



RADIO TEST REPORT

Test Report No. : 10441271H-B-R1

Applicant : Sony Computer Entertainment Inc.

Type of Equipment : PlayStation® TV

Model No. : VTE-1001

FCC ID : AK8VTE1001F2

**Test regulation : FCC Part 15 Subpart C: 2014
*Bluetooth part**

Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 10441271H-B. 10441271H-B is replaced with this report.

Date of test: August 19 to October 7, 2014

Representative test engineer:

T. Shimada

Takumi Shimada
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Consumer Technology Division

Approved by:

M. Nishiyama

Masanori Nishiyama
Manager
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 10441271H-B

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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	PlayStation® TV
Model No	VTE-1001
Serial No	Refer to Section 4, Clause 4.2
Country of Manufacture	China
Receipt Date of Sample	August 2, 2014
Condition of EUT	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	No modification by the test lab.

2.2 Product Description

VTE-1001 is PlayStation® TV.

WLAN antenna and Bluetooth antenna transmit simultaneously, but there is no correlation between WLAN antenna and Bluetooth antenna.

Product Specification

Maximum clock frequency in the system	444MHz
Operating Temperature	5-35 deg. C
Power Supply	DC 5.0V
Size	105.0 x 65.0 x 13.6 mm
Weight	Approx. 110g

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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)	DC 1.8V/DC 3.1V
Antenna Type	Inverted F
Antenna Gain	1.25dBi (Peak)

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)	DC 1.8V
Antenna Type	Inverted F
Antenna Gain	-0.88dBi (peak)

*This test report applies for Bluetooth.

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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 May 1, 2014 and effective June 2, 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 EUT complies with FCC Part 15 Subpart B: 2014, final revised on May 1, 2014 and effective June 2, 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 20.5dB, 0.61940MHz, L AV 18.4dB, 0.61940MHz, 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	3.2dB 370.877MHz, QP, Horizontal	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 Part 15.31 (e)

This EUT provides stable voltage (DC 1.8V/3.1V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.5dB
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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	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	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	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	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	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.

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, Carrier Frequency Separation	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	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 Inquiry -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) *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: LABTOOL-VTE10-L.L-Ver.1.0.2 *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.		

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4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

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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	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz
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, 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-26.5GHz

Test data : APPENDIX

Test result : Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz or 3MHz	100kHz or 30kHz	300kHz or 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

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

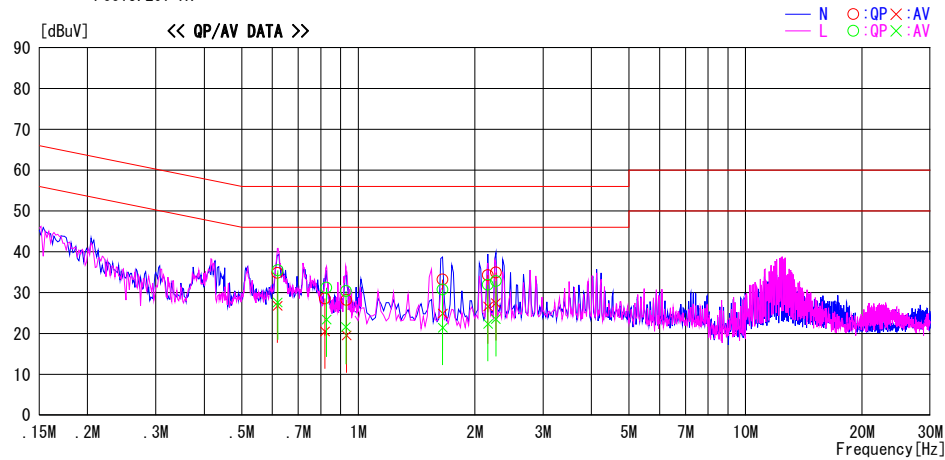
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/08/20

Report No. : 10441271H

Temp./Humi. : 24deg. C / 62% RH
Engineer : Yuta Moriya

Mode / Remarks : Tx DH5 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]		
0.61880	21.4	13.4	13.4	34.8	26.8	56.0	46.0	21.2	19.2	N	
0.82050	15.2	7.1	13.4	28.6	20.5	56.0	46.0	27.4	25.5	N	
0.93283	14.8	6.1	13.4	28.2	19.5	56.0	46.0	27.8	26.5	N	
1.65252	19.7	11.4	13.5	33.2	24.9	56.0	46.0	22.8	21.1	N	
2.16146	20.6	12.9	13.7	34.3	26.6	56.0	46.0	21.7	19.4	N	
2.26724	21.2	13.7	13.7	34.9	27.4	56.0	46.0	21.1	18.6	N	
0.61940	22.1	14.2	13.4	35.5	27.6	56.0	46.0	20.5	18.4	L	
0.82822	17.8	10.0	13.4	31.2	23.4	56.0	46.0	24.8	22.6	L	
0.92934	17.0	8.2	13.4	30.4	21.6	56.0	46.0	25.6	24.4	L	
1.65252	17.2	7.9	13.5	30.7	21.4	56.0	46.0	25.3	24.6	L	
2.16146	18.2	8.6	13.7	31.9	22.3	56.0	46.0	24.1	23.7	L	
2.26640	19.1	9.8	13.7	32.8	23.5	56.0	46.0	23.2	22.5	L	

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

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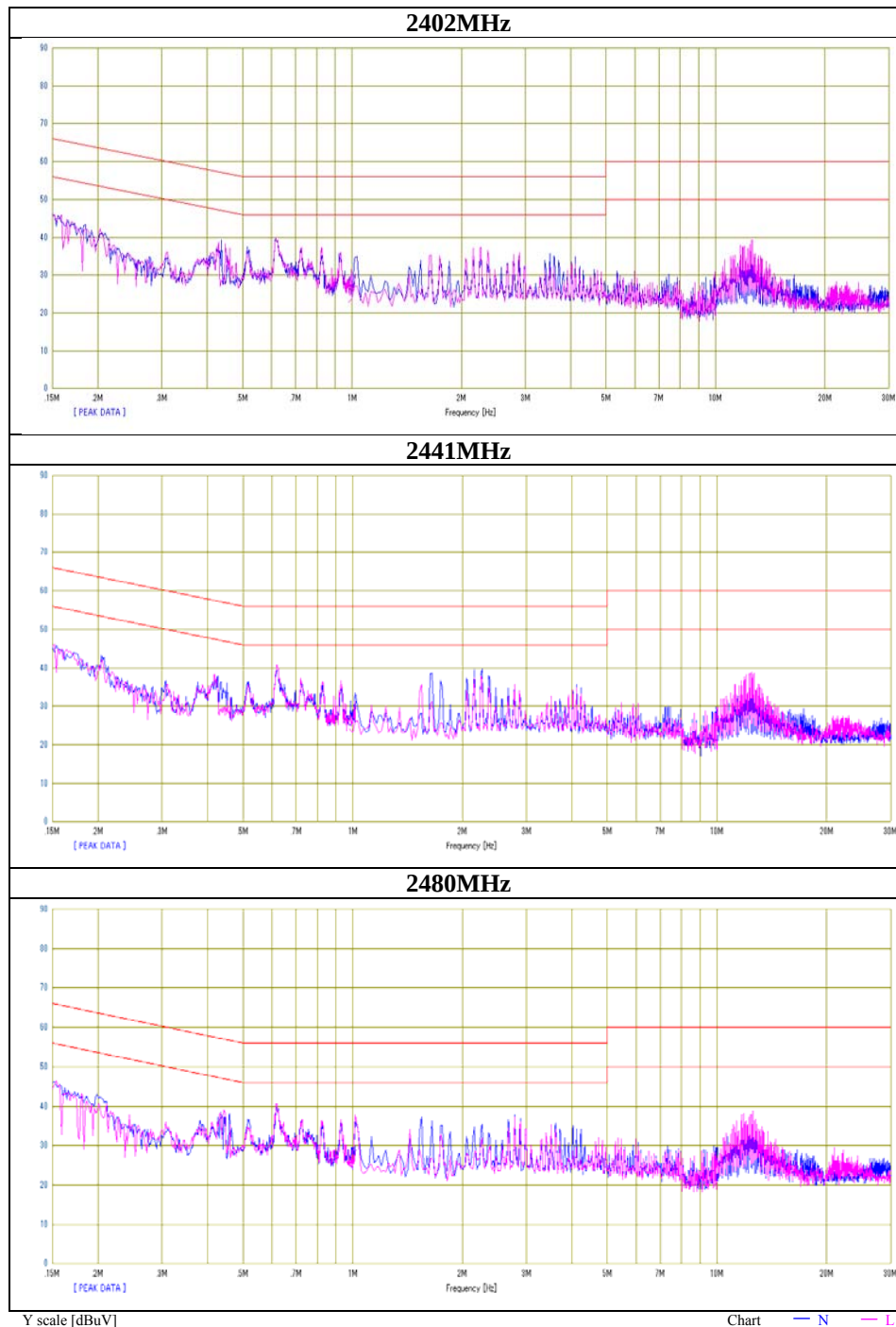
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Conducted Emission

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. 10441271H
Date 08/20/2014
Temperature/ Humidity 24 deg. C / 62% RH
Engineer Yuta Moriya
Mode Tx, DH5



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Conducted Emission

DATA OF CONDUCTED EMISSION TEST

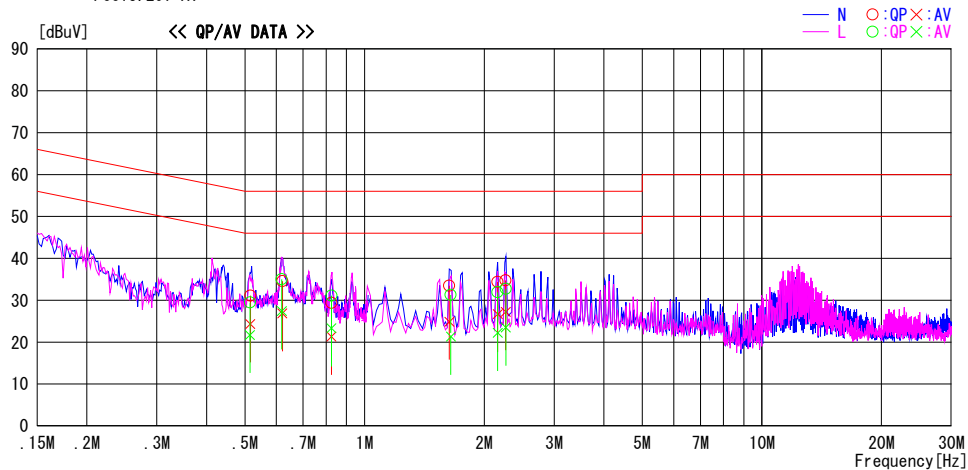
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2014/08/20

Report No. : 10441271H

Temp./Humi. : 24deg. C / 62% RH
Engineer : Yuta Moriya

Mode / Remarks : Tx 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

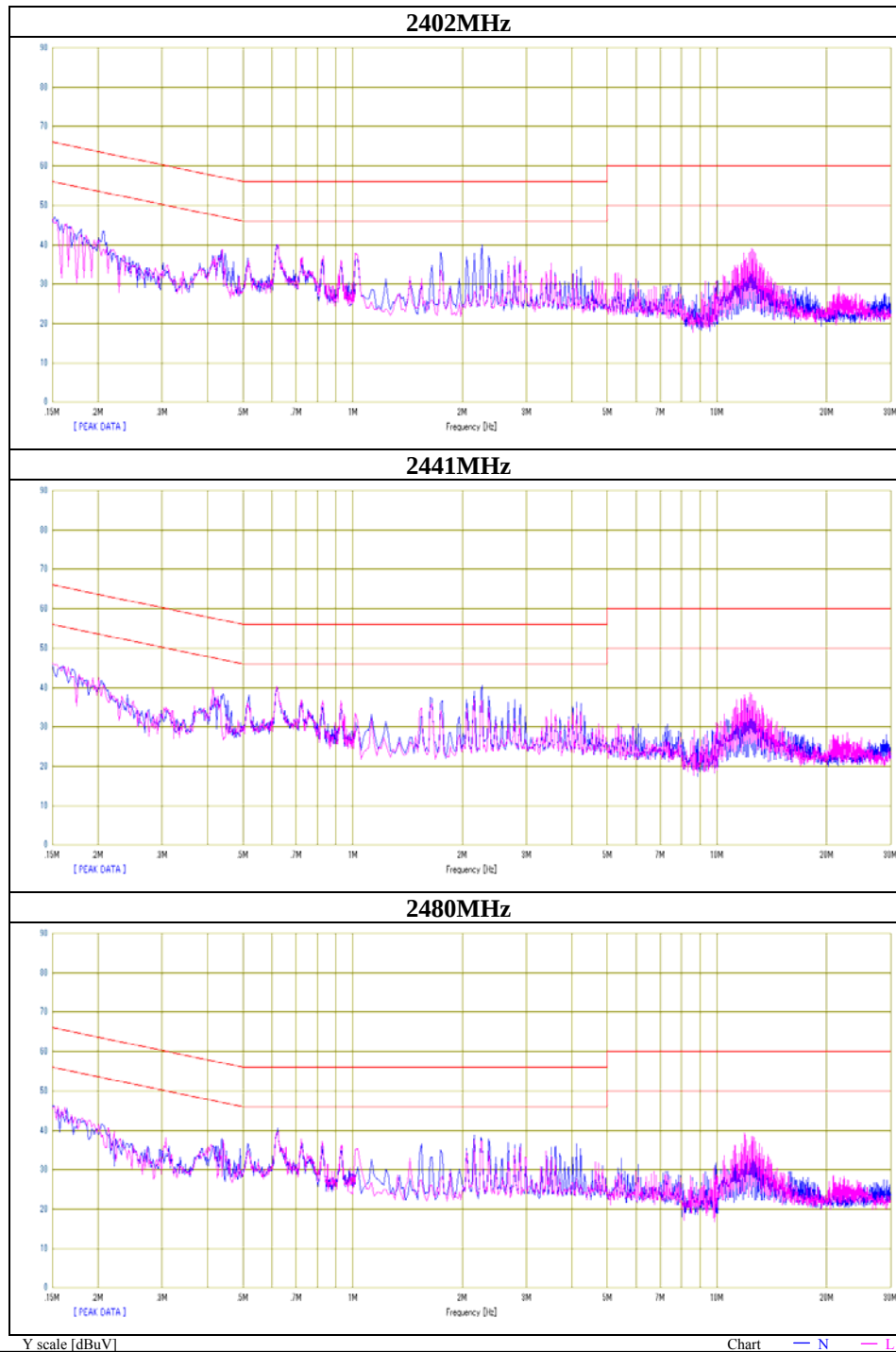


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.51572	17.8	11.0	13.3	31.1	24.3	56.0	46.0	24.9	21.7	N	
0.62074	21.2	13.5	13.4	34.6	26.9	56.0	46.0	21.4	19.1	N	
0.82473	16.0	7.9	13.4	29.4	21.3	56.0	46.0	26.6	24.7	N	
1.63435	20.0	11.4	13.5	33.5	24.9	56.0	46.0	22.5	21.1	N	
2.16146	20.7	13.0	13.7	34.4	26.7	56.0	46.0	21.6	19.3	N	
2.26541	21.0	13.5	13.7	34.7	27.2	56.0	46.0	21.3	18.8	N	
0.51480	16.2	8.4	13.3	29.5	21.7	56.0	46.0	26.5	24.3	L	
0.61900	21.6	14.0	13.4	35.0	27.4	56.0	46.0	21.0	18.6	L	
0.82540	17.7	9.9	13.4	31.1	23.3	56.0	46.0	24.9	22.7	L	
1.64730	17.8	7.8	13.5	31.3	21.3	56.0	46.0	24.7	24.7	L	
2.16146	18.2	8.5	13.7	31.9	22.2	56.0	46.0	24.1	23.8	L	
2.26666	19.0	9.8	13.7	32.7	23.5	56.0	46.0	23.3	22.5	L	

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

Conducted Emission

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. 10441271H
Date 08/20/2014
Temperature/ Humidity 24 deg. C / 62% RH
Engineer Yuta Moriya
Mode Tx, 3DH5



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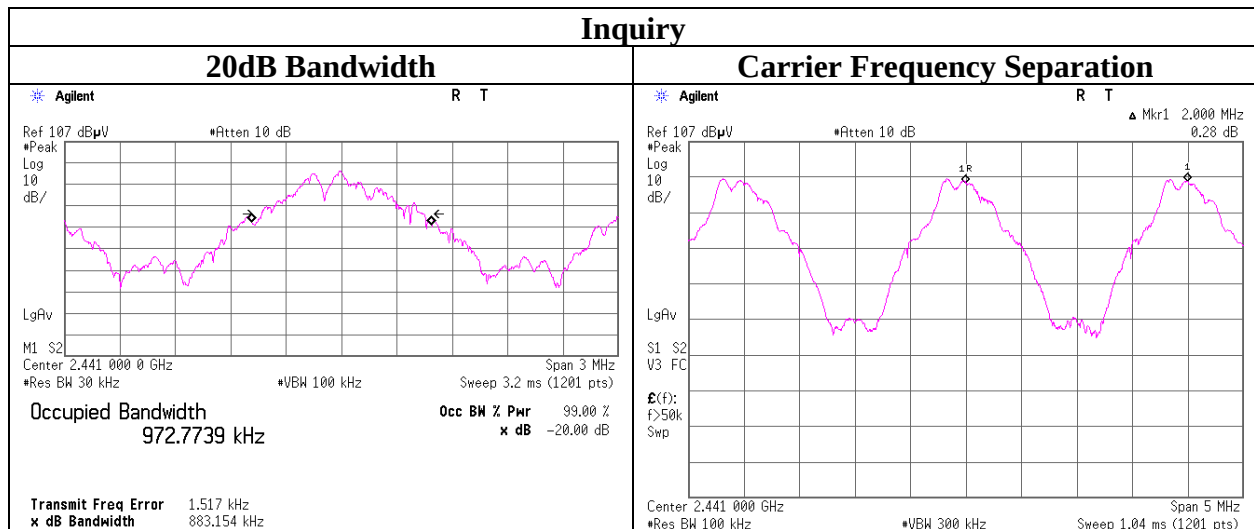
Facsimile : +81 596 24 8124

