



RADIO TEST REPORT

Test Report No. : 11425761H-A

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Audio
Model No. : FT0110A
FCC ID : BABFT0110A
Test regulation : FCC Part 15 Subpart C: 2016
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: August 31 to September 6, 2016

Representative test engineer:

Tomoki Matsui
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

REVISION HISTORY

Original Test Report No.: 11425761H-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.	:	FT0110A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	August 31, 2016
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

Model: FT0110A (referred to as the EUT in this report) is a Car Audio.

Radio Specification

[Bluetooth (Ver. 2.1 with EDR function)]

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS, GFSK, $\pi/4$ DQPSK, 8DPSK
Power Supply (radio part input)	:	DC 3.3 V
Antenna type	:	Inverted-F PCB Antenna
Antenna Gain	:	-5.61 dBi
Clock frequency(ies)	:	26 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC part 15 final revised on April 6, 2016.

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

* 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 (2)	See data.	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (1)		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 (4)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (4)		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 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	0.4 dB 299.996 MHz, QP, Hori.	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)

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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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	
0.9 dB	1.0 dB	1.4 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3m	3.8 dB
10m	3.7 dB

Polarity	Radiated emission (Below 1GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 - 200 MHz	200 - 1000MHz	30 - 200 MHz	200 - 1000MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

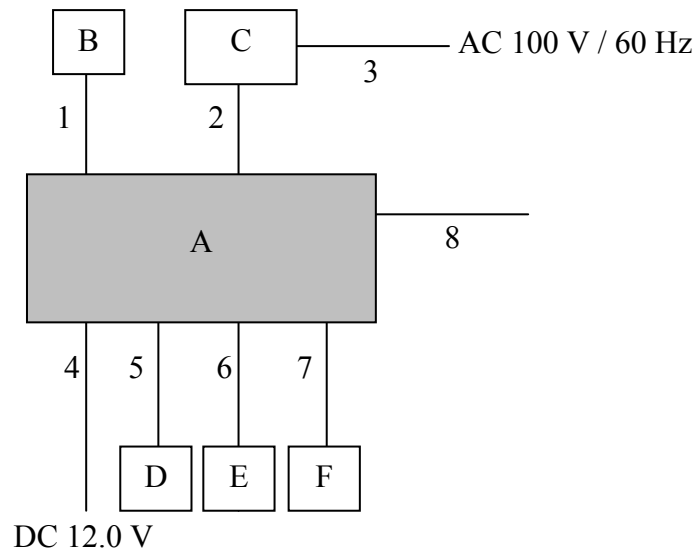
4.1 Operating Mode(s)

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

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
20dB Bandwidth, Carrier Frequency Separation	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 / EDR: Ext.=255, Int.=50 Software: CSR BlueTest3 Ver.2.5.8.667 *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	FT0110A	BN500028 for AT* BN500018 for RE*	FUJITSU TEN LIMITED	EUT
B	USB Memory	PD-07 WH8GB	-	KING MAX	-
C	DVD Player	DV-600AV-S	HEKD0133282S	Pioneer	-
D	Termination	-	-	-	-
E	Termination	-	-	-	-
F	Termination	-	-	-	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	3.0	Shielded	Shielded	-
2	HDMI Cable	3.0	Shielded	Shielded	-
3	AC Cable	1.2	Unshielded	Unshielded	-
4	DC Cable	3.5	Unshielded	Unshielded	-
5	Signal Cable	1.5	Unshielded	Unshielded	-
6	FM Antenna Cable	3.0	Shielded	Shielded	-
7	Signal Cable	3.0	Unshielded	Unshielded	-
8	Signal Cable	0.1	Unshielded	Unshielded	-

*AT: Antenna Terminal Conducted test, RE: Radiated Spurious Emission test

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SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1GHz]

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.

