



RADIO TEST REPORT


Test Report No. : 10538067H-A-R3

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Audio
Model No. : FT0086A
FCC ID : BABFT0086A
Test regulation : FCC Part 15 Subpart C: 2015
Test Result : Complied

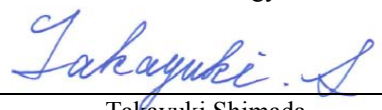
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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10538067H-A-R2. 10538067H-A-R2 is replaced with this report.

Date of test: October 29 to November 15, 2014

Representative test engineer:


Yuta Moriya
Engineer
Consumer Technology Division

Approved by:


Takayuki Shimada
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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13-EM-F0429

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SECTION 1: Customer information

Company Name : FUJITSU TEN LIMITED
Address : 2-28, Gosho-dori 1-Chome, Hyogo-ku, Kobe, 652-8510 JAPAN
Telephone Number : +81-78-682-2159
Facsimile Number : +81-78-671-7160
Contact Person : YO SHOTATSU

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

2.1 Identification of E.U.T.

Type of Equipment : Car Audio
Model No. : FT0086A
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12.0V
Receipt Date of Sample : October 21, 2014
Country of Mass-production : INDIA
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

General Specification

Clock frequency(ies) in the system : See below table

Component, location	Generated frequency	Type, Rating etc.
<u>Main PCB</u>		
Crystal Oscillator X401	12.000 MHz	Main CPU Clock
Crystal Oscillator X402	11.2896 MHz	Audio Clock
Crystal Oscillator X7502	62.400 MHz	DSP Clock
Crystal Oscillator X5001	16.934 MHz	Deck Clock
Crystal Oscillator X6000	28.224 MHz	Caymano Clock
Crystal Oscillator X4000	24.576 MHz	Front End IC Clock
Serial Flash	72 MHz	Communication
DDCON Clock	300 kHz, 340 kHz※	PWM
	※DDCON Clock Frequency output depends on AM Tuning	
<u>Panel PCB</u>		
Bluetooth Module	26.00MHz 115.2 kHz	Crystal Oscillator Communication
LCD Driver	750kHz	Communication

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Radio Specification

[Bluetooth (Ver. 2.1 with EDR function)]

Radio Type : Transceiver
Frequency of Operation : 2402-2480MHz
Modulation : FHSS
Power Supply (radio part input) : DC 3.3V
Antenna type : Inverted-F PCB Antenna
Antenna Gain : -9.1dBi

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 2015

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 January 21, 2015 does not affect the test specification applied to the EUT.

* The EUT complies with FCC Part 15 Subpart B: 2015, final revised on January 21, 2015.

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 8.8	FCC: Section 15.207 ----- IC: RSS-Gen 8.8	-	N/A *1)	-	
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 6.12	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 6.13	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 8.9 and 8.10		5.4dB 287.972MHz, Horizontal, QP	Complied	Conducted/ Radiated

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

*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

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

FCC 15.31 (e)

The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the 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 6.6	IC: -	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)	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

Radiated emission test (3m)

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

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3.5 Test Location

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	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.

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

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated) 20dB Bandwidth	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
<p>*EUT does not have Inquiry mode. *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: BDR: Ext.=255, Int.=50 EDR: Ext.=255, Int.=50 - Software: CSR BlueSuite BlueTest Version 2.2.0.0 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p>		

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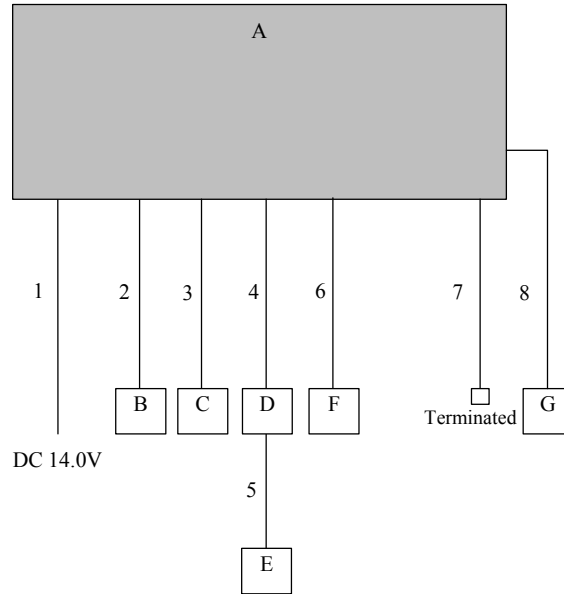
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4.2 Configuration and peripherals



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

*The testing was performed with DC 14.0V only.

As the stable voltage (DC3.3V) is provided to RF module via the internal regulator, it does not influence on the test result.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	FT0086A	DL900023 *1) DL900036 *2)	FUJITSU TEN	EUT
B	Control SW	-	-	FUJITSU TEN	-
C	Microphone	-	6	FUJITSU TEN	-
D	USB Socket	39105-57L10	-	SUZUKI	-
E	USB Memory	PD07-WH4GB	C090000000014303	KING MAX	-
F	AVX Socket	-	-	KING MAX	-
G	Terminal	4ROK	-	JRM	-

*1) Used for Antenna Terminal Conducted tests

*2) Used for Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-
2	Signal Cable	3.0	Unshielded	Unshielded	-
3	Signal Cable	3.0	Unshielded	Unshielded	-
4	USB Cable	0.3	Shielded	Shielded	-
5	USB Cable	3.0	Shielded	Shielded	-
6	Signal Cable	3.0	Unshielded	Unshielded	-
7	Signal Cable	3.8	Shielded	Shielded	-
8	Signal Cable	3.0	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

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

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

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

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

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

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

Test Antennas are used as below;

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

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

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

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz	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 test was made on EUT at the normal use position.

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 6: 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 Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3MHz	30kHz	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	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	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) Reference data
*3) 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 low enough 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

20dB Bandwidth and Carrier Frequency Separation

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10538067H
Date 10/29/2014
Temperature/ Humidity 23 deg. C / 30% RH
Engineer Yuta Moriya
Mode Tx (Hopping on) DH5/3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.927	1.000	≥ 0.618
DH5	2441.0	0.964	1.000	≥ 0.643
DH5	2480.0	0.929	1.000	≥ 0.619
3DH5	2402.0	1.262	1.000	≥ 0.841
3DH5	2441.0	1.278	1.000	≥ 0.852
3DH5	2480.0	1.266	1.000	≥ 0.844

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

No limit applies to 20dB Bandwidth.

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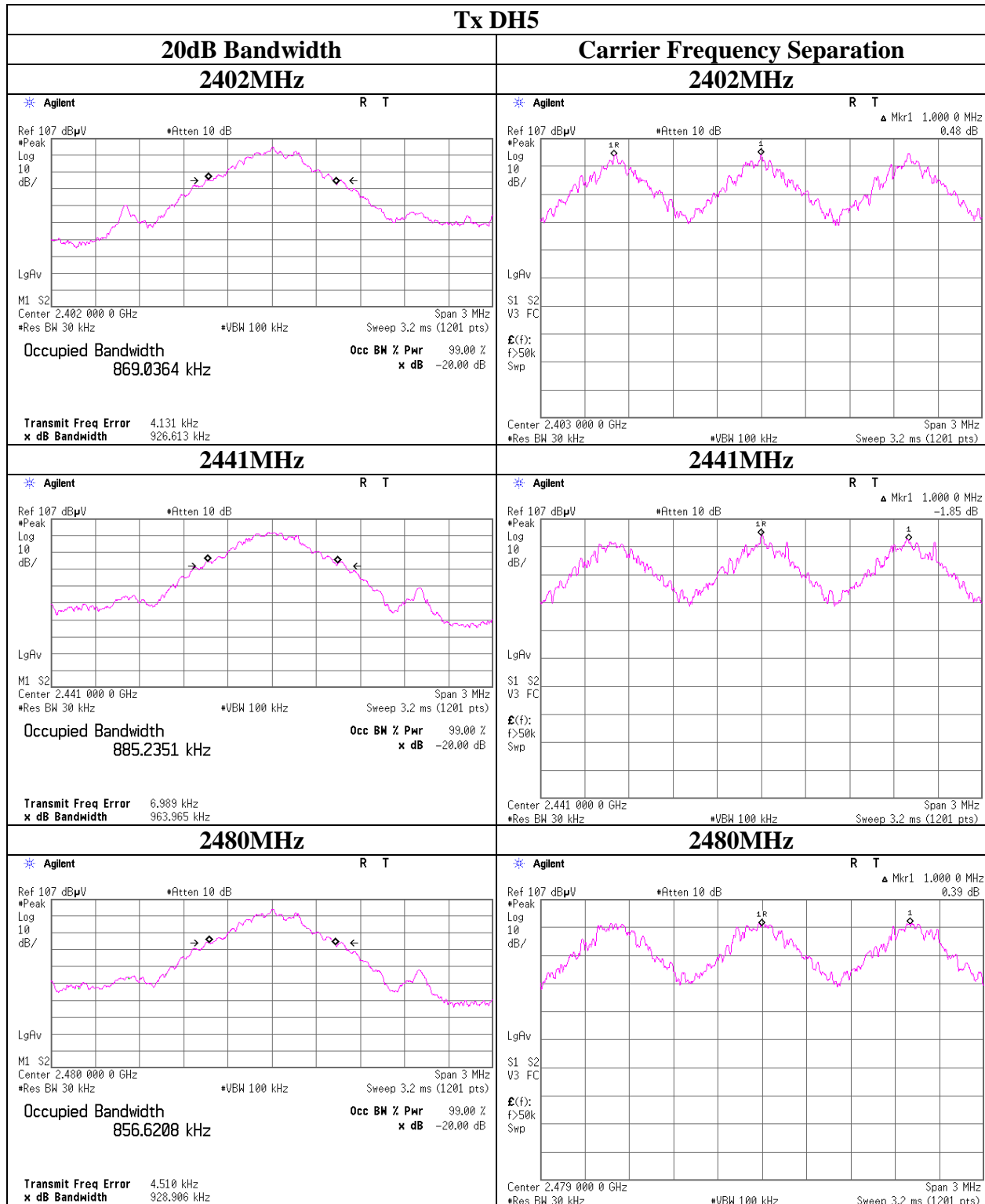
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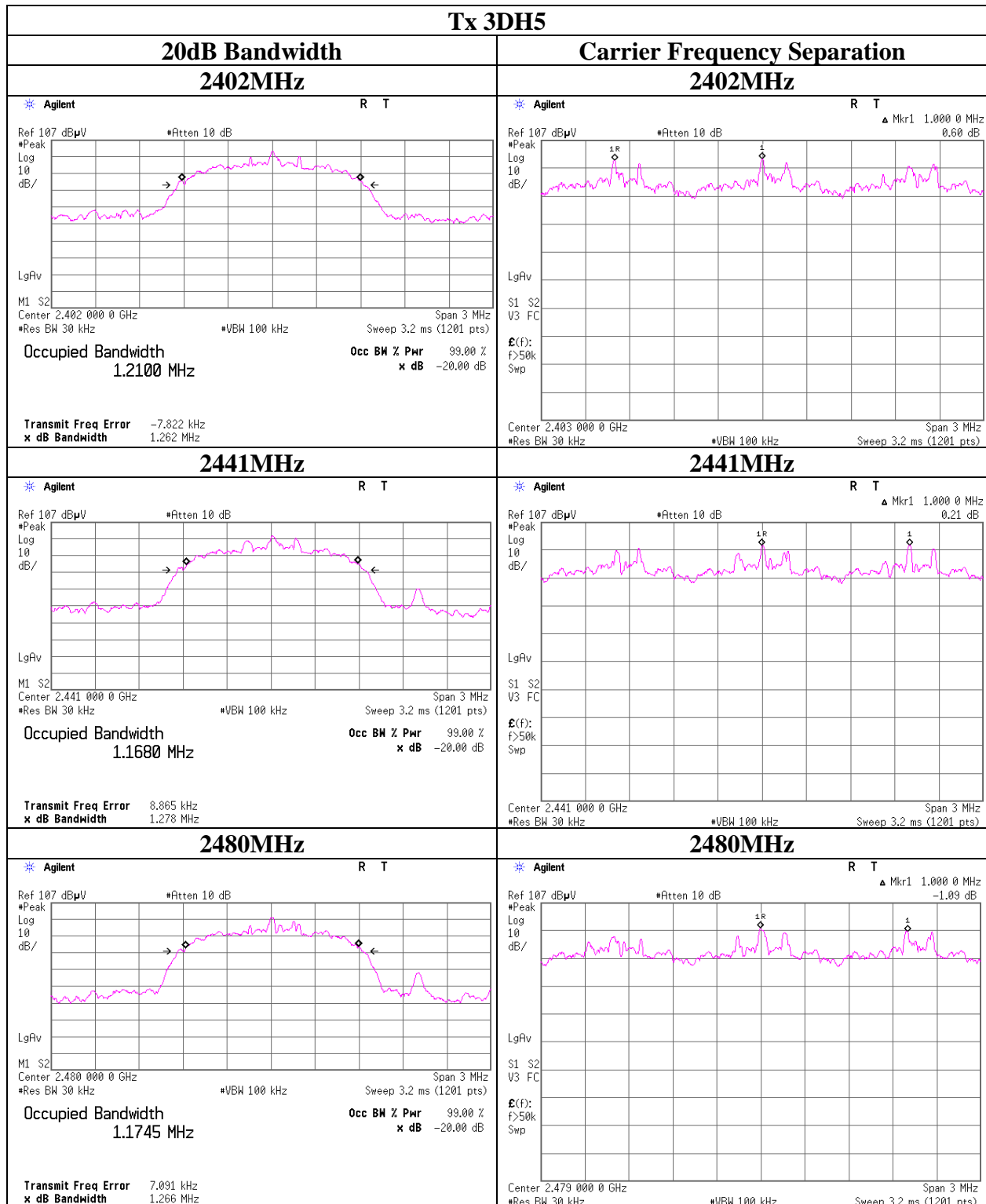
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20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation



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Number of Hopping Frequency

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10538067H
Date 10/29/2014
Temperature/ Humidity 23 deg. C / 30% RH
Engineer Yuta Moriya
Mode Tx (Hopping on) DH5/3DH5