20dB Bandwidth and Carrier Frequency Separation

Test place : Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. : 10441271H
Date : 09/11/2014
Temperature/ Humidity : 21 deg. C / 54% 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	0.967	1.000	≥ 0.644
DH5	2441.0	0.965	1.000	≥ 0.643
DH5	2480.0	0.966	1.000	≥ 0.644
3DH5	2402.0	1.311	1.000	≥ 0.874
3DH5	2441.0	1.311	1.000	≥ 0.874
3DH5	2480.0	1.345	1.000	≥ 0.897
Inquiry	2441.0	0.883	2.000	≥ 0.589

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



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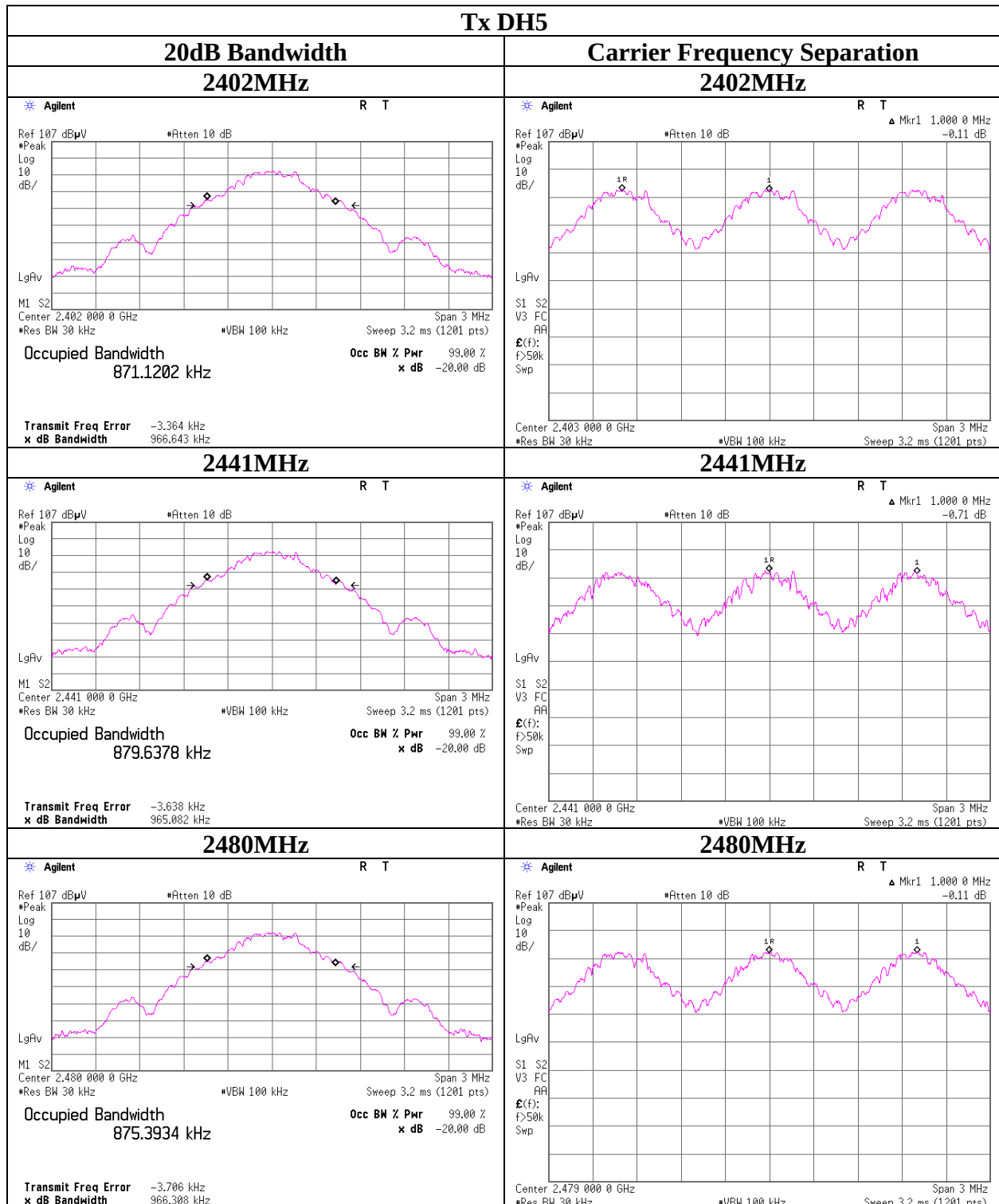
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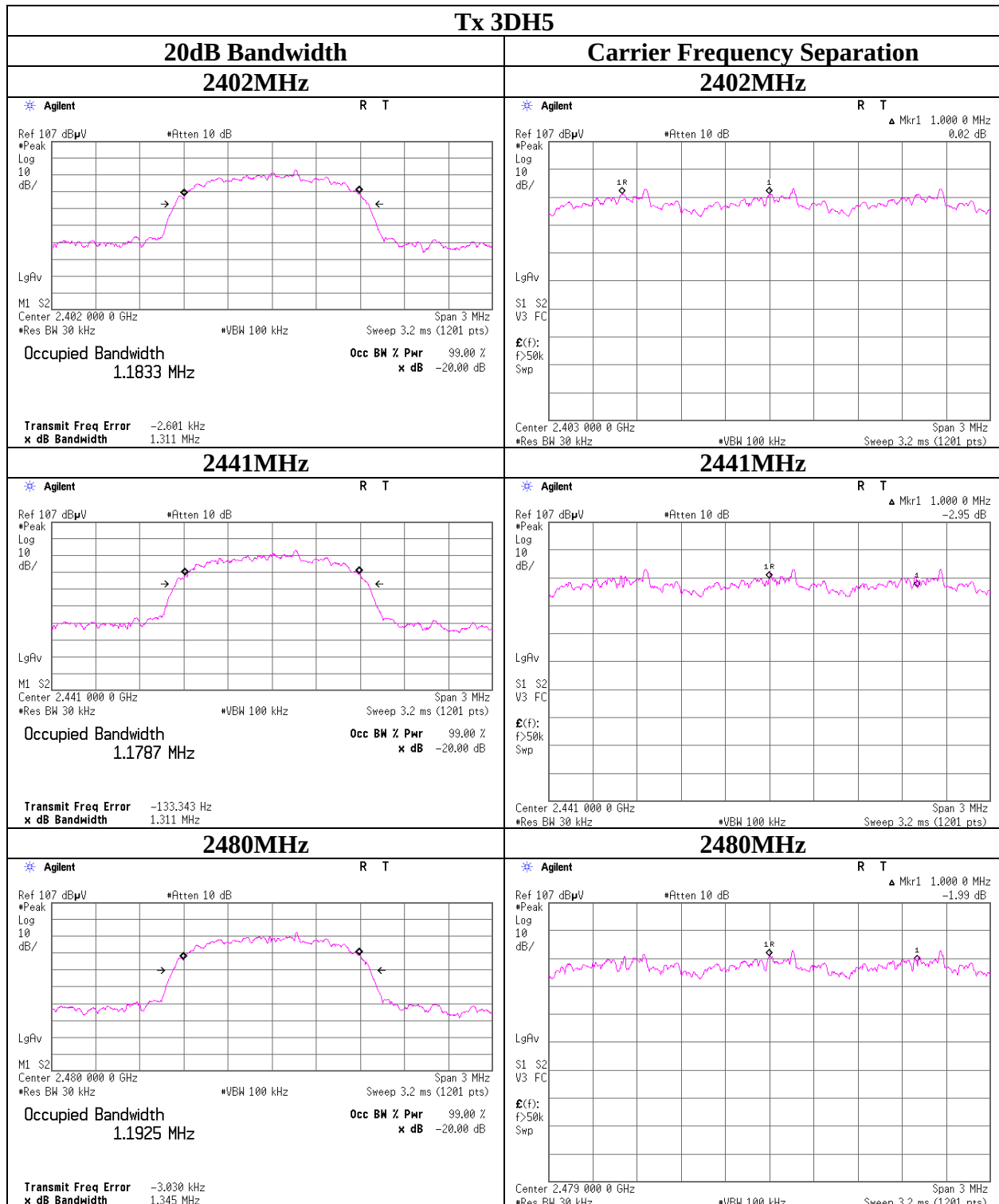
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation



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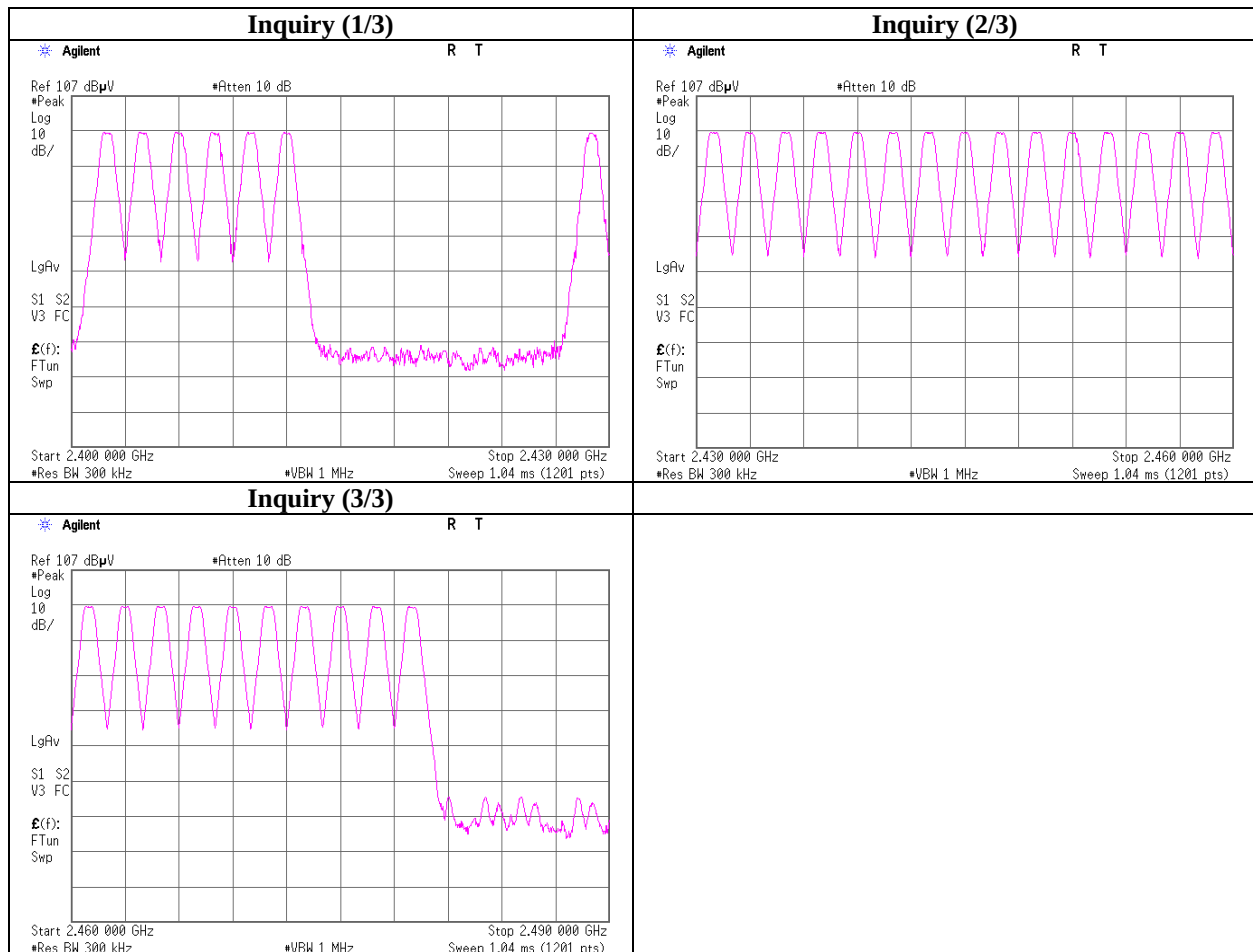
Facsimile : +81 596 24 8124

Number of Hopping Frequency

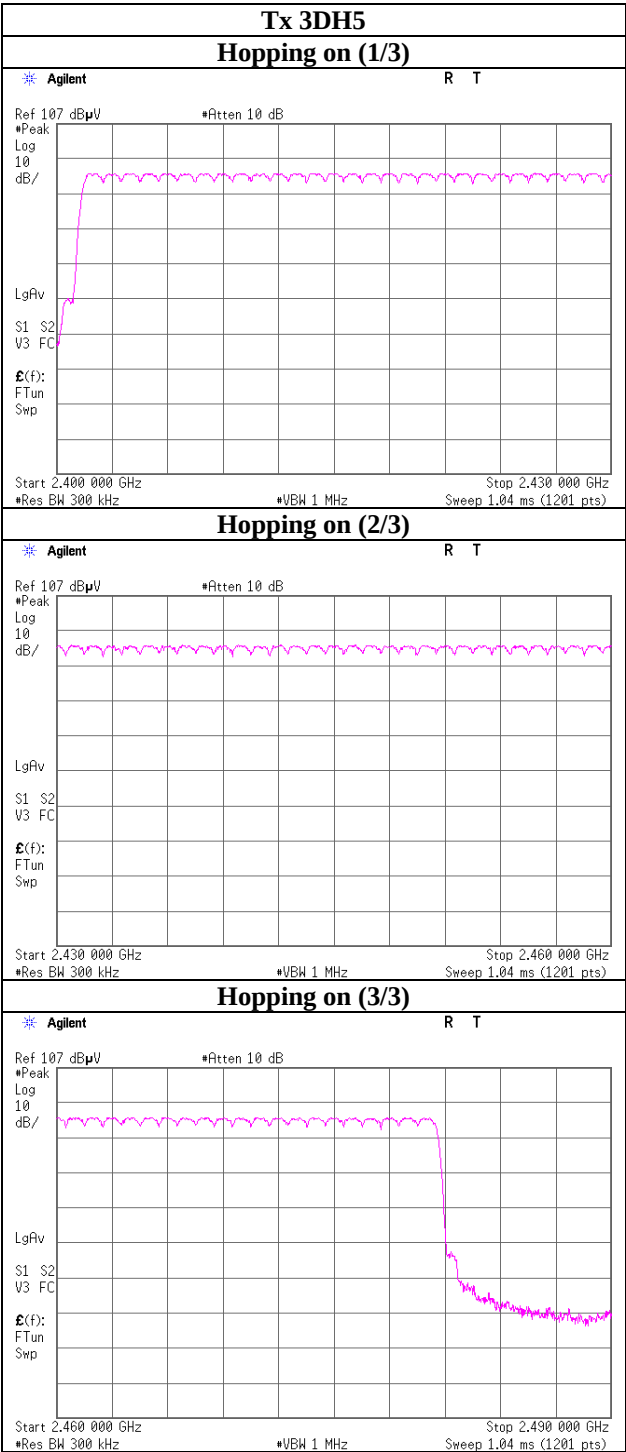
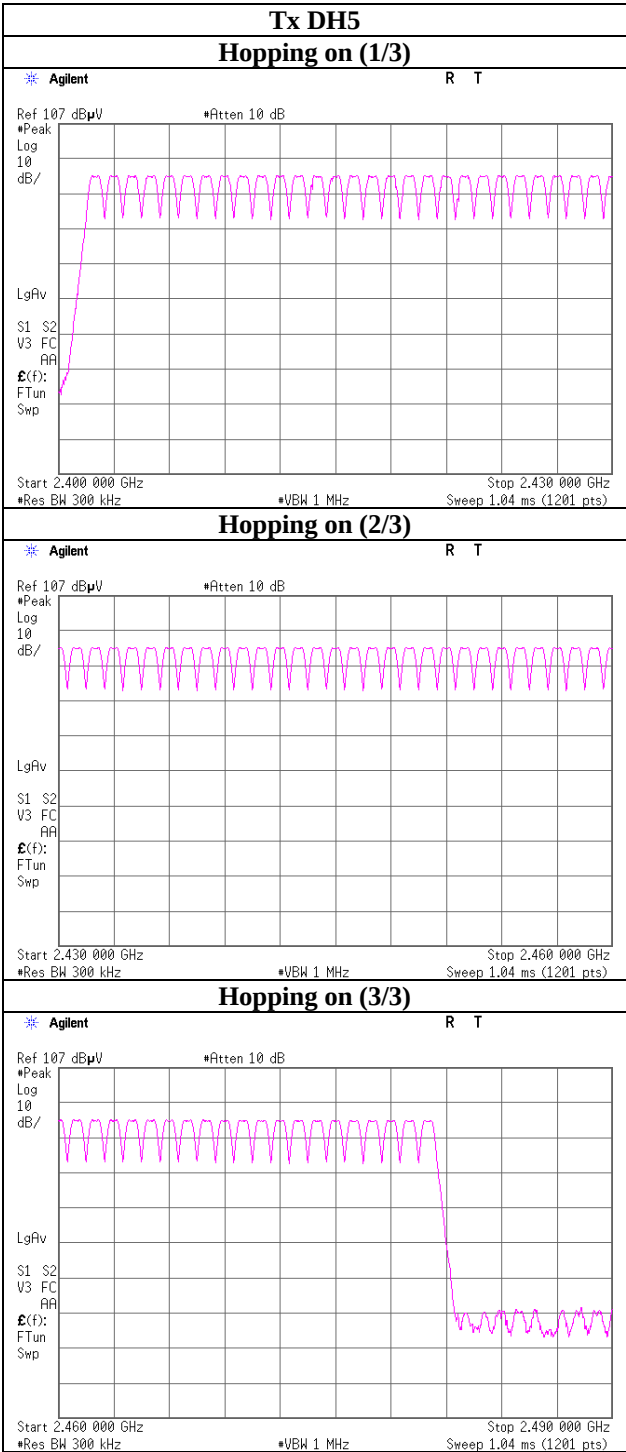
Test place	Ise EMC Lab. No.11 Semi Anechoic Chamber	
Report No.	10441271H	
Date	09/11/2014	10/07/2014
Temperature/ Humidity	21 deg. C / 54% RH	23 deg. C / 57% RH
Engineer	Takumi Shimada	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry	

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.