[For above 1GHz]

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	4.5 m*2) (1 GHz – 10 GHz), 1 m*3) (10 GHz – 26.5 GHz)		4.5 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: $20 \times \log(4.5 \text{ m}/3.0 \text{ m}) = 3.53 \text{ dB}$

*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

APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

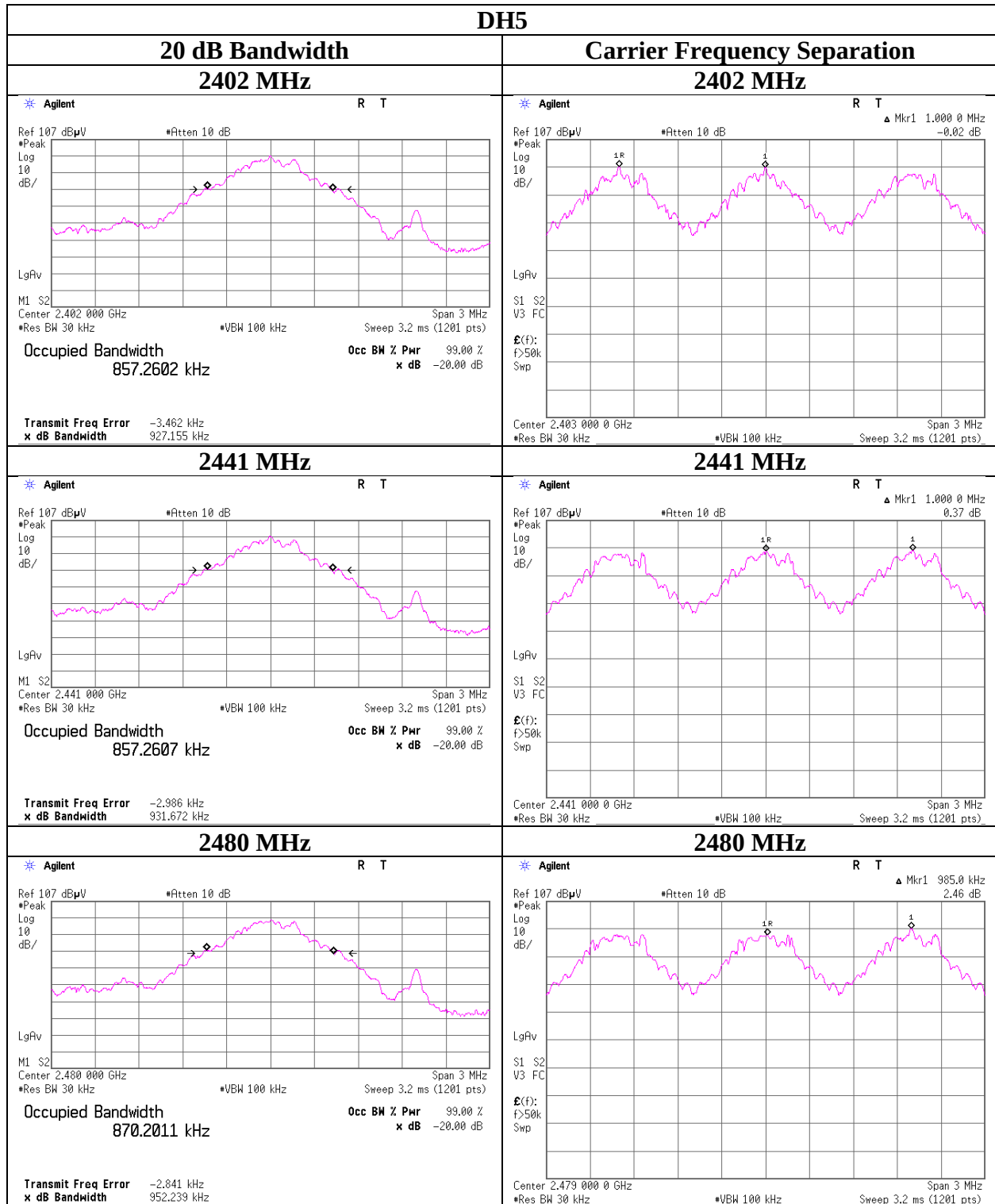
Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11425761H
Date September 6, 2016
Temperature / Humidity 24 deg. C / 64 % RH
Engineer Tomoki Matsui
Mode Tx, Hopping Off, DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.927	1.000	>= 0.618
DH5	2441.0	0.932	1.000	>= 0.621
DH5	2480.0	0.952	0.985	>= 0.635
3DH5	2402.0	1.274	1.000	>= 0.849
3DH5	2441.0	1.263	1.005	>= 0.842
3DH5	2480.0	1.298	1.000	>= 0.865

