



RADIO TEST REPORT

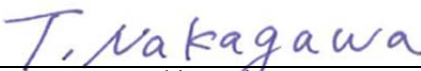
Test Report No. : 11791362H-A

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Audio
Model No. : FT0117A
FCC ID : BABFT0117A
Test regulation : FCC Part 15 Subpart C: 2017
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This 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: May 29 to June 1, 2017

Representative test engineer:


Tomohisa Nakagawa
Engineer
Consumer Technology Division

Approved by:


Tsubasa Takayama
Engineer
Consumer Technology Division



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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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	:	DAISUKE FUKII

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

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio
Model No.	:	FT0117A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	May 26, 2017
Country of Mass-production	:	Thailand / Spain
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

Model: FT0117A (referred to as the EUT in this report) is a Car Audio.

General Specification

Clock frequency(ies) in the system	:	216 MHz
Operating Temperature	:	-20 deg. C - +65 deg. C

Radio Specification

[Bluetooth Ver4.1 + EDR (without Bluetooth Low Energy)]

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS, GFSK, $\pi/4$ DQPSK, 8 DPSK
Power Supply (radio part input)	:	DC 3.3 V
Antenna type	:	Inverted F PCB Antenna
Antenna Gain	:	-2.45 dBi Peak

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 14, 2017 and effective July 14, 2017

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 June 14, 2017, does not affect the test specification applied to the EUT.

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods 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-247 5.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (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-247 5.4 (b)		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-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	2.5 dB 12010.000 MHz, Vertical, AV	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 C63.10: 2013 is also referred.

FCC Part 15.31 (e)

This EUT provides stable voltage(DC 3.3 V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 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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Antenna terminal test	Uncertainty (+/-)
RF output power	1.2 dB
Antenna terminated conducted emission / power density / Burst power	2.9 dB
Occupied channel bandwidth	0.96 %
Frequency Readout	0.94 %

Polarity	Radiated emission (Below 1 GHz)			
	(3 m*)(+/-)		(10 m*)(+/-)	
	30 MHz to 200 MHz	200 MHz to 1000 MHz	30 MHz to 200 MHz	200 MHz to 1000 MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	5.2 dB	6.3 dB	5.0 dB	5.0 dB

Radiated emission (Above 1 GHz)				
(3 m*)(+/-)		(1 m*)(+/-)		(10 m*)(+/-)
1 GHz to 6 GHz	6 GHz to 18 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz	1 GHz to 18 GHz
5.2 dB	5.5 dB	5.5 dB	5.4 dB	5.5 dB

* Measurement distance

Radiated emission test

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

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

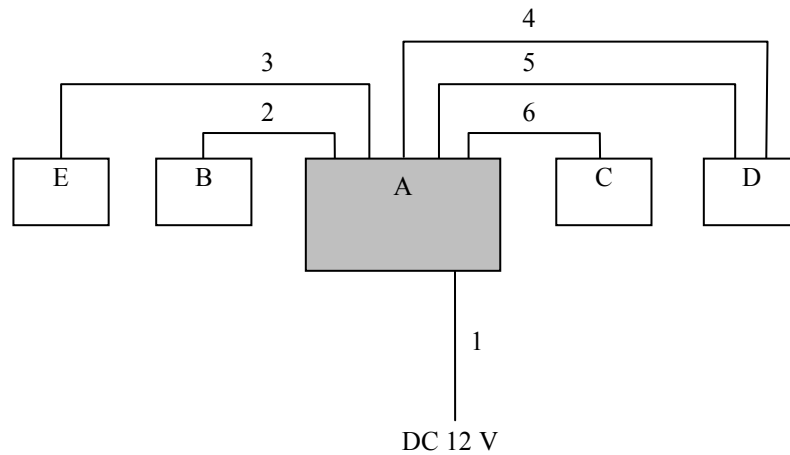
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
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: Ext.=255.Int=63 EDR: Ext.=255.Int=63 Software: Diag. mode(BT Certification mode) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

4.2 Configuration and peripherals



* Cabling and setup(s) 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	Remarks
A	Car Audio	FT0117A	BP300018 for RE* BP300036 for AT*	FUJITSU TEN LIMITED	EUT
B	Load (4 Ω)	-	-	-	-
C	Dummy Load (FM / AM Antenna)	-	-	-	-
D	iPod Touch	MC540J/A	C3RJ4SLADT75	Apple	-
E	Switch Jig	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.5 for RE* 1.0 for AT*	Unshielded	Unshielded	-
2	Speaker Cable	3.5	Unshielded	Unshielded	-
3	Signal Cable	3.5	Unshielded	Unshielded	-
4	Audio Cable	4.0	Unshielded	Unshielded	-
5	USB Cable	3.0	Unshielded	Unshielded	-
6	FM / AM Antenna Cable	0.2	Shielded	Shielded	-

*RE: Radiated Spurious Emission test

AT: Antenna Terminal Conducted tests

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SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

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

The height of the measuring antenna varied between 1 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 200 MHz	200 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	4.45 m*2) (1 GHz - 10 GHz), 1 m*3) (10 GHz - 26.5 GHz)		4.45 m*2) (1 GHz - 10 GHz), 1 m*3) (10 GHz - 26.5 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: $20 \times \log(4.45 \text{ m}/3.0 \text{ m}) = 3.43 \text{ dB}$

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

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 MHz - 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 *2)	-	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 *3)	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) 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 not detected as shown in the chart.

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

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

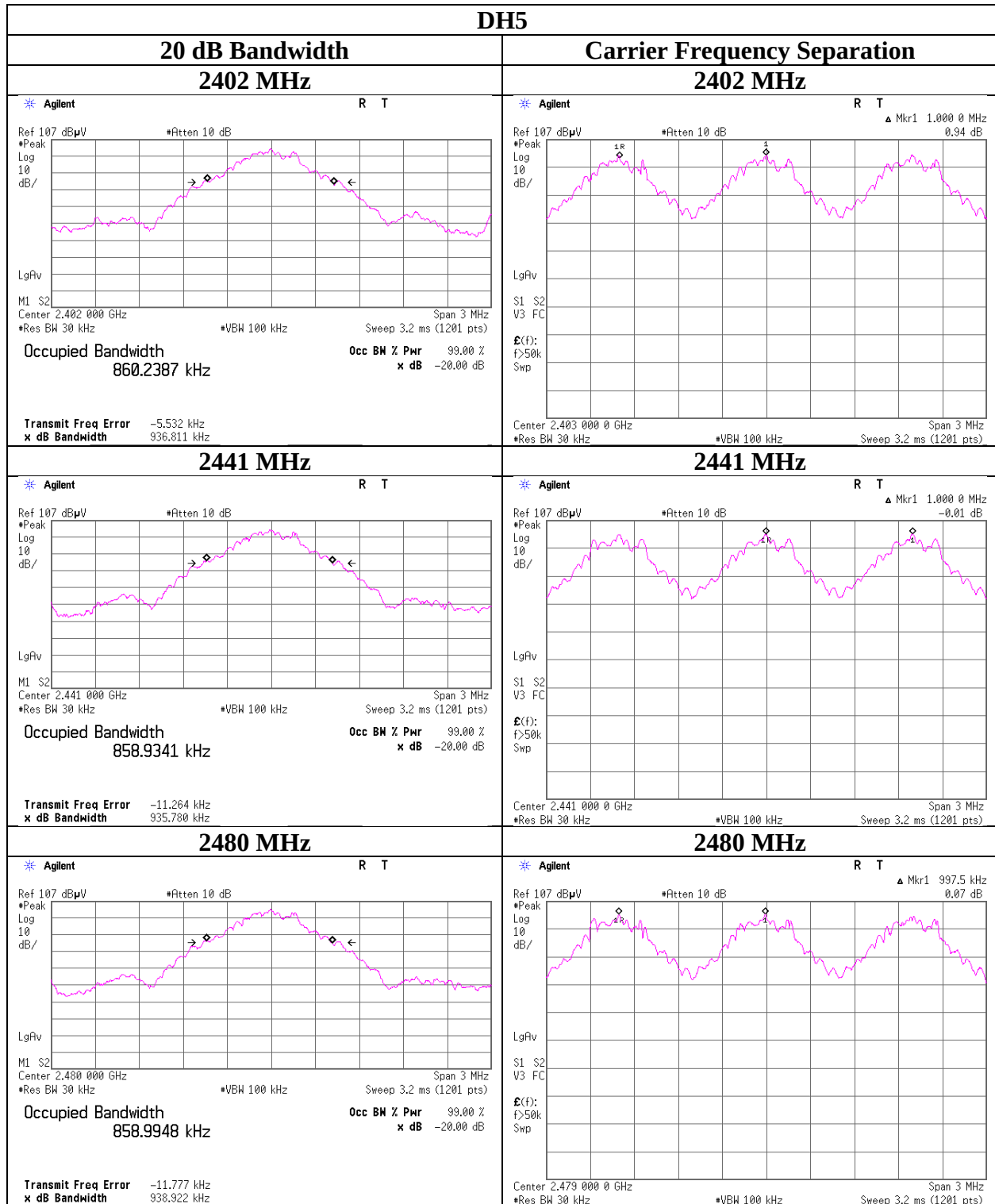
Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11791362H
Date June 1, 2017
Temperature / Humidity 24 deg. C / 57 % RH
Engineer Tomoki Matsui
Mode Tx, Hopping On and Off

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.937	1.000	≥ 0.625
DH5	2441.0	0.936	1.000	≥ 0.624
DH5	2480.0	0.939	0.998	≥ 0.626
3DH5	2402.0	1.269	1.000	≥ 0.846
3DH5	2441.0	1.268	1.000	≥ 0.845
3DH5	2480.0	1.288	0.988	≥ 0.859

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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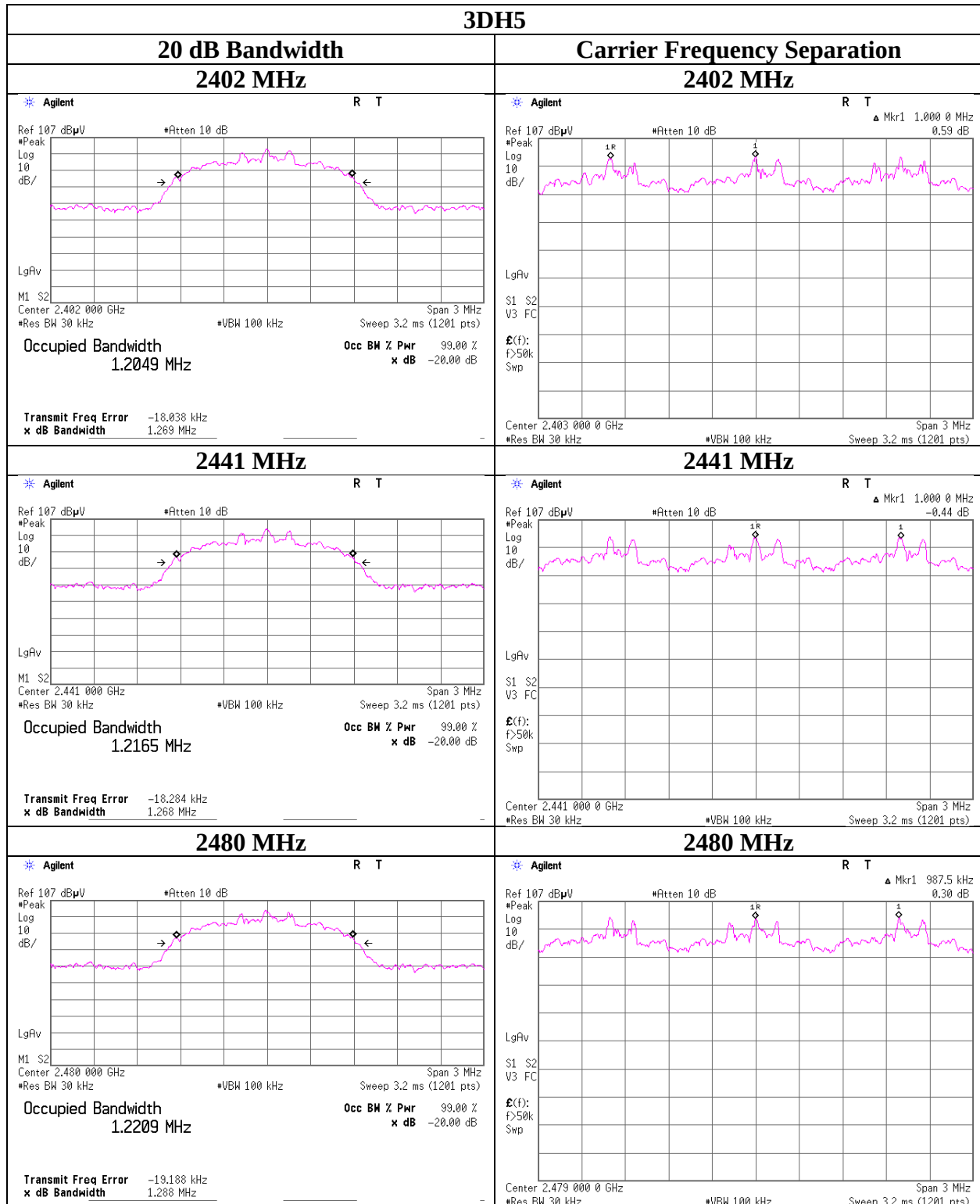
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20dB Bandwidth and Carrier Frequency Separation