Number of Hopping Frequency



Dwell time

Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10441271H
Date 09/05/2013
Temperature/ Humidity 23 deg. C / 68% 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	50.6 times /	5 sec. x	31.6 sec. =	320 times	0.395	400
DH3	27.4 times /	5 sec. x	31.6 sec. =	174 times	1.657	400
DH5	17.2 times /	5 sec. x	31.6 sec. =	109 times	2.915	400
3DH1	49.8 times /	5 sec. x	31.6 sec. =	315 times	0.400	400
3DH3	26.2 times /	5 sec. x	31.6 sec. =	166 times	1.657	400
3DH5	15.8 times /	5 sec. x	31.6 sec. =	100 times	2.919	400
Inquiry	100.0 times /	1 sec. x	12.8 sec. =	1280 times	0.100	400

Sample Calculation

Result = Number of transmission x Length of transmission time

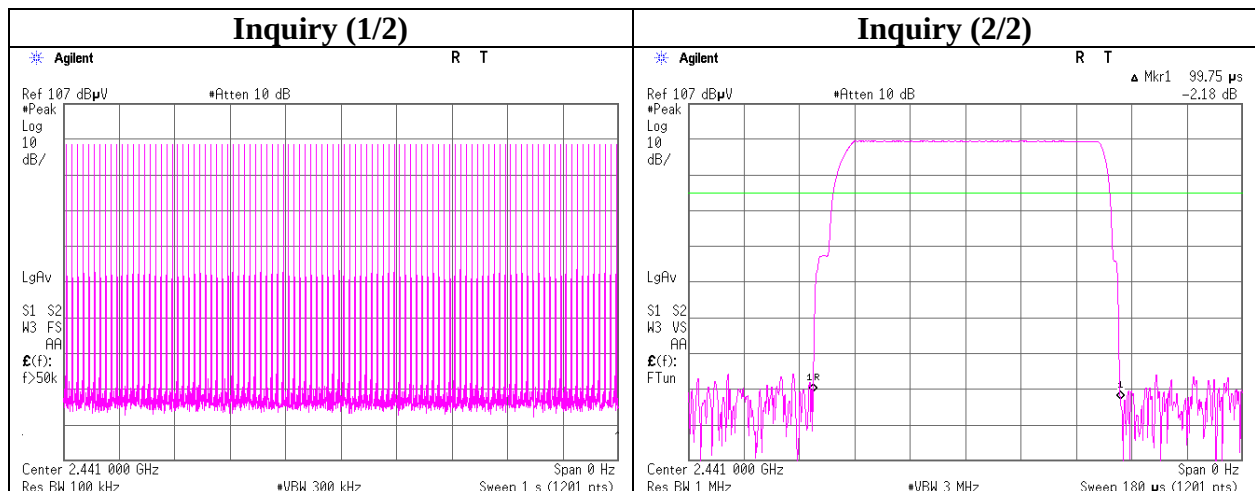
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	52	50	51	50	50	50.6
DH3	28	26	26	28	29	27.4
DH5	14	21	13	18	20	17.2
3DH1	49	52	48	51	49	49.8
3DH3	24	25	27	28	27	26.2
3DH5	15	14	16	17	17	15.8

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

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



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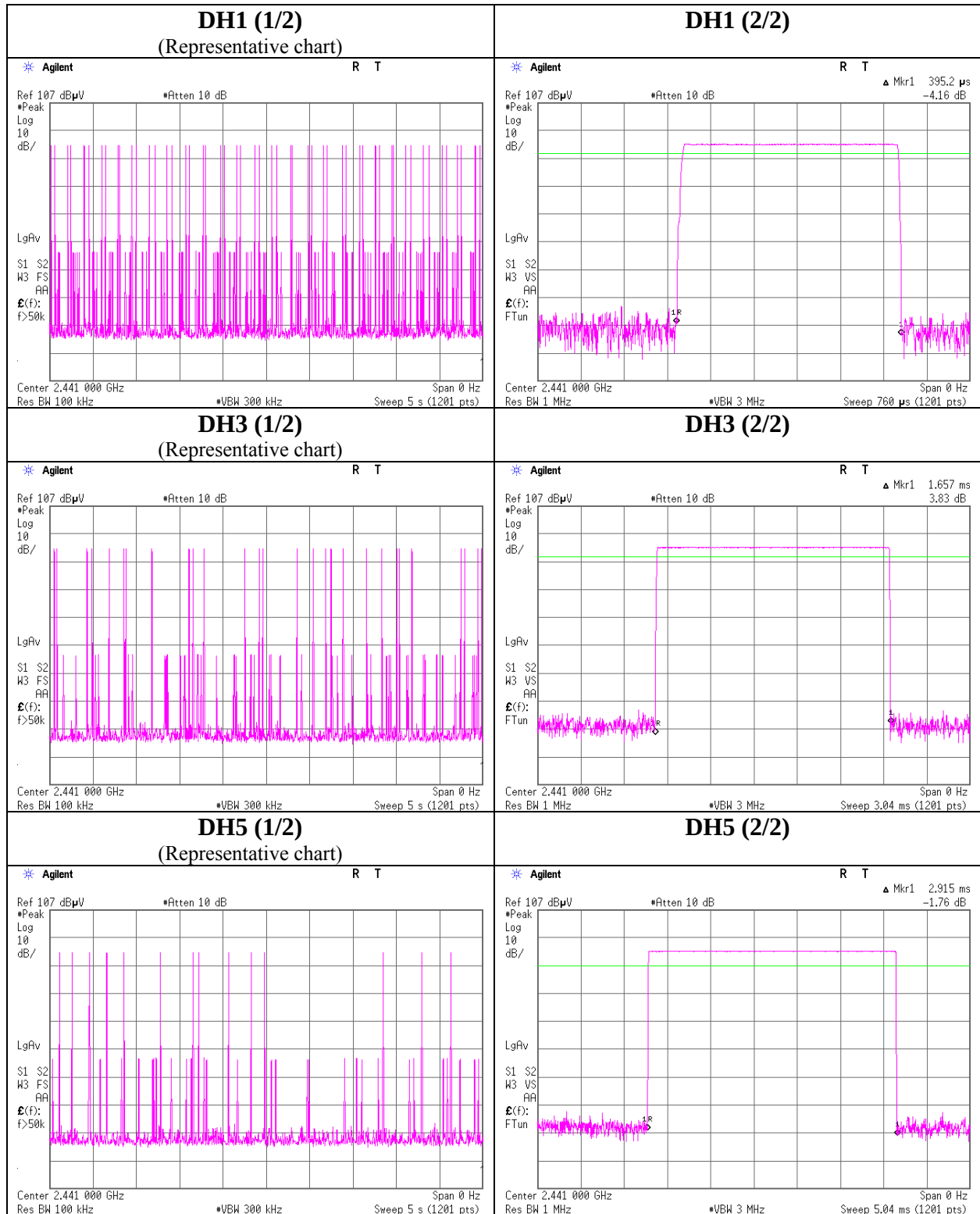
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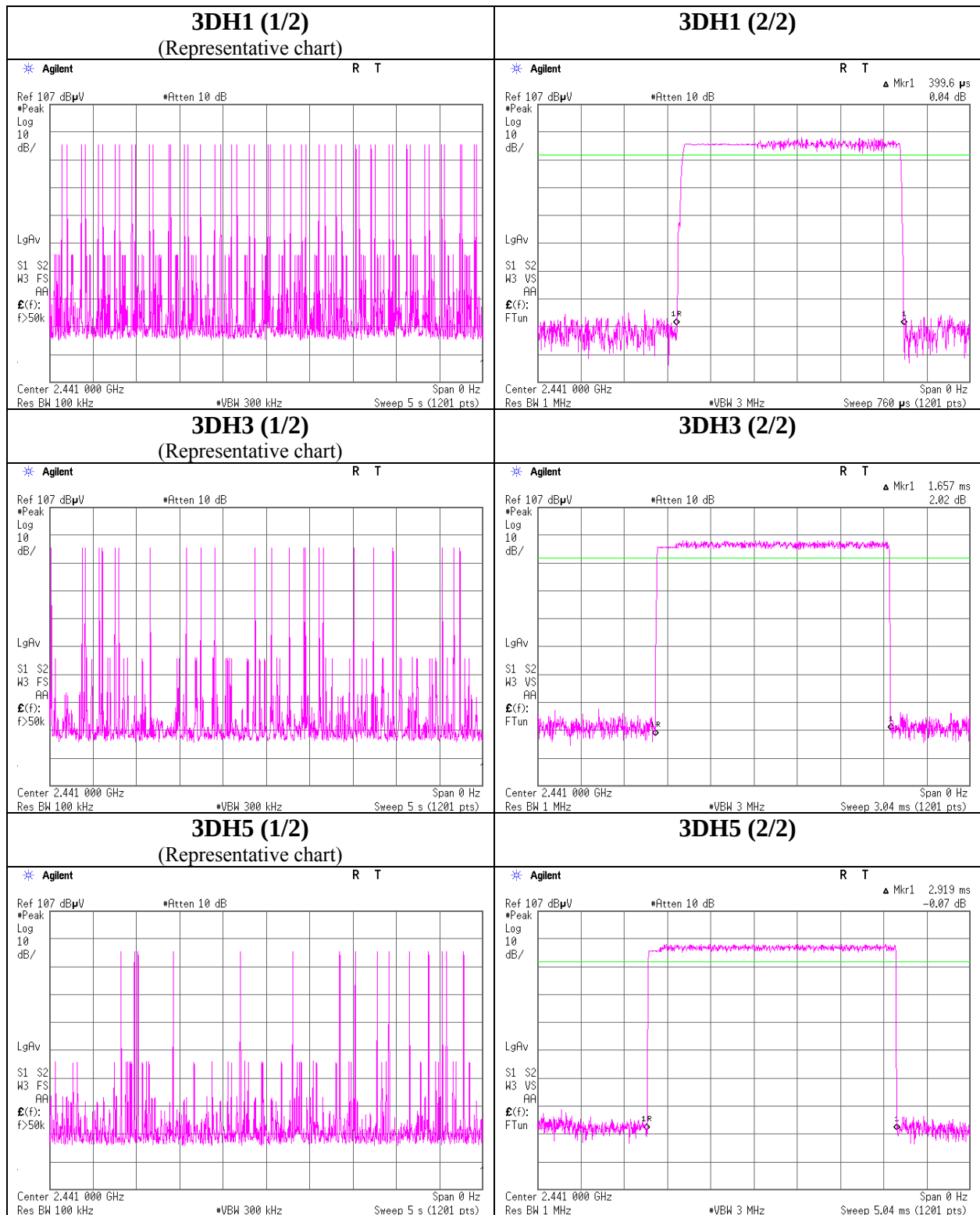
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Dwell time



Dwell time



Maximum Peak Output Power

Test place : Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. : 10441271H
Date : 09/11/2014
Temperature/ Humidity : 21 deg. C / 54% RH
Engineer : Takumi Shimada
Mode : Tx (Hopping off) DH5/2DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-14.63	0.50	10.08	-4.05	0.39	20.96	125	25.01
DH5	2441.0	-14.57	0.50	10.08	-3.99	0.40	20.96	125	24.95
DH5	2480.0	-14.83	0.50	10.08	-4.25	0.38	20.96	125	25.21
2DH5	2402.0	-12.14	0.50	10.08	-1.56	0.70	20.96	125	22.52
2DH5	2441.0	-12.11	0.50	10.08	-1.53	0.70	20.96	125	22.49
2DH5	2480.0	-12.32	0.50	10.08	-1.74	0.67	20.96	125	22.70
3DH5	2402.0	-11.71	0.50	10.08	-1.13	0.77	20.96	125	22.09
3DH5	2441.0	-11.59	0.50	10.08	-1.01	0.79	20.96	125	21.97
3DH5	2480.0	-11.74	0.50	10.08	-1.16	0.77	20.96	125	22.12
Inquiry	2441.0	-10.57	0.50	10.08	0.01	1.00	20.96	125	20.95

Sample Calculation:

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

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

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

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Average Output Power
(Reference data for SAR testing)

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg.C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
DH5	2402.0	-16.34	0.50	10.08	-5.76	0.27
DH5	2441.0	-16.26	0.50	10.08	-5.68	0.27
DH5	2480.0	-16.51	0.50	10.08	-5.93	0.26
2DH5	2402.0	-15.88	0.50	10.08	-5.30	0.30
2DH5	2441.0	-15.75	0.50	10.08	-5.17	0.30
2DH5	2480.0	-15.98	0.50	10.08	-5.40	0.29
3DH5	2402.0	-15.83	0.50	10.08	-5.25	0.30
3DH5	2441.0	-15.55	0.50	10.08	-4.97	0.32
3DH5	2480.0	-15.98	0.50	10.08	-5.40	0.29
Inquiry	2441.0	-19.31	0.50	10.08	-8.73	0.13

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. : 10441271H
Date : 08/19/2014 08/20/2014
Temperature/ Humidity : 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer : Satofumi Matsuyama Yuta Moriya
(Below 1GHz, (Above 10GHz)
1-10GHz)
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	74.177	QP	46.3	6.5	8.1	38.8	22.1	40.0	17.9	
Hori	148.345	QP	41.8	14.8	9.0	38.9	26.7	43.5	16.8	
Hori	222.523	QP	44.4	16.8	9.8	39.0	32.0	46.0	14.0	
Hori	297.703	QP	44.7	19.6	10.4	38.6	36.1	46.0	9.9	
Hori	370.877	QP	53.8	16.4	11.0	38.4	42.8	46.0	3.2	
Hori	445.052	QP	46.3	17.6	11.6	38.3	37.2	46.0	8.8	
Hori	2390.000	PK	45.5	26.7	2.5	36.7	38.0	73.9	35.9	
Hori	4804.000	PK	46.0	30.9	4.9	36.2	45.6	73.9	28.3	
Hori	12010.000	PK	50.2	39.1	-2.2	36.1	51.0	73.9	22.9	
Hori	2390.000	AV	33.1	26.7	2.5	36.7	25.6	53.9	28.3	
Hori	4804.000	AV	32.8	30.9	4.9	36.2	32.4	53.9	21.5	
Vert	74.178	QP	50.6	6.5	8.1	38.8	26.4	40.0	13.6	
Vert	148.343	QP	38.9	14.8	9.0	38.9	23.8	43.5	19.7	
Vert	222.526	QP	45.1	16.8	9.8	39.0	32.7	46.0	13.3	
Vert	297.702	QP	43.2	19.6	10.4	38.6	34.6	46.0	11.4	
Vert	370.876	QP	51.6	16.4	11.0	38.4	40.6	46.0	5.4	
Vert	445.053	QP	44.9	17.6	11.6	38.3	35.8	46.0	10.2	
Vert	2390.000	PK	45.9	26.7	2.5	36.7	38.4	73.9	35.5	
Vert	4804.000	PK	45.5	30.9	4.9	36.2	45.1	73.9	28.8	
Vert	12010.000	PK	48.7	39.1	-2.2	36.1	49.5	73.9	24.4	
Vert	2390.000	AV	33.0	26.7	2.5	36.7	25.5	53.9	28.4	
Vert	4804.000	AV	32.8	30.9	4.9	36.2	32.4	53.9	21.5	

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

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

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

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

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	96.5	26.7	2.5	36.7	89.0	-	-	Carrier
Hori	2400.000	PK	40.8	26.7	2.5	36.7	33.3	69.0	35.7	
Hori	7206.000	PK	49.2	35.9	5.8	36.3	54.6	69.0	14.4	
Hori	9608.000	PK	34.7	38.1	6.6	36.8	42.6	69.0	26.4	
Vert	2402.000	PK	96.0	26.7	2.5	36.7	88.5	-	-	Carrier
Vert	2400.000	PK	39.0	26.7	2.5	36.7	31.5	68.5	37.0	
Vert	7206.000	PK	52.7	35.9	5.8	36.3	58.1	68.5	10.4	
Vert	9608.000	PK	45.7	38.1	6.6	36.8	53.6	68.5	14.9	

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	12010.000	AV	39.4	39.1	-2.2	36.1	-24.7	15.5	53.9	38.4	
Vert	12010.000	AV	37.8	39.1	-2.2	36.1	-24.7	13.9	53.9	40.0	

