



RADIO TEST REPORT

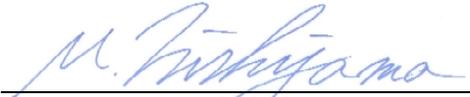
Test Report No. : 10250677H-B

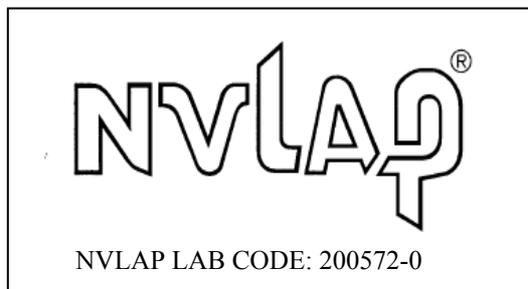
Applicant : Sony Computer Entertainment Inc.
Type of Equipment : Computer Entertainment System
Model No. : CUH-1115A
FCC ID : AK8CUH100F1
Test regulation : FCC Part 15 Subpart C: 2014
*Bluetooth (BDR/EDR) Part
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: March 14 to 25, 2014

Representative test engineer: 
Takumi Shimada
Engineer
Consumer Technology Division

Approved by: 
Masanori Nishiyama
Manager
Consumer Technology Division



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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Ise HQ EMC Lab.

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SECTION 1: Customer information

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

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

2.1 Identification of E.U.T.

Type of Equipment	Computer Entertainment System
Model No	CUH-1115A
Serial No	20689DD2A5A3 for Antenna Terminal Conducted test 1300099 for Conducted Emission and Radiated Emission tests
Country of Manufacture	China/Japan
Receipt Date of Sample	March 10, 2014
Condition of EUT	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	No modification by the test lab

2.2 Product Description

CUH-1115A is the Computer Entertainment System .

Product Specification

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

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Radio Specification

WLAN (IEEE802.11b/g/n-20)

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	IFA (Antenna A/B)
Antenna Gain: G _{ANT}	3.0dBi (Antenna A/B)
Directional Gain	6.01dBi (Antenna A/B)

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Bandwidth & Channel spacing	1MHz & 1MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (peak)

Bluetooth (Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	GFSK
Bandwidth & Channel spacing	1MHz & 2MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC3.3V/1.8V
Antenna Type	PIFA
Antenna Gain	4.5 dBi (peak)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on March 6, 2014 and effective April 7, 2014

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

*The revision on March 6, 2014 does not affect the test specification applied to the EUT.

*The EUT complies with FCC Part 15 Subpart B: 2014, final revised on March 6, 2014 and effective April 7, 2014.

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 12.9dB, 0.15000MHz, L AV 18.9dB 0.36220MHz, L	Complied	-	
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (b)	See data.	Complied	Conducted	
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) ----- IC: RSS-210 A8.1 (a)		Complied	Conducted	
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted	
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) ----- IC: RSS-210 A8.1 (d)		Complied	Conducted	
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.8	FCC: Section15.247(a)(b)(1) ----- IC: RSS-210 A8.4 (2)		Complied	Conducted	
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3		2.8dB 32.790MHz, QP, Vertical	Complied	Conducted/ Radiated

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

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

FCC 15.31 (e)

This EUT provides stable voltage(DC3.3/1.8V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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	3.5dB
No.3	3.6dB
No.4	3.5dB

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	4.0dB	5.1dB	5.0dB	5.1dB	6.0dB	4.9dB	4.3dB
No.2	3.9dB	5.2dB	5.0dB	4.9dB	5.9dB	4.7dB	4.2dB
No.3	4.3dB	5.1dB	5.2dB	5.2dB	6.0dB	4.8dB	4.2dB
No.4	4.6dB	5.2dB	5.0dB	5.2dB	6.0dB	5.7dB	4.2dB

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

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

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

Conducted Emission test

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

Radiated emission test (3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 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 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
<p>*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. *EUT has the power settings by the software as follows; Power settings: Same as production model Software: CPro_DOS_Labtool_Ver1.0.8.24 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p>		

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4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber .

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

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SECTION 6: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

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

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

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

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

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

Test Antennas are used as below;

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

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

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

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

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

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

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

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

Measurement range : 30M-26.5GHz
Test data : APPENDIX
Test result : Pass

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	2.5MHz, 3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz, 3MHz	100kHz, 30kHz	300kHz, 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *2)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	10MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

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

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

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APPENDIX 1: Data of EMI test

Conducted Emission

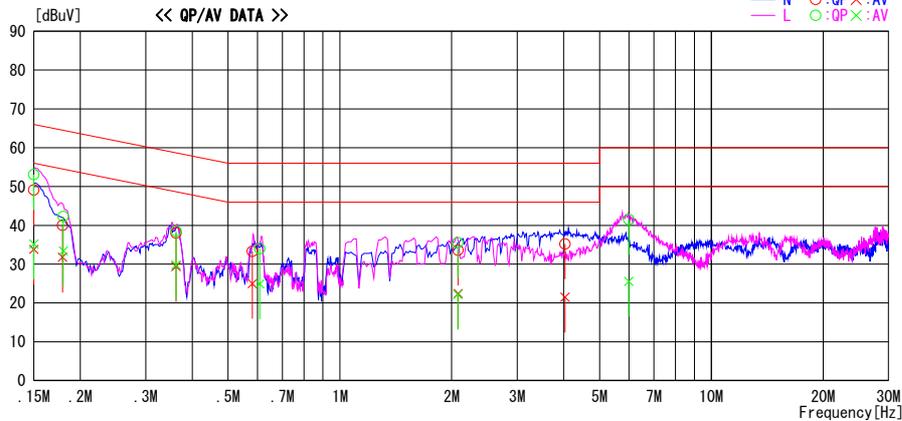
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/03/25

Report No. : 10250677H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 34% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : BT DHS 2441MHz

LIMIT : FCC15. 207 QP
FCC15. 207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	35.8	20.5	13.3	49.1	33.8	66.0	56.0	16.9	22.2	N	
0.17920	26.7	18.5	13.3	40.0	31.8	64.5	54.5	24.5	22.7	N	
0.36200	24.7	16.1	13.3	38.0	29.4	58.7	48.7	20.7	19.3	N	
0.58120	19.9	11.6	13.4	33.3	25.0	56.0	46.0	22.7	21.0	N	
2.08080	20.0	8.8	13.6	33.6	22.4	56.0	46.0	22.4	23.6	N	
4.03720	21.4	7.7	13.8	35.2	21.5	56.0	46.0	20.8	24.5	N	
0.15000	39.8	21.9	13.3	53.1	35.2	66.0	56.0	12.9	20.8	L	
0.18010	29.0	20.1	13.3	42.3	33.4	64.5	54.5	22.2	21.1	L	
0.36220	25.2	16.5	13.3	38.5	29.8	58.7	48.7	20.2	18.9	L	
0.60830	20.6	11.5	13.4	34.0	24.9	56.0	46.0	22.0	21.1	L	
2.07610	21.9	8.6	13.6	35.5	22.2	56.0	46.0	20.5	23.8	L	
5.99530	27.6	11.7	13.9	41.5	25.6	60.0	50.0	18.5	24.4	L	

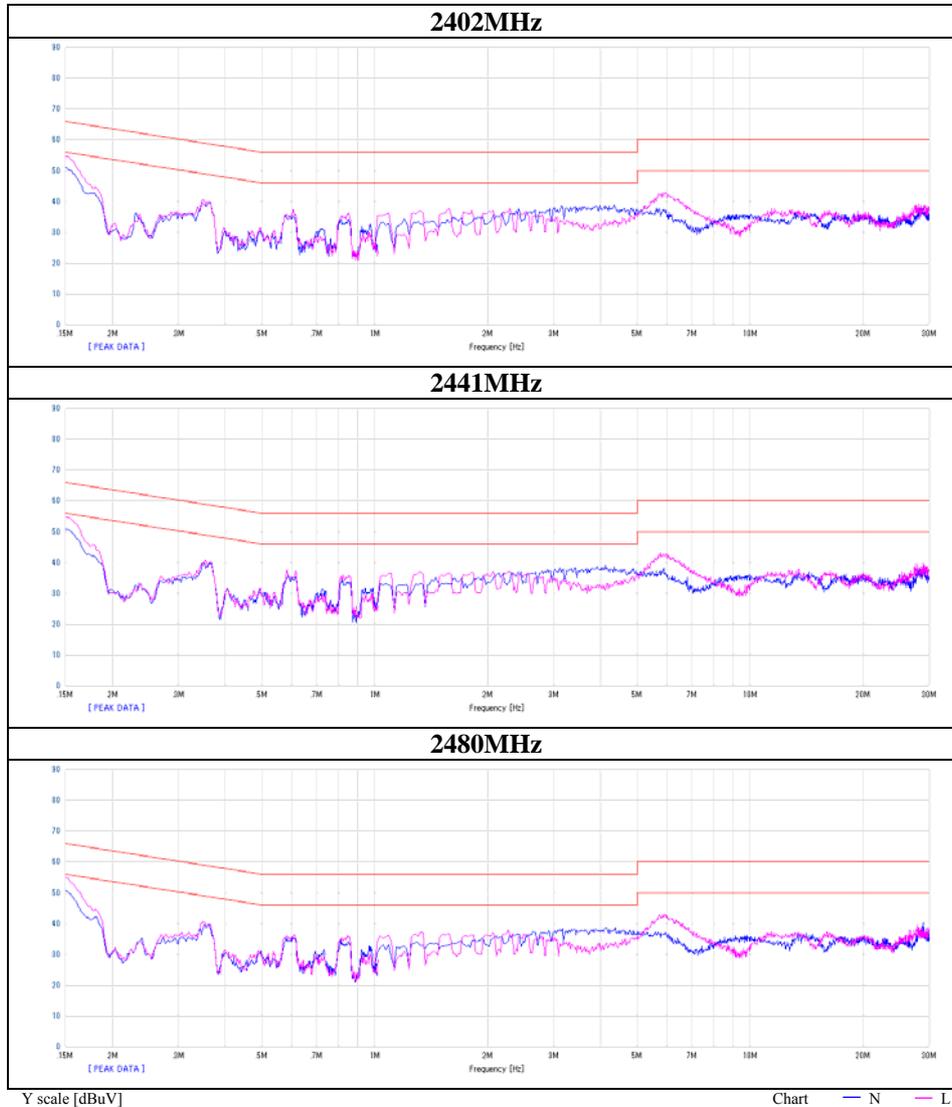
CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (LISN LOSS+ATTEN. LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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Conducted Emission

Test place	Ise HQ EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10250677H
Date	03/25/2014
Temperature/ Humidity	22deg. C / 34% RH
Engineer	Hironobu Ohnishi
Mode	Tx DH5



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Conducted Emission

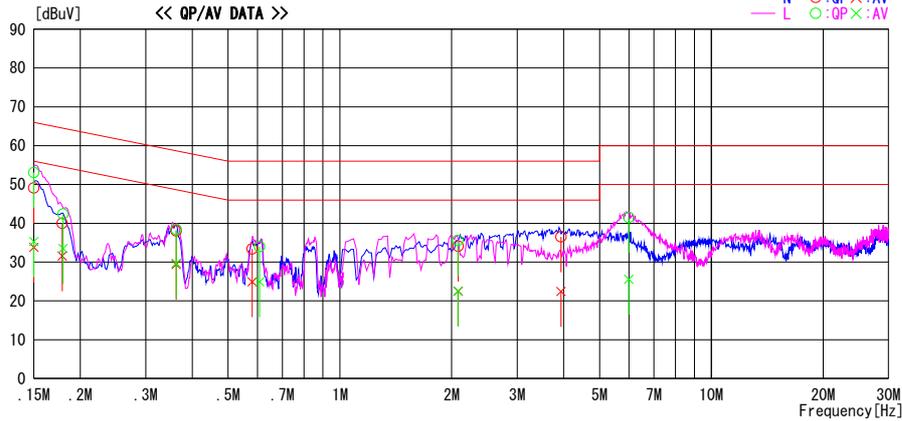
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2014/03/25

Report No. : 10250677H
Power : AC 120V / 60Hz
Temp./Humi. : 22deg. C / 34% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : BT 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	35.8	20.5	13.3	49.1	33.8	66.0	56.0	16.9	22.2	N	
0.17880	26.7	18.3	13.3	40.0	31.6	64.5	54.5	24.5	22.9	N	
0.36230	24.7	16.1	13.3	38.0	29.4	58.7	48.7	20.7	19.3	N	
0.58060	20.0	11.5	13.4	33.4	24.9	56.0	46.0	22.6	21.1	N	
2.08200	20.5	8.9	13.6	34.1	22.5	56.0	46.0	21.9	23.5	N	
3.93680	22.7	8.6	13.8	36.5	22.4	56.0	46.0	19.5	23.6	N	
0.15000	39.8	22.0	13.3	53.1	35.3	66.0	56.0	12.9	20.7	L	
0.17970	29.1	20.2	13.3	42.4	33.5	64.5	54.5	22.1	21.0	L	
0.36250	25.1	16.4	13.3	38.4	29.7	58.7	48.7	20.3	19.0	L	
0.60780	20.6	11.5	13.4	34.0	24.9	56.0	46.0	22.0	21.1	L	
2.07710	22.0	8.9	13.6	35.6	22.5	56.0	46.0	20.4	23.5	L	
5.99510	27.6	11.7	13.9	41.5	25.6	60.0	50.0	18.5	24.4	L	

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

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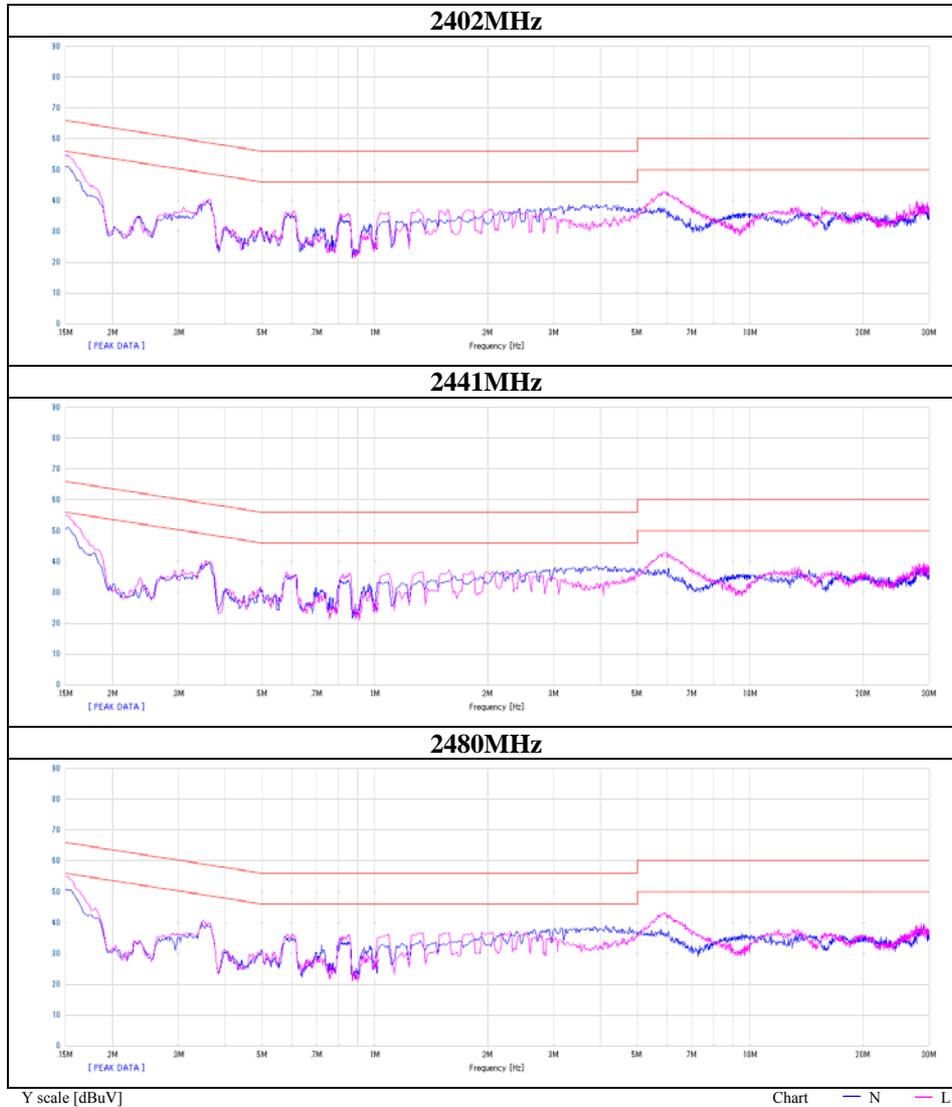
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Conducted Emission

Test place	Ise HQ EMC Lab. No.4 Semi Anechoic Chamber
Report No.	10250677H
Date	03/25/2014
Temperature/ Humidity	22deg. C / 34% RH
Engineer	Hironobu Ohnishi
Mode	Tx 3DH5