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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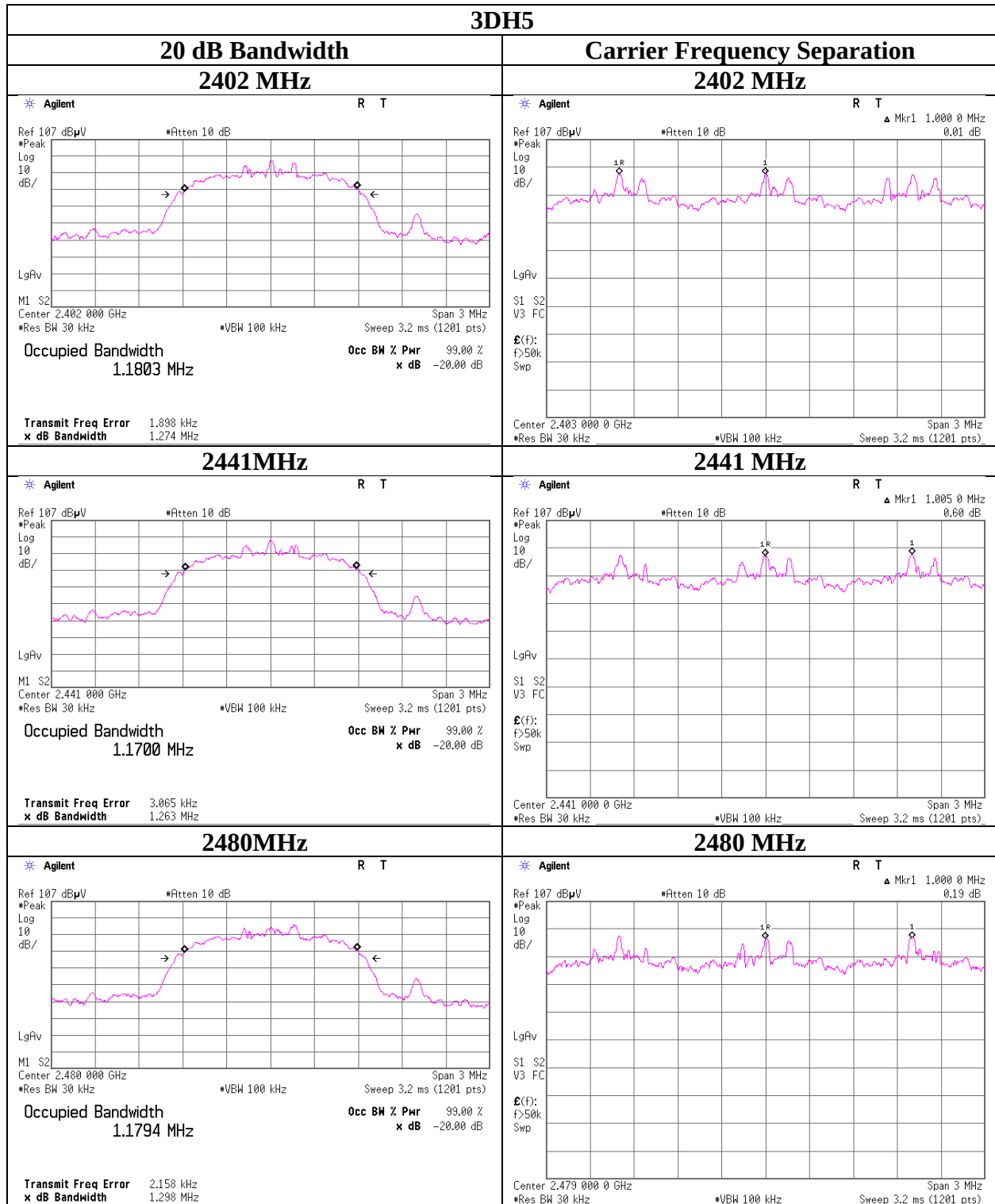
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20dB Bandwidth and Carrier Frequency Separation