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

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

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. : 10441271H
Date : 08/19/2014 08/20/2014
Temperature/ Humidity : 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer : Satofumi Matsuyama Yuta Moriya
(Below 1GHz, (Above 10GHz)
1-10GHz)
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	74.178	QP	46.1	6.5	8.1	38.8	21.9	40.0	18.1	
Hori	148.346	QP	41.7	14.8	9.0	38.9	26.6	43.5	16.9	
Hori	222.522	QP	45.4	16.8	9.8	39.0	33.0	46.0	13.0	
Hori	296.705	QP	44.4	19.6	10.4	38.6	35.8	46.0	10.2	
Hori	370.878	QP	52.1	16.4	11.0	38.4	41.1	46.0	4.9	
Hori	445.051	QP	45.0	17.6	11.6	38.3	35.9	46.0	10.1	
Hori	4882.000	PK	45.1	31.2	5.0	36.2	45.1	73.9	28.8	
Hori	7323.000	PK	50.6	36.0	5.8	36.4	56.0	73.9	17.9	
Hori	9764.000	PK	45.6	38.2	6.7	36.8	53.7	73.9	20.2	
Hori	12205.000	PK	51.3	39.2	-2.0	35.9	52.6	73.9	21.3	
Hori	4882.000	AV	31.8	31.2	5.0	36.2	31.8	53.9	22.1	
Hori	9764.000	PK	45.6	38.2	6.7	36.8	53.7	73.9	20.2	
Vert	74.177	QP	50.0	6.5	8.1	38.8	25.8	40.0	14.2	
Vert	148.345	QP	38.7	14.8	9.0	38.9	23.6	43.5	19.9	
Vert	222.526	QP	43.9	16.8	9.8	39.0	31.5	46.0	14.5	
Vert	296.701	QP	42.7	19.6	10.4	38.6	34.1	46.0	11.9	
Vert	370.878	QP	50.9	16.4	11.0	38.4	39.9	46.0	6.1	
Vert	445.054	QP	43.3	17.6	11.6	38.3	34.2	46.0	11.8	
Vert	4882.000	PK	45.0	31.2	5.0	36.2	45.0	73.9	28.9	
Vert	7323.000	PK	55.2	36.0	5.8	36.4	60.6	73.9	13.3	
Vert	9764.000	PK	45.7	38.2	6.7	36.8	53.8	73.9	20.1	
Vert	12205.000	PK	50.0	39.2	-2.0	35.9	51.3	73.9	22.6	
Vert	4882.000	AV	31.9	31.2	5.0	36.2	31.9	53.9	22.0	
Vert	9764.000	PK	45.7	38.2	6.7	36.8	53.8	73.9	20.1	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	7323.000	AV	42.4	36.0	5.8	36.4	-24.7	23.1	53.9	30.8	
Hori	12205.000	AV	39.9	39.2	-2.0	35.9	-24.7	16.5	53.9	37.4	
Vert	7323.000	AV	48.5	36.0	5.8	36.4	-24.7	29.2	53.9	24.7	
Vert	12205.000	AV	39.6	39.2	-2.0	35.9	-24.7	16.2	53.9	37.7	

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

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

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. : 10441271H
Date : 08/19/2014 08/20/2014
Temperature/ Humidity : 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer : Satofumi Matsuyama Yuta Moriya
(Below 1GHz) (Above 10GHz)
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	74.176	QP	46.2	6.5	8.1	38.8	22.0	40.0	18.0	
Hori	148.347	QP	41.6	14.8	9.0	38.9	26.5	43.5	17.0	
Hori	222.523	QP	45.5	16.8	9.8	39.0	33.1	46.0	12.9	
Hori	296.703	QP	44.3	19.6	10.4	38.6	35.7	46.0	10.3	
Hori	370.876	QP	52.0	16.4	11.0	38.4	41.0	46.0	5.0	
Hori	445.050	QP	45.1	17.6	11.6	38.3	36.0	46.0	10.0	
Hori	2483.500	PK	51.1	26.8	2.6	36.7	43.8	73.9	30.1	
Hori	4960.000	PK	44.6	31.4	5.0	36.2	44.8	73.9	29.1	
Hori	7440.000	PK	49.9	36.1	6.0	36.4	55.6	73.9	18.3	
Hori	9920.000	PK	45.6	38.4	6.8	36.9	53.9	73.9	20.0	
Hori	12400.000	PK	50.5	39.3	-2.0	35.6	52.2	73.9	21.7	
Hori	2483.500	AV	33.4	26.8	2.6	36.7	26.1	53.9	27.8	
Hori	4960.000	AV	31.7	31.4	5.0	36.2	31.9	53.9	22.1	
Hori	9920.000	AV	32.4	38.4	6.8	36.9	40.7	53.9	13.2	
Vert	74.177	QP	50.1	6.5	8.1	38.8	25.9	40.0	14.1	
Vert	148.344	QP	38.5	14.8	9.0	38.9	23.4	43.5	20.1	
Vert	222.525	QP	43.8	16.8	9.8	39.0	31.4	46.0	14.6	
Vert	296.705	QP	42.5	19.6	10.4	38.6	33.9	46.0	12.1	
Vert	370.877	QP	50.8	16.4	11.0	38.4	39.8	46.0	6.2	
Vert	445.053	QP	43.2	17.6	11.6	38.3	34.1	46.0	11.9	
Vert	2483.500	PK	51.0	26.8	2.6	36.7	43.7	73.9	30.2	
Vert	4960.000	PK	44.5	31.4	5.0	36.2	44.7	73.9	29.2	
Vert	7440.000	PK	52.6	36.1	6.0	36.4	58.3	73.9	15.6	
Vert	9920.000	PK	45.6	38.4	6.8	36.9	53.9	73.9	20.0	
Vert	12400.000	PK	49.9	39.3	-2.0	35.6	51.6	73.9	22.3	
Vert	2483.500	AV	33.7	26.8	2.6	36.7	26.4	53.9	27.5	
Vert	4960.000	AV	31.7	31.4	5.0	36.2	31.9	53.9	22.1	
Vert	9920.000	AV	32.4	38.4	6.8	36.9	40.7	53.9	13.2	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	7440.000	AV	40.2	36.1	6.0	36.4	-24.7	21.2	53.9	32.7	
Hori	12400.000	AV	40.4	39.3	-2.0	35.6	-24.7	17.4	53.9	36.5	
Vert	7440.000	AV	43.6	36.1	6.0	36.4	-24.7	24.6	53.9	29.3	
Vert	12400.000	AV	39.5	39.3	-2.0	35.6	-24.7	16.5	53.9	37.4	

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

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

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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Telephone : +81 596 24 8999

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. : 10441271H
Date : 08/19/2014 08/20/2014
Temperature/ Humidity : 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer : Satofumi Matsuyama Yuta Moriya
 (Below 1GHz) (Above 10GHz)
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	74.175	QP	46.0	6.5	8.1	38.8	21.8	40.0	18.2	
Hori	148.344	QP	41.4	14.8	9.0	38.9	26.3	43.5	17.2	
Hori	222.525	QP	44.0	16.8	9.8	39.0	31.6	46.0	14.4	
Hori	297.704	QP	44.3	19.6	10.4	38.6	35.7	46.0	10.3	
Hori	370.878	QP	51.9	16.4	11.0	38.4	40.9	46.0	5.1	
Hori	445.054	QP	46.0	17.6	11.6	38.3	36.9	46.0	9.1	
Hori	2390.000	PK	47.9	26.7	2.5	36.7	40.4	73.9	33.5	
Hori	4804.000	PK	46.0	30.9	4.9	36.2	45.6	73.9	28.3	
Hori	12010.000	PK	51.3	39.1	-2.2	36.1	52.1	73.9	21.8	
Hori	2390.000	AV	33.4	26.7	2.5	36.7	25.9	53.9	28.0	
Hori	4804.000	AV	32.8	30.9	4.9	36.2	32.4	53.9	21.5	
Vert	74.176	QP	50.2	6.5	8.1	38.8	26.0	40.0	14.0	
Vert	148.341	QP	38.7	14.8	9.0	38.9	23.6	43.5	19.9	
Vert	222.523	QP	44.9	16.8	9.8	39.0	32.5	46.0	13.5	
Vert	297.701	QP	42.8	19.6	10.4	38.6	34.2	46.0	11.8	
Vert	370.879	QP	50.7	16.4	11.0	38.4	39.7	46.0	6.3	
Vert	445.055	QP	44.5	17.6	11.6	38.3	35.4	46.0	10.6	
Vert	2390.000	PK	49.3	26.7	2.5	36.7	41.8	73.9	32.1	
Vert	4804.000	PK	45.5	30.9	4.9	36.2	45.1	73.9	28.8	
Vert	12010.000	PK	49.4	39.1	-2.2	36.1	50.2	73.9	23.7	
Vert	2390.000	AV	33.7	26.7	2.5	36.7	26.2	53.9	27.7	
Vert	4804.000	AV	32.8	30.9	4.9	36.2	32.4	53.9	21.5	

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

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

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

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

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	94.6	26.7	2.5	36.7	87.1	-	-	Carrier
Hori	2400.000	PK	46.1	26.7	2.5	36.7	38.6	67.1	28.5	
Hori	7206.000	PK	48.0	35.9	5.8	36.3	53.4	67.1	13.7	
Hori	9608.000	PK	34.7	38.1	6.6	36.8	42.6	67.1	24.5	
Vert	2402.000	PK	97.8	26.7	2.5	36.7	90.3	-	-	Carrier
Vert	2400.000	PK	48.1	26.7	2.5	36.7	40.6	70.3	29.7	
Vert	7206.000	PK	53.1	35.9	5.8	36.3	58.5	70.3	11.8	
Vert	9608.000	PK	44.8	38.1	6.6	36.8	52.7	70.3	17.6	

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	12010.000	AV	38.8	39.1	-2.2	36.1	-24.7	14.9	53.9	39.0	
Vert	12010.000	AV	37.2	39.1	-2.2	36.1	-24.7	13.3	53.9	40.6	

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

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

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

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

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

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Facsimile : +81 596 24 8124

Radiated Spurious Emission

Test place : Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. : 10441271H
Date : 08/19/2014 08/20/2014
Temperature/ Humidity : 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer : Satofumi Matsuyama Yuta Moriya
(Below 1GHz) (Above 10GHz)
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	74.171	QP	45.9	6.5	8.1	38.8	21.7	40.0	18.3	
Hori	148.346	QP	41.3	14.8	9.0	38.9	26.2	43.5	17.3	
Hori	222.522	QP	44.2	16.8	9.8	39.0	31.8	46.0	14.2	
Hori	297.702	QP	44.3	19.6	10.4	38.6	35.7	46.0	10.3	
Hori	370.876	QP	51.1	16.4	11.0	38.4	40.1	46.0	5.9	
Hori	445.053	QP	45.7	17.6	11.6	38.3	36.6	46.0	9.4	
Hori	4882.000	PK	45.1	31.2	5.0	36.2	45.1	73.9	28.8	
Hori	7323.000	PK	48.9	36.0	5.8	36.4	54.3	73.9	19.6	
Hori	9764.000	PK	45.6	38.2	6.7	36.8	53.7	73.9	20.2	
Hori	12205.000	PK	51.2	39.2	-2.0	35.9	52.5	73.9	21.4	
Hori	4882.000	AV	31.8	31.2	5.0	36.2	31.8	53.9	22.1	
Hori	9764.000	PK	45.6	38.2	6.7	36.8	53.7	73.9	20.2	
Vert	74.172	QP	50.1	6.5	8.1	38.8	25.9	40.0	14.1	
Vert	148.343	QP	38.5	14.8	9.0	38.9	23.4	43.5	20.1	
Vert	222.521	QP	45.0	16.8	9.8	39.0	32.6	46.0	13.4	
Vert	297.704	QP	42.5	19.6	10.4	38.6	33.9	46.0	12.1	
Vert	370.880	QP	50.1	16.4	11.0	38.4	39.1	46.0	6.9	
Vert	445.054	QP	44.2	17.6	11.6	38.3	35.1	46.0	10.9	
Vert	4882.000	PK	45.0	31.2	5.0	36.2	45.0	73.9	28.9	
Vert	7323.000	PK	55.3	36.0	5.8	36.4	60.7	73.9	13.2	
Vert	9764.000	PK	45.7	38.2	6.7	36.8	53.8	73.9	20.1	
Vert	12205.000	PK	50.6	39.2	-2.0	35.9	51.9	73.9	22.0	
Vert	4882.000	AV	31.9	31.2	5.0	36.2	31.9	53.9	22.0	
Vert	9764.000	PK	45.7	38.2	6.7	36.8	53.8	73.9	20.1	

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).

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	7323.000	AV	39.3	36.0	5.8	36.4	-24.7	20.0	53.9	33.9	
Hori	12205.000	AV	38.8	39.2	-2.0	35.9	-24.7	15.4	53.9	38.5	
Vert	7323.000	AV	46.8	36.0	5.8	36.4	-24.7	27.5	53.9	26.4	
Vert	12205.000	AV	38.4	39.2	-2.0	35.9	-24.7	15.0	53.9	38.9	

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

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

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

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

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

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Radiated Spurious Emission

Test place Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No. 10441271H
Date 08/19/2014 08/20/2014
Temperature/ Humidity 23 deg.C/ 63% RH 24 deg.C/ 62% RH
Engineer Satofumi Matsuyama Yuta Moriya
(Below 1GHz) (Above 10GHz)
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	74.174	QP	45.8	6.5	8.1	38.8	21.6	40.0	18.4	
Hori	148.342	QP	41.4	14.8	9.0	38.9	26.3	43.5	17.2	
Hori	222.521	QP	44.3	16.8	9.8	39.0	31.9	46.0	14.1	
Hori	297.705	QP	44.4	19.6	10.4	38.6	35.8	46.0	10.2	
Hori	370.879	QP	51.7	16.4	11.0	38.4	40.7	46.0	5.3	
Hori	445.055	QP	45.8	17.6	11.6	38.3	36.7	46.0	9.3	
Hori	2483.500	PK	54.6	26.8	2.6	36.7	47.3	73.9	26.6	
Hori	4960.000	PK	44.6	31.4	5.0	36.2	44.8	73.9	29.1	
Hori	7440.000	PK	49.4	36.1	6.0	36.4	55.1	73.9	18.8	
Hori	9920.000	PK	45.6	38.4	6.8	36.9	53.9	73.9	20.0	
Hori	12400.000	PK	50.9	39.3	-2.0	35.6	52.6	73.9	21.3	
Hori	2483.500	AV	35.9	26.8	2.6	36.7	28.6	53.9	25.3	
Hori	4960.000	AV	31.7	31.4	5.0	36.2	31.9	53.9	22.1	
Hori	9920.000	AV	32.4	38.4	6.8	36.9	40.7	53.9	13.2	
Vert	74.171	QP	50.2	6.5	8.1	38.8	26.0	40.0	14.0	
Vert	148.345	QP	38.4	14.8	9.0	38.9	23.3	43.5	20.2	
Vert	222.524	QP	45.1	16.8	9.8	39.0	32.7	46.0	13.4	
Vert	297.702	QP	42.3	19.6	10.4	38.6	33.7	46.0	12.3	
Vert	370.881	QP	50.9	16.4	11.0	38.4	39.9	46.0	6.1	
Vert	445.053	QP	44.3	17.6	11.6	38.3	35.2	46.0	10.8	
Vert	2483.500	PK	54.5	26.8	2.6	36.7	47.2	73.9	26.7	
Vert	4960.000	PK	44.5	31.4	5.0	36.2	44.7	73.9	29.2	
Vert	7440.000	PK	54.0	36.1	6.0	36.4	59.7	73.9	14.2	
Vert	9920.000	PK	45.6	38.4	6.8	36.9	53.9	73.9	20.0	
Vert	12400.000	PK	48.4	39.3	-2.0	35.6	50.1	73.9	23.8	
Vert	2483.500	AV	36.1	26.8	2.6	36.7	28.8	53.9	25.1	
Vert	4960.000	AV	31.7	31.4	5.0	36.2	31.9	53.9	22.1	
Vert	9920.000	AV	32.4	38.4	6.8	36.9	40.7	53.9	13.2	

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).

