RADIO TEST REPORT

Test Report No. : 10008022H-A-R1

Applicant	:	**Sony Computer Entertainment Inc.**
Type of Equipment	:	**Wireless Controller**
Model No.	:	**CUH-ZCT1U**
FCC ID	:	**AK8CUHZCT1**
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.
6. This report is a revised version of 10008022H-A. 10008022H-A is replaced with this report.

Date of test: April 15 to 17, 2013

Representative test engineer:
Takumi Shimada
Engineer of WiSE Japan,
UL Verification Service

Approved by:
Masanori Nishiyama
Manager of WiSE Japan,
UL Verification Service

NVLAP LAB CODE: 200572-0

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

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REVISION HISTORY

Original Test Report No.: 10008022H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10008022H-A	May 16, 2013	-	-
1	10008022H-A-R1	May 21, 2013	5	Changed detector for worst margin of "Spurious Emission & Band Edge Compliance" from PK to AV in the table

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SECTION 1: Customer information

Company Name	Sony Computer Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-3-6748-6333
Facsimile Number	+81-3-6748-6383
Contact Person	Kiyoto Sasaki

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

2.1 Identification of E.U.T.

Type of Equipment	Wireless Controller
Model No	CUH-ZCT1U
Serial No	See Clause 4.2
Country of Manufacture	China
Receipt Date of Sample	April 11, 2013
Condition of EUT	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	No modification by the test lab.

2.2 Product Description

Model No: CUH-ZCT1U is the Wireless Controller for game machine.

Product Specification

Maximum clock frequency in the system	96MHz
Operating Temperature	5-35 deg. C
Power Supply	DC5V (USB Bus Power)
Battery Supply	DC3.7V
Size	161.2 x 100.3 x 64.5 mm
Weight	210 g

Radio Specification: Bluetooth (Ver. 2.1+EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, π/4DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Method of frequency generation	Crystal
Power Supply (inner)	DC3.2V
Antenna Type	PWB Pattern Antenna
Antenna Gain	1.0dBi max

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	Test specification: FCC Part 15 Subpart C: 2012, final revised on December 27, 2012 and effective January 28, 2013
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

*The EUT complies with FCC Part 15 Subpart B: 2012, final revised on December 27, 2012 and effective January 28, 2013

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.4:2003 7. AC powerline conducted emission measurements **IC:** RSS-Gen 7.2.4	**FCC:** Section 15.207 **IC:** RSS-Gen 7.2.4	[QP] 22.9dB, 0.15317MHz, N [AV] 22.1dB, 0.56378MHz, L	Complied	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-210 A8.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-210 A8.1 (a)		-	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	5.3dB 7206.000MHz, Horizontal, AV	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 (DC3.2V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 4.6.1	**IC:** RSS-Gen 4.6.1	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Conducted emission (±dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(±dB)				(1m*)(±dB)		(0.5m*)(±dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

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

Power meter (±dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (±dB)			Antenna terminal conducted emission (±dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

Conducted Emission test
The data listed in this test report has enough margin, more than the site margin.

Radiated emission test(3m)
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

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

	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
20dB Bandwidth Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *EUT has the power settings by the software as follows; Power settings: 8dBm Software: BtUART v2.0 *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.		

4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

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

Detector	**: QP and CISPR AV**
Measurement range	**: 0.15-30MHz**
Test data	**: APPENDIX**
Test result	**: Pass**

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

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5 (IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m *2) (above 10GHz)		3m (below 10GHz), 1m *2) (above 10GHz)

*1) Although 00-705 accepts VBW=10Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB

- 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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	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 *2)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	10MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) The measurement was performed with Max Hold since the duty cycle was not 100%.
*2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

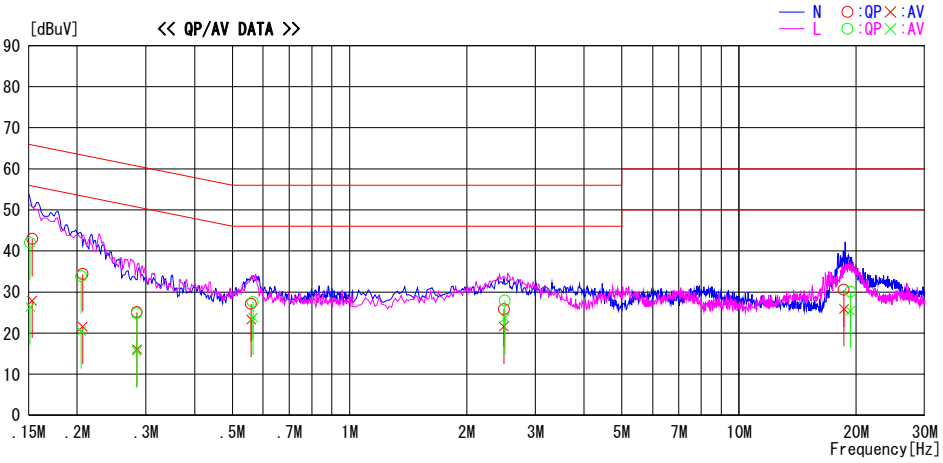
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2013/04/17

Report No. : 10008022H

Temp./Humi. : 25deg.C / 41% RH
Engineer : Takumi Shimada

Mode / Remarks : Tx DH5 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



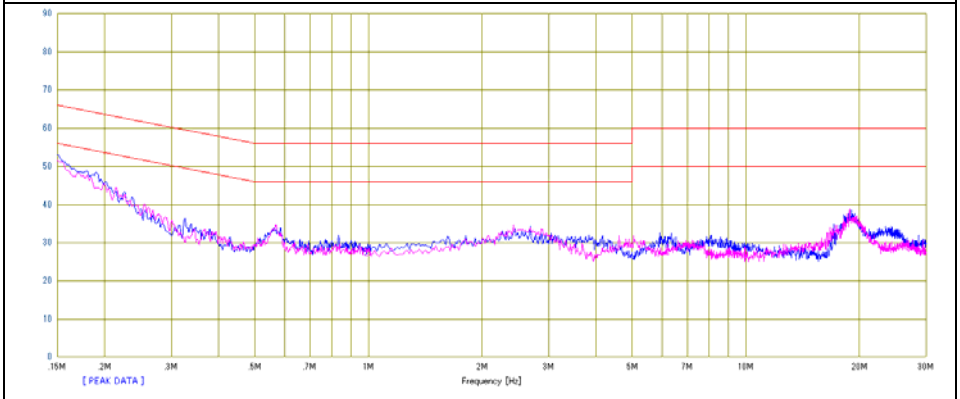
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15317	29.7	14.7	13.2	42.9	27.9	65.8	55.8	22.9	27.9	N	
0.20639	21.2	8.4	13.2	34.4	21.6	63.3	53.3	28.9	31.7	N	
0.28461	11.8	2.8	13.3	25.1	16.1	60.7	50.7	35.6	34.6	N	
0.55868	13.8	10.0	13.3	27.1	23.3	56.0	46.0	28.9	22.7	N	
2.49336	12.3	8.1	13.5	25.8	21.6	56.0	46.0	30.2	24.4	N	
18.59960	15.8	11.1	14.8	30.6	25.9	60.0	50.0	29.4	24.1	N	
0.15132	28.8	13.1	13.2	42.0	26.3	65.9	55.9	23.9	29.6	L	
0.20473	20.6	7.3	13.2	33.8	20.5	63.4	53.4	29.6	32.9	L	
0.28426	11.5	2.4	13.3	24.8	15.7	60.7	50.7	35.9	35.0	L	
0.56544	14.3	10.5	13.3	27.6	23.8	56.0	46.0	28.4	22.2	L	
2.50448	14.4	10.2	13.5	27.9	23.7	56.0	46.0	28.1	22.3	L	
19.31920	15.3	10.6	14.8	30.1	25.4	60.0	50.0	29.9	24.6	L	

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

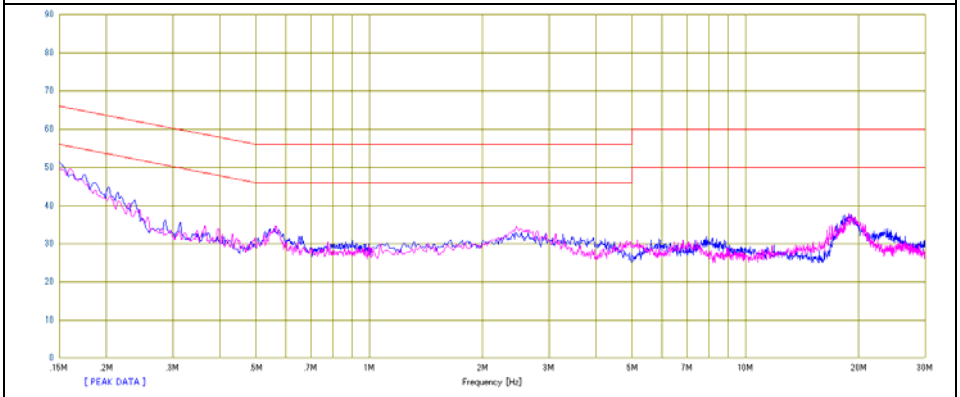
Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/17/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Takumi Shimada
Mode	Tx DH5

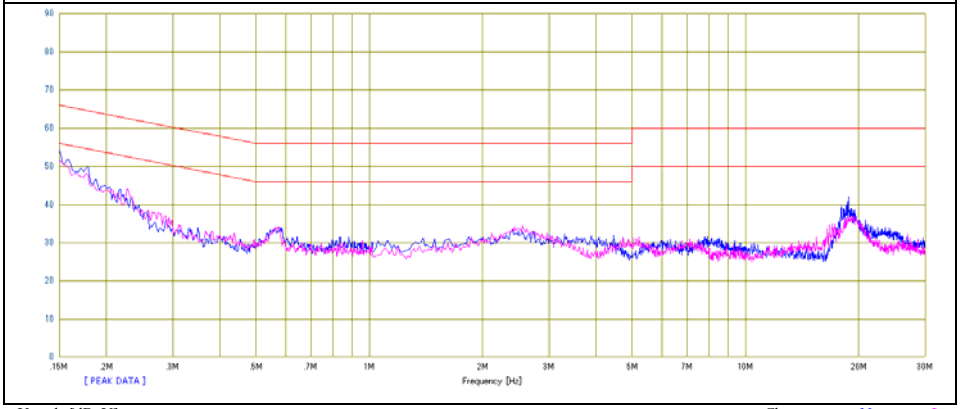
2402MHz



2441MHz



2480MHz



Y scale [dBuV] Chart — N — L

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

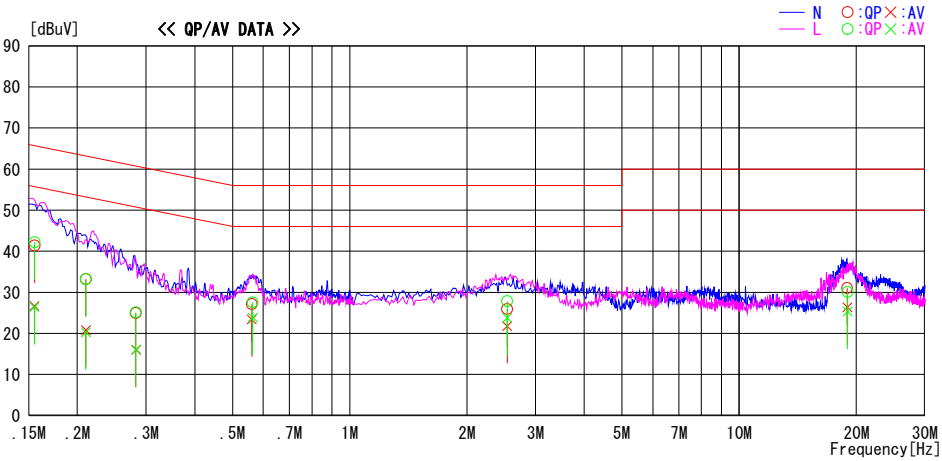
UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2013/04/17

Report No. : 10008022H

Temp./Humi. : 25deg.C / 41% RH
Engineer : Takumi Shimada

Mode / Remarks : Tx 3DH5 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



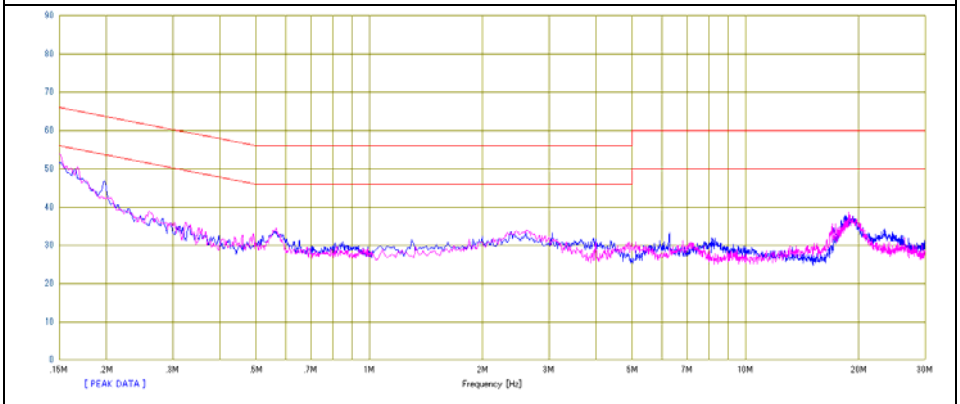
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15530	28.2	13.5	13.2	41.4	26.7	65.7	55.7	24.3	29.0	N	
0.21035	20.0	7.6	13.2	33.2	20.8	63.2	53.2	30.0	32.4	N	
0.28273	11.6	2.7	13.3	24.9	16.0	60.7	50.7	35.8	34.7	N	
0.56112	13.8	10.1	13.3	27.1	23.4	56.0	46.0	28.9	22.6	N	
2.53585	12.4	8.3	13.5	25.9	21.8	56.0	46.0	30.1	24.2	N	
18.96660	16.2	11.5	14.8	31.0	26.3	60.0	50.0	29.0	23.7	N	
0.15531	29.0	13.2	13.2	42.2	26.4	65.7	55.7	23.5	29.3	L	
0.21035	20.0	7.0	13.2	33.2	20.2	63.2	53.2	30.0	33.0	L	
0.28272	11.8	2.8	13.3	25.1	16.1	60.7	50.7	35.6	34.6	L	
0.56378	14.3	10.6	13.3	27.6	23.9	56.0	46.0	28.4	22.1	L	
2.53580	14.3	10.3	13.5	27.8	23.8	56.0	46.0	28.2	22.2	L	
19.00540	15.3	10.5	14.8	30.1	25.3	60.0	50.0	29.9	24.7	L	

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

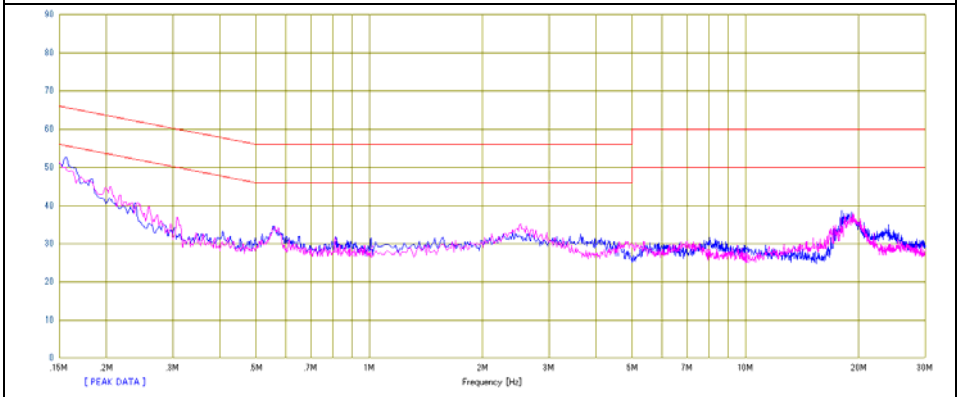
Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/17/2013
Temperature/ Humidity	25 deg. C / 41% RH
Engineer	Takumi Shimada
Mode	Tx 3DH5

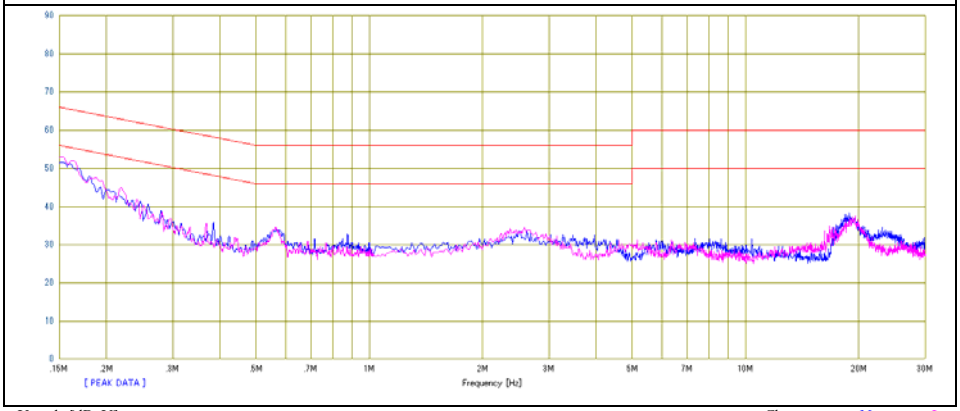
2402MHz



2441MHz



2480MHz



Y scale [dBuV] Chart — N — L

UL Japan, Inc.
Head Office EMC Lab.
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20dB Bandwidth and Carrier Frequency Separation