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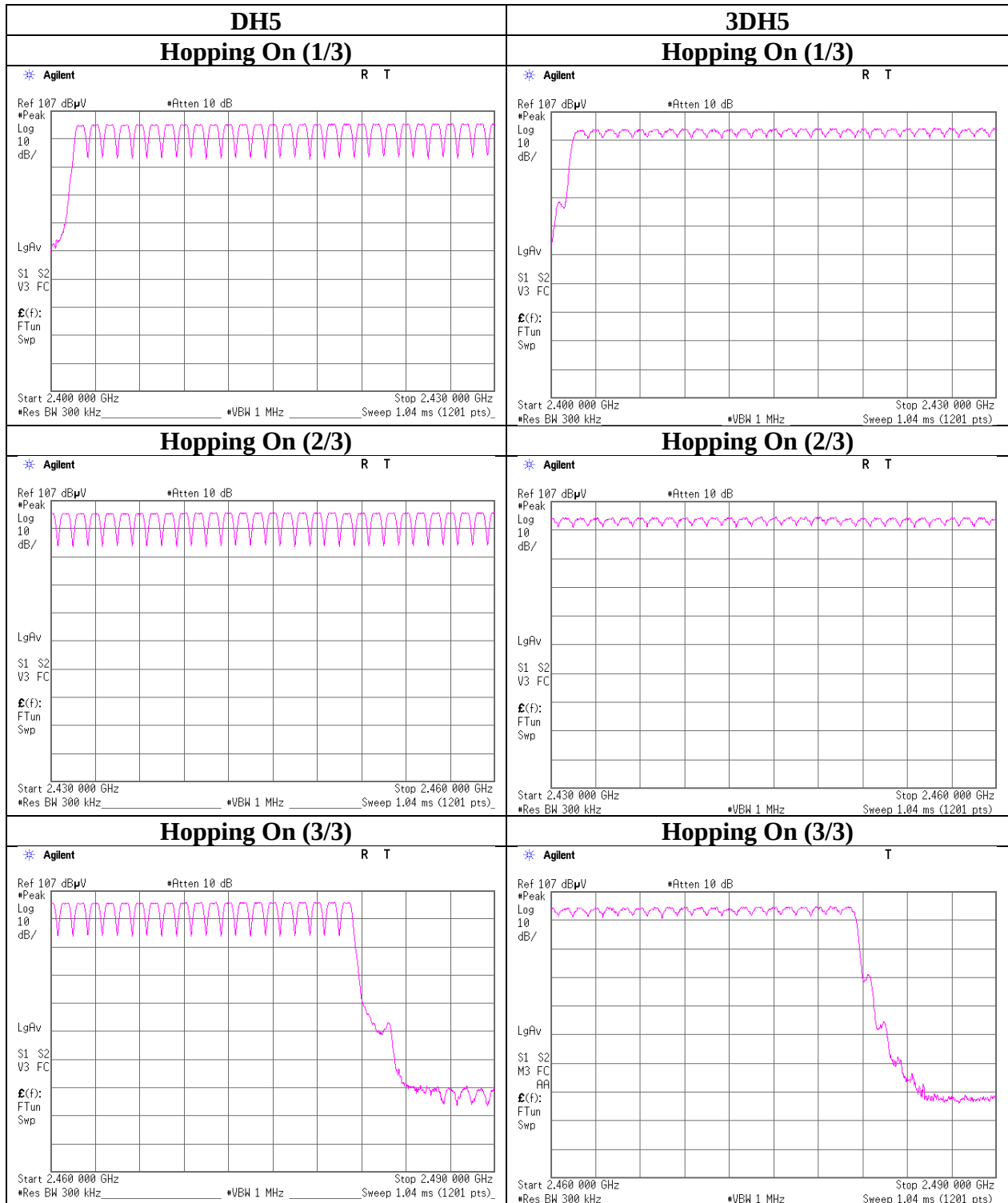
Number of Hopping Frequency

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11791362H
Date June 1, 2017
Temperature / Humidity 24 deg. C / 57 % RH
Engineer Tomoki Matsui
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.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping On

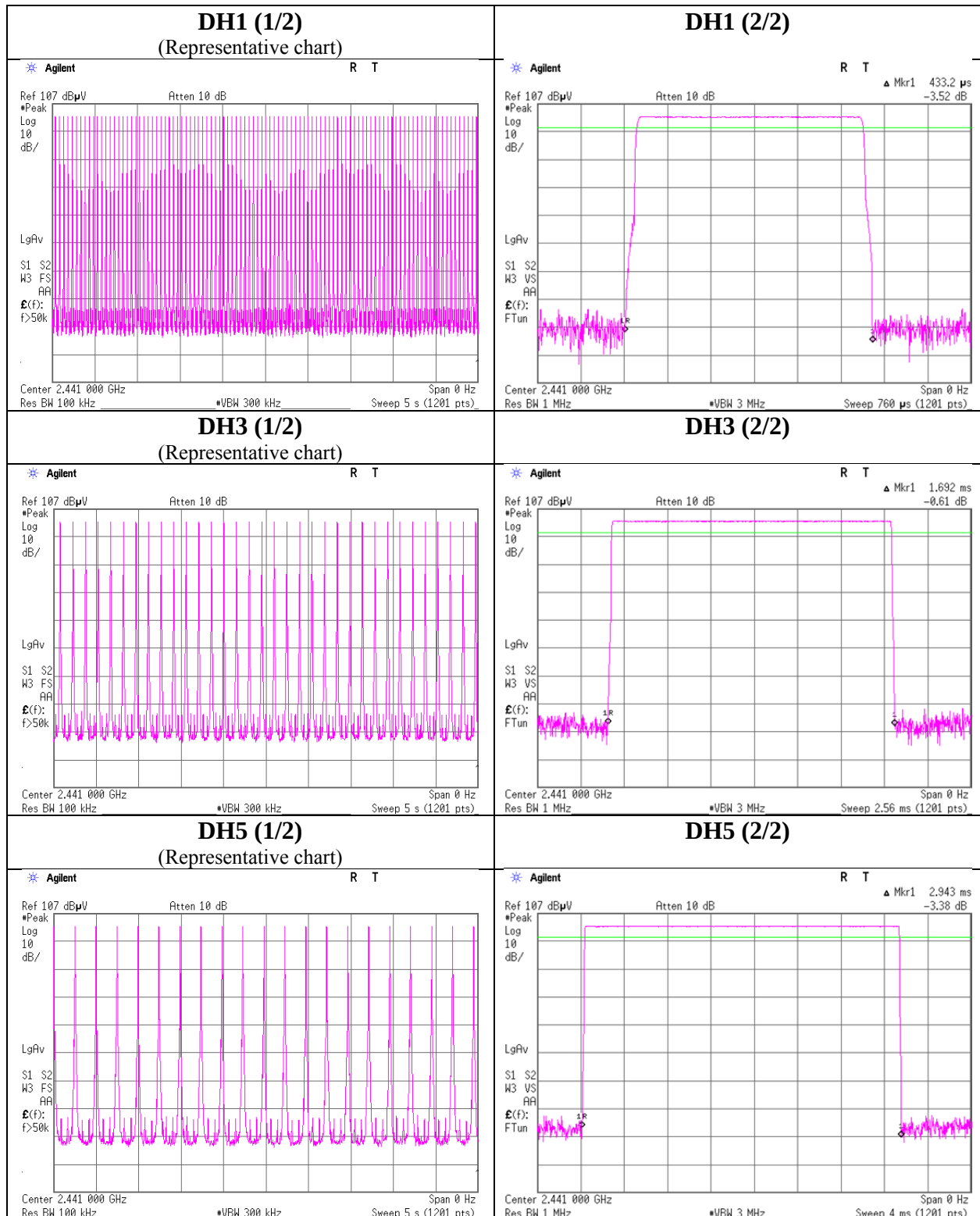
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	101.0 times / 5 sec. x 31.6 sec. = 639 times	0.433	277	400
DH3	34.0 times / 5 sec. x 31.6 sec. = 215 times	1.692	364	400
DH5	21.0 times / 5 sec. x 31.6 sec. = 133 times	2.943	391	400
3DH1	101.0 times / 5 sec. x 31.6 sec. = 639 times	0.449	287	400
3DH3	34.0 times / 5 sec. x 31.6 sec. = 215 times	1.702	366	400
3DH5	21.0 times / 5 sec. x 31.6 sec. = 133 times	2.953	393	400

Sample Calculation

Result = Number of transmission x Length of transmission

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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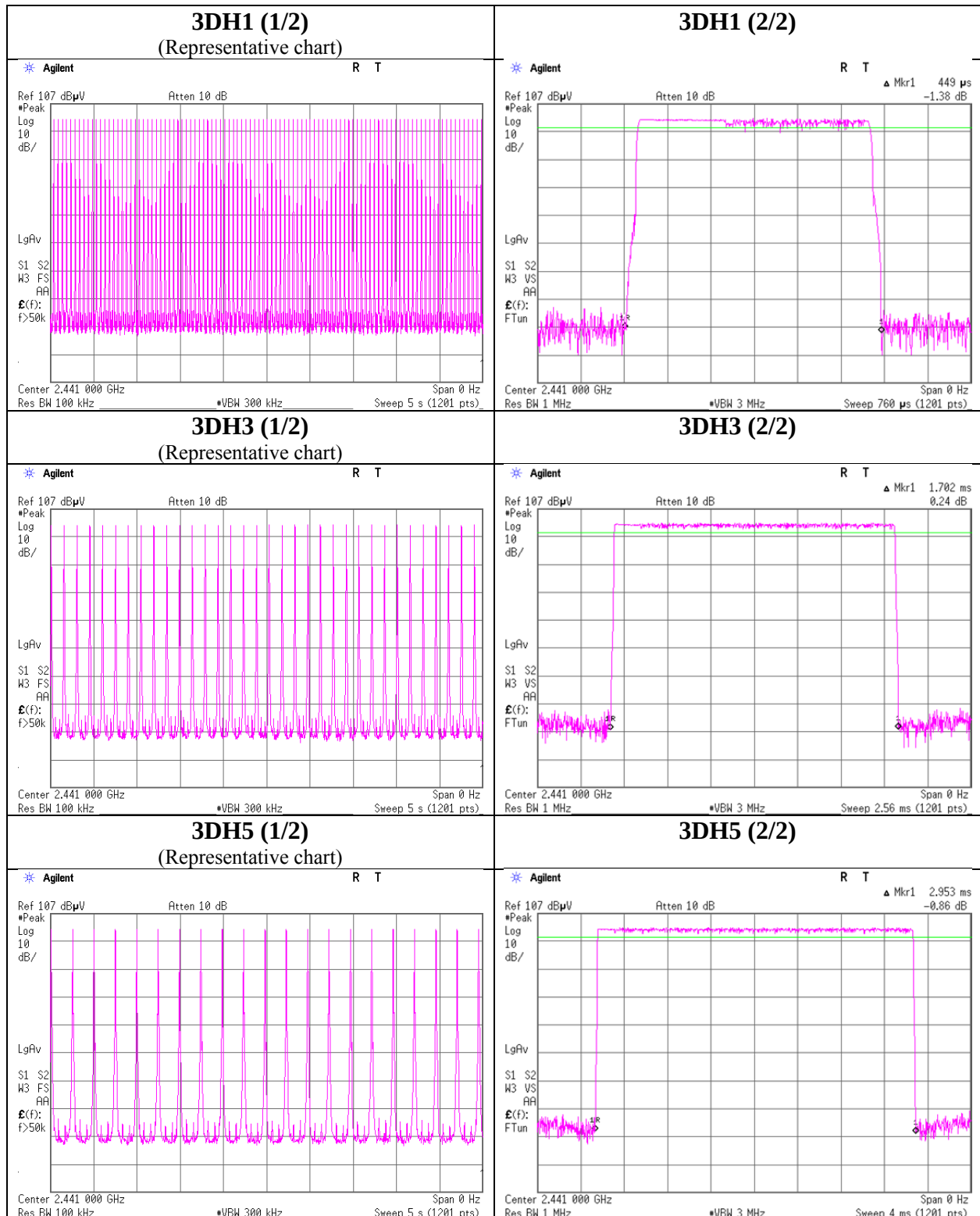
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Dwell time



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Maximum Peak Output Power

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
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	-4.62	1.40	10.05	6.83	4.82	20.96	125	14.13
DH5	2441.0	-3.92	1.40	10.05	7.53	5.67	20.96	125	13.43
DH5	2480.0	-3.62	1.41	10.05	7.84	6.09	20.96	125	13.12
2DH5	2402.0	-5.43	1.40	10.05	6.02	4.00	20.96	125	14.94
2DH5	2441.0	-4.56	1.40	10.05	6.89	4.89	20.96	125	14.07
2DH5	2480.0	-4.24	1.41	10.05	7.22	5.28	20.96	125	13.74
3DH5	2402.0	-5.32	1.40	10.05	6.13	4.10	20.96	125	14.83
3DH5	2441.0	-4.41	1.40	10.05	7.04	5.06	20.96	125	13.92
3DH5	2480.0	-4.11	1.41	10.05	7.35	5.44	20.96	125	13.61

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 for RF Exposure)

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-5.15	1.40	10.05	6.30	4.27	20.96	125	14.66
DH5	2441.0	-4.42	1.40	10.05	7.03	5.05	20.96	125	13.93
DH5	2480.0	-4.09	1.41	10.05	7.37	5.46	20.96	125	13.59
2DH5	2402.0	-7.33	1.40	10.05	4.12	2.58	20.96	125	16.84
2DH5	2441.0	-6.28	1.40	10.05	5.17	3.29	20.96	125	15.79
2DH5	2480.0	-5.98	1.41	10.05	5.48	3.53	20.96	125	15.48
3DH5	2402.0	-7.34	1.40	10.05	4.11	2.58	20.96	125	16.85
3DH5	2441.0	-6.28	1.40	10.05	5.17	3.29	20.96	125	15.79
3DH5	2480.0	-5.99	1.41	10.05	5.47	3.53	20.96	125	15.49