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

Distance factor: 10GHz-26.5GHz $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	7440.000	AV	39.3	36.1	6.0	36.4	-24.7	20.3	53.9	33.6	
Hori	12400.000	AV	38.2	39.3	-2.0	35.6	-24.7	15.2	53.9	38.7	
Vert	7440.000	AV	45.3	36.1	6.0	36.4	-24.7	26.3	53.9	27.6	
Vert	12400.000	AV	36.8	39.3	-2.0	35.6	-24.7	13.8	53.9	40.1	

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

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

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

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

Distance factor: 10GHz-26.5GHz $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

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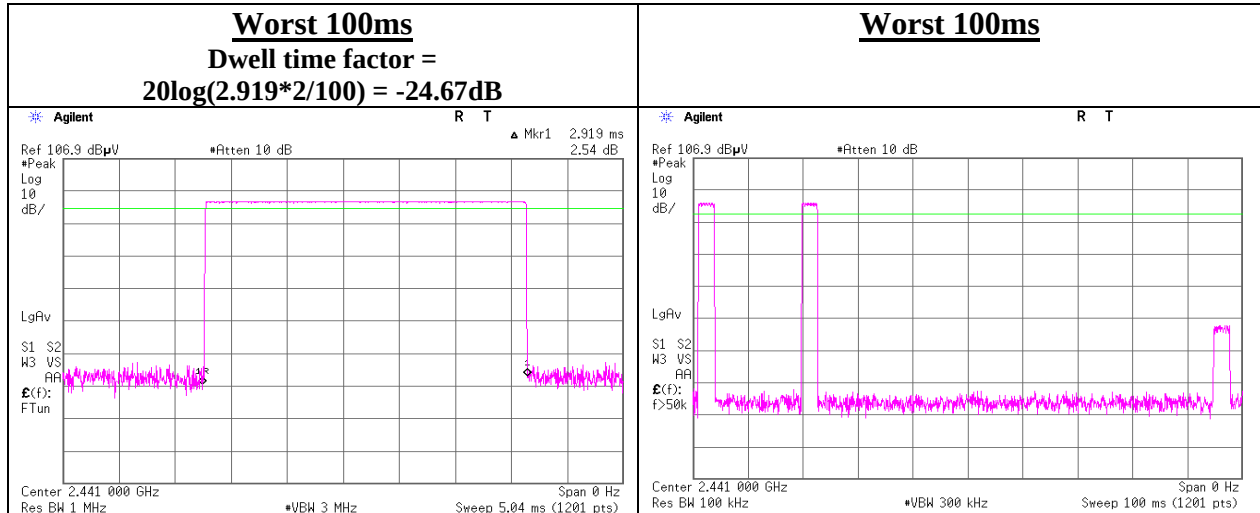
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

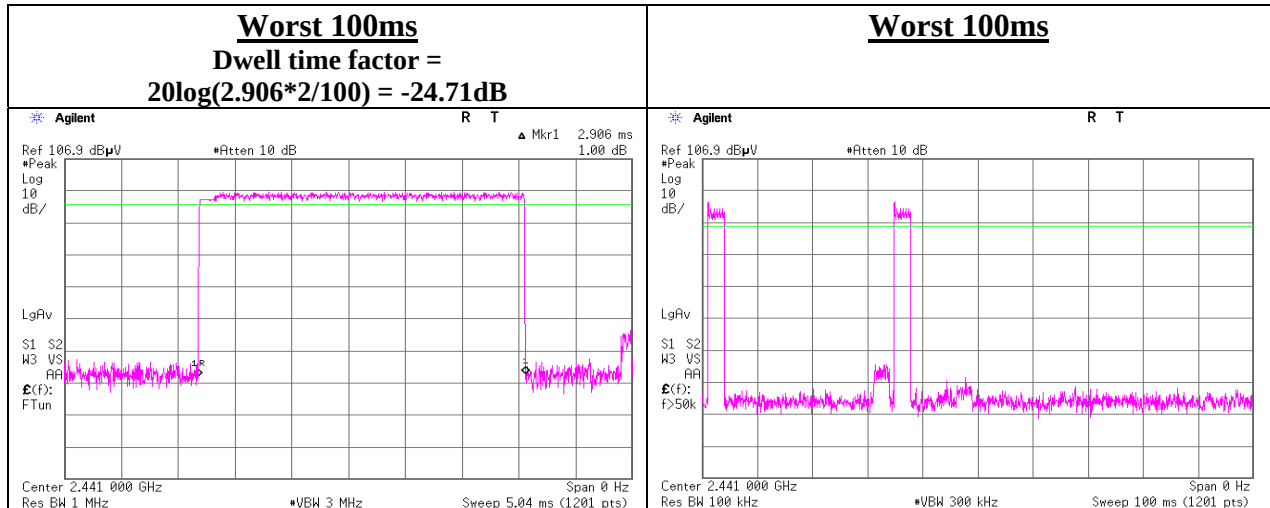
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Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10441271H
Date	08/20/2014
Temperature/ Humidity	24 deg.C/ 62% RH
Engineer	Yuta Momriya
Mode	Tx (Hopping on) DH5/3DH5

DH5



3DH5



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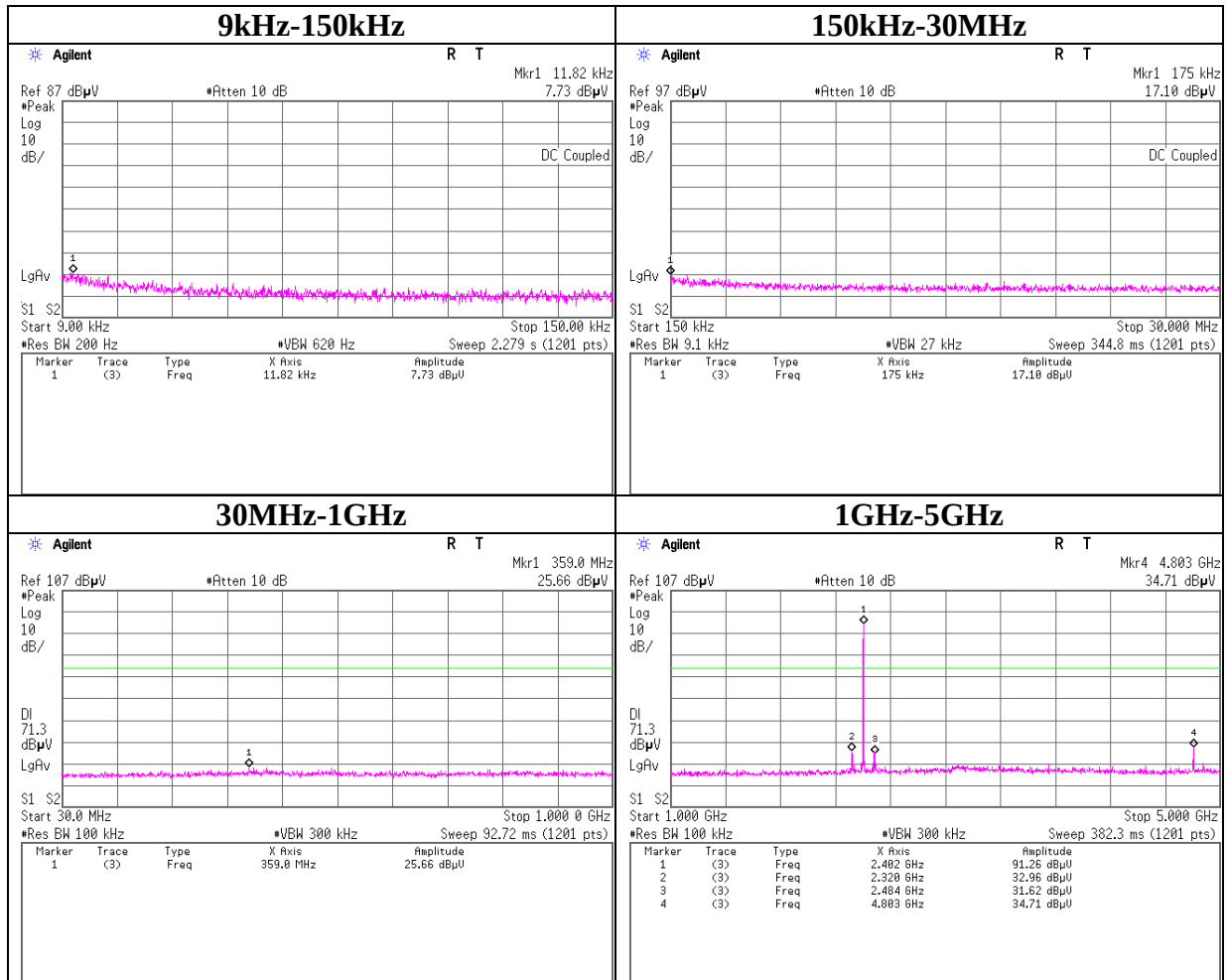
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. : 10441271H
Date : 09/11/2014
Temperature/ Humidity : 21 deg. C / 54% RH
Engineer : Takumi Shimada
Mode : Tx (Hopping off) DH5

Tx DH5 2402MHz



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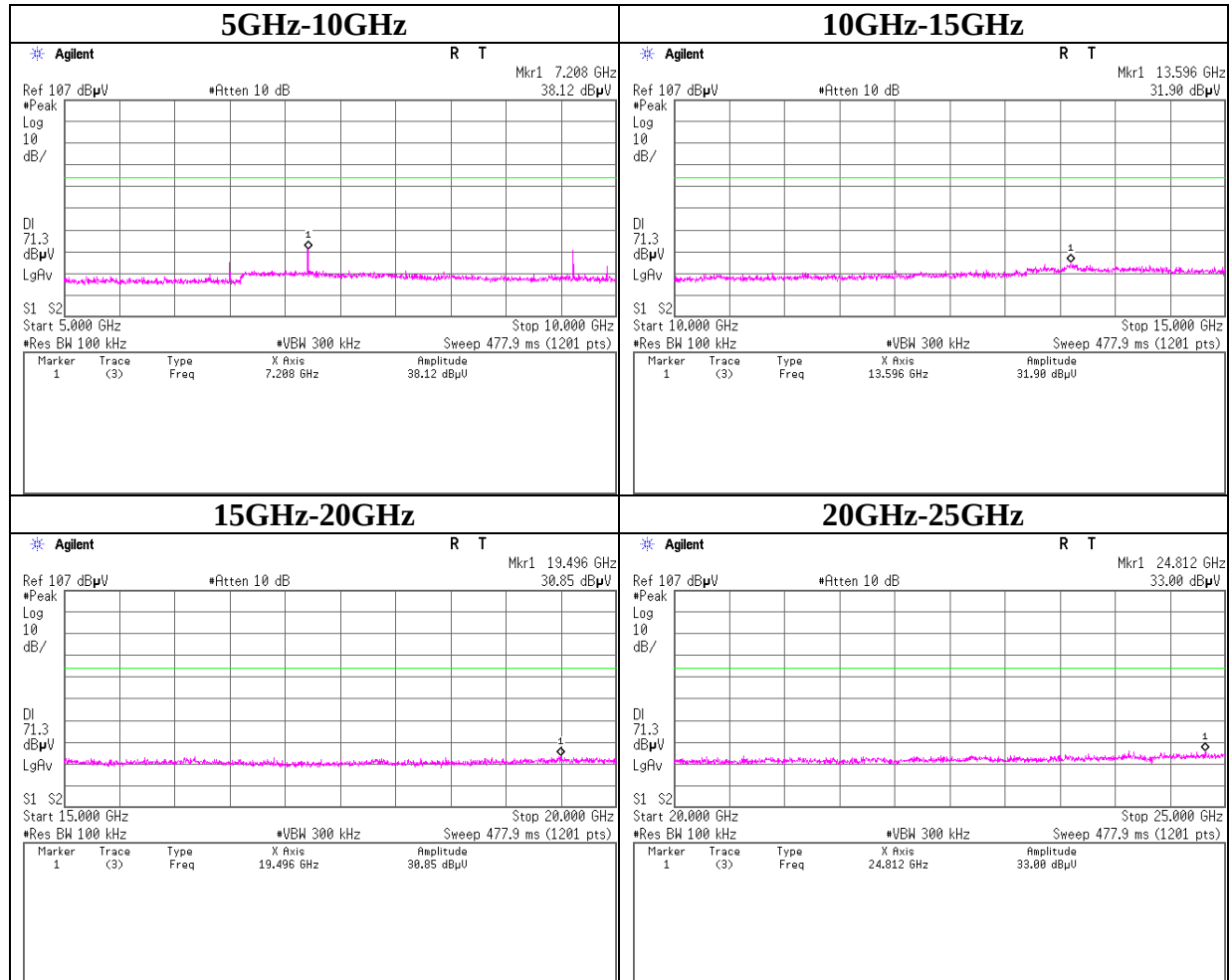
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5

Tx DH5 2402MHz



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Ise EMC Lab.

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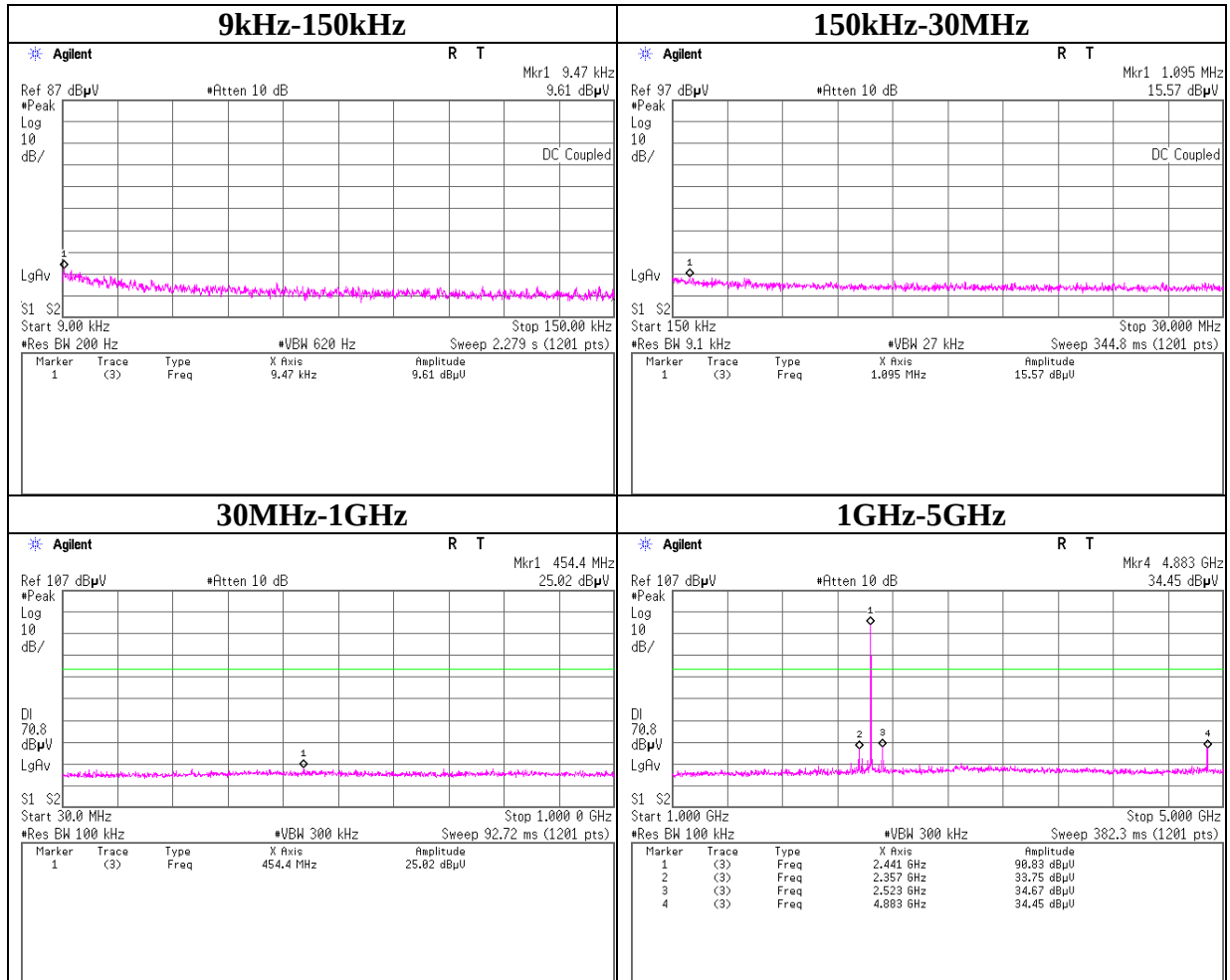
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5

Tx DH5 2441MHz



UL Japan, Inc.

Ise EMC Lab.