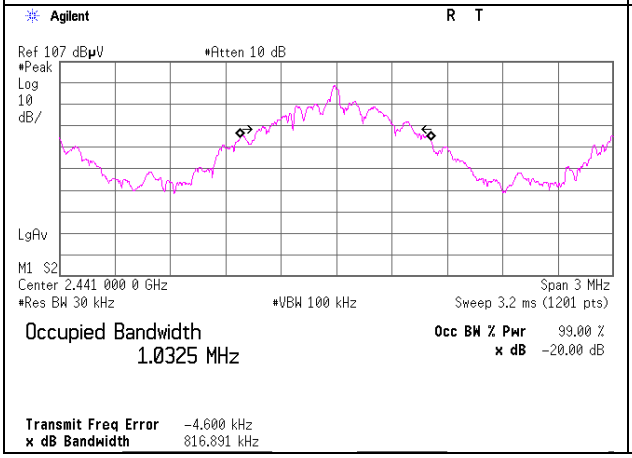
Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	10008022H
Date	04/15/2013
Temperature/ Humidity	25 deg. C / 48% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.946	1.000	>= 0.630
DH5	2441.0	0.945	1.000	>= 0.630
DH5	2480.0	0.943	1.000	>= 0.629
3DH5	2402.0	1.295	1.000	>= 0.863
3DH5	2441.0	1.298	1.000	>= 0.865
3DH5	2480.0	1.296	1.000	>= 0.864
Inquiry	2441.0	0.817	2.000	>= 0.545

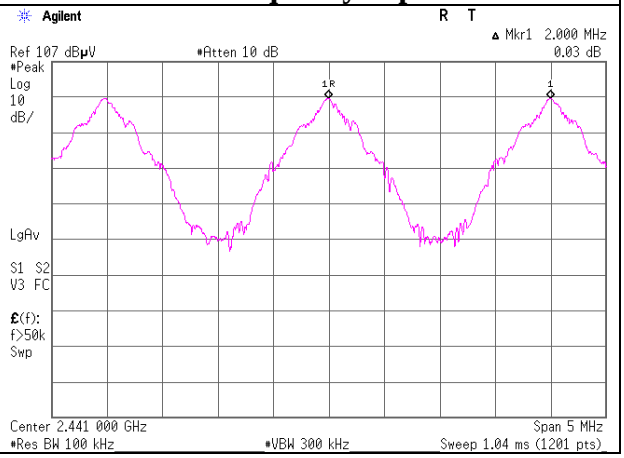
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

Inquiry

20dB Bandwidth



Carrier Frequency Separation

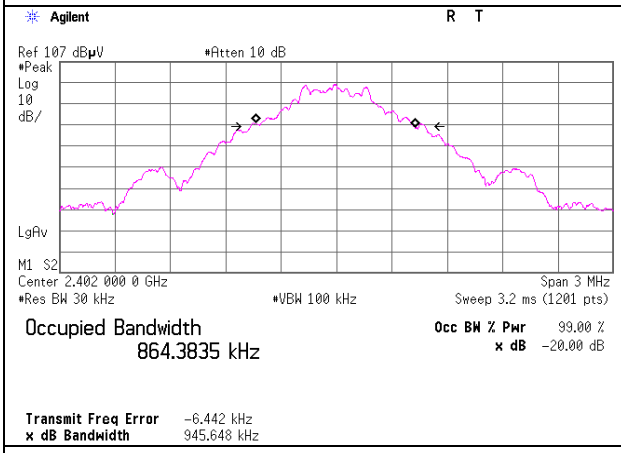


20dB Bandwidth and Carrier Frequency Separation

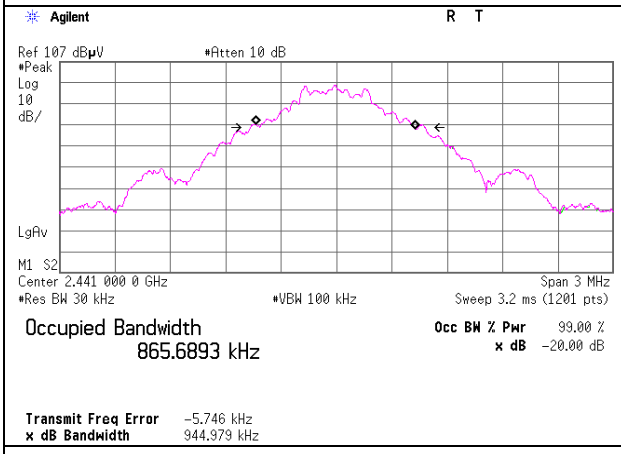
Tx DH5

20dB Bandwidth

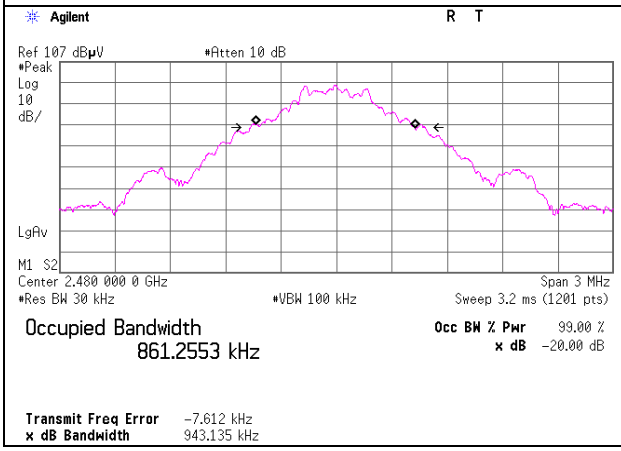
2402MHz



2441MHz

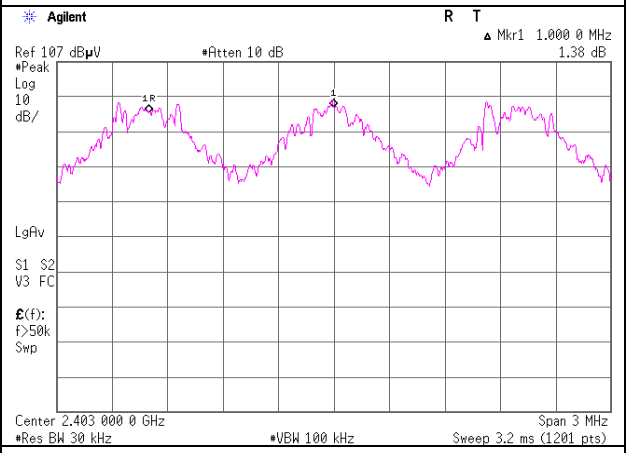


2480MHz

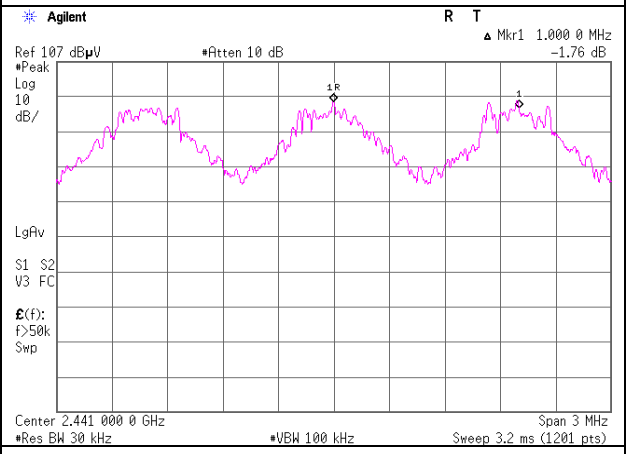


Carrier Frequency Separation

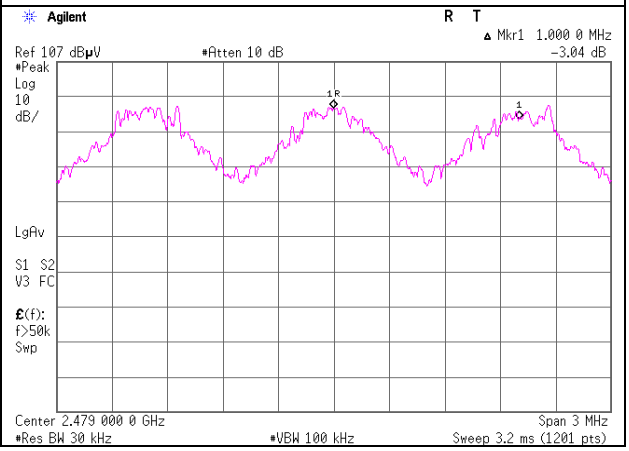
2402MHz



2441MHz



2480MHz

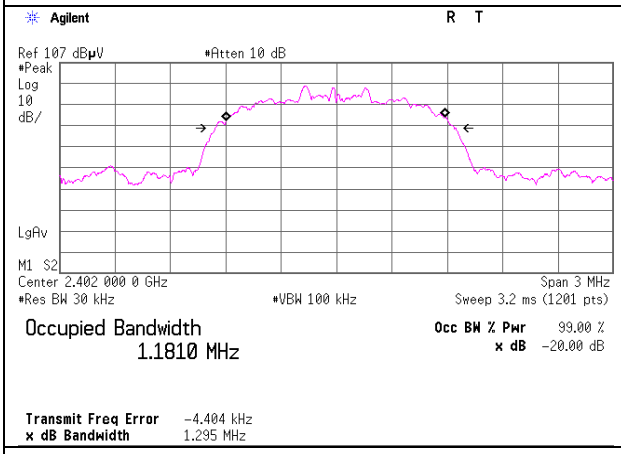


20dB Bandwidth and Carrier Frequency Separation

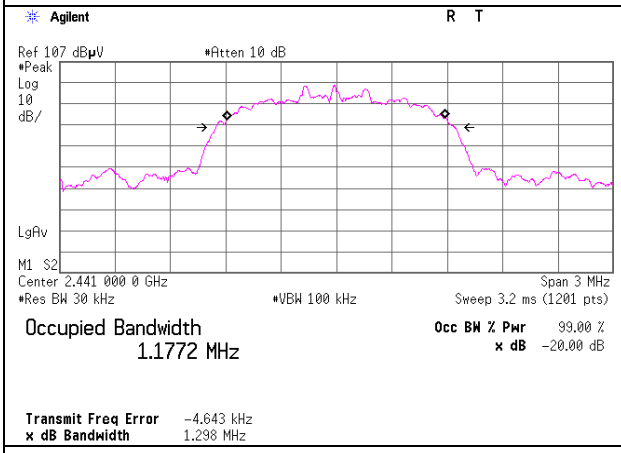
Tx 3DH5

20dB Bandwidth

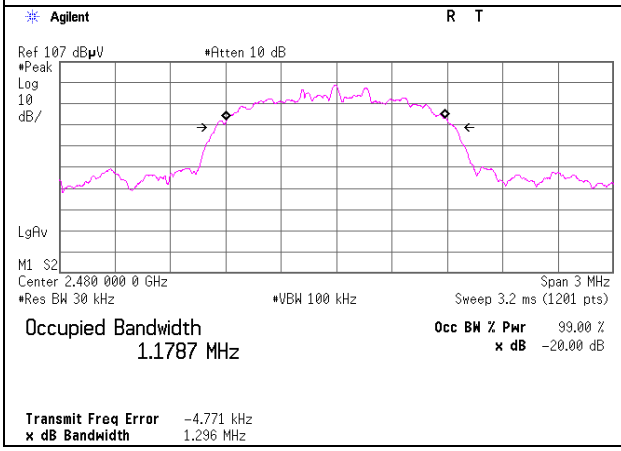
2402MHz



2441MHz

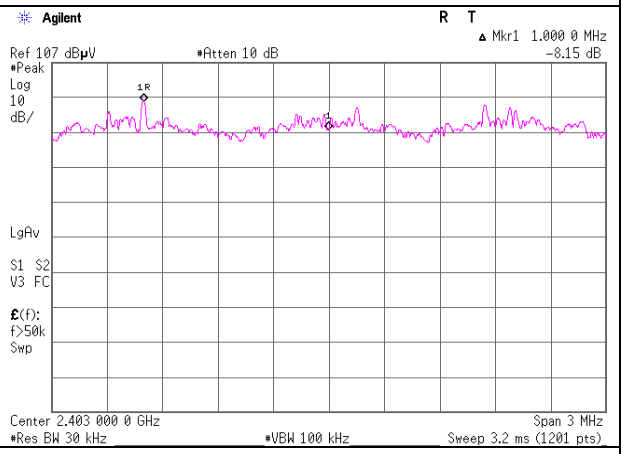


2480MHz

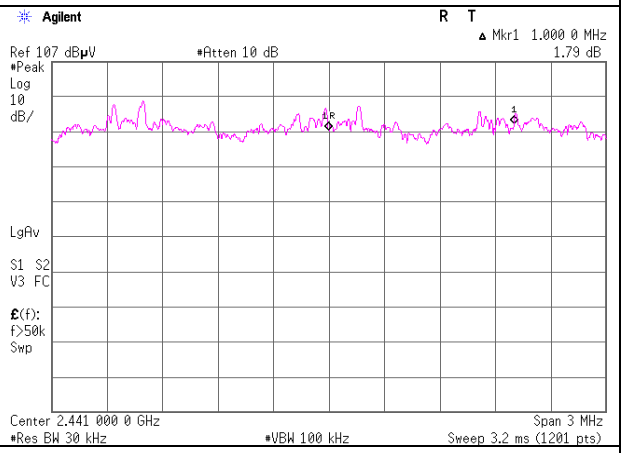


Carrier Frequency Separation

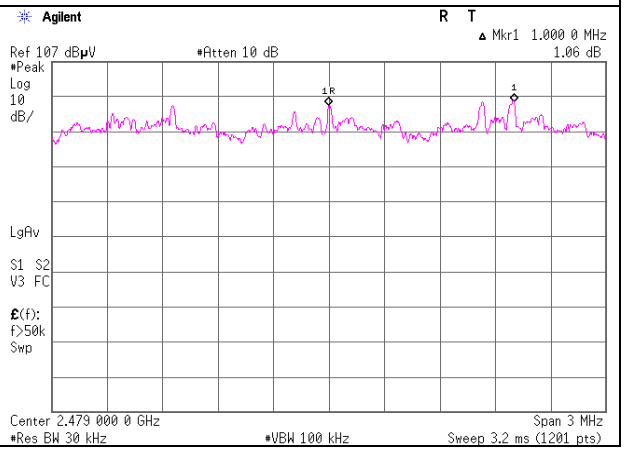
2402MHz



2441MHz



2480MHz



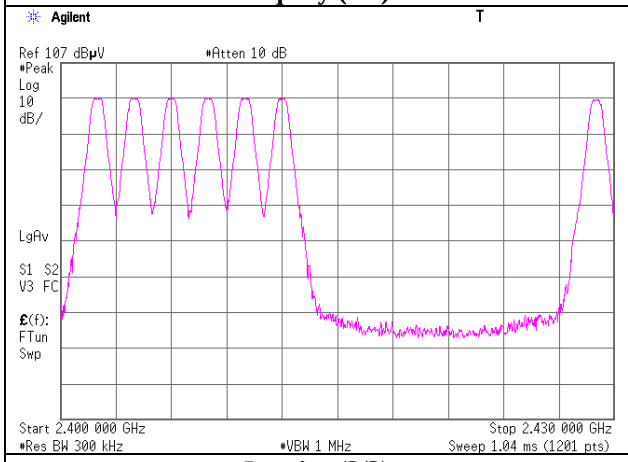
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	10008022H
Date	04/15/2013
Temperature/ Humidity	25 deg. C / 48% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

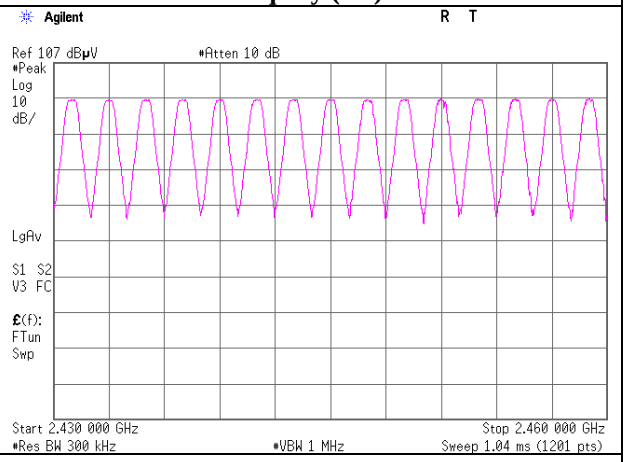
Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

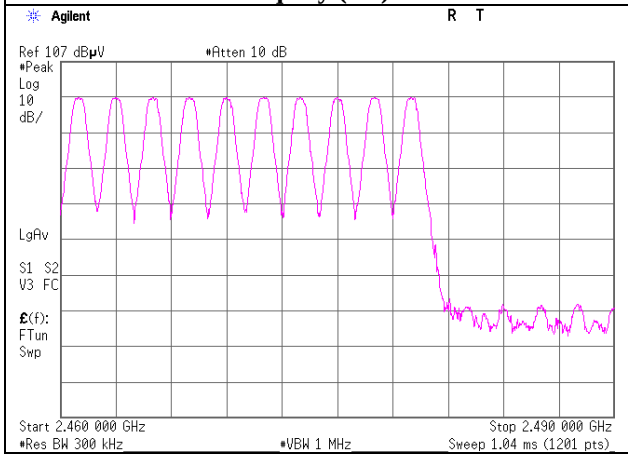
Inquiry (1/3)



Inquiry (2/3)



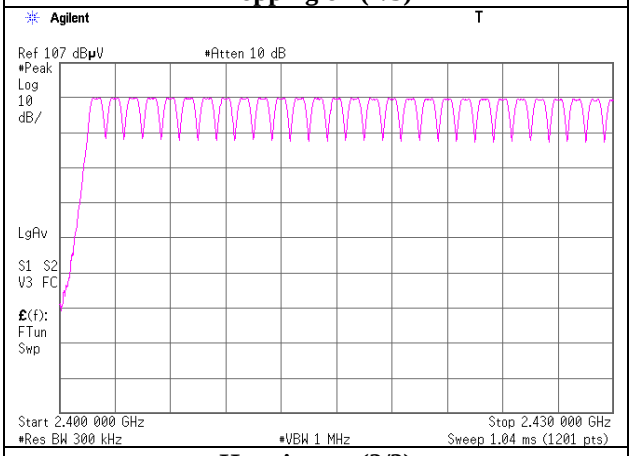
Inquiry (3/3)



