



RADIO TEST REPORT

Test Report No. : 10790682H-A

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Audio
Model No. : FT0052D
FCC ID : BABFT0052D
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)

Date of test:

July 23 to 27, 2015

Representative test engineer:

Kazuya Yoshioka
Engineer
Consumer Technology Division

Approved by:

Takahiro Hatakeda
Leader
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 10790682H-A

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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	:	FUKII DAISUKE

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

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio
Model No.	:	FT0052D
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	July 16, 2015
Country of Mass-production	:	Thailand
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 : 26MHz

Radio Specification

[Bluetooth (Ver. 2.1 with EDR function)]

Radio Type : Transceiver
Frequency of Operation : 2402-2480 MHz
Modulation : FHSS
Power Supply (inner) : DC 3.3 V
Antenna type : Pattern Antenna
Antenna Gain : -4.80 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : Test specification: FCC Part 15 Subpart C: 2015, final revised on September 8, 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 September 8, 2015 does not affect the test specification applied to the EUT.

* The EUT complies with FCC Part 15 Subpart B: 2015, final revised on June 12, 2015 and effective July 13, 2015

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4-2009 7. AC powerline conducted emission measurements	FCC: Section 15.207	-	N/A *1)	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)(iii)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(1)(iii)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(a)(b)(1)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705	FCC: Section15.247(d)	5.8 dB 1652.697 MHz, AV. Horizontal	Complied	Conducted/ Radiated (above 30 MHz) *2)

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.

*2) Radiated test was selected over 30 MHz based on section 15.247(d)

* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

FCC Part 15.31 (e)

The EUT provides stable voltage (DC 3.3 V) 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 $k = 2$.
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Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.5 dB	6.3 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.4 dB	6.3 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.4 dB	6.4 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.6 dB	6.4 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Radiated emission test

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

3.5 Test Location

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Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, 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
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
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	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
*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. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all test items based on Bluetooth Core specification. *EUT has the power settings by the software as follows; - Power settings: BDR: Power Ext Amp=255, Power Int Amp=50 EDR: Power Ext Amp=255, Power Int Amp=50 - Software: CSR BlueTest 3 Version: Release Build 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.		

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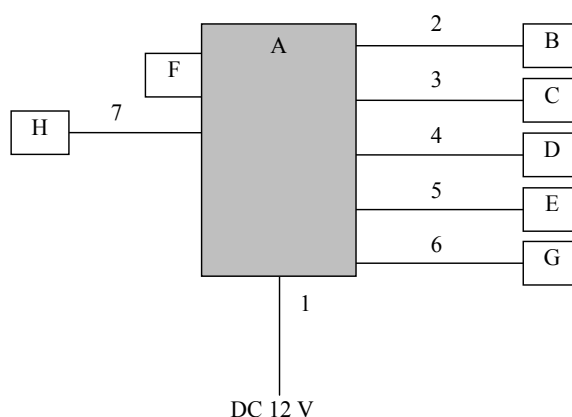
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Car Audio	FT0052D	100047866-002	FUJITSU TEN	EUT
B	Dummy Load	-	-	-	-
C	Dummy Load	-	-	-	-
D	Dummy Load	-	-	-	-
E	Dummy Load	-	-	-	-
F	USB Memory	RUF2-JU16GS-BK	P10617	BUFFALO	-
G	Microphone	-	-	-	-
H	iPod	A1367	C3RJ4SLADT75	APPLE	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	2.0	Unshielded	Unshielded	-
2	Signal Cable	1.0	Unshielded	Unshielded	-
3	Signal Cable	1.0	Unshielded	Unshielded	-
4	Signal Cable	1.9	Unshielded	Unshielded	-
5	Signal Cable	1.5	Unshielded	Unshielded	-
6	Signal Cable	1.5	Unshielded	Unshielded	-
7	Signal Cable	1.5	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m 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 m and 4 m 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	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

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

*1) Although DA 00-705 accepts VBW = 10 Hz 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	: 30 M - 26.5 GHz
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	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.

*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.

(9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

*3) Reference data

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

Test data : APPENDIX

Test result : Pass

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APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

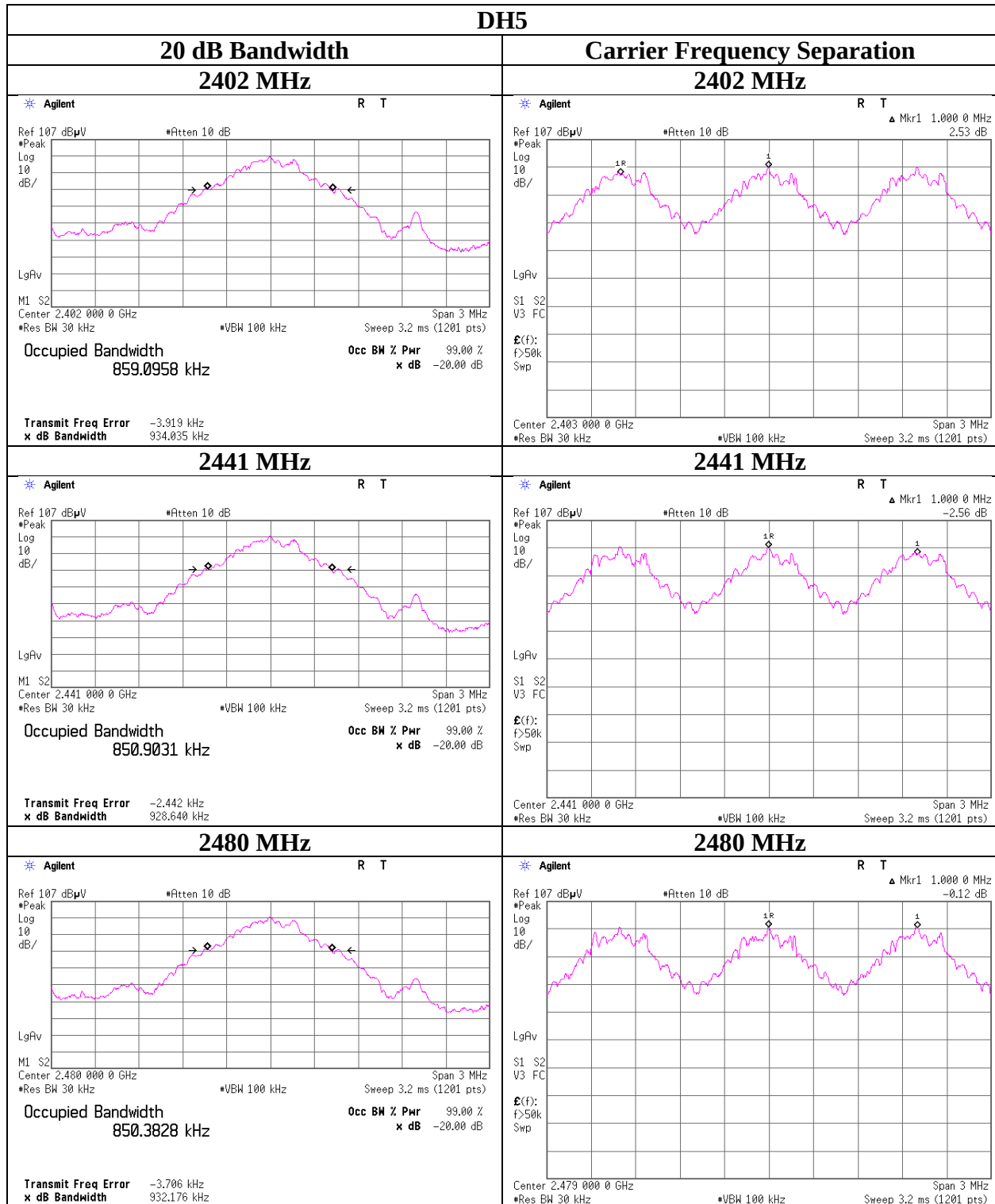
Test place Ise EMC Lab. No.6 Measurement Room
Report No. 10790682H
Date July 23, 2015
Temperature / Humidity 23 deg. C / 75 % RH
Engineer Kazuya Yoshioka
Mode Tx, Hopping Off, DH5/3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.934	1.000	≥ 0.623
DH5	2441.0	0.929	1.000	≥ 0.619
DH5	2480.0	0.932	1.000	≥ 0.621
3DH5	2402.0	1.270	1.000	≥ 0.847
3DH5	2441.0	1.268	1.000	≥ 0.845
3DH5	2480.0	1.263	1.000	≥ 0.842

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

No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



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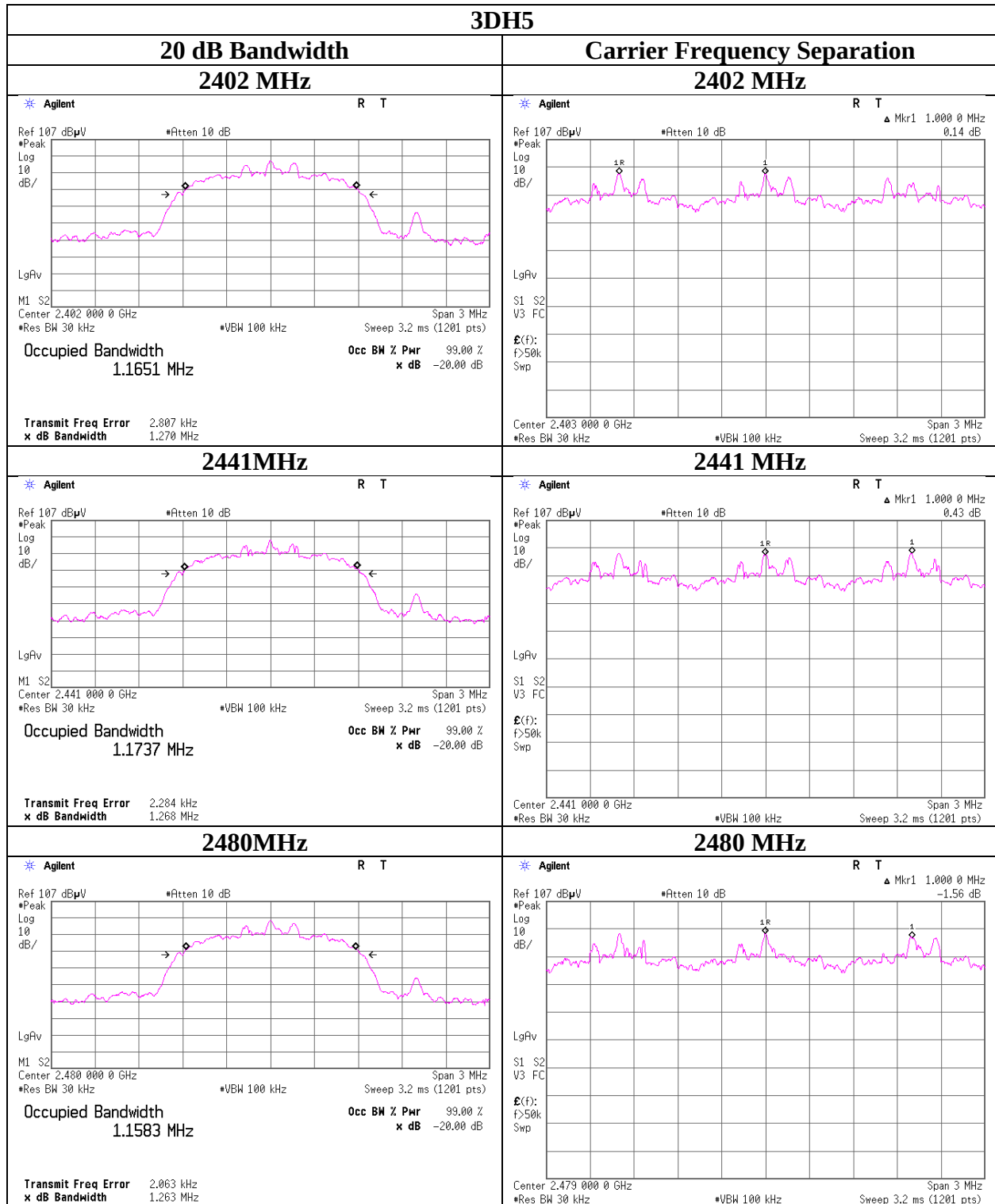
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20dB Bandwidth and Carrier Frequency Separation



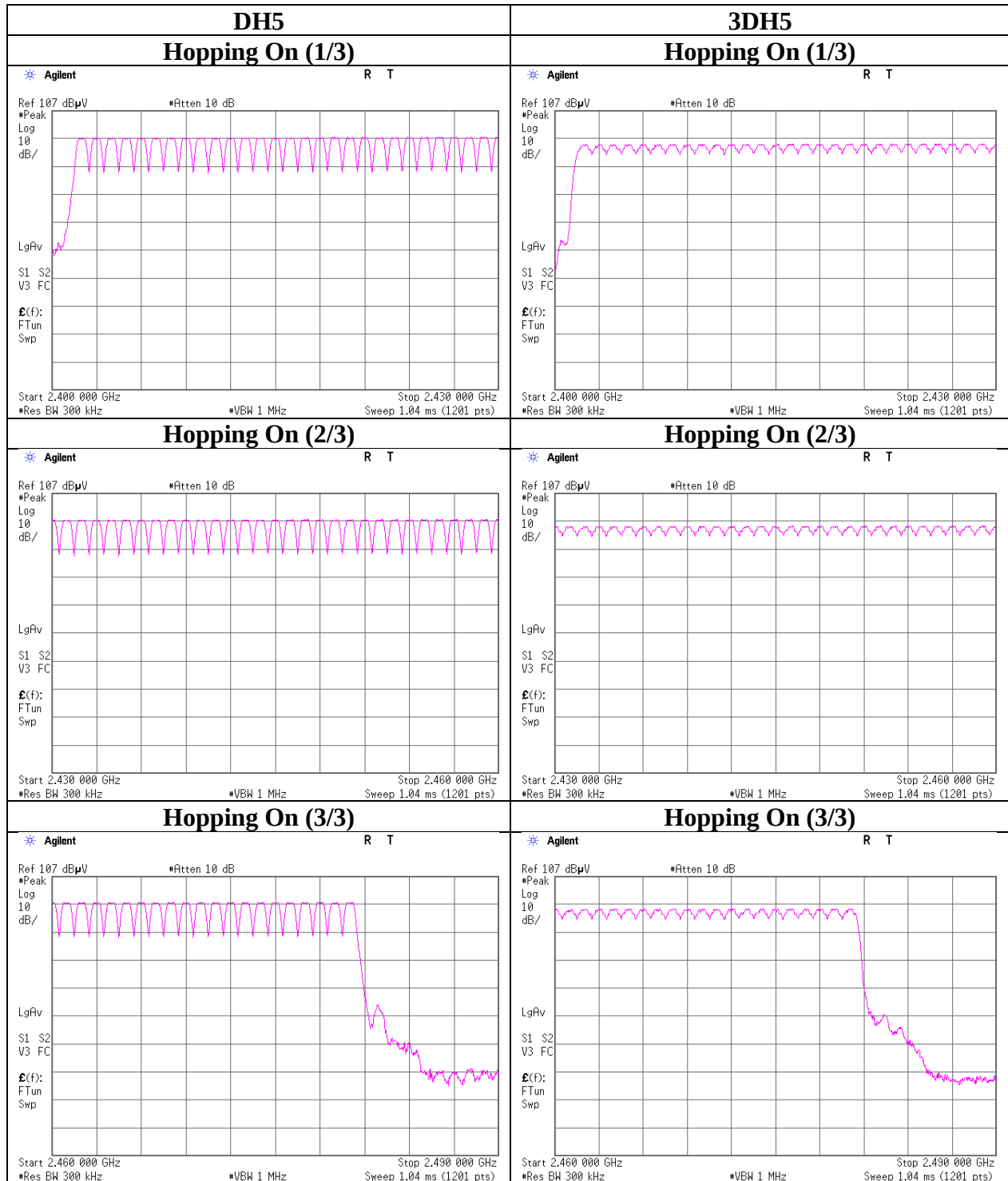
Number of Hopping Frequency

Test place Ise EMC Lab. No.6 Measurement Room
Report No. 10790682H
Date July 23, 2015
Temperature / Humidity 23 deg. C / 75 % RH
Engineer Kazuya Yoshioka
Mode Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
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.