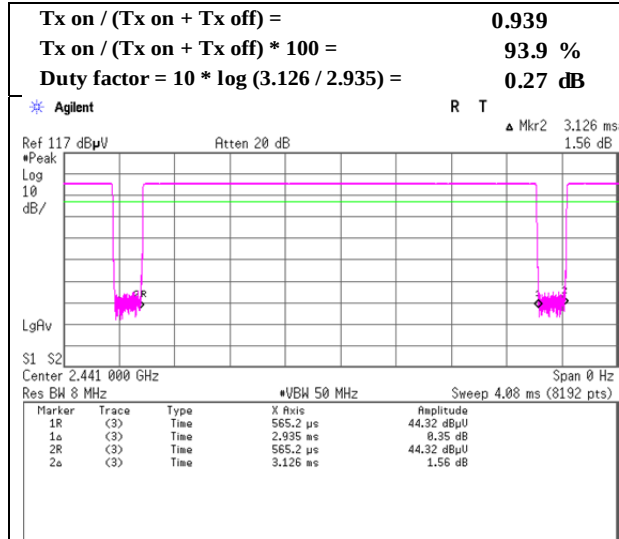
Sample Calculation:

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

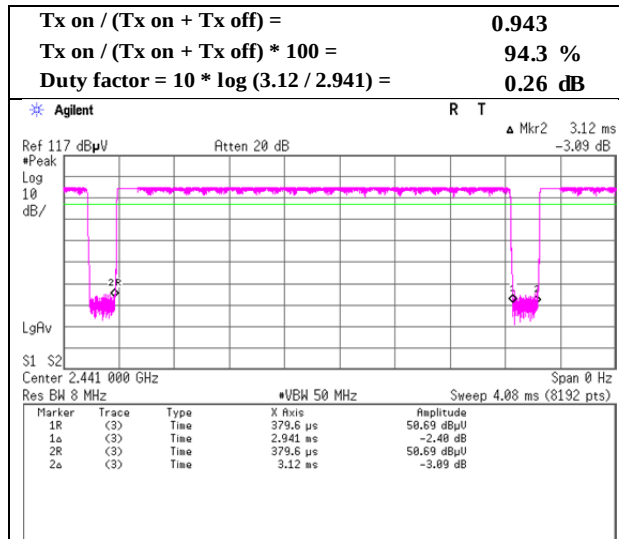
Burst Rate Confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off

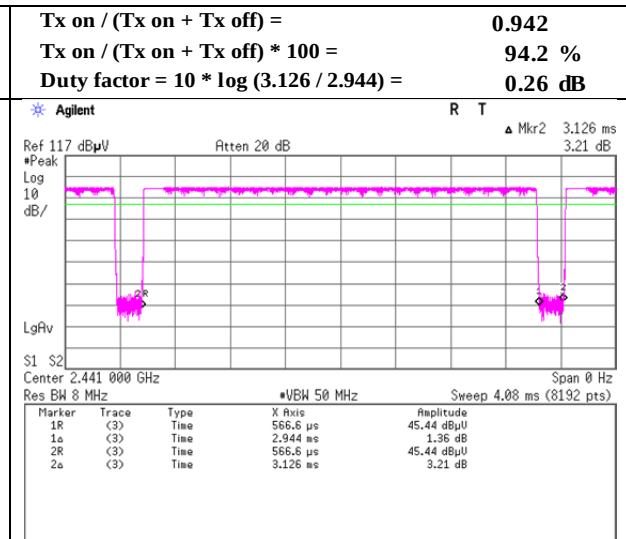
DH5



2DH5

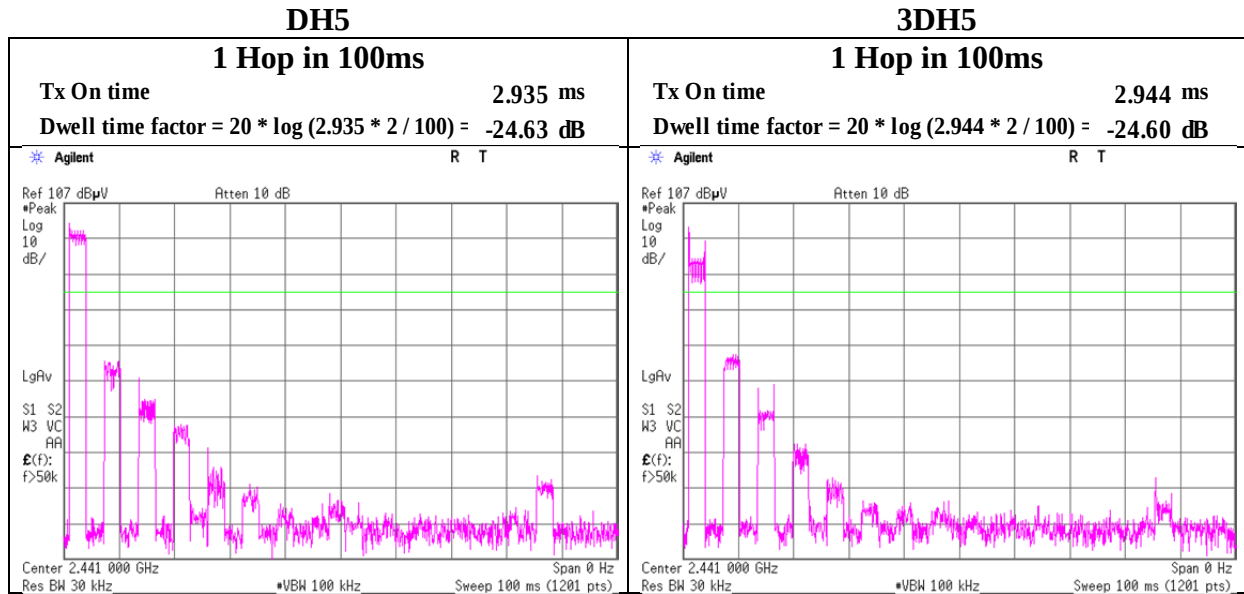


3DH5



Dwell time factor

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping On



A hopping channel might be occupied 2 times within 100 ms 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

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.000	QP	40.6	13.0	9.9	32.0	-	31.5	46.0	14.5	
Hori	395.904	QP	44.9	15.6	10.6	32.0	-	39.1	46.0	6.9	
Hori	504.010	QP	37.8	17.7	11.4	32.0	-	34.9	46.0	11.1	
Hori	792.010	QP	39.0	20.6	12.9	31.5	-	41.0	46.0	5.0	
Hori	864.004	QP	32.0	21.6	13.2	31.1	-	35.7	46.0	10.3	
Hori	936.002	QP	30.1	22.2	13.6	30.8	-	35.1	46.0	10.9	
Hori	2390.000	PK	41.4	27.4	3.3	32.1	-	40.0	73.9	33.9	
Hori	2558.070	PK	48.1	27.5	3.4	32.0	-	47.0	73.9	26.9	
Hori	4804.000	PK	41.0	30.8	5.9	31.2	-	46.5	73.9	27.4	
Hori	7206.000	PK	42.1	36.2	6.8	32.4	-	52.7	73.9	21.2	
Hori	9608.000	PK	41.2	38.4	7.8	32.7	-	54.7	73.9	19.2	Floor noise
Hori	12010.000	PK	52.1	39.7	-1.5	33.2	-	57.1	73.9	16.8	
Hori	2390.000	AV	28.4	27.4	3.3	32.1	-	27.0	53.9	26.9	
Hori	2558.070	AV	42.8	27.5	3.5	32.0	-	41.8	53.9	12.1	
Hori	4804.000	AV	30.6	30.8	5.9	31.2	-	36.1	53.9	17.8	
Hori	7206.000	AV	28.9	36.2	6.8	32.4	-	39.5	53.9	14.4	
Hori	9608.000	AV	27.8	38.4	7.8	32.7	-	41.3	53.9	12.6	Floor noise
Hori	12010.000	AV	42.0	39.7	-1.5	33.2	-	47.0	53.9	6.9	
Vert	288.000	QP	34.0	13.0	9.9	32.0	-	24.9	46.0	21.1	
Vert	395.904	QP	38.1	15.6	10.6	32.0	-	32.3	46.0	13.7	
Vert	504.010	QP	37.6	17.7	11.4	32.0	-	34.7	46.0	11.3	
Vert	792.010	QP	35.8	20.6	12.9	31.5	-	37.8	46.0	8.2	
Vert	864.004	QP	31.6	21.6	13.2	31.1	-	35.3	46.0	10.7	
Vert	936.002	QP	32.8	22.2	13.6	30.8	-	37.8	46.0	8.2	
Vert	2390.000	PK	41.8	27.4	3.3	32.1	-	40.4	73.9	33.5	
Vert	2558.070	PK	49.8	27.5	3.4	32.0	-	48.7	73.9	25.2	
Vert	4804.000	PK	43.9	30.8	5.9	31.2	-	49.4	73.9	24.5	
Vert	7206.000	PK	42.8	36.2	6.8	32.4	-	53.4	73.9	20.5	
Vert	9608.000	PK	42.7	38.4	7.8	32.7	-	56.2	73.9	17.7	Floor noise
Vert	12010.000	PK	56.7	39.7	-1.5	33.2	-	61.7	73.9	12.2	
Vert	2390.000	AV	29.9	27.4	3.3	32.1	-	28.5	53.9	25.4	
Vert	2558.070	AV	45.2	27.5	3.4	32.0	-	44.1	53.9	9.8	
Vert	4804.000	AV	36.4	30.8	5.9	31.2	-	41.9	53.9	12.0	
Vert	7206.000	AV	31.0	36.2	6.8	32.4	-	41.6	53.9	12.3	
Vert	9608.000	AV	27.7	38.4	7.8	32.7	-	41.2	53.9	12.7	Floor noise
Vert	12010.000	AV	46.4	39.7	-1.5	33.2	-	51.4	53.9	2.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log (4.45 m / 3.0 m) = 3.43 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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	99.8	27.4	3.3	32.1	98.4	-	-	Carrier
Hori	2399.158	PK	52.8	27.4	3.3	32.1	51.4	78.4	27.0	
Hori	2400.000	PK	55.8	27.4	3.3	32.1	54.4	78.4	24.0	
Vert	2402.000	PK	99.8	27.4	6.6	32.1	101.7	-	-	Carrier
Vert	2399.158	PK	51.7	27.4	3.3	32.1	50.3	81.7	31.4	
Vert	2400.000	PK	54.7	27.4	3.3	32.1	53.3	81.7	28.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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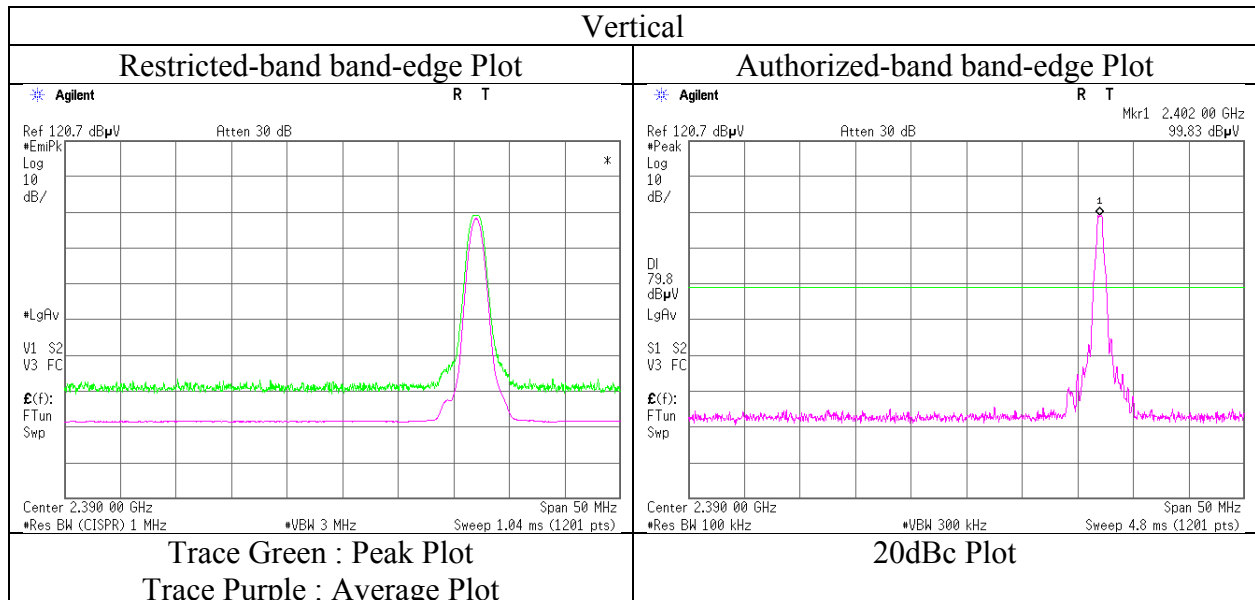
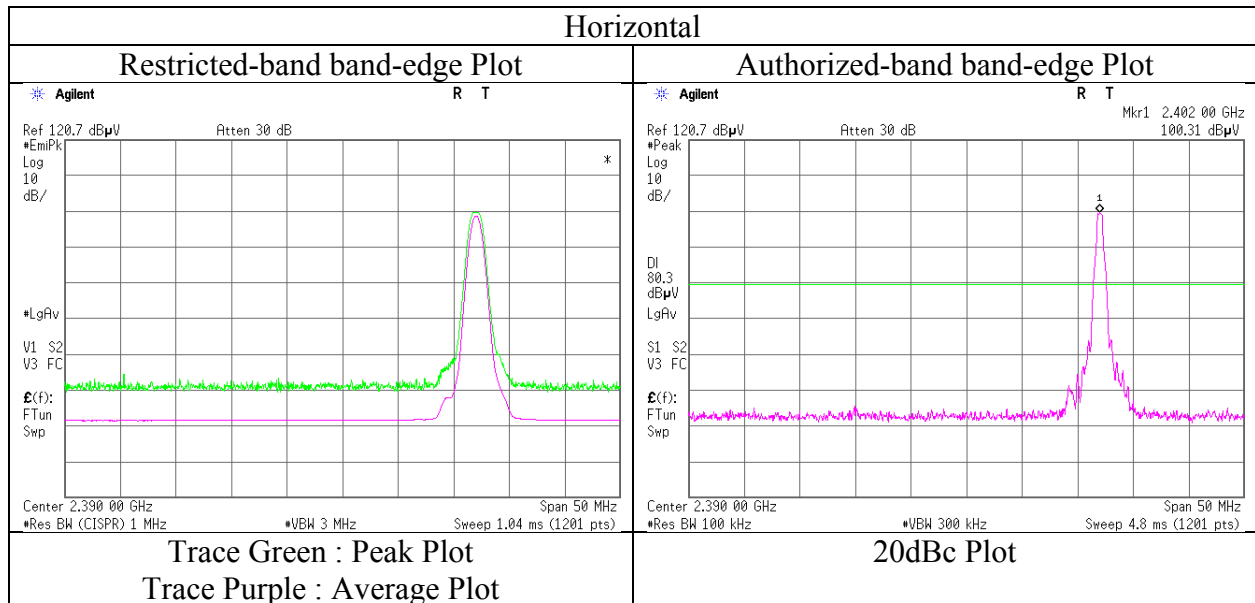
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Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11791362H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	May 29, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Tomohisa Nakagawa
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