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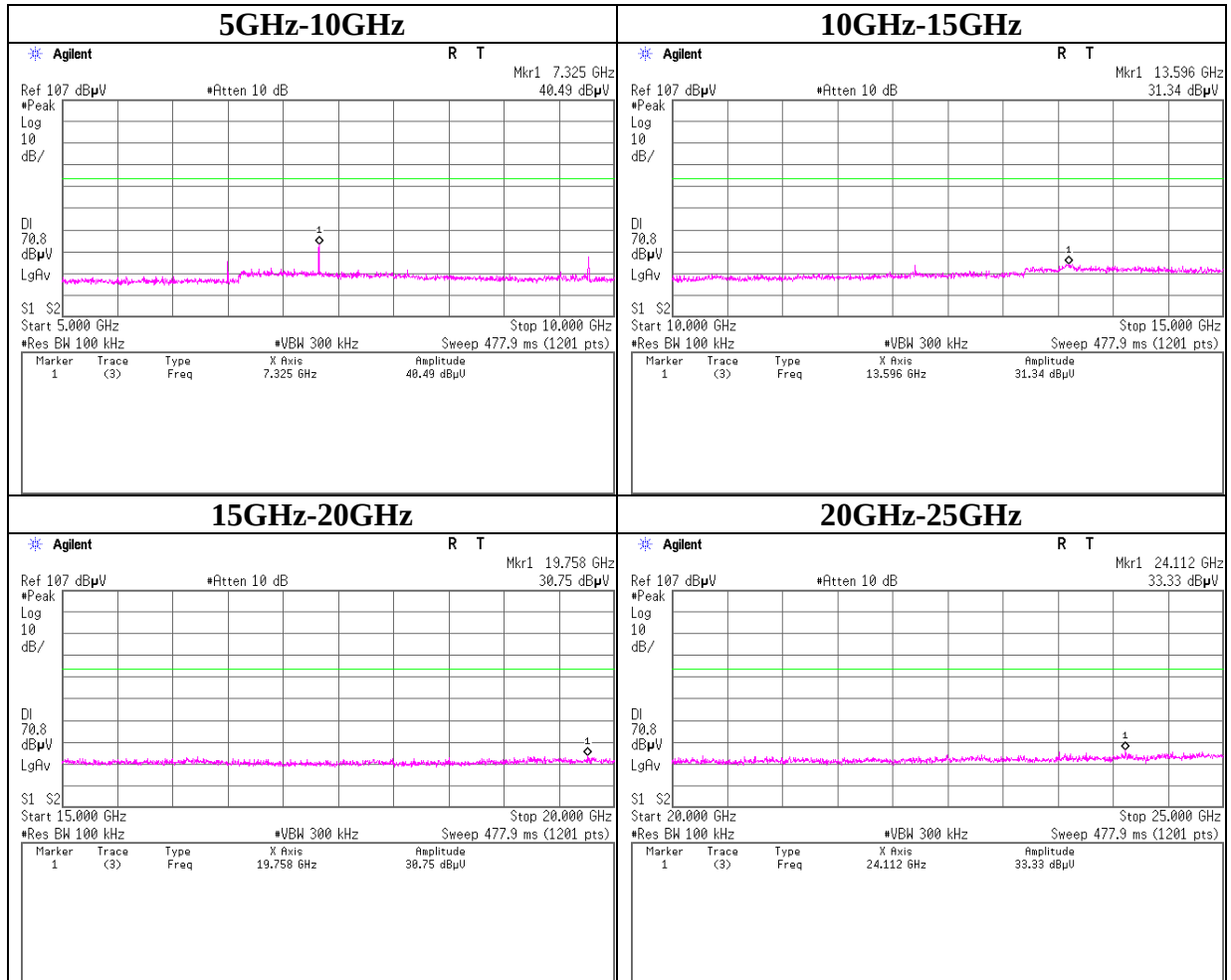
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5

Tx DH5 2441MHz



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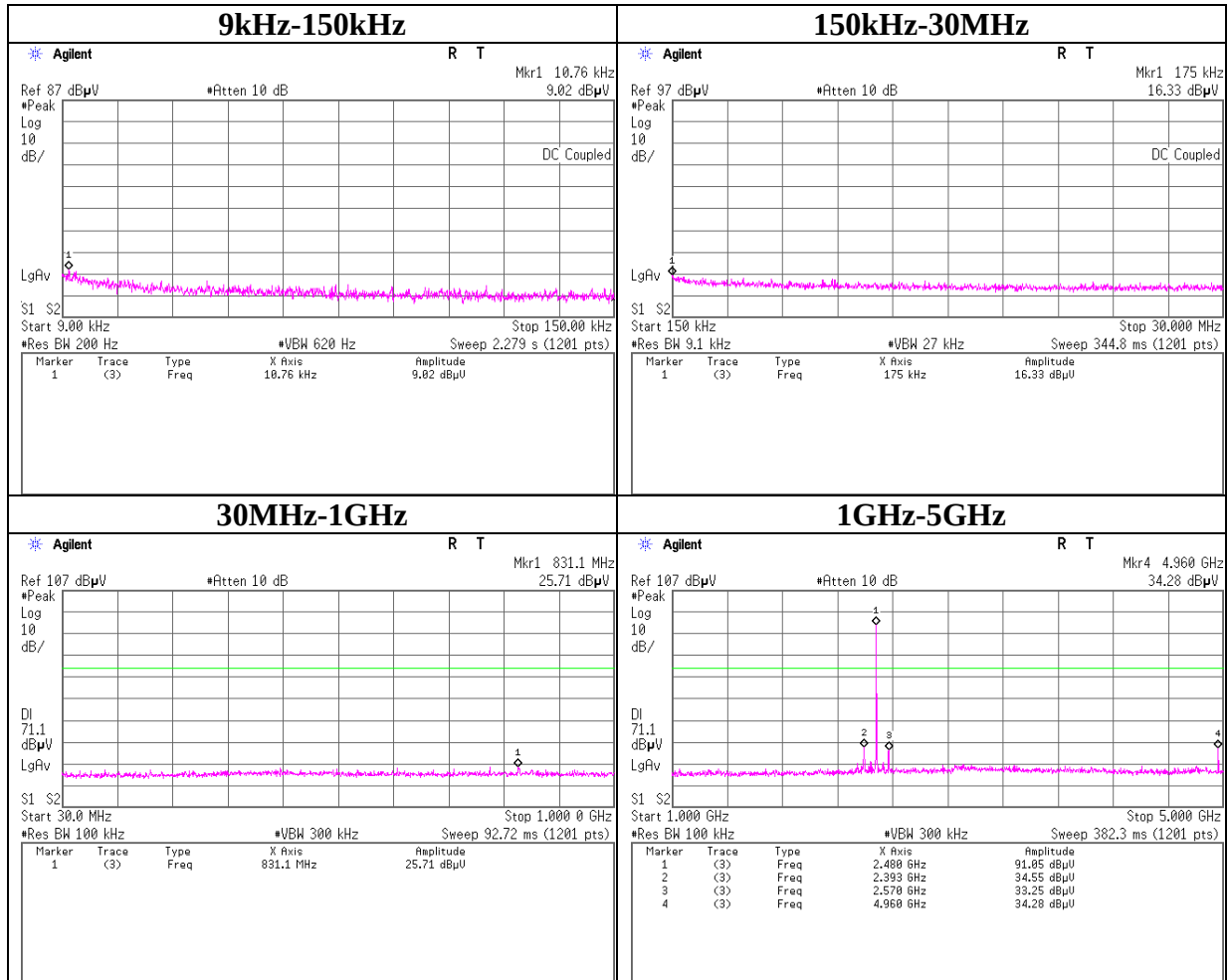
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No.	10441271H
Date	09/11/2014
Temperature/ Humidity	21 deg. C / 54% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz



UL Japan, Inc.

Ise EMC Lab.

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

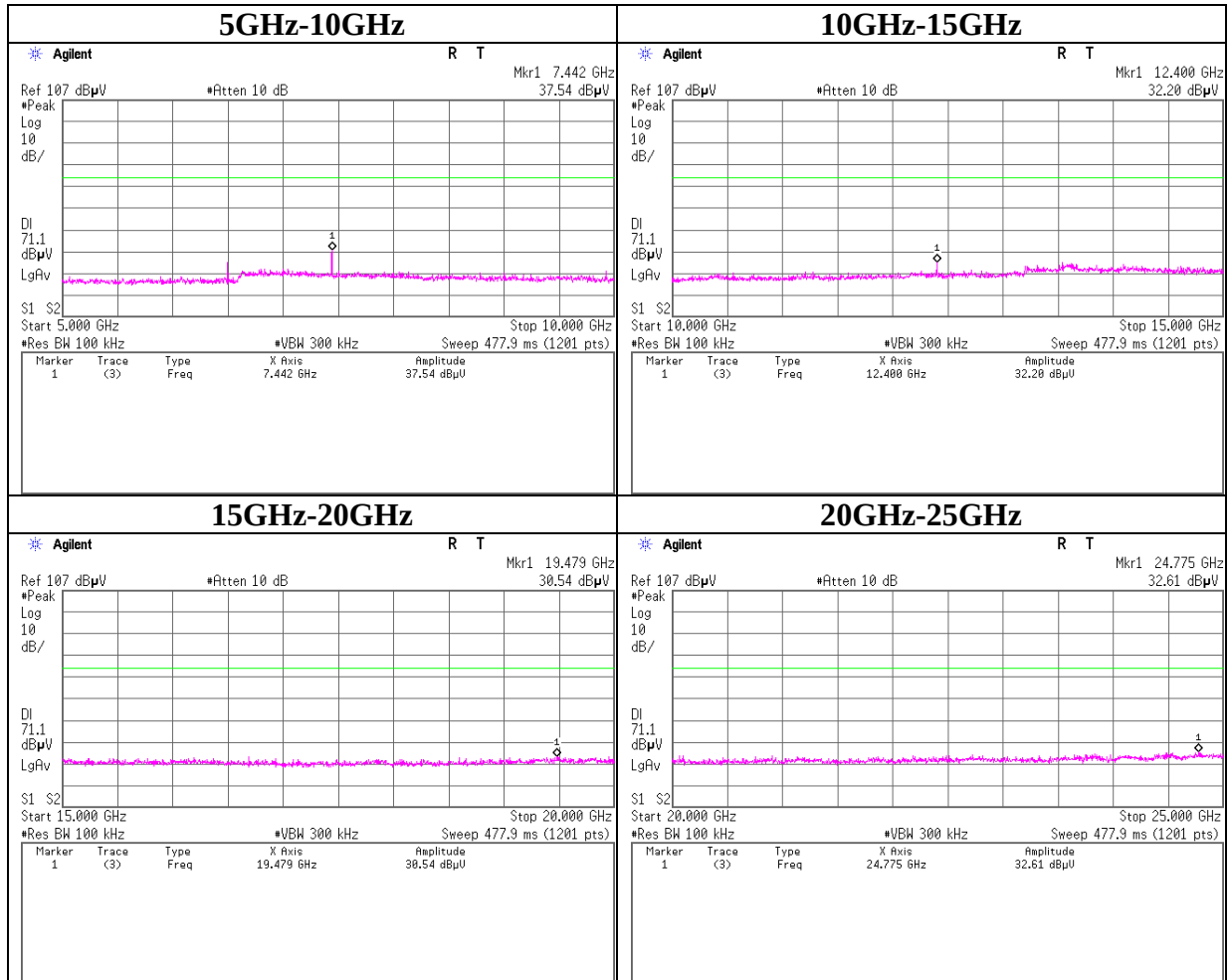
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. : 10441271H
Date : 09/11/2014
Temperature/ Humidity : 21 deg. C / 54% RH
Engineer : Takumi Shimada
Mode : Tx (Hopping off) DH5

Tx DH5 2480MHz



UL Japan, Inc.

Ise EMC Lab.

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Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place

Report No.

Date

Temperature/ Humidity

Engineer

Mode

Ise EMC Lab. No.11 Semi Anechoic Chamber

10441271H

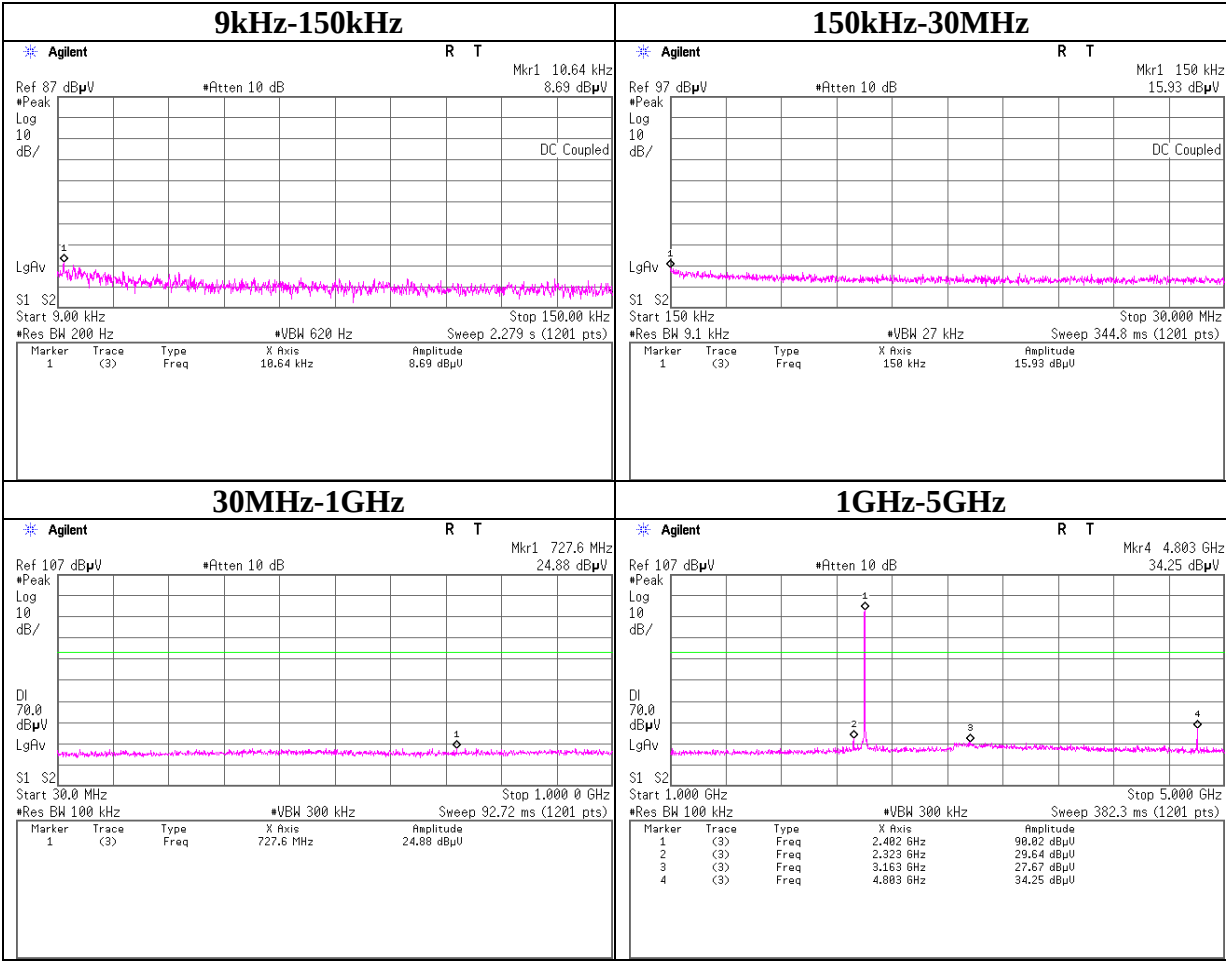
09/11/2014

21 deg. C / 54% RH

Takumi Shimada

Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz



Conducted Spurious Emission

Test place

Report No.