Number of Hopping Frequency



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Dwell time

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping On

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 [msec]	Result [msec]	Limit [msec]
DH1	52.4 times / 5 sec. x 31.6 sec. = 332 times	0.520	173	400
DH3	25.4 times / 5 sec. x 31.6 sec. = 161 times	1.780	287	400
DH5	16.8 times / 5 sec. x 31.6 sec. = 107 times	3.033	325	400
3DH1	51.4 times / 5 sec. x 31.6 sec. = 325 times	0.535	174	400
3DH3	25.2 times / 5 sec. x 31.6 sec. = 160 times	1.790	286	400
3DH5	17.4 times / 5 sec. x 31.6 sec. = 110 times	3.043	335	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

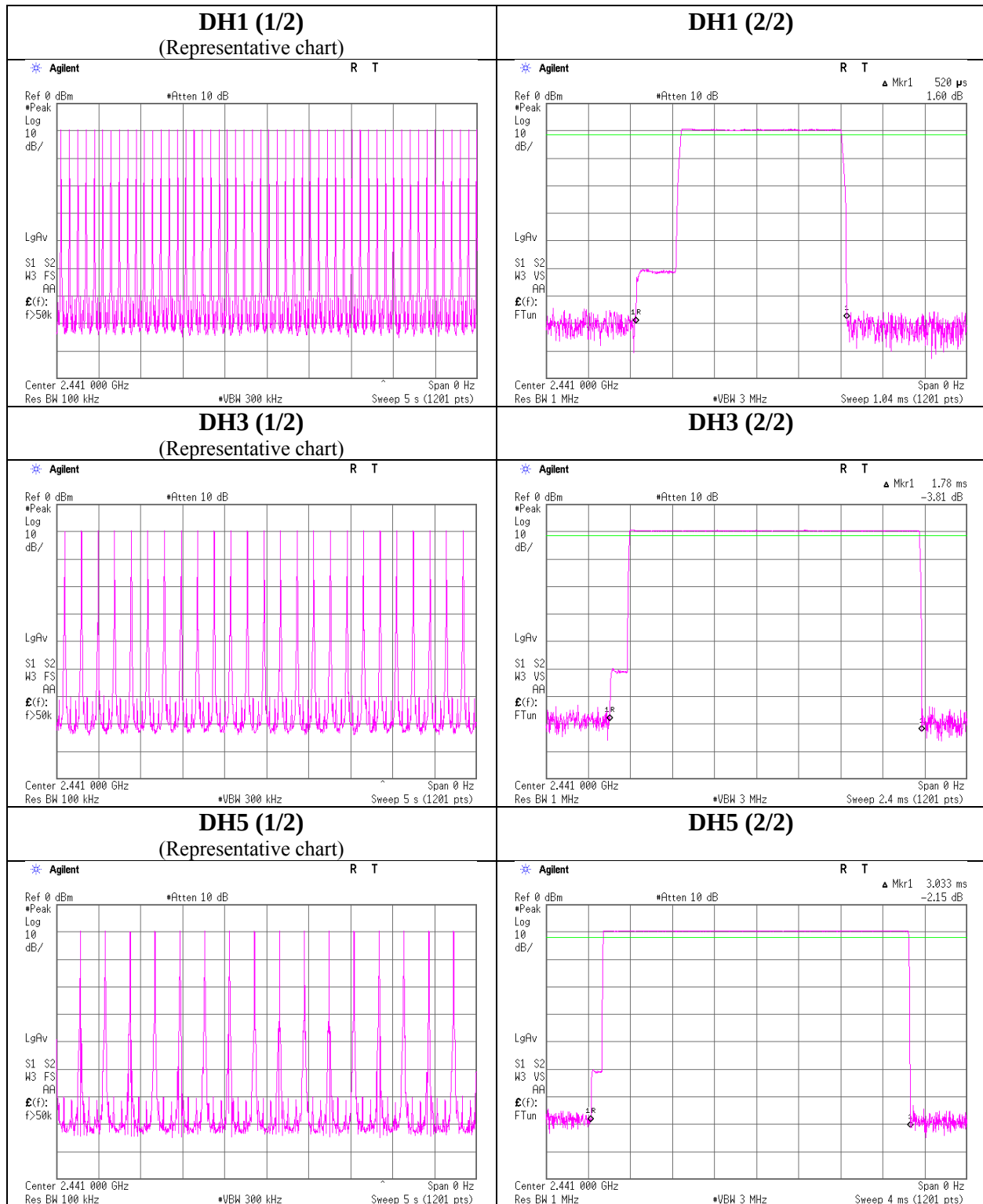
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	53	53	52	52	52	52.4
DH3	25	25	26	26	25	25.4
DH5	16	17	17	17	17	16.8
3DH1	52	52	51	51	51	51.4
3DH3	26	25	25	25	25	25.2
3DH5	17	17	17	18	18	17.4

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 $N = 79$.

Dwell time



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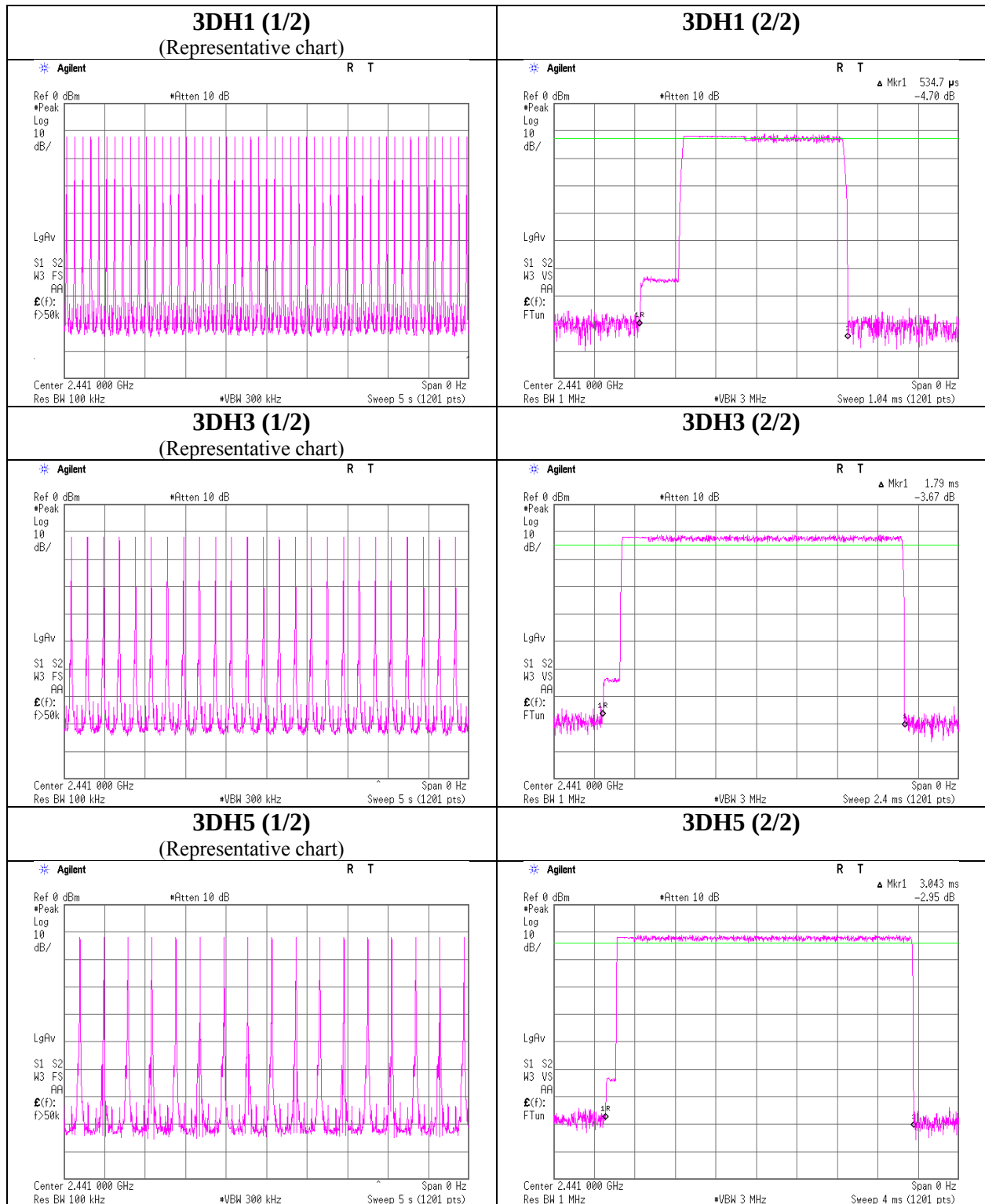
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Dwell time



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Maximum Peak Output Power

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10790682H
Date	July 23, 2015
Temperature / Humidity	23 deg. C / 75 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-9.53	1.77	10.07	2.31	1.70	20.96	125	18.65
DH5	2441.0	-9.18	1.79	10.07	2.68	1.85	20.96	125	18.28
DH5	2480.0	-9.02	1.79	10.07	2.84	1.92	20.96	125	18.12
2DH5	2402.0	-11.14	1.77	10.07	0.70	1.17	20.96	125	20.26
2DH5	2441.0	-10.74	1.79	10.07	1.12	1.29	20.96	125	19.84
2DH5	2480.0	-10.60	1.79	10.07	1.26	1.34	20.96	125	19.70
3DH5	2402.0	-10.99	1.77	10.07	0.85	1.22	20.96	125	20.11
3DH5	2441.0	-10.62	1.79	10.07	1.24	1.33	20.96	125	19.72
3DH5	2480.0	-10.48	1.79	10.07	1.38	1.37	20.96	125	19.58

Sample Calculation:

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

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

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

Average Output Power
(Reference data)

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10790682H
Date	July 23, 2015
Temperature / Humidity	23 deg. C / 75 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-10.88	1.77	10.07	0.96	1.25	0.92	1.88	1.54
DH5	2441.0	-10.49	1.79	10.07	1.37	1.37	0.92	2.29	1.69
DH5	2480.0	-10.32	1.79	10.07	1.54	1.43	0.92	2.46	1.76
2DH5	2402.0	-14.55	1.77	10.07	-2.71	0.54	0.90	-1.81	0.66
2DH5	2441.0	-14.21	1.79	10.07	-2.35	0.58	0.90	-1.45	0.72
2DH5	2480.0	-14.10	1.79	10.07	-2.24	0.60	0.90	-1.34	0.73
3DH5	2402.0	-14.52	1.77	10.07	-2.68	0.54	0.90	-1.78	0.66
3DH5	2441.0	-14.21	1.79	10.07	-2.35	0.58	0.90	-1.45	0.72
3DH5	2480.0	-14.16	1.79	10.07	-2.30	0.59	0.90	-1.40	0.72

Sample Calculation:

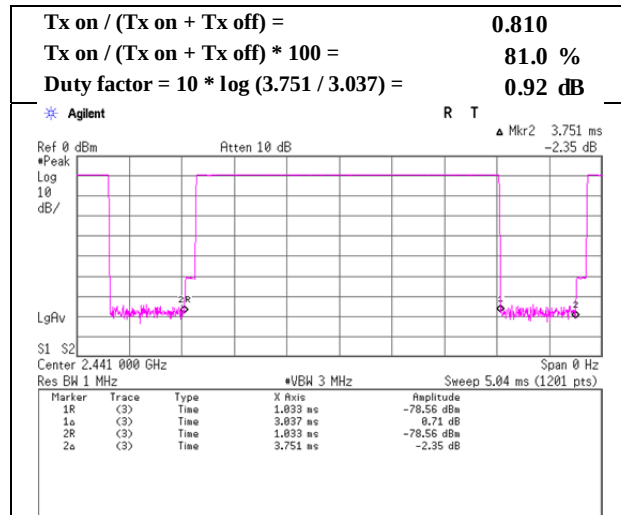
Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power) = Frame power + Duty factor

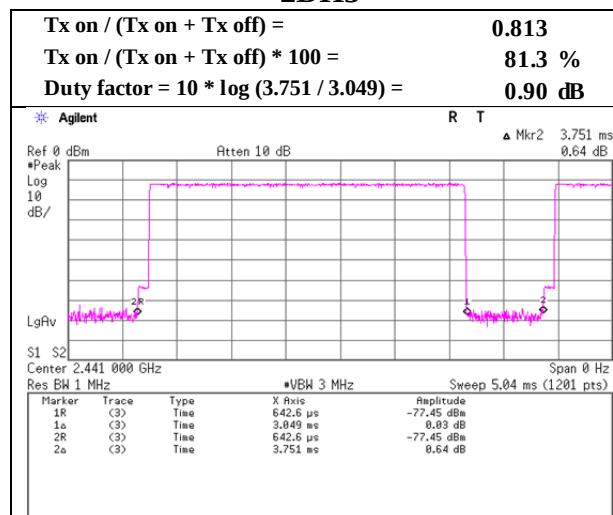
Burst Rate Confirmation

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off

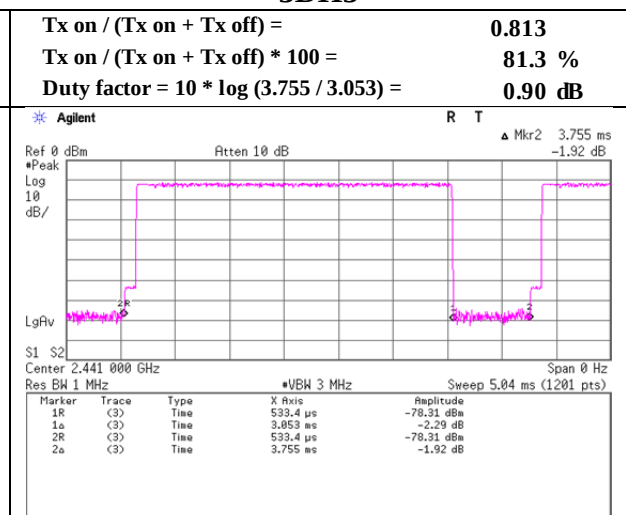
DH5



2DH5

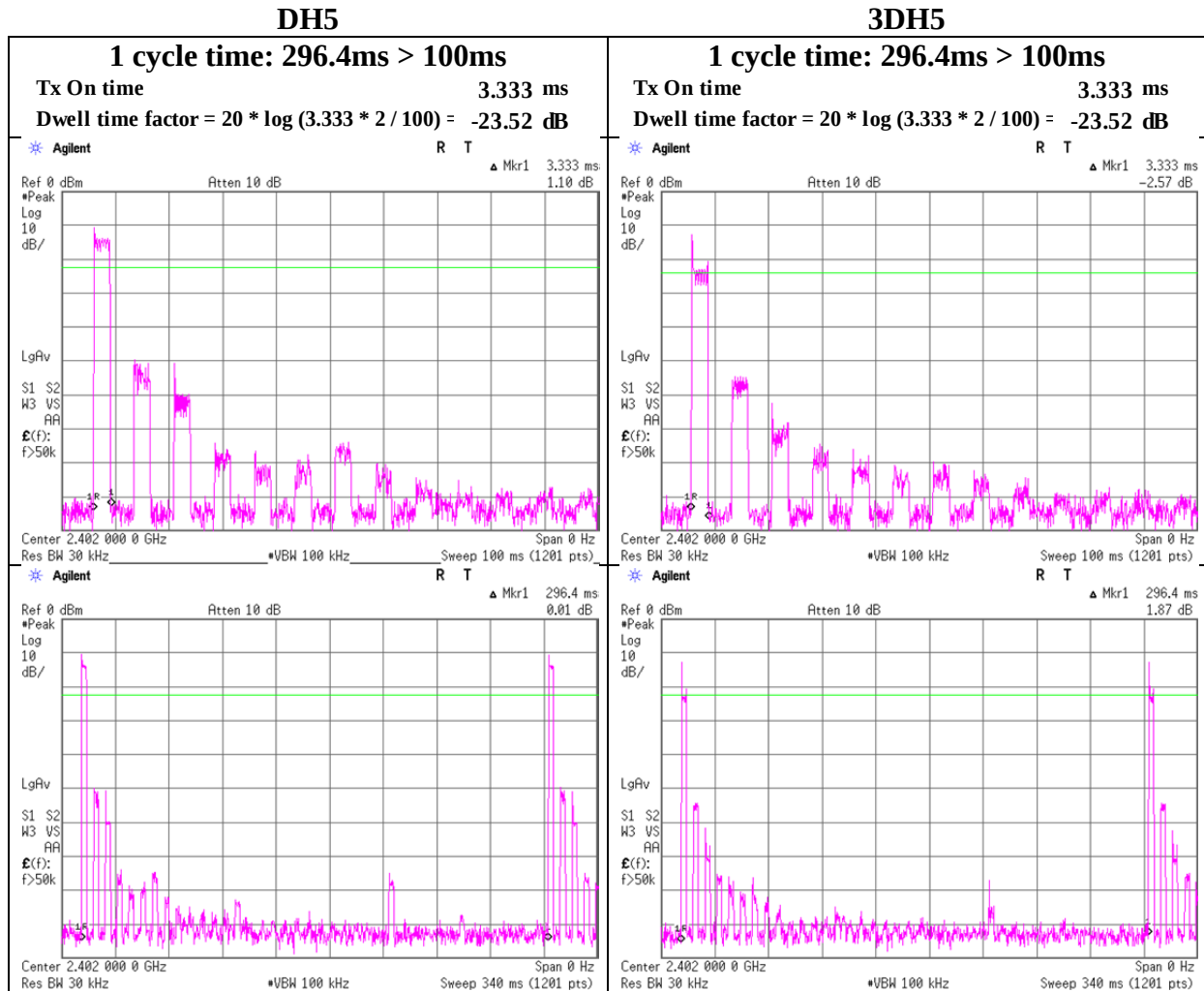


3DH5



Dwell time factor

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10790682H
Date	July 23, 2015
Temperature / Humidity	23 deg. C / 75 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping On



A hopping channel might be occupied 2 times within 100ms on minimum hopping mode (AFH). Therefore Tx On time was multiplied by 2. As for Tx On time, refer to “Burst Rate Confirmation”.