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Radiated Spurious Emission

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.000	QP	40.8	13.0	9.9	32.0	-	31.7	46.0	14.3	
Hori	395.884	QP	44.9	15.6	10.6	32.0	-	39.1	46.0	6.9	
Hori	504.010	QP	37.5	17.7	11.4	32.0	-	34.6	46.0	11.4	
Hori	791.992	QP	38.2	20.6	12.9	31.5	-	40.2	46.0	5.8	
Hori	863.992	QP	32.0	21.6	13.2	31.1	-	35.7	46.0	10.3	
Hori	936.012	QP	29.6	22.2	13.6	30.8	-	34.6	46.0	11.4	
Hori	2596.893	PK	47.4	27.6	3.5	32.0	-	46.5	73.9	27.4	
Hori	4882.000	PK	42.1	31.1	4.9	31.2	-	46.9	73.9	27.0	
Hori	7323.000	PK	42.1	36.4	6.1	32.5	-	52.1	73.9	21.8	
Hori	9764.000	PK	41.3	38.6	7.2	32.8	-	54.3	73.9	19.6	Floor noise
Hori	12205.000	PK	56.3	39.7	-1.4	33.2	-	61.4	73.9	12.5	
Hori	2596.893	AV	41.5	27.6	3.5	32.0	-	40.6	53.9	13.3	
Hori	4882.000	AV	34.2	31.1	4.9	31.2	-	39.0	53.9	14.9	
Hori	7323.000	AV	30.4	36.4	6.1	32.5	-	40.4	53.9	13.5	
Hori	9764.000	AV	29.2	38.6	7.2	32.8	-	42.2	53.9	11.7	Floor noise
Vert	288.000	QP	34.0	13.0	9.9	32.0	-	24.9	46.0	21.1	
Vert	395.884	QP	37.9	15.6	10.6	32.0	-	32.1	46.0	13.9	
Vert	504.010	QP	37.6	17.7	11.4	32.0	-	34.7	46.0	11.3	
Vert	791.992	QP	35.7	20.6	12.9	31.5	-	37.7	46.0	8.3	
Vert	863.992	QP	31.4	21.6	13.2	31.1	-	35.1	46.0	10.9	
Vert	936.012	QP	32.4	22.2	13.6	30.8	-	37.4	46.0	8.6	
Vert	2596.893	PK	47.7	27.6	3.5	32.0	-	46.8	73.9	27.1	
Vert	4882.000	PK	44.4	31.1	4.9	31.2	-	49.2	73.9	24.7	
Vert	7323.000	PK	42.0	36.4	6.1	32.5	-	52.0	73.9	21.9	
Vert	9764.000	PK	41.0	38.6	7.2	32.8	-	54.0	73.9	19.9	Floor noise
Vert	12205.000	PK	58.9	39.7	-1.4	33.2	-	64.0	73.9	9.9	
Vert	2596.893	AV	42.6	27.6	3.5	32.0	-	41.7	53.9	12.2	
Vert	4882.000	AV	38.2	31.1	4.9	31.2	-	43.0	53.9	10.9	
Vert	7323.000	AV	31.6	36.4	6.1	32.5	-	41.6	53.9	12.3	
Vert	9764.000	AV	28.9	38.6	7.2	32.8	-	41.9	53.9	12.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.43 \text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	12205.000	AV	46.7	39.7	-1.4	33.2	-24.6	27.2	53.9	26.7	*
Vert	12205.000	AV	49.3	39.7	-1.4	33.2	-24.6	29.8	53.9	24.1	*

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz))

- 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

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.000	QP	40.4	13.0	9.9	32.0	-	31.3	46.0	14.7	
Hori	395.884	QP	45.0	15.6	10.6	32.0	-	39.2	46.0	6.8	
Hori	504.002	QP	37.7	17.7	11.4	32.0	-	34.8	46.0	11.2	
Hori	791.994	QP	38.2	20.6	12.9	31.5	-	40.2	46.0	5.8	
Hori	864.006	QP	31.9	21.6	13.2	31.1	-	35.6	46.0	10.4	
Hori	936.004	QP	29.5	22.2	13.6	30.8	-	34.5	46.0	11.5	
Hori	2483.500	PK	52.6	27.4	6.8	32.0	-	54.8	73.9	19.1	
Hori	2635.537	PK	46.1	27.7	6.8	32.0	-	48.6	73.9	25.3	
Hori	4960.000	PK	41.0	31.4	9.2	31.1	-	50.5	73.9	23.4	
Hori	7440.000	PK	41.5	36.5	10.1	32.5	-	55.6	73.9	18.3	
Hori	9920.000	PK	42.5	38.8	11.1	32.9	-	59.5	73.9	14.4	Floor noise
Hori	12400.000	PK	55.0	39.7	-1.3	33.1	-	60.3	73.9	13.6	
Hori	2483.500	AV	40.3	27.4	6.8	32.0	-	42.5	53.9	11.4	
Hori	2635.537	AV	39.7	27.7	6.8	32.0	-	42.2	53.9	11.7	
Hori	4960.000	AV	30.4	31.4	9.2	31.1	-	39.9	53.9	14.0	
Hori	7440.000	AV	29.0	36.5	10.1	32.5	-	43.1	53.9	10.8	
Hori	9920.000	AV	28.1	38.8	11.1	32.9	-	45.1	53.9	8.8	Floor noise
Vert	288.000	QP	34.2	13.0	9.9	32.0	-	25.1	46.0	20.9	
Vert	395.884	QP	37.8	15.6	10.6	32.0	-	32.0	46.0	14.0	
Vert	504.002	QP	37.6	17.7	11.4	32.0	-	34.7	46.0	11.3	
Vert	791.994	QP	35.6	20.6	12.9	31.5	-	37.6	46.0	8.4	
Vert	864.006	QP	31.1	21.6	13.2	31.1	-	34.8	46.0	11.2	
Vert	936.004	QP	32.3	22.2	13.6	30.8	-	37.3	46.0	8.7	
Vert	2483.500	PK	53.8	27.4	6.8	32.0	-	56.0	73.9	17.9	
Vert	2635.537	PK	47.1	27.7	6.8	32.0	-	49.6	73.9	24.3	
Vert	4960.000	PK	44.4	31.4	9.2	31.1	-	53.9	73.9	20.0	
Vert	7440.000	PK	43.3	36.5	10.1	32.5	-	57.4	73.9	16.5	
Vert	9920.000	PK	40.7	38.8	11.1	32.9	-	57.7	73.9	16.2	Floor noise
Vert	12400.000	PK	59.1	39.7	-1.3	33.1	-	64.4	73.9	9.5	
Vert	2483.500	AV	44.6	27.4	6.8	32.0	-	46.8	53.9	7.1	
Vert	2635.537	AV	41.7	27.7	6.8	32.0	-	44.2	53.9	9.7	
Vert	4960.000	AV	35.6	31.4	9.2	31.1	-	45.1	53.9	8.8	
Vert	7440.000	AV	28.3	36.5	10.1	32.5	-	42.4	53.9	11.5	
Vert	9920.000	AV	27.7	38.8	11.1	32.9	-	44.7	53.9	9.2	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log(4.45 m / 3.0 m) = 3.43 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	12400.000	AV	45.0	39.7	-1.3	33.1	-24.6	25.7	53.9	28.2	*
Vert	12400.000	AV	49.8	39.7	-1.3	33.1	-24.6	30.5	53.9	23.4	*

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz))

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

*Above noise was synchronized with carrier frequency.

Distance factor: 1 GHz - 10 GHz 20log(4.45 m / 3.0 m) = 3.43 dB

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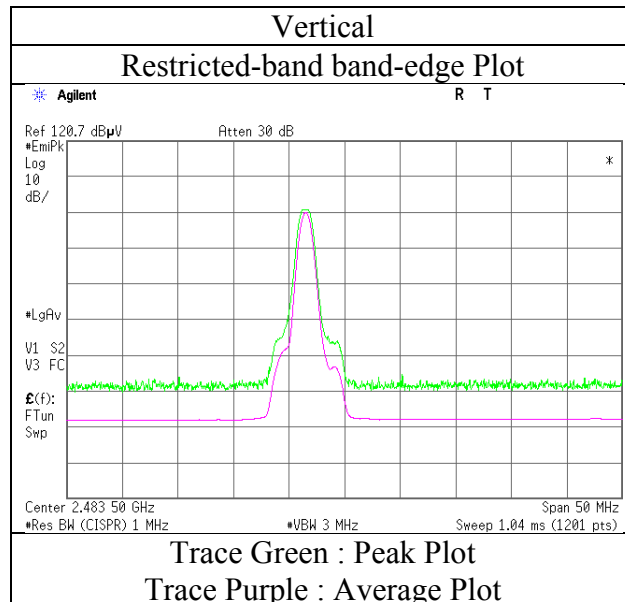
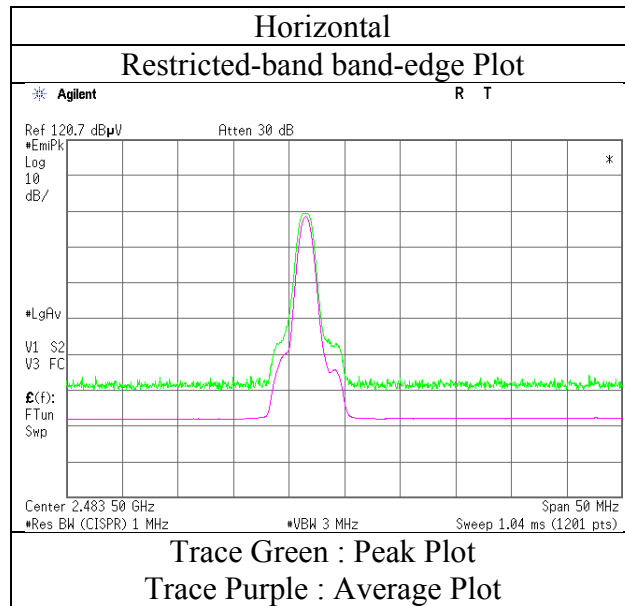
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11791362H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	May 29, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Tomohisa Nakagawa
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.000	QP	40.5	13.0	9.9	32.0	-	31.4	46.0	14.6	
Hori	395.904	QP	45.0	15.6	10.6	32.0	-	39.2	46.0	6.8	
Hori	504.010	QP	35.8	17.7	11.4	32.0	-	32.9	46.0	13.1	
Hori	792.010	QP	38.9	20.6	12.9	31.5	-	40.9	46.0	5.1	
Hori	864.004	QP	32.0	21.6	13.2	31.1	-	35.7	46.0	10.3	
Hori	936.018	QP	29.2	22.2	13.6	30.8	-	34.2	46.0	11.8	
Hori	2390.000	PK	41.0	27.4	3.3	32.1	-	39.6	73.9	34.3	
Hori	2558.070	PK	47.0	27.5	3.5	32.0	-	46.0	73.9	27.9	
Hori	4804.000	PK	38.9	30.8	5.9	31.2	-	44.4	73.9	29.5	Floor noise
Hori	7206.000	PK	40.8	36.2	6.8	32.4	-	51.4	73.9	22.5	Floor noise
Hori	9608.000	PK	41.5	38.4	7.8	32.7	-	55.0	73.9	18.9	Floor noise
Hori	12010.000	PK	45.0	39.7	-1.5	33.2	-	50.0	73.9	23.9	
Hori	2390.000	AV	28.1	27.4	3.3	32.1	-	26.7	53.9	27.2	
Hori	2558.070	AV	39.6	27.5	3.5	32.0	-	38.6	53.9	15.3	
Hori	4804.000	AV	26.2	30.8	5.9	31.2	-	31.7	53.9	22.2	Floor noise
Hori	7206.000	AV	27.2	36.2	6.8	32.4	-	37.8	53.9	16.1	Floor noise
Hori	9608.000	AV	27.6	38.4	7.8	32.7	-	41.1	53.9	12.8	Floor noise
Hori	12010.000	AV	34.8	39.7	-1.5	33.2	-	39.8	53.9	14.1	
Vert	288.000	QP	33.8	13.0	9.9	32.0	-	24.7	46.0	21.3	
Vert	395.904	QP	37.9	15.6	10.6	32.0	-	32.1	46.0	13.9	
Vert	504.010	QP	37.7	17.7	11.4	32.0	-	34.8	46.0	11.2	
Vert	792.010	QP	35.3	20.6	12.9	31.5	-	37.3	46.0	8.7	
Vert	864.004	QP	31.6	21.6	13.2	31.1	-	35.3	46.0	10.7	
Vert	936.018	QP	32.0	22.2	13.6	30.8	-	37.0	46.0	9.0	
Vert	2390.000	PK	42.5	27.4	3.3	32.1	-	41.1	73.9	32.8	
Vert	2558.070	PK	49.2	27.5	3.5	32.0	-	48.2	73.9	25.7	
Vert	4804.000	PK	40.6	30.8	5.9	31.2	-	46.1	73.9	27.8	Floor noise
Vert	7206.000	PK	41.3	36.2	6.8	32.4	-	51.9	73.9	22.0	Floor noise
Vert	9608.000	PK	42.6	38.4	7.8	32.7	-	56.1	73.9	17.8	Floor noise
Vert	12010.000	PK	48.4	39.7	-1.5	33.2	-	53.4	73.9	20.5	
Vert	2390.000	AV	29.6	27.4	3.3	32.1	-	28.2	53.9	25.7	
Vert	2558.070	AV	42.5	27.5	3.5	32.0	-	41.5	53.9	12.4	
Vert	4804.000	AV	26.4	30.8	5.9	31.2	-	31.9	53.9	22.0	Floor noise
Vert	7206.000	AV	27.3	36.2	6.8	32.4	-	37.9	53.9	16.0	Floor noise
Vert	9608.000	AV	27.6	38.4	7.8	32.7	-	41.1	53.9	12.8	Floor noise
Vert	12010.000	AV	37.3	39.7	-1.5	33.2	-	42.3	53.9	11.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.43 \text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	99.2	27.4	3.3	32.1	97.8	-	-	Carrier
Hori	2400.000	PK	59.4	27.4	3.3	32.1	58.0	77.8	19.8	
Vert	2402.000	PK	98.8	27.4	3.3	32.1	97.4	-	-	Carrier
Vert	2400.000	PK	59.0	27.4	3.3	32.1	57.6	77.4	19.8	