Date

Temperature/ Humidity

Engineer

Mode

Ise EMC Lab. No.11 Semi Anechoic Chamber

10441271H

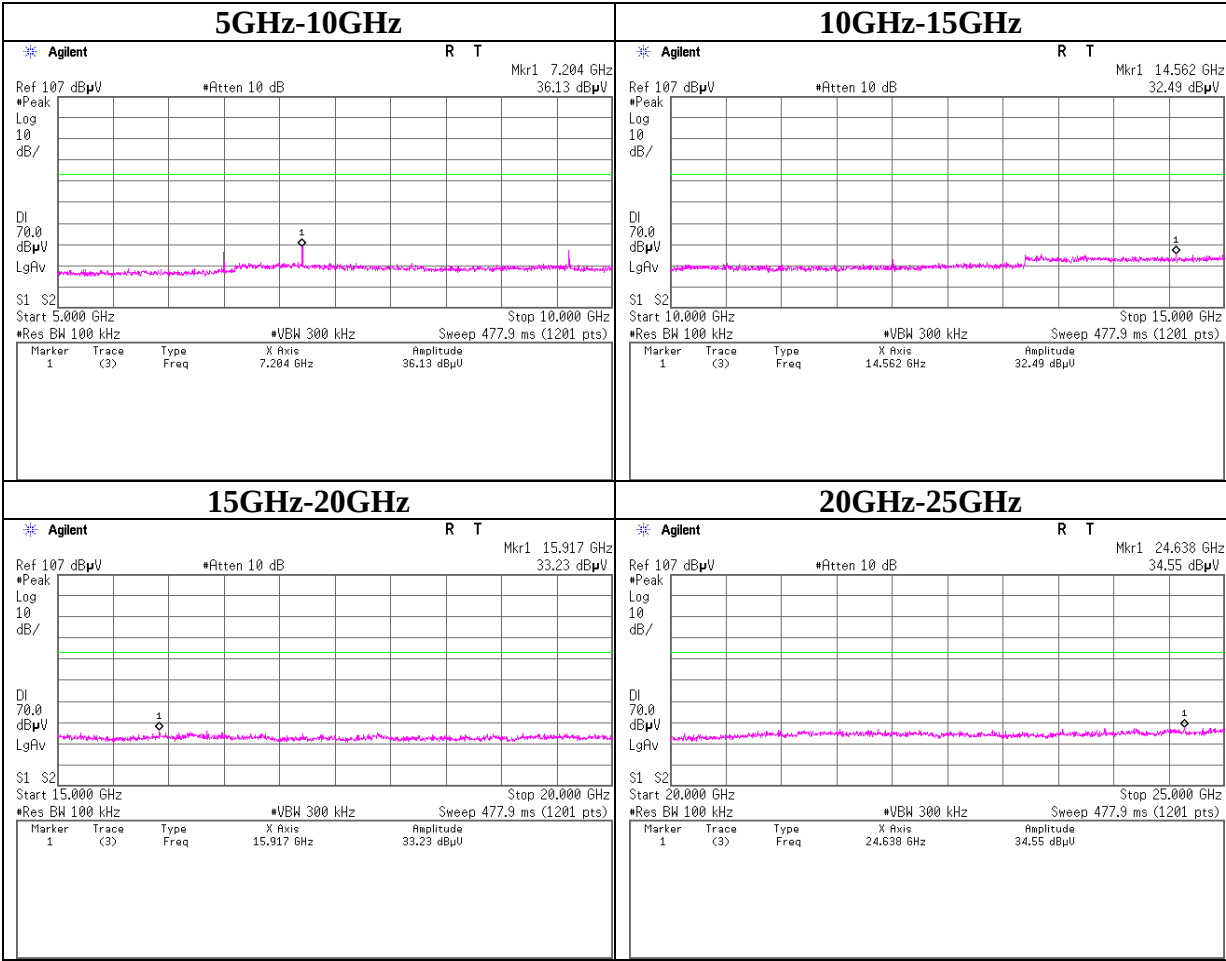
09/11/2014

21 deg. C / 54% RH

Takumi Shimada

Tx (Hopping off) 3DH5

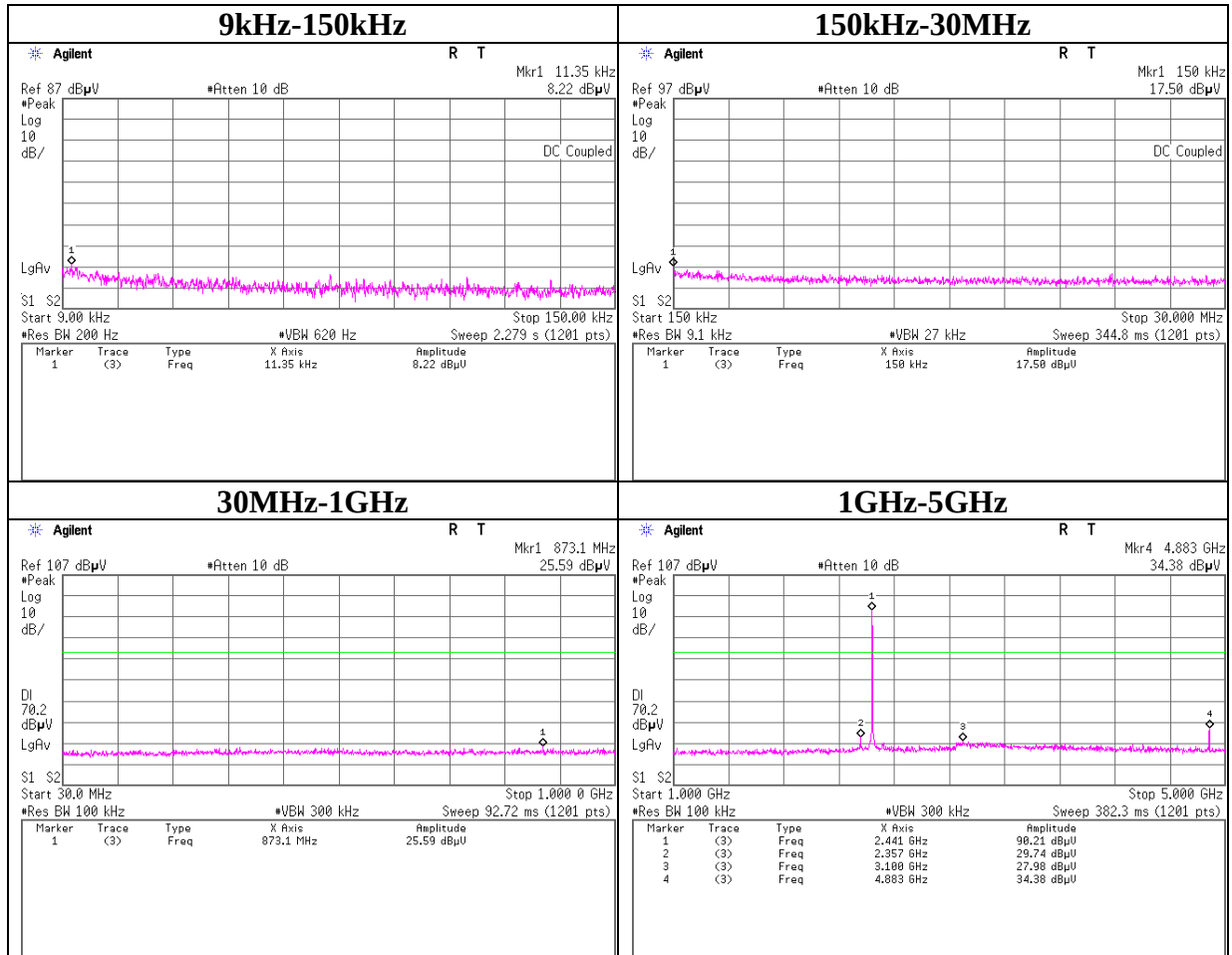
Tx 3DH5 2402MHz



Conducted Spurious Emission

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Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



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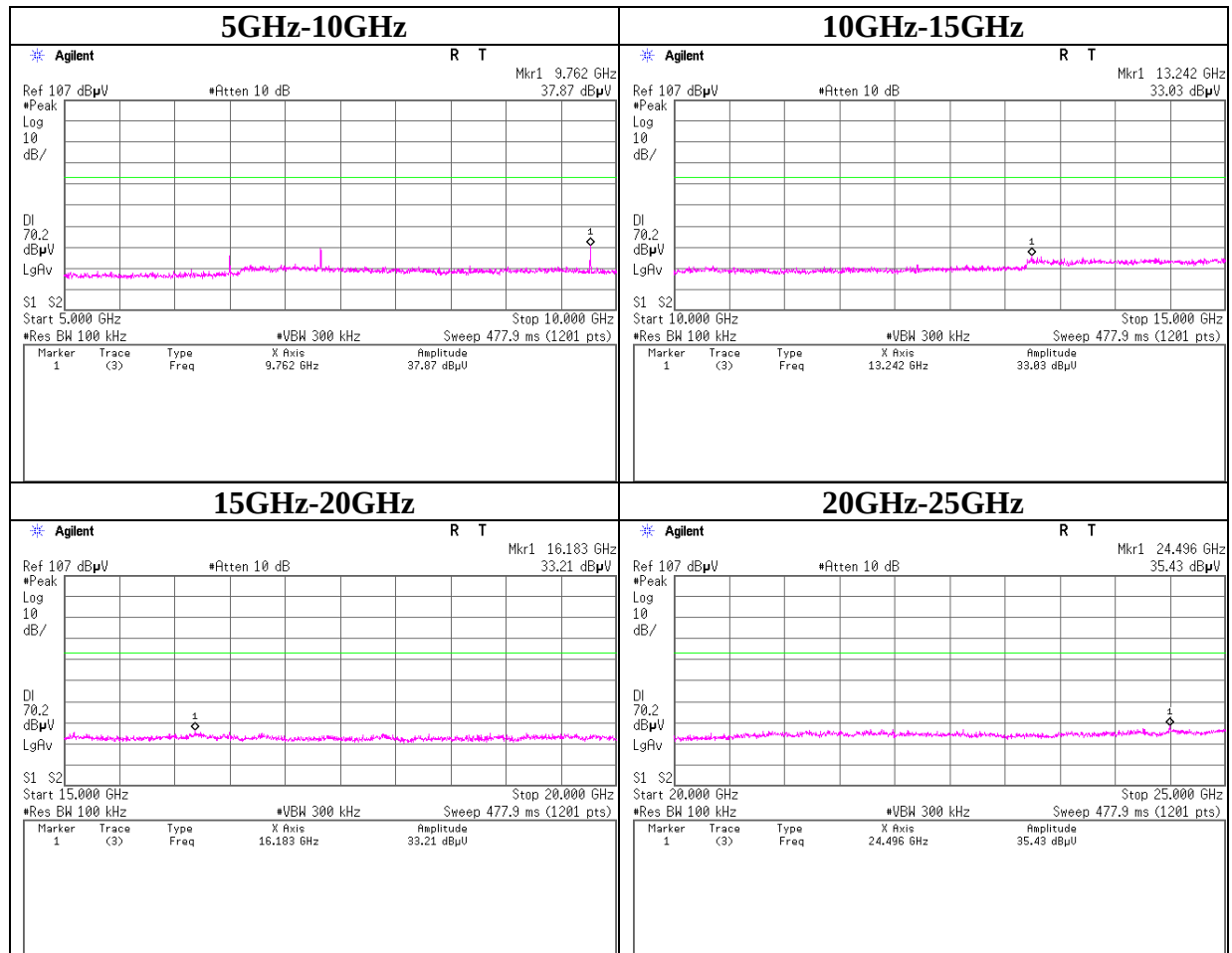
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Engineer Takumi Shimada
Mode Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



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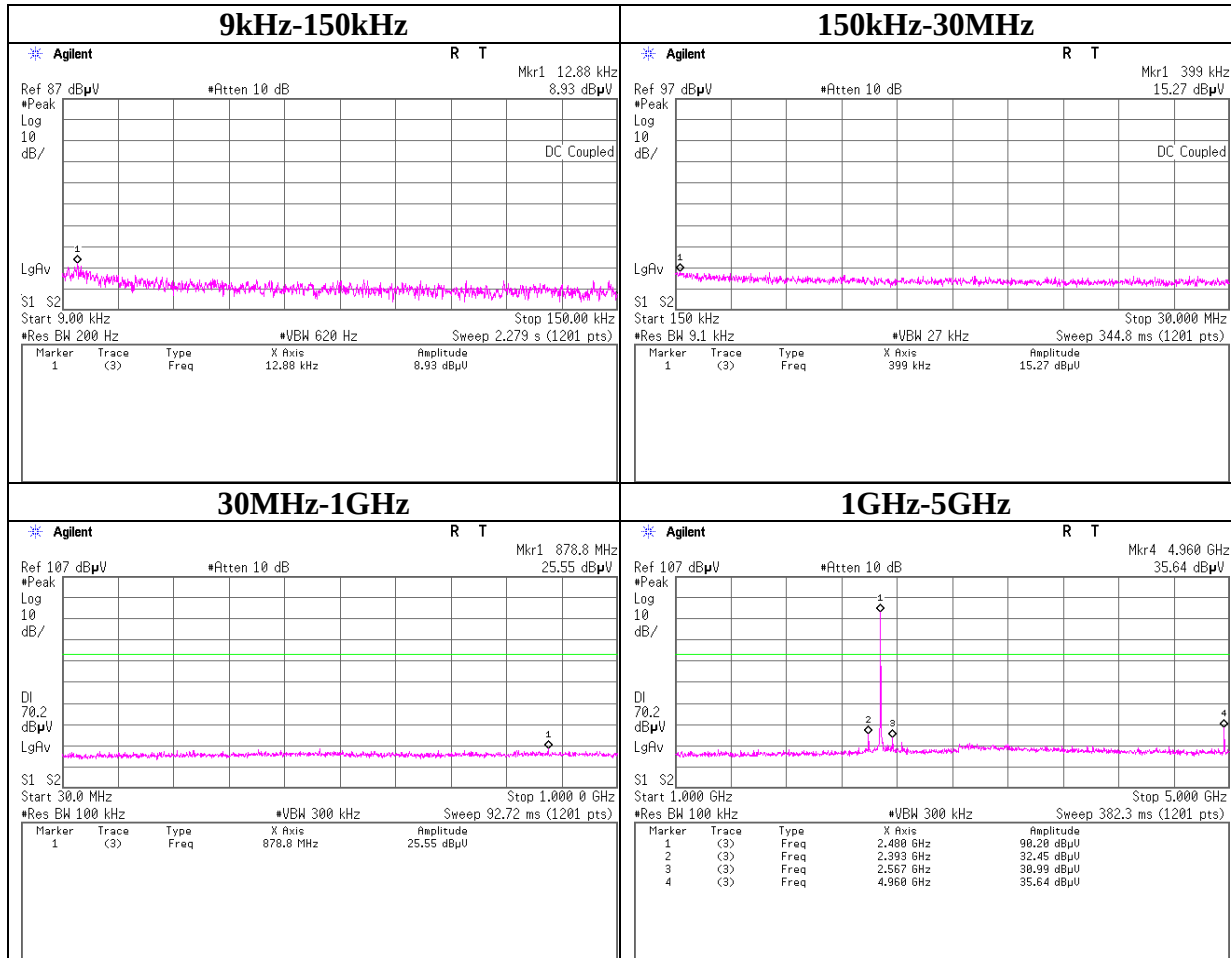
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Conducted Spurious Emission

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Report No. : 10441271H
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Engineer : Takumi Shimada
Mode : Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz



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Conducted Spurious Emission

Test place

Report No.