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Radiated Spurious Emission

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.3
Report No.	10790682H		
Date	July 24, 2015 (Day)	July 24, 2015 (Night)	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tsubasa Takayama (30-1000MHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.466	QP	41.9	7.6	7.5	32.1	24.9	40.0	15.1	
Hori	117.895	QP	36.5	12.5	8.2	32.2	25.0	43.5	18.5	
Hori	204.149	QP	38.2	16.6	9.1	32.1	31.8	43.5	11.7	
Hori	347.833	QP	42.1	16.2	10.3	32.0	36.6	46.0	9.4	
Hori	762.003	QP	29.6	21.6	12.6	31.8	32.0	46.0	14.0	
Hori	863.976	QP	32.3	22.4	13.1	31.2	36.6	46.0	9.4	
Hori	1602.013	PK	53.0	25.6	2.8	36.3	45.1	73.9	28.8	
Hori	2390.000	PK	45.6	26.8	3.3	36.1	39.6	73.9	34.3	
Hori	4804.000	PK	60.4	31.8	5.4	35.6	62.0	73.9	11.9	
Hori	7206.000	PK	43.9	36.1	6.6	35.6	51.0	73.9	22.9	NS
Hori	9608.000	PK	44.2	38.6	7.1	36.3	53.6	73.9	20.3	NS
Hori	1602.013	AV	49.4	25.6	2.8	36.3	41.5	53.9	12.4	
Hori	2390.000	AV	33.3	26.8	3.3	36.1	27.3	53.9	26.6	
Hori	7206.000	AV	32.0	36.1	6.6	35.6	39.1	53.9	14.8	NS
Hori	9608.000	AV	32.1	38.6	7.1	36.3	41.5	53.9	12.4	NS
Vert	59.960	QP	46.1	7.4	7.5	32.1	23.9	40.0	11.1	
Vert	109.520	QP	43.0	11.4	8.1	32.2	30.3	43.5	13.2	
Vert	119.090	QP	38.1	12.6	8.3	32.2	26.8	43.5	16.7	
Vert	203.160	QP	37.1	16.5	9.1	32.1	30.6	43.5	12.9	
Vert	350.440	QP	35.1	16.2	10.3	32.0	29.6	46.0	16.4	
Vert	543.993	QP	27.5	18.8	11.4	32.1	25.6	46.0	20.4	
Vert	863.995	QP	30.6	22.4	13.1	31.2	34.9	46.0	11.1	
Vert	1601.973	PK	55.9	25.6	2.8	36.3	48.0	73.9	25.9	
Vert	2390.000	PK	46.3	26.8	3.3	36.1	40.3	73.9	33.6	
Vert	4804.000	PK	63.2	31.8	5.4	35.6	64.8	73.9	9.1	
Vert	7206.000	PK	44.9	36.1	6.6	35.6	52.0	73.9	22.0	NS
Vert	9608.000	PK	44.2	38.6	7.1	36.3	53.6	73.9	20.3	NS
Vert	1601.973	AV	53.9	25.6	2.8	36.3	46.0	53.9	7.9	
Vert	2390.000	AV	33.1	26.8	3.3	36.1	27.1	53.9	26.8	
Vert	7206.000	AV	32.1	36.1	6.6	35.6	39.2	53.9	14.7	NS
Vert	9608.000	AV	31.9	38.6	7.1	36.3	41.3	53.9	12.6	NS

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

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

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

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

NS: No signal detected.

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	100.1	26.8	3.3	36.1	94.1	-	-	Carrier
Hori	2400.000	PK	57.0	26.8	3.3	36.1	51.0	74.1	23.1	
Vert	2402.000	PK	100.3	26.8	3.3	36.1	94.3	-	-	Carrier
Vert	2400.000	PK	55.8	26.8	3.3	36.1	49.8	74.3	24.5	

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	4804.000	AV	50.3	31.8	5.4	35.6	-23.5	28.4	53.9	25.5	*
Vert	4804.000	AV	53.3	31.8	5.4	35.6	-23.5	31.4	53.9	22.5	*

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.

Ise EMC Lab.

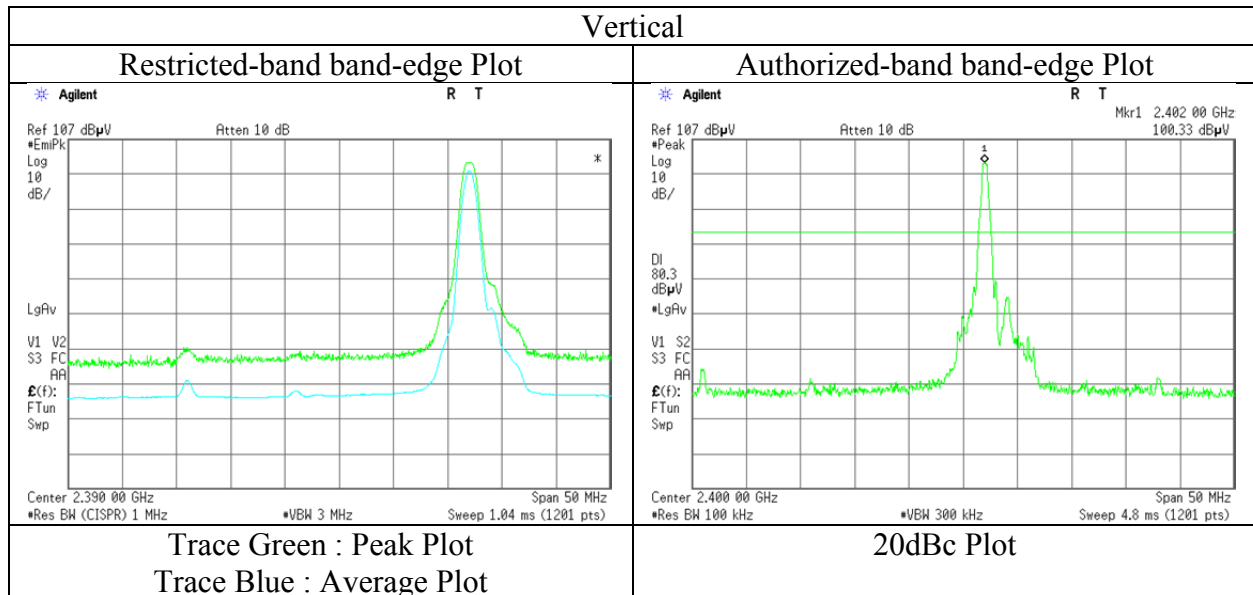
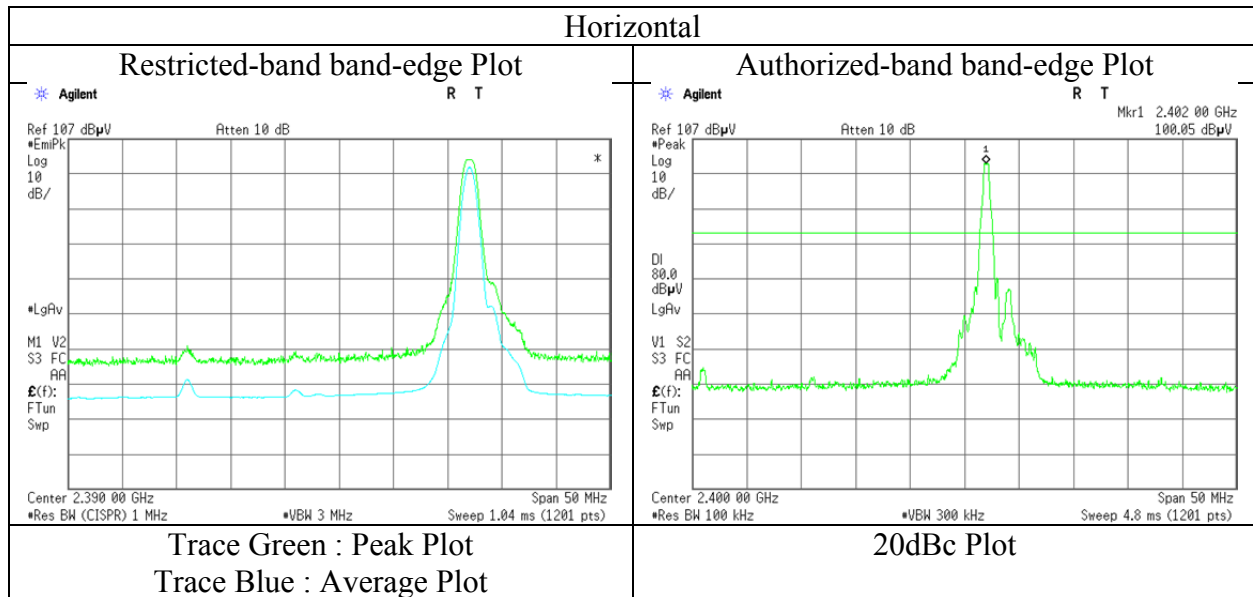
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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10790682H
Date	July 24, 2015
Temperature / Humidity	22 deg. C / 69 % RH
Engineer	Kazuya Yoshioka (1-10GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



* Final result of restricted band edge was shown in tabular data.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.3
Report No.	10790682H		
Date	July 24, 2015 (Day)	July 24, 2015 (Night)	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tsubasa Takayama (30-1000MHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.570	QP	41.5	7.5	7.5	32.1	24.4	40.0	15.6	
Hori	118.530	QP	37.8	12.5	8.3	32.2	26.4	43.5	17.1	
Hori	206.950	QP	39.2	16.6	9.1	32.1	32.8	43.5	10.7	
Hori	256.040	QP	39.7	17.5	9.5	32.0	34.7	46.0	11.3	
Hori	349.250	QP	40.3	16.2	10.3	32.0	34.8	46.0	11.2	
Hori	762.053	QP	25.6	21.6	12.6	31.8	28.0	46.0	18.0	
Hori	863.620	QP	31.5	22.4	13.1	31.2	35.8	46.0	10.2	
Hori	1626.772	PK	55.3	25.7	2.8	36.3	47.5	73.9	26.4	
Hori	4882.000	PK	60.8	32.0	5.4	35.6	62.6	73.9	11.3	
Hori	7323.000	PK	44.5	36.1	6.6	35.6	51.6	73.9	22.4	NS
Hori	9764.000	PK	43.7	38.6	7.1	36.3	53.1	73.9	20.8	NS
Hori	1626.772	AV	52.5	25.7	2.8	36.3	44.7	53.9	9.2	
Hori	7323.000	AV	31.8	36.1	6.6	35.6	38.9	53.9	15.0	NS
Hori	9764.000	AV	32.0	38.6	7.1	36.3	41.4	53.9	12.5	NS
Vert	59.245	QP	46.6	7.6	7.5	32.1	29.6	40.0	10.4	
Vert	109.544	QP	39.8	11.4	8.1	32.2	27.1	43.5	16.4	
Vert	119.090	QP	46.0	12.6	8.3	32.2	34.7	43.5	8.8	
Vert	177.744	QP	34.9	16.2	8.8	32.2	27.7	43.5	15.8	
Vert	203.467	QP	34.7	16.5	9.1	32.1	28.2	43.5	15.3	
Vert	347.840	QP	34.4	16.2	10.3	32.0	28.9	46.0	17.1	
Vert	863.880	QP	24.0	22.4	13.1	31.2	28.3	46.0	17.7	
Vert	1626.635	PK	56.5	25.7	2.8	36.3	48.7	73.9	25.2	
Vert	4882.000	PK	64.9	32.0	5.4	35.6	66.7	73.9	7.2	
Vert	7323.000	PK	44.0	36.1	6.6	35.6	51.1	73.9	22.8	NS
Vert	9764.000	PK	43.6	38.6	7.1	36.3	53.0	73.9	21.0	NS
Vert	1626.635	AV	54.4	25.7	2.8	36.3	46.6	53.9	7.3	
Vert	7323.000	AV	31.7	36.1	6.6	35.6	38.8	53.9	15.1	NS
Vert	9764.000	AV	31.7	38.6	7.1	36.3	41.1	53.9	12.8	NS

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

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

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

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

NS: No signal detected.

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	4882.000	AV	53.8	32.0	5.4	35.6	-23.5	32.1	53.9	21.8	
Vert	4882.000	AV	58.0	32.0	5.4	35.6	-23.5	36.3	53.9	17.6	

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.

Radiated Spurious Emission

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.3
Report No.	10790682H		
Date	July 24, 2015 (Day)	July 24, 2015 (Night)	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tsubasa Takayama (30-1000MHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.324	QP	40.6	7.6	7.5	32.1	23.6	40.0	16.4	
Hori	117.232	QP	37.7	12.4	8.2	32.2	26.1	43.5	17.4	
Hori	206.990	QP	38.1	16.6	9.1	32.1	31.7	43.5	11.8	
Hori	256.004	QP	37.8	17.5	9.5	32.0	32.8	46.0	13.2	
Hori	347.990	QP	40.8	16.2	10.3	32.0	35.3	46.0	10.7	
Hori	762.042	QP	29.7	21.6	12.6	31.8	32.1	46.0	13.9	
Hori	863.986	QP	31.1	22.4	13.1	31.2	35.4	46.0	10.6	
Hori	1652.658	PK	56.8	25.7	2.8	36.3	49.0	73.9	24.9	
Hori	2483.500	PK	52.1	26.9	3.3	36.1	46.2	73.9	27.7	
Hori	4960.000	PK	61.2	32.1	5.5	35.6	63.2	73.9	10.8	
Hori	7440.000	PK	44.7	36.1	6.5	35.6	51.7	73.9	22.2	NS
Hori	9920.000	PK	44.2	38.6	7.4	36.4	53.8	73.9	20.1	NS
Hori	1652.658	AV	54.6	25.7	2.8	36.3	46.8	53.9	7.1	
Hori	2483.500	AV	38.9	26.9	3.3	36.1	33.0	53.9	20.9	
Hori	7440.000	AV	32.5	36.1	6.5	35.6	39.5	53.9	14.4	NS
Hori	9920.000	AV	32.1	38.6	7.4	36.4	41.7	53.9	12.2	NS
Vert	59.372	QP	46.7	7.6	7.5	32.1	29.7	40.0	10.3	
Vert	108.896	QP	43.7	11.3	8.1	32.2	30.9	43.5	12.6	
Vert	119.092	QP	44.1	12.6	8.3	32.2	32.8	43.5	10.7	
Vert	178.110	QP	33.6	16.2	8.8	32.2	26.4	43.5	17.1	
Vert	203.710	QP	34.5	16.5	9.1	32.1	28.0	43.5	15.5	
Vert	352.330	QP	35.4	16.3	10.3	32.0	30.0	46.0	16.0	
Vert	863.986	QP	33.1	22.4	13.1	31.2	37.4	46.0	8.6	
Vert	1655.000	PK	57.9	25.7	2.8	36.3	50.1	73.9	23.8	
Vert	2483.500	PK	50.2	26.9	3.3	36.1	44.3	73.9	29.6	
Vert	4960.000	PK	63.6	32.1	5.3	35.6	65.4	73.9	8.5	
Vert	7440.000	PK	44.5	36.1	6.6	35.6	51.6	73.9	22.3	NS
Vert	9920.000	PK	44.3	38.6	7.1	36.4	53.6	73.9	20.3	NS
Vert	1655.000	AV	55.2	25.7	2.8	36.3	47.4	53.9	6.5	
Vert	2483.500	AV	37.2	26.9	3.3	36.1	31.3	53.9	22.6	
Vert	7440.000	AV	32.5	36.1	6.6	35.6	39.6	53.9	14.3	NS
Vert	9920.000	AV	32.1	38.6	7.1	36.4	41.4	53.9	12.6	NS

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

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

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

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

NS: No signal detected.