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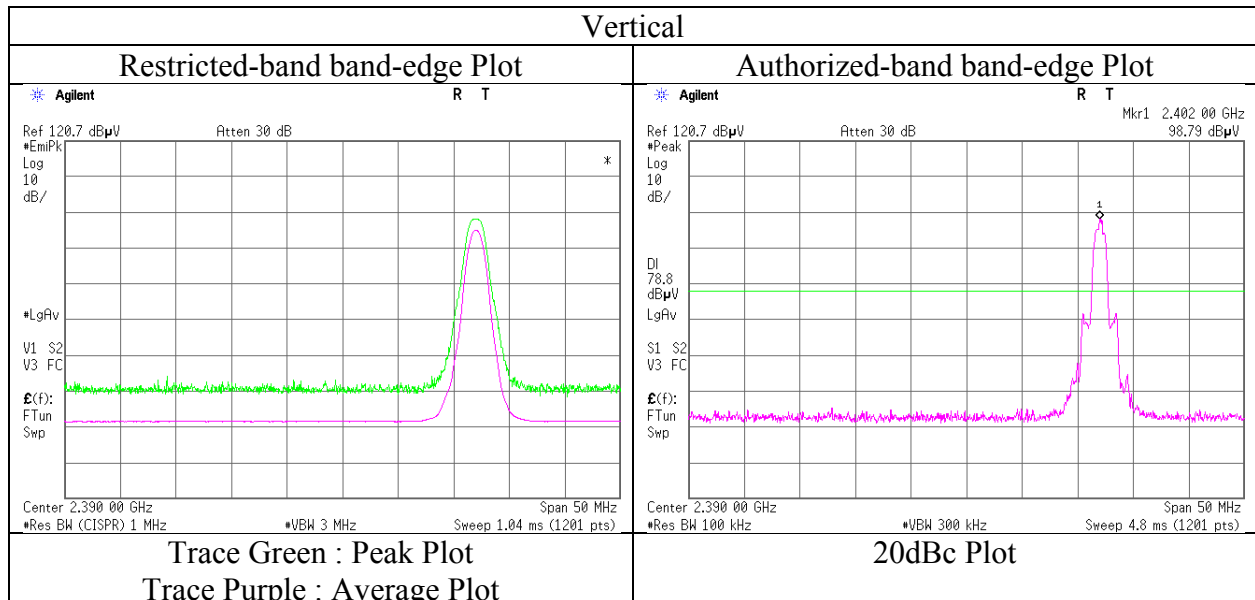
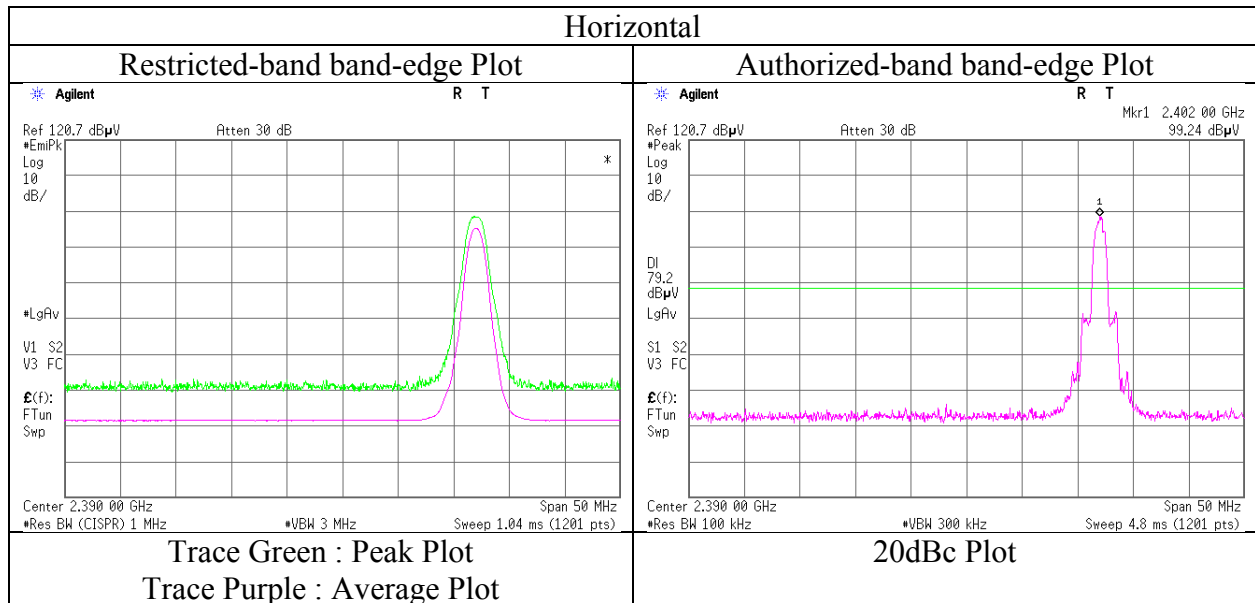
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11791362H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	May 29, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Tomohisa Nakagawa
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



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

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Ise EMC Lab.

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

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.000	QP	40.3	13.0	9.9	32.0	-	31.2	46.0	14.8	
Hori	395.904	QP	44.7	15.6	10.6	32.0	-	38.9	46.0	7.1	
Hori	503.994	QP	35.8	17.7	11.4	32.0	-	32.9	46.0	13.1	
Hori	791.998	QP	38.8	20.6	12.9	31.5	-	40.8	46.0	5.2	
Hori	864.002	QP	32.0	21.6	13.2	31.1	-	35.7	46.0	10.3	
Hori	935.996	QP	29.6	22.2	13.6	30.8	-	34.6	46.0	11.4	
Hori	2596.893	PK	45.6	27.6	3.5	32.0	-	44.7	73.9	29.2	
Hori	4882.000	PK	39.8	31.1	5.9	31.2	-	45.6	73.9	28.3	Floor noise
Hori	7323.000	PK	41.5	36.4	6.8	32.5	-	52.2	73.9	21.7	Floor noise
Hori	9764.000	PK	40.7	38.6	7.8	32.8	-	54.3	73.9	19.6	Floor noise
Hori	12205.000	PK	50.4	39.7	-1.4	33.2	-	55.5	73.9	18.4	
Hori	2596.893	AV	37.6	27.6	3.5	32.0	-	36.7	53.9	17.2	
Hori	4882.000	AV	27.6	31.1	5.9	31.2	-	33.4	53.9	20.5	Floor noise
Hori	7323.000	AV	28.9	36.4	6.8	32.5	-	39.6	53.9	14.3	Floor noise
Hori	9764.000	AV	28.9	38.6	7.8	32.8	-	42.5	53.9	11.4	Floor noise
Hori	12205.000	AV	39.7	39.7	-1.4	33.2	-	44.8	53.9	9.1	
Vert	288.000	QP	33.7	13.0	9.9	32.0	-	24.6	46.0	21.4	
Vert	395.904	QP	37.8	15.6	10.6	32.0	-	32.0	46.0	14.0	
Vert	503.994	QP	37.5	17.7	11.4	32.0	-	34.6	46.0	11.4	
Vert	791.998	QP	35.0	20.6	12.9	31.5	-	37.0	46.0	9.0	
Vert	864.002	QP	31.2	21.6	13.2	31.1	-	34.9	46.0	11.1	
Vert	935.996	QP	32.1	22.2	13.6	30.8	-	37.1	46.0	8.9	
Vert	2596.893	PK	47.0	27.6	3.5	32.0	-	46.1	73.9	27.8	
Vert	4882.000	PK	40.4	31.1	5.9	31.2	-	46.2	73.9	27.7	Floor noise
Vert	7323.000	PK	40.5	36.4	6.8	32.5	-	51.2	73.9	22.7	Floor noise
Vert	9764.000	PK	40.4	38.6	7.8	32.8	-	54.0	73.9	19.9	Floor noise
Vert	12205.000	PK	52.1	39.7	-1.4	33.2	-	57.2	73.9	16.7	
Vert	2596.893	AV	40.1	27.6	3.5	32.0	-	39.2	53.9	14.7	
Vert	4882.000	AV	29.2	31.1	5.9	31.2	-	35.0	53.9	18.9	Floor noise
Vert	7323.000	AV	28.9	36.4	6.8	32.5	-	39.6	53.9	14.3	Floor noise
Vert	9764.000	AV	28.8	38.6	7.8	32.8	-	42.4	53.9	11.5	Floor noise
Vert	12205.000	AV	41.3	39.7	-1.4	33.2	-	46.4	53.9	7.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz 20log(4.45 m / 3.0 m) = 3.43 dB
 10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Report No.	11791362H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.4	No.3	No.3
Date	May 29, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa (1 GHz - 10 GHz)	Ryota Yamanaka (Below 1 GHz)	Tomohisa Nakagawa (10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	288.005	QP	40.6	13.0	9.9	32.0	-	31.5	46.0	14.5	
Hori	395.904	QP	45.0	15.6	10.6	32.0	-	39.2	46.0	6.8	
Hori	503.994	QP	35.8	17.7	11.4	32.0	-	32.9	46.0	13.1	
Hori	792.018	QP	38.4	20.6	12.9	31.5	-	40.4	46.0	5.6	
Hori	864.000	QP	32.1	21.6	13.2	31.1	-	35.8	46.0	10.2	
Hori	936.003	QP	30.0	22.2	13.6	30.8	-	35.0	46.0	11.0	
Hori	2483.500	PK	64.4	27.4	3.4	32.0	-	63.2	73.9	10.7	
Hori	2635.537	PK	45.0	27.7	3.4	32.0	-	44.1	73.9	29.8	
Hori	4960.000	PK	40.1	31.4	4.8	31.1	-	45.2	73.9	28.7	Floor noise
Hori	7440.000	PK	40.6	36.5	6.1	32.5	-	50.7	73.9	23.2	Floor noise
Hori	9920.000	PK	40.9	38.8	7.1	32.9	-	53.9	73.9	20.0	Floor noise
Hori	12400.000	PK	49.0	39.7	-1.3	33.1	-	54.3	73.9	19.6	
Hori	2483.500	AV	47.6	27.4	3.4	32.0	-	46.4	53.9	7.5	
Hori	2635.537	AV	35.7	27.7	3.4	32.0	-	34.8	53.9	19.1	
Hori	4960.000	AV	27.1	31.4	4.8	31.1	-	32.2	53.9	21.7	Floor noise
Hori	7440.000	AV	27.3	36.5	6.1	32.5	-	37.4	53.9	16.5	Floor noise
Hori	9920.000	AV	27.5	38.8	7.1	32.9	-	40.5	53.9	13.4	Floor noise
Hori	12400.000	AV	38.0	39.7	-1.3	33.1	-	43.3	53.9	10.6	
Vert	288.010	QP	33.9	13.0	9.9	32.0	-	24.8	46.0	21.2	
Vert	395.904	QP	37.9	15.6	10.6	32.0	-	32.1	46.0	13.9	
Vert	503.994	QP	37.4	17.7	11.4	32.0	-	34.5	46.0	11.5	
Vert	792.018	QP	34.6	20.6	12.9	31.5	-	36.6	46.0	9.4	
Vert	864.000	QP	31.1	21.6	13.2	31.1	-	34.8	46.0	11.2	
Vert	936.003	QP	32.3	22.2	13.6	30.8	-	37.3	46.0	8.7	
Vert	2483.500	PK	64.8	27.4	3.4	32.0	-	63.6	73.9	10.3	
Vert	2635.537	PK	46.5	27.7	3.4	32.0	-	45.6	73.9	28.3	
Vert	4960.000	PK	40.3	31.4	4.8	31.1	-	45.4	73.9	28.5	Floor noise
Vert	7440.000	PK	40.4	36.5	6.1	32.5	-	50.5	73.9	23.4	Floor noise
Vert	9920.000	PK	41.3	38.8	7.1	32.9	-	54.3	73.9	19.6	Floor noise
Vert	12400.000	PK	54.0	39.7	-1.3	33.1	-	59.3	73.9	14.6	
Vert	2483.500	AV	43.3	27.4	3.4	32.0	-	42.1	53.9	11.8	
Vert	2635.537	AV	37.6	27.7	3.4	32.0	-	36.7	53.9	17.2	
Vert	4960.000	AV	27.0	31.4	4.8	31.1	-	32.1	53.9	21.8	Floor noise
Vert	7440.000	AV	27.1	36.5	6.1	32.5	-	37.2	53.9	16.7	Floor noise
Vert	9920.000	AV	27.6	38.8	7.1	32.9	-	40.6	53.9	13.3	Floor noise
Vert	12400.000	AV	42.7	39.7	-1.3	33.1	-	48.0	53.9	5.9	