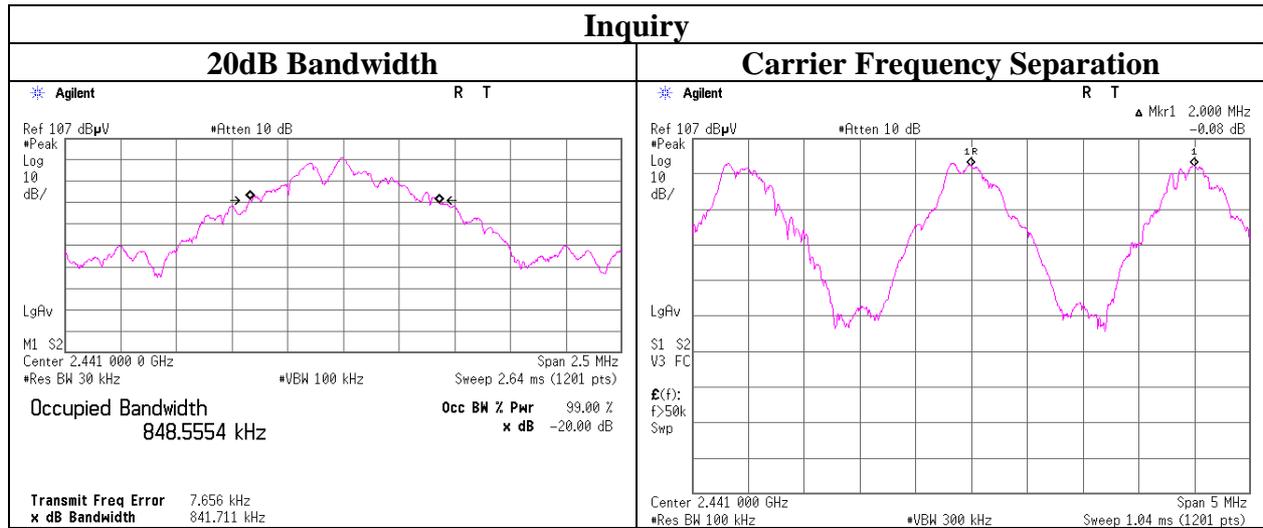
20dB Bandwidth and Carrier Frequency Separation

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.966	1.000	≥ 0.644
DH5	2441.0	0.963	1.000	≥ 0.642
DH5	2480.0	0.963	1.000	≥ 0.642
3DH5	2402.0	1.304	1.000	≥ 0.869
3DH5	2441.0	1.301	1.000	≥ 0.867
3DH5	2480.0	1.306	1.000	≥ 0.871
Inquiry	2441.0	0.842	2.000	≥ 0.561

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

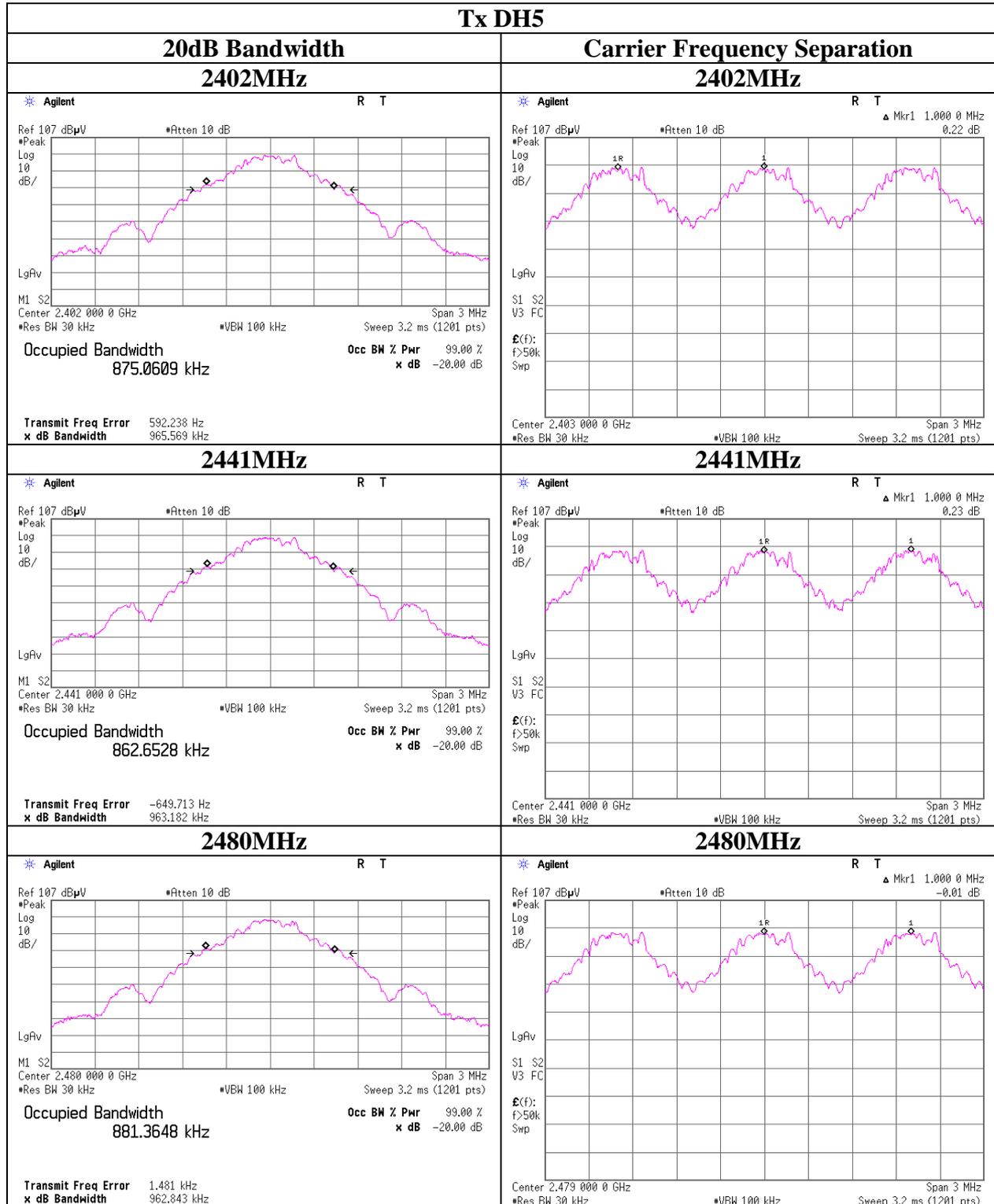
No limit applies to 20dB Bandwidth.



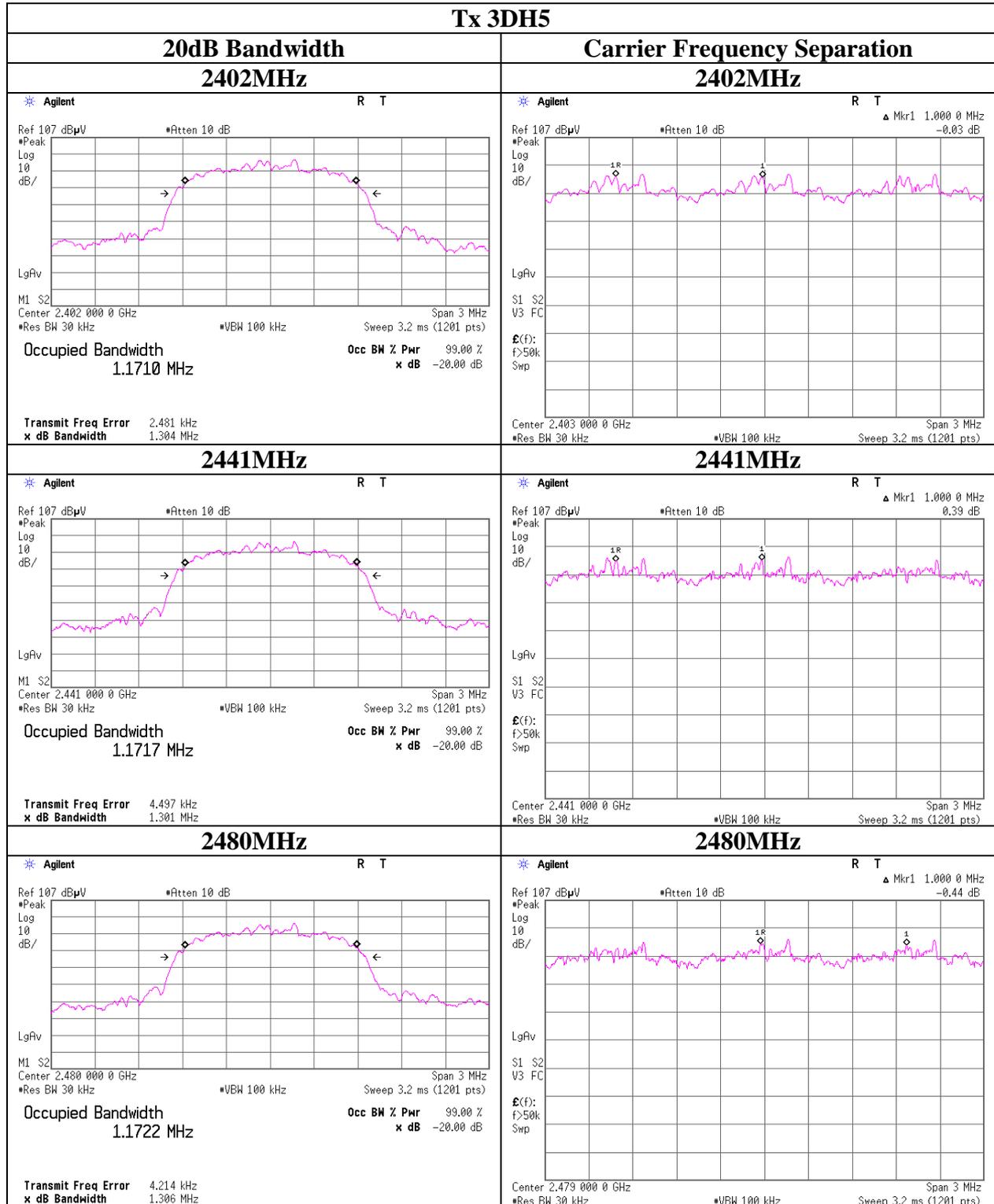
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20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation

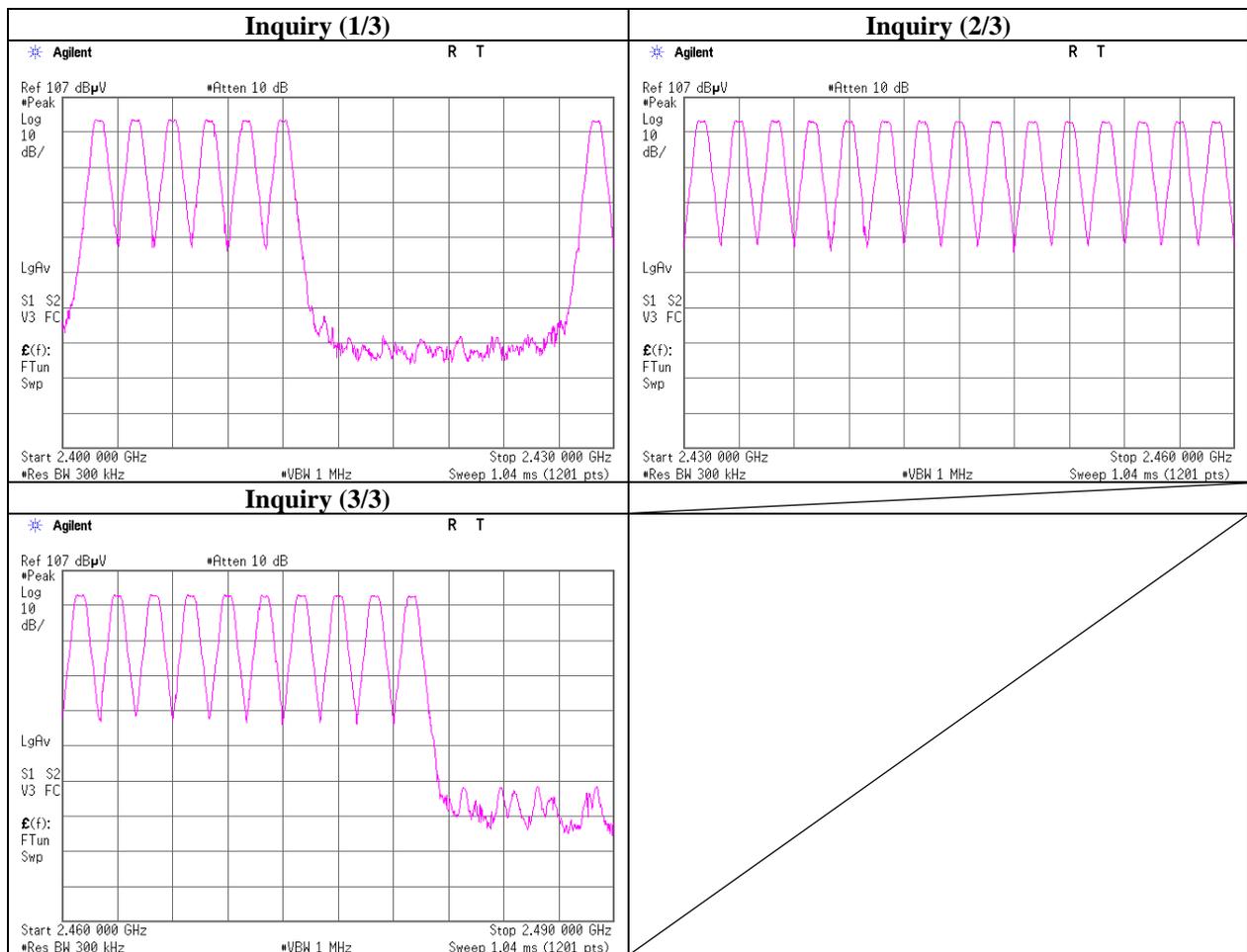


Number of Hopping Frequency

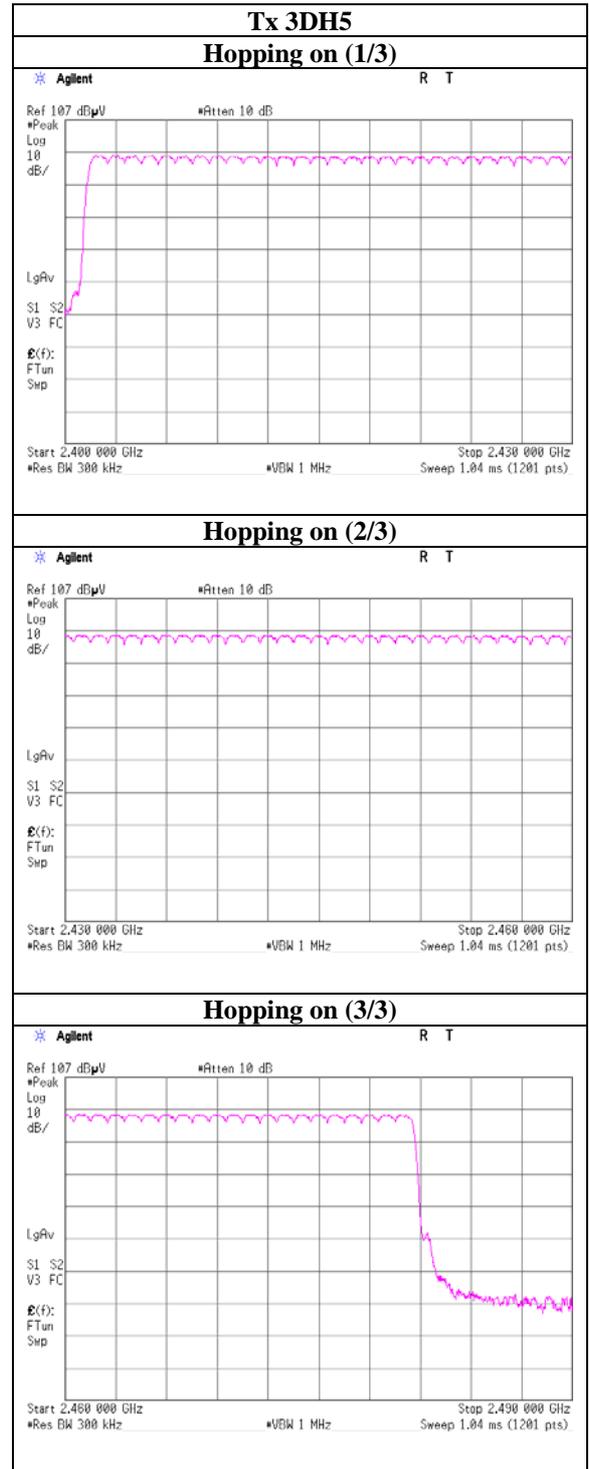
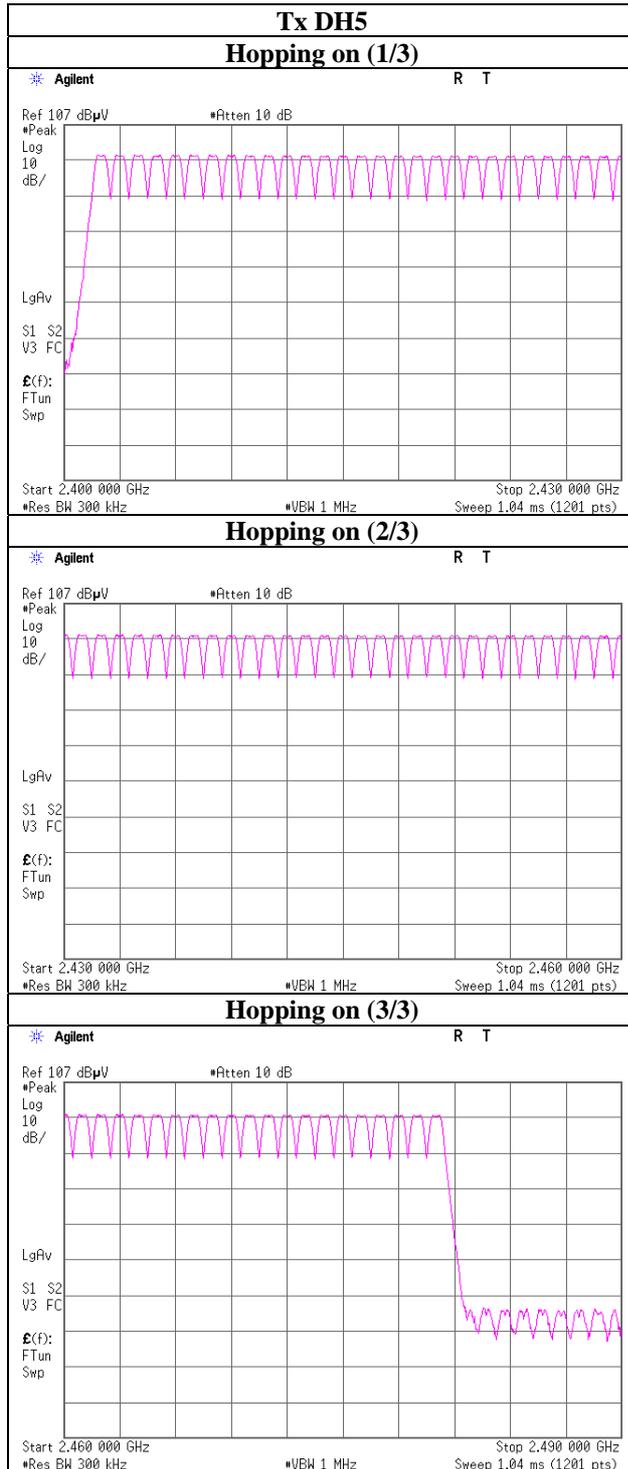
Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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