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	4960.000	AV	55.2	32.1	5.5	35.6	-23.5	33.7	53.9	20.2	
Vert	4960.000	AV	57.4	32.1	5.3	35.6	-23.5	35.7	53.9	18.2	

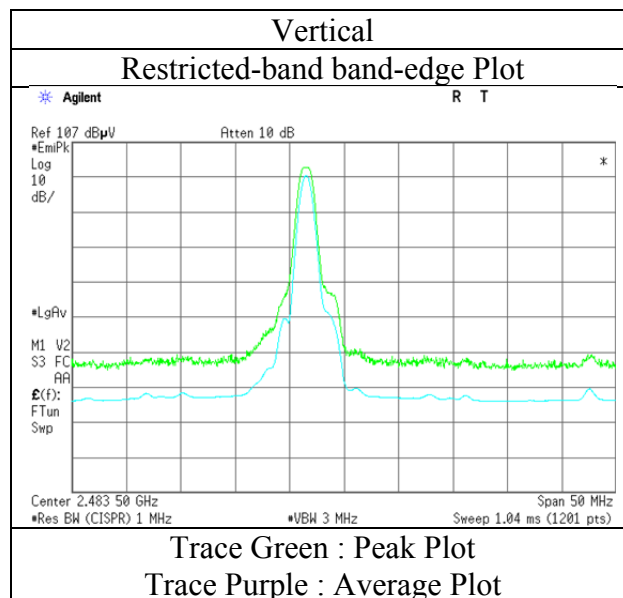
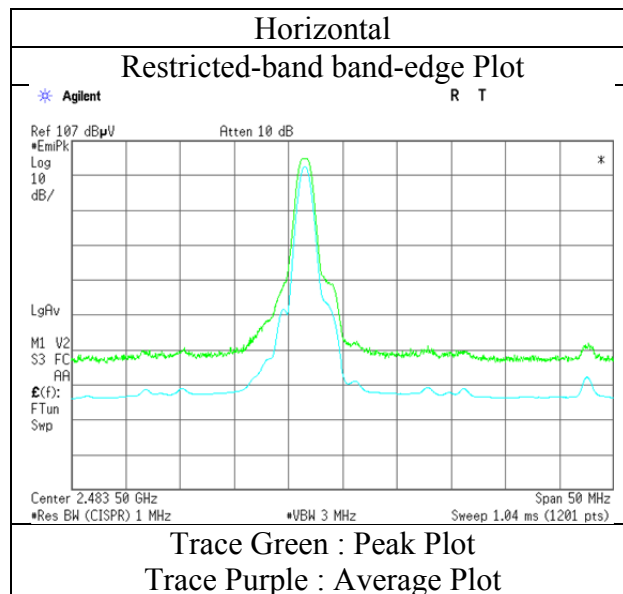
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz))

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

*Above noise was synchronized with carrier frequency.

Radiated Spurious Emission (Reference Plot for band-edge)

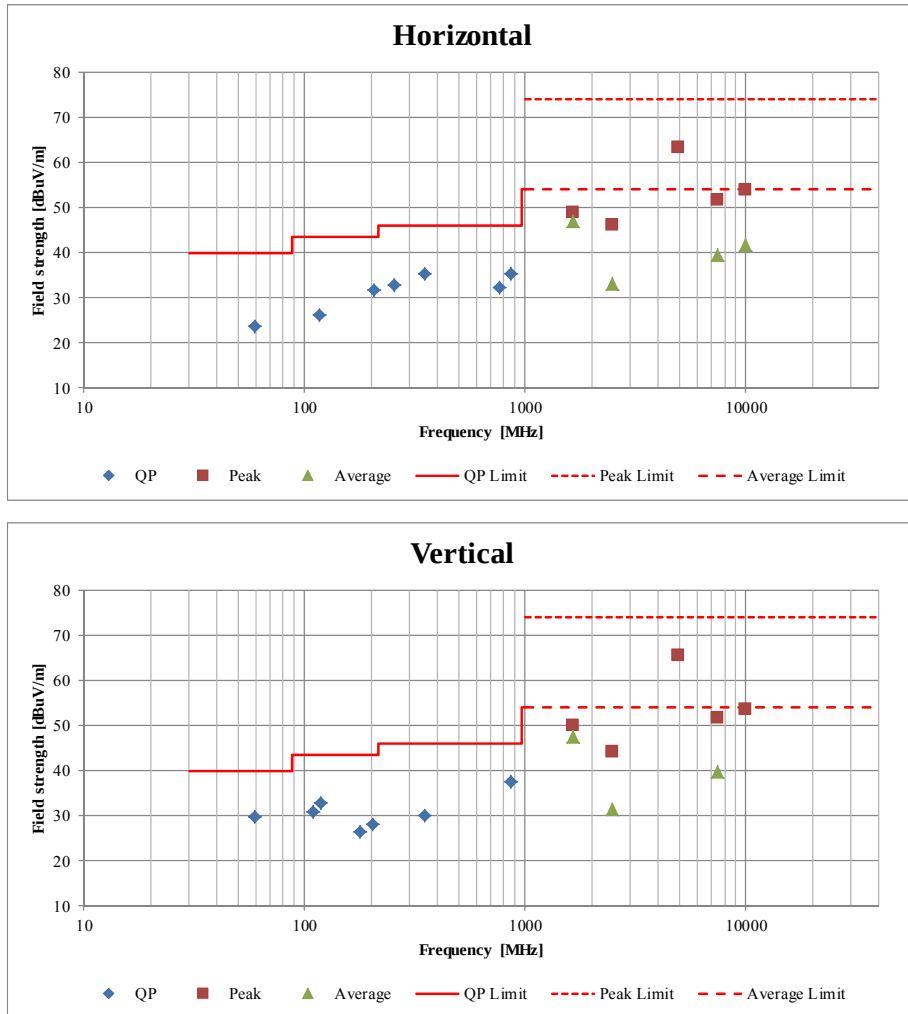
Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10790682H
Date	July 24, 2015
Temperature / Humidity	22 deg. C / 69 % RH
Engineer	Kazuya Yoshioka (1-10GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz



* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (Plot data, Worst case)

Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.1	No.1	No.3
Report No.	10790682H		
Date	July 24, 2015 (Day)	July 24, 2015 (Night)	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Kazuya Yoshioka (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Tsubasa Takayama (30-1000MHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		



*These plots data contains sufficient number to show the trend of characteristic features for EUT.

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Radiated Spurious Emission

Test place : Ise EMC Lab.
Semi Anechoic Chamber : No.1
Report No. : 10790682H
Date : July 24, 2015
Temperature / Humidity : 22 deg. C / 69 % RH
Engineer : Takafumi Noguchi
Mode : Tx, Hopping Off, 3DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.324	QP	41.3	7.6	7.5	32.1	24.3	40.0	15.7	
Hori	117.232	QP	36.8	12.4	8.2	32.2	25.2	43.5	18.3	
Hori	207.190	QP	39.1	16.6	9.1	32.1	32.7	43.5	10.8	
Hori	256.114	QP	36.9	17.5	9.5	32.0	31.9	46.0	14.1	
Hori	346.890	QP	34.5	16.1	10.3	32.0	28.9	46.0	17.1	
Hori	762.242	QP	25.8	21.6	12.6	31.8	28.2	46.0	17.8	
Hori	863.976	QP	30.9	22.4	13.1	31.2	35.2	46.0	10.8	
Hori	1602.003	PK	53.3	25.6	2.8	36.3	45.4	73.9	28.5	
Hori	2390.000	PK	46.3	26.8	3.3	36.1	40.3	73.9	33.6	
Hori	4804.000	PK	56.0	31.8	5.4	35.6	57.6	73.9	16.3	
Hori	7206.000	PK	44.6	36.1	6.6	35.6	51.7	73.9	22.2	NS
Hori	9608.000	PK	44.8	38.6	7.1	36.3	54.2	73.9	19.7	NS
Hori	1602.003	AV	50.5	25.6	2.8	36.3	42.6	53.9	11.3	
Hori	2390.000	AV	33.3	26.8	3.3	36.1	27.3	53.9	26.6	
Hori	4804.000	AV	40.0	31.8	5.4	35.6	41.6	53.9	12.3	
Hori	7206.000	AV	32.5	36.1	6.6	35.6	39.6	53.9	14.3	NS
Hori	9608.000	AV	32.5	38.6	7.1	36.3	41.9	53.9	12.0	NS
Vert	59.372	QP	46.1	7.6	7.5	32.1	29.1	40.0	10.9	
Vert	108.896	QP	39.9	11.3	8.1	32.2	27.1	43.5	16.4	
Vert	118.790	QP	45.7	12.6	8.3	32.2	34.4	43.5	9.1	
Vert	178.221	QP	35.0	16.2	8.8	32.2	27.8	43.5	15.7	
Vert	202.916	QP	34.6	16.5	9.1	32.1	28.1	43.5	15.4	
Vert	263.986	QP	37.3	17.9	9.6	32.0	32.8	46.0	13.2	
Vert	351.430	QP	41.0	16.3	10.3	32.0	35.6	46.0	10.4	
Vert	863.886	QP	24.2	22.4	13.1	31.2	28.5	46.0	17.5	
Vert	1602.003	PK	54.8	25.6	2.8	36.3	46.9	73.9	27.0	
Vert	2390.000	PK	46.9	26.8	3.3	36.1	40.9	73.9	33.0	
Vert	4804.000	PK	57.9	31.8	5.4	35.6	59.5	73.9	14.4	
Vert	7206.000	PK	44.5	36.1	6.6	35.6	51.6	73.9	22.3	NS
Vert	9608.000	PK	44.7	38.6	7.1	36.3	54.1	73.9	19.8	NS
Vert	1602.003	AV	51.8	25.6	2.8	36.3	43.9	53.9	10.0	
Vert	2390.000	AV	33.1	26.8	3.3	36.1	27.1	53.9	26.8	
Vert	4804.000	AV	41.9	31.8	5.4	35.6	43.5	53.9	10.4	
Vert	7206.000	AV	32.6	36.1	6.6	35.6	39.7	53.9	14.2	NS
Vert	9608.000	AV	32.5	38.6	7.1	36.3	41.9	53.9	12.0	NS

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

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

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

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

NS: No signal detected.

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	99.1	26.8	3.3	36.1	93.1	-	-	Carrier
Hori	2400.000	PK	52.9	26.8	3.3	36.1	46.9	73.1	26.2	
Vert	2402.000	PK	97.4	26.8	3.3	36.1	91.4	-	-	Carrier
Vert	2400.000	PK	51.4	26.8	3.3	36.1	45.4	71.4	26.0	

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

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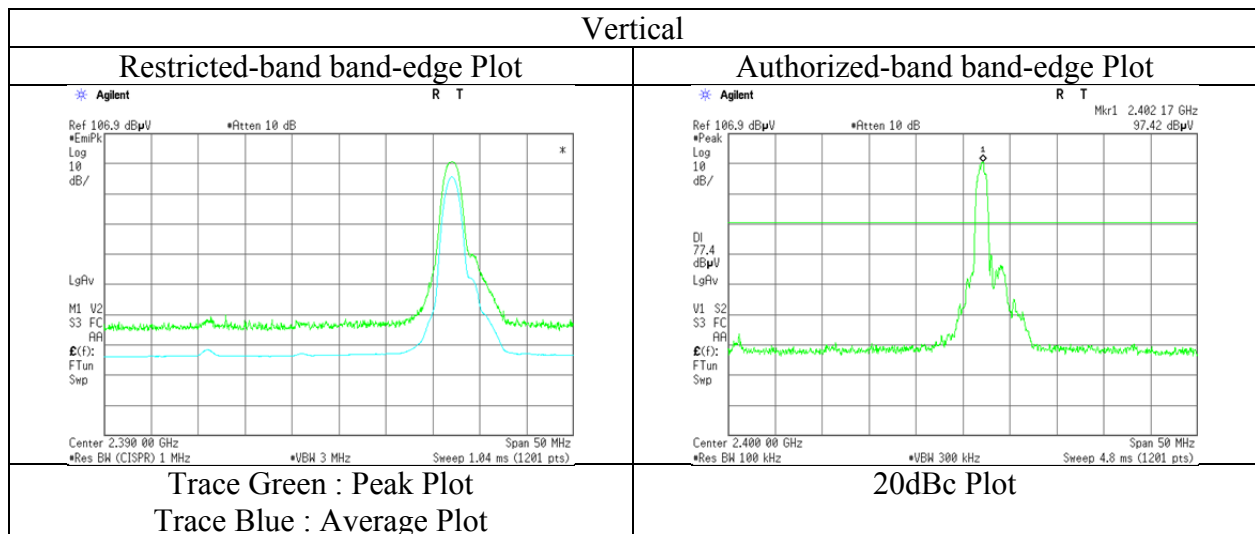
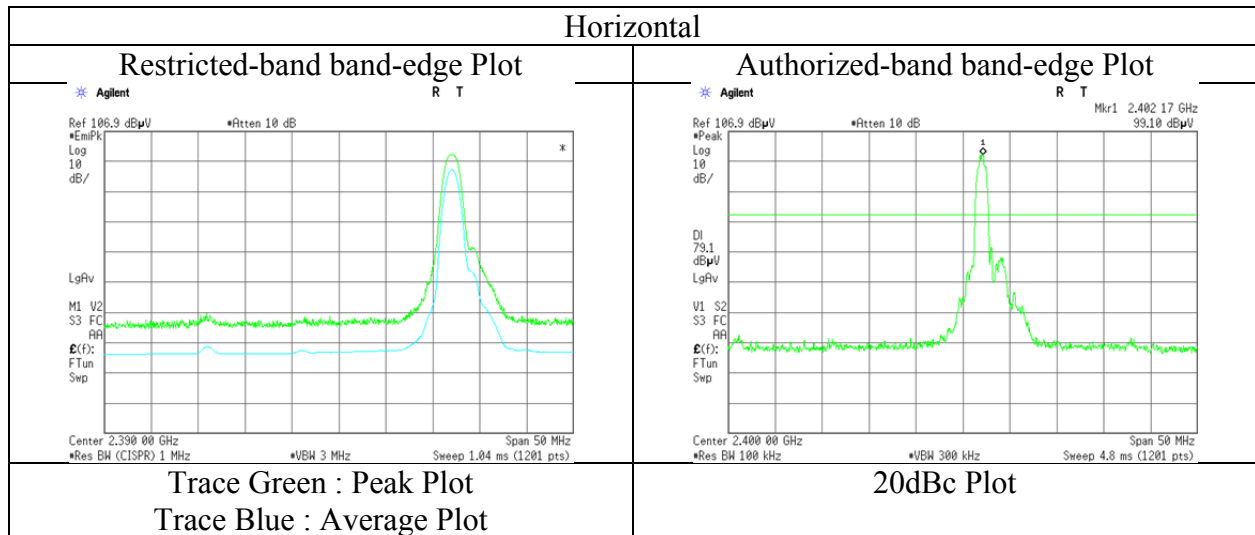
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Telephone : +81 596 24 8999

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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10790682H
Date	July 24, 2015
Temperature / Humidity	22 deg. C / 69 % RH
Engineer	Takafumi Noguchi
	(1-26.5GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



* Final result of restricted band edge was shown in tabular data.

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Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.1	No.3
Report No.	10790682H	
Date	July 24, 2015	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Takafumi Noguchi	Tsubasa Takayama
	(1-26.5GHz)	(30-1000MHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.329	QP	40.8	7.6	7.5	32.1	23.8	40.0	16.2	
Hori	117.292	QP	37.6	12.4	8.2	32.2	26.0	43.5	17.5	
Hori	207.942	QP	41.2	16.6	9.1	32.1	34.8	43.5	8.7	
Hori	264.005	QP	44.5	17.9	9.6	32.0	40.0	46.0	6.0	
Hori	350.808	QP	39.7	16.2	10.3	32.0	34.2	46.0	11.8	
Hori	762.042	QP	29.5	21.6	12.6	31.8	31.9	46.0	14.1	
Hori	863.977	QP	32.9	22.4	13.1	31.2	37.2	46.0	8.8	
Hori	1626.723	PK	56.9	25.7	2.8	36.3	49.1	73.9	24.8	
Hori	4882.000	PK	56.6	32.0	5.4	35.6	58.4	73.9	15.5	
Hori	7323.000	PK	44.5	36.1	6.6	35.6	51.6	73.9	22.3	NS
Hori	9764.000	PK	44.2	38.6	7.1	36.3	53.6	73.9	20.3	NS
Hori	1626.723	AV	54.7	25.7	2.8	36.3	46.9	53.9	7.0	
Hori	4882.000	AV	42.6	32.0	5.4	35.6	44.4	53.9	9.5	
Hori	7323.000	AV	32.2	36.1	6.6	35.6	39.3	53.9	14.6	NS
Hori	9764.000	AV	32.2	38.6	7.1	36.3	41.6	53.9	12.3	NS
Vert	59.379	QP	40.6	7.6	7.5	32.1	23.6	40.0	16.4	
Vert	89.992	QP	46.7	8.4	7.9	32.2	30.8	43.5	12.7	
Vert	108.998	QP	41.9	11.3	8.1	32.2	29.1	43.5	14.4	
Vert	118.512	QP	44.6	12.5	8.3	32.2	33.2	43.5	10.3	
Vert	178.019	QP	35.3	16.2	8.8	32.2	28.1	43.5	15.4	
Vert	205.873	QP	33.8	16.6	9.1	32.1	27.4	43.5	16.1	
Vert	348.351	QP	32.6	16.2	10.3	32.0	27.1	46.0	18.9	
Vert	863.984	QP	31.4	22.4	13.1	31.2	35.7	46.0	10.3	
Vert	1626.723	PK	55.2	25.7	2.8	36.3	47.4	73.9	26.5	
Vert	4882.000	PK	58.4	32.0	5.4	35.6	60.2	73.9	13.7	
Vert	7323.000	PK	44.3	36.1	6.6	35.6	51.4	73.9	22.5	NS
Vert	9764.000	PK	44.8	38.6	7.1	36.3	54.2	73.9	19.7	NS
Vert	1626.723	AV	52.9	25.7	2.8	36.3	45.1	53.9	8.8	
Vert	4882.000	AV	44.4	32.0	5.4	35.6	46.2	53.9	7.7	
Vert	7323.000	AV	32.2	36.1	6.6	35.6	39.3	53.9	14.6	NS
Vert	9764.000	AV	32.3	38.6	7.1	36.3	41.7	53.9	12.2	NS

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

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

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

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

NS: No signal detected.