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

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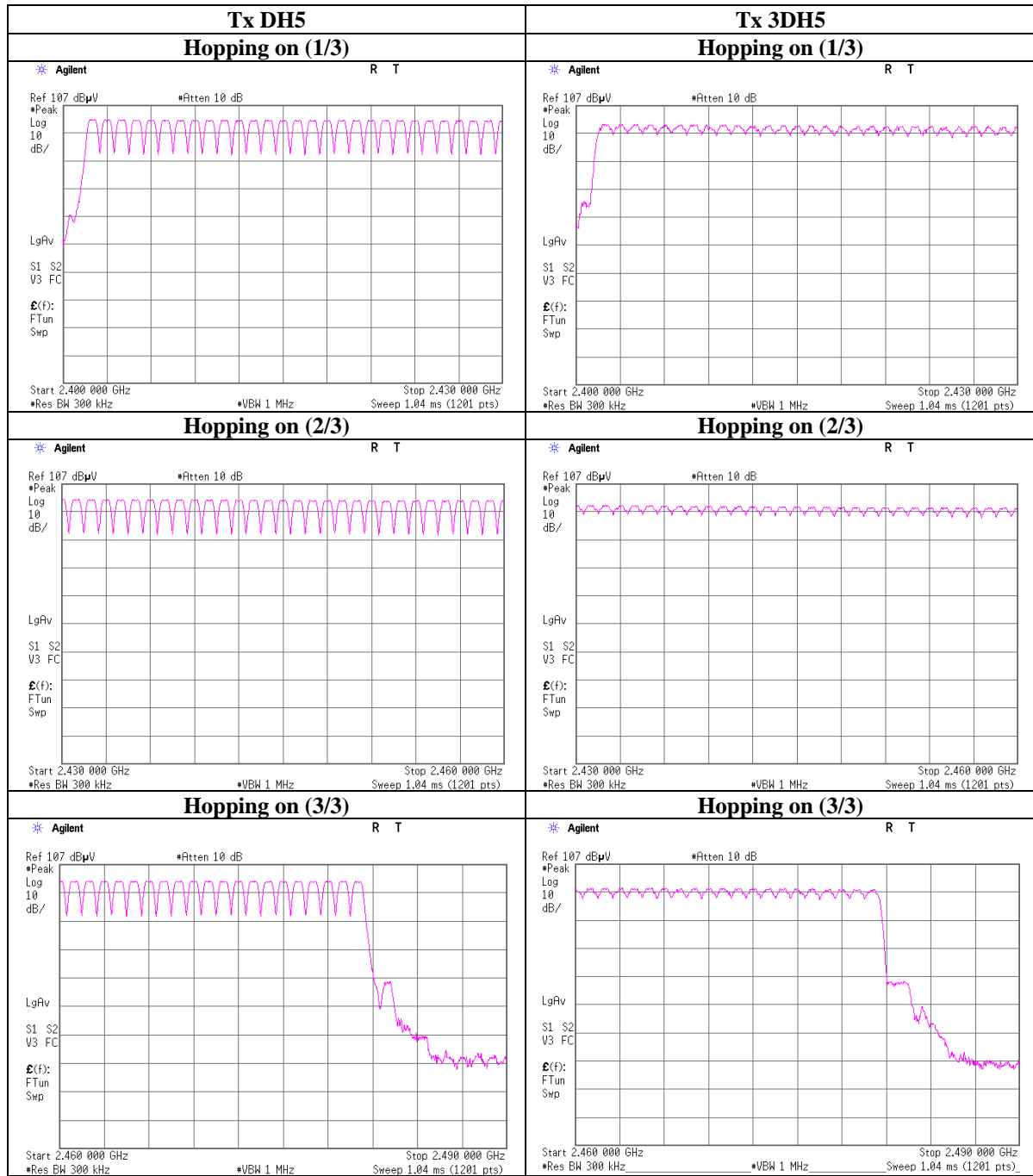
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Number of Hopping Frequency



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Dwell time

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 10538067H
 Date : 10/29/2014
 Temperature/ Humidity : 23 deg. C / 30% RH
 Engineer : Yuta Moriya
 Mode : Tx (Hopping on) DH5/3DH5

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	50.0 times /	5 sec. x	31.6 sec. = 316 times	0.522	165	400
DH3	25.0 times /	5 sec. x	31.6 sec. = 158 times	1.780	281	400
DH5	17.0 times /	5 sec. x	31.6 sec. = 108 times	3.030	327	400
3DH1	51.0 times /	5 sec. x	31.6 sec. = 323 times	0.534	172	400
3DH3	25.0 times /	5 sec. x	31.6 sec. = 158 times	1.790	283	400
3DH5	17.0 times /	5 sec. x	31.6 sec. = 108 times	3.040	328	400

Sample Calculation

Result = Number of transmission x Length of transmission time

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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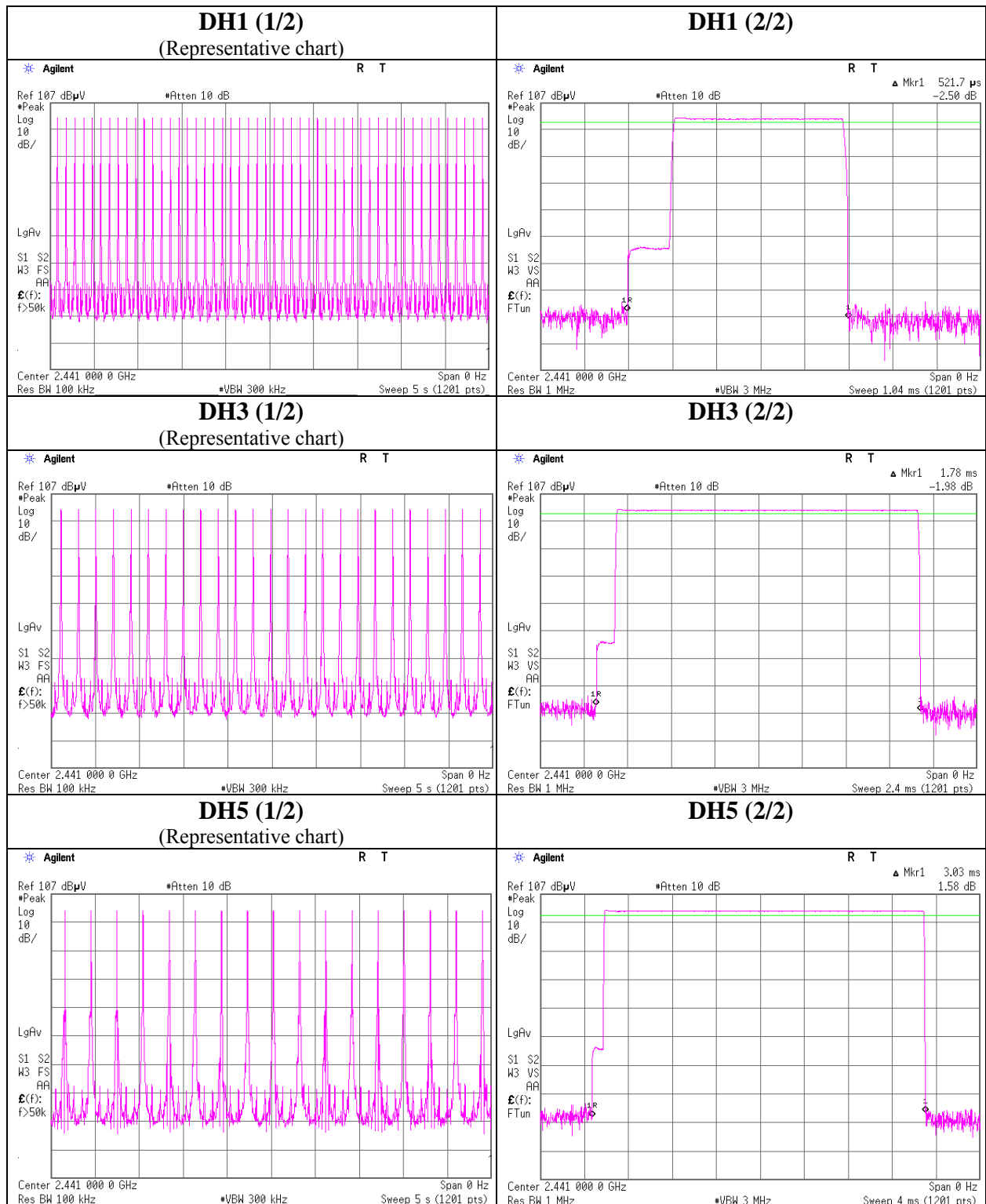
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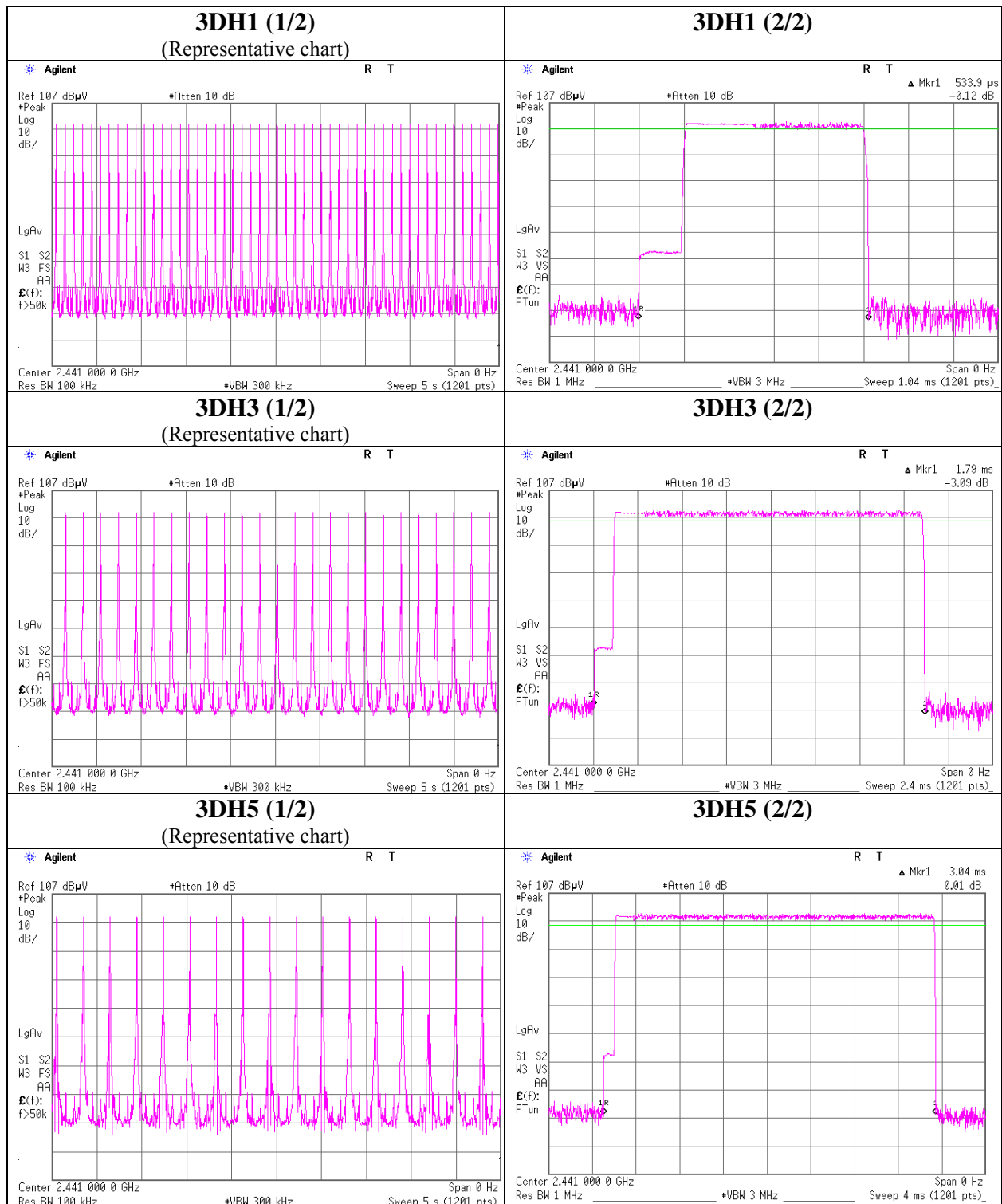
Dwell time



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Dwell time



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Maximum Peak Output Power

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 10538067H
Date 10/29/2014
Temperature/ Humidity 23 deg. C / 30% RH
Engineer Yuta Moriya
Mode Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-4.73	1.95	-2.78	0.53	20.96	125	23.74
DH5	2441.0	-5.54	1.96	-3.58	0.44	20.96	125	24.54
DH5	2480.0	-5.72	1.97	-3.75	0.42	20.96	125	24.71
2DH5	2402.0	-5.52	1.95	-3.57	0.44	20.96	125	24.53
2DH5	2441.0	-6.84	1.96	-4.88	0.33	20.96	125	25.84
2DH5	2480.0	-7.54	1.97	-5.57	0.28	20.96	125	26.53
3DH5	2402.0	-5.41	1.95	-3.46	0.45	20.96	125	24.42
3DH5	2441.0	-6.73	1.96	-4.77	0.33	20.96	125	25.73
3DH5	2480.0	-7.40	1.97	-5.43	0.29	20.96	125	26.39

Sample Calculation:

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

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

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

UL Japan, Inc.

Ise EMC Lab.