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



Number of Hopping Frequency



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Dwell time

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on)
	DH1/DH3/DH5/3DH1/3DH3/3DH5/Inquiry

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	50.6 times / 5 sec. x 31.6 sec. = 320 times	0.399	128	400
DH3	25.2 times / 5 sec. x 31.6 sec. = 160 times	1.663	266	400
DH5	16.2 times / 5 sec. x 31.6 sec. = 103 times	2.911	300	400
3DH1	49.6 times / 5 sec. x 31.6 sec. = 314 times	0.402	126	400
3DH3	25.4 times / 5 sec. x 31.6 sec. = 161 times	1.657	267	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	2.909	314	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.105	134	400

Sample Calculation

Result = Number of transmission x Length of transmission time

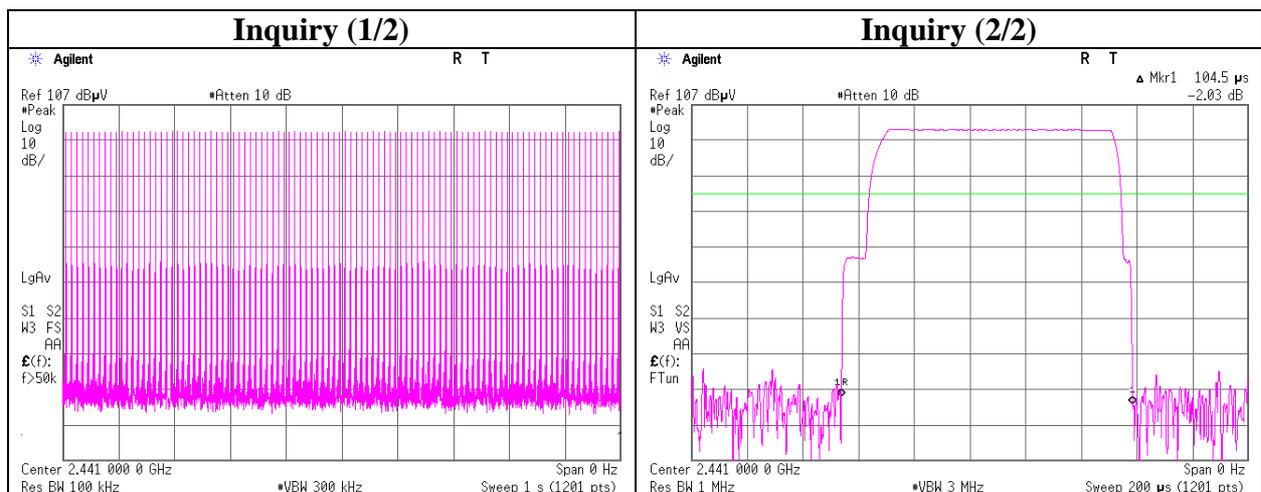
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	52	49	51	51	50.6
DH3	23	26	26	25	26	25.2
DH5	15	17	18	18	13	16.2
3DH1	50	49	49	50	50	49.6
3DH3	23	25	25	28	26	25.4
3DH5	15	16	19	18	17	17

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

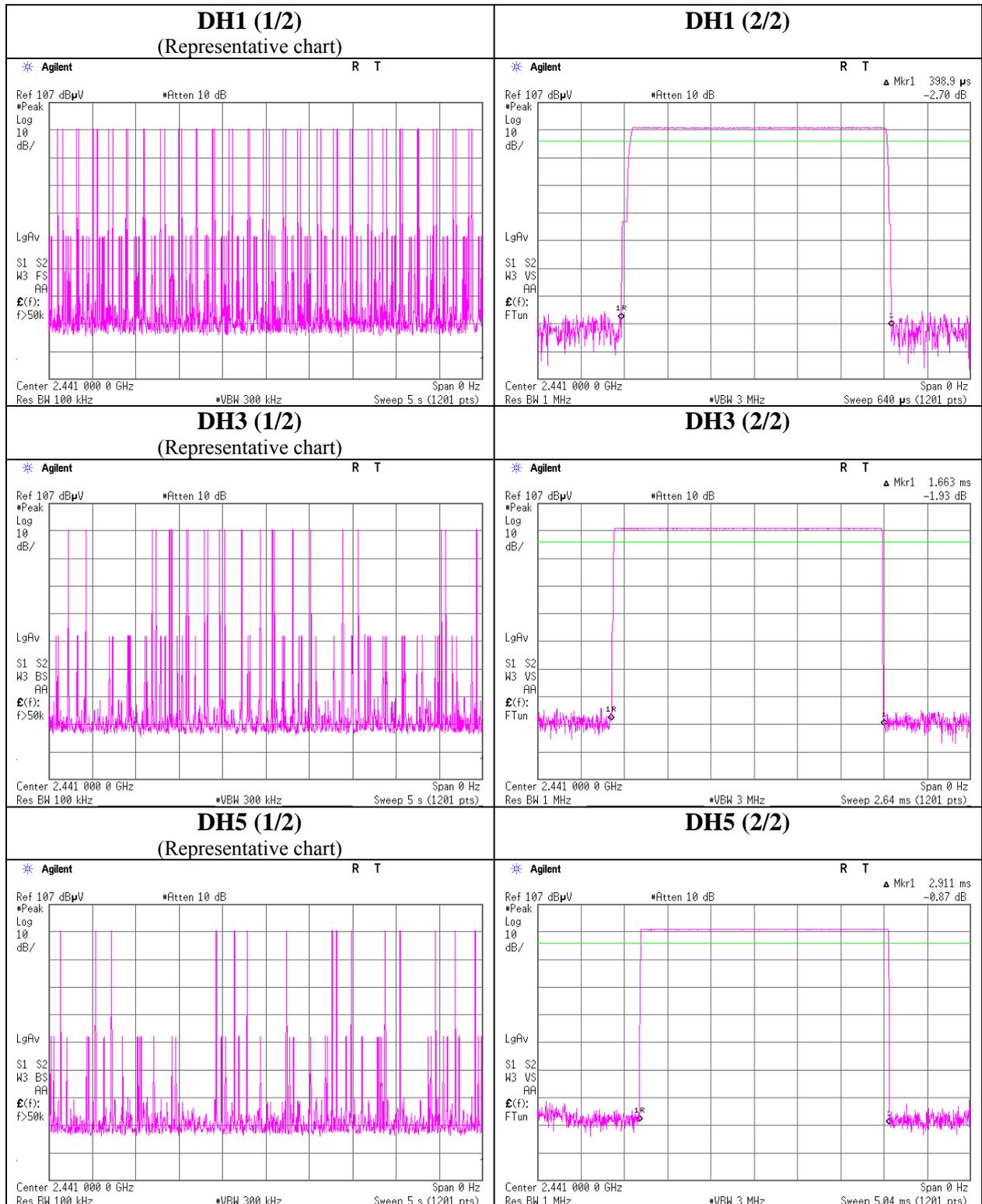
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s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



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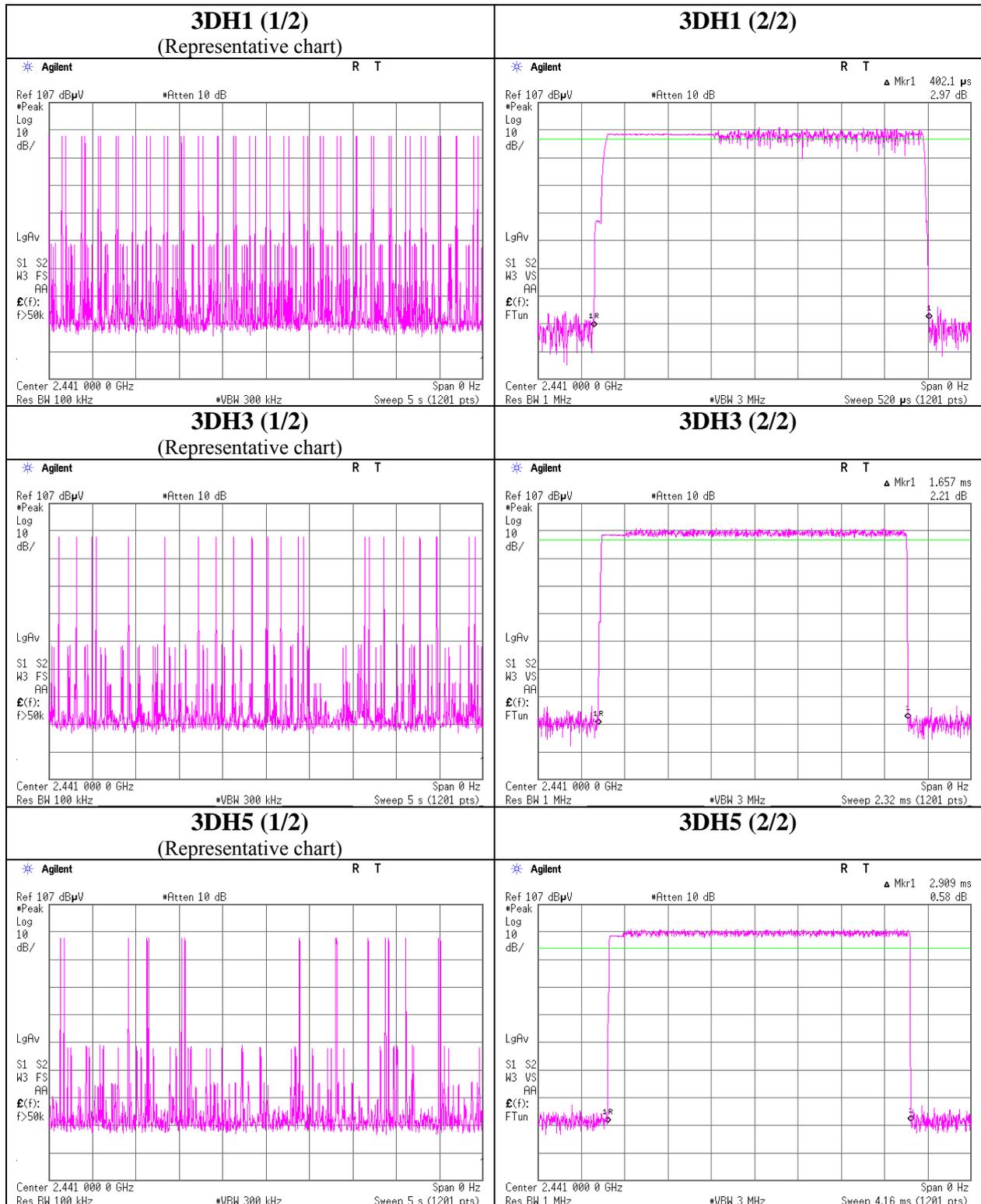
Dwell time



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Dwell time



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Maximum Peak Output Power

Test place : Ise HQ EMC Lab. No.3 Shielded Room
Report No. : 10250677H
Date : 03/14/2014
Temperature/ Humidity : 22 deg. C / 35% RH
Engineer : Yutaka Yoshida
Mode : Tx (Hopping off) DH5/2DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading Peak [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-7.83	0.74	9.97	2.88	1.94	20.96	125	18.08
DH5	2441.0	-8.20	0.74	9.97	2.51	1.78	20.96	125	18.45
DH5	2480.0	-8.55	0.75	9.97	2.17	1.65	20.96	125	18.79
2DH5	2402.0	-7.92	0.74	9.97	2.79	1.90	20.96	125	18.17
2DH5	2441.0	-8.31	0.74	9.97	2.40	1.74	20.96	125	18.56
2DH5	2480.0	-8.59	0.75	9.97	2.13	1.63	20.96	125	18.83
3DH5	2402.0	-7.27	0.74	9.97	3.44	2.21	20.96	125	17.52
3DH5	2441.0	-7.70	0.74	9.97	3.01	2.00	20.96	125	17.95
3DH5	2480.0	-8.06	0.75	9.97	2.66	1.85	20.96	125	18.30
Inquiry	2441.0	-7.69	0.74	9.97	3.02	2.00	20.96	125	17.94

Sample Calculation:

Result = Reading + Cable Loss + 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.

Average Power (For reporting purpose only)

Test place : Ise HQ EMC Lab. No.3 Shielded Room
Report No. : 10250677H
Date : 03/14/2014
Temperature/ Humidity : 22 deg. C / 35% RH
Engineer : Yutaka Yoshida
Mode : Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-9.06	0.74	9.97	1.65	1.46
DH5	2441.0	-9.46	0.74	9.97	1.25	1.33
DH5	2480.0	-9.80	0.75	9.97	0.92	1.24
2DH5	2402.0	-11.60	0.74	9.97	-0.89	0.81
2DH5	2441.0	-11.98	0.74	9.97	-1.27	0.75
2DH5	2480.0	-12.31	0.75	9.97	-1.59	0.69
3DH5	2402.0	-11.59	0.74	9.97	-0.88	0.82
3DH5	2441.0	-11.98	0.74	9.97	-1.27	0.75
3DH5	2480.0	-12.31	0.75	9.97	-1.59	0.69

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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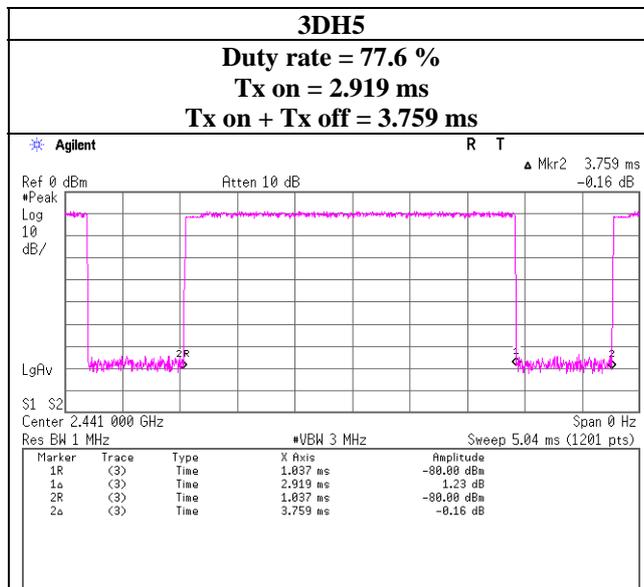
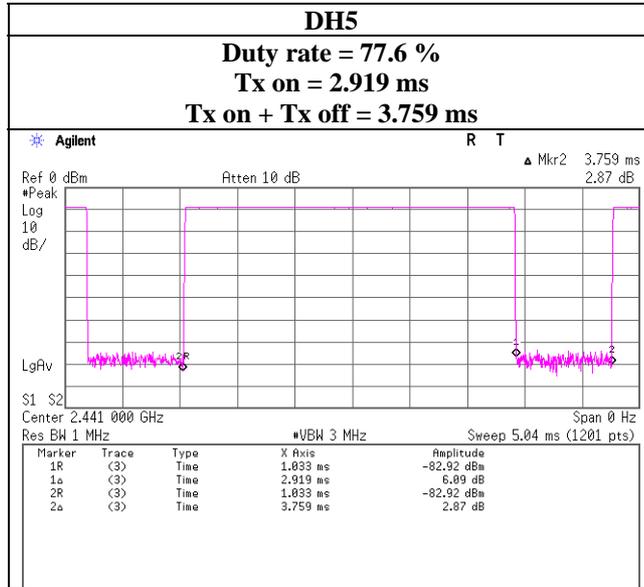
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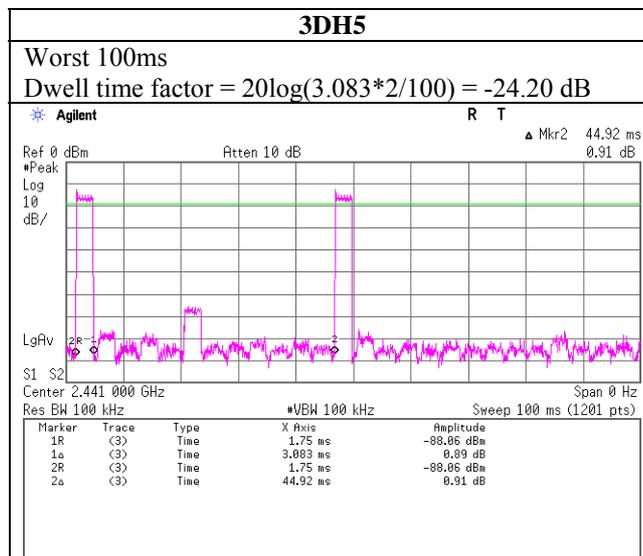
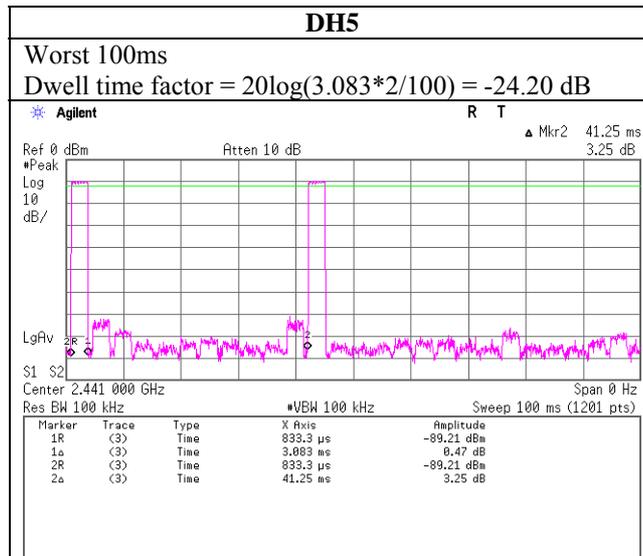
Burst rate confirmation

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping off) DH5/3DH5



Dwell time factor

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5



*Dwell time factor was not used for Radiated emission test.

Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa 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	32.703	QP	35.4	16.9	7.1	32.1	27.3	40.0	12.7	
Hori	198.099	QP	40.4	16.5	9.1	32.0	34.0	43.5	9.5	
Hori	405.008	QP	33.1	17.6	10.6	32.0	29.3	46.0	16.7	
Hori	624.094	QP	33.8	20.6	11.9	32.2	34.1	46.0	11.9	
Hori	718.762	QP	34.3	22.5	12.4	32.2	37.0	46.0	9.0	
Hori	743.290	QP	37.6	22.7	12.5	32.0	40.8	46.0	5.2	
Hori	2390.000	PK	43.6	28.2	3.1	32.4	42.5	73.9	31.4	
Hori	4804.000	PK	41.3	30.5	5.3	31.4	45.7	73.9	28.2	
Hori	7206.000	PK	43.6	35.8	6.7	32.3	53.8	73.9	20.1	
Hori	9608.000	PK	41.5	39.0	7.3	33.0	54.8	73.9	19.1	
Hori	16814.000	PK	45.1	40.1	-2.1	32.2	50.9	73.9	23.0	
Hori	2390.000	AV	30.4	28.2	3.1	32.4	29.3	53.9	24.6	
Hori	4804.000	AV	30.5	30.5	5.3	31.4	34.9	53.9	19.0	
Hori	7206.000	AV	31.6	35.8	6.7	32.3	41.8	53.9	12.1	
Hori	9608.000	AV	29.2	39.0	7.3	33.0	42.5	53.9	11.4	
Hori	16814.000	AV	34.8	40.1	-2.1	32.2	40.6	53.9	13.3	
Vert	32.661	QP	44.7	16.9	7.1	32.1	36.6	40.0	3.4	
Vert	197.945	QP	37.0	16.5	9.1	32.0	30.6	43.5	12.9	
Vert	405.465	QP	34.6	17.6	10.6	32.0	30.8	46.0	15.2	
Vert	624.100	QP	32.5	20.6	11.9	32.2	32.8	46.0	13.2	
Vert	718.759	QP	30.5	22.5	12.4	32.2	33.2	46.0	12.8	
Vert	742.493	QP	36.5	22.7	12.5	32.0	39.7	46.0	6.3	
Vert	2390.000	PK	43.0	28.2	3.1	32.4	41.9	73.9	32.0	
Vert	4804.000	PK	42.7	30.5	5.3	31.4	47.1	73.9	26.8	
Vert	7206.000	PK	43.1	35.8	6.7	32.3	53.3	73.9	20.6	
Vert	9608.000	PK	44.1	39.0	7.3	33.0	57.4	73.9	16.5	
Vert	16814.000	PK	43.7	40.1	-2.1	32.2	49.5	73.9	24.4	
Vert	2390.000	AV	30.0	28.2	3.1	32.4	28.9	53.9	25.0	
Vert	4804.000	AV	30.1	30.5	5.3	31.4	34.5	53.9	19.4	
Vert	7206.000	AV	30.9	35.8	6.7	32.3	41.1	53.9	12.8	
Vert	9608.000	AV	29.2	39.0	7.3	33.0	42.5	53.9	11.4	
Vert	16814.000	AV	30.7	40.1	-2.1	32.2	36.5	53.9	17.4	

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

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2402.000	PK	103.9	28.2	3.1	32.4	102.8	-	-	Carrier
Hori	2400.000	PK	44.8	28.2	3.1	32.4	43.7	82.8	39.1	
Vert	2402.000	PK	102.5	28.2	3.1	32.4	101.4	-	-	Carrier
Vert	2400.000	PK	43.1	28.2	3.1	32.4	42.0	81.4	39.4	

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

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Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa 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	32.697	QP	36.5	16.9	7.1	32.1	28.4	40.0	11.6	
Hori	198.105	QP	40.5	16.5	9.1	32.0	34.1	43.5	9.4	
Hori	405.006	QP	35.6	17.6	10.6	32.0	31.8	46.0	14.2	
Hori	624.103	QP	33.6	20.6	11.9	32.2	33.9	46.0	12.1	
Hori	718.772	QP	34.1	22.5	12.4	32.2	36.8	46.0	9.2	
Hori	743.282	QP	37.1	22.7	12.5	32.0	40.3	46.0	5.7	
Hori	4882.000	PK	41.9	30.6	5.3	31.4	46.4	73.9	27.5	
Hori	7323.000	PK	42.3	36.0	6.8	32.4	52.7	73.9	21.2	
Hori	9764.000	PK	41.1	39.4	7.3	33.0	54.8	73.9	19.1	
Hori	17087.000	PK	43.0	41.2	-2.0	32.3	49.9	73.9	24.0	
Hori	4882.000	AV	30.6	30.6	5.3	31.4	35.1	53.9	18.8	
Hori	7323.000	AV	30.1	36.0	6.8	32.4	40.5	53.9	13.4	
Hori	9764.000	AV	28.3	39.4	7.3	33.0	42.0	53.9	11.9	
Hori	17087.000	AV	30.2	41.2	-2.0	32.3	37.1	53.9	16.8	
Vert	32.661	QP	44.5	16.9	7.1	32.1	36.4	40.0	3.6	
Vert	197.937	QP	37.2	16.5	9.1	32.0	30.8	43.5	12.7	
Vert	405.454	QP	34.7	17.6	10.6	32.0	30.9	46.0	15.1	
Vert	624.103	QP	32.5	20.6	11.9	32.2	32.8	46.0	13.2	
Vert	718.763	QP	30.4	22.5	12.4	32.2	33.1	46.0	12.9	
Vert	742.486	QP	36.9	22.7	12.5	32.0	40.1	46.0	5.9	
Vert	4882.000	PK	41.9	30.6	5.3	31.4	46.4	73.9	27.5	
Vert	7323.000	PK	44.0	36.0	6.8	32.4	54.4	73.9	19.5	
Vert	9764.000	PK	41.7	39.4	7.3	33.0	55.4	73.9	18.5	
Vert	17087.000	PK	42.9	41.2	-2.0	32.3	49.8	73.9	24.1	
Vert	4882.000	AV	32.5	30.6	5.3	31.4	37.0	53.9	16.9	
Vert	7323.000	AV	31.8	36.0	6.8	32.4	42.2	53.9	11.7	
Vert	9764.000	AV	29.3	39.4	7.3	33.0	43.0	53.9	10.9	
Vert	17087.000	AV	30.4	41.2	-2.0	32.3	37.3	53.9	16.6	

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

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

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

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Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
Mode Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	32.791	QP	39.0	16.9	7.1	32.1	30.9	40.0	9.1	
Hori	198.070	QP	37.7	16.5	9.1	32.0	31.3	43.5	12.2	
Hori	405.009	QP	35.8	17.6	10.6	32.0	32.0	46.0	14.0	
Hori	624.101	QP	33.1	20.6	11.9	32.2	33.4	46.0	12.6	
Hori	718.842	QP	34.3	22.5	12.4	32.2	37.0	46.0	9.0	
Hori	743.279	QP	35.8	22.7	12.5	32.0	39.0	46.0	7.0	
Hori	2483.500	PK	52.2	28.4	3.1	32.3	51.4	73.9	22.5	
Hori	4960.000	PK	40.6	30.7	5.4	31.4	45.3	73.9	28.6	
Hori	7440.000	PK	42.3	36.2	6.7	32.4	52.8	73.9	21.1	
Hori	9920.000	PK	41.3	39.8	7.4	33.1	55.4	73.9	18.5	
Hori	17360.000	PK	42.6	43.1	-1.9	32.3	51.5	73.9	22.4	
Hori	2483.500	AV	32.3	28.4	3.1	32.3	31.5	53.9	22.4	
Hori	4960.000	AV	27.9	30.7	5.4	31.4	32.6	53.9	21.3	
Hori	7440.000	AV	30.4	36.2	6.7	32.4	40.9	53.9	13.0	
Hori	9920.000	AV	28.4	39.8	7.4	33.1	42.5	53.9	11.4	
Hori	17360.000	AV	30.4	43.1	-1.9	32.3	39.3	53.9	14.6	
Vert	32.790	QP	45.3	16.9	7.1	32.1	37.2	40.0	2.8	
Vert	197.897	QP	37.5	16.5	9.1	32.0	31.1	43.5	12.4	
Vert	405.449	QP	35.1	17.6	10.6	32.0	31.3	46.0	14.7	
Vert	624.097	QP	32.2	20.6	11.9	32.2	32.5	46.0	13.5	
Vert	718.784	QP	30.6	22.5	12.4	32.2	33.3	46.0	12.7	
Vert	742.491	QP	36.7	22.7	12.5	32.0	39.9	46.0	6.1	
Vert	2483.500	PK	52.0	28.4	3.1	32.3	51.2	73.9	22.7	
Vert	4960.000	PK	41.6	30.7	5.4	31.4	46.3	73.9	27.6	
Vert	7440.000	PK	44.1	36.2	6.7	32.4	54.6	73.9	19.3	
Vert	9920.000	PK	41.7	39.8	7.4	33.1	55.8	73.9	18.1	
Vert	17360.000	PK	43.3	43.1	-1.9	32.3	52.2	73.9	21.7	
Vert	2483.500	AV	32.6	28.4	3.1	32.3	31.8	53.9	22.1	
Vert	4960.000	AV	28.9	30.7	5.4	31.4	33.6	53.9	20.3	
Vert	7440.000	AV	31.8	36.2	6.7	32.4	42.3	53.9	11.6	
Vert	9920.000	AV	29.4	39.8	7.4	33.1	43.5	53.9	10.4	
Vert	17360.000	AV	30.2	43.1	-1.9	32.3	39.1	53.9	14.8	

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

Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa 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	33.289	QP	39.6	16.8	7.1	32.1	31.4	40.0	8.6	
Hori	198.016	QP	39.3	16.5	9.1	32.0	32.9	43.5	10.6	
Hori	405.492	QP	35.4	17.6	10.6	32.0	31.6	46.0	14.4	
Hori	544.079	QP	31.0	19.6	11.4	32.1	29.9	46.0	16.1	
Hori	718.765	QP	32.6	22.5	12.4	32.2	35.3	46.0	10.7	
Hori	742.469	QP	38.5	22.7	12.5	32.0	41.7	46.0	4.3	
Hori	2390.000	PK	52.6	28.2	3.1	32.4	51.5	73.9	22.4	
Hori	4804.000	PK	41.5	30.5	5.3	31.4	45.9	73.9	28.0	
Hori	7206.000	PK	41.6	35.8	6.7	32.3	51.8	73.9	22.1	
Hori	9608.000	PK	41.8	39.0	7.3	33.0	55.1	73.9	18.8	
Hori	16814.000	PK	46.1	40.1	-2.1	32.2	51.9	73.9	22.0	
Hori	2390.000	AV	32.6	28.2	3.1	32.4	31.5	53.9	22.4	
Hori	4804.000	AV	30.6	30.5	5.3	31.4	35.0	53.9	18.9	
Hori	7206.000	AV	29.5	35.8	6.7	32.3	39.7	53.9	14.2	
Hori	9608.000	AV	29.2	39.0	7.3	33.0	42.5	53.9	11.4	
Hori	16814.000	AV	33.3	40.1	-2.1	32.2	39.1	53.9	14.8	
Vert	33.200	QP	43.4	16.8	7.1	32.1	35.2	40.0	4.8	
Vert	198.016	QP	37.3	16.5	9.1	32.0	30.9	43.5	12.6	
Vert	378.906	QP	41.8	17.3	10.4	31.9	37.6	46.0	8.4	
Vert	544.075	QP	33.3	19.6	11.4	32.1	32.2	46.0	13.8	
Vert	718.758	QP	29.0	22.5	12.4	32.2	31.7	46.0	14.3	
Vert	742.493	QP	36.0	22.7	12.5	32.0	39.2	46.0	6.8	
Vert	2390.000	PK	55.5	28.2	3.1	32.4	54.4	73.9	19.5	
Vert	4804.000	PK	42.0	30.5	5.3	31.4	46.4	73.9	27.5	
Vert	7206.000	PK	42.6	35.8	6.7	32.3	52.8	73.9	21.1	
Vert	9608.000	PK	41.7	39.0	7.3	33.0	55.0	73.9	18.9	
Vert	16814.000	PK	43.1	40.1	-2.1	32.2	48.9	73.9	25.0	
Vert	2390.000	AV	34.5	28.2	3.1	32.4	33.4	53.9	20.5	
Vert	4804.000	AV	30.5	30.5	5.3	31.4	34.9	53.9	19.0	
Vert	7206.000	AV	30.1	35.8	6.7	32.3	40.3	53.9	13.6	
Vert	9608.000	AV	29.2	39.0	7.3	33.0	42.5	53.9	11.4	
Vert	16814.000	AV	31.5	40.1	-2.1	32.2	37.3	53.9	16.6	

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

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

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

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant.Fac.	Loss	Gain	Result	Limit	Margin	Remark
Hori	2402.000	PK	103.9	28.2	3.1	32.4	102.8	-	-	Carrier
Hori	2400.000	PK	53.1	28.2	3.1	32.4	52.0	82.8	30.8	
Vert	2402.000	PK	105.9	28.2	3.1	32.4	104.8	-	-	Carrier
Vert	2400.000	PK	55.4	28.2	3.1	32.4	54.3	84.8	30.5	

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

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Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa 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	33.273	QP	39.5	16.8	7.1	32.1	31.3	40.0	8.7	
Hori	198.014	QP	38.8	16.5	9.1	32.0	32.4	43.5	11.1	
Hori	405.474	QP	35.3	17.6	10.6	32.0	31.5	46.0	14.5	
Hori	544.073	QP	31.2	19.6	11.4	32.1	30.1	46.0	15.9	
Hori	718.761	QP	32.3	22.5	12.4	32.2	35.0	46.0	11.0	
Hori	742.474	QP	38.1	22.7	12.5	32.0	41.3	46.0	4.7	
Hori	4882.000	PK	43.0	30.6	5.3	31.4	47.5	73.9	26.4	
Hori	7323.000	PK	41.9	36.0	6.8	32.4	52.3	73.9	21.6	
Hori	9764.000	PK	41.7	39.4	7.3	33.0	55.4	73.9	18.5	
Hori	17360.000	PK	44.5	43.1	-1.9	32.3	53.4	73.9	20.5	
Hori	4882.000	AV	31.1	30.6	5.3	31.4	35.6	53.9	18.3	
Hori	7323.000	AV	29.5	36.0	6.8	32.4	39.9	53.9	14.0	
Hori	9764.000	AV	29.2	39.4	7.3	33.0	42.9	53.9	11.0	
Hori	17360.000	AV	30.8	43.1	-1.9	32.3	39.7	53.9	14.2	
Vert	33.228	QP	43.8	16.8	7.1	32.1	35.6	40.0	4.4	
Vert	198.017	QP	37.4	16.5	9.1	32.0	31.0	43.5	12.5	
Vert	378.911	QP	41.6	17.3	10.4	31.9	37.4	46.0	8.6	
Vert	544.079	QP	33.1	19.6	11.4	32.1	32.0	46.0	14.0	
Vert	718.762	QP	29.1	22.5	12.4	32.2	31.8	46.0	14.2	
Vert	742.485	QP	36.4	22.7	12.5	32.0	39.6	46.0	6.4	
Vert	4882.000	PK	42.8	30.6	5.3	31.4	47.3	73.9	26.6	
Vert	7323.000	PK	42.5	36.0	6.8	32.4	52.9	73.9	21.0	
Vert	9764.000	PK	41.3	39.4	7.3	33.0	55.0	73.9	18.9	
Vert	17360.000	PK	42.8	43.1	-1.9	32.3	51.7	73.9	22.2	
Vert	4882.000	AV	31.6	30.6	5.3	31.4	36.1	53.9	17.8	
Vert	7323.000	AV	30.2	36.0	6.8	32.4	40.6	53.9	13.3	
Vert	9764.000	AV	29.3	39.4	7.3	33.0	43.0	53.9	10.9	
Vert	17360.000	AV	30.5	43.1	-1.9	32.3	39.4	53.9	14.5	