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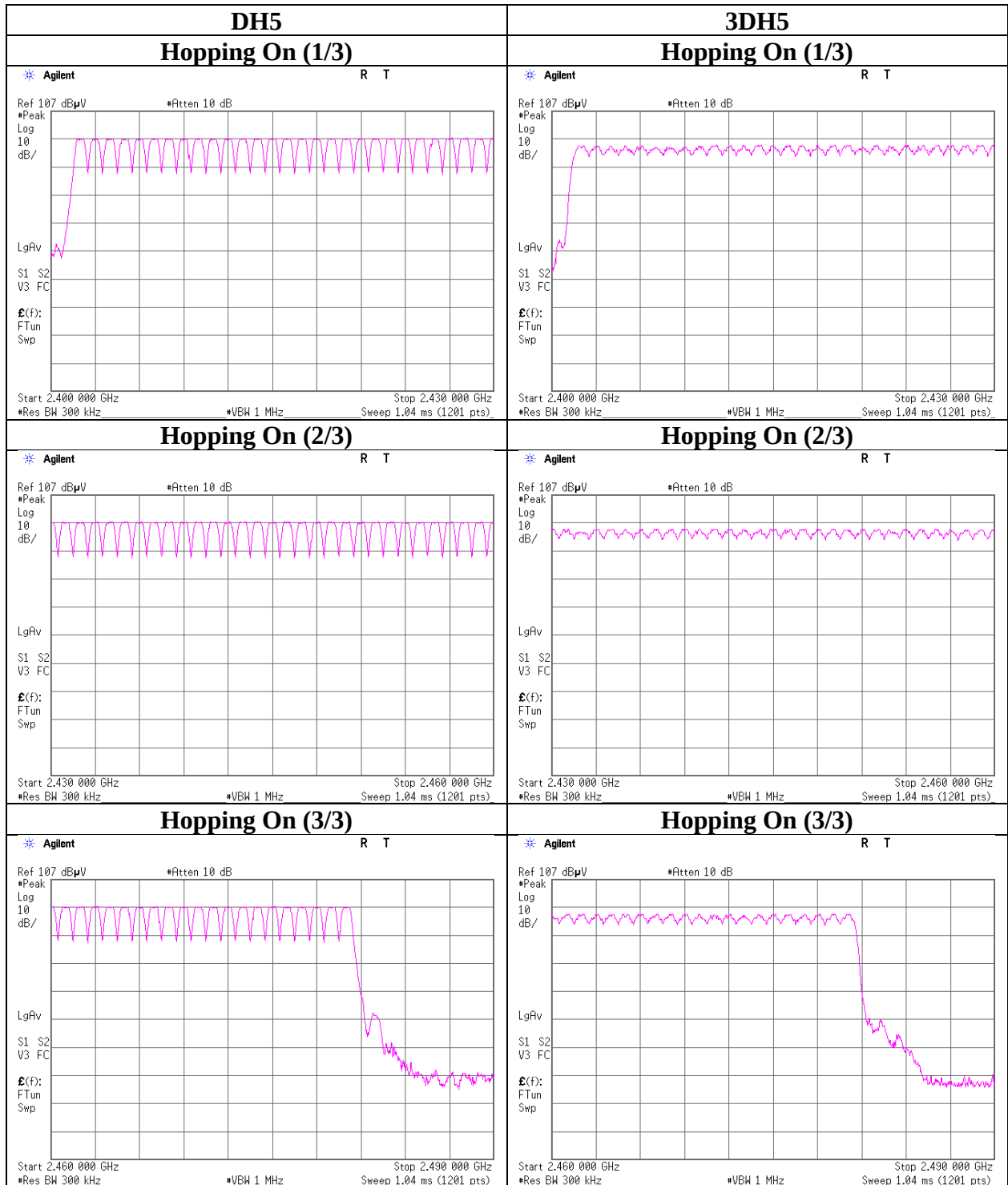
Number of Hopping Frequency

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11425761H
Date September 6, 2016
Temperature / Humidity 24 deg. C / 64 % 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.7 Shielded Room
Report No. 11425761H
Date September 6, 2016
Temperature / Humidity 24 deg. C / 64 % RH
Engineer Tomoki Matsui
Mode Tx, Hopping On