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Average Output Power
(Reference data for SAR testing)

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 10538067H
Date : 10/29/2014
Temperature/ Humidity : 23 deg. C / 30% RH
Engineer : Yuta Moriya
Mode : Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-5.99	1.95	-4.04	0.39	20.97	125	25.01
DH5	2441.0	-6.83	1.96	-4.87	0.33	20.97	125	25.84
DH5	2480.0	-7.09	1.97	-5.12	0.31	20.97	125	26.09
2DH5	2402.0	-8.33	1.95	-6.38	0.23	20.97	125	27.35
2DH5	2441.0	-10.03	1.96	-8.07	0.16	20.97	125	29.04
2DH5	2480.0	-11.01	1.97	-9.04	0.12	20.97	125	30.01
3DH5	2402.0	-8.32	1.95	-6.37	0.23	20.97	125	27.34
3DH5	2441.0	-10.03	1.96	-8.07	0.16	20.97	125	29.04
3DH5	2480.0	-11.07	1.97	-9.10	0.12	20.97	125	30.07

Sample Calculation:

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

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka (1-26.5GHz)	Shinya Watanabe (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	181.340	QP	30.2	16.4	8.0	27.9	26.7	43.5	16.8	
Hori	190.518	QP	32.5	16.5	8.1	27.9	29.2	43.5	14.3	
Hori	195.226	QP	34.8	16.6	8.1	27.9	31.6	43.5	11.9	
Hori	285.770	QP	36.0	18.9	8.6	27.4	36.1	46.0	9.9	
Hori	666.825	QP	33.0	20.4	10.2	28.2	35.4	46.0	10.6	
Hori	683.298	QP	33.2	20.5	10.3	28.1	35.9	46.0	10.1	
Hori	960.043	QP	32.8	23.2	11.3	27.1	40.2	53.9	13.7	
Hori	1602.012	PK	52.8	25.5	2.6	33.7	47.2	73.9	26.7	
Hori	1920.126	PK	50.6	26.0	2.9	33.1	46.4	73.9	27.5	
Hori	2390.000	PK	41.7	26.8	3.2	32.7	39.0	73.9	34.9	
Hori	4804.000	PK	56.1	30.6	5.2	31.8	60.1	73.9	13.8	
Hori	7206.000	PK	42.2	35.9	6.6	32.7	52.0	73.9	21.9	
Hori	9608.000	PK	41.3	38.4	7.0	33.3	53.4	73.9	20.5	
Hori	1920.126	AV	46.9	26.0	2.9	33.1	42.7	53.9	11.2	
Hori	2390.000	AV	29.6	26.8	3.2	32.7	26.9	53.9	27.0	
Hori	7206.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Hori	9608.000	AV	30.2	38.4	7.0	33.3	42.3	53.9	11.6	
Vert	181.720	QP	30.1	16.4	8.0	27.9	26.6	43.5	16.9	
Vert	190.508	QP	35.7	16.5	8.1	27.9	32.4	43.5	11.1	
Vert	195.216	QP	31.3	16.6	8.1	27.9	28.1	43.5	15.4	
Vert	285.771	QP	32.5	18.9	8.6	27.4	32.6	46.0	13.4	
Vert	666.808	QP	31.1	20.4	10.2	28.2	33.5	46.0	12.5	
Vert	683.278	QP	31.9	20.5	10.3	28.1	34.6	46.0	11.4	
Vert	952.564	QP	31.0	23.1	11.3	27.1	38.3	46.0	7.7	
Vert	959.958	QP	32.3	23.2	11.3	27.1	39.7	46.0	6.3	
Vert	1601.958	PK	56.5	25.5	2.6	33.7	50.9	73.9	23.0	
Vert	1919.881	PK	52.3	26.0	2.9	33.1	48.1	73.9	25.8	
Vert	2390.000	PK	41.4	26.8	3.2	32.7	38.7	73.9	35.2	
Vert	4804.000	PK	56.0	30.6	5.2	31.8	60.0	73.9	13.9	
Vert	7206.000	PK	42.4	35.9	6.6	32.7	52.2	73.9	21.7	
Vert	9608.000	PK	41.4	38.4	7.0	33.3	53.5	73.9	20.4	
Vert	1919.881	AV	50.0	26.0	2.9	33.1	45.8	53.9	8.1	
Vert	2390.000	AV	29.7	26.8	3.2	32.7	27.0	53.9	26.9	
Vert	7206.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Vert	9608.000	AV	30.2	38.4	7.0	33.3	42.3	53.9	11.6	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10538067H
Date : 11/13/2014
Temperature/ Humidity : 24 deg. C / 37% RH
Engineer : Kazuya Yoshioka
Mode : Tx, DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result dBuV/m	Limit dBuV/m	Margin [dB]	Remark
Hori	2402.000	PK	76.8	26.8	3.2	32.7	74.1	-	-	Carrier
Hori	2400.000	PK	35.7	26.8	3.2	32.7	33.0	54.1	21.1	
Vert	2402.000	PK	82.6	26.8	3.2	32.7	79.9	-	-	Carrier
Vert	2400.000	PK	43.1	26.8	3.2	32.7	40.4	59.9	19.5	

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	1602.012	AV	50.8	25.5	2.6	33.7	-24.0	21.2	53.9	32.7	*
Hori	4804.000	AV	50.4	30.6	5.2	31.8	-24.0	30.4	53.9	23.5	*
Vert	1601.958	AV	55.4	25.5	2.6	33.7	-24.0	25.8	53.9	28.1	*
Vert	4804.000	AV	49.8	30.6	5.2	31.8	-24.0	29.8	53.9	24.1	*

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

*Above noise was synchronized with carrier frequency.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka	Shinya Watanabe
	(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	180.058	QP	30.0	16.4	8.0	28.0	26.4	43.5	17.1	
Hori	191.999	QP	33.1	16.6	8.1	27.9	29.9	43.5	13.6	
Hori	195.224	QP	32.2	16.6	8.1	27.9	29.0	43.5	14.5	
Hori	285.773	QP	36.1	18.9	8.6	27.4	36.2	46.0	9.8	
Hori	666.803	QP	35.3	20.4	10.2	28.2	37.7	46.0	8.3	
Hori	683.261	QP	36.7	20.5	10.3	28.1	39.4	46.0	6.6	
Hori	960.020	QP	32.2	23.2	11.3	27.1	39.6	53.9	14.3	
Hori	1627.937	PK	55.5	25.6	2.7	33.7	50.1	73.9	23.8	
Hori	1920.053	PK	49.9	26.0	2.9	33.1	45.7	73.9	28.2	
Hori	4882.000	PK	49.5	30.8	5.3	31.7	53.9	73.9	20.0	
Hori	7323.000	PK	40.9	35.9	6.5	32.7	50.6	73.9	23.3	
Hori	9764.000	PK	41.6	38.7	7.1	33.4	54.0	73.9	19.9	
Hori	1920.053	AV	46.2	26.0	2.9	33.1	42.0	53.9	11.9	
Hori	7323.000	AV	29.7	35.9	6.5	32.7	39.4	53.9	14.5	
Hori	9764.000	AV	30.1	38.7	7.1	33.4	42.5	53.9	11.4	
Vert	180.148	QP	30.0	16.4	8.0	28.0	26.4	43.5	17.1	
Vert	190.509	QP	37.0	16.5	8.1	27.9	33.7	43.5	9.8	
Vert	195.234	QP	34.8	16.6	8.1	27.9	31.6	43.5	11.9	
Vert	285.777	QP	33.1	18.9	8.6	27.4	33.2	46.0	12.8	
Vert	666.798	QP	32.1	20.4	10.2	28.2	34.5	46.0	11.5	
Vert	683.270	QP	31.5	20.5	10.3	28.1	34.2	46.0	11.8	
Vert	952.581	QP	31.2	23.1	11.3	27.1	38.5	46.0	7.5	
Vert	960.048	QP	31.7	23.2	11.3	27.1	39.1	53.9	14.8	
Vert	1627.974	PK	55.5	25.6	2.7	33.7	50.1	73.9	23.8	
Vert	1920.098	PK	53.4	26.0	2.9	33.1	49.2	73.9	24.7	
Vert	4882.000	PK	51.7	30.8	5.3	31.7	56.1	73.9	17.8	
Vert	7323.000	PK	41.1	35.9	6.5	32.7	50.8	73.9	23.1	
Vert	9764.000	PK	41.8	38.7	7.1	33.4	54.2	73.9	19.7	
Vert	1920.098	AV	51.0	26.0	2.9	33.1	46.8	53.9	7.1	
Vert	7323.000	AV	29.7	35.9	6.5	32.7	39.4	53.9	14.5	
Vert	9764.000	AV	30.1	38.7	7.1	33.4	42.5	53.9	11.4	

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

UL Japan, Inc.

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
 Report No. : 10538067H
 Date : 11/13/2014
 Temperature/ Humidity : 24 deg. C / 37% RH
 Engineer : Kazuya Yoshioka
 Mode : Tx, DH5 2441MHz

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1627.937	AV	54.3	25.6	2.7	33.7	-24.0	24.9	53.9	29.0	*
Hori	4882.000	AV	42.7	30.8	5.3	31.7	-24.0	23.1	53.9	30.8	*
Vert	1627.974	AV	53.8	25.6	2.7	33.7	-24.0	24.4	53.9	29.5	*
Vert	4882.000	AV	44.6	30.8	5.3	31.7	-24.0	25.0	53.9	28.9	*

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

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

*Above noise was synchronized with carrier frequency.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka	Shinya Watanabe
	(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	181.225	QP	30.1	16.4	8.0	27.9	26.6	43.5	16.9	
Hori	190.512	QP	32.5	16.5	8.1	27.9	29.2	43.5	14.3	
Hori	195.221	QP	30.9	16.6	8.1	27.9	27.7	43.5	15.8	
Hori	285.776	QP	36.1	18.9	8.6	27.4	36.2	46.0	9.8	
Hori	666.797	QP	34.7	20.4	10.2	28.2	37.1	46.0	8.9	
Hori	683.268	QP	30.8	20.5	10.3	28.1	33.5	46.0	12.5	
Hori	960.030	QP	32.1	23.2	11.3	27.1	39.5	53.9	14.4	
Hori	1653.952	PK	53.0	25.6	2.7	33.6	47.7	73.9	26.2	
Hori	1919.821	PK	49.4	26.0	2.9	33.1	45.2	73.9	28.7	
Hori	2483.500	PK	41.4	26.9	3.2	32.7	38.8	73.9	35.1	
Hori	4960.000	PK	53.6	30.9	5.2	31.7	58.0	73.9	15.9	
Hori	7440.000	PK	41.4	35.9	6.6	32.7	51.2	73.9	22.7	
Hori	9920.000	PK	41.4	38.9	7.1	33.5	53.9	73.9	20.0	
Hori	1919.821	AV	46.1	26.0	2.9	33.1	41.9	53.9	12.0	
Hori	2483.500	AV	30.3	26.9	3.2	32.7	27.7	53.9	26.2	
Hori	7440.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Hori	9920.000	AV	30.1	38.9	7.1	33.5	42.6	53.9	11.3	
Vert	181.119	QP	30.1	16.4	8.0	27.9	26.6	43.5	16.9	
Vert	190.511	QP	37.2	16.5	8.1	27.9	33.9	43.5	9.6	
Vert	195.222	QP	33.7	16.6	8.1	27.9	30.5	43.5	13.0	
Vert	285.773	QP	32.8	18.9	8.6	27.4	32.9	46.0	13.1	
Vert	666.803	QP	33.4	20.4	10.2	28.2	35.8	46.0	10.2	
Vert	683.259	QP	36.0	20.5	10.3	28.1	38.7	46.0	7.3	
Vert	952.569	QP	30.6	23.1	11.3	27.1	37.9	46.0	8.1	
Vert	960.027	QP	30.8	23.2	11.3	27.1	38.2	53.9	15.7	
Vert	1654.082	PK	55.8	25.6	2.7	33.6	50.5	73.9	23.4	
Vert	1919.923	PK	53.2	26.0	2.9	33.1	49.0	73.9	24.9	
Vert	2483.500	PK	41.3	26.9	3.2	32.7	38.7	73.9	35.2	
Vert	4960.000	PK	50.5	30.9	5.2	31.7	54.9	73.9	19.0	
Vert	7440.000	PK	41.6	35.9	6.6	32.7	51.4	73.9	22.5	
Vert	9920.000	PK	41.7	38.9	7.1	33.5	54.2	73.9	19.7	
Vert	1919.923	AV	50.8	26.0	2.9	33.1	46.6	53.9	7.3	
Vert	2483.500	AV	30.2	26.9	3.2	32.7	27.6	53.9	26.3	
Vert	7440.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Vert	9920.000	AV	30.1	38.9	7.1	33.5	42.6	53.9	11.3	

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

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

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.3 Semi Anechoic Chamber
 Report No. : 10538067H
 Date : 11/13/2014
 Temperature/ Humidity : 24 deg. C / 37% RH
 Engineer : Kazuya Yoshioka
 Mode : Tx, DH5 2480MHz

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	1653.952	AV	51.1	25.6	2.7	33.6	-24.0	21.8	53.9	32.1	*
Hori	4960.000	AV	46.1	30.9	5.2	31.7	-24.0	26.5	53.9	27.4	*
Vert	1654.082	AV	54.4	25.6	2.7	33.6	-24.0	25.1	53.9	28.8	*
Vert	4960.000	AV	44.4	30.9	5.2	31.7	-24.0	24.8	53.9	29.1	*

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

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

*Above noise was synchronized with carrier frequency.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka (1-26.5GHz)	Shinya Watanabe (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	191.992	QP	33.3	16.6	8.1	27.9	30.1	43.5	13.4	
Hori	200.099	QP	33.6	16.6	8.1	27.9	30.4	43.5	13.1	
Hori	208.016	QP	30.0	16.7	8.2	27.8	27.1	43.5	16.4	
Hori	287.972	QP	40.3	19.1	8.6	27.4	40.6	46.0	5.4	
Hori	666.806	QP	35.2	20.4	10.2	28.2	37.6	46.0	8.4	
Hori	959.964	QP	31.9	23.2	11.3	27.1	39.3	46.0	6.7	
Hori	1601.875	PK	52.4	25.5	2.6	33.7	46.8	73.9	27.1	
Hori	1919.803	PK	50.1	26.0	2.9	33.1	45.9	73.9	28.0	
Hori	2390.000	PK	41.8	26.8	3.2	32.7	39.1	73.9	34.8	
Hori	4804.000	PK	49.1	30.6	5.2	31.8	53.1	73.9	20.8	
Hori	7206.000	PK	42.3	35.9	6.6	32.7	52.1	73.9	21.8	
Hori	9608.000	PK	41.5	38.4	7.0	33.3	53.6	73.9	20.3	
Hori	1919.803	AV	46.7	26.0	2.9	33.1	42.5	53.9	11.4	
Hori	2390.000	AV	29.7	26.8	3.2	32.7	27.0	53.9	26.9	
Hori	7206.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Hori	9608.000	AV	30.2	38.4	7.0	33.3	42.3	53.9	11.6	
Vert	190.515	QP	37.2	16.5	8.1	27.9	33.9	43.5	9.6	
Vert	199.986	QP	28.5	16.6	8.1	27.9	25.3	43.5	18.2	
Vert	207.977	QP	29.0	16.7	8.2	27.8	26.1	43.5	17.4	
Vert	287.850	QP	34.8	19.0	8.6	27.4	35.0	46.0	11.0	
Vert	666.800	QP	32.8	20.4	10.2	28.2	35.2	46.0	10.8	
Vert	960.003	QP	31.1	23.2	11.3	27.1	38.5	53.9	15.4	
Vert	1602.026	PK	55.9	25.5	2.6	33.7	50.3	73.9	23.6	
Vert	1920.109	PK	52.9	26.0	2.9	33.1	48.7	73.9	25.2	
Vert	2390.000	PK	42.1	26.8	3.2	32.7	39.4	73.9	34.5	
Vert	4804.000	PK	49.4	30.6	5.2	31.8	53.4	73.9	20.5	
Vert	7206.000	PK	42.6	35.9	6.6	32.7	52.4	73.9	21.5	
Vert	9608.000	PK	42.8	38.4	7.0	33.3	54.9	73.9	19.0	
Vert	1920.109	AV	50.6	26.0	2.9	33.1	46.4	53.9	7.5	
Vert	2390.000	AV	29.7	26.8	3.2	32.7	27.0	53.9	26.9	
Vert	7206.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Vert	9608.000	AV	30.2	38.4	7.0	33.3	42.3	53.9	11.6	

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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10538067H
Date : 11/13/2014
Temperature/ Humidity : 24 deg. C / 37% RH
Engineer : Kazuya Yoshioka
Mode : Tx, 3DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result dBuV/m	Limit dBuV/m	Margin [dB]	Remark
Hori	2402.000	PK	77.8	26.8	3.2	32.7	75.1	-	-	Carrier
Hori	2400.000	PK	35.2	26.8	3.2	32.7	32.5	55.1	22.6	
Vert	2402.000	PK	80.1	26.8	3.2	32.7	77.4	-	-	Carrier
Vert	2400.000	PK	40.0	26.8	3.2	32.7	37.3	57.4	20.1	