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

Radiated Spurious Emission

Test place Ise HQ EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 100250677HH
Date 03/20/2014 03/24/2014
Temperature/ Humidity 23 deg. C / 41% RH 22 deg. C / 34% RH
Engineer Tomohisa Nakagawa Takumi Shimada
(1-26.5GHz) (30-1000MHz)
Mode Tx, 3DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.223	QP	38.5	16.8	7.1	32.1	30.3	40.0	9.7	
Hori	197.990	QP	40.8	16.5	9.1	32.0	34.4	43.5	9.1	
Hori	405.439	QP	35.4	17.6	10.6	32.0	31.6	46.0	14.4	
Hori	544.084	QP	31.4	19.6	11.4	32.1	30.3	46.0	15.7	
Hori	718.639	QP	32.5	22.5	12.4	32.2	35.2	46.0	10.8	
Hori	742.467	QP	37.8	22.7	12.5	32.0	41.0	46.0	5.0	
Hori	2483.500	PK	57.8	28.4	3.1	32.3	57.0	73.9	16.9	
Hori	4960.000	PK	40.9	30.7	5.4	31.4	45.6	73.9	28.3	
Hori	7440.000	PK	42.5	36.2	6.7	32.4	53.0	73.9	20.9	
Hori	9920.000	PK	42.2	39.8	7.4	33.1	56.3	73.9	17.6	
Hori	17360.000	PK	44.5	43.1	-1.9	32.3	53.4	73.9	20.5	
Hori	2483.500	AV	37.4	28.4	3.1	32.3	36.6	53.9	17.3	
Hori	4960.000	AV	28.4	30.7	5.4	31.4	33.1	53.9	20.8	
Hori	7440.000	AV	29.9	36.2	6.7	32.4	40.4	53.9	13.5	
Hori	9920.000	AV	29.3	39.8	7.4	33.1	43.4	53.9	10.5	
Hori	17360.000	AV	30.8	43.1	-1.9	32.3	39.7	53.9	14.2	
Vert	33.289	QP	43.5	16.8	7.1	32.1	35.3	40.0	4.7	
Vert	196.556	QP	37.4	16.5	9.1	32.0	31.0	43.5	12.5	
Vert	378.909	QP	41.1	17.3	10.4	31.9	36.9	46.0	9.1	
Vert	544.083	QP	33.3	19.6	11.4	32.1	32.2	46.0	13.8	
Vert	718.757	QP	29.2	22.5	12.4	32.2	31.9	46.0	14.1	
Vert	742.478	QP	36.7	22.7	12.5	32.0	39.9	46.0	6.1	
Vert	2483.500	PK	56.6	28.4	3.1	32.3	55.8	73.9	18.1	
Vert	4960.000	PK	40.4	30.7	5.4	31.4	45.1	73.9	28.8	
Vert	7440.000	PK	42.4	36.2	6.7	32.4	52.9	73.9	21.0	
Vert	9920.000	PK	41.7	39.8	7.4	33.1	55.8	73.9	18.1	
Vert	17360.000	PK	42.8	43.1	-1.9	32.3	51.7	73.9	22.2	
Vert	2483.500	AV	36.7	28.4	3.1	32.3	35.9	53.9	18.0	
Vert	4960.000	AV	28.9	30.7	5.4	31.4	33.6	53.9	20.3	
Vert	7440.000	AV	30.8	36.2	6.7	32.4	41.3	53.9	12.6	
Vert	9920.000	AV	29.3	39.8	7.4	33.1	43.4	53.9	10.5	
Vert	17360.000	AV	30.5	43.1	-1.9	32.3	39.4	53.9	14.5	

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

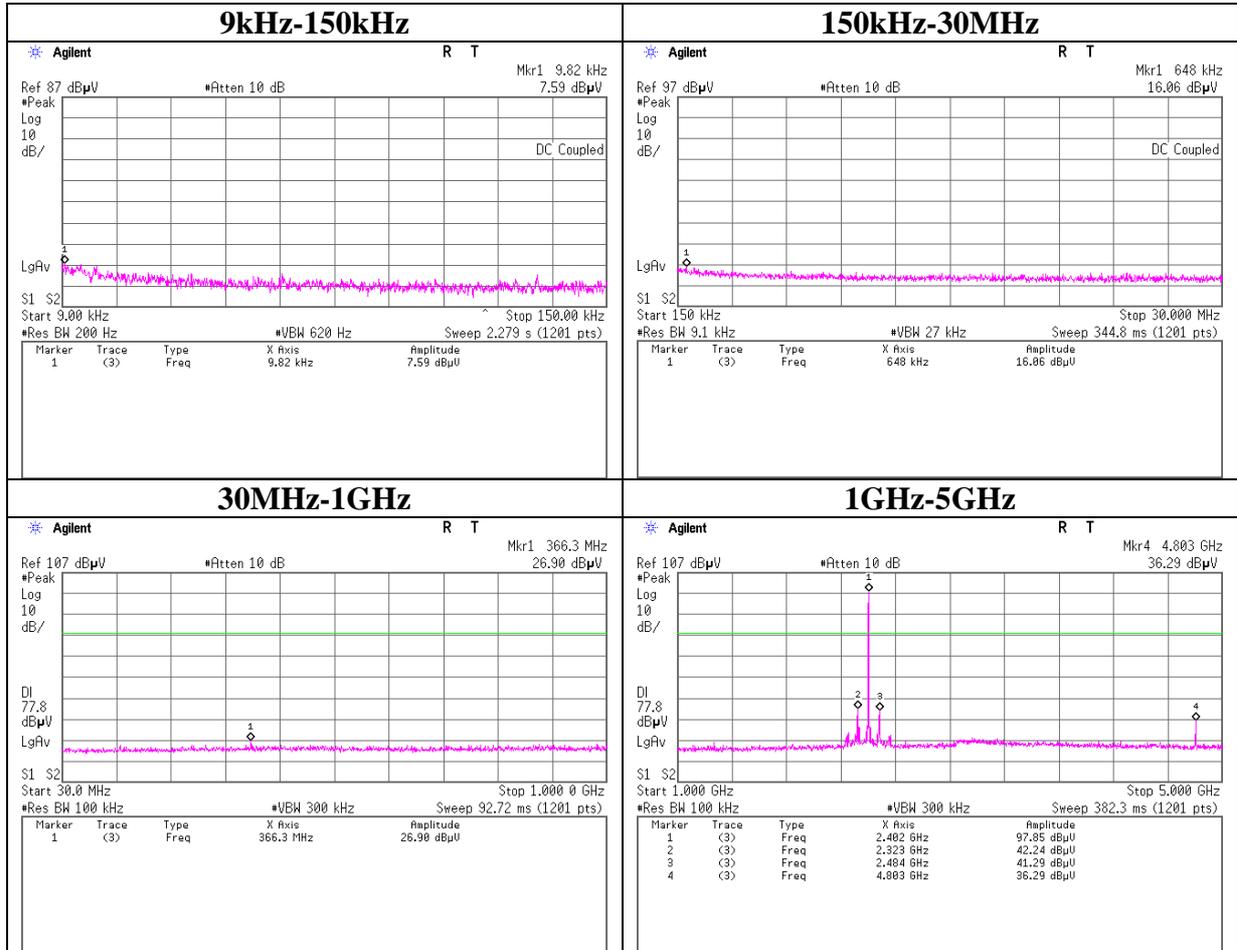
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

Conducted Spurious Emission

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5

Tx DH5 2402MHz

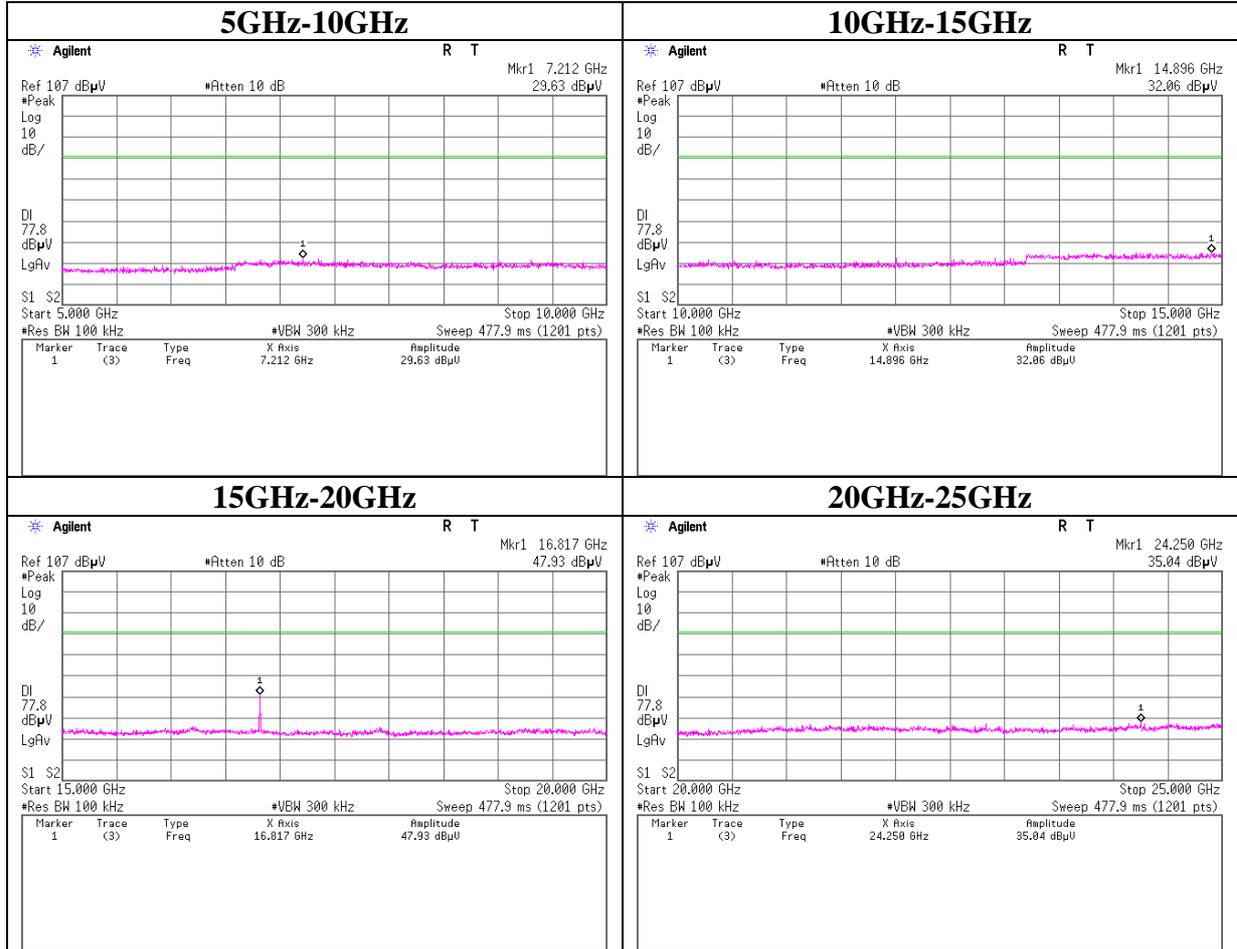


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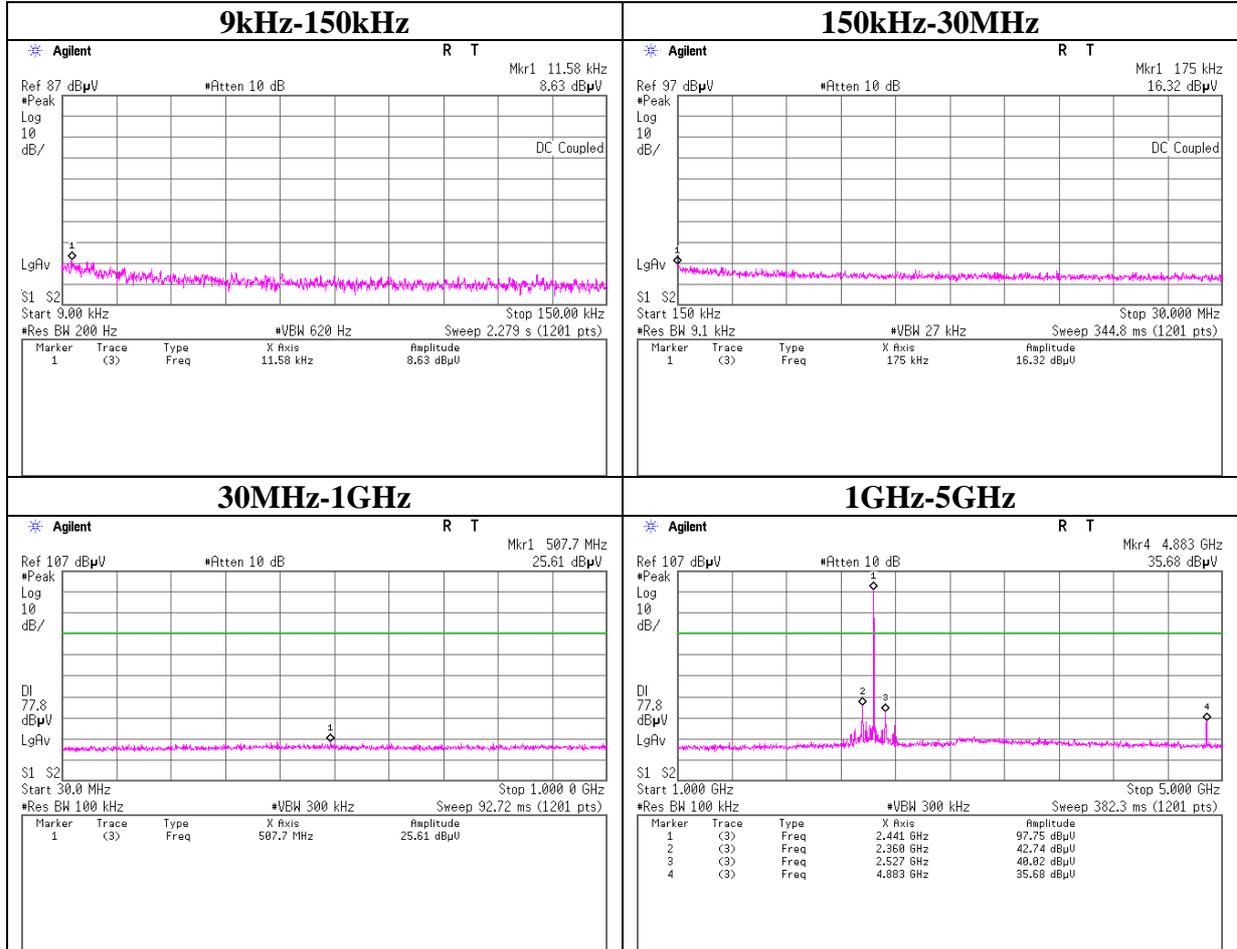
Conducted Spurious Emission