Radiated Spurious Emission

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.1	No.3
Report No.	10790682H	
Date	July 24, 2015	July 27, 2015
Temperature / Humidity	22 deg. C / 69 % RH	26 deg. C / 59 % RH
Engineer	Takafumi Noguchi	Tsubasa Takayama
	(1-26.5GHz)	(30-1000MHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	59.296	QP	41.1	7.6	7.5	32.1	24.1	40.0	15.9	
Hori	118.535	QP	36.7	12.5	8.3	32.2	25.3	43.5	18.2	
Hori	206.367	QP	37.7	16.6	9.1	32.1	31.3	43.5	12.2	
Hori	255.986	QP	42.3	17.5	9.5	32.0	37.3	46.0	8.7	
Hori	347.990	QP	41.8	16.2	10.3	32.0	36.3	46.0	9.7	
Hori	791.960	QP	26.4	22.1	12.8	31.6	29.7	46.0	16.3	
Hori	863.984	QP	32.5	22.4	13.1	31.2	36.8	46.0	9.2	
Hori	1652.697	PK	57.8	25.7	2.8	36.3	50.0	73.9	23.9	
Hori	2483.500	PK	52.0	26.9	3.3	36.1	46.1	73.9	27.8	
Hori	4960.000	PK	57.2	32.1	5.3	35.6	59.0	73.9	14.9	
Hori	7440.000	PK	45.0	36.1	6.6	35.6	52.1	73.9	21.8	NS
Hori	9920.000	PK	45.1	38.6	7.1	36.4	54.4	73.9	19.5	NS
Hori	1652.697	AV	55.9	25.7	2.8	36.3	48.1	53.9	5.8	
Hori	2483.500	AV	38.4	26.9	3.3	36.1	32.5	53.9	21.4	
Hori	4960.000	AV	44.3	32.1	5.3	35.6	46.1	53.9	7.8	
Hori	7440.000	AV	33.0	36.1	6.6	35.6	40.1	53.9	13.8	NS
Hori	9920.000	AV	32.5	38.6	7.1	36.4	41.8	53.9	12.1	NS
Vert	59.315	QP	44.2	7.6	7.5	32.1	27.2	40.0	12.8	
Vert	89.989	QP	43.3	8.4	7.9	32.2	27.4	43.5	16.1	
Vert	108.863	QP	43.4	11.3	8.1	32.2	30.6	43.5	12.9	
Vert	118.512	QP	45.0	12.5	8.3	32.2	33.6	43.5	9.9	
Vert	177.999	QP	32.8	16.2	8.8	32.2	25.6	43.5	17.9	
Vert	204.880	QP	39.5	16.6	9.1	32.1	33.1	43.5	10.4	
Vert	355.920	QP	34.2	16.4	10.3	32.0	28.9	46.0	17.1	
Vert	863.983	QP	32.2	22.4	13.1	31.2	36.5	46.0	9.5	
Vert	1652.697	PK	57.2	25.7	2.8	36.3	49.4	73.9	24.5	
Vert	2483.500	PK	49.6	26.9	3.3	36.1	43.7	73.9	30.2	
Vert	4960.000	PK	57.4	32.1	5.3	35.6	59.2	73.9	14.7	
Vert	7440.000	PK	44.6	36.1	6.6	35.6	51.7	73.9	22.2	NS
Vert	9920.000	PK	44.4	38.6	7.1	36.4	53.7	73.9	20.2	NS
Vert	1652.697	AV	55.4	25.7	2.8	36.3	47.6	53.9	6.3	
Vert	2483.500	AV	36.4	26.9	3.3	36.1	30.5	53.9	23.4	
Vert	4960.000	AV	44.8	32.1	5.3	35.6	46.6	53.9	7.3	
Vert	7440.000	AV	32.9	36.1	6.6	35.6	40.0	53.9	13.9	NS
Vert	9920.000	AV	32.6	38.6	7.1	36.4	41.9	53.9	12.0	NS

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

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

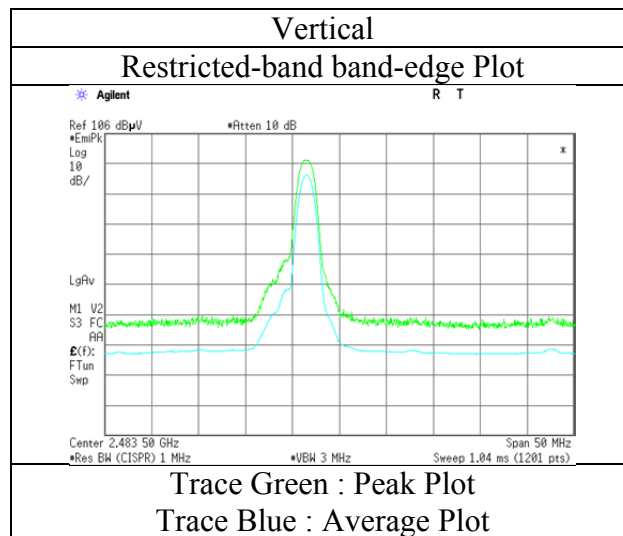
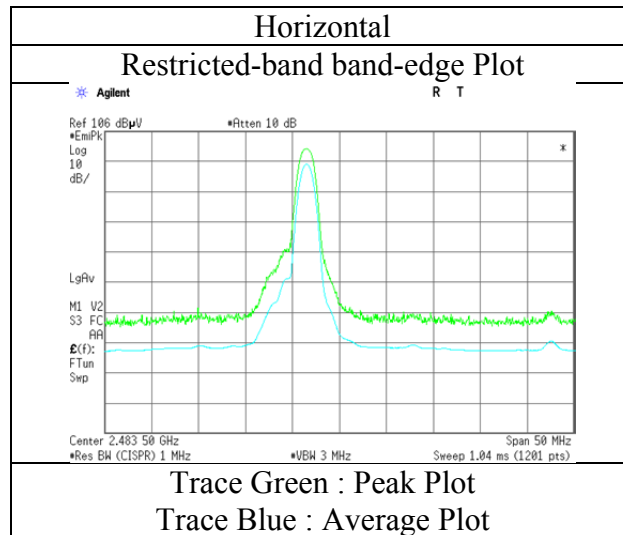
*The 10th harmonic was not seen so the result was its base noise level.

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

NS: No signal detected.

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10790682H
Date	July 24, 2015
Temperature / Humidity	22 deg. C / 69 % RH
Engineer	Takafumi Noguchi
	(1-26.5GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

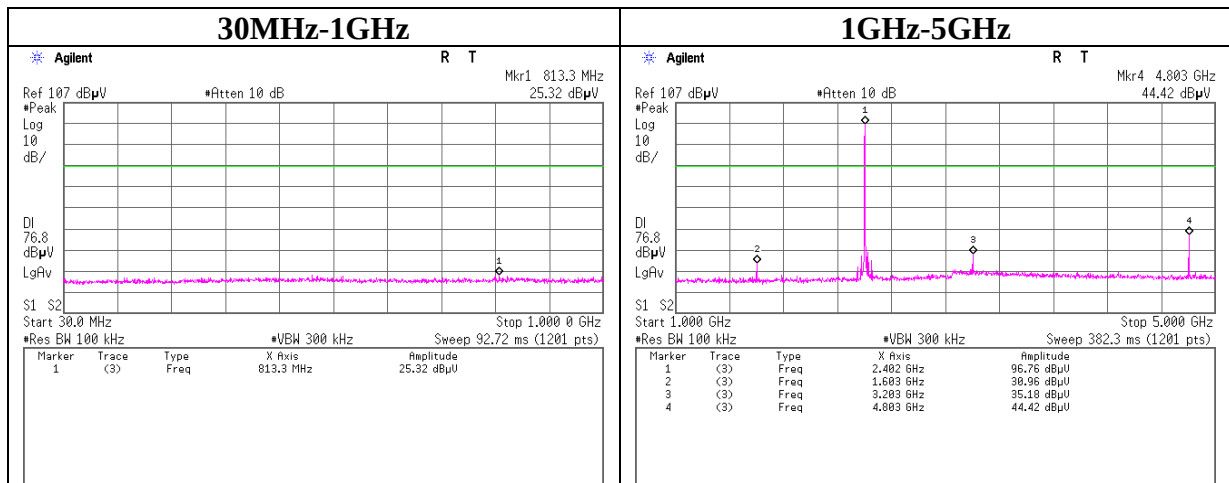
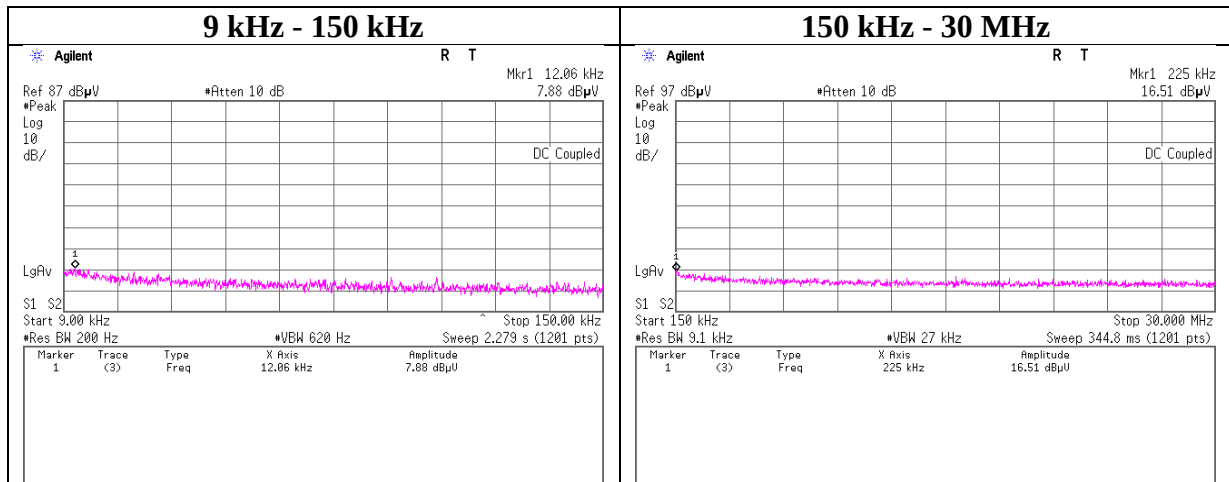


* Final result of restricted band edge was shown in tabular data.

Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

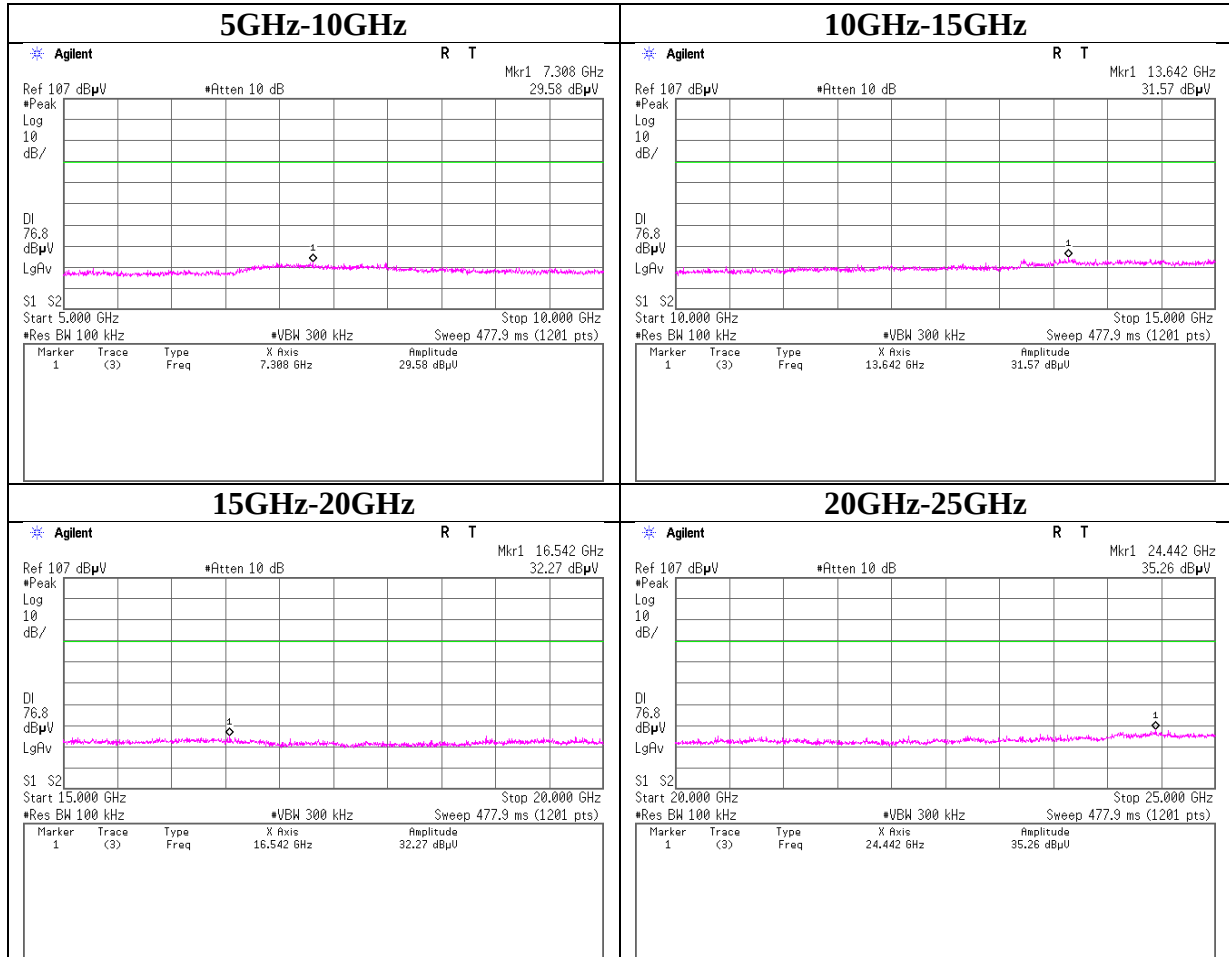
Tx DH5 2402 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

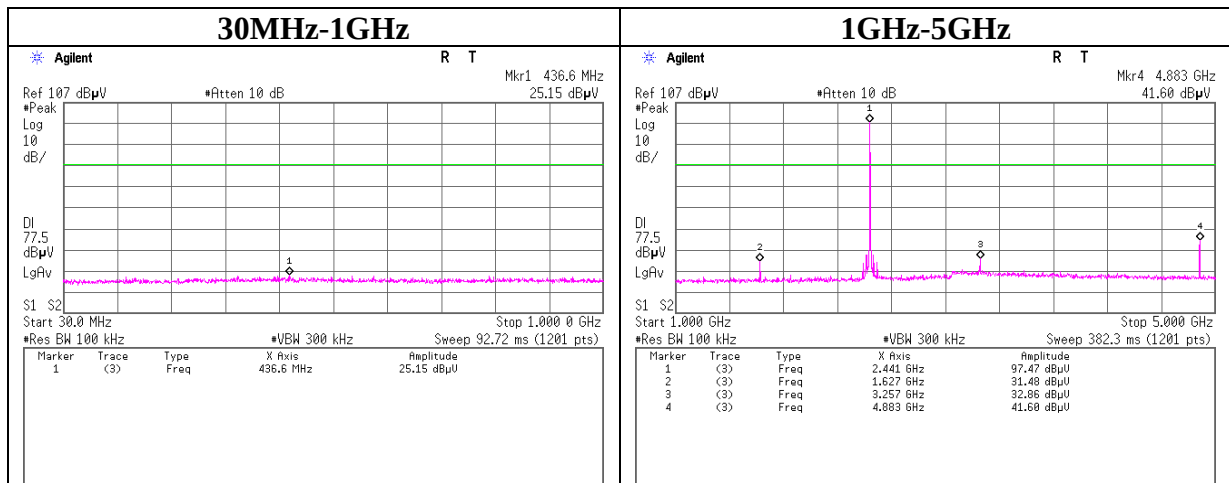
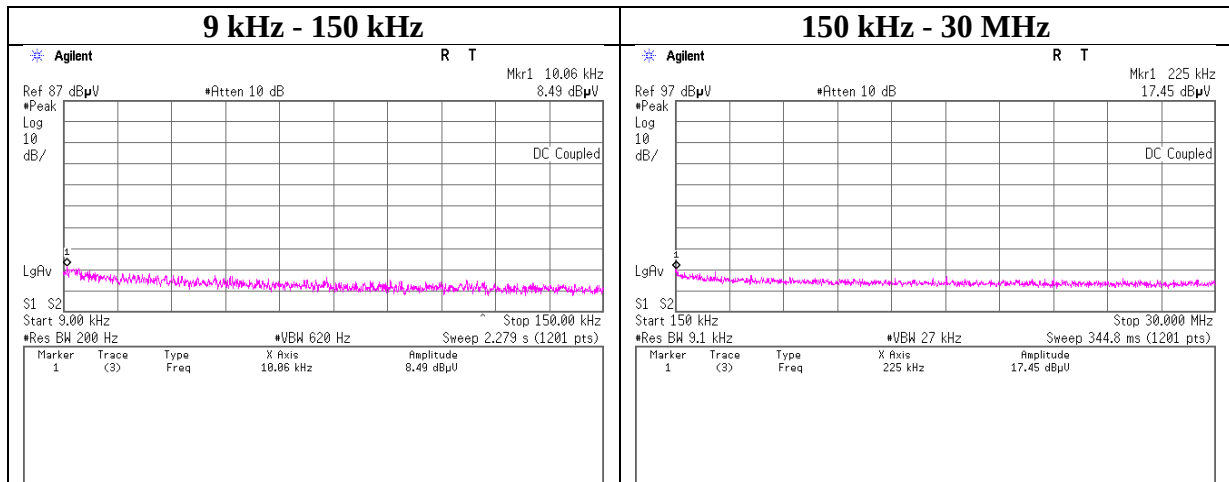
Tx DH5 2402MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10790682H
Date	July 23, 2015
Temperature / Humidity	23 deg. C / 75 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, DH5