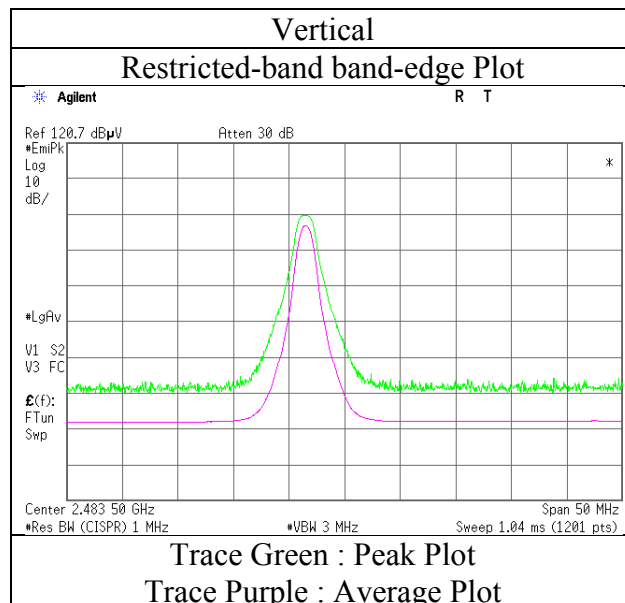
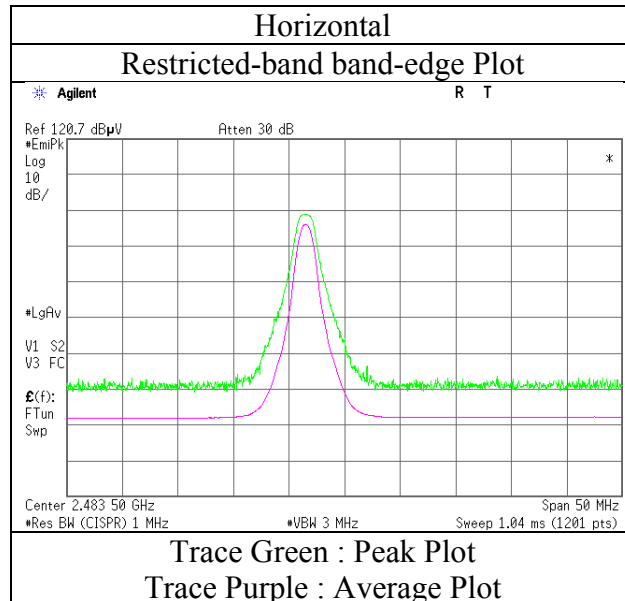
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor: 1 GHz - 10 GHz $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.43 \text{ dB}$
 10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11791362H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.4
Date	May 29, 2017
Temperature / Humidity	23 deg. C / 52 % RH
Engineer	Tomohisa Nakagawa
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz



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

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Ise EMC Lab.

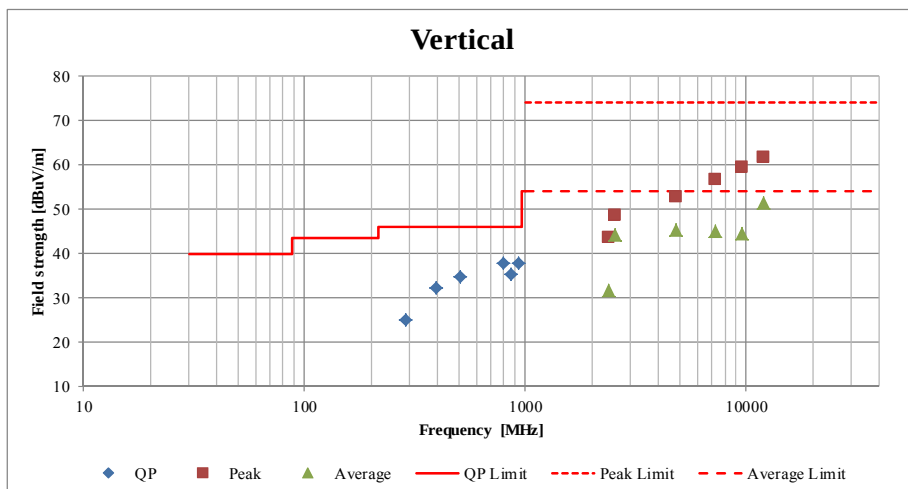
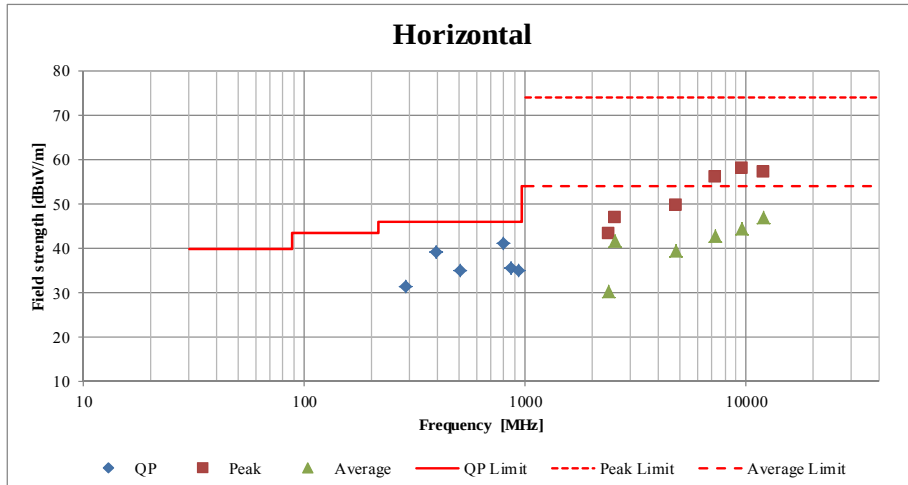
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Plot data, Worst case)

Report No.	11791362H	No.4	No.3	No.3
Test place	Ise EMC Lab.			
Semi Anechoic Chamber				
Date	May 29, 2017	May 30, 2017	May 30, 2017	May 30, 2017
Temperature / Humidity	23 deg. C / 52 % RH	23 deg. C / 52 % RH	22 deg. C / 49 % RH	22 deg. C / 49 % RH
Engineer	Tomohisa Nakagawa	Ryota Yamanaka	Tomohisa Nakagawa	Tomohisa Nakagawa
	(1 GHz - 10 GHz)	(Below 1 GHz)	(10 GHz - 26.5 GHz)	(10 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz			

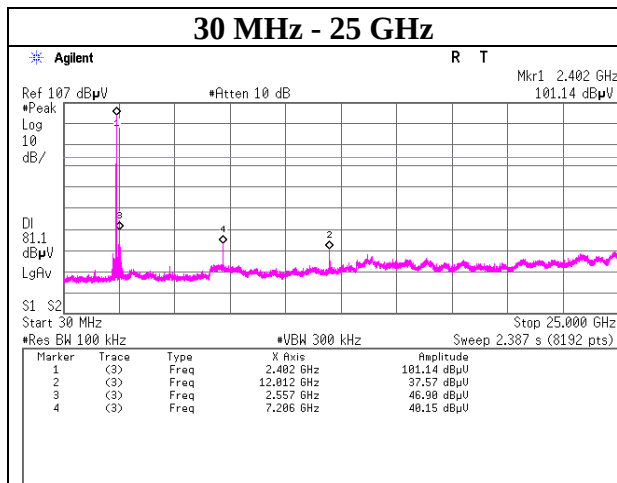
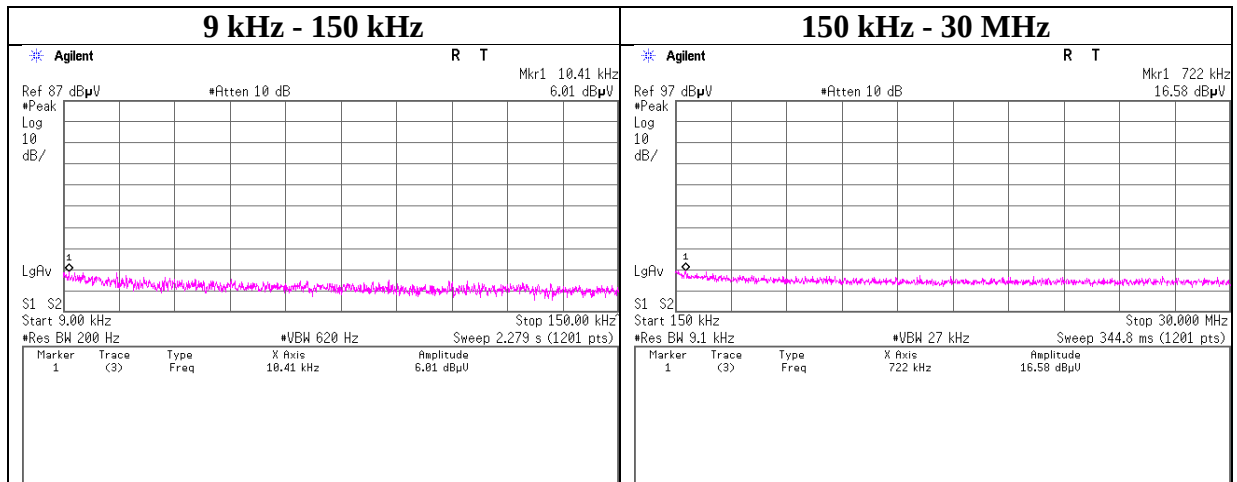


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, DH5

2402 MHz



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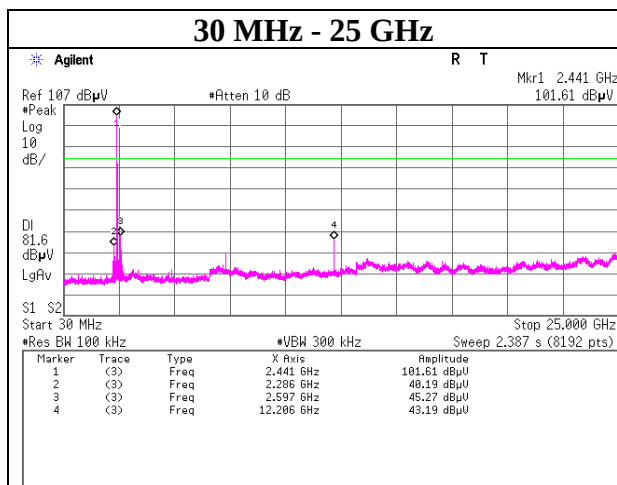
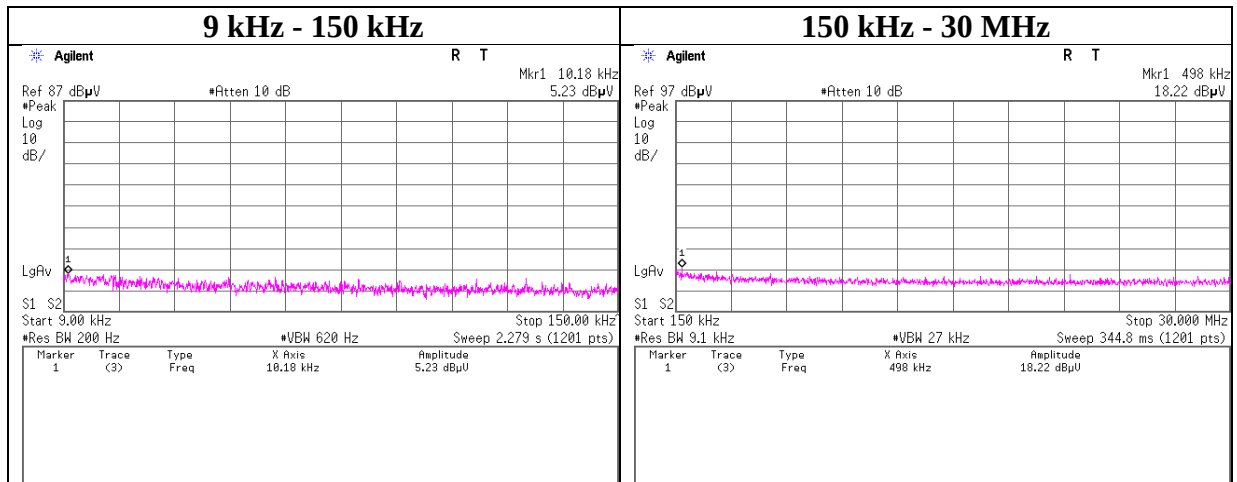
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, DH5