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	1601.875	AV	49.9	25.5	2.6	33.7	-24.0	20.3	53.9	33.6	*
Hori	4804.000	AV	39.0	30.6	5.2	31.8	-24.0	19.0	53.9	34.9	*
Vert	1602.026	AV	54.1	25.5	2.6	33.7	-24.0	24.5	53.9	29.4	*
Vert	4804.000	AV	39.6	30.6	5.2	31.8	-24.0	19.6	53.9	34.3	*

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

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

*Above noise was synchronized with carrier frequency.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka (1-26.5GHz)	Shinya Watanabe (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	191.994	QP	35.5	16.6	8.1	27.9	32.3	43.5	11.2	
Hori	199.989	QP	36.8	16.6	8.1	27.9	33.6	43.5	9.9	
Hori	215.990	QP	32.2	16.8	8.2	27.8	29.4	43.5	14.1	
Hori	287.990	QP	35.4	19.1	8.6	27.4	35.7	46.0	10.3	
Hori	666.798	QP	34.6	20.4	10.2	28.2	37.0	46.0	9.0	
Hori	959.945	QP	32.0	23.2	11.3	27.1	39.4	46.0	6.6	
Hori	1627.910	PK	52.1	25.6	2.7	33.7	46.7	73.9	27.2	
Hori	1919.978	PK	50.2	26.0	2.9	33.1	46.0	73.9	27.9	
Hori	4882.000	PK	49.0	30.8	5.3	31.7	53.4	73.9	20.5	
Hori	7323.000	PK	41.1	35.9	6.5	32.7	50.8	73.9	23.1	
Hori	9764.000	PK	41.7	38.7	7.1	33.4	54.1	73.9	19.8	
Hori	1919.978	AV	46.8	26.0	2.9	33.1	42.6	53.9	11.3	
Hori	7323.000	AV	29.7	35.9	6.5	32.7	39.4	53.9	14.5	
Hori	9764.000	AV	30.1	38.7	7.1	33.4	42.5	53.9	11.4	
Vert	191.998	QP	30.0	16.6	8.1	27.9	26.8	43.5	16.7	
Vert	199.985	QP	31.8	16.6	8.1	27.9	28.6	43.5	14.9	
Vert	215.997	QP	31.6	16.8	8.2	27.8	28.8	43.5	14.7	
Vert	287.973	QP	26.2	19.1	8.6	27.4	26.5	46.0	19.5	
Vert	683.262	QP	35.8	20.5	10.3	28.1	38.5	46.0	7.5	
Vert	959.976	QP	30.1	23.2	11.3	27.1	37.5	46.0	8.5	
Vert	1628.035	PK	56.4	25.6	2.7	33.7	51.0	73.9	22.9	
Vert	1919.936	PK	53.0	26.0	2.9	33.1	48.8	73.9	25.1	
Vert	4882.000	PK	47.9	30.8	5.3	31.7	52.3	73.9	21.6	
Vert	7323.000	PK	41.3	35.9	6.5	32.7	51.0	73.9	22.9	
Vert	9764.000	PK	41.9	38.7	7.1	33.4	54.3	73.9	19.6	
Vert	1919.936	AV	50.4	26.0	2.9	33.1	46.2	53.9	7.7	
Vert	7323.000	AV	29.7	35.9	6.5	32.7	39.4	53.9	14.5	
Vert	9764.000	AV	30.1	38.7	7.1	33.4	42.5	53.9	11.4	

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
 Report No. : 10538067H
 Date : 11/13/2014
 Temperature/ Humidity : 24 deg. C / 37% RH
 Engineer : Kazuya Yoshioka
 Mode : Tx, 3DH5 2441MHz

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1627.910	AV	49.8	25.6	2.7	33.7	-24.0	20.4	53.9	33.5	*
Hori	4882.000	AV	36.6	30.8	5.3	31.7	-24.0	17.0	53.9	36.9	*
Vert	1628.035	AV	54.9	25.6	2.7	33.7	-24.0	25.5	53.9	28.4	*
Vert	4882.000	AV	35.6	30.8	5.3	31.7	-24.0	16.0	53.9	37.9	*

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

*Above noise was synchronized with carrier frequency.

UL Japan, Inc.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.3	No.2
Report No.	10538067H	
Date	11/13/2014	11/15/2014
Temperature/ Humidity	24 deg. C / 37% RH	21 deg. C / 37% RH
Engineer	Kazuya Yoshioka	Shinya Watanabe
	(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	191.978	QP	36.6	16.6	8.1	27.9	33.4	43.5	10.1	
Hori	199.980	QP	36.0	16.6	8.1	27.9	32.8	43.5	10.7	
Hori	223.949	QP	37.3	16.9	8.3	27.7	34.8	46.0	11.2	
Hori	287.973	QP	38.3	19.1	8.6	27.4	38.6	46.0	7.4	
Hori	666.802	QP	34.9	20.4	10.2	28.2	37.3	46.0	8.7	
Hori	960.380	QP	32.2	23.2	11.3	27.1	39.6	53.9	14.3	
Hori	1654.027	PK	54.5	25.6	2.7	33.6	49.2	73.9	24.7	
Hori	1919.823	PK	50.3	26.0	2.9	33.1	46.1	73.9	27.8	
Hori	2483.500	PK	42.0	26.9	3.2	32.7	39.4	73.9	34.5	
Hori	4960.000	PK	46.9	30.9	5.2	31.7	51.3	73.9	22.6	
Hori	7440.000	PK	41.6	35.9	6.6	32.7	51.4	73.9	22.5	
Hori	9920.000	PK	41.6	38.9	7.1	33.5	54.1	73.9	19.8	
Hori	1919.823	AV	46.6	26.0	2.9	33.1	42.4	53.9	11.5	
Hori	2483.500	AV	31.1	26.9	3.2	32.7	28.5	53.9	25.4	
Hori	7440.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Hori	9920.000	AV	30.1	38.9	7.1	33.5	42.6	53.9	11.3	
Vert	191.987	QP	29.5	16.6	8.1	27.9	26.3	43.5	17.2	
Vert	200.002	QP	29.3	16.6	8.1	27.9	26.1	43.5	17.4	
Vert	223.982	QP	31.8	16.9	8.3	27.7	29.3	46.0	16.7	
Vert	287.994	QP	29.8	19.1	8.6	27.4	30.1	46.0	15.9	
Vert	683.251	QP	35.6	20.5	10.3	28.1	38.3	46.0	7.7	
Vert	960.028	QP	30.8	23.2	11.3	27.1	38.2	53.9	15.7	
Vert	1654.030	PK	56.4	25.6	2.7	33.6	51.1	73.9	22.8	
Vert	1919.795	PK	53.2	26.0	2.9	33.1	49.0	73.9	24.9	
Vert	2483.500	PK	43.4	26.9	3.2	32.7	40.8	73.9	33.1	
Vert	4960.000	PK	46.0	30.9	5.2	31.7	50.4	73.9	23.5	
Vert	7440.000	PK	41.5	35.9	6.6	32.7	51.3	73.9	22.6	
Vert	9920.000	PK	41.9	38.9	7.1	33.5	54.4	73.9	19.5	
Vert	1919.795	AV	50.8	26.0	2.9	33.1	46.6	53.9	7.3	
Vert	2483.500	AV	31.0	26.9	3.2	32.7	28.4	53.9	25.5	
Vert	7440.000	AV	30.0	35.9	6.6	32.7	39.8	53.9	14.1	
Vert	9920.000	AV	30.1	38.9	7.1	33.5	42.6	53.9	11.3	

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

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

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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 Semi Anechoic Chamber
 Report No. : 10538067H
 Date : 11/13/2014
 Temperature/ Humidity : 24 deg. C / 37% RH
 Engineer : Kazuya Yoshioka
 Mode : Tx, 3DH5 2480MHz

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	1654.027	AV	51.9	25.6	2.7	33.6	-24.0	22.6	53.9	31.3	*
Hori	4960.000	AV	32.6	30.9	5.2	31.7	-24.0	13.0	53.9	40.9	*
Vert	1654.030	AV	54.8	25.6	2.7	33.6	-24.0	25.5	53.9	28.4	*
Vert	4960.000	AV	32.4	30.9	5.2	31.7	-24.0	12.8	53.9	41.1	*

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

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

*Above noise was synchronized with carrier frequency.

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Ise EMC Lab.

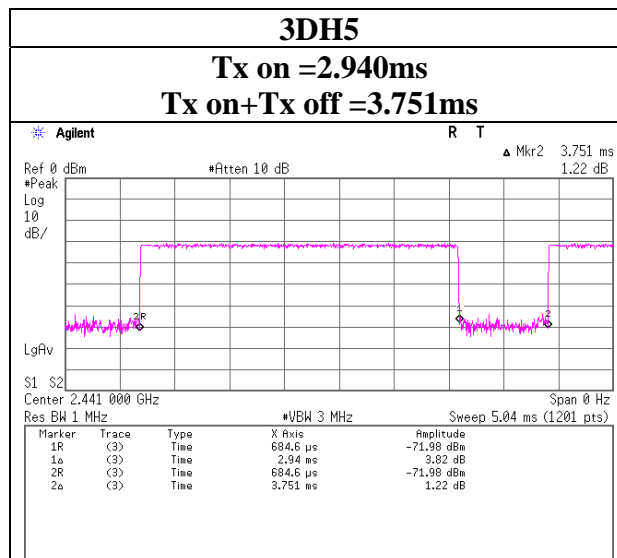
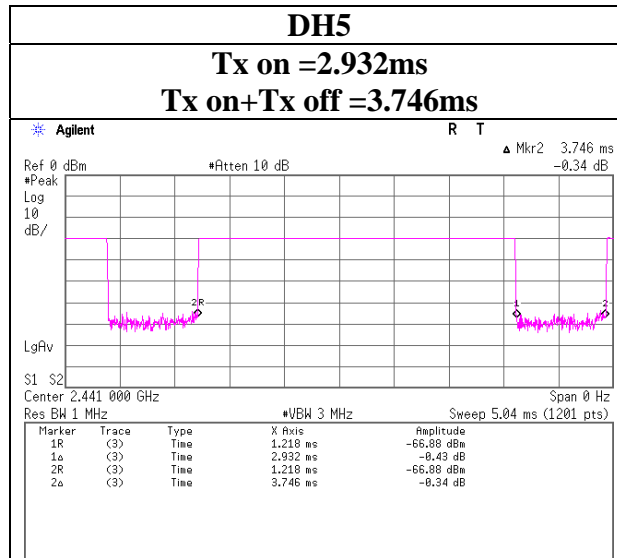
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Duty Cycle

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10538067H
Date	11/13/2014
Temperature/ Humidity	24deg. C / 37% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5/3DH5

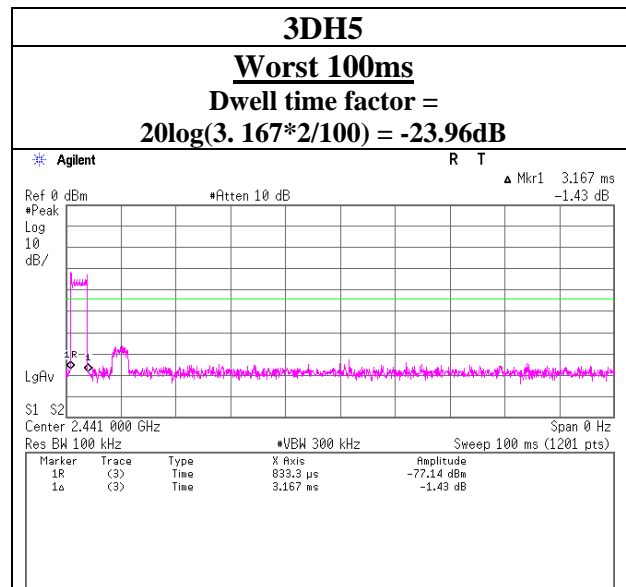
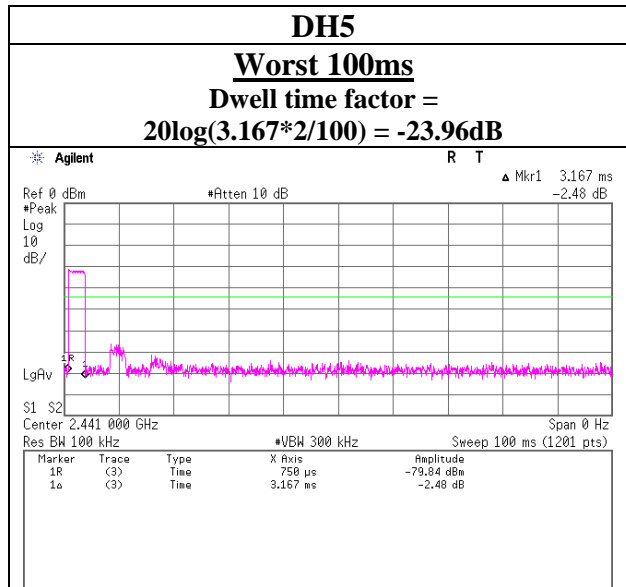


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Dwell time factor

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10538067H
Date	11/13/2014
Temperature/ Humidity	24deg. C / 37% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on) DH5/3DH5