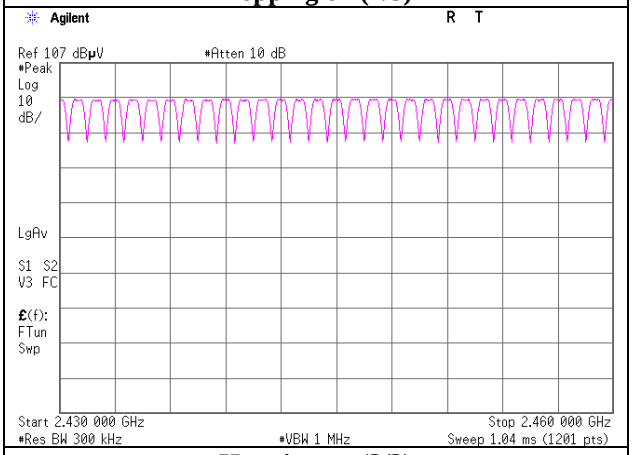
Number of Hopping Frequency

Tx DH5

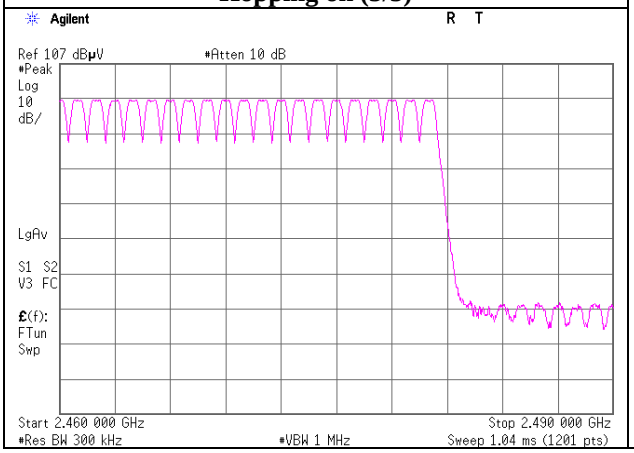
Hopping on (1/3)



Hopping on (2/3)

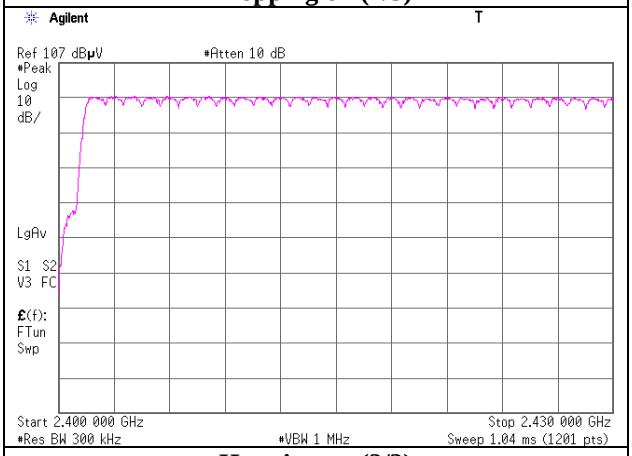


Hopping on (3/3)

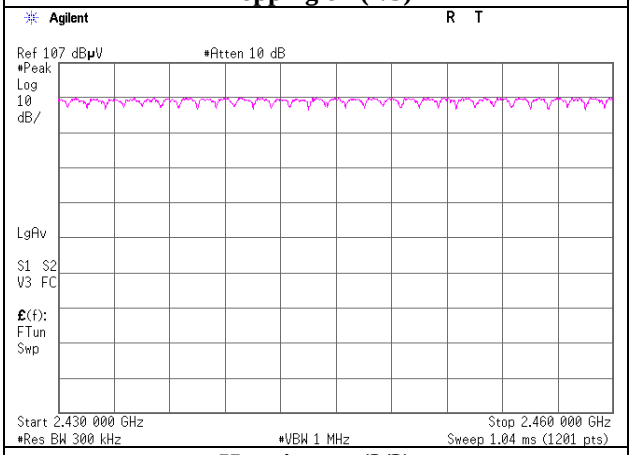


Tx 3DH5

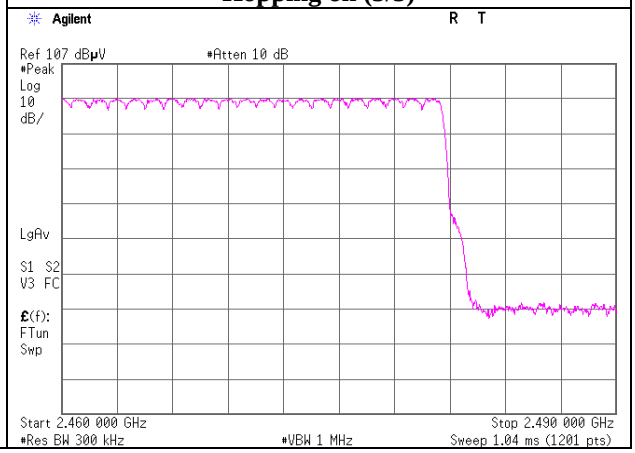
Hopping on (1/3)



Hopping on (2/3)



Hopping on (3/3)



Dwell time

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	10008022H
Date	04/15/2013
Temperature/ Humidity	25 deg. C / 48% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	49.2 times / 5 sec. x 31.6 sec. = 311 times	0.405	126	400
DH3	25.8 times / 5 sec. x 31.6 sec. = 164 times	1.677	275	400
DH5	17.8 times / 5 sec. x 31.6 sec. = 113 times	2.919	330	400
3DH1	50.4 times / 5 sec. x 31.6 sec. = 319 times	0.412	131	400
3DH3	23.8 times / 5 sec. x 31.6 sec. = 151 times	1.675	253	400
3DH5	17.6 times / 5 sec. x 31.6 sec. = 112 times	2.936	329	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 transmition time

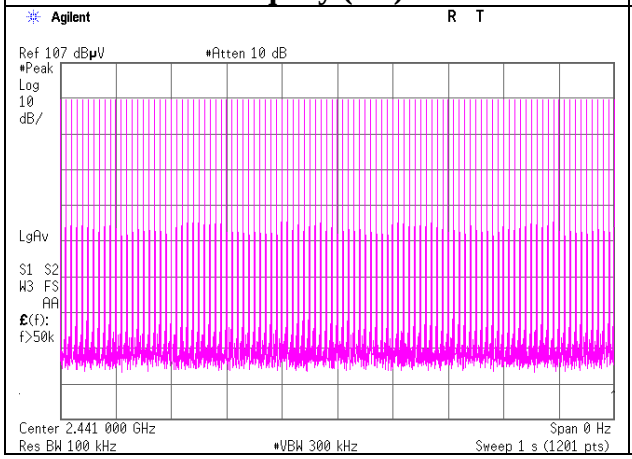
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	50	48	50	47	49.2
DH3	28	24	28	25	24	25.8
DH5	15	20	19	20	15	17.8
3DH1	50	51	50	50	51	50.4
3DH3	25	24	24	22	24	23.8
3DH5	15	19	18	19	17	17.6

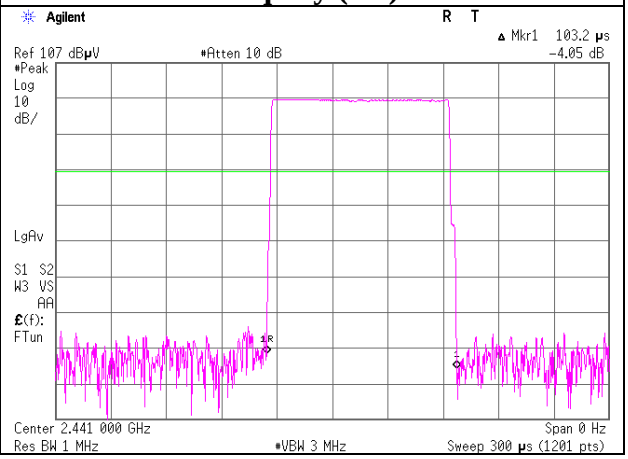
Sample Calculation
Average= Summation(Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for N=79.

Inquiry (1/2)

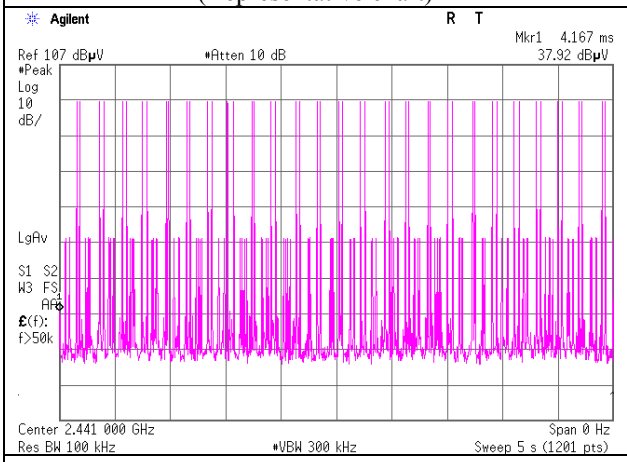


Inquiry (2/2)

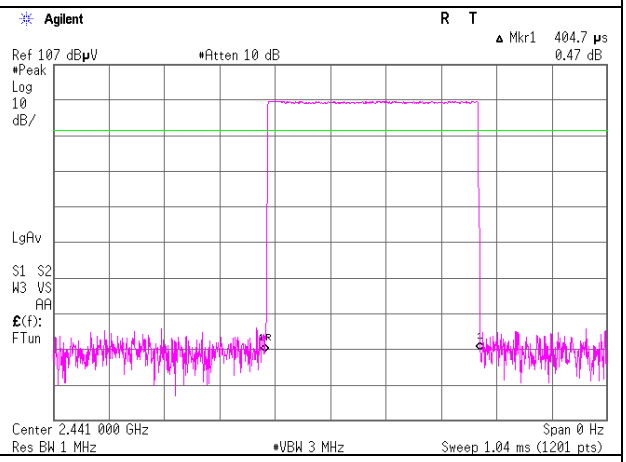


Dwell time

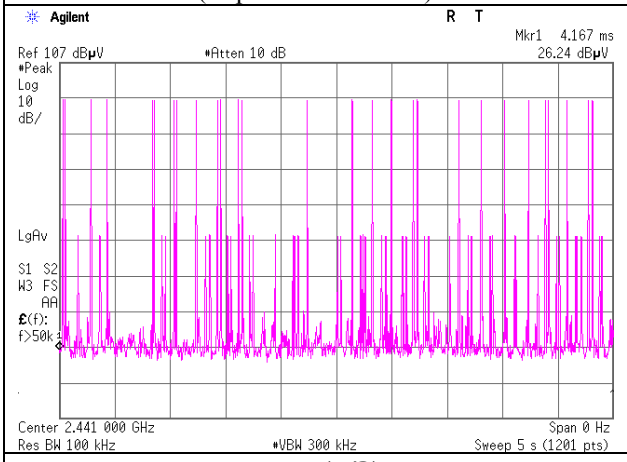
DH1 (1/2)
(Representative chart)



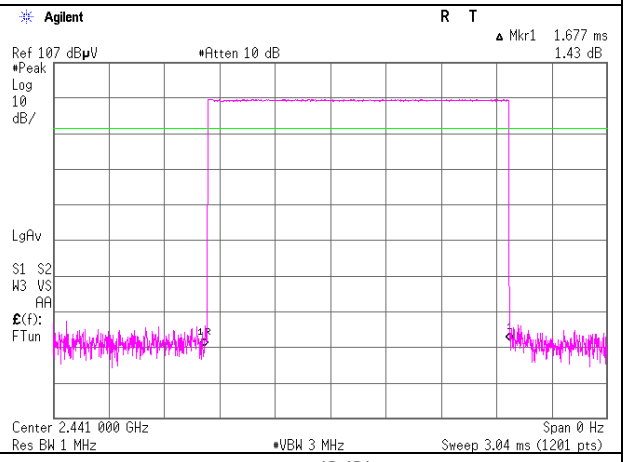
DH1 (2/2)



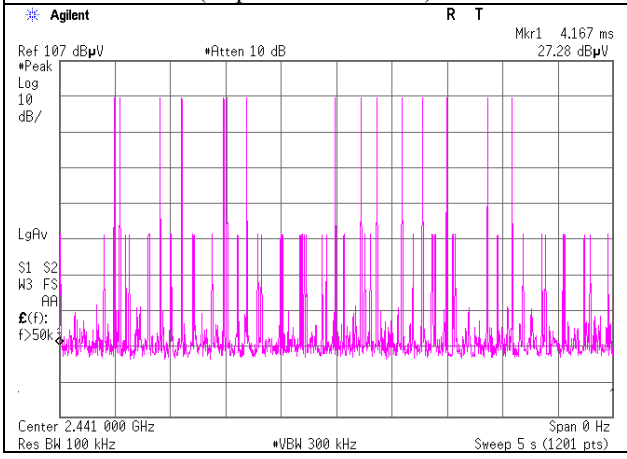
DH3 (1/2)
(Representative chart)



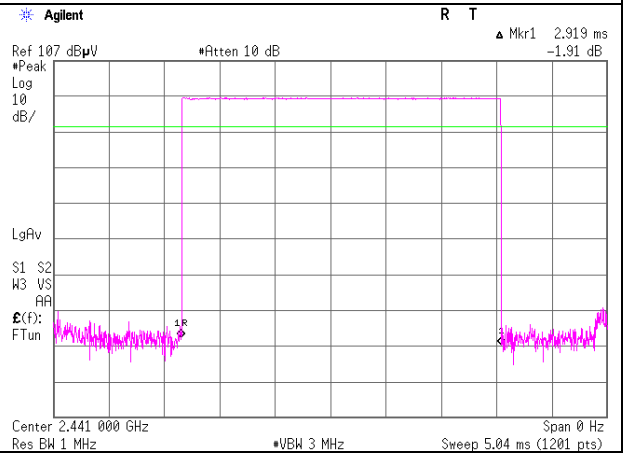
DH3 (2/2)



DH5 (1/2)
(Representative chart)

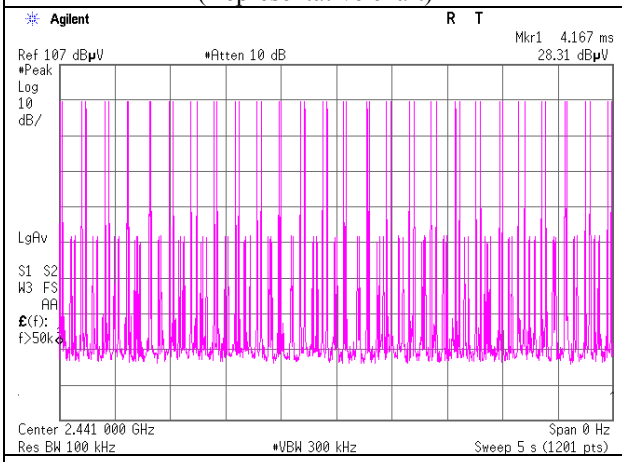


DH5 (2/2)

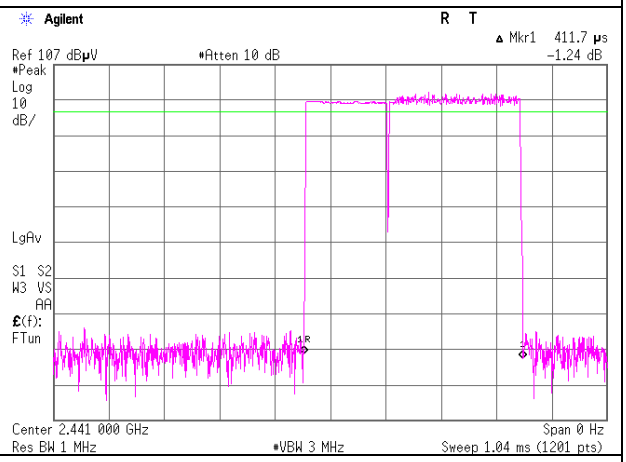


Dwell time

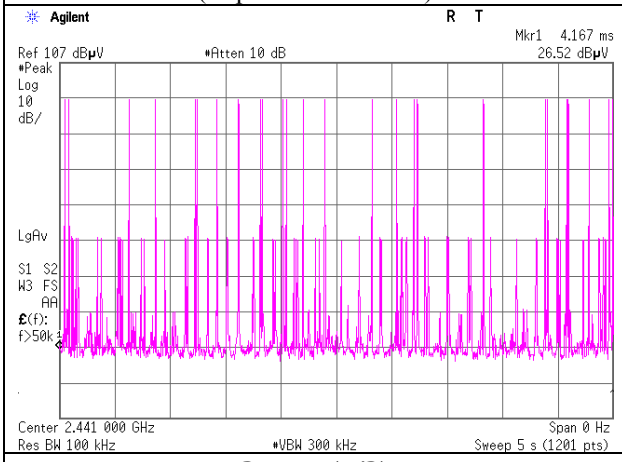
3DH1 (1/2)
(Representative chart)



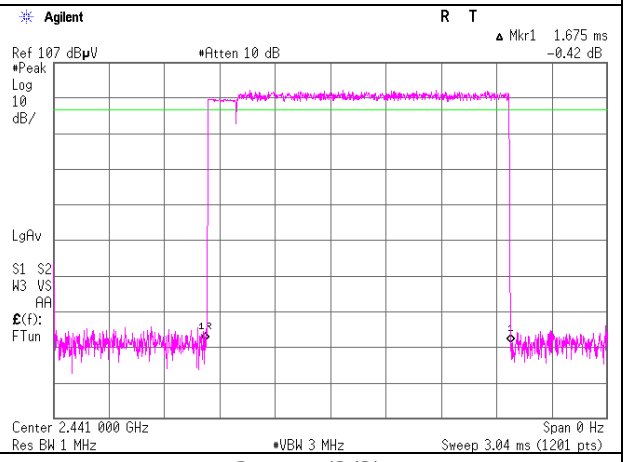
3DH1 (2/2)