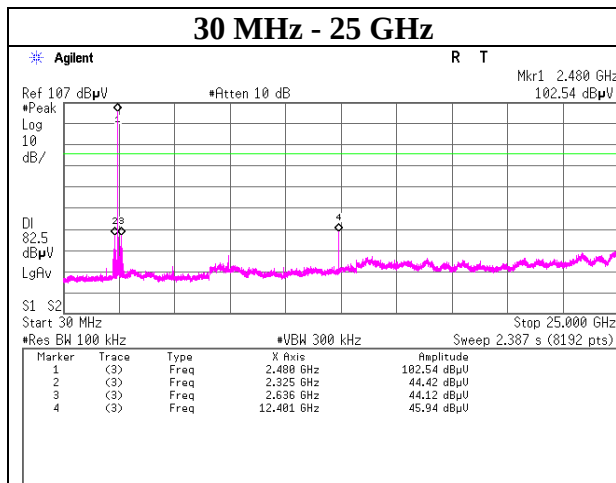
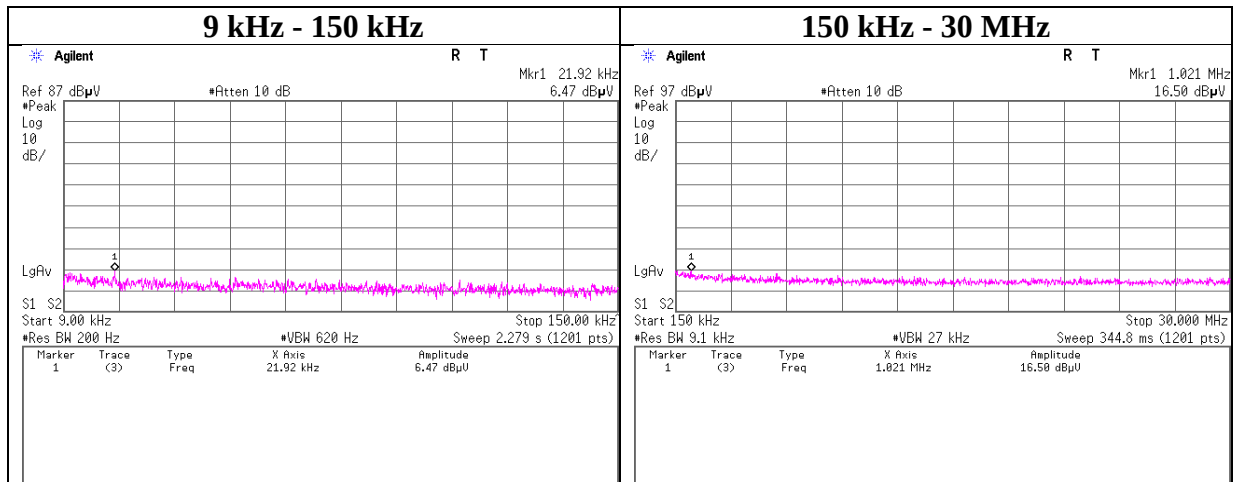
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, DH5

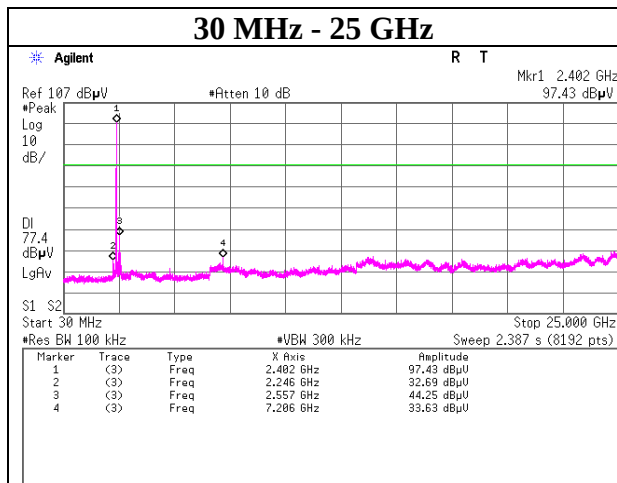
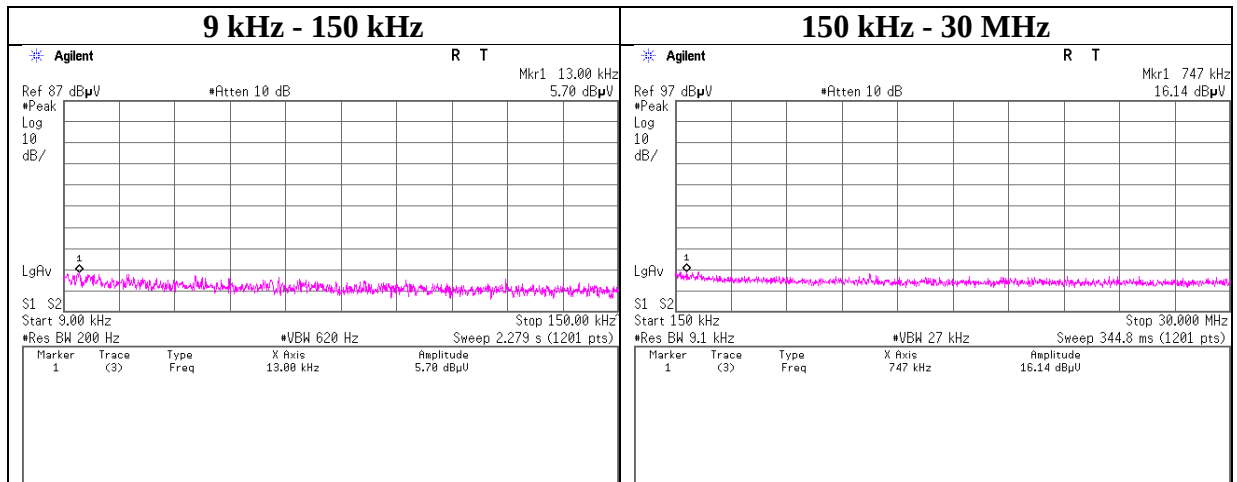
2480 MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, 3DH5

2402 MHz



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Ise EMC Lab.

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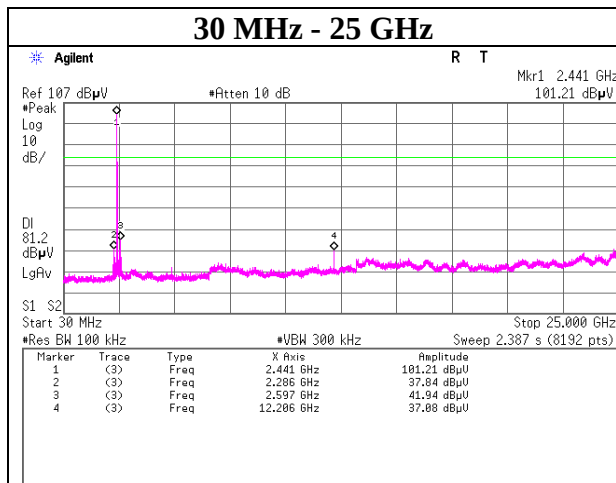
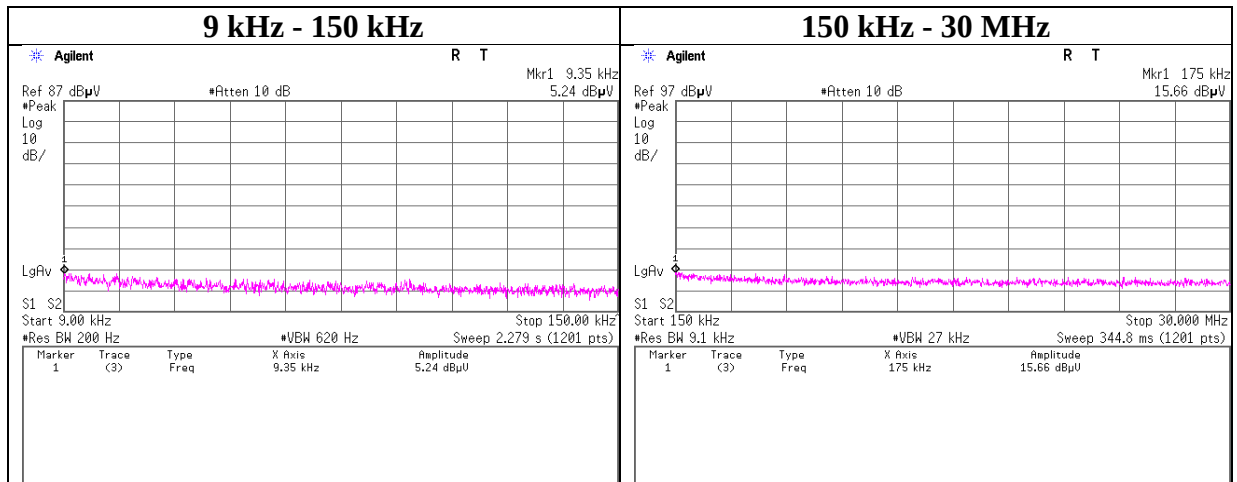
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, 3DH5

2441 MHz



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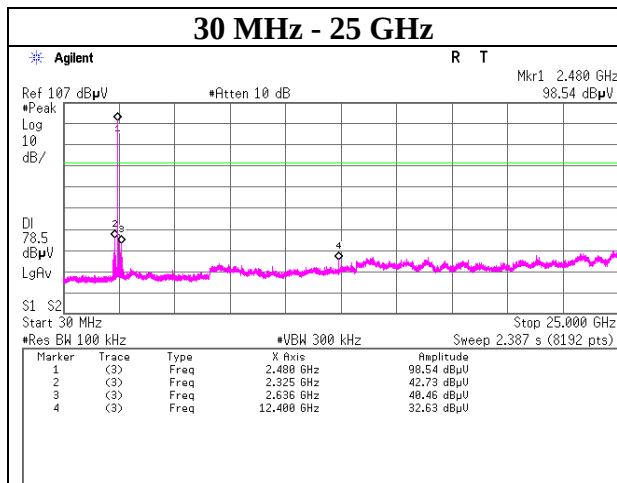
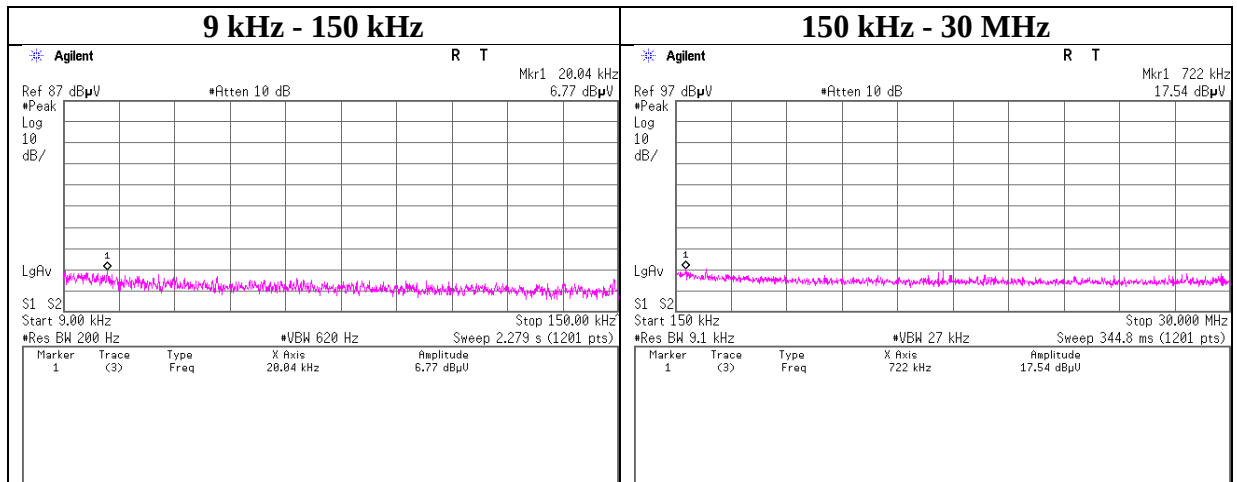
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, 3DH5

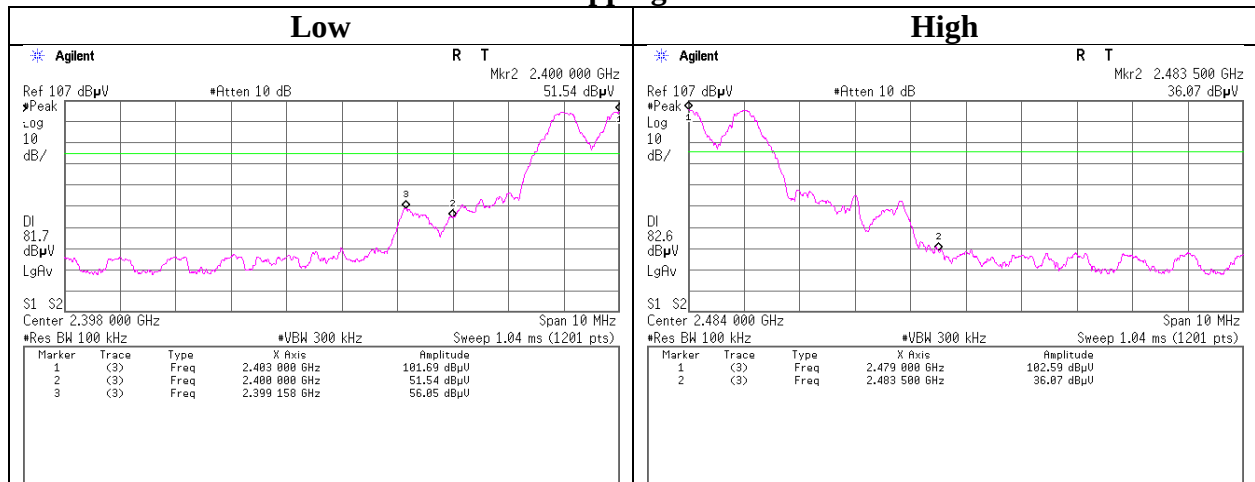
2480 MHz



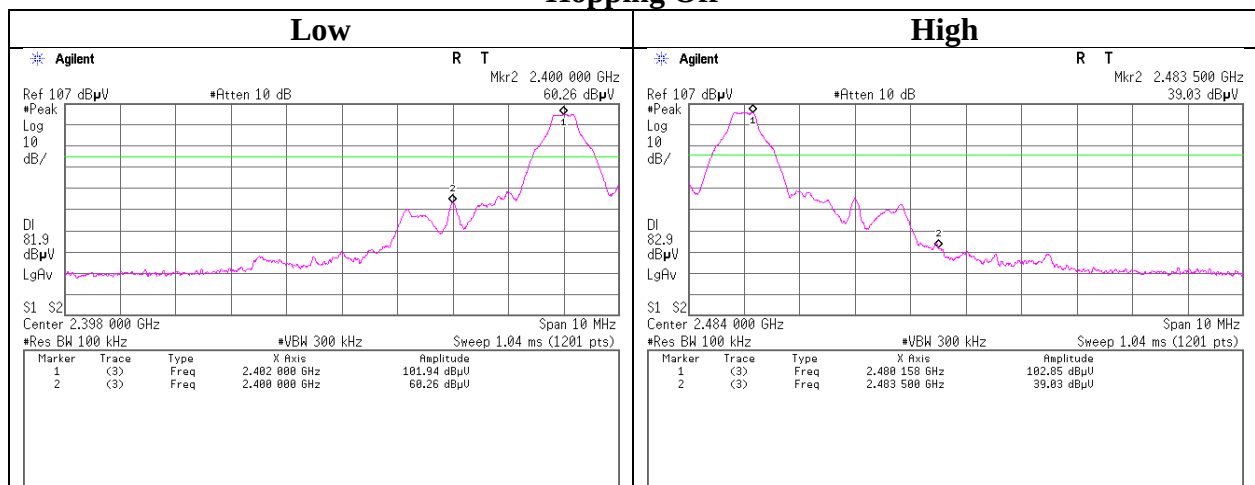
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
Mode : Tx DH5