Tx DH5 2402MHz



Conducted Spurious Emission

Tx DH5 2441MHz



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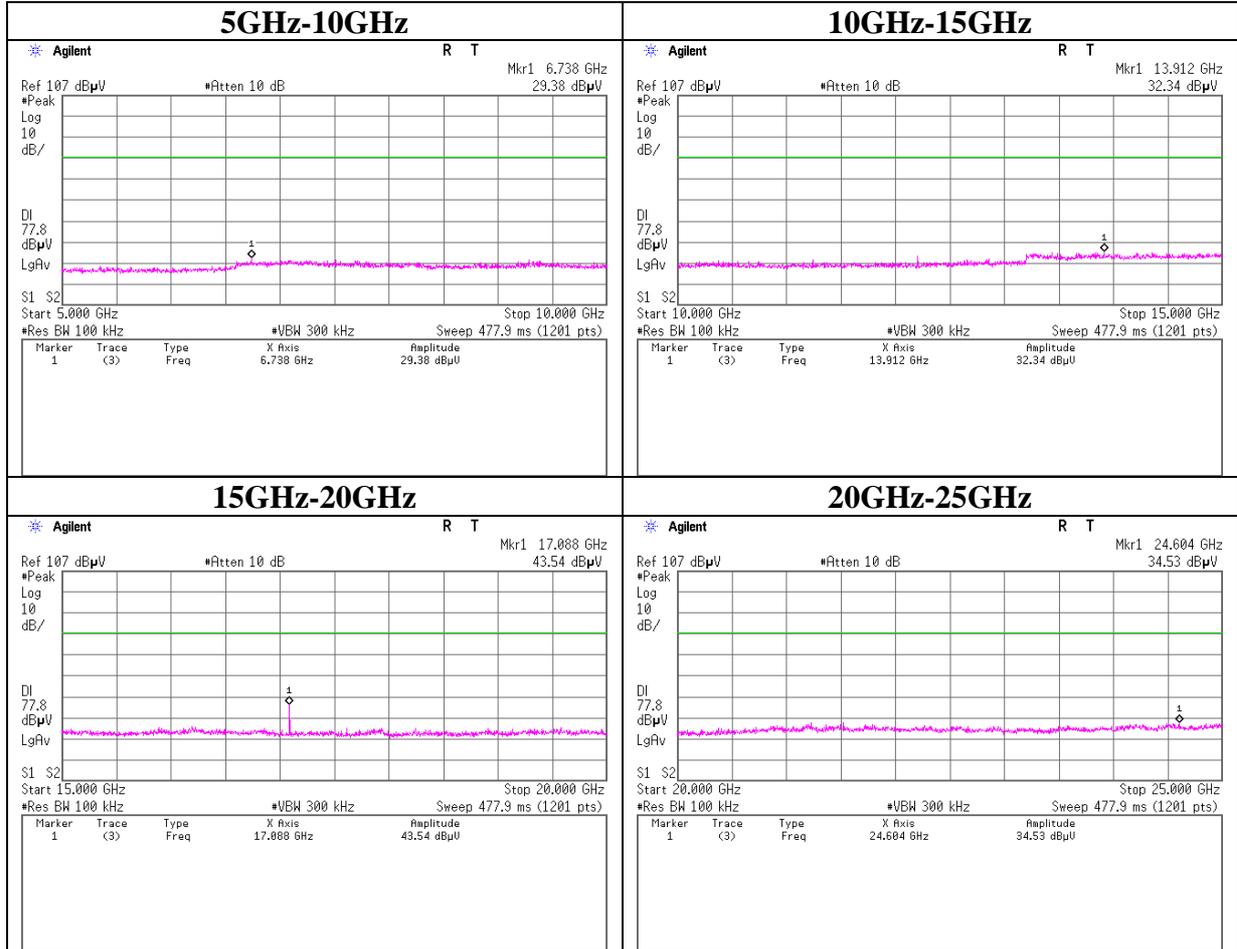
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Conducted Spurious Emission

Tx DH5 2441MHz



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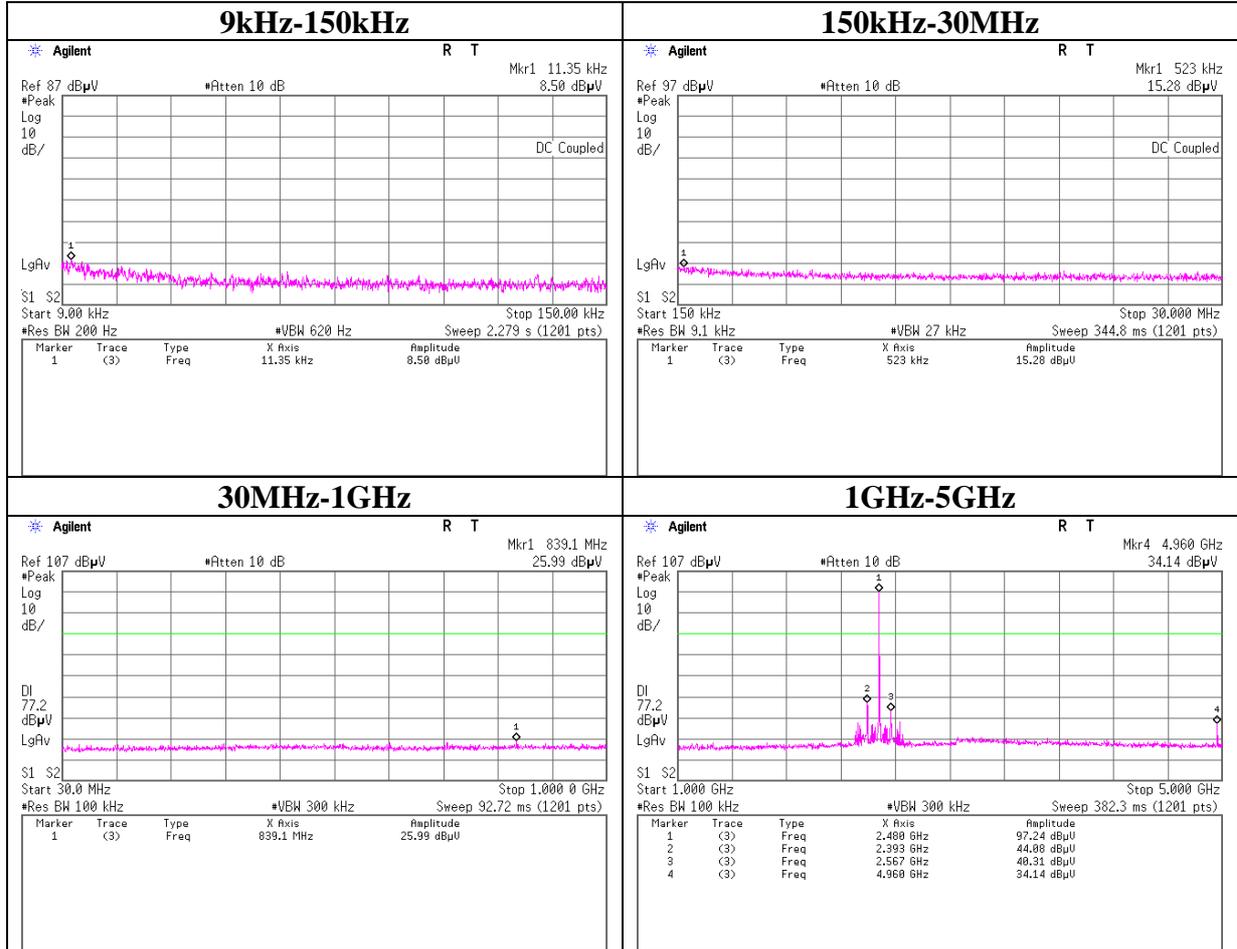
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Conducted Spurious Emission

Tx DH5 2480MHz



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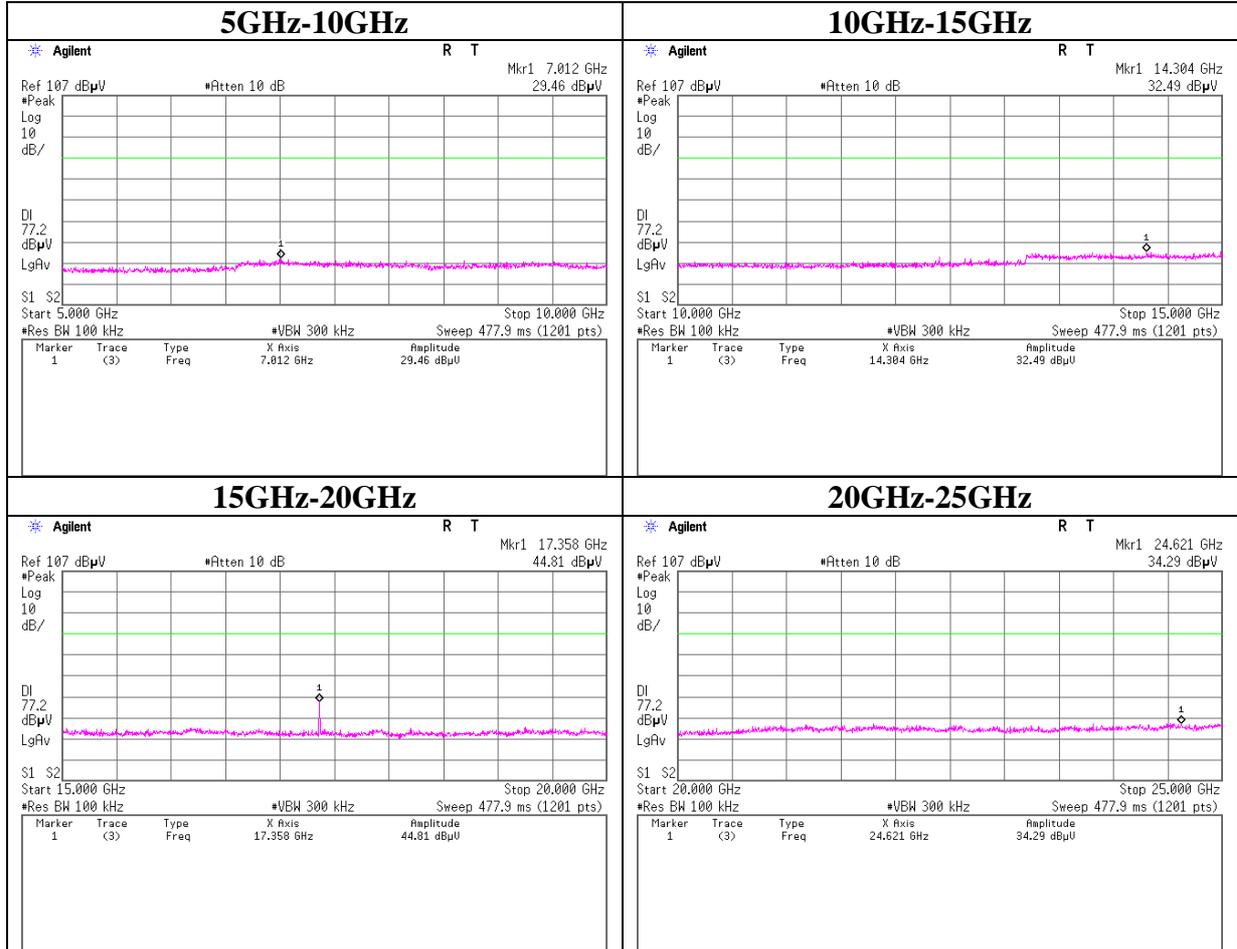
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Conducted Spurious Emission

Tx DH5 2480MHz

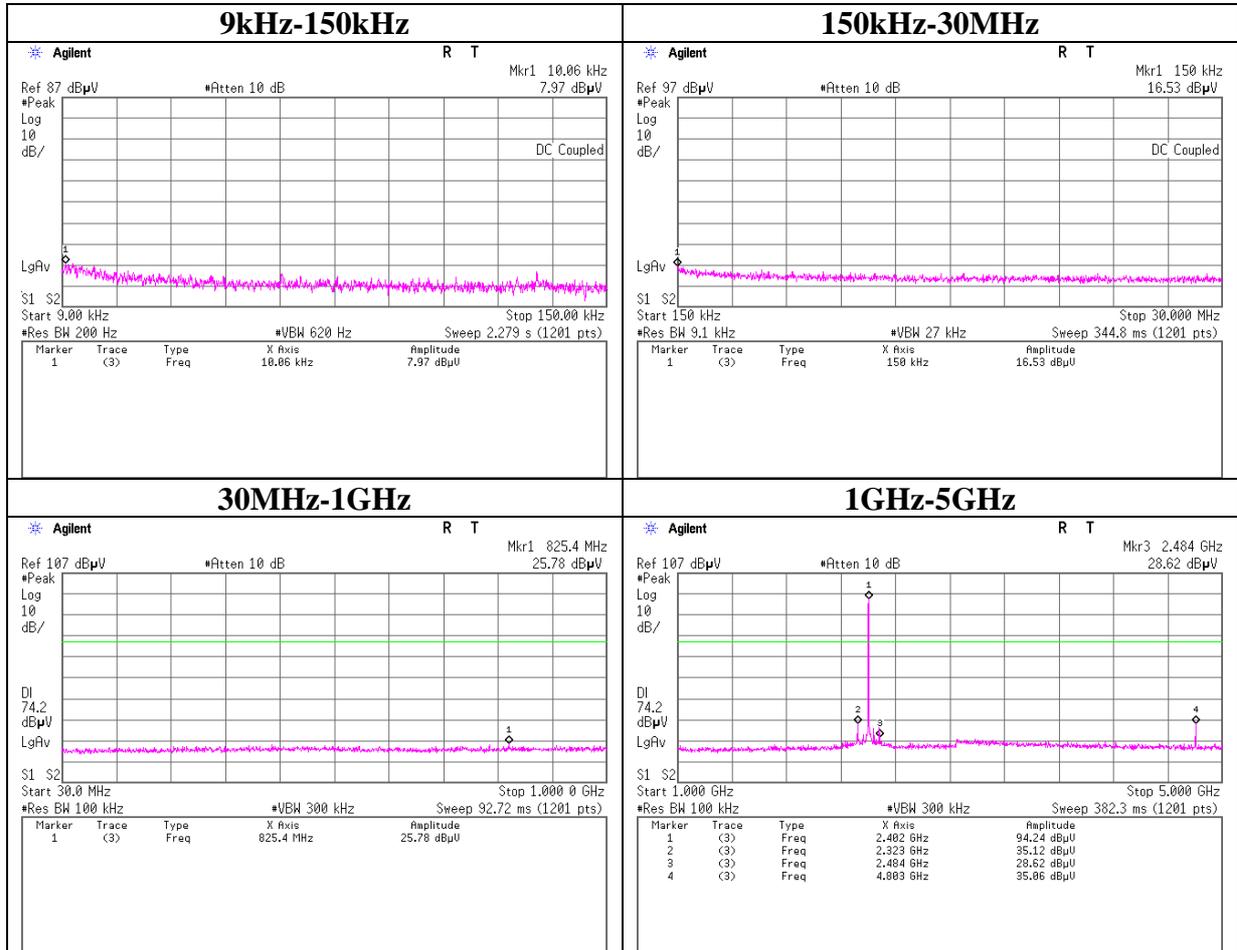


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Conducted Spurious Emission

Tx 3DH5 2402MHz



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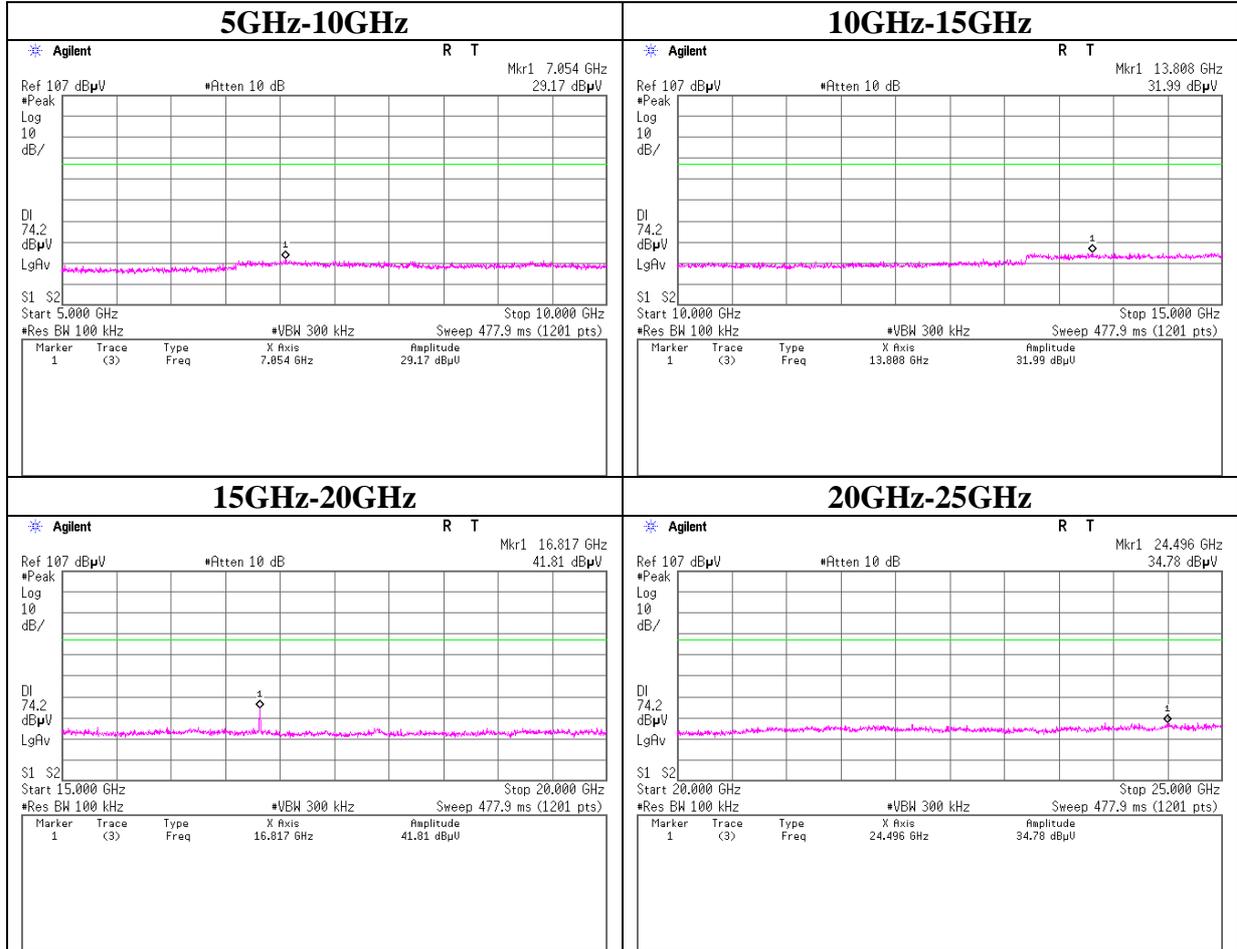
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Telephone : +81 596 24 8999