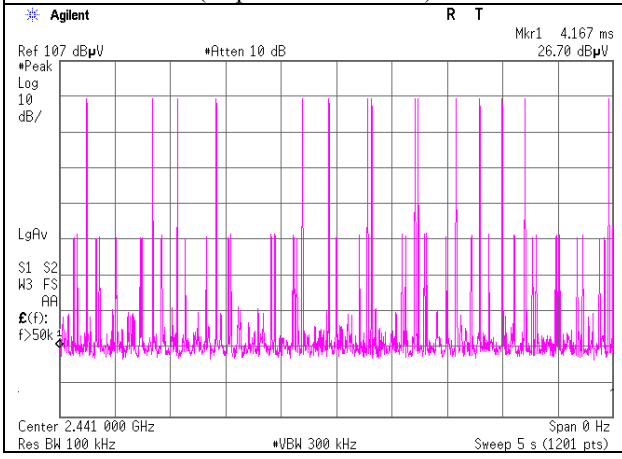
3DH3 (1/2)
(Representative chart)



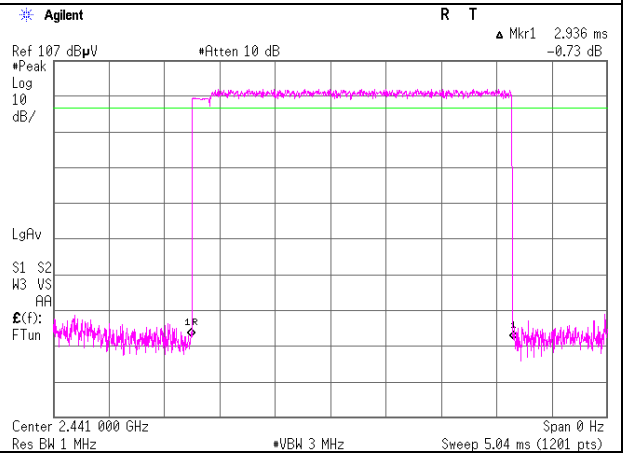
3DH3 (2/2)



3DH5 (1/2)
(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.3 Measurement Room
Report No.	10008022H
Date	04/15/2013
Temperature/ Humidity	25 deg. C / 48% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping off) DH5/3DH5/Inquiry

Mode	Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-10.00	0.80	9.95	0.75	1.19	20.97	125	20.22
DH5	2441.0	-10.43	0.80	9.95	0.32	1.08	20.97	125	20.65
DH5	2480.0	-10.27	0.80	9.95	0.48	1.12	20.97	125	20.49
3DH5	2402.0	-7.27	0.80	9.95	3.48	2.23	20.97	125	17.49
3DH5	2441.0	-7.61	0.80	9.95	3.14	2.06	20.97	125	17.83
3DH5	2480.0	-7.40	0.80	9.95	3.35	2.16	20.97	125	17.62
Inquiry	2441.0	-9.91	0.80	9.95	0.84	1.21	20.97	125	20.13

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

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10008022H
Date 04/16/2013
Temperature/ Humidity 24 deg. C / 46% RH
Engineer Takumi Shimada
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	48.061	QP	36.4	11.4	7.3	32.1	23.0	40.0	17.0	
Hori	84.110	QP	48.0	7.2	7.8	32.2	30.8	40.0	9.2	
Hori	96.113	QP	45.2	9.3	8.0	32.1	30.4	43.5	13.1	
Hori	120.011	QP	35.5	13.0	8.3	32.1	24.7	43.5	18.8	
Hori	276.974	QP	29.9	18.8	9.7	32.0	26.4	46.0	19.6	
Hori	360.013	QP	29.2	16.3	10.3	32.0	23.8	46.0	22.2	
Hori	2246.000	PK	45.0	26.9	2.2	32.4	41.7	73.9	32.2	
Hori	2390.000	PK	44.2	27.4	2.3	32.4	41.5	73.9	32.4	
Hori	4804.000	PK	41.9	31.6	4.8	31.4	46.9	73.9	27.1	
Hori	7206.000	PK	47.3	36.3	5.6	32.3	56.9	73.9	17.0	
Hori	9608.000	PK	43.4	38.1	6.4	33.0	54.9	73.9	19.0	
Hori	2246.000	AV	35.3	26.9	2.2	32.4	32.0	53.9	21.9	
Hori	2390.000	AV	30.6	27.4	2.3	32.4	27.9	53.9	26.0	
Hori	4804.000	AV	28.5	31.6	4.8	31.4	33.5	53.9	20.4	
Hori	7206.000	AV	37.2	36.3	5.6	32.3	46.8	53.9	7.1	
Hori	9608.000	AV	31.9	38.1	6.4	33.0	43.4	53.9	10.5	
Vert	48.065	QP	46.5	11.4	7.3	32.1	33.1	40.0	6.9	
Vert	84.100	QP	40.5	7.2	7.8	32.2	23.3	40.0	16.7	
Vert	96.122	QP	43.0	9.4	8.0	32.1	28.3	43.5	15.2	
Vert	120.006	QP	37.8	13.0	8.3	32.1	27.0	43.5	16.5	
Vert	276.970	QP	33.2	18.8	9.7	32.0	29.7	46.0	16.3	
Vert	360.013	QP	27.0	16.3	10.3	32.0	21.6	46.0	24.4	
Vert	2246.004	PK	52.8	26.9	2.2	32.4	49.5	73.9	24.4	
Vert	2390.000	PK	43.3	27.4	2.3	32.4	40.6	73.9	33.3	
Vert	4804.000	PK	39.8	31.6	4.8	31.4	44.8	73.9	29.1	
Vert	7206.000	PK	46.0	36.3	5.6	32.3	55.6	73.9	18.3	
Vert	9608.000	PK	43.6	38.1	6.4	33.0	55.1	73.9	18.8	
Vert	2246.004	AV	34.7	26.9	2.2	32.4	31.4	53.9	22.5	
Vert	2390.000	AV	30.3	27.4	2.3	32.4	27.6	53.9	26.3	
Vert	4804.000	AV	28.3	31.6	4.8	31.4	33.3	53.9	20.6	
Vert	7206.000	AV	37.5	36.3	5.6	32.3	47.1	53.9	6.8	
Vert	9608.000	AV	32.3	38.1	6.4	33.0	43.8	53.9	10.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	Tx, DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	99.4	27.4	2.3	32.4	96.7	-	-	Carrier
Hori	2400.000	PK	47.4	27.4	2.3	32.4	44.7	76.7	32.0	
Hori	2558.000	PK	45.5	27.9	2.4	32.3	43.5	76.7	33.2	
Vert	2402.000	PK	96.7	27.4	2.3	32.4	94.0	-	-	Carrier
Vert	2400.000	PK	45.2	27.4	2.3	32.4	42.5	74.0	31.5	
Vert	2558.051	PK	43.4	27.9	2.4	32.3	41.4	74.0	32.6	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
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	48.063	QP	36.5	11.4	7.3	32.1	23.1	40.0	16.9	
Hori	84.105	QP	48.2	7.2	7.8	32.2	31.0	40.0	9.0	
Hori	96.120	QP	44.8	9.4	8.0	32.1	30.1	43.5	13.4	
Hori	120.014	QP	35.2	13.0	8.3	32.1	24.4	43.5	19.1	
Hori	276.972	QP	30.0	18.8	9.7	32.0	26.5	46.0	19.5	
Hori	360.014	QP	29.3	16.3	10.3	32.0	23.9	46.0	22.1	
Hori	2337.000	PK	44.2	27.2	2.2	32.4	41.2	73.9	32.7	
Hori	4882.000	PK	41.3	31.9	4.7	31.4	46.5	73.9	27.5	
Hori	7323.000	PK	45.5	36.5	5.6	32.4	55.2	73.9	18.7	
Hori	9764.000	PK	43.4	38.3	6.4	33.0	55.1	73.9	18.8	
Hori	2337.000	AV	32.0	27.2	2.2	32.4	29.0	53.9	24.9	
Hori	4882.000	AV	28.8	31.9	4.7	31.4	34.0	53.9	20.0	
Hori	7323.000	AV	34.6	36.5	5.6	32.4	44.3	53.9	9.6	
Hori	9764.000	AV	32.1	38.3	6.4	33.0	43.8	53.9	10.1	
Vert	48.061	QP	46.2	11.4	7.3	32.1	32.8	40.0	7.2	
Vert	84.103	QP	40.3	7.2	7.8	32.2	23.1	40.0	16.9	
Vert	96.122	QP	43.2	9.4	8.0	32.1	28.5	43.5	15.0	
Vert	120.011	QP	37.6	13.0	8.3	32.1	26.8	43.5	16.7	
Vert	276.970	QP	33.1	18.8	9.7	32.0	29.6	46.0	16.4	
Vert	360.014	QP	27.1	16.3	10.3	32.0	21.7	46.0	24.3	
Vert	2337.000	PK	41.9	27.2	2.2	32.4	38.9	73.9	35.0	
Vert	4882.000	PK	41.1	31.9	4.7	31.4	46.3	73.9	27.6	
Vert	7323.000	PK	45.0	36.5	5.6	32.4	54.7	73.9	19.2	
Vert	9764.000	PK	43.9	38.3	6.4	33.0	55.6	73.9	18.3	
Vert	2337.000	AV	30.0	27.2	2.2	32.4	27.0	53.9	26.9	
Vert	4882.000	AV	29.8	31.9	4.7	31.4	35.0	53.9	18.9	
Vert	7323.000	AV	35.2	36.5	5.6	32.4	44.9	53.9	9.0	
Vert	9764.000	AV	32.7	38.3	6.4	33.0	44.4	53.9	9.5	

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).

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	Tx, DH5 2441MHz

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	2441.000	PK	98.9	27.6	2.3	32.3	96.5	-	-	Carrier
Hori	2597.000	PK	40.9	28.1	2.4	32.3	39.1	76.5	37.4	
Vert	2441.000	PK	96.6	27.6	2.3	32.3	94.2	-	-	Carrier
Vert	2597.000	PK	41.7	28.1	2.4	32.3	39.9	74.2	34.3	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10008022H
Date 04/16/2013
Temperature/ Humidity 24 deg. C / 46% RH
Engineer Takumi Shimada
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	48.064	QP	36.1	11.4	7.3	32.1	22.7	40.0	17.3	
Hori	84.110	QP	48.3	7.2	7.8	32.2	31.1	40.0	8.9	
Hori	96.121	QP	45.0	9.4	8.0	32.1	30.3	43.5	13.2	
Hori	120.009	QP	35.4	13.0	8.3	32.1	24.6	43.5	18.9	
Hori	276.972	QP	30.1	18.8	9.7	32.0	26.6	46.0	19.4	
Hori	360.014	QP	29.1	16.3	10.3	32.0	23.7	46.0	22.3	
Hori	2324.000	PK	44.1	27.2	2.2	32.4	41.1	73.9	32.8	
Hori	2483.500	PK	54.4	27.7	2.3	32.3	52.1	73.9	21.8	
Hori	4960.000	PK	40.9	32.2	4.7	31.4	46.4	73.9	27.6	
Hori	7440.000	PK	45.5	36.7	5.6	32.4	55.4	73.9	18.5	
Hori	9920.000	PK	43.3	38.6	6.4	33.1	55.2	73.9	18.7	
Hori	2324.000	AV	34.4	27.2	2.2	32.4	31.4	53.9	22.5	
Hori	2483.500	AV	34.3	27.7	2.3	32.3	32.0	53.9	21.9	
Hori	4960.000	AV	29.5	32.2	4.7	31.4	35.0	53.9	18.9	
Hori	7440.000	AV	34.3	36.7	5.6	32.4	44.2	53.9	9.7	
Hori	9920.000	AV	32.8	38.6	6.4	33.1	44.7	53.9	9.2	
Vert	48.063	QP	46.2	11.4	7.3	32.1	32.8	40.0	7.2	
Vert	84.112	QP	40.2	7.2	7.8	32.2	23.0	40.0	17.0	
Vert	96.121	QP	42.8	9.4	8.0	32.1	28.1	43.5	15.4	
Vert	120.007	QP	37.5	13.0	8.3	32.1	26.7	43.5	16.8	
Vert	276.972	QP	44.0	18.8	9.7	32.0	40.5	46.0	5.5	
Vert	360.013	QP	26.8	16.3	10.3	32.0	21.4	46.0	24.6	
Vert	2324.000	PK	49.7	27.2	2.2	32.4	46.7	73.9	27.3	
Vert	2483.500	PK	52.7	27.7	2.3	32.3	50.4	73.9	23.5	
Vert	4960.000	PK	40.0	32.2	4.7	31.4	45.5	73.9	28.4	
Vert	7440.000	PK	44.6	36.7	5.6	32.4	54.5	73.9	19.4	
Vert	9920.000	PK	42.4	38.6	6.4	33.1	54.3	73.9	19.6	
Vert	2324.000	AV	33.1	27.2	2.2	32.4	30.1	53.9	23.8	
Vert	2483.500	AV	32.8	27.7	2.3	32.3	30.5	53.9	23.4	
Vert	4960.000	AV	28.8	32.2	4.7	31.4	34.3	53.9	19.6	
Vert	7440.000	AV	33.1	36.7	5.6	32.4	43.0	53.9	10.9	
Vert	9920.000	AV	31.2	38.6	6.4	33.1	43.1	53.9	10.8	

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).

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	Tx, DH5 2480MHz

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	2480.000	PK	99.1	27.7	2.3	32.3	96.8	-	-	Carrier
Hori	2610.000	PK	38.9	28.1	2.4	32.3	37.1	76.8	39.7	
Vert	2480.000	PK	97.1	27.7	2.3	32.3	94.8	-	-	Carrier
Vert	2610.000	PK	36.8	28.1	2.4	32.3	35.0	74.8	39.8	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10008022H
Date 04/16/2013
Temperature/ Humidity 24 deg. C / 46% RH
Engineer Takumi Shimada
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	48.060	QP	36.7	11.4	7.3	32.1	23.3	40.0	16.7	
Hori	84.101	QP	47.7	7.2	7.8	32.2	30.5	40.0	9.5	
Hori	96.111	QP	45.2	9.3	8.0	32.1	30.4	43.5	13.1	
Hori	120.009	QP	35.6	13.0	8.3	32.1	24.8	43.5	18.7	
Hori	276.971	QP	29.7	18.8	9.7	32.0	26.2	46.0	19.8	
Hori	360.012	QP	28.9	16.3	10.3	32.0	23.5	46.0	22.5	
Hori	2246.000	PK	44.8	26.9	2.2	32.4	41.5	73.9	32.4	
Hori	2390.000	PK	44.3	27.4	2.3	32.4	41.6	73.9	32.3	
Hori	4804.000	PK	41.4	31.6	4.8	31.4	46.4	73.9	27.5	
Hori	7206.000	PK	49.7	36.3	5.6	32.3	59.3	73.9	14.6	
Hori	9608.000	PK	45.1	38.1	6.4	33.0	56.6	73.9	17.3	
Hori	2246.000	AV	34.8	26.9	2.2	32.4	31.5	53.9	22.4	
Hori	2390.000	AV	31.1	27.4	2.3	32.4	28.4	53.9	25.5	
Hori	4804.000	AV	29.3	31.6	4.8	31.4	34.3	53.9	19.6	
Hori	7206.000	AV	39.0	36.3	5.6	32.3	48.6	53.9	5.3	
Hori	9608.000	AV	33.3	38.1	6.4	33.0	44.8	53.9	9.1	
Vert	48.064	QP	46.2	11.4	7.3	32.1	32.8	40.0	7.2	
Vert	84.103	QP	40.1	7.2	7.8	32.2	22.9	40.0	17.1	
Vert	96.118	QP	43.2	9.3	8.0	32.1	28.4	43.5	15.1	
Vert	120.007	QP	37.5	13.0	8.3	32.1	26.7	43.5	16.8	
Vert	276.970	QP	33.4	18.8	9.7	32.0	29.9	46.0	16.1	
Vert	360.015	QP	27.2	16.3	10.3	32.0	21.8	46.0	24.2	
Vert	2246.000	PK	51.8	26.9	2.2	32.4	48.5	73.9	25.4	
Vert	2390.000	PK	49.0	27.4	2.3	32.4	46.3	73.9	27.6	
Vert	4804.000	PK	40.9	31.6	4.8	31.4	45.9	73.9	28.0	
Vert	7206.000	PK	48.4	36.3	5.6	32.3	58.0	73.9	15.9	
Vert	9608.000	PK	43.7	38.1	6.4	33.0	55.2	73.9	18.7	
Vert	2246.000	AV	33.5	26.9	2.2	32.4	30.2	53.9	23.7	
Vert	2390.000	AV	31.0	27.4	2.3	32.4	28.3	53.9	25.6	
Vert	4804.000	AV	28.3	31.6	4.8	31.4	33.3	53.9	20.6	
Vert	7206.000	AV	37.3	36.3	5.6	32.3	46.9	53.9	7.0	
Vert	9608.000	AV	32.7	38.1	6.4	33.0	44.2	53.9	9.7	