Tx DH5 2441 MHz



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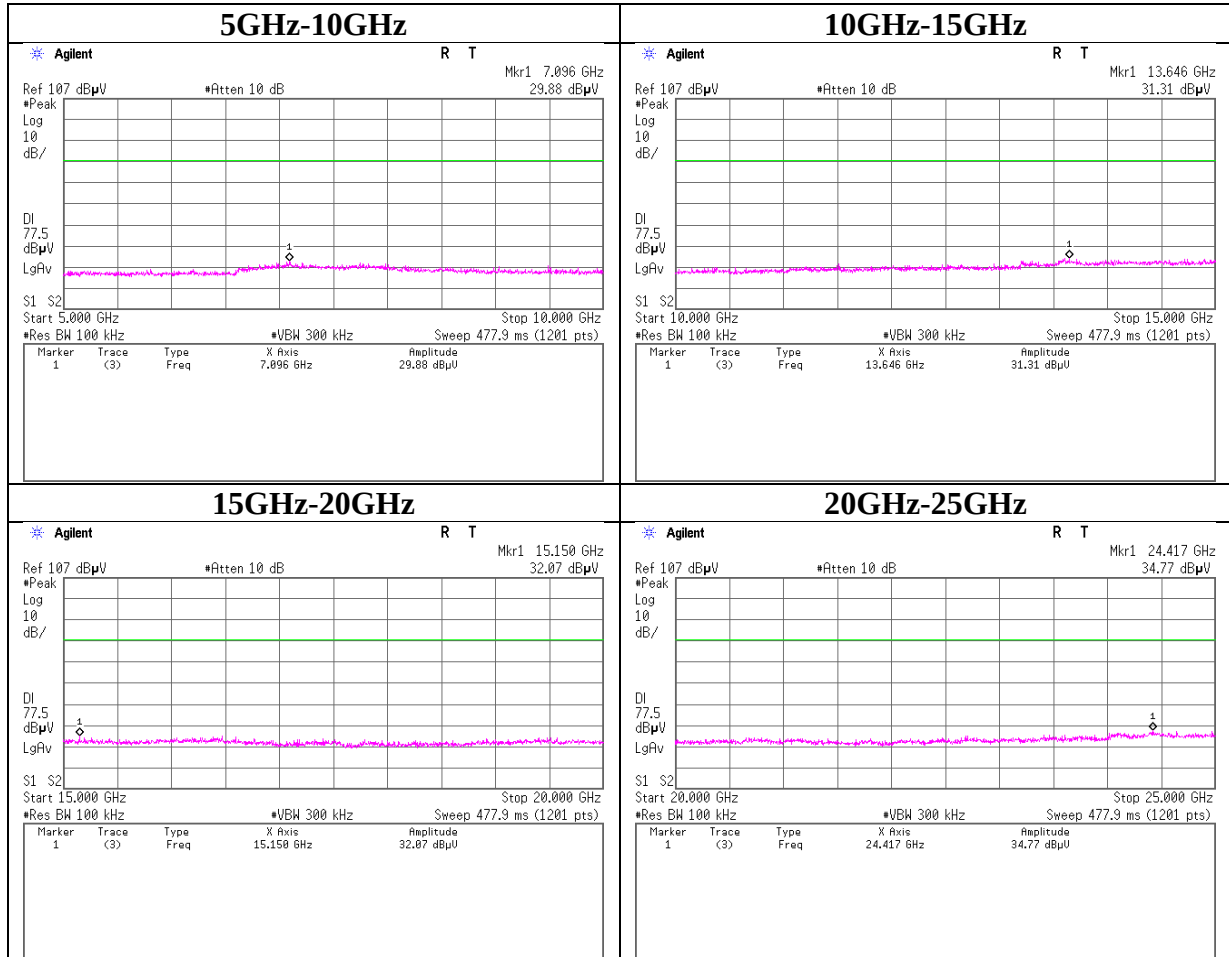
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

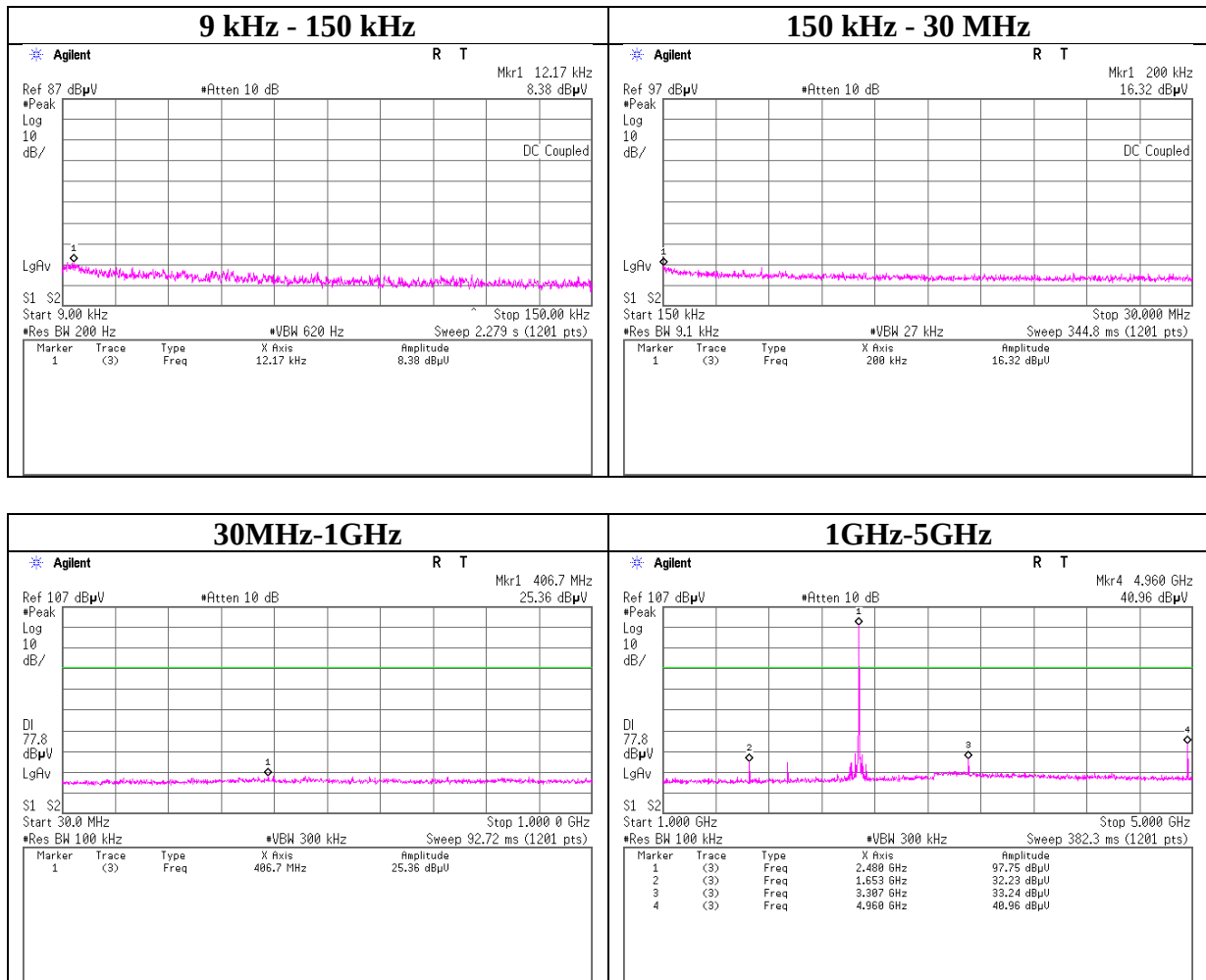
Tx DH5 2441MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

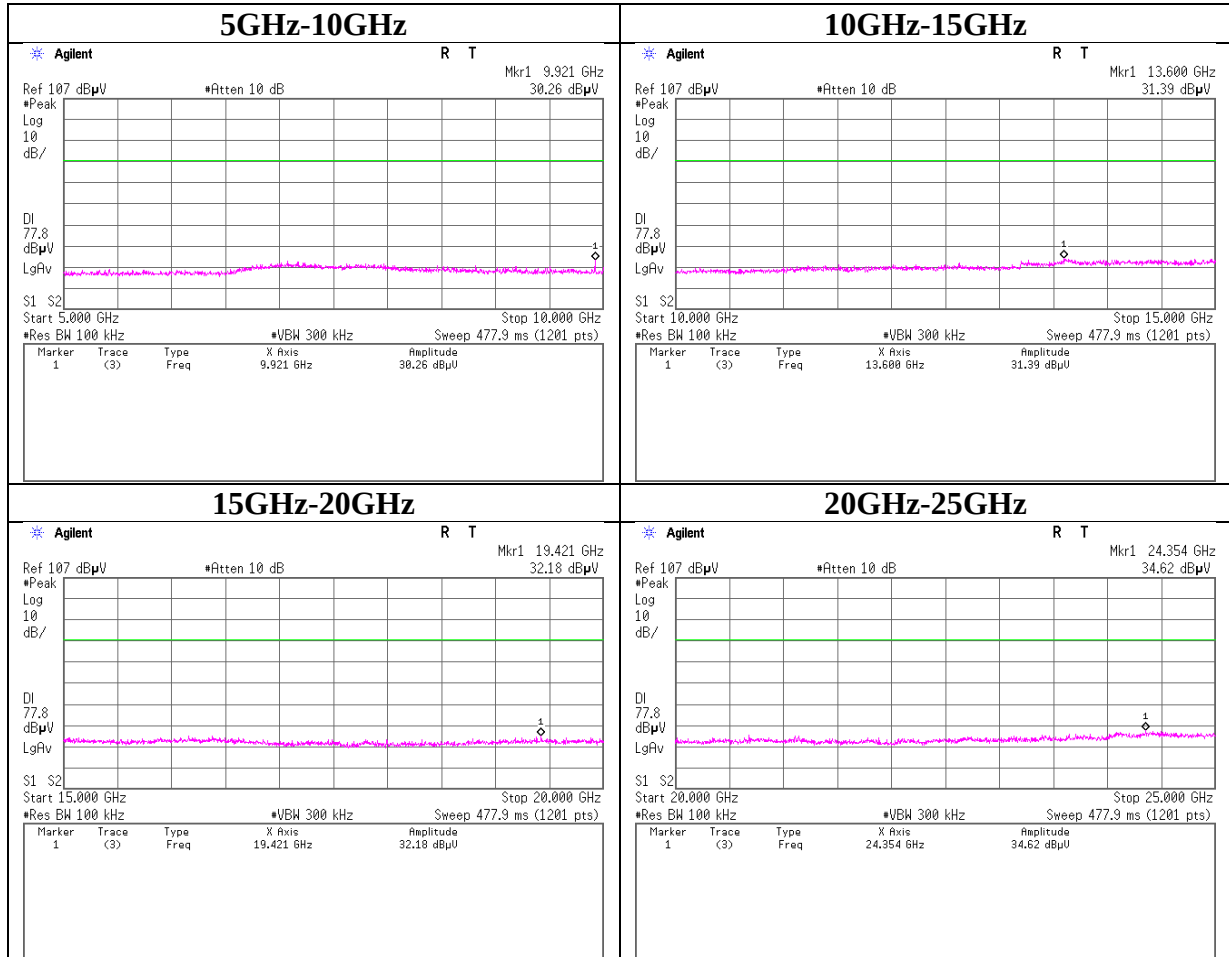
Tx DH5 2480 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

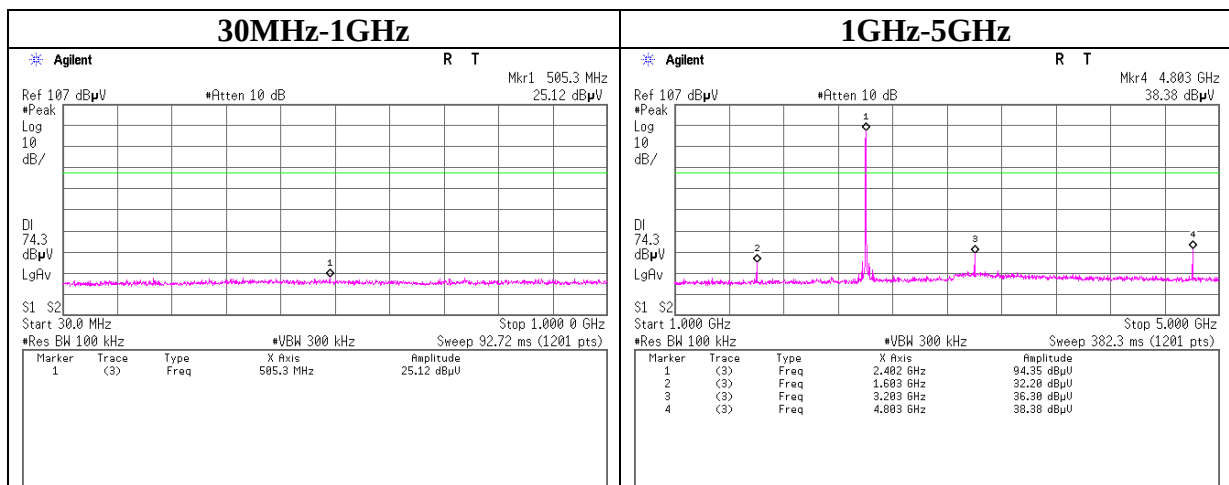
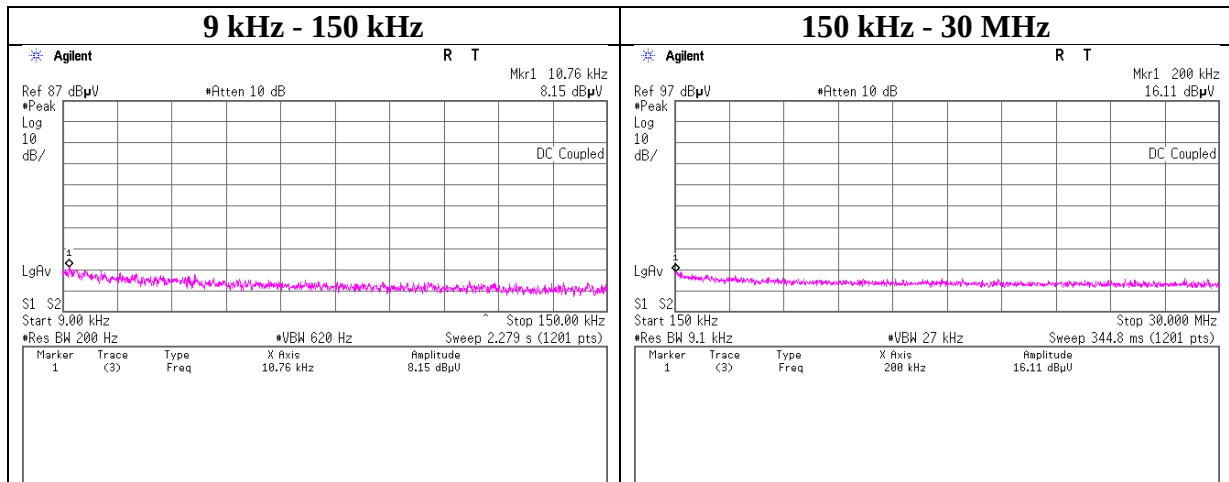
Tx DH5 2480MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.6 Measurement Room
Report No.	10790682H
Date	July 23, 2015
Temperature / Humidity	23 deg. C / 75 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, 3DH5