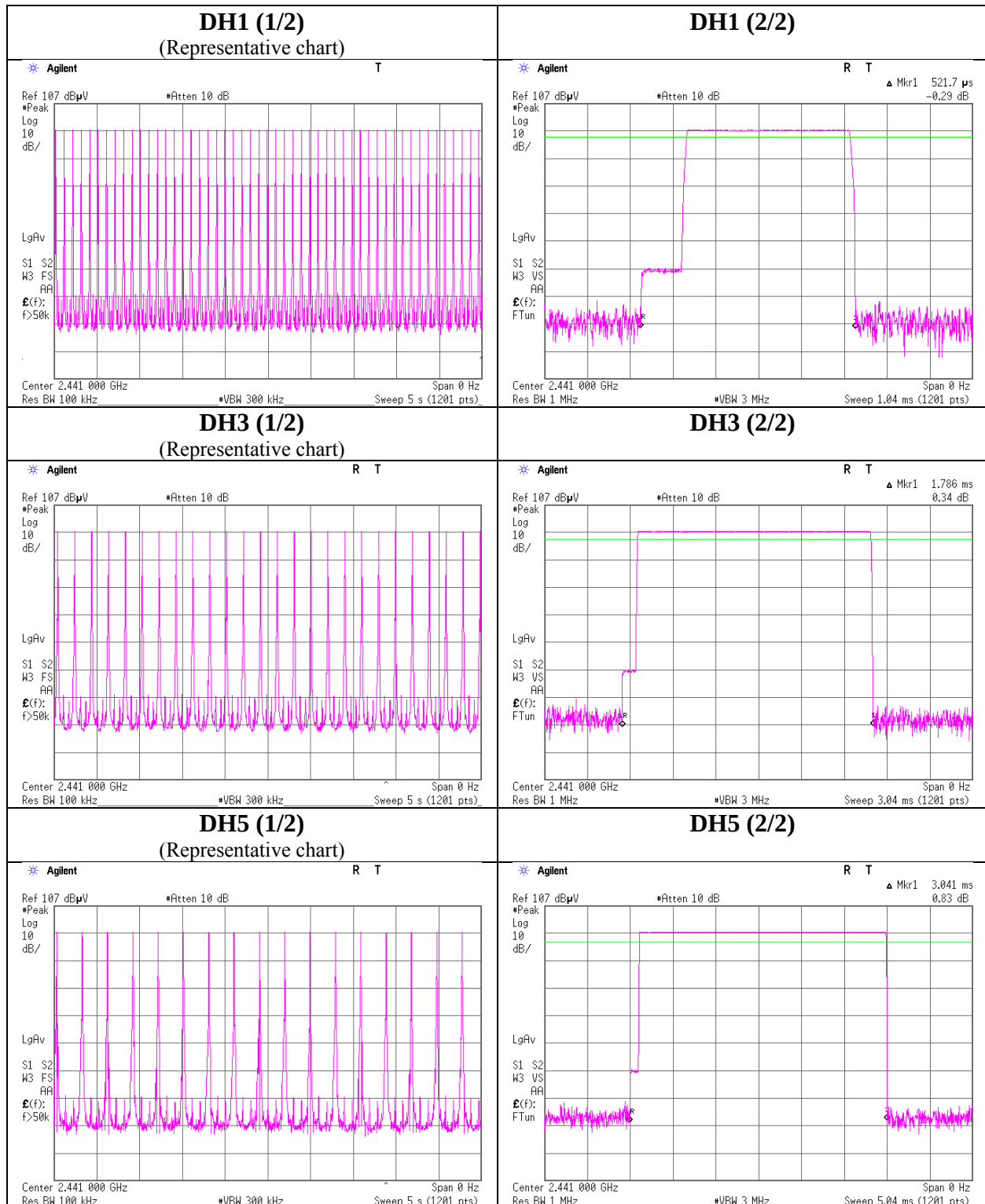
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period				Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.522	169	400
DH3	26.0 times	/	5 sec.	x 31.6 sec. = 165 times	1.786	295	400
DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	3.041	328	400
3DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.535	173	400