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

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

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi 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	99.2	27.4	2.3	32.4	96.5	-	-	Carrier
Hori	2400.000	PK	48.0	27.4	2.3	32.4	45.3	76.5	31.2	
Hori	2558.000	PK	45.7	27.9	2.4	32.3	43.7	76.5	32.8	
Vert	2402.000	PK	95.9	27.4	2.3	32.4	93.2	-	-	Carrier
Vert	2400.000	PK	43.4	27.4	2.3	32.4	40.7	73.2	32.5	
Vert	2558.000	PK	43.9	27.9	2.4	32.3	41.9	73.2	31.3	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10008022H
Date 04/16/2013
Temperature/ Humidity 24 deg. C / 46% RH
Engineer Takumi Shimada
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	48.063	QP	36.6	11.4	7.3	32.1	23.2	40.0	16.8	
Hori	84.107	QP	47.8	7.2	7.8	32.2	30.6	40.0	9.4	
Hori	96.121	QP	44.9	9.4	8.0	32.1	30.2	43.5	13.3	
Hori	120.011	QP	35.1	13.0	8.3	32.1	24.3	43.5	19.2	
Hori	276.971	QP	30.3	18.8	9.7	32.0	26.8	46.0	19.2	
Hori	360.013	QP	29.0	16.3	10.3	32.0	23.6	46.0	22.4	
Hori	2337.000	PK	45.0	27.2	2.2	32.4	42.0	73.9	31.9	
Hori	4882.000	PK	40.1	31.9	4.7	31.4	45.3	73.9	28.6	
Hori	7323.000	PK	47.5	36.5	5.6	32.4	57.2	73.9	16.7	
Hori	9764.000	PK	44.9	38.3	6.4	33.0	56.6	73.9	17.3	
Hori	2337.000	AV	32.8	27.2	2.2	32.4	29.8	53.9	24.1	
Hori	4882.000	AV	28.5	31.9	4.7	31.4	33.7	53.9	20.2	
Hori	7323.000	AV	36.2	36.5	5.6	32.4	45.9	53.9	8.0	
Hori	9764.000	AV	35.1	38.3	6.4	33.0	46.8	53.9	7.1	
Vert	48.062	QP	46.1	11.4	7.3	32.1	32.7	40.0	7.3	
Vert	84.103	QP	40.2	7.2	7.8	32.2	23.0	40.0	17.0	
Vert	96.122	QP	42.7	9.4	8.0	32.1	28.0	43.5	15.5	
Vert	120.011	QP	37.7	13.0	8.3	32.1	26.9	43.5	16.6	
Vert	276.973	QP	33.5	18.8	9.7	32.0	30.0	46.0	16.0	
Vert	360.014	QP	27.3	16.3	10.3	32.0	21.9	46.0	24.1	
Vert	2337.000	PK	42.7	27.2	2.2	32.4	39.7	73.9	34.2	
Vert	4882.000	PK	40.1	31.9	4.7	31.4	45.3	73.9	28.6	
Vert	7323.000	PK	46.4	36.5	5.6	32.4	56.1	73.9	17.8	
Vert	9764.000	PK	43.2	38.3	6.4	33.0	54.9	73.9	19.0	
Vert	2337.000	AV	30.6	27.2	2.2	32.4	27.6	53.9	26.3	
Vert	4882.000	AV	28.7	31.9	4.7	31.4	33.9	53.9	20.0	
Vert	7323.000	AV	35.1	36.5	5.6	32.4	44.8	53.9	9.1	
Vert	9764.000	AV	32.4	38.3	6.4	33.0	44.1	53.9	9.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	Tx, 3DH5 2441MHz

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	2441.000	PK	95.5	27.6	2.3	32.3	93.1	-	-	Carrier
Hori	2597.000	PK	40.8	28.1	2.4	32.3	39.0	73.1	34.1	
Vert	2441.000	PK	96.7	27.6	2.3	32.3	94.3	-	-	Carrier
Vert	2597.000	PK	40.4	28.1	2.4	32.3	38.6	74.3	35.7	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10008022H
Date 04/16/2013
Temperature/ Humidity 24 deg. C / 46% RH
Engineer Takumi Shimada
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	48.063	QP	35.9	11.4	7.3	32.1	22.5	40.0	17.5	
Hori	84.111	QP	47.8	7.2	7.8	32.2	30.6	40.0	9.4	
Hori	96.121	QP	44.9	9.4	8.0	32.1	30.2	43.5	13.3	
Hori	120.007	QP	35.4	13.0	8.3	32.1	24.6	43.5	18.9	
Hori	276.970	QP	30.2	18.8	9.7	32.0	26.7	46.0	19.3	
Hori	360.013	QP	28.9	16.3	10.3	32.0	23.5	46.0	22.5	
Hori	2324.000	PK	43.9	27.2	2.2	32.4	40.9	73.9	33.0	
Hori	2483.500	PK	54.1	27.7	2.3	32.3	51.8	73.9	22.1	
Hori	4960.000	PK	41.2	32.2	4.7	31.4	46.7	73.9	27.2	
Hori	7440.000	PK	47.5	36.7	5.6	32.4	57.4	73.9	16.5	
Hori	9920.000	PK	45.8	38.6	6.4	33.1	57.7	73.9	16.3	
Hori	2324.000	AV	34.7	27.2	2.2	32.4	31.7	53.9	22.3	
Hori	2483.500	AV	34.2	27.7	2.3	32.3	31.9	53.9	22.0	
Hori	4960.000	AV	29.3	32.2	4.7	31.4	34.8	53.9	19.1	
Hori	7440.000	AV	35.1	36.7	5.6	32.4	45.0	53.9	8.9	
Hori	9920.000	AV	36.5	38.6	6.4	33.1	48.4	53.9	5.5	
Vert	48.063	QP	46.1	11.4	7.3	32.1	32.7	40.0	7.3	
Vert	84.112	QP	40.3	7.2	7.8	32.2	23.1	40.0	16.9	
Vert	96.123	QP	42.4	9.4	8.0	32.1	27.7	43.5	15.8	
Vert	120.008	QP	37.5	13.0	8.3	32.1	26.7	43.5	16.8	
Vert	276.973	QP	32.9	18.8	9.7	32.0	29.4	46.0	16.6	
Vert	360.010	QP	26.6	16.3	10.3	32.0	21.2	46.0	24.8	
Vert	2324.000	PK	47.9	27.2	2.2	32.4	44.9	73.9	29.0	
Vert	2483.500	PK	52.4	27.7	2.3	32.3	50.1	73.9	23.8	
Vert	4960.000	PK	41.8	32.2	4.7	31.4	47.3	73.9	26.6	
Vert	7440.000	PK	45.3	36.7	5.6	32.4	55.2	73.9	18.7	
Vert	9920.000	PK	45.0	38.6	6.4	33.1	56.9	73.9	17.0	
Vert	2324.000	AV	33.6	27.2	2.2	32.4	30.6	53.9	23.3	
Vert	2483.500	AV	32.7	27.7	2.3	32.3	30.4	53.9	23.5	
Vert	4960.000	AV	29.9	32.2	4.7	31.4	35.4	53.9	18.5	
Vert	7440.000	AV	33.8	36.7	5.6	32.4	43.7	53.9	10.2	
Vert	9920.000	AV	35.8	38.6	6.4	33.1	47.7	53.9	6.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

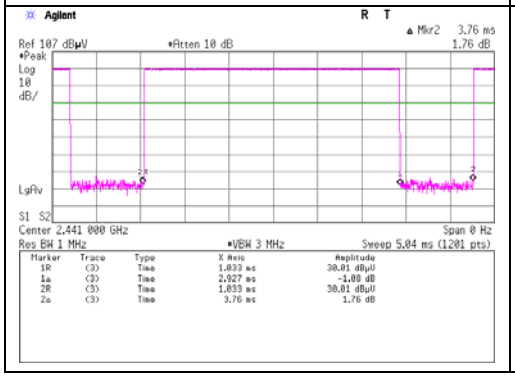
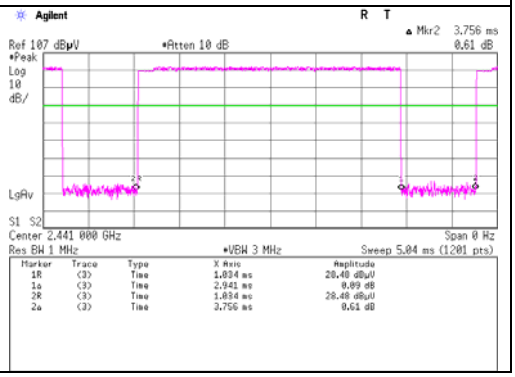
Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10008022H
Date	04/16/2013
Temperature/ Humidity	24 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	Tx, 3DH5 2480MHz

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	2480.000	PK	99.6	27.7	2.3	32.3	97.3	-	-	Carrier
Hori	2610.000	PK	39.5	28.1	2.4	32.3	37.7	77.3	39.6	
Vert	2480.000	PK	97.0	27.7	2.3	32.3	94.7	-	-	Carrier
Vert	2610.000	PK	37.8	28.1	2.4	32.3	36.0	74.7	38.7	

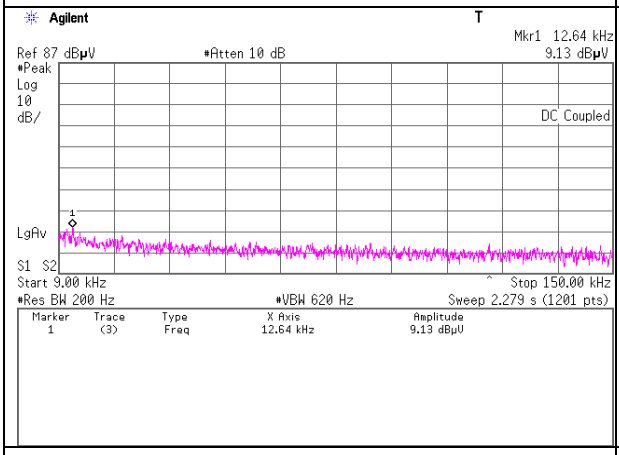
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Burst Rate Confirmation	
DH5	**3DH5**
Duty rate = 77.8% **Tx on = 2.927ms** **Tx on+Tx off = 3.76ms**	**Duty rate = 78.3%** **Tx on = 2.941ms** **Tx on+Tx off = 3.756ms**
	

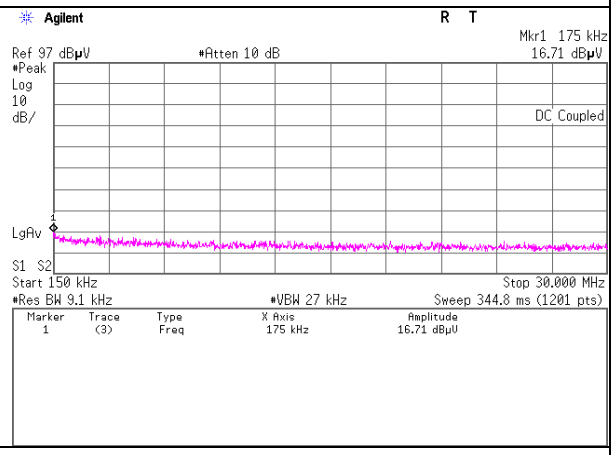
Conducted Spurious Emission

Tx DH5 2402MHz

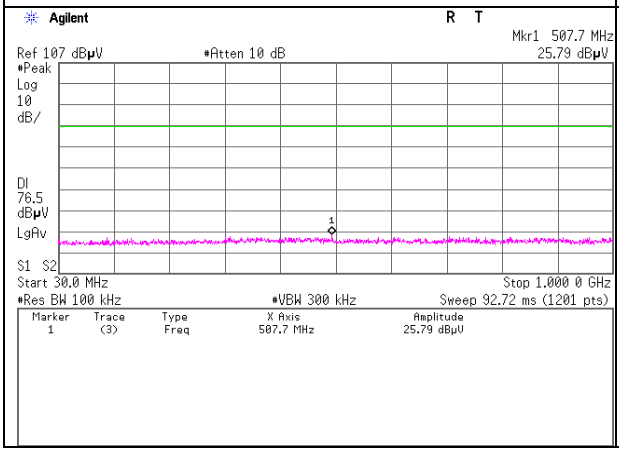
9kHz-150kHz



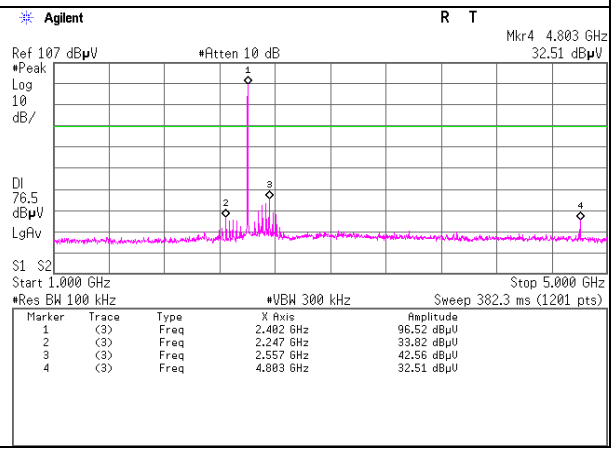
150kHz-30MHz



30MHz-1GHz



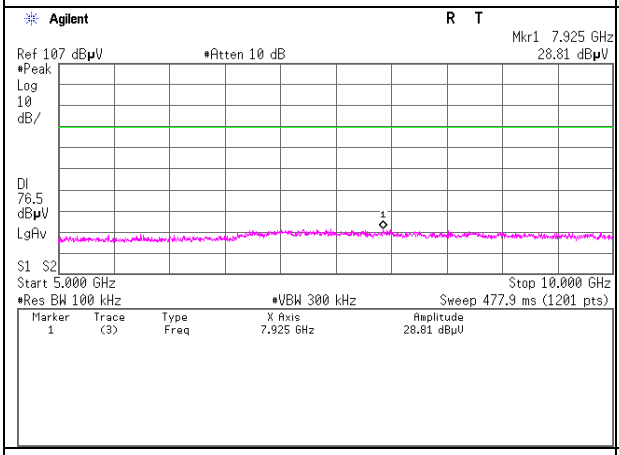
1GHz-5GHz



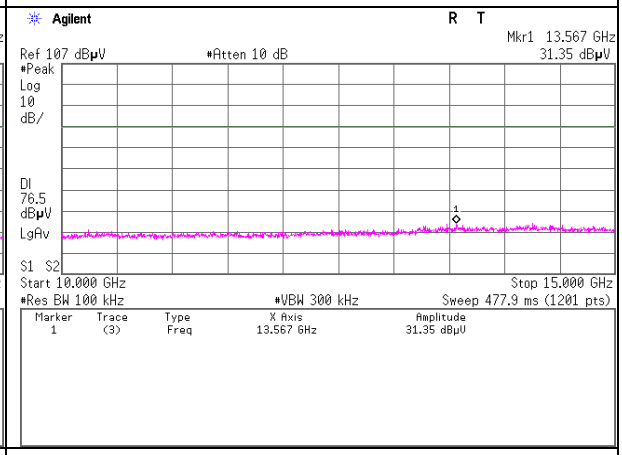
Conducted Spurious Emission

Tx DH5 2402MHz

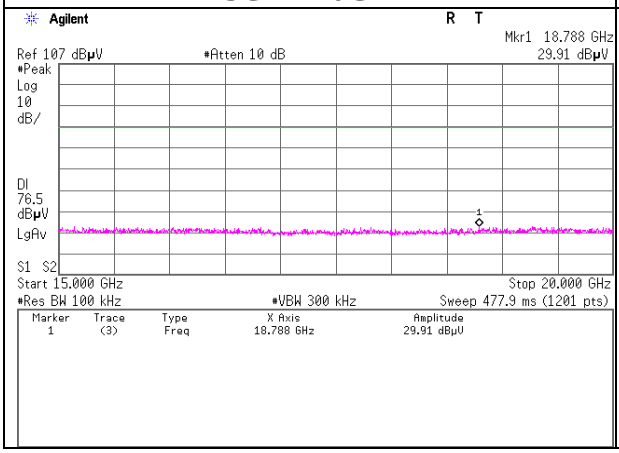
5GHz-10GHz



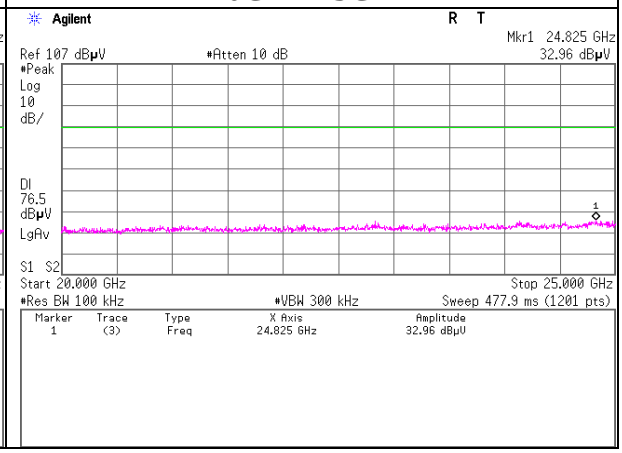
10GHz-15GHz



15GHz-20GHz



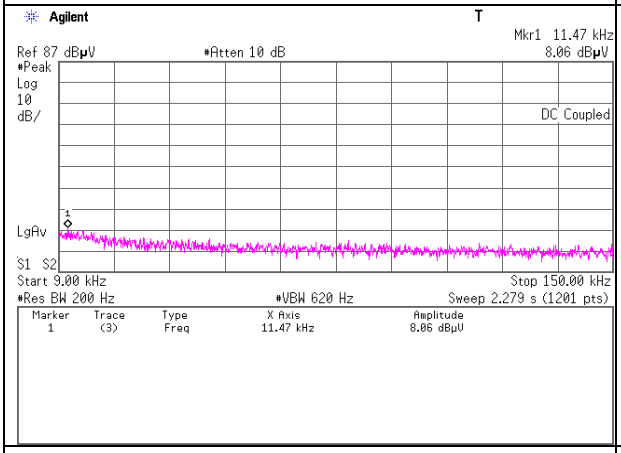
20GHz-25GHz



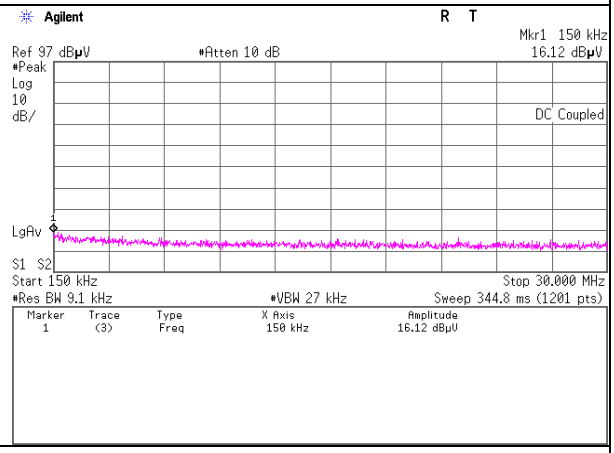
Conducted Spurious Emission

Tx DH5 2441MHz

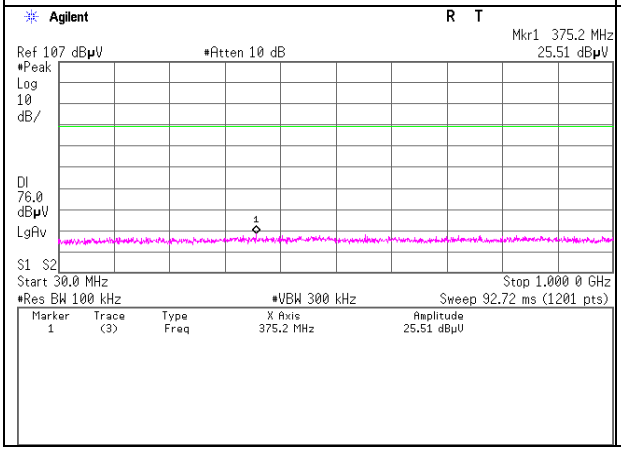
9kHz-150kHz



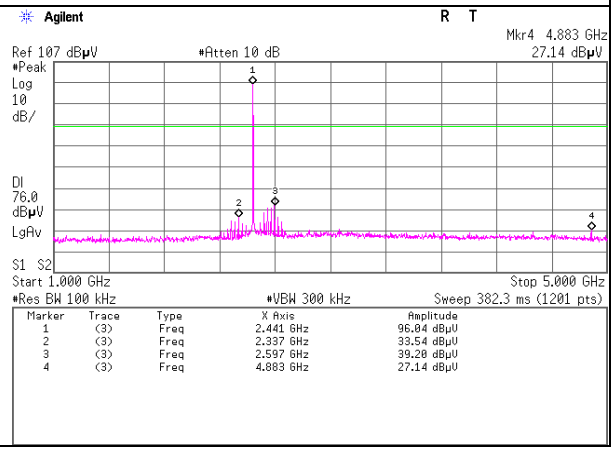
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz



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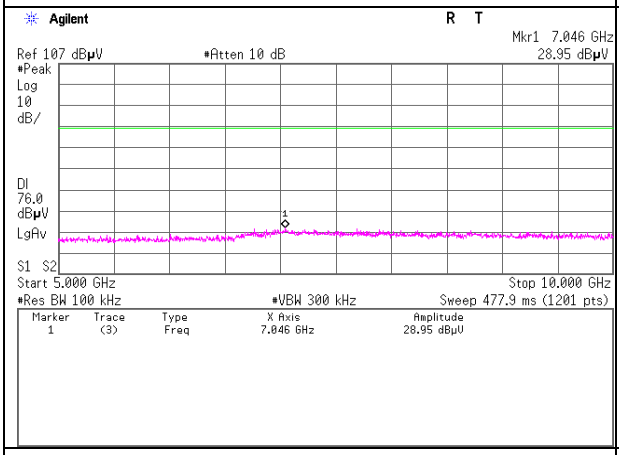
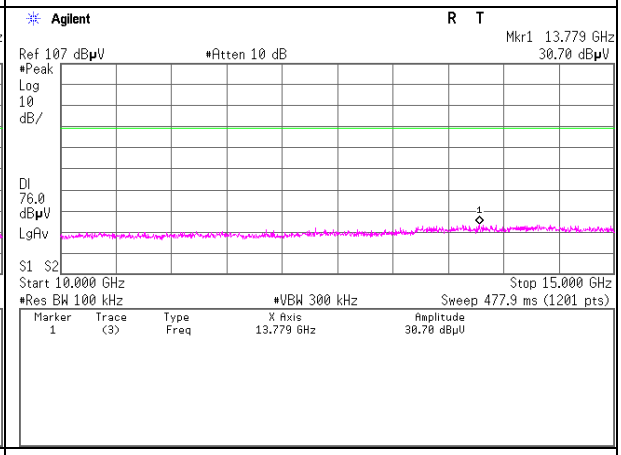
Conducted Spurious Emission

Tx DH5 2441MHz

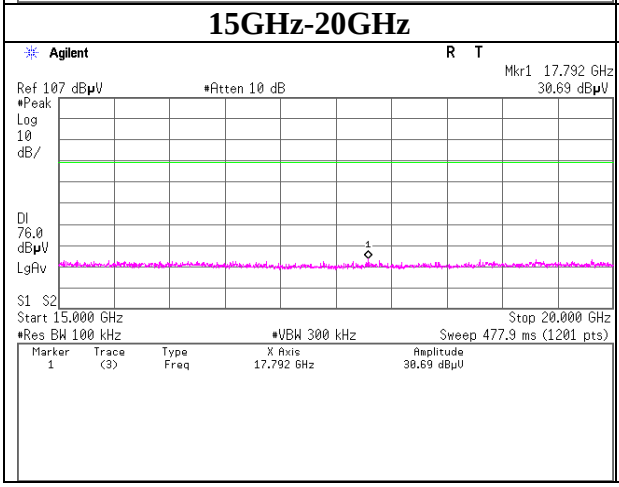
5GHz-10GHz



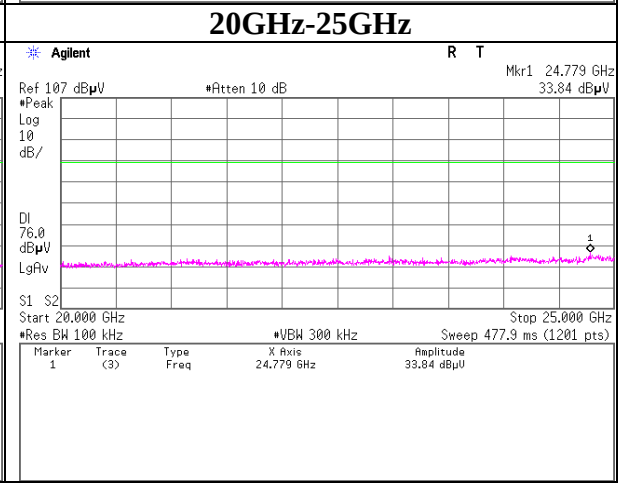
10GHz-15GHz



15GHz-20GHz



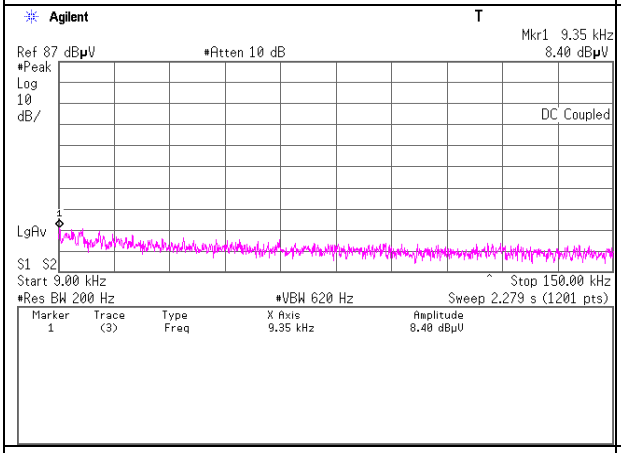
20GHz-25GHz



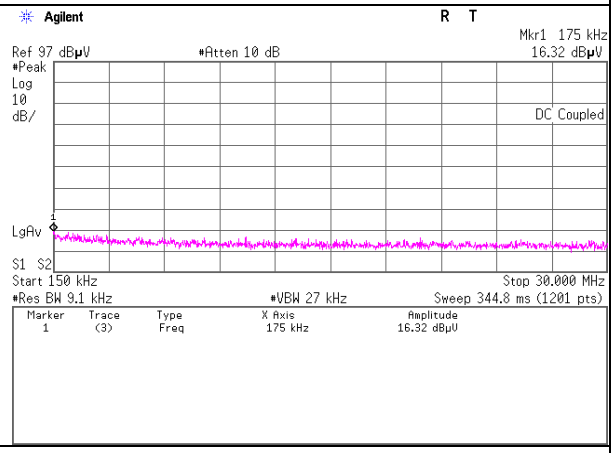
Conducted Spurious Emission

Tx DH5 2480MHz

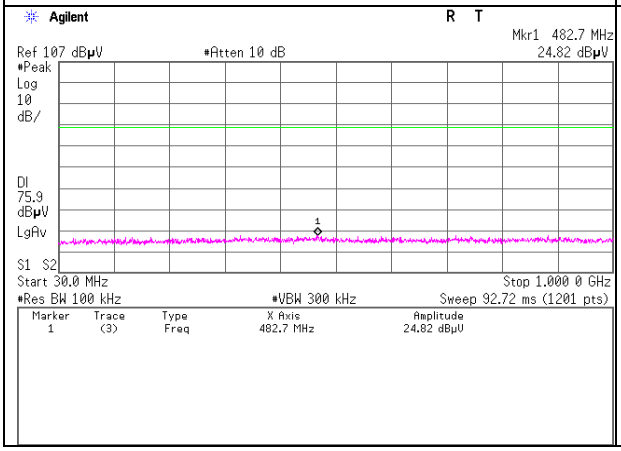
9kHz-150kHz



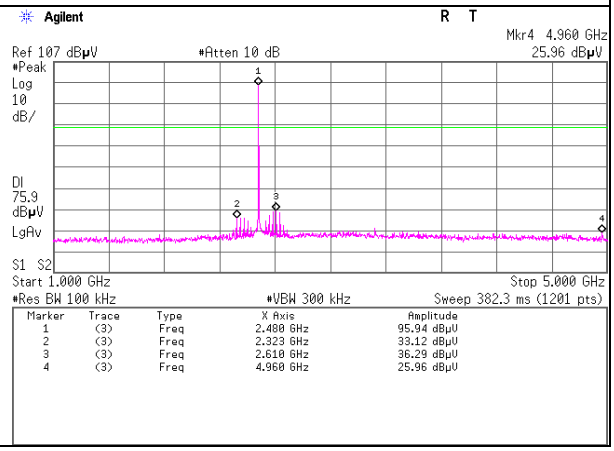
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz



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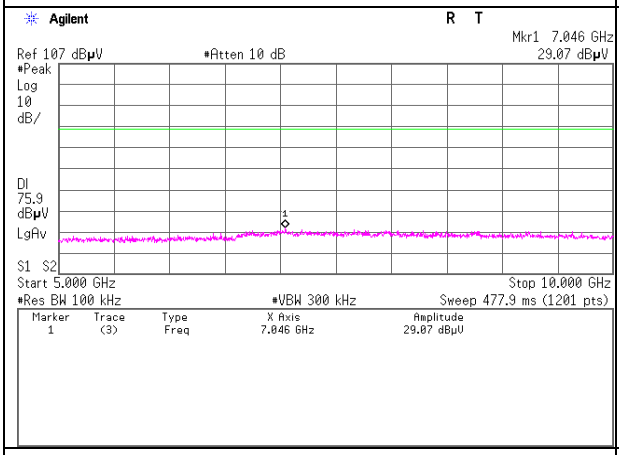
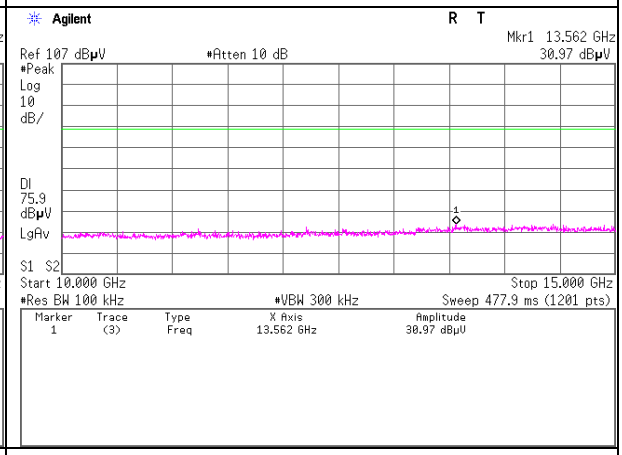
Conducted Spurious Emission