Tx 3DH5 2402MHz



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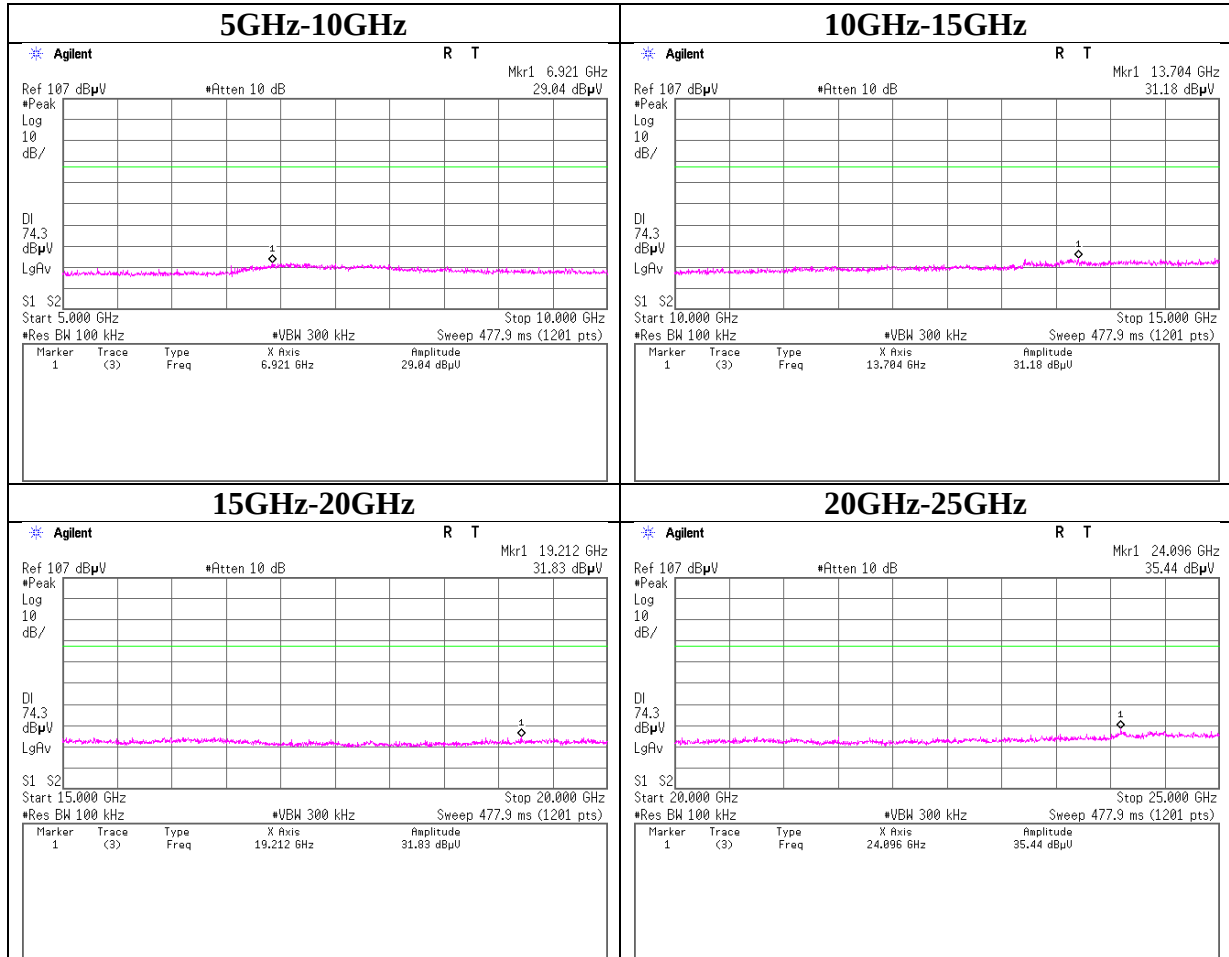
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

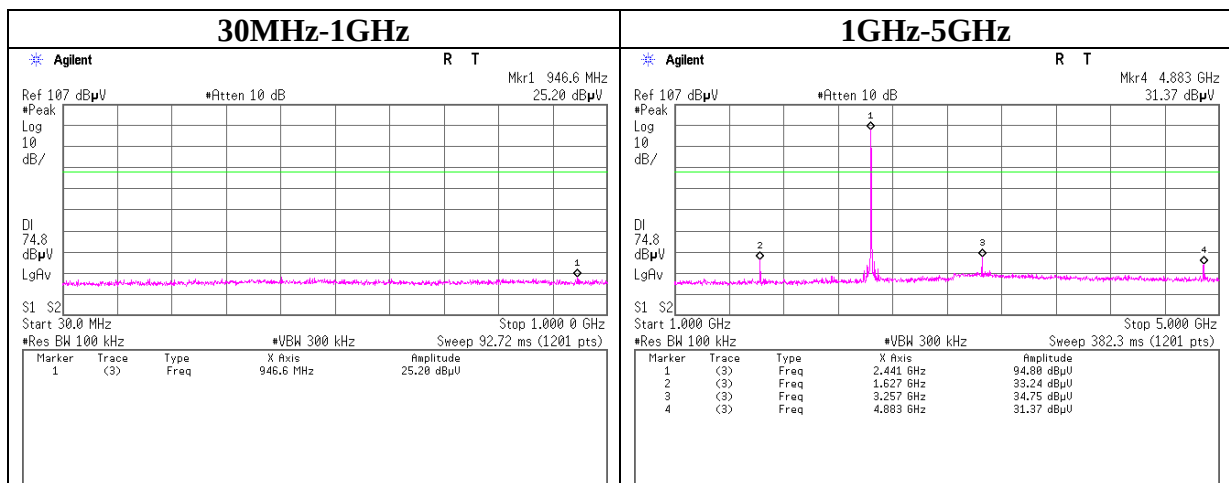
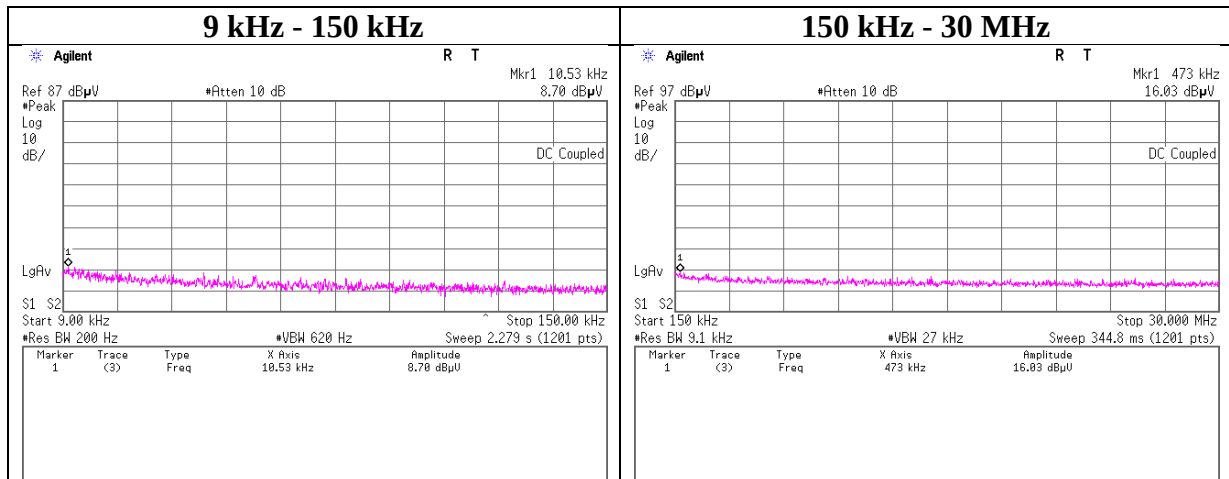
Tx 3DH5 2402MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

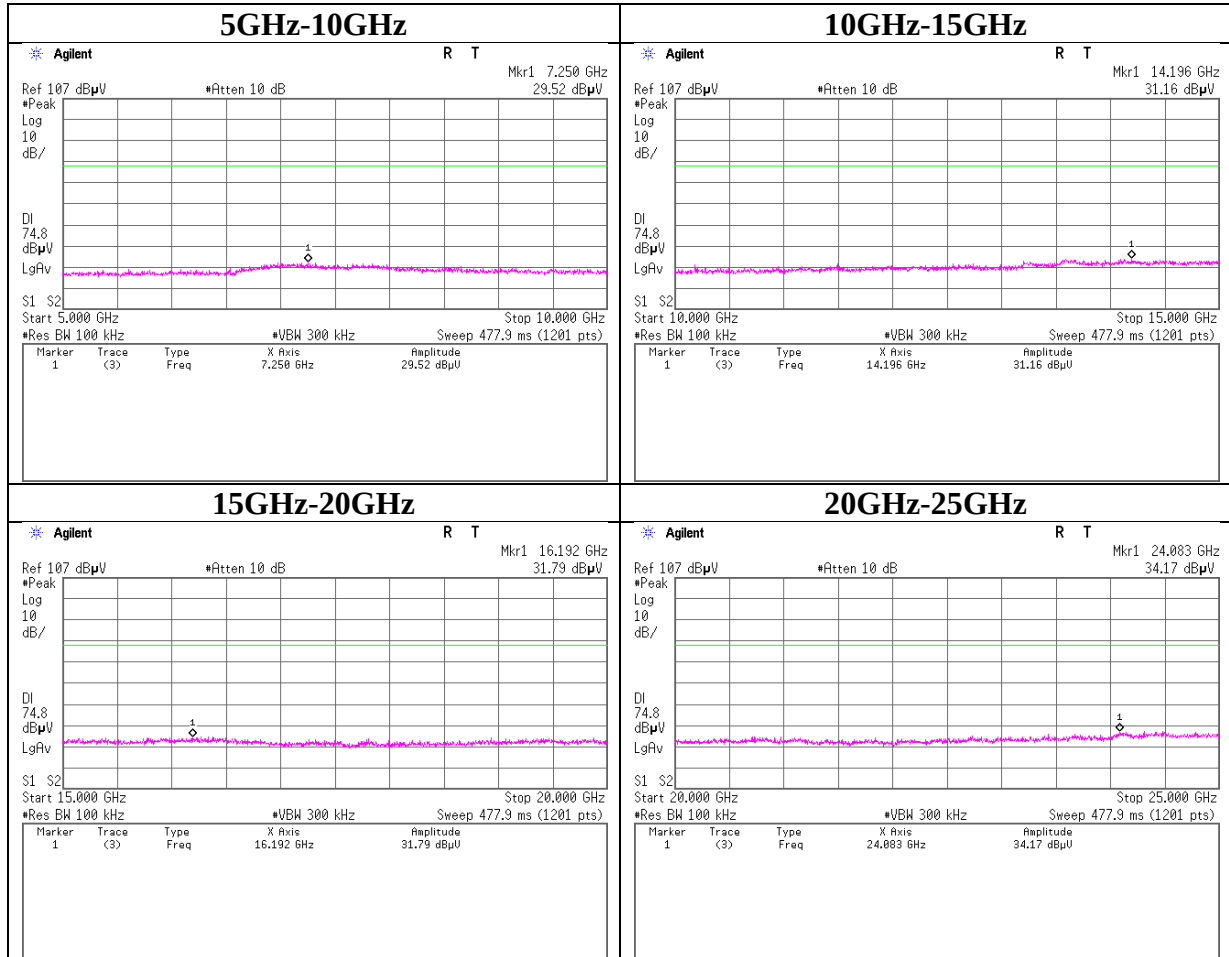
Tx 3DH5 2441MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

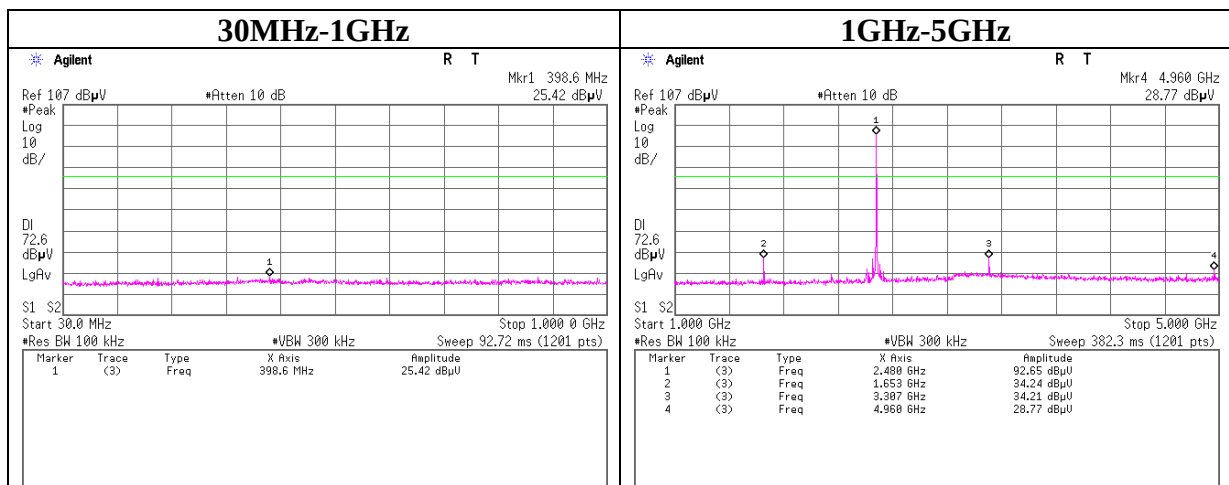
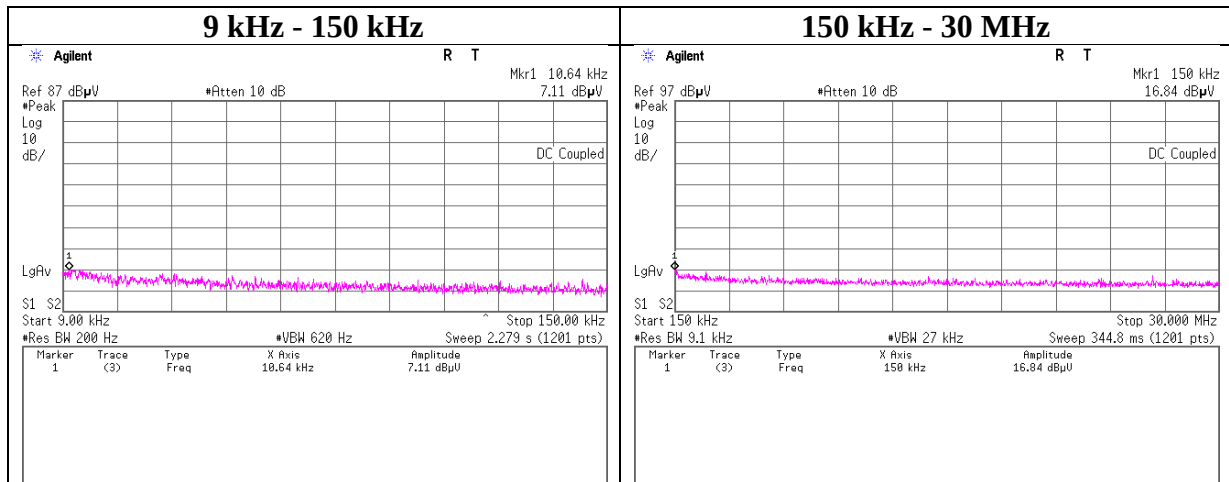
Tx 3DH5 2441MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

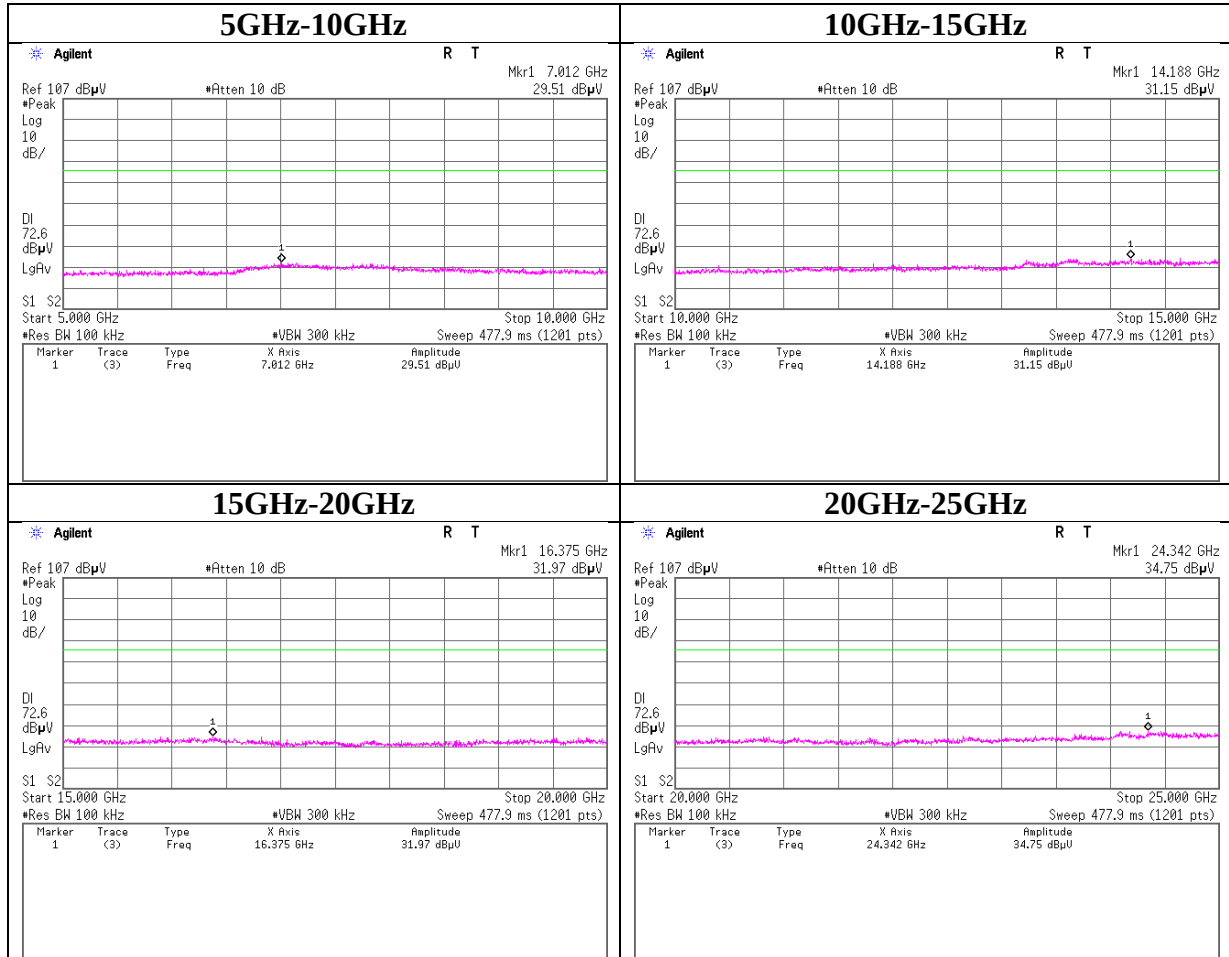
Tx 3DH5 2480MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