3DH3	26.0 times	/	5 sec.	x 31.6 sec. = 165 times	1.791	296	400
3DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	3.053	330	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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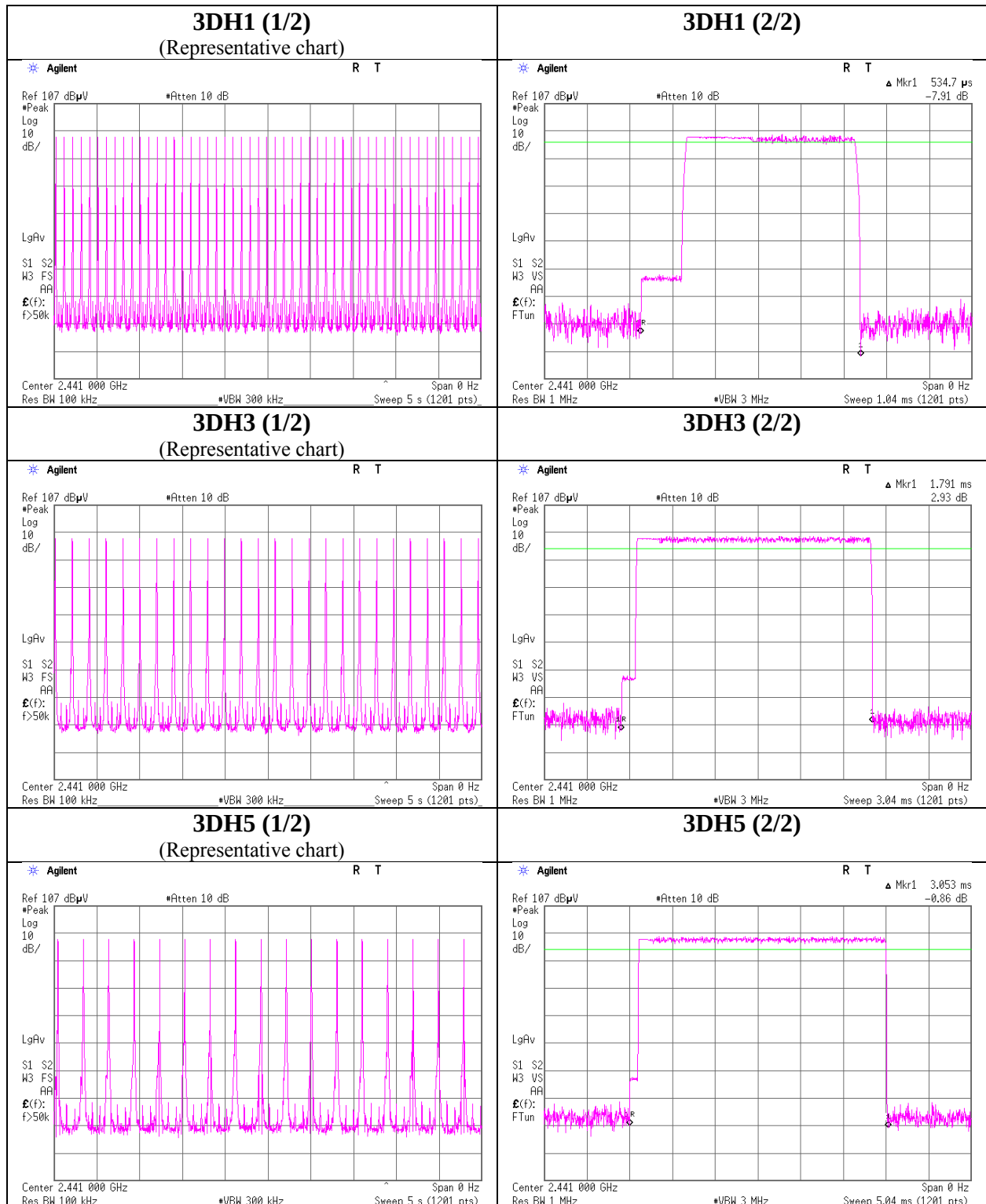
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Dwell time



Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-9.57	1.89	10.09	2.41	1.74	20.96	125	18.55
DH5	2441.0	-9.27	1.90	10.09	2.72	1.87	20.96	125	18.24
DH5	2480.0	-9.31	1.90	10.09	2.68	1.85	20.96	125	18.28
2DH5	2402.0	-11.09	1.89	10.09	0.89	1.23	20.96	125	20.07
2DH5	2441.0	-10.81	1.90	10.09	1.18	1.31	20.96	125	19.78
2DH5	2480.0	-10.97	1.90	10.09	1.02	1.26	20.96	125	19.94
3DH5	2402.0	-10.90	1.89	10.09	1.08	1.28	20.96	125	19.88
3DH5	2441.0	-10.62	1.90	10.09	1.37	1.37	20.96	125	19.59
3DH5	2480.0	-10.78	1.90	10.09	1.21	1.32	20.96	125	19.75

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.7 Shielded Room
Report No.	11425761H
Date	September 6, 2016
Temperature / Humidity	24 deg. C / 64 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-10.90	1.89	10.09	1.08	1.28	0.93	2.01	1.59
DH5	2441.0	-10.61	1.90	10.09	1.38	1.37	0.93	2.31	1.70
DH5	2480.0	-10.61	1.90	10.09	1.38	1.37	0.93	2.31	1.70
2DH5	2402.0	-14.53	1.89	10.09	-2.55	0.56	0.92	-1.63	0.69
2DH5	2441.0	-14.32	1.90	10.09	-2.33	0.58	0.92	-1.41	0.72
2DH5	2480.0	-14.54	1.90	10.09	-2.55	0.56	0.92	-1.63	0.69
3DH5	2402.0	-14.51	1.89	10.09	-2.53	0.56	0.91	-1.62	0.69
3DH5	2441.0	-14.27	1.90	10.09	-2.28	0.59	0.91	-1.37	0.73
3DH5	2480.0	-14.51	1.90	10.09	-2.52	0.56	0.91	-1.61	0.69

Sample Calculation:

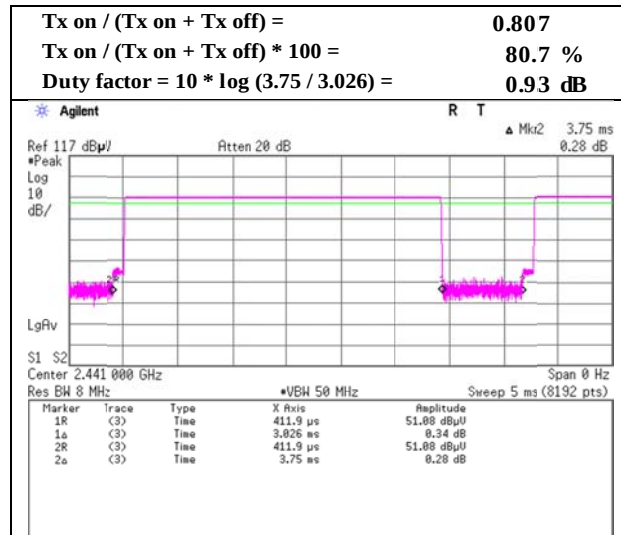
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power average) = Time average + Duty factor