Tx DH5 2480MHz

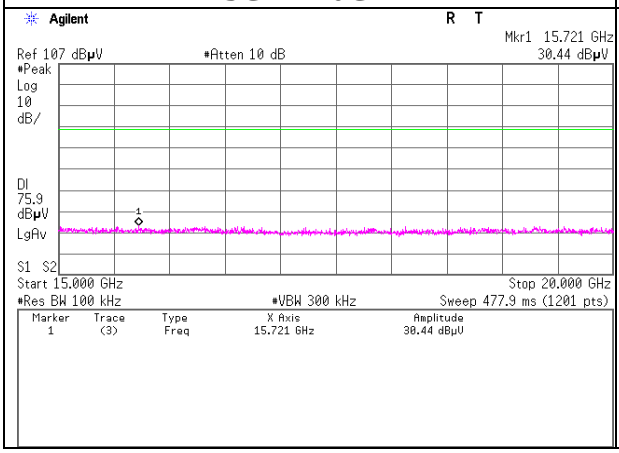
5GHz-10GHz



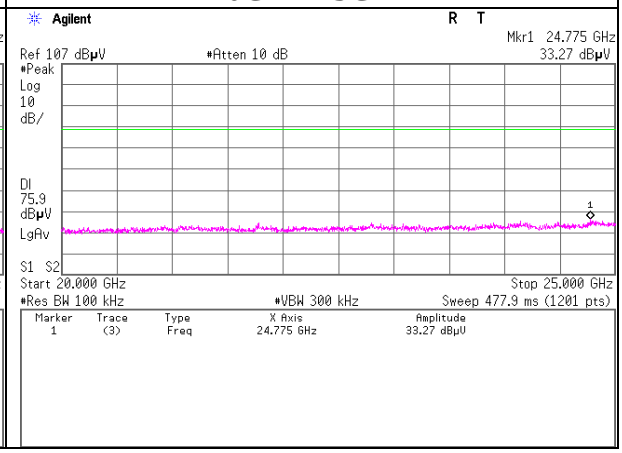
10GHz-15GHz



15GHz-20GHz



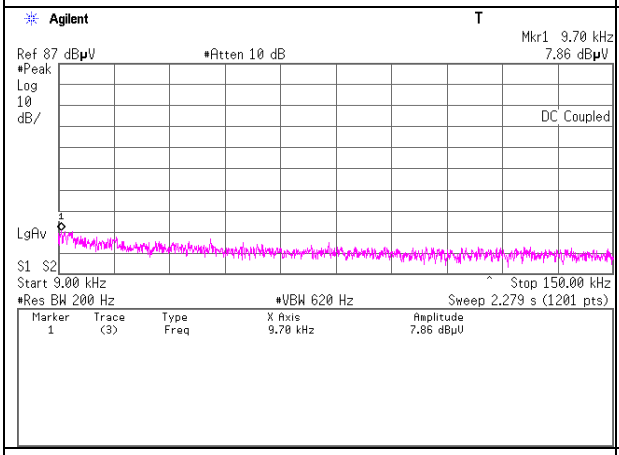
20GHz-25GHz



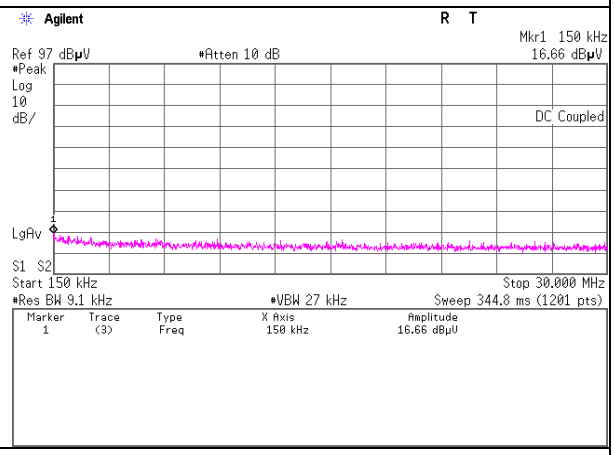
Conducted Spurious Emission

Tx 3DH5 2402MHz

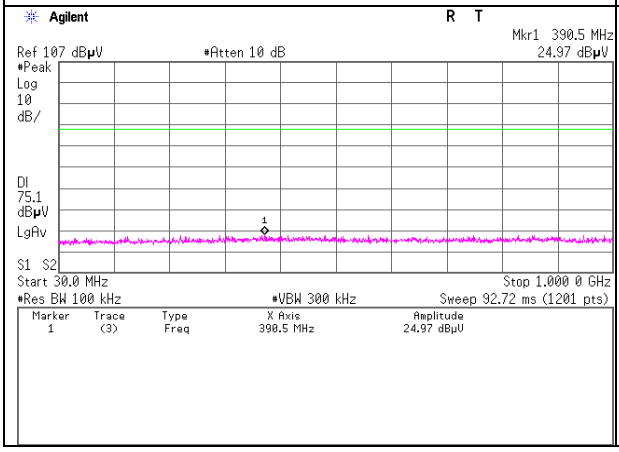
9kHz-150kHz



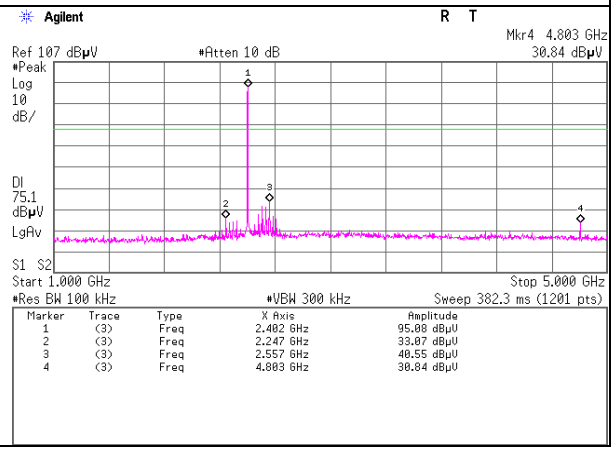
150kHz-30MHz



30MHz-1GHz



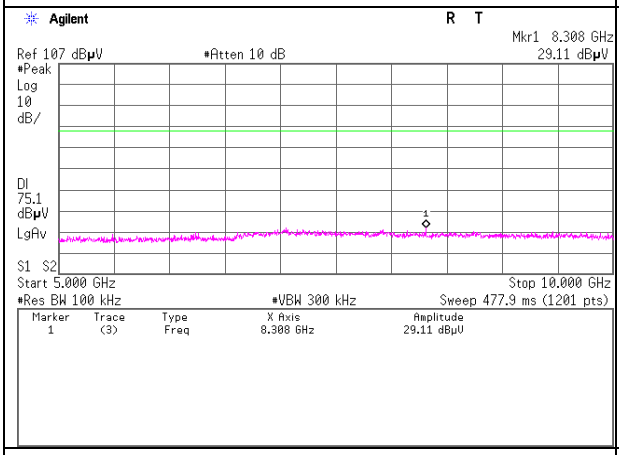
1GHz-5GHz



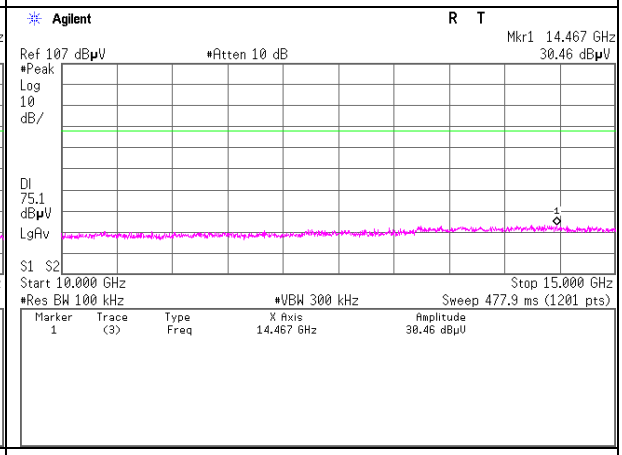
Conducted Spurious Emission

Tx 3DH5 2402MHz

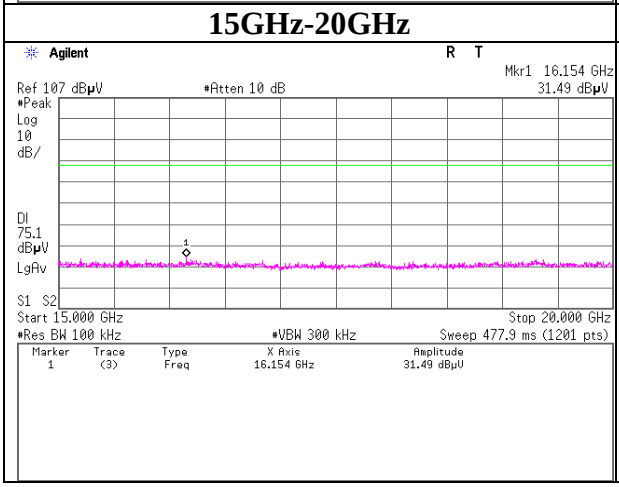
5GHz-10GHz



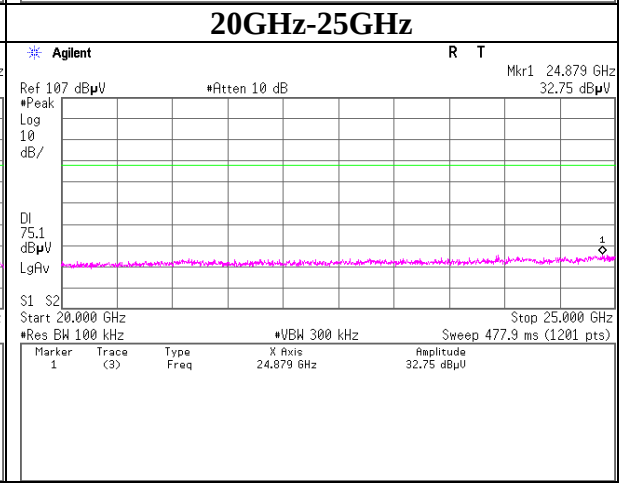
10GHz-15GHz



15GHz-20GHz



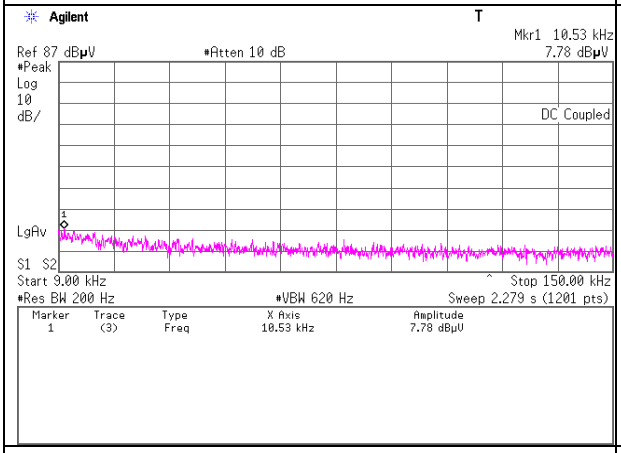
20GHz-25GHz



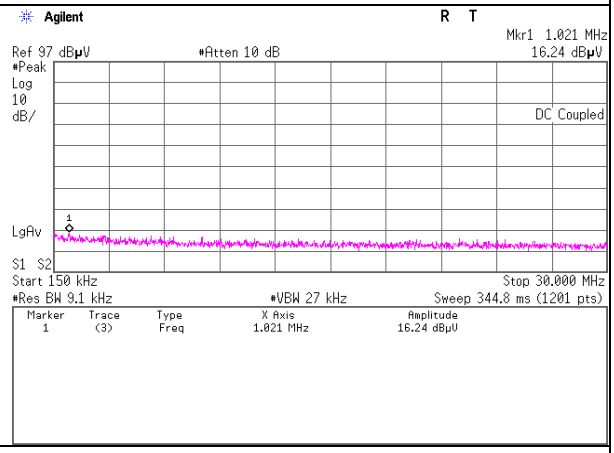
Conducted Spurious Emission

Tx 3DH5 2441MHz

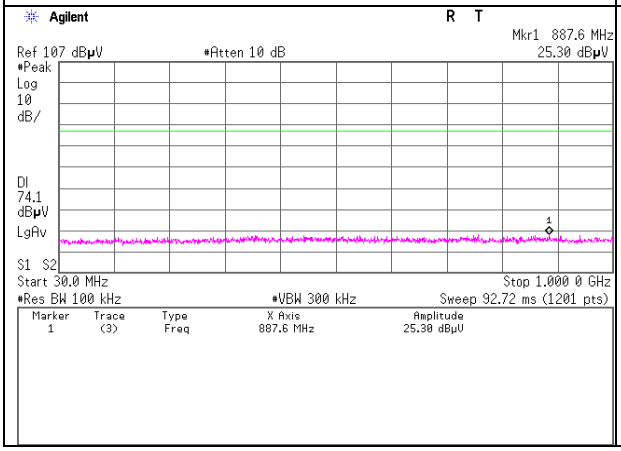
9kHz-150kHz



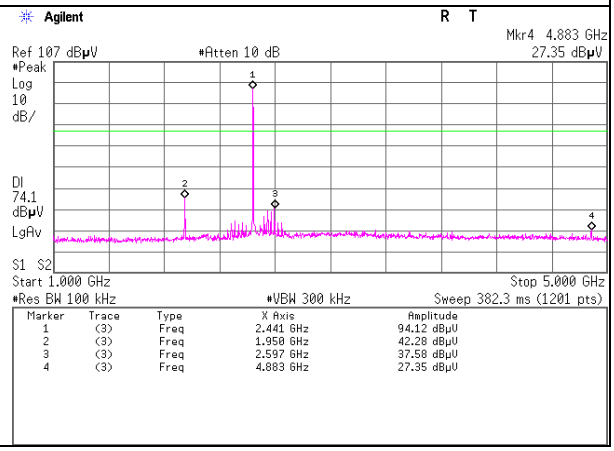
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz



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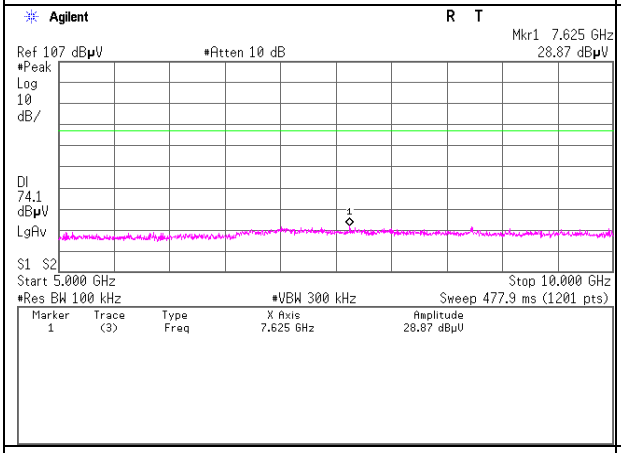
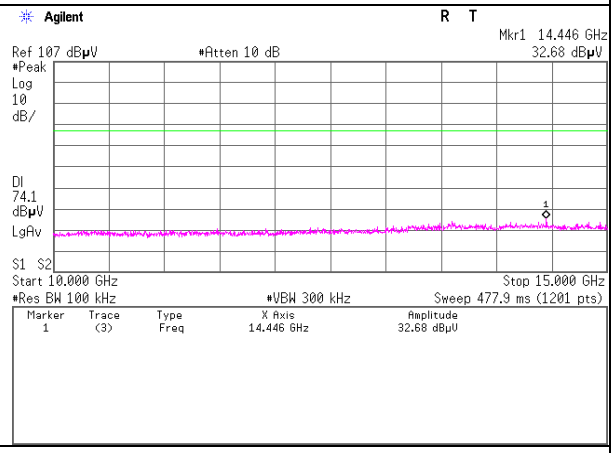
Conducted Spurious Emission