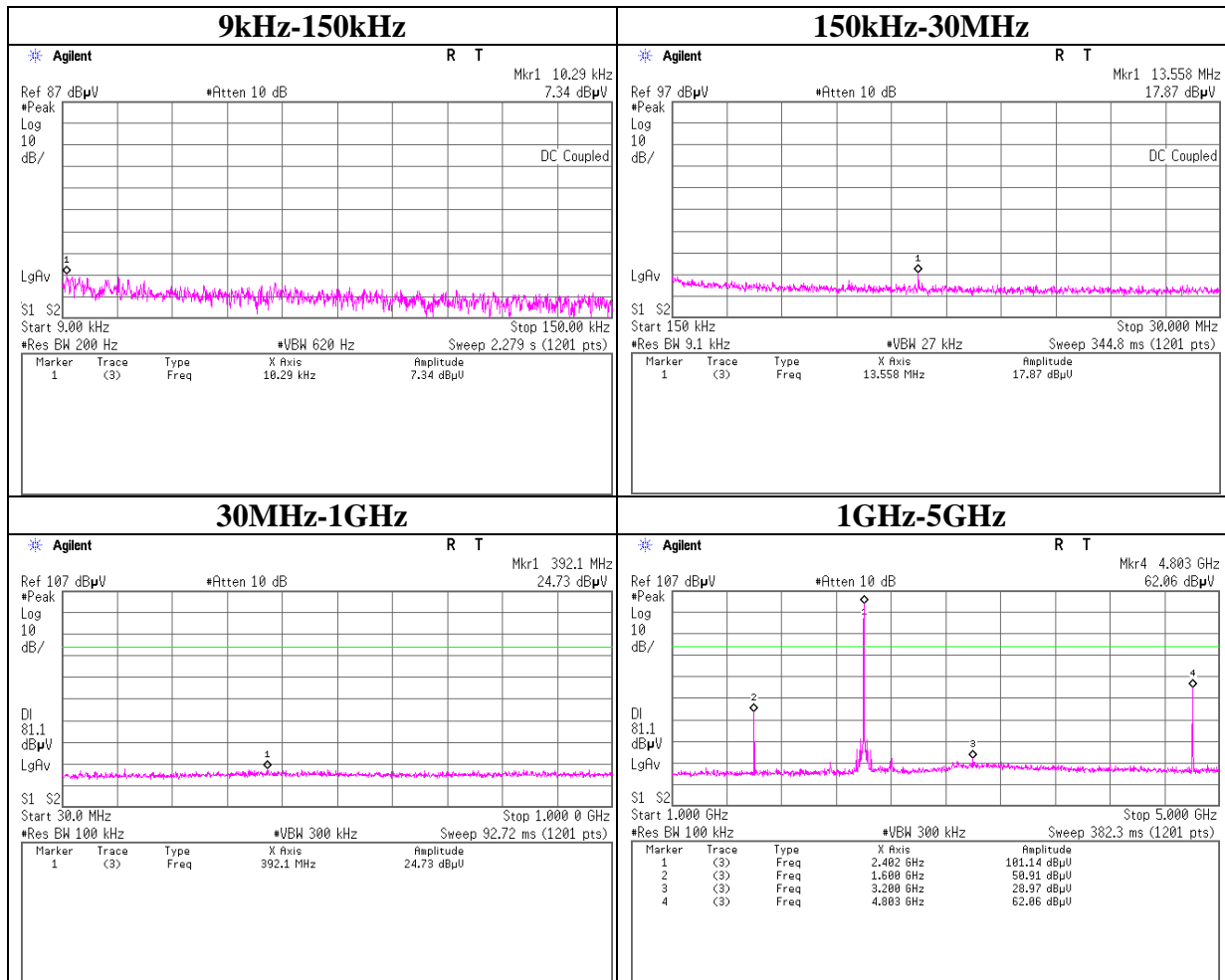
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Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

Tx DH5 2402MHz



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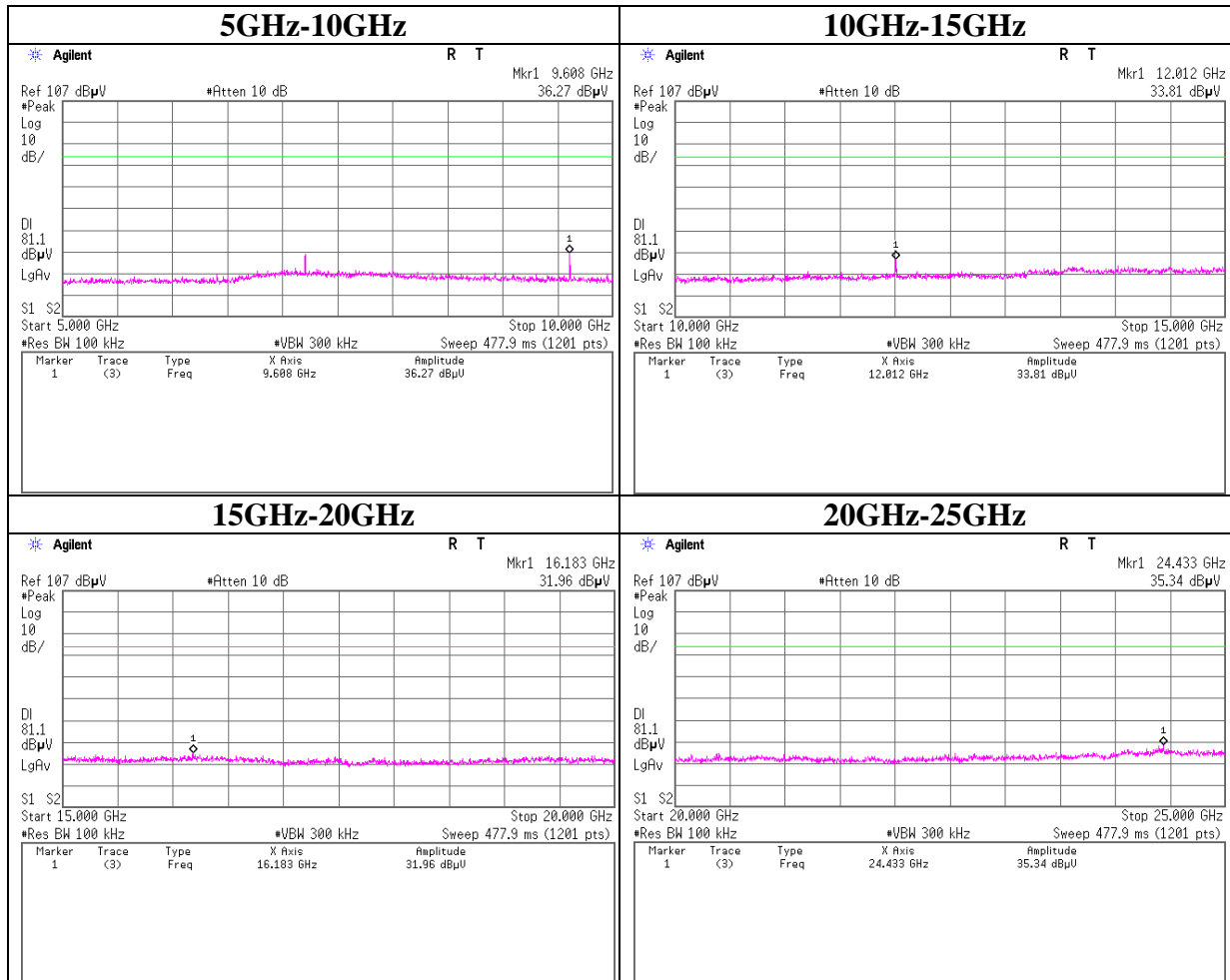
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

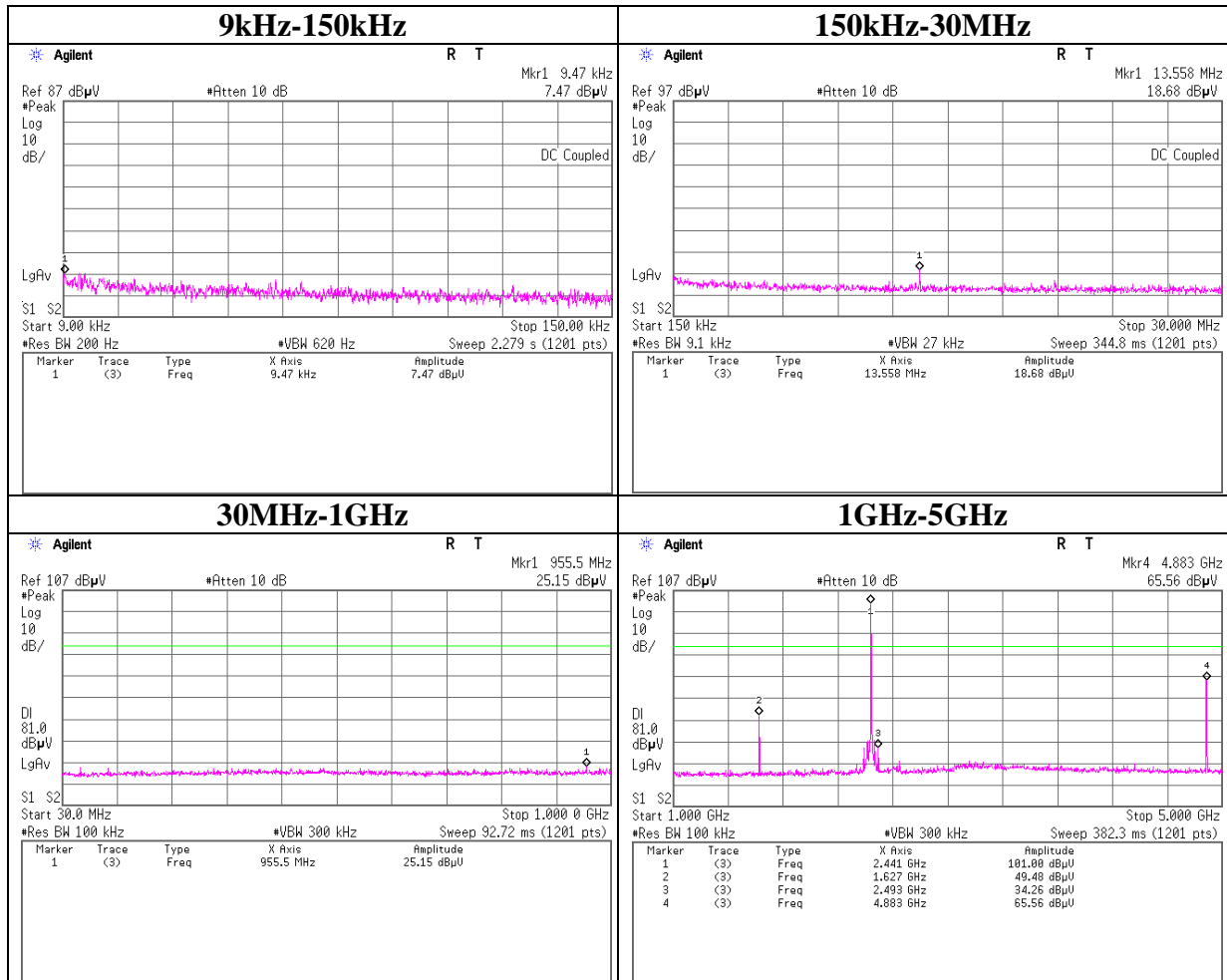
Tx DH5 2402MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

Tx DH5 2441MHz



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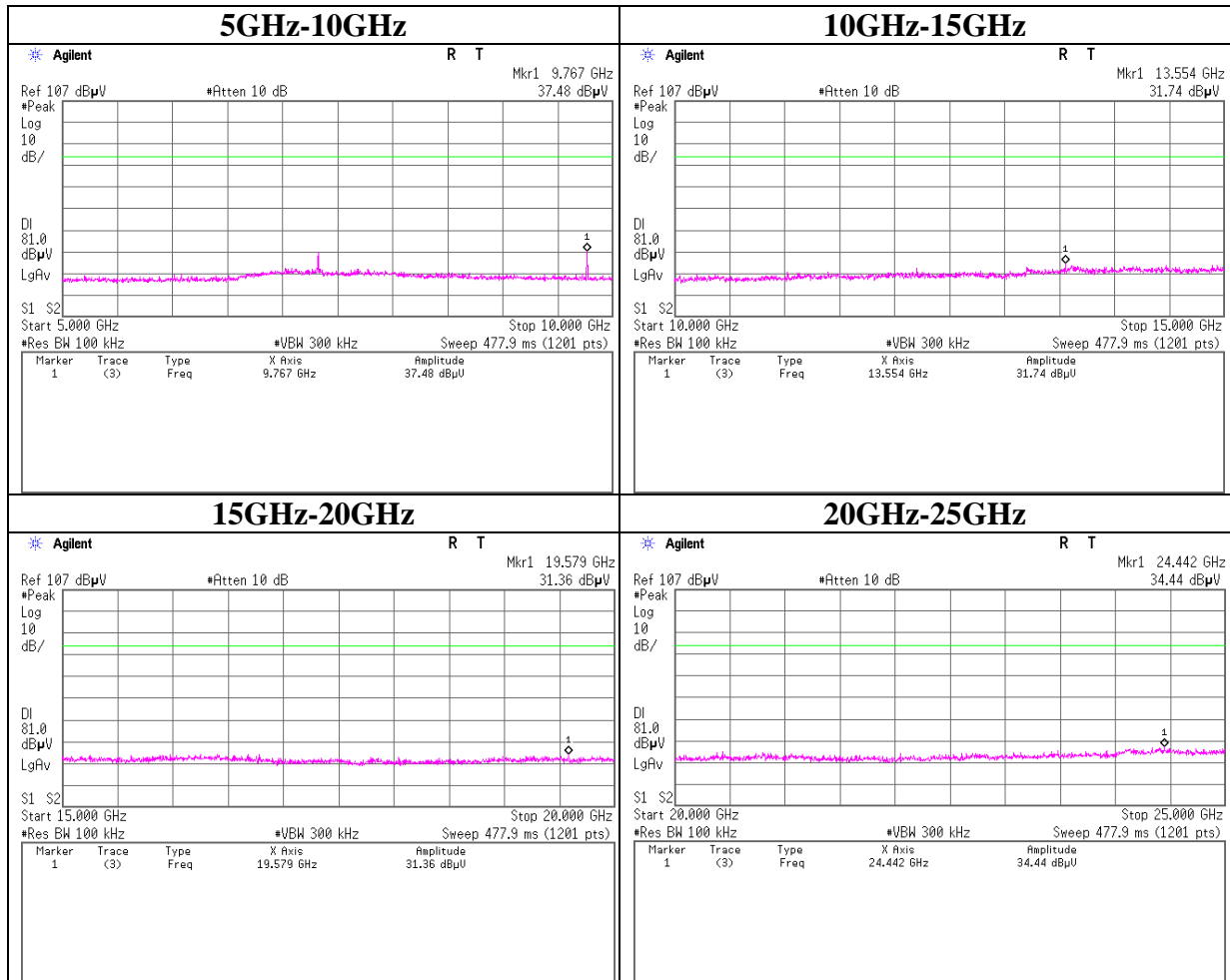
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