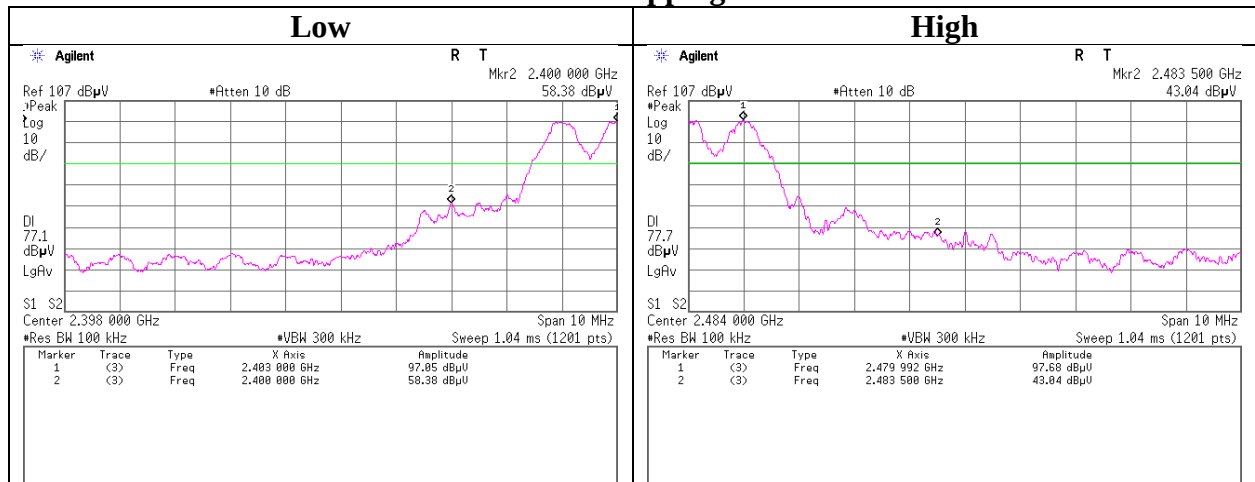
Tx 3DH5 2480MHz



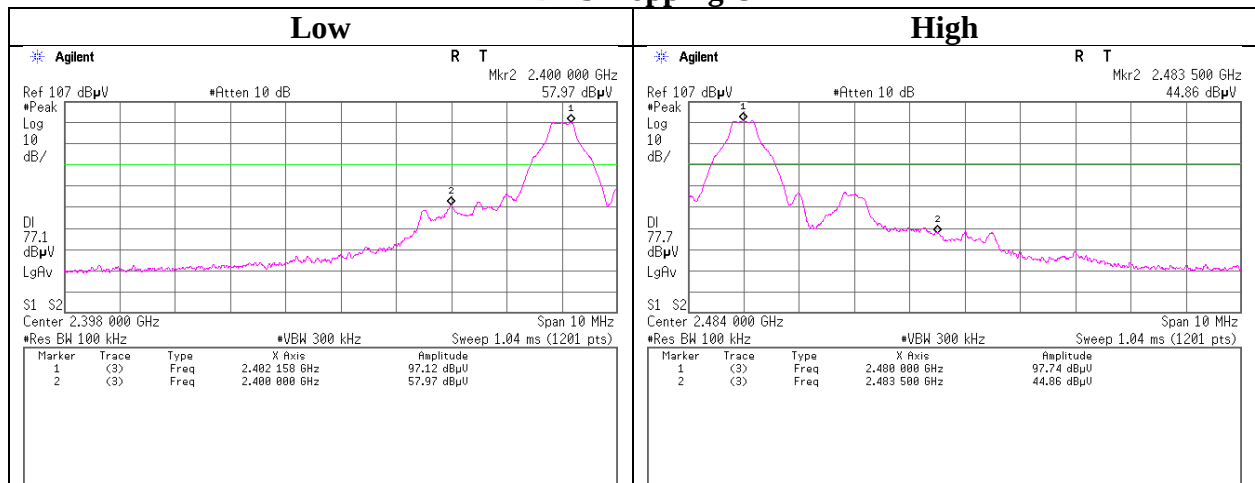
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx Hopping On/Off DH5

Tx DH5 Hopping On



Tx DH5 Hopping Off



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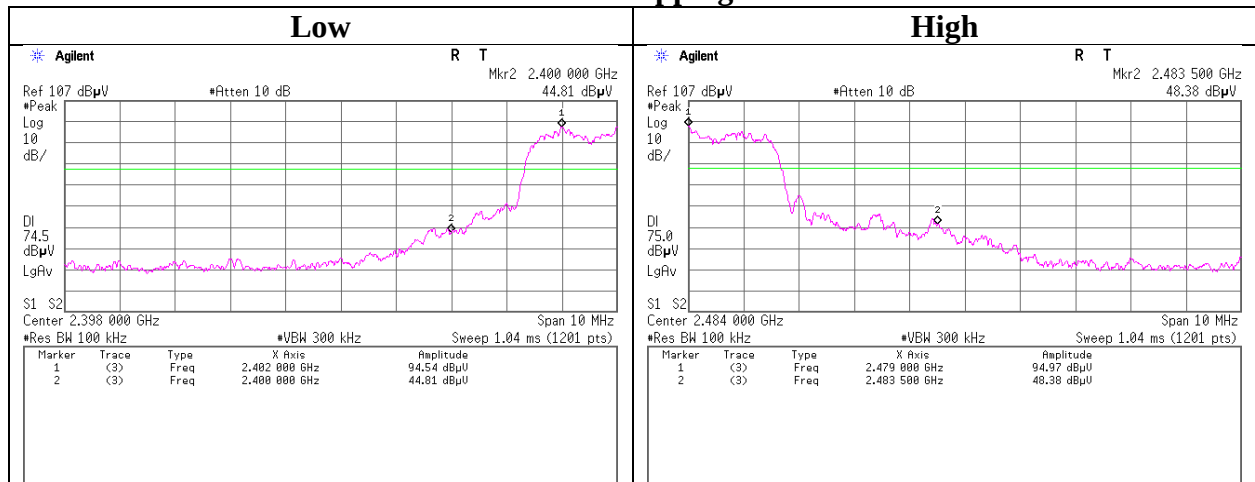
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

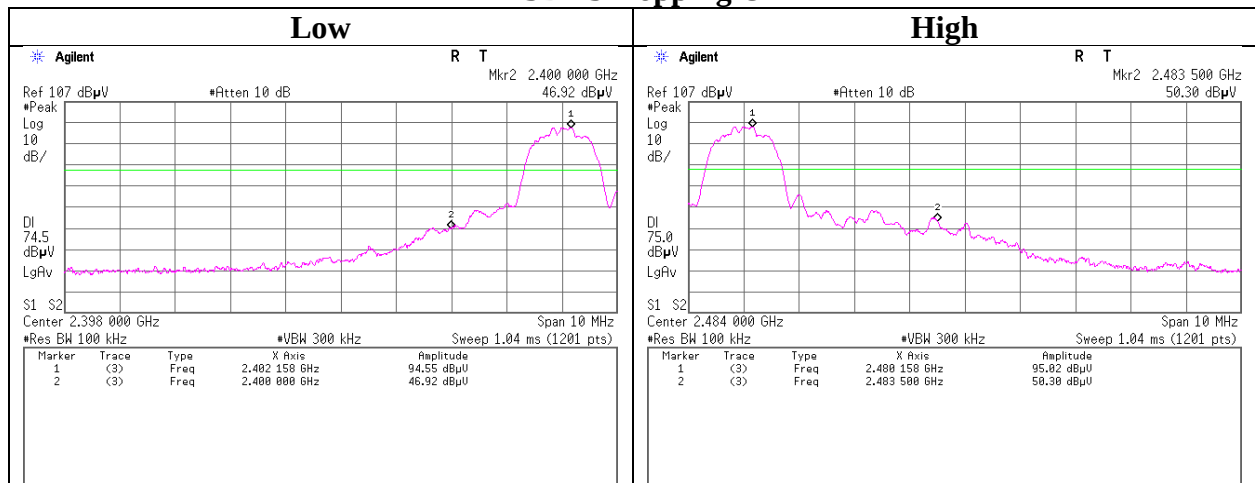
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.6 Measurement Room
Report No. : 10790682H
Date : July 23, 2015
Temperature / Humidity : 23 deg. C / 75 % RH
Engineer : Kazuya Yoshioka
Mode : Tx Hopping On/Off 3DH5

Tx 3DH5 Hopping On



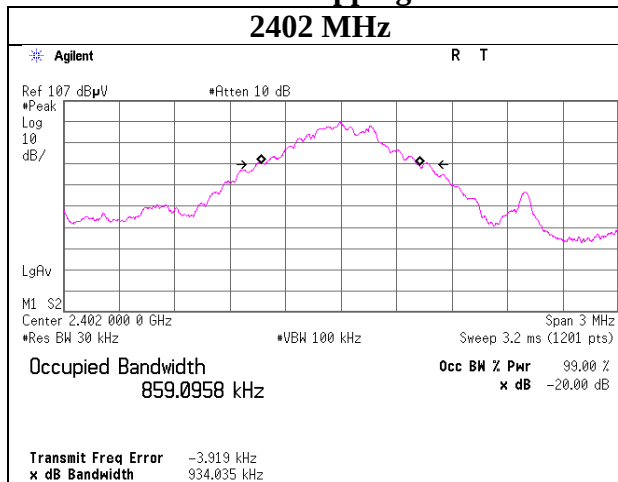
Tx 3DH5 Hopping Off



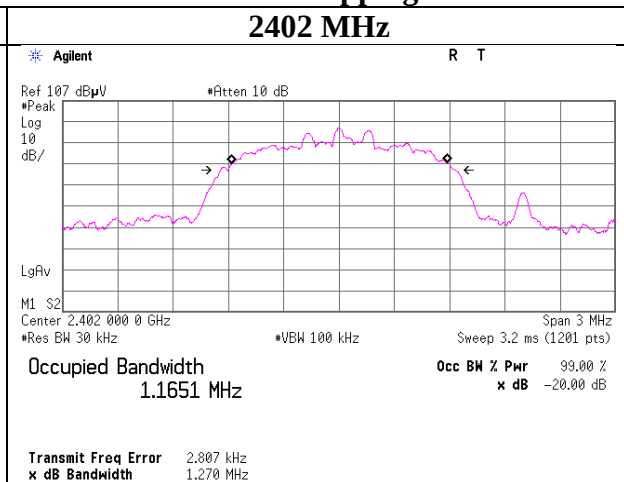
99%Occupied Bandwidth

Test place Ise EMC Lab. No.6 Measurement Room
Report No. 10790682H
Date July 23, 2015
Temperature / Humidity 23 deg. C / 75 % RH
Engineer Kazuya Yoshioka
Mode Tx Hopping Off

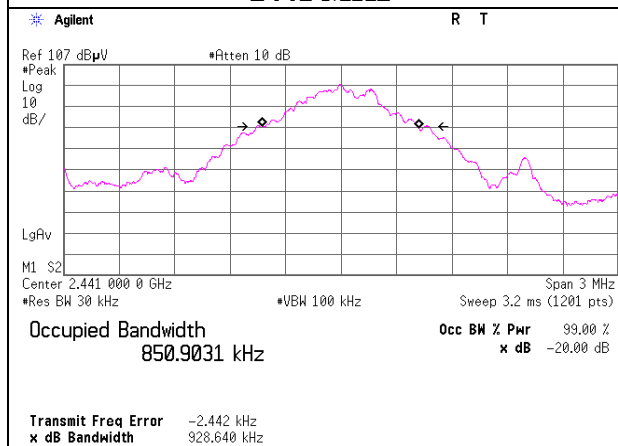
Tx DH5 Hopping Off



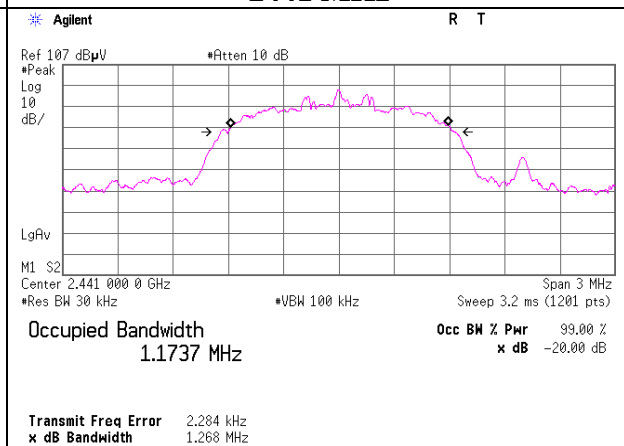
Tx 3DH5 Hopping Off



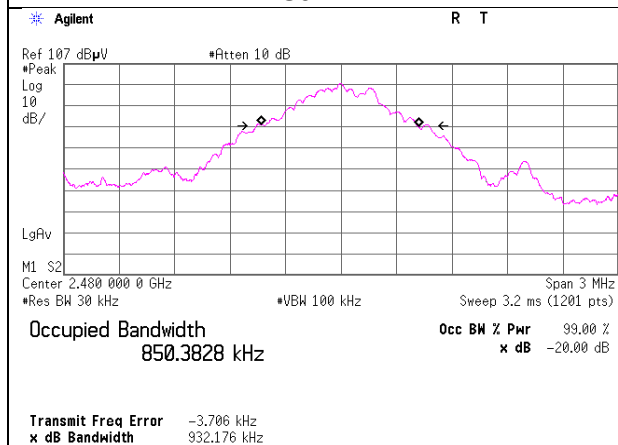
2441 MHz



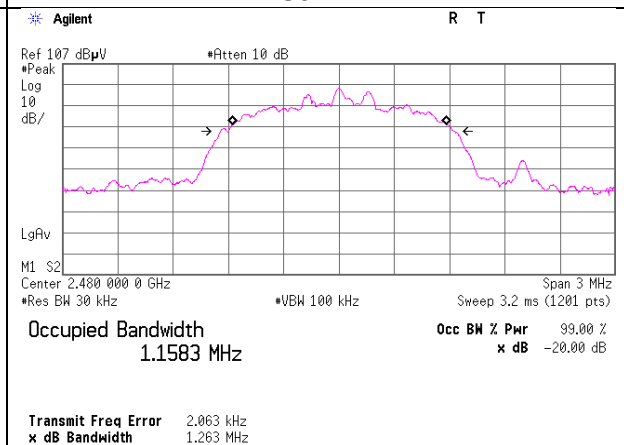
2441 MHz



2480 MHz



2480 MHz



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	AT	2015/01/13 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2014/10/06 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2014/10/06 * 12
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	AT	2015/02/16 * 12
MAT-58	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2015/01/09 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2014/10/02 * 12
MMM-12	DIGITAL HiTESTER	Hioki	3805	060500120	AT	2015/02/05 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2014/09/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE	2015/01/13 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2015/05/18 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2015/02/04 * 12
MCC-165	Microwave Cable	Junkosha	MWX221	1203S213(1m) / 1311S166(5m)	RE	2014/11/11 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2015/02/26 * 12
MHA-01	Horn Antenna 18-26.5GHz	EMCO	3160-09	1266	RE	2015/06/06 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/19 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-14	Spectrum Analyzer	Agilent	E4440A	MY48250080	RE	2014/10/17 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2014/08/19 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2014/10/18 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2014/10/18 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2015/07/13 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2015/04/08 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2015/03/10 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE	2015/08/19 * 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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