Tx 3DH5 2441MHz

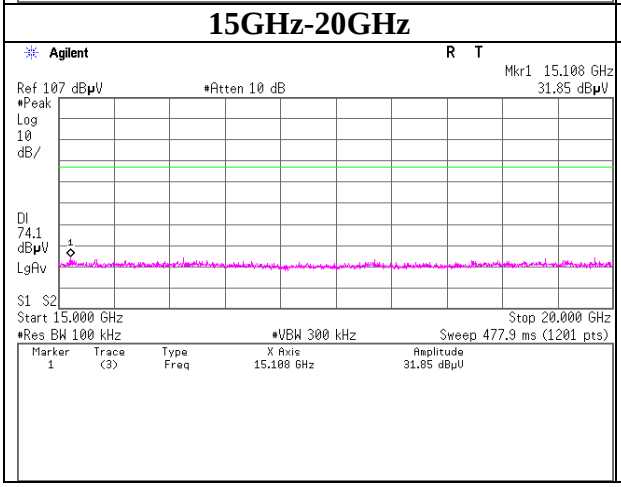
5GHz-10GHz



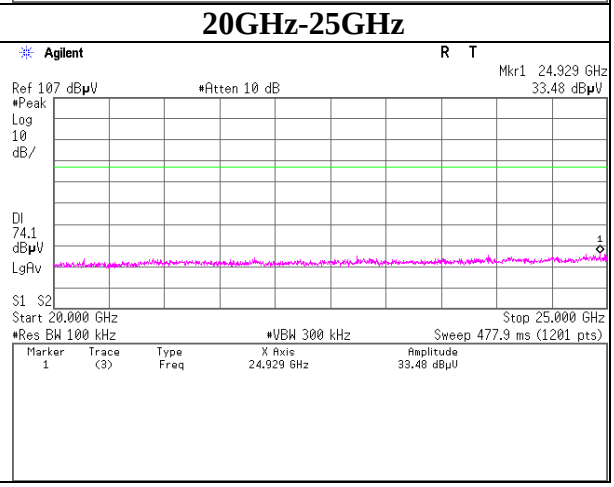
10GHz-15GHz



15GHz-20GHz



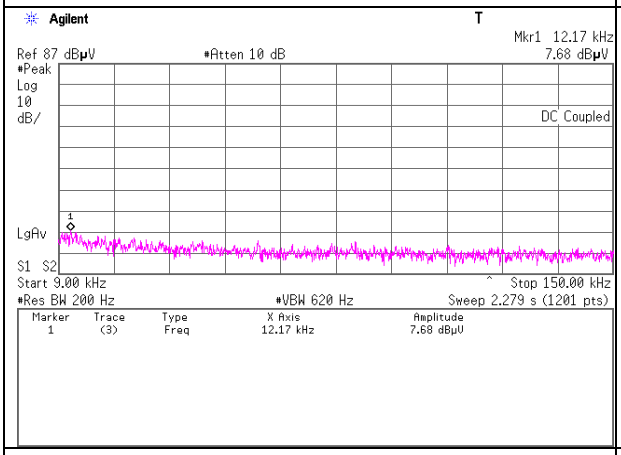
20GHz-25GHz



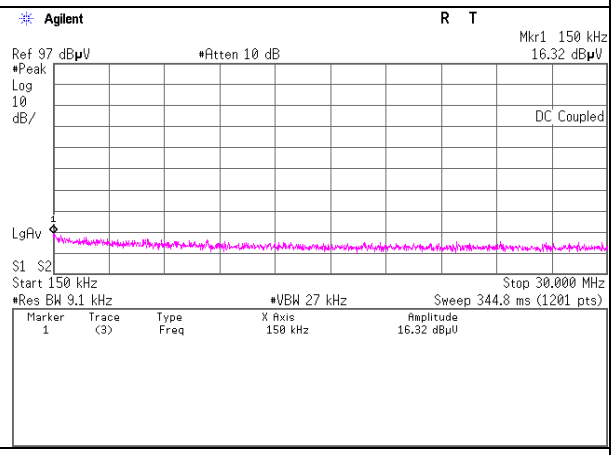
Conducted Spurious Emission

Tx 3DH5 2480MHz

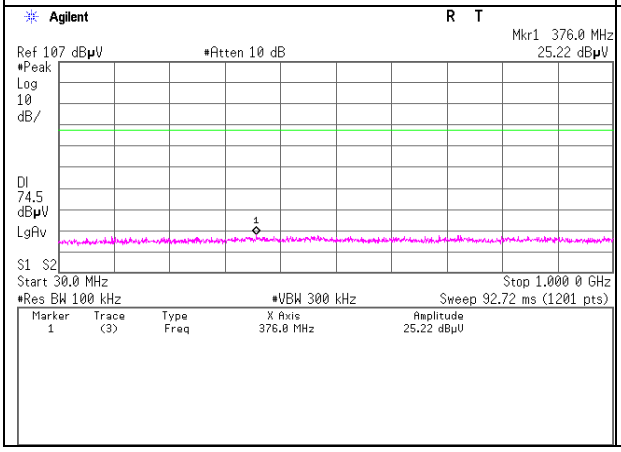
9kHz-150kHz



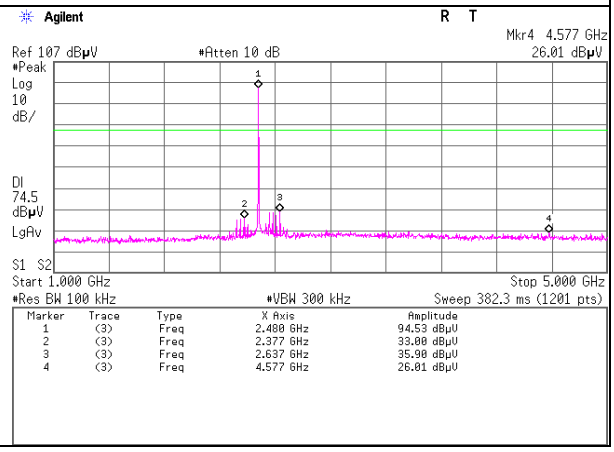
150kHz-30MHz



30MHz-1GHz



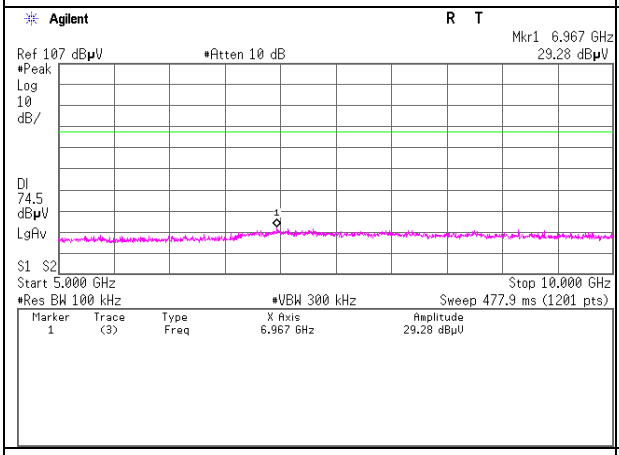
1GHz-5GHz



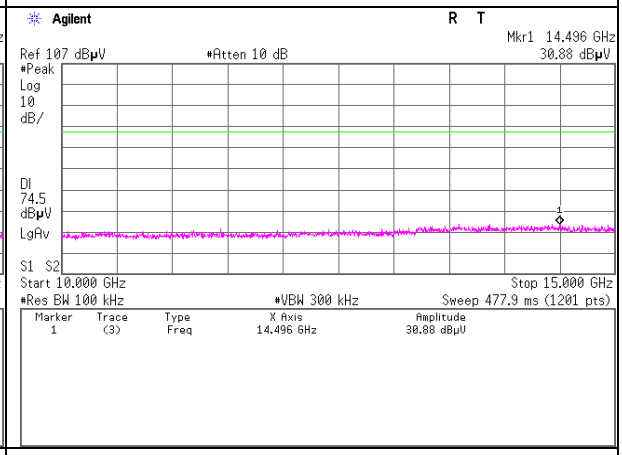
Conducted Spurious Emission

Tx 3DH5 2480MHz

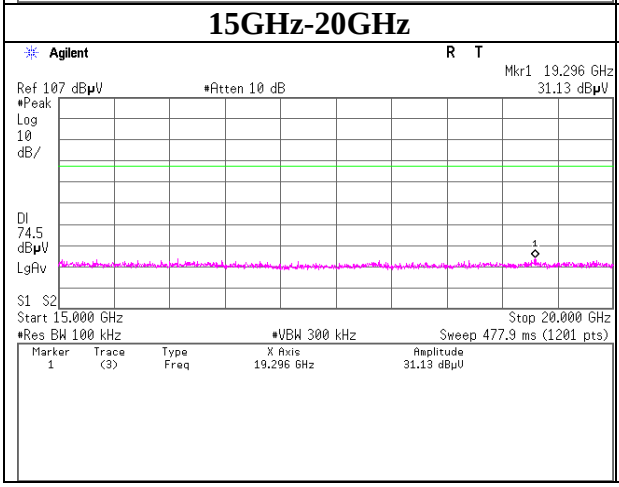
5GHz-10GHz



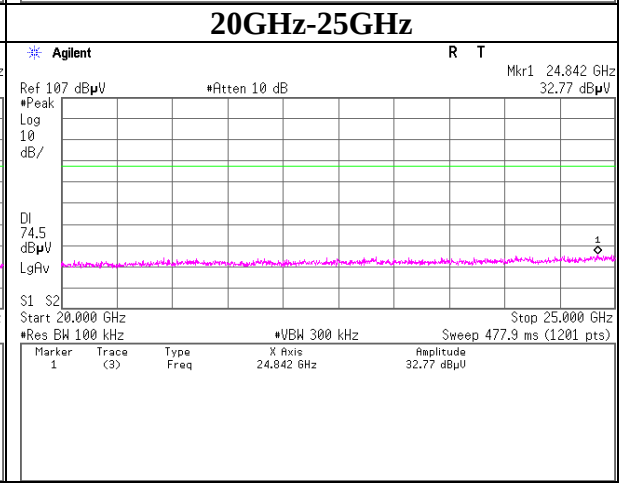
10GHz-15GHz



15GHz-20GHz



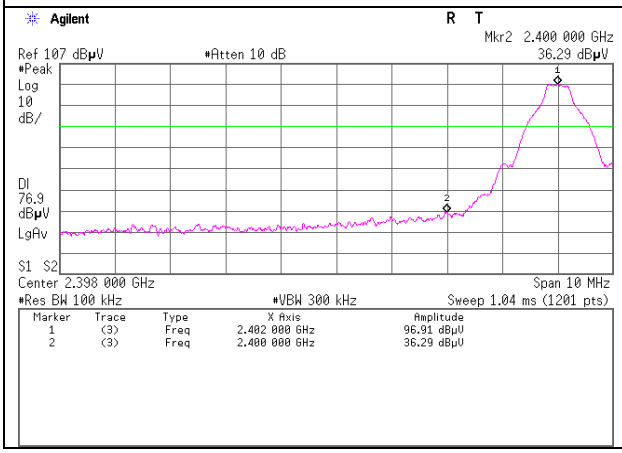
20GHz-25GHz



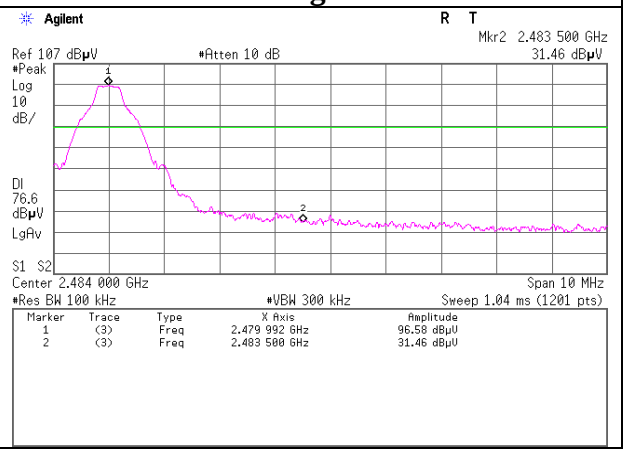
Conducted Emission Band Edge compliance

Tx DH5, Hopping off

Low

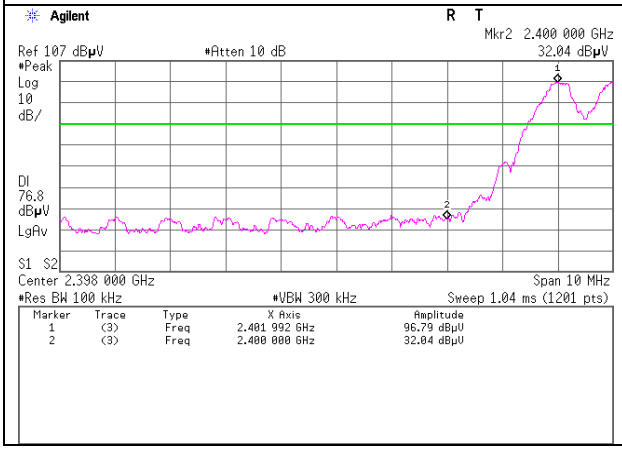


High

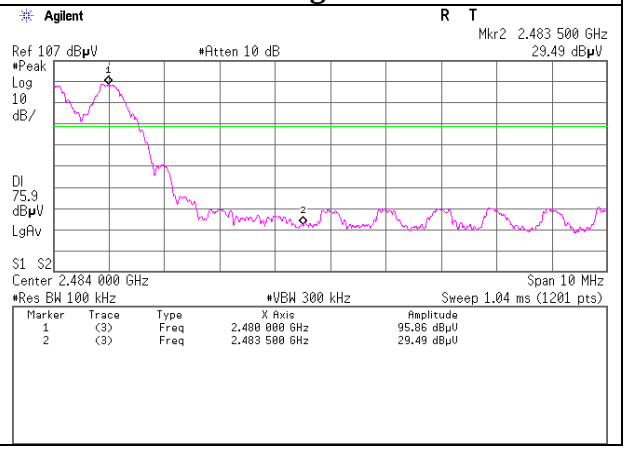


Tx DH5, Hopping on

Low



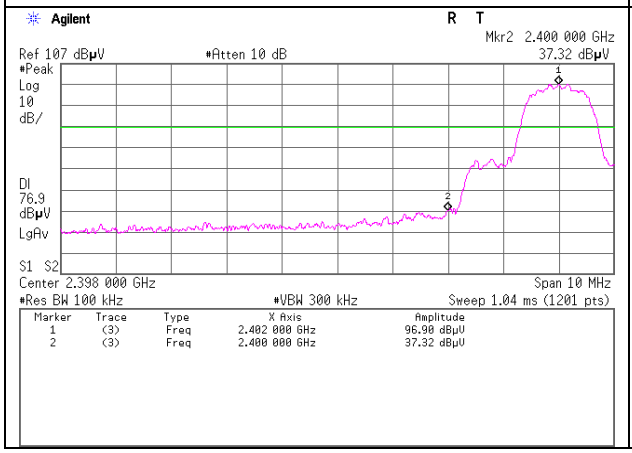
High



Conducted Emission Band Edge compliance

Tx 3DH5, Hopping off

Low



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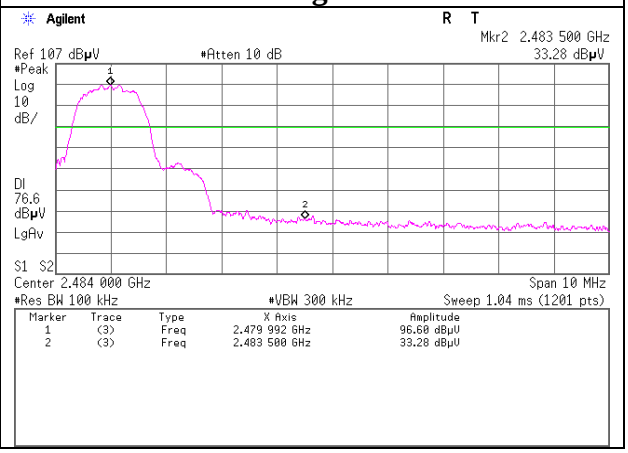
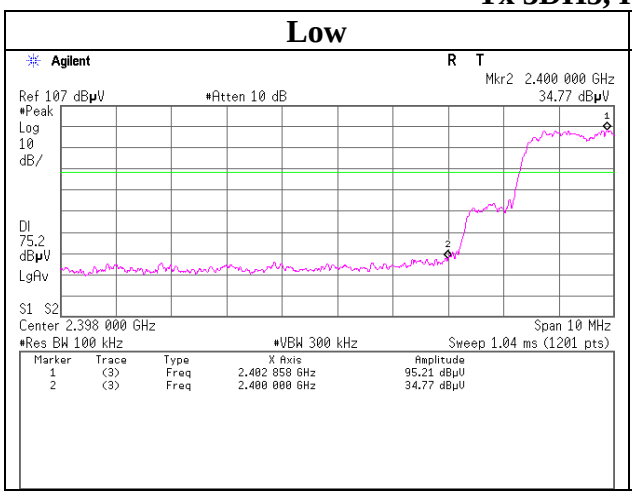


Tx 3DH5, Hopping on

Low



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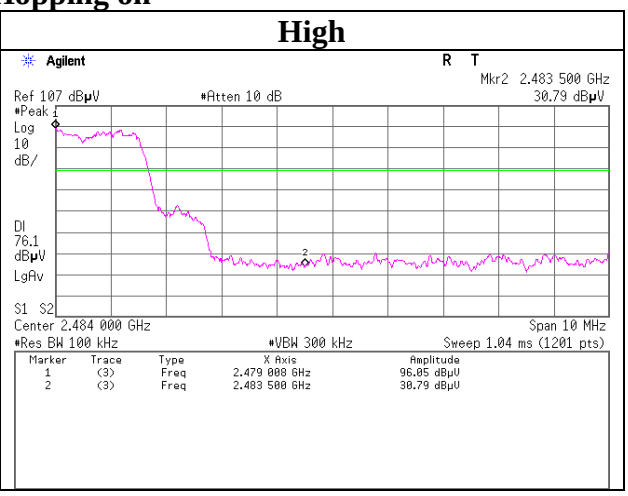
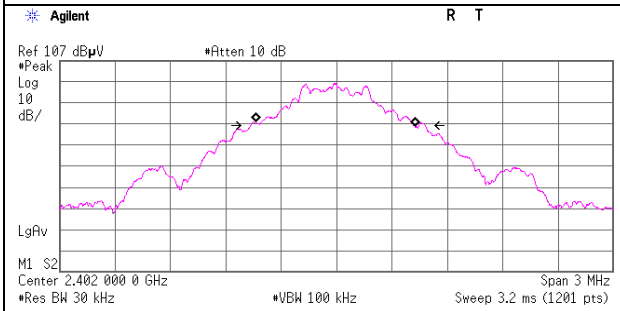


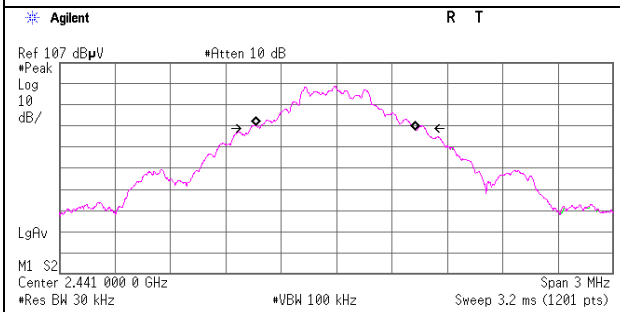
99%Occupied Bandwidth

Tx DH5, Hopping off

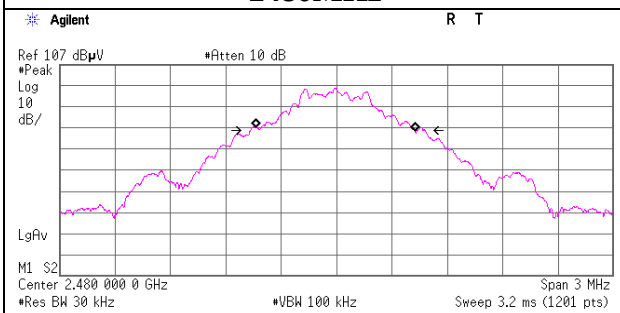
2402MHz



2441MHz

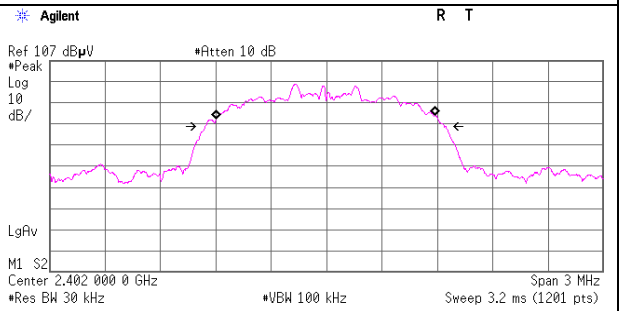


2480MHz

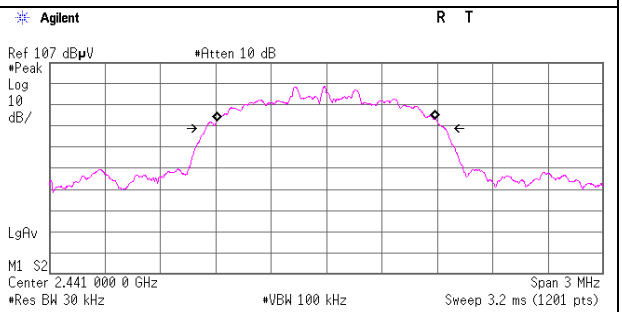


Tx 3DH5, Hopping off

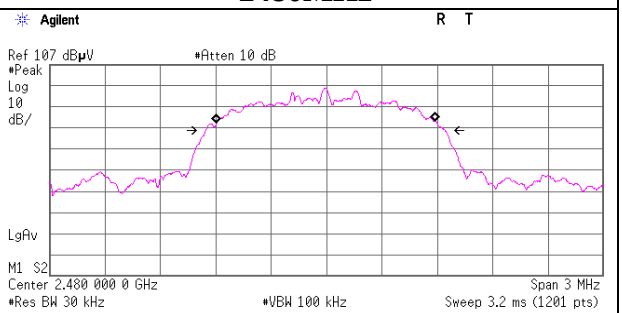
2402MHz



2441MHz

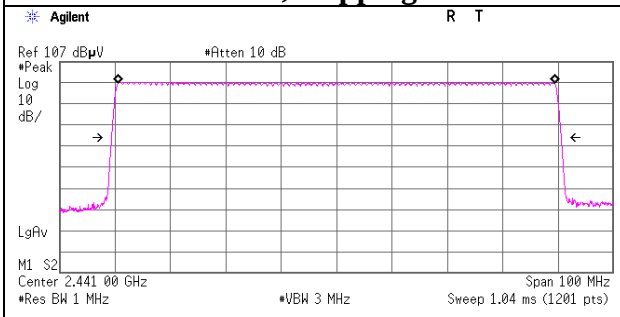


2480MHz

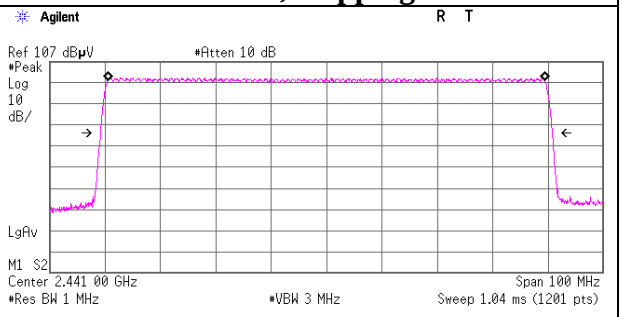


99% Occupied Bandwidth

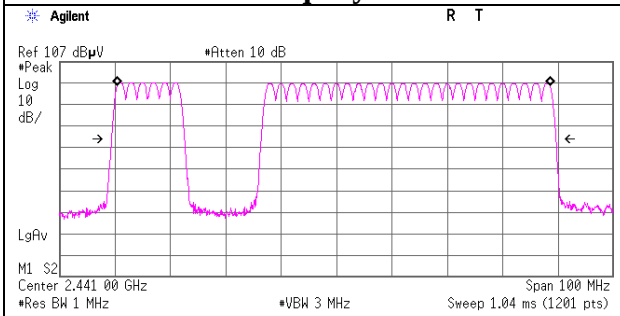
Tx DH5, Hopping on



Tx 3DH5, Hopping on



Inquiry



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT/RE/CE	2012/06/19 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2012/10/08 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2012/10/08 * 12
MAT-24	Attenuator(10dB) (above1GHz)	Agilent	8493C	71389	AT	2012/06/27 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2013/01/17 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2013/02/28 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2013/02/26 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2012/08/23 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2012/10/08 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2012/10/08 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2012/07/12 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2013/04/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2013/03/12 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2012/09/05 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2013/03/12 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2012/12/24 * 12
MHF-19	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	602	RE	2012/09/12 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2013/01/07 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(3m)/ sucoform141-PE(1m)/ 421-010(1.5m)/ RFM-E321(Switcher)	-/00640	CE	2012/07/12 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2013/01/22 * 12

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