Hopping On



Hopping Off



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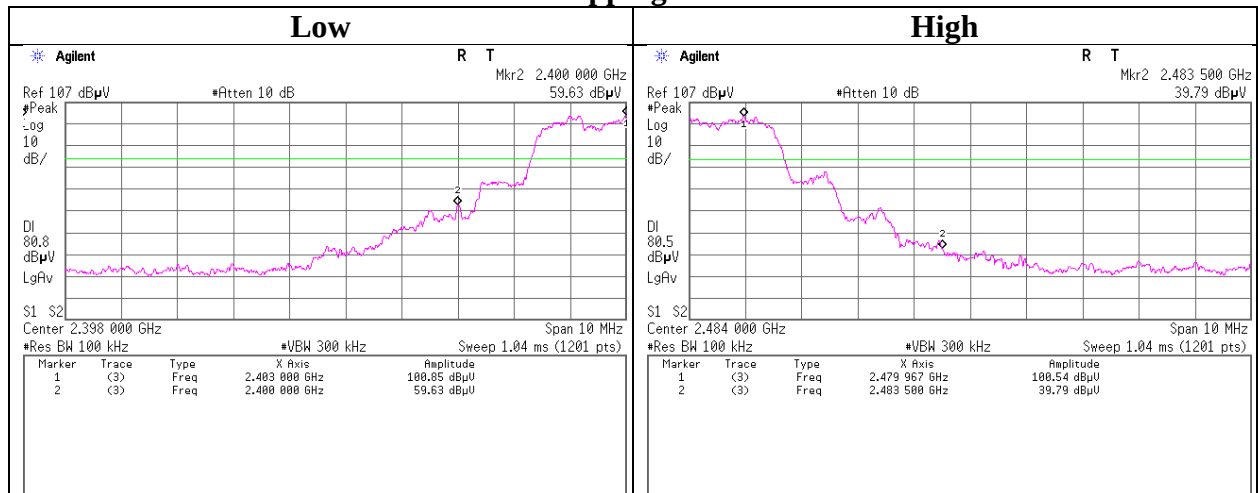
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

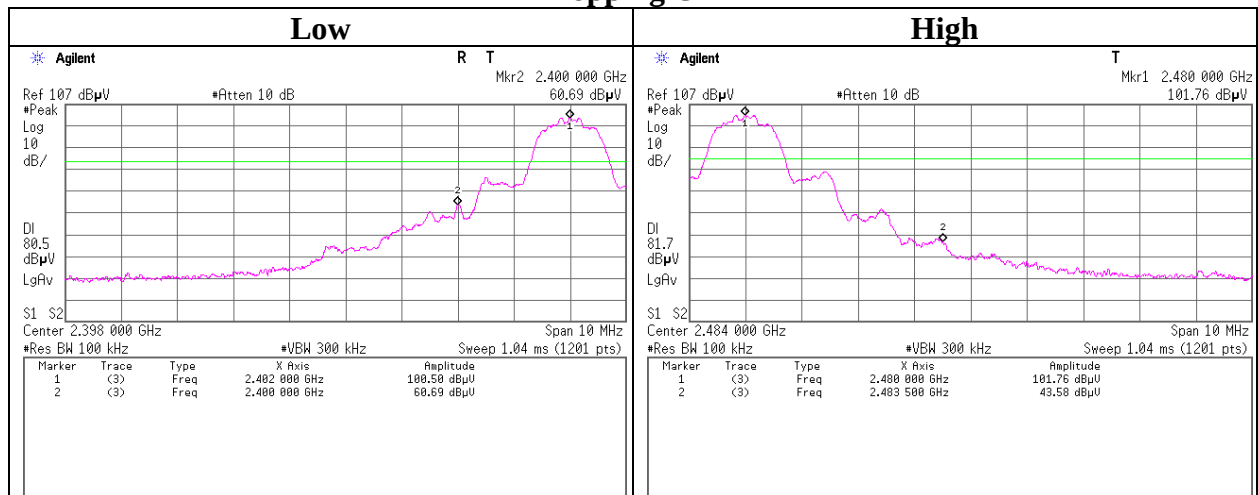
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.11 Measurement Room
Report No. : 11791362H
Date : June 1, 2017
Temperature / Humidity : 24 deg. C / 57 % RH
Engineer : Tomoki Matsui
Mode : Tx 3DH5

Hopping On



Hopping Off



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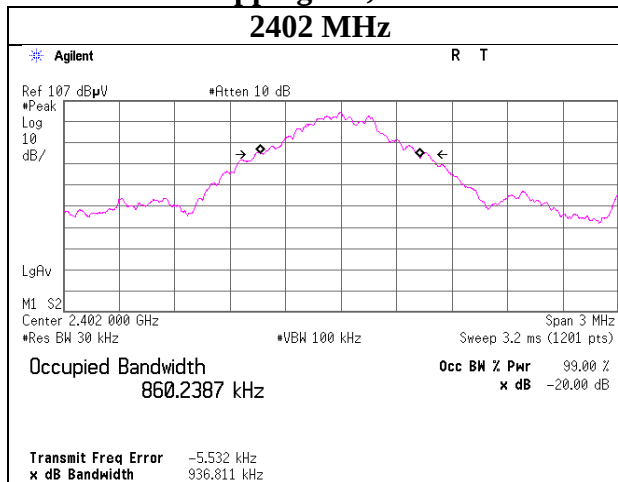
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

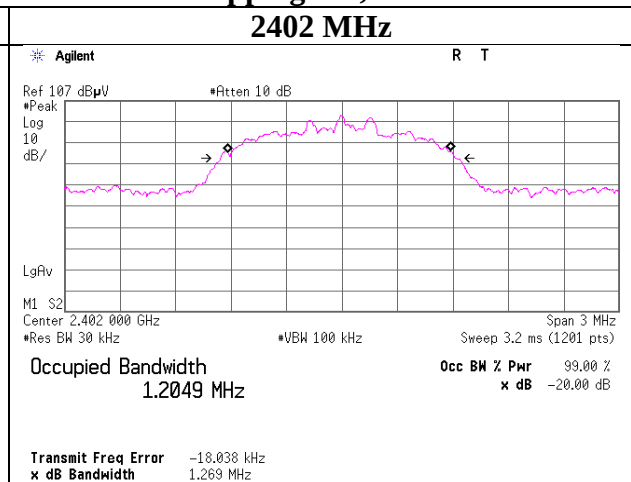
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx Hopping Off

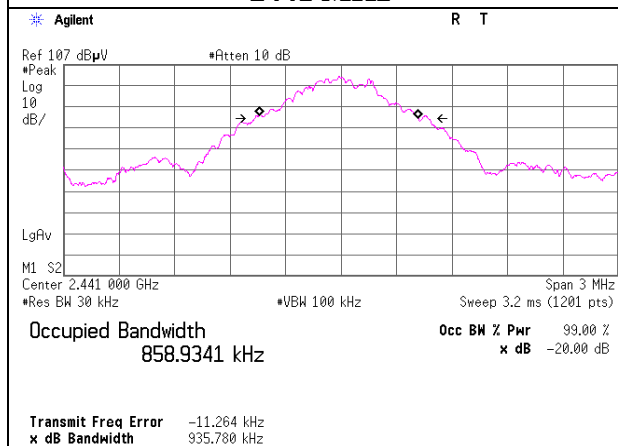
Hopping Off, DH5



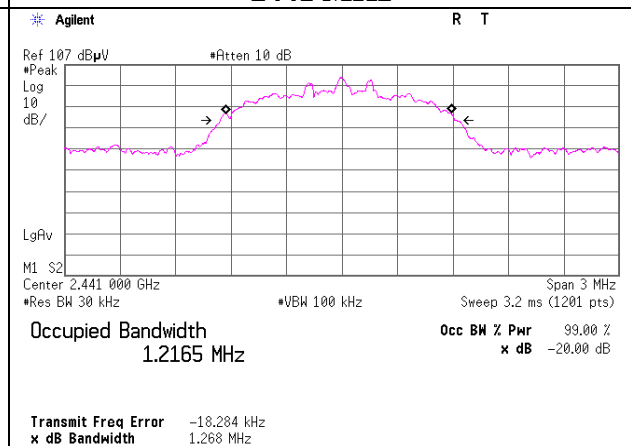
Hopping Off, 3DH5



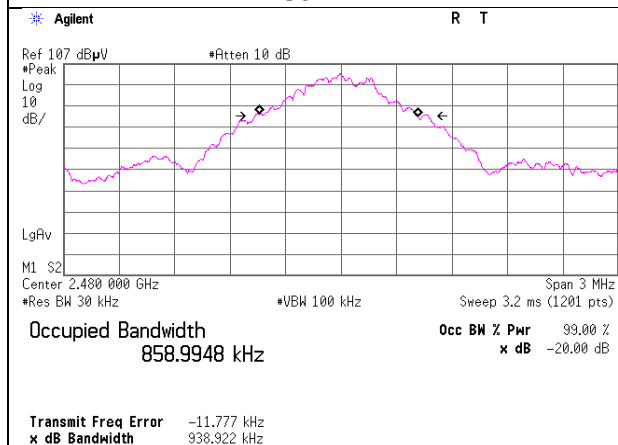
2441 MHz



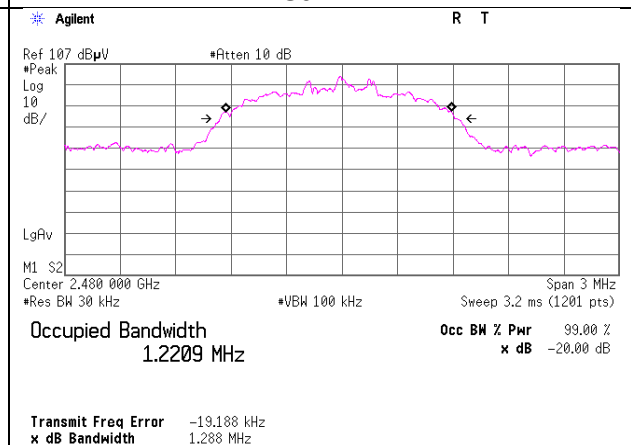
2441 MHz



2480 MHz



2480 MHz



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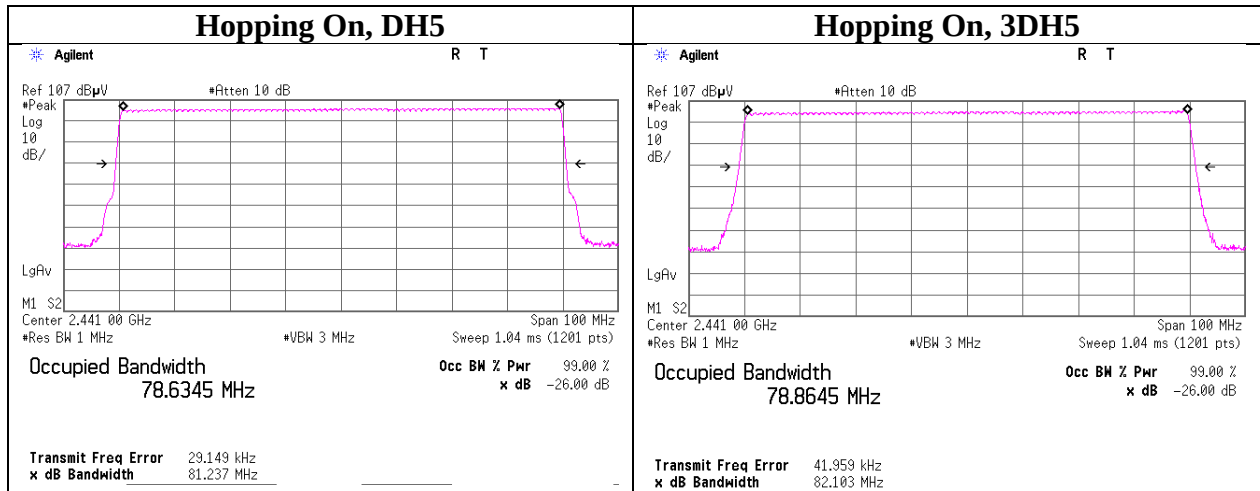
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99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11791362H
Date	June 1, 2017
Temperature / Humidity	24 deg. C / 57 % RH
Engineer	Tomoki Matsui
Mode	Tx Hopping On



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2016/10/19 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2017/01/20 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2017/01/19 * 12
MRENT-126	Spectrum Analyzer	KEYSIGHT	E4440A	MY46185516	RE	2016/07/01 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2016/09/28 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2016/06/21 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2016/10/21 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2016/10/20 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2017/01/20 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	RE	2017/02/21 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2016/09/15 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2016/10/15 * 12
MLA-22	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	RE	2017/01/26 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2016/07/26 * 12
MAT-98	Attenuator	KEYSIGHT	8491A	MY52462349	RE	2016/12/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2017/03/27 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2017/01/19 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2017/05/14 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2016/08/17 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2016/10/17 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2016/10/17 * 12
MCC-174	Microwave Cable	Junkosha	MWX221	1409S497	AT	2017/03/13 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/12/15 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2017/03/24 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2016/11/28 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2016/12/13 * 12
MMM-17	DIGITAL HiTESTER	Hioki	3805	070900530	AT	2017/01/19 * 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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