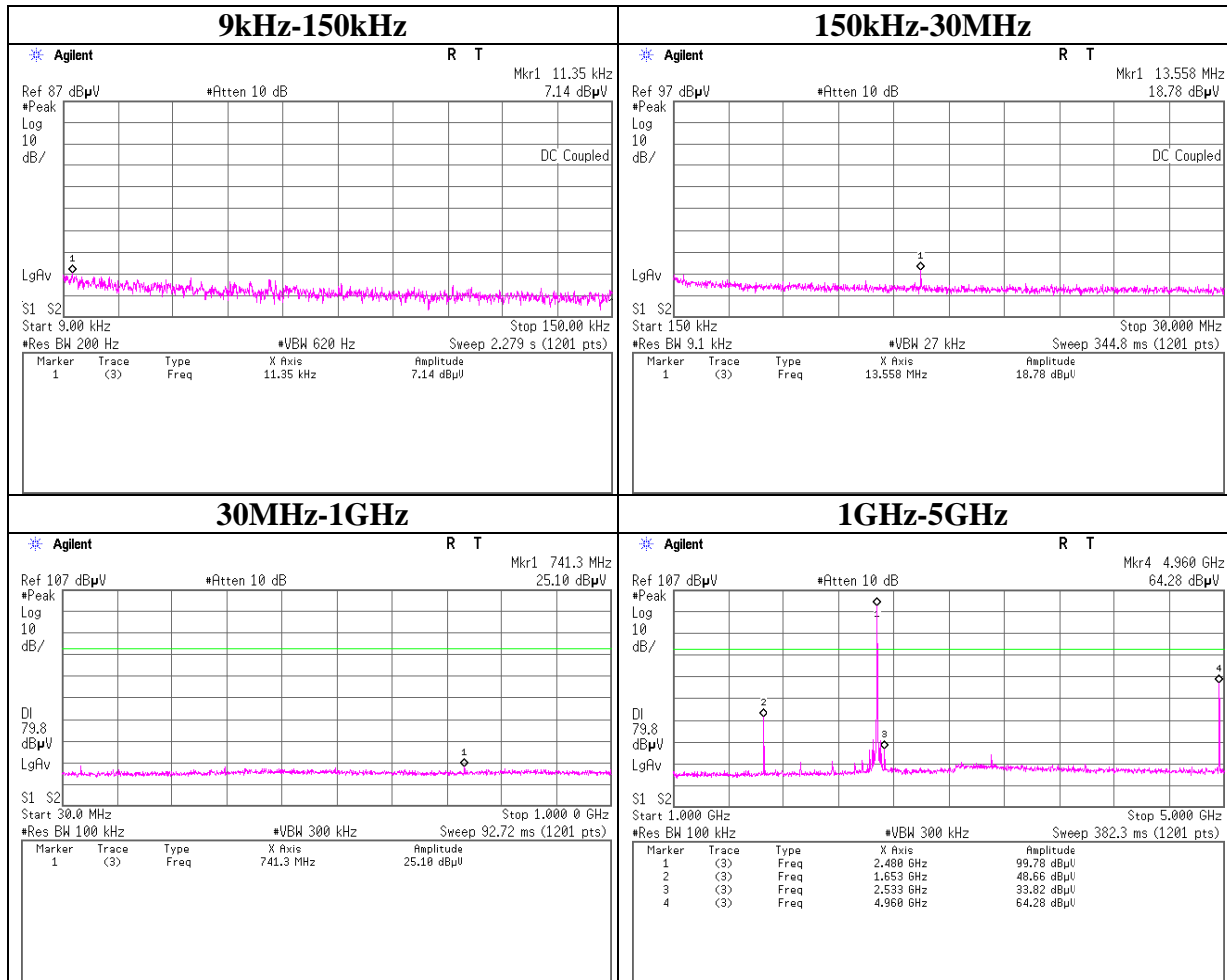
Tx DH5 2441MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz



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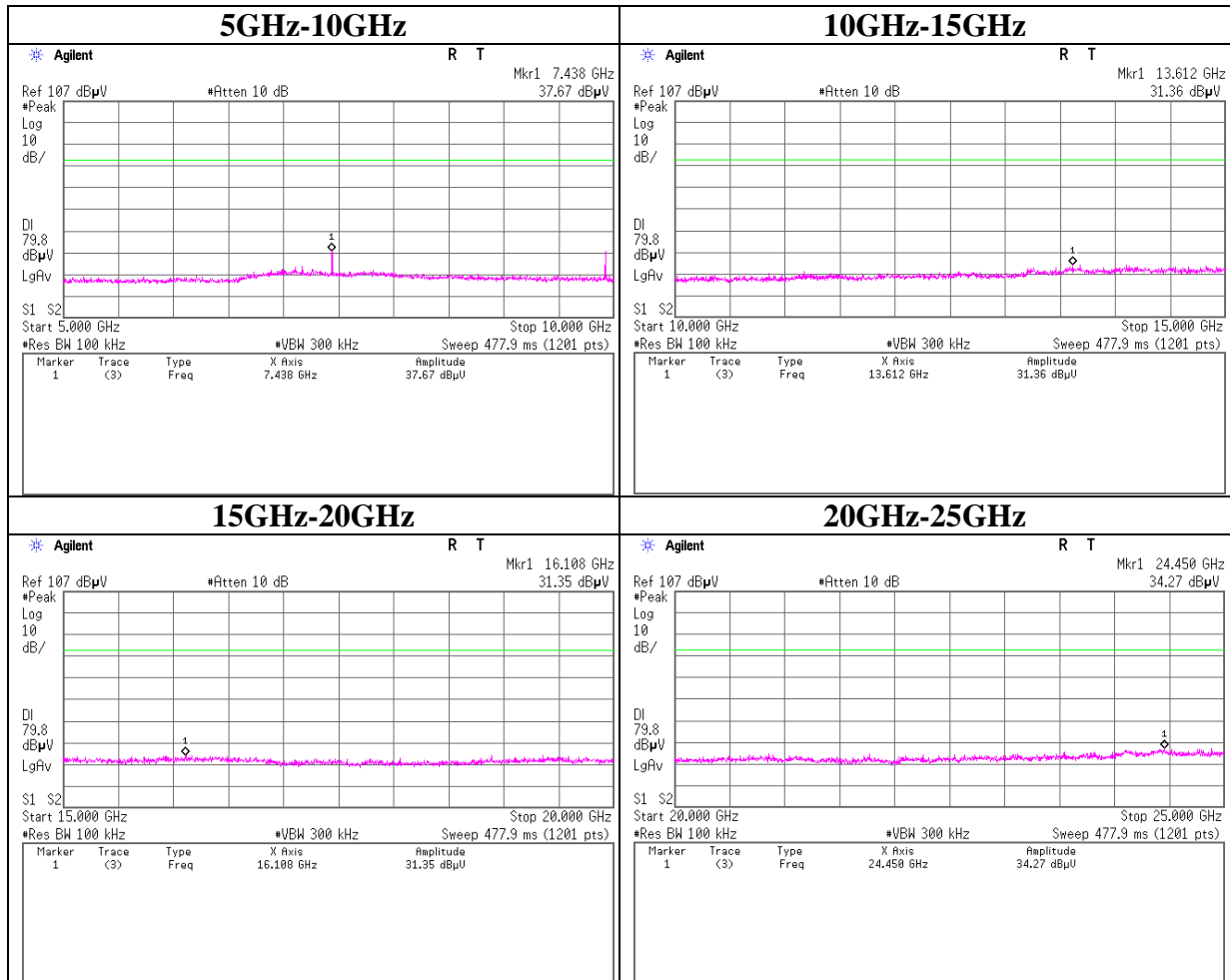
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5

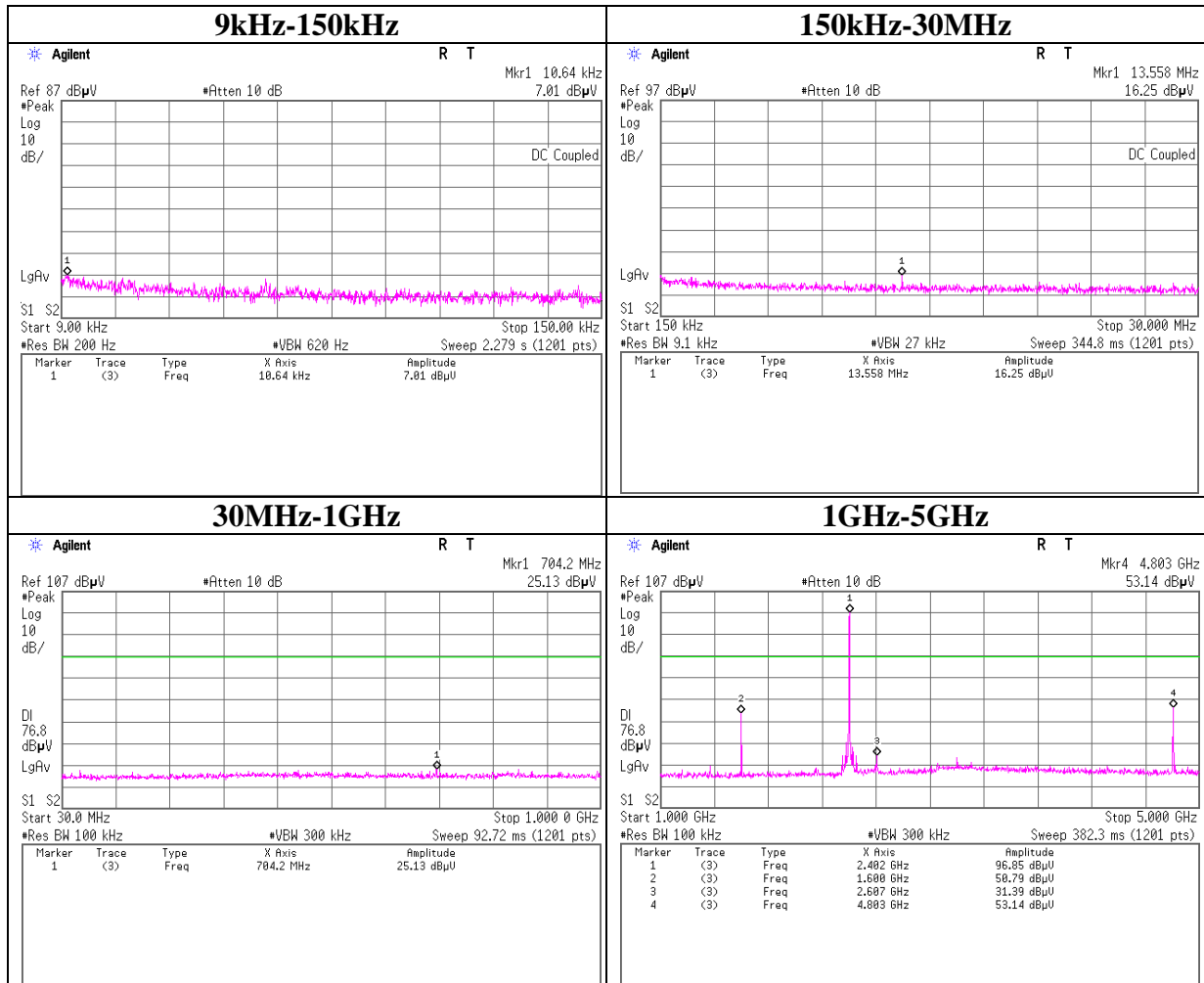
Tx DH5 2480MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz



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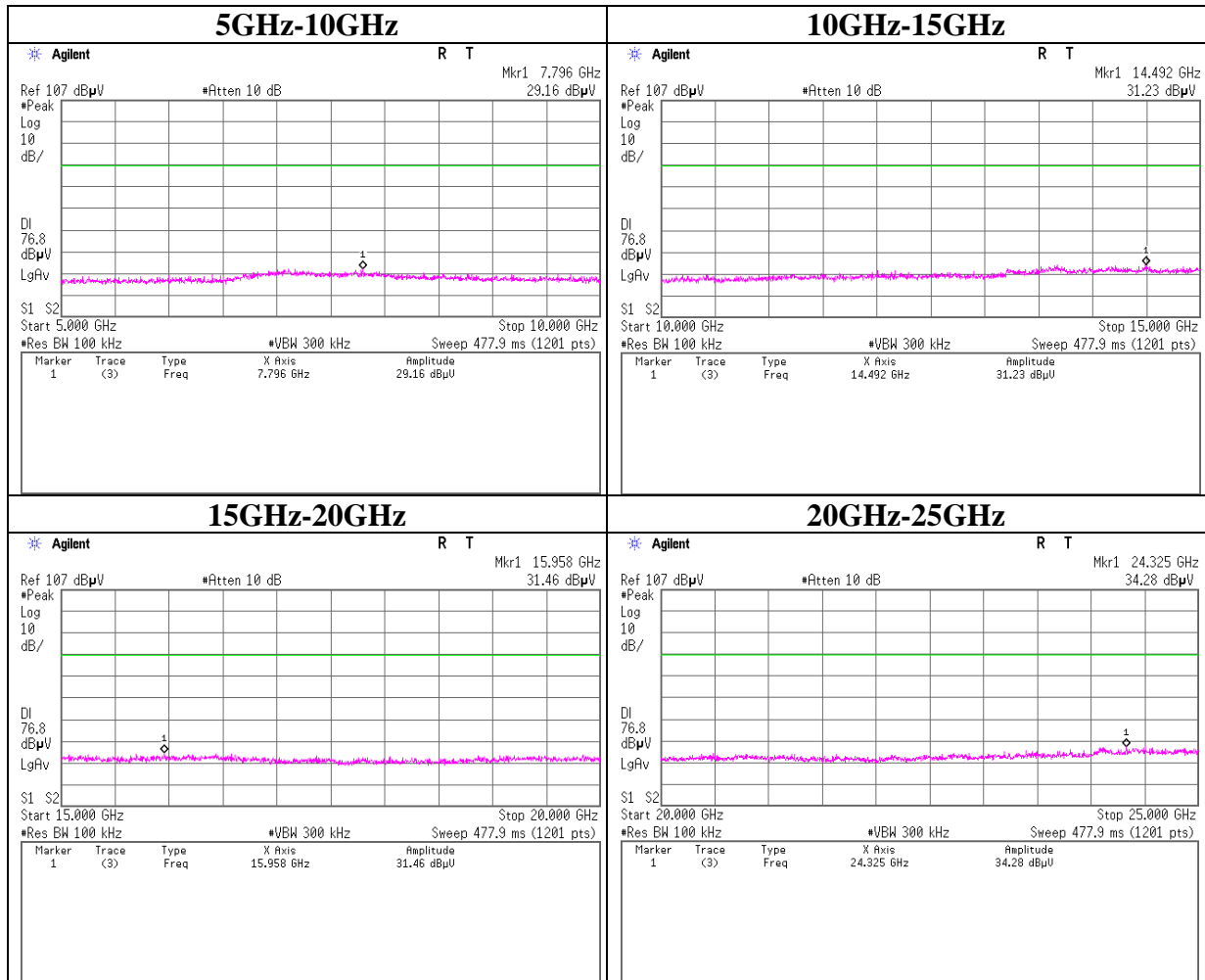
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz



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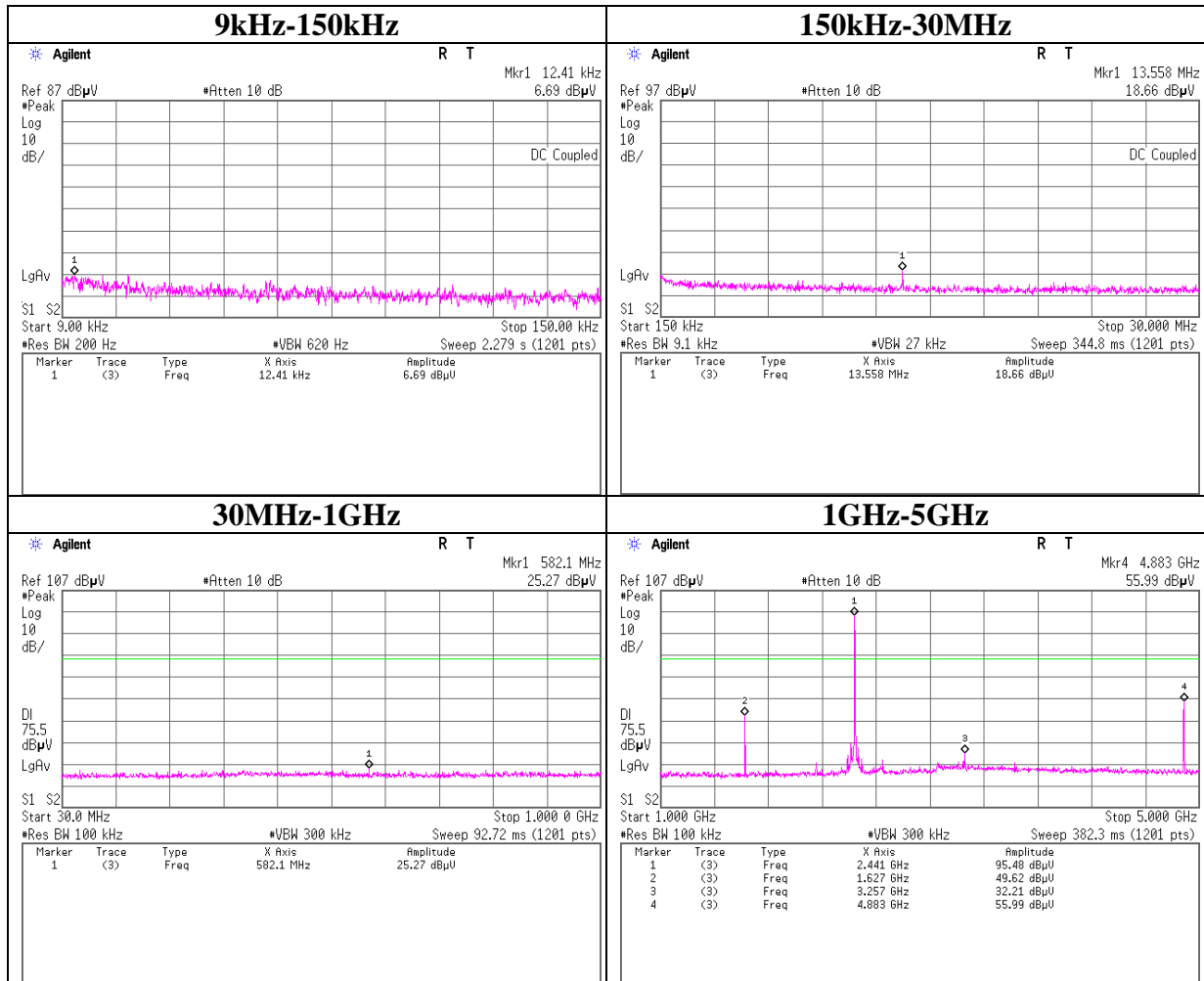
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



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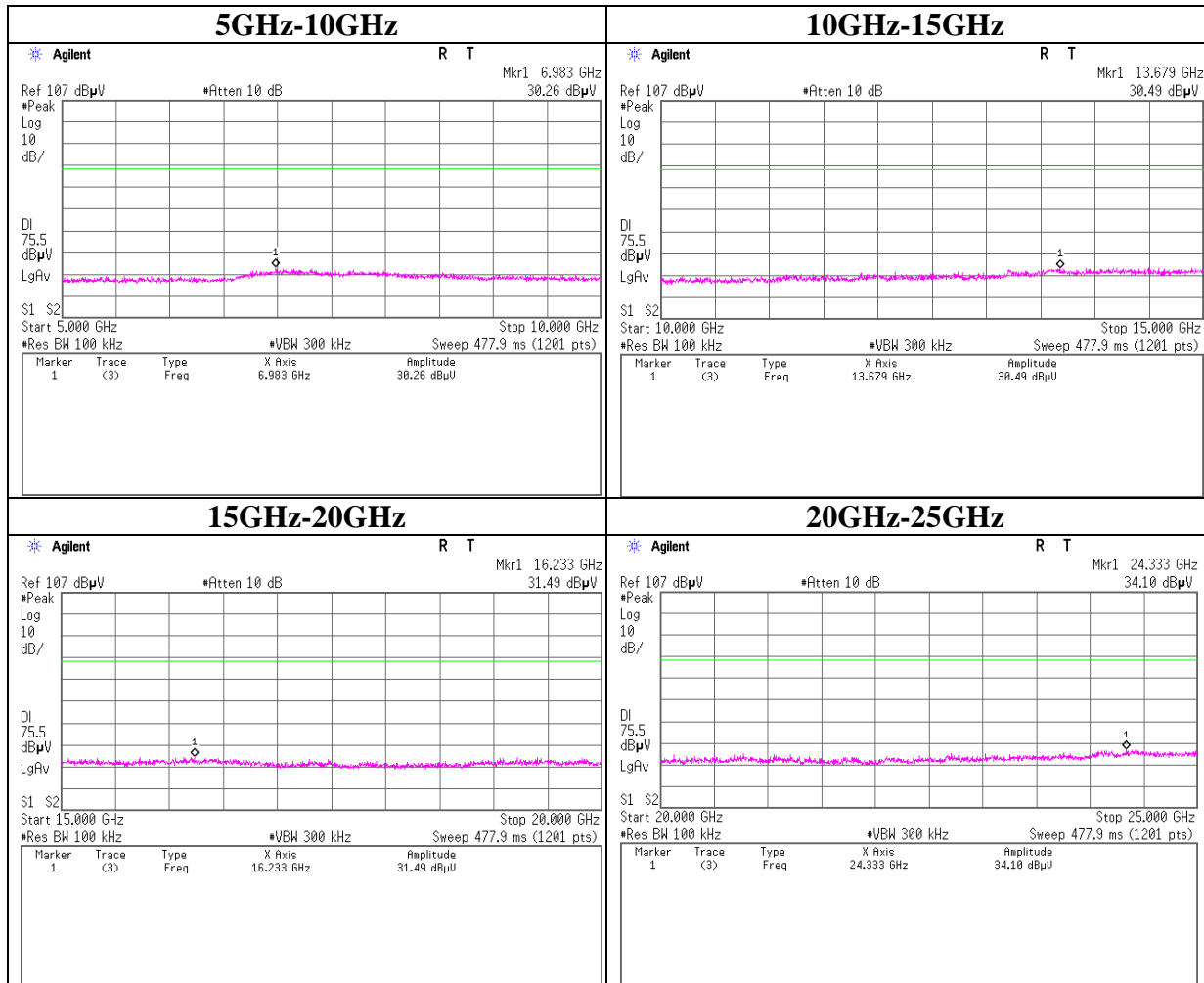
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz



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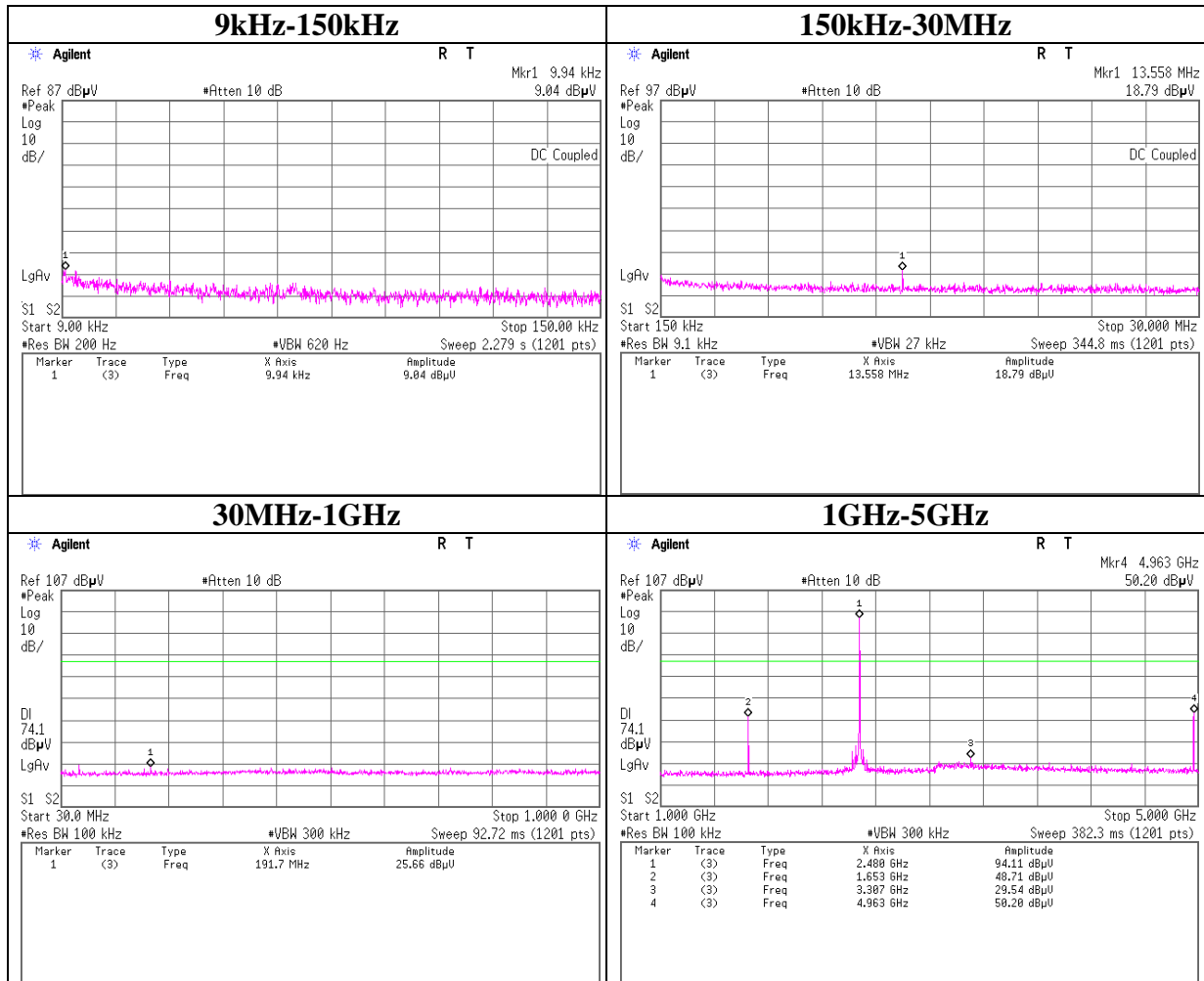
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz



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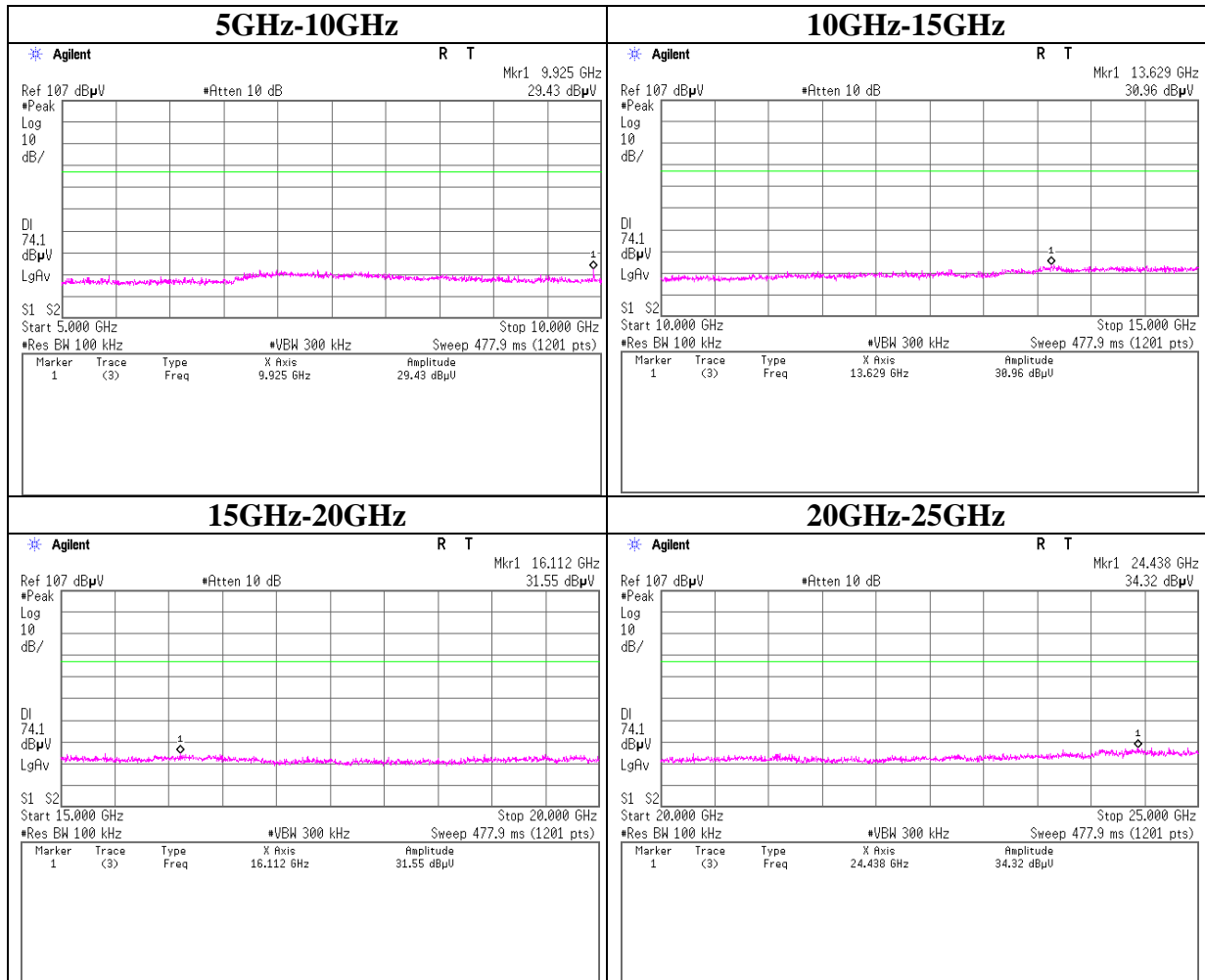
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz



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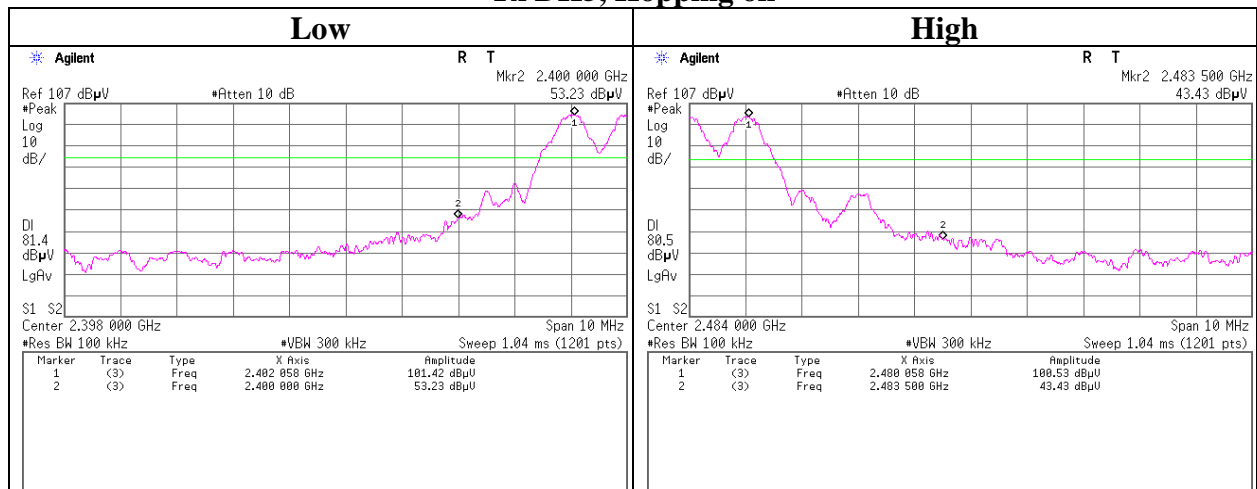
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

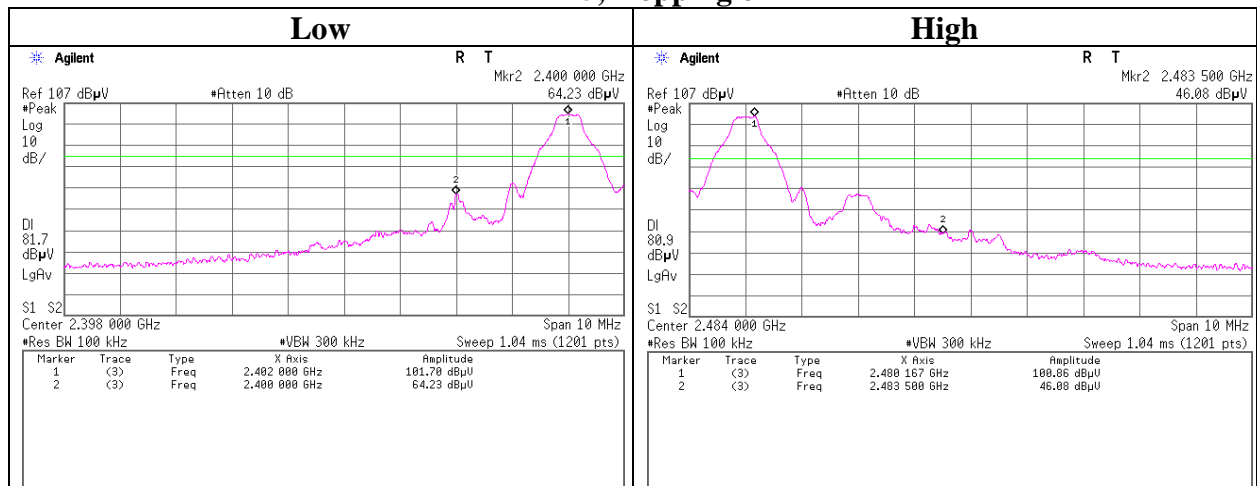
Conducted Emission Band Edge compliance

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping on/off) DH5

Tx DH5, Hopping on



Tx DH5, Hopping off



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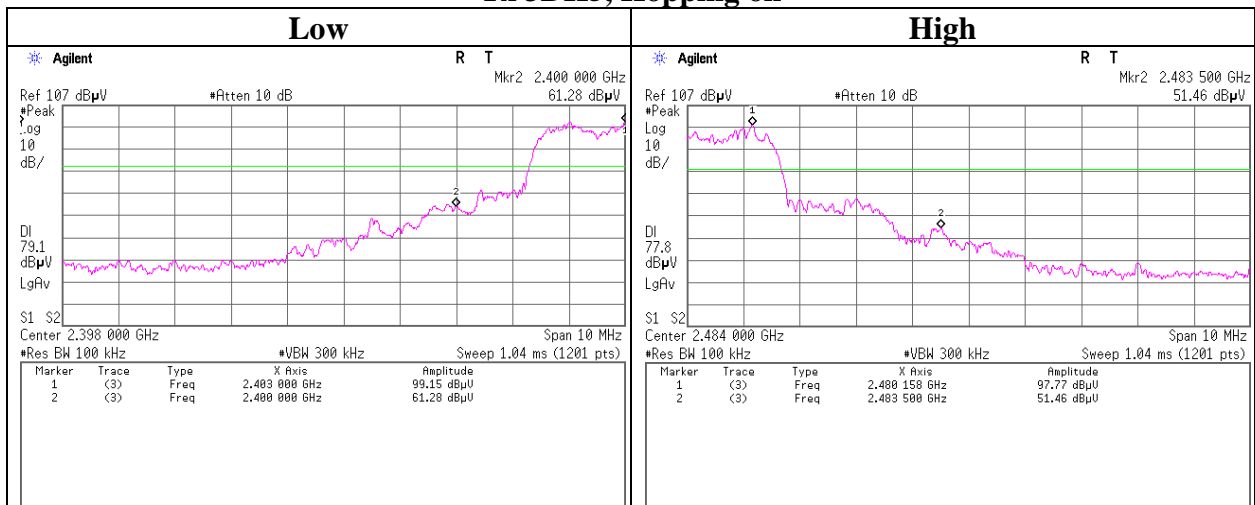
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

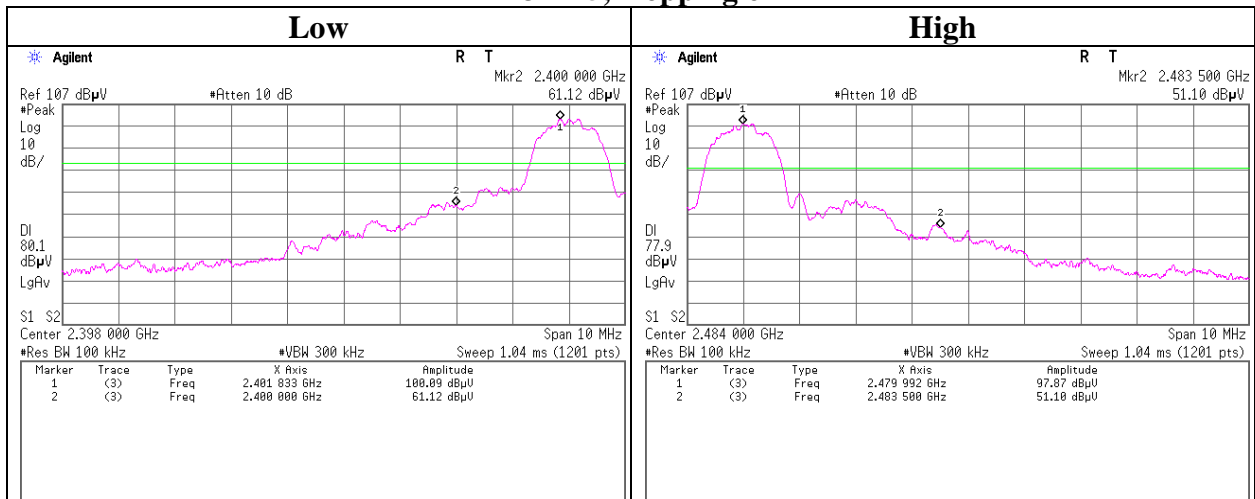
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 10538067H
 Date : 10/29/2014
 Temperature/ Humidity : 23 deg. C / 30% RH
 Engineer : Yuta Moriya
 Mode : Tx (Hopping on/off) 3DH5

Tx 3DH5, Hopping on



Tx 3DH5, Hopping off



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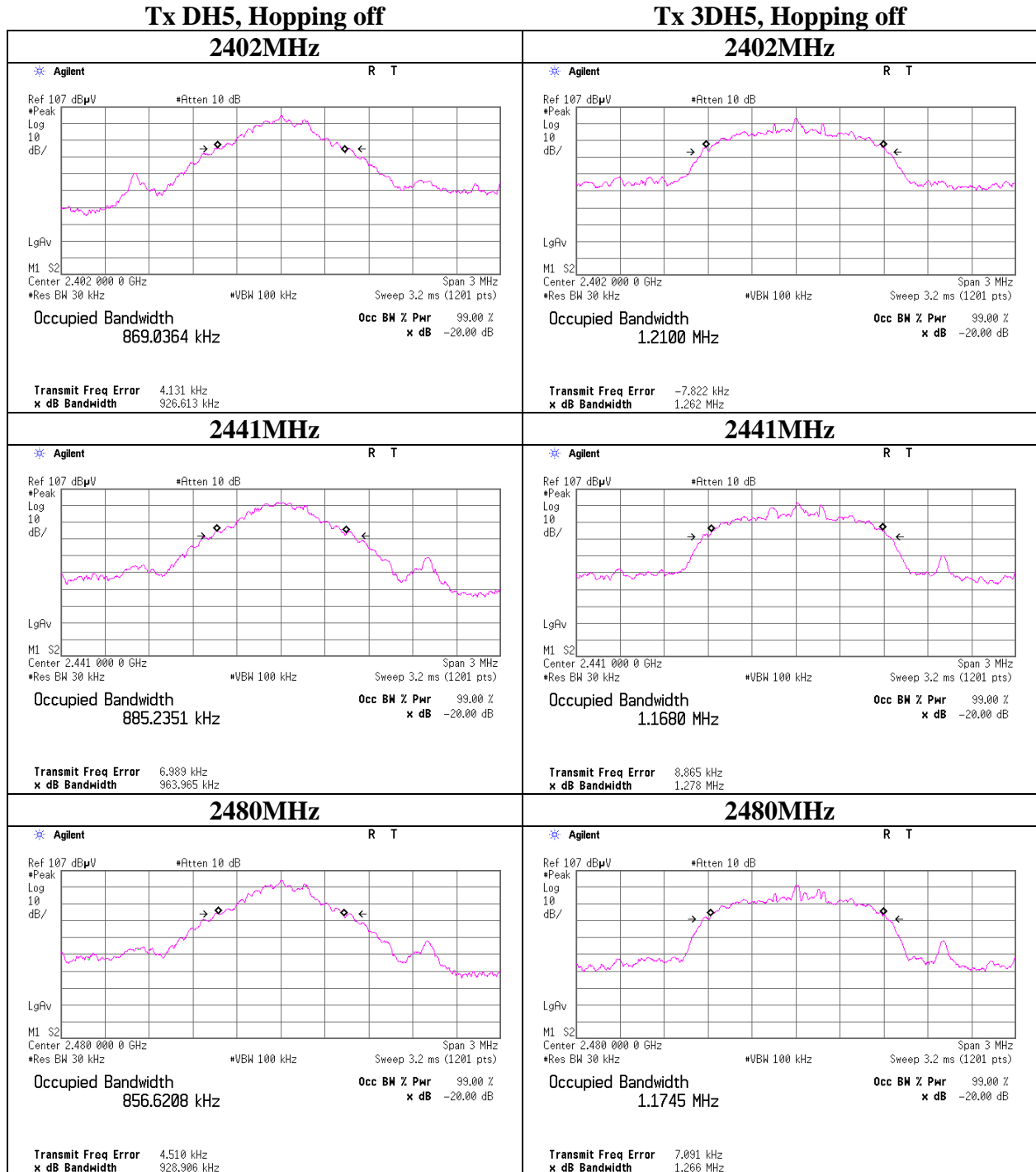
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Telephone : +81 596 24 8999

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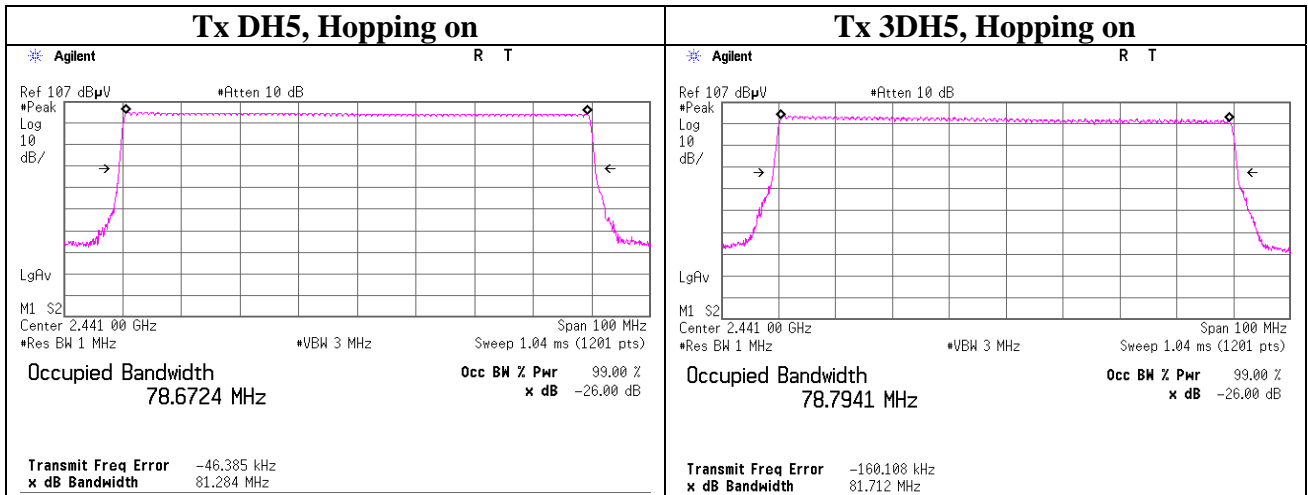
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping off) DH5/3DH5



99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10538067H
Date	10/29/2014
Temperature/ Humidity	23 deg. C / 30% RH
Engineer	Yuta Moriya
Mode	Tx (Hopping on) DH5/3DH5



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APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2014/02/28 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2014/10/06 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2014/10/06 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2014/10/02 * 12
MDPS-03	DC Power Supply	Kikusui	PMC35-2A	13090501	AT	Pre Check
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2013/12/17 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2014/03/28 * 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	-
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	RE	2014/03/05 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2014/05/26 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2014/03/24 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2014/05/26 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2014/06/25 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2014/02/20 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2013/11/25 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2014/06/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2014/02/20 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2013/11/26 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2014/09/26 * 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: RE: Radiated Emission test

AT: Antenna Terminal Conducted test

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