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Conducted Spurious Emission

Tx 3DH5 2402MHz



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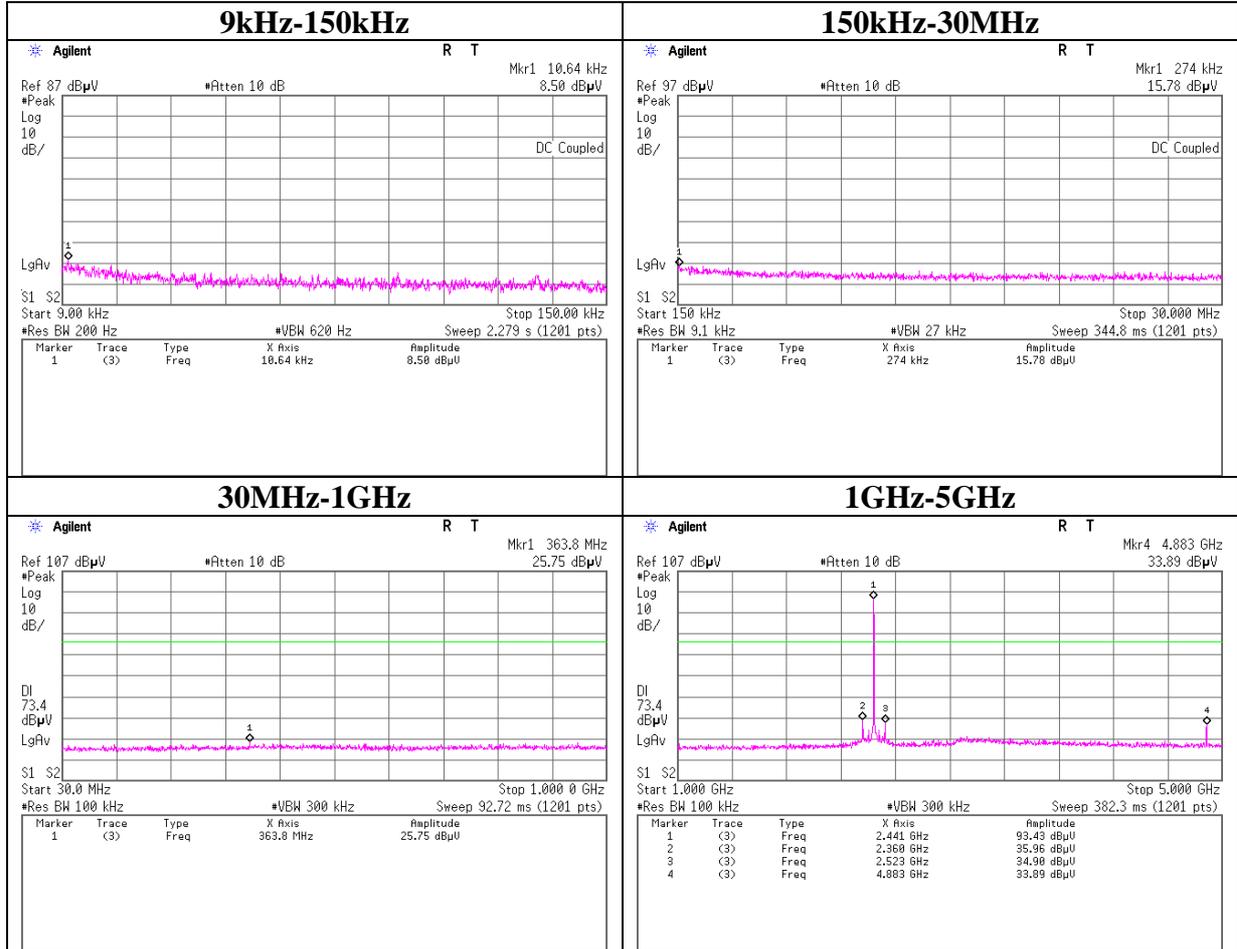
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Conducted Spurious Emission

Tx 3DH5 2441MHz



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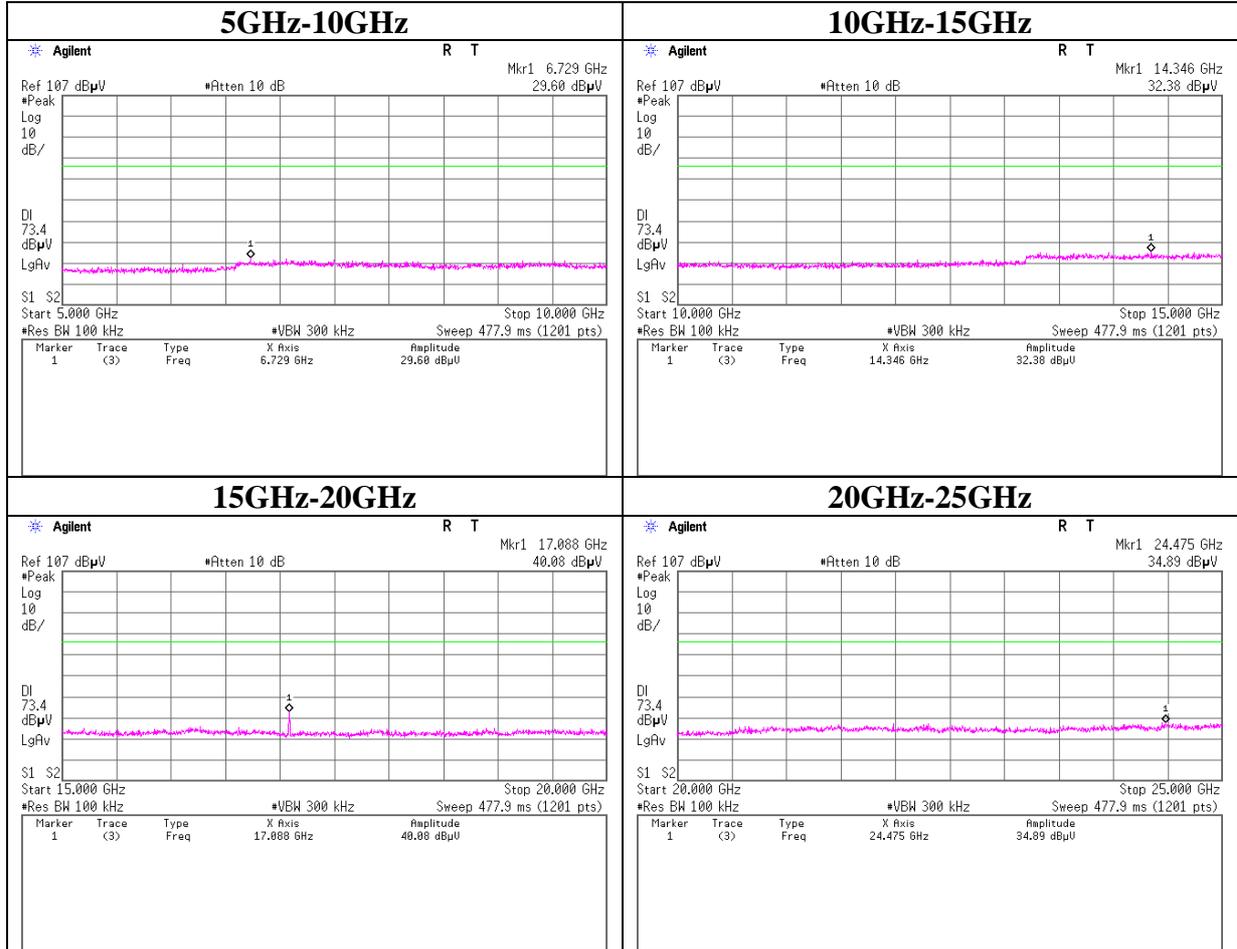
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Conducted Spurious Emission

Tx 3DH5 2441MHz



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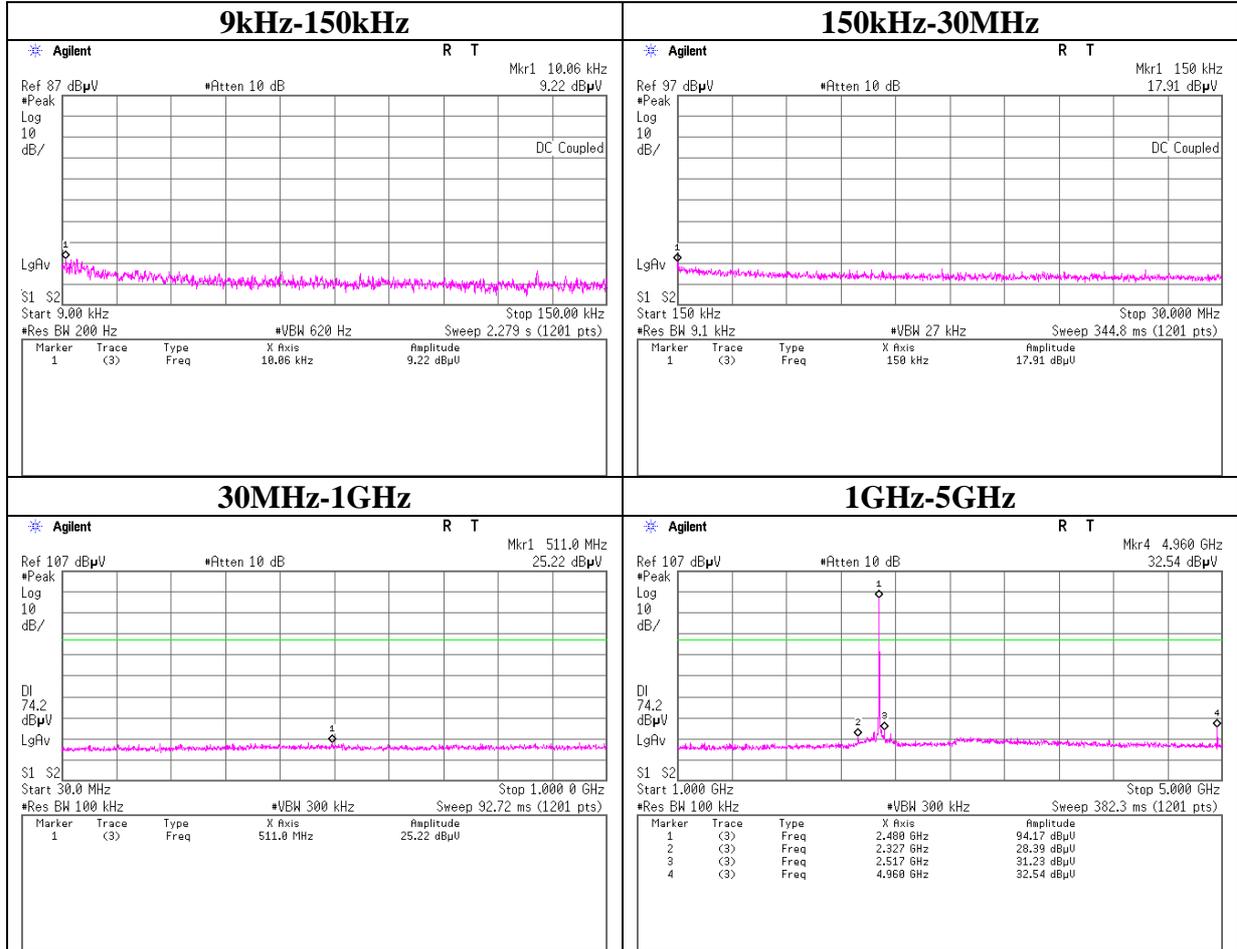
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Telephone : +81 596 24 8999

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Conducted Spurious Emission

Tx 3DH5 2480MHz



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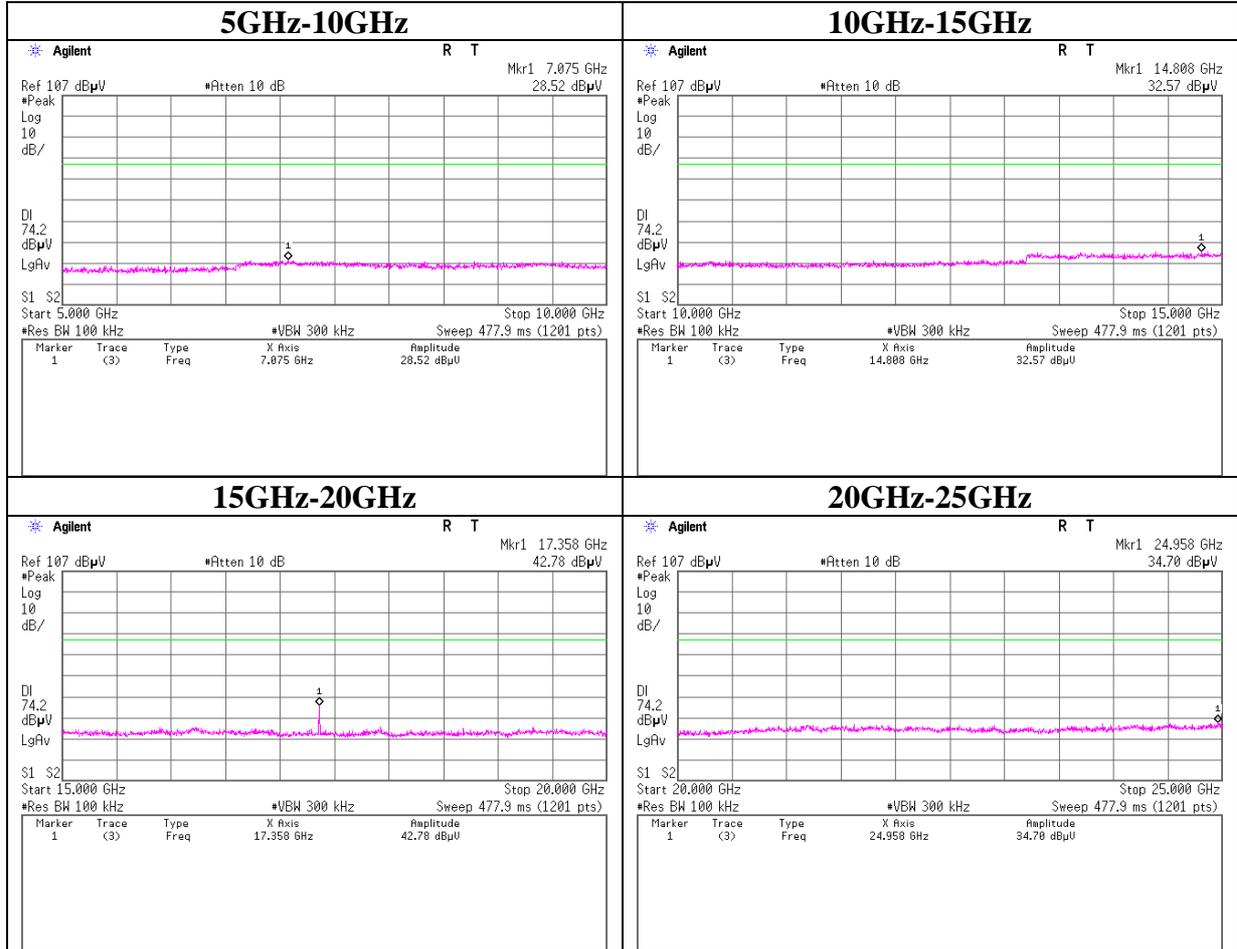
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Conducted Spurious Emission