Date

Temperature/ Humidity

Engineer

Mode

Ise EMC Lab. No.11 Semi Anechoic Chamber

10441271H

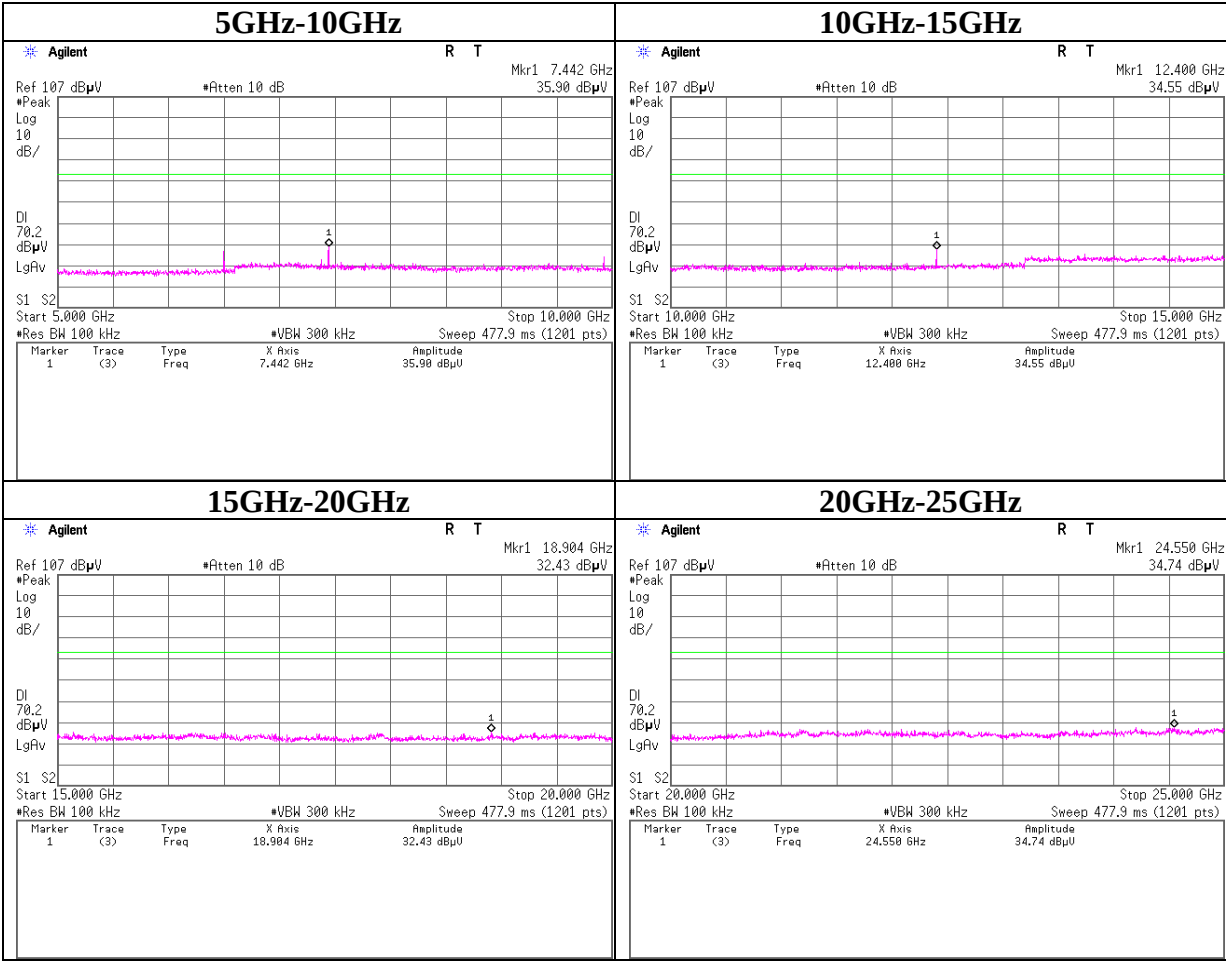
09/11/2014

21 deg. C / 54% RH

Takumi Shimada

Tx (Hopping off) 3DH5

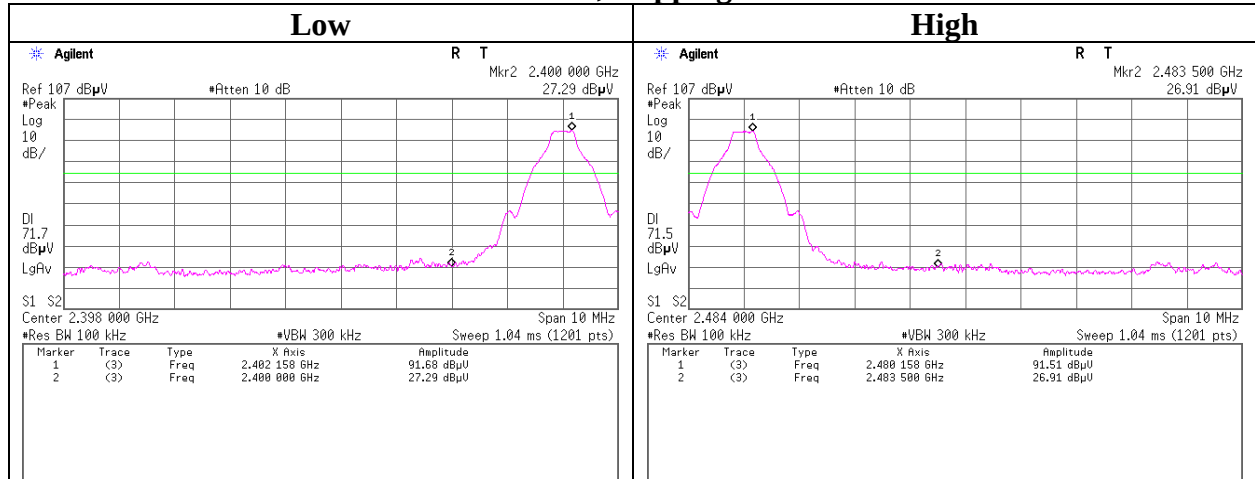
Tx 3DH5 2480MHz



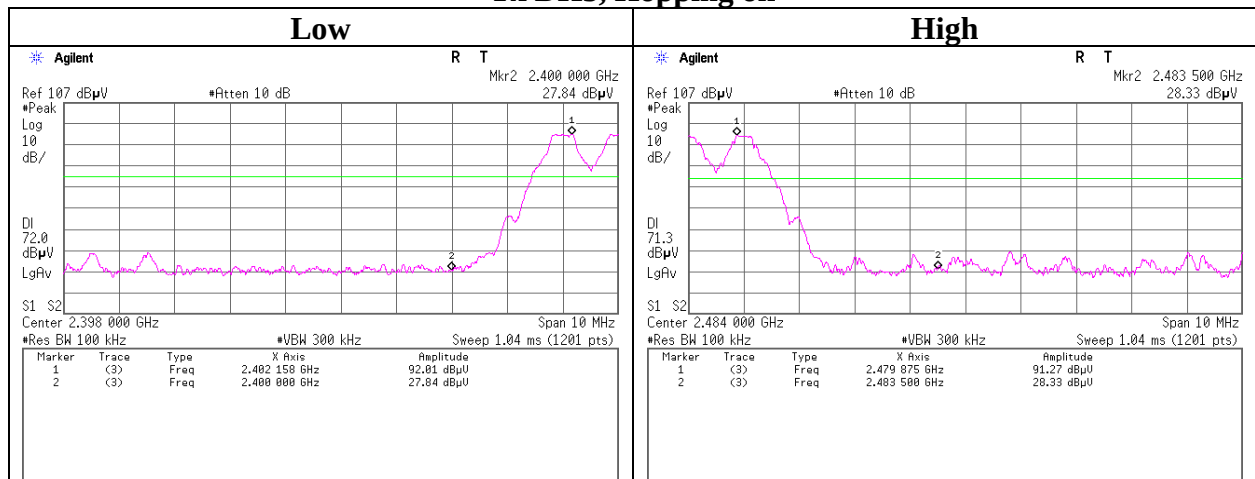
Conducted Emission Band Edge compliance

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5

Tx DH5, Hopping off



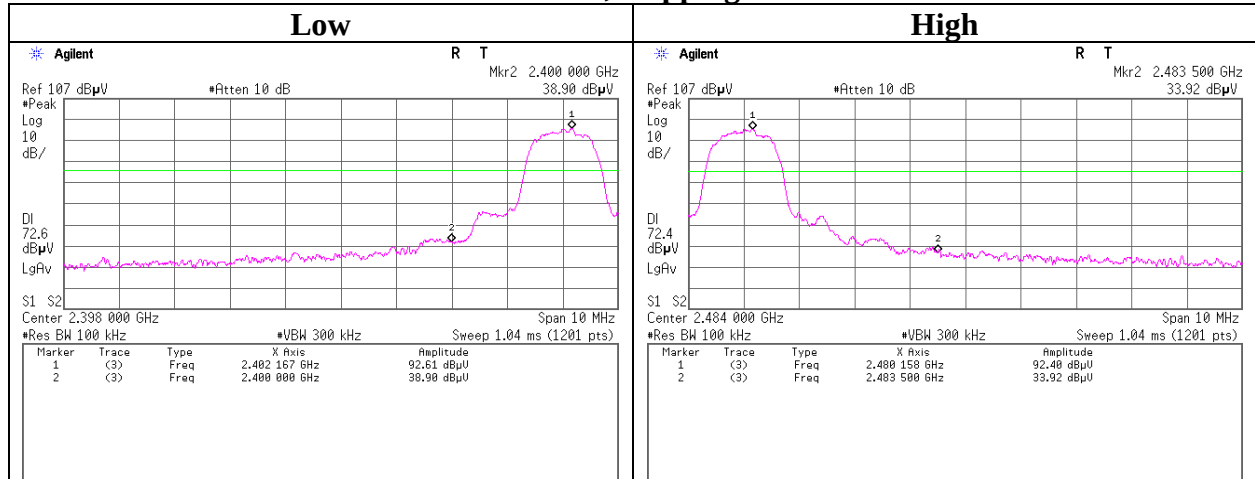
Tx DH5, Hopping on



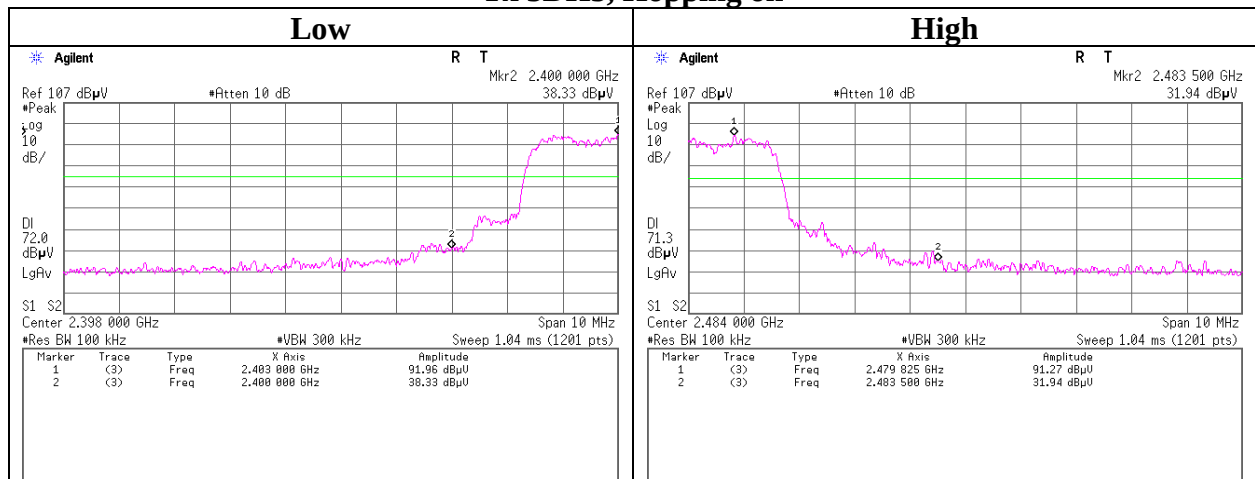
Conducted Emission Band Edge compliance

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) 3DH5

Tx 3DH5, Hopping off



Tx 3DH5, Hopping on



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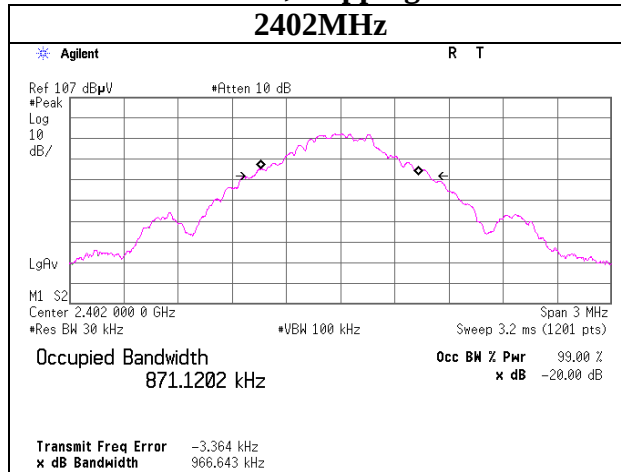
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

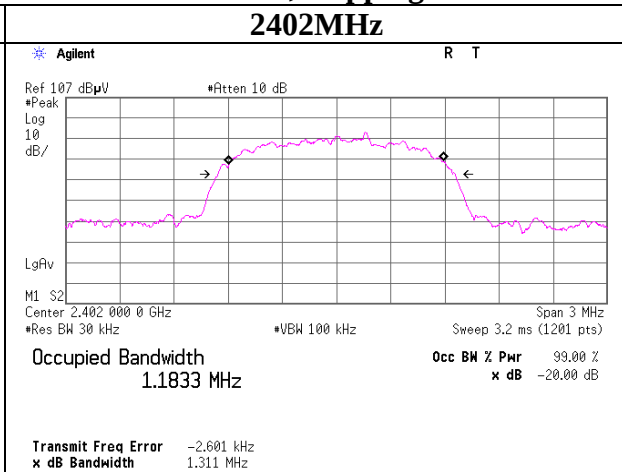
99%Occupied Bandwidth

Test place Ise EMC Lab. No.11 Semi Anechoic Chamber
Report No. 10441271H
Date 09/11/2014
Temperature/ Humidity 21 deg. C / 54% RH
Engineer Takumi Shimada
Mode Tx (Hopping off) DH5/3DH5

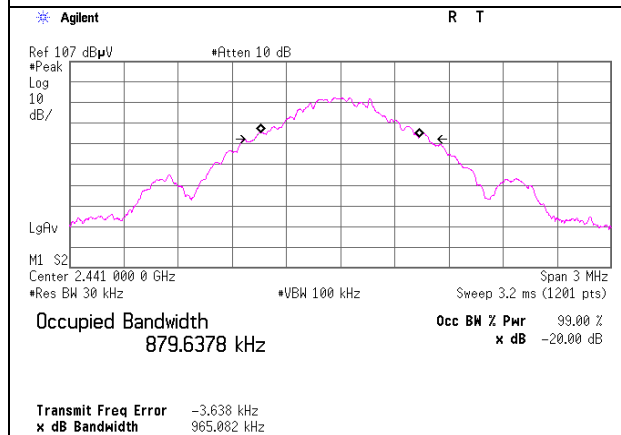
Tx DH5, Hopping off



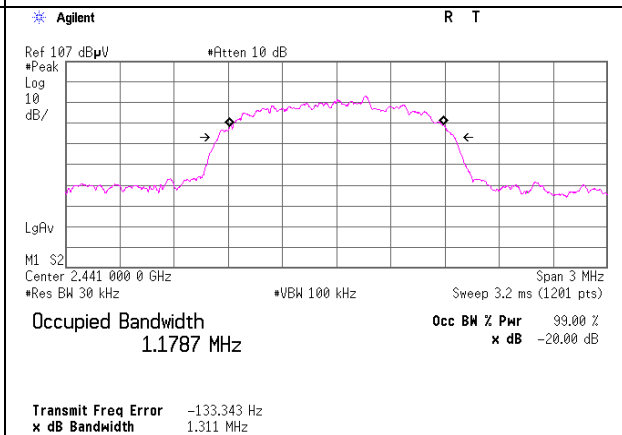
Tx 3DH5, Hopping off



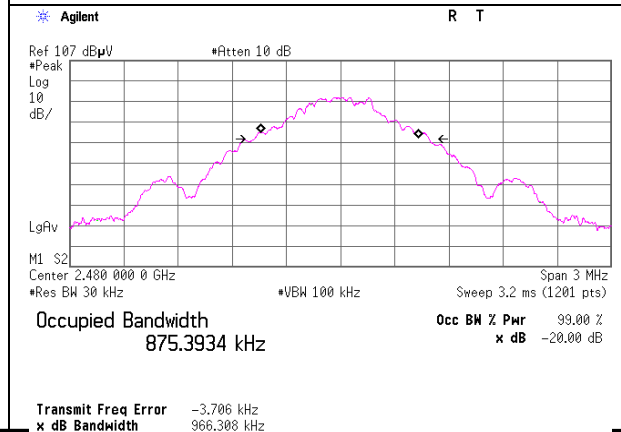
2441MHz



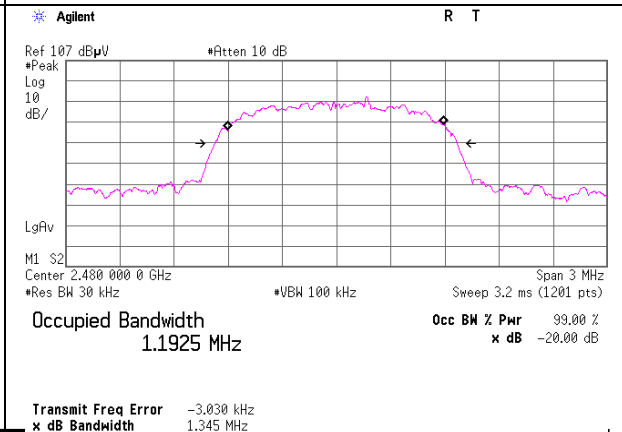
2441MHz



2480MHz



2480MHz



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99% Occupied Bandwidth

Test place

Report No.

Date

Temperature/ Humidity

Engineer

Mode

Ise EMC Lab. No.11 Semi Anechoic Chamber

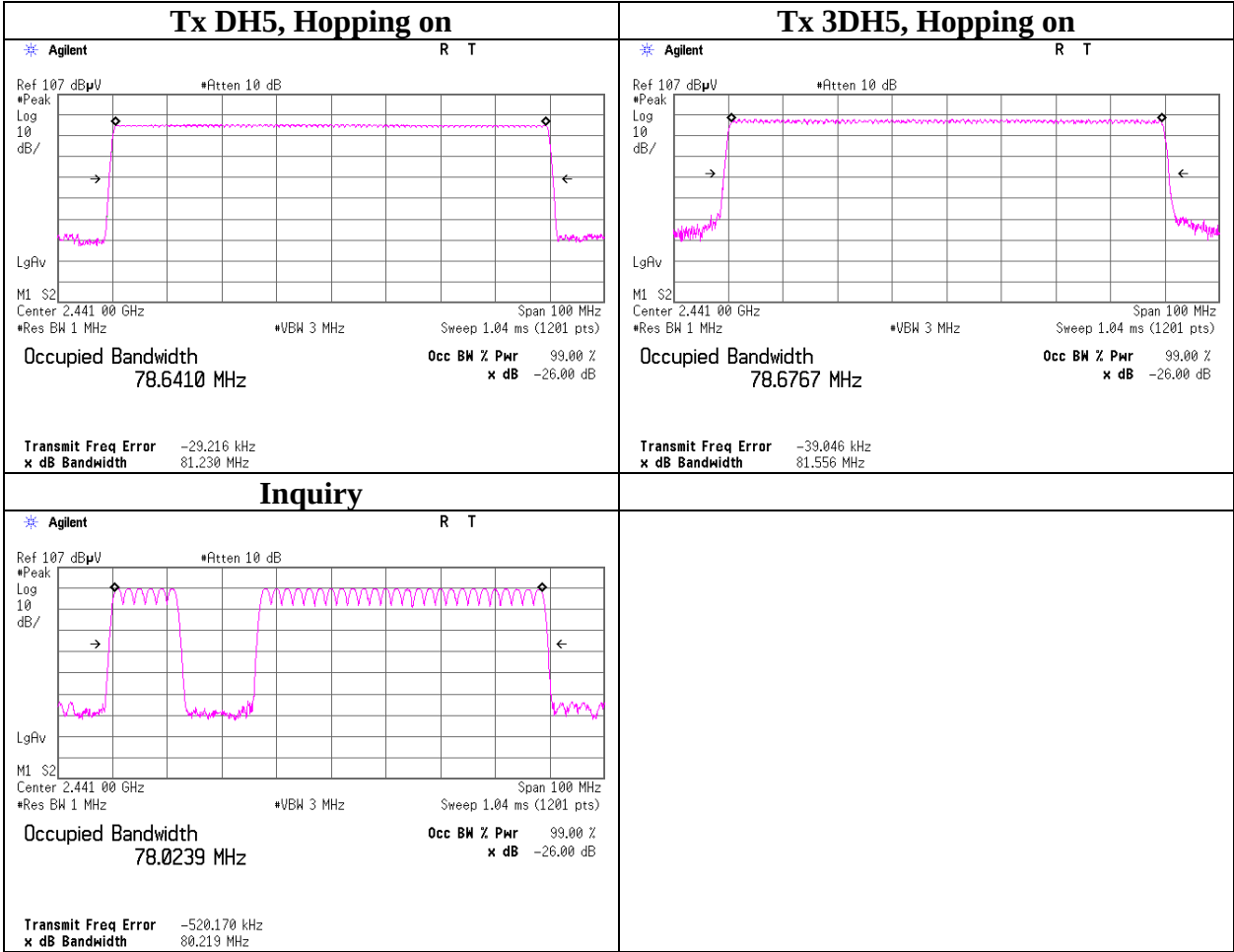
10441271H

09/11/2014

21 deg. C / 54% RH

Takumi Shimada

Tx (Hopping off) DH5/3DH5/Inquiry



APPENDIX 2: Test instruments

EMI Test Equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE/CE	2013/08/01 * 12 *1)
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE/CE	2014/02/20 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE/CE	2014/06/06 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2013/11/24 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2013/11/24 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2013/11/26 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	RE	2013/09/12 * 12 *1)
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2014/02/17 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2014/05/16 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2014/02/05 * 12
MCC-165	Microwave Cable	Junkosha	MWX221	1203S213(1m) / 1311S166(5m)	RE	2013/11/27 * 12
MHF-17	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	7001	RE	2013/09/18 * 12 *1)
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2013/12/24 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2013/11/25 * 12
MLS-25	LISN(AMN)	Schwarzbeck	NSLK8127	8127-731	CE(EUT)	2014/07/09 * 12
MLS-26	LISN(AMN)	Schwarzbeck	NSLK8127	8127-732	CE(AE)	2014/07/09 * 12
MTA-30	Terminator	TME	CT-01	-	CE	2014/01/20 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	- /01068(Switcher)	CE	2013/09/12 * 12 *1)
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2014/01/29 * 12
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	AT	2014/03/05 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2014/03/13 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2013/10/21 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2013/10/21 * 12
MOS-21	Thermo-Hygrometer	Custom	CTH-201	0002	AT	2013/12/17 * 12

*1) This test equipment was used for the tests before the expiration date of the calibration.

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 test

RE: Radiated Emission test

AT: Antenna Terminal Conducted test

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