Tx 3DH5 2480MHz



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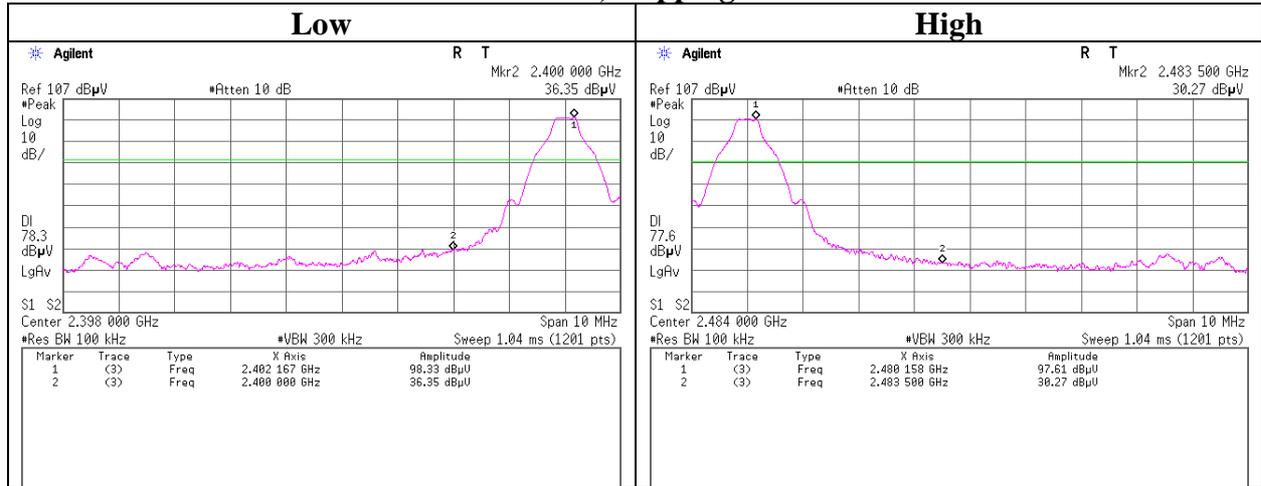
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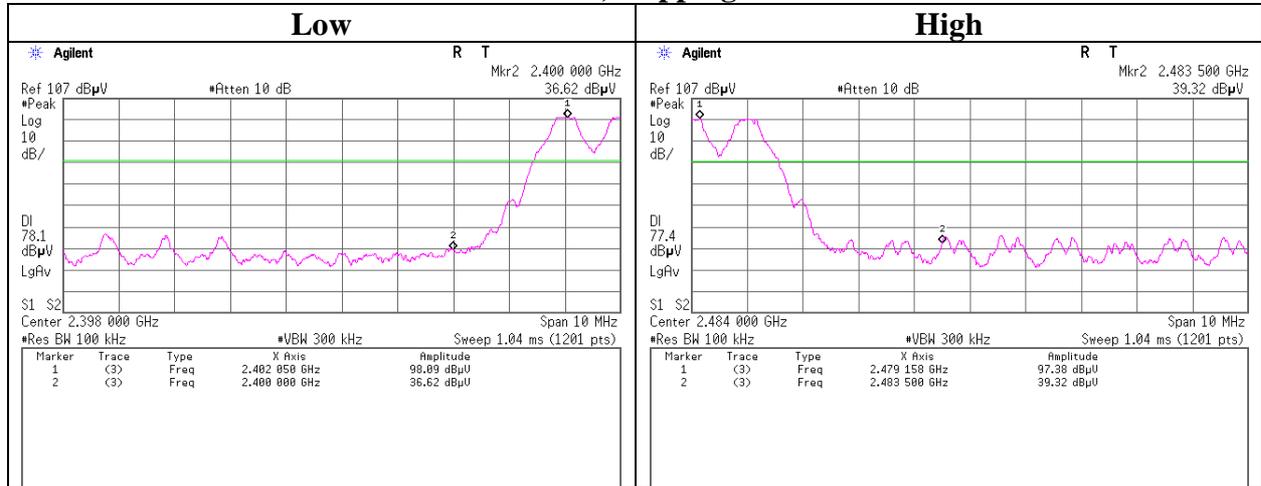
Conducted Emission Band Edge compliance

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Tx DH5, Hopping off

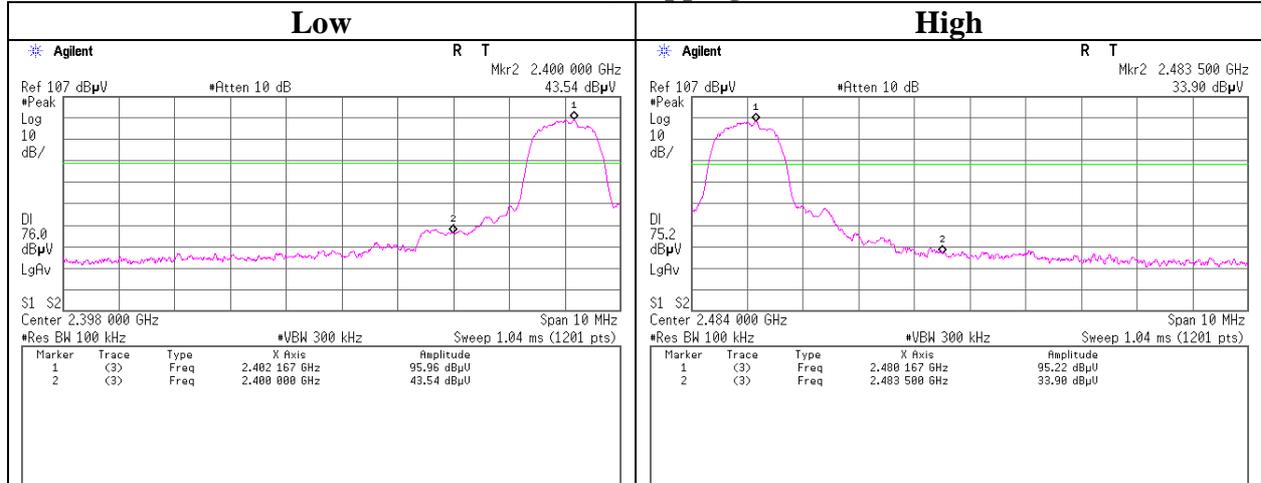


Tx DH5, Hopping on

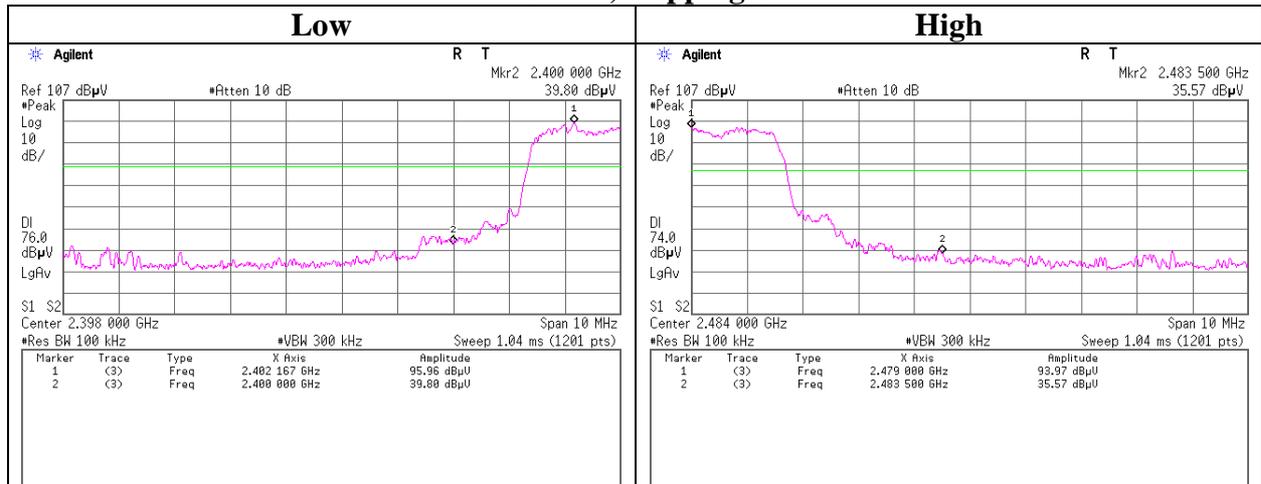


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping off



Tx 3DH5, Hopping on



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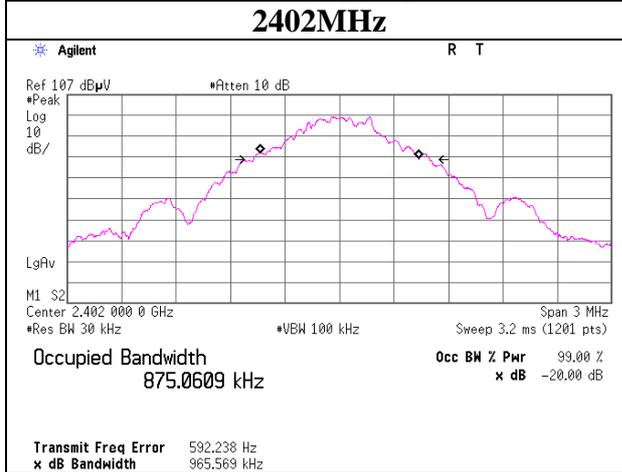
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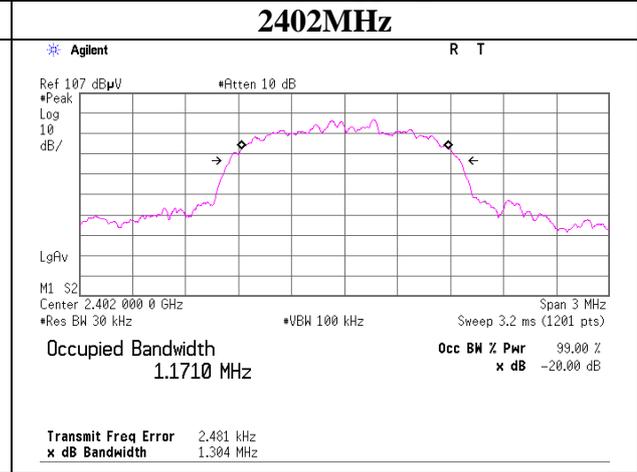
99%Occupied Bandwidth

Test place	Ise HQ EMC Lab. No.3 Shielded Room
Report No.	10250677H
Date	03/14/2014
Temperature/ Humidity	22 deg. C / 35% RH
Engineer	Yutaka Yoshida
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

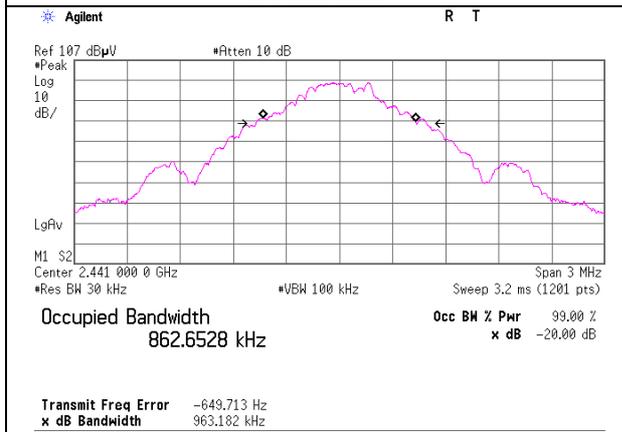
Tx DH5, Hopping off



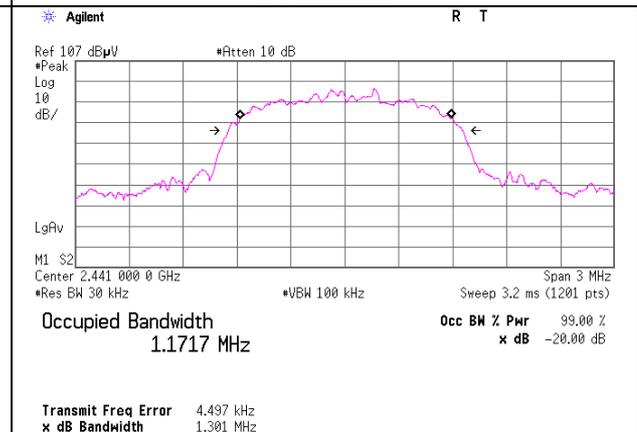
Tx 3DH5, Hopping off



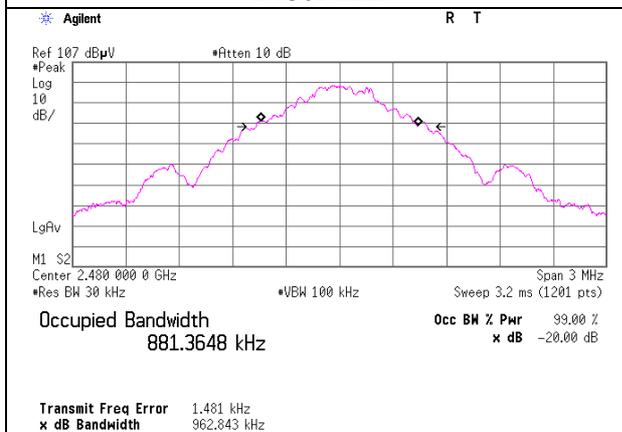
2441MHz



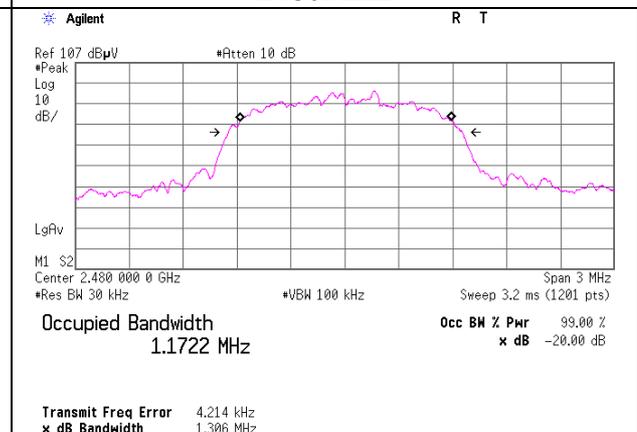
2441MHz



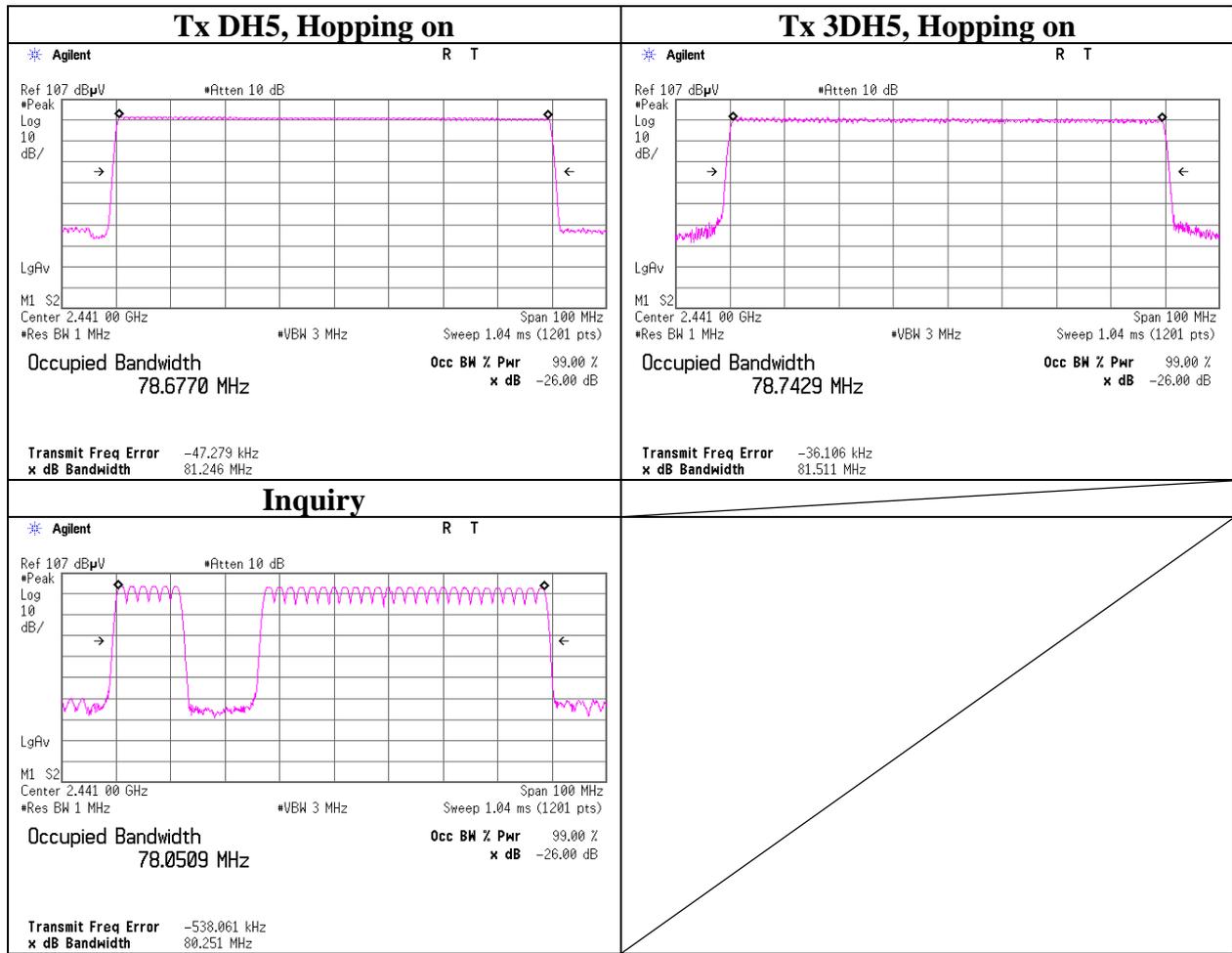
2480MHz



2480MHz



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	AT	2014/03/05 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2013/06/12 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2013/06/12 * 12
MAT-24	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71389	AT	2013/06/05 * 12
MCC-102	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A(200)	-	AT	2013/06/24 * 12
MCC-144	Microwave Cable	Junkosha	MWX221	1207S407	AT	2013/08/19 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	1201	AT	2014/01/14 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	AT	2014/01/22 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2014/02/27 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2014/02/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-114	Spectrum Analyzer	Agilent	E4440A	MY46187105	RE	2013/11/11 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2013/05/17 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2013/09/27 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2013/03/12 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA917030 6	RE	2013/05/17 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2013/09/01 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2014/02/28 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE/CE	2014/02/20 * 12
MJM-09	Measure	KDS	E19-55	-	RE/CE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE/CE	2013/11/12 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2013/11/24 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2013/11/24 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2013/06/18 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2013/11/26 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2014/03/14 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2013/11/08 * 12

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EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2014/01/27 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	8127384	CE(AE)	2014/03/10 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2014/01/20 * 12
MAT-67	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D- 2W(10m)/SFM14 1(5m)/421- 010(1m)/sucofor m141- PE(1m)/RFM- E121(Switcher)	-/04178	CE	2013/07/23 * 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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