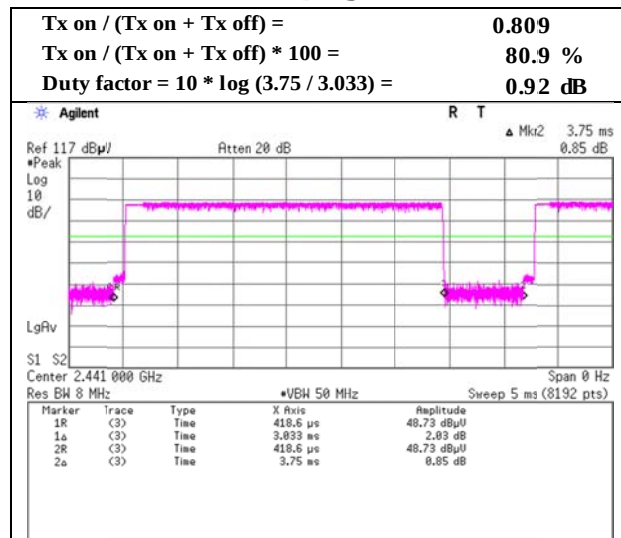
Burst Rate Confirmation

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off

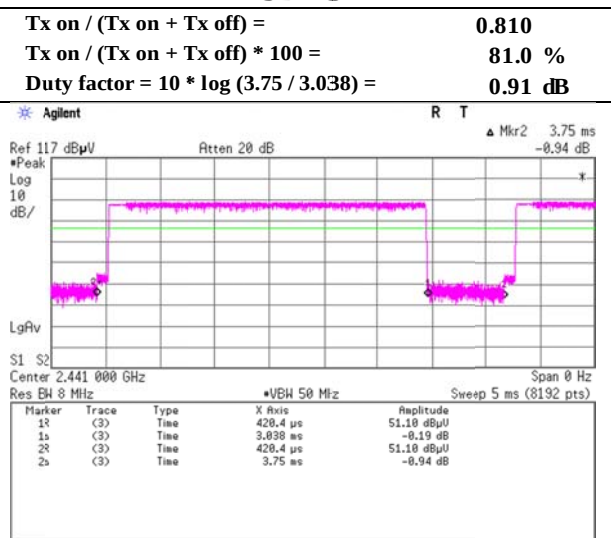
DH5



2DH5



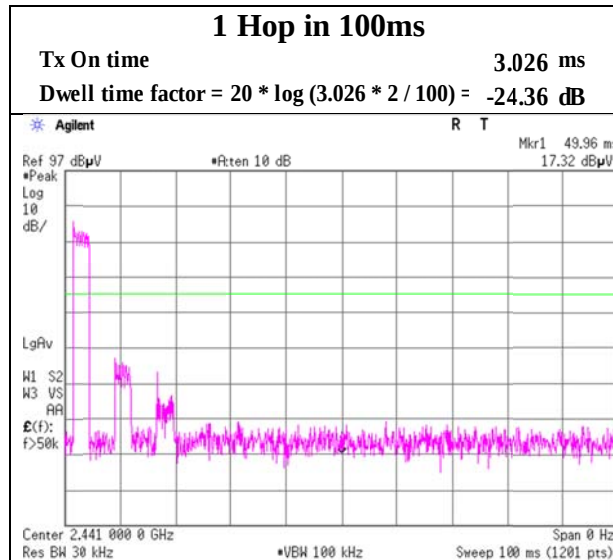
3DH5



Dwell time factor

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11425761H
Date	August 31, 2016
Temperature / Humidity	22 deg. C / 50 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping On

DH5



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”.

Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	149.997	QP	35.8	14.9	8.7	32.0	27.4	43.5	16.1	
Hori	159.976	QP	38.2	15.3	8.8	32.0	30.3	43.5	13.2	
Hori	299.996	QP	54.2	13.4	9.8	31.8	45.6	46.0	0.4	
Hori	399.994	QP	42.3	15.6	10.5	32.1	36.3	46.0	9.7	
Hori	749.992	QP	30.5	20.3	12.3	31.9	31.2	46.0	14.8	
Hori	863.992	QP	30.0	21.4	12.8	31.3	32.9	46.0	13.1	
Hori	2390.000	PK	42.3	27.1	6.7	32.1	44.0	73.9	29.9	
Hori	4804.000	PK	52.2	31.0	9.0	31.3	60.9	73.9	13.0	
Hori	7206.000	PK	41.6	35.7	10.1	32.6	54.8	73.9	19.1	Floor noise
Hori	9608.000	PK	41.3	37.3	10.9	32.6	56.9	73.9	17.0	Floor noise
Hori	2390.000	AV	29.4	27.1	6.7	32.1	31.1	53.9	22.8	
Hori	7206.000	AV	29.3	35.7	10.1	32.6	42.5	53.9	11.4	Floor noise
Hori	9608.000	AV	28.6	37.3	10.9	32.6	44.2	53.9	9.7	Floor noise
Vert	149.998	QP	36.7	14.9	8.7	32.0	28.3	43.5	15.2	
Vert	159.993	QP	39.9	15.3	8.8	32.0	32.0	43.5	11.5	
Vert	299.995	QP	44.5	13.4	9.8	31.8	35.9	46.0	10.1	
Vert	399.995	QP	35.9	15.6	10.5	32.1	29.9	46.0	16.1	
Vert	749.990	QP	31.0	20.3	12.3	31.9	31.7	46.0	14.3	
Vert	935.991	QP	29.3	22.0	13.2	31.0	33.5	46.0	12.5	
Vert	2390.000	PK	42.1	27.1	6.7	32.1	43.8	73.9	30.1	
Vert	4804.000	PK	48.0	31.0	9.0	31.3	56.7	73.9	17.2	
Vert	7206.000	PK	41.6	35.7	10.1	32.6	54.8	73.9	19.1	Floor noise
Vert	9608.000	PK	41.5	37.3	10.9	32.6	57.1	73.9	16.8	Floor noise
Vert	2390.000	AV	29.5	27.1	6.7	32.1	31.2	53.9	22.7	
Vert	7206.000	AV	29.4	35.7	10.1	32.6	42.6	53.9	11.3	Floor noise
Vert	9608.000	AV	28.6	37.3	10.9	32.6	44.2	53.9	9.7	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 $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
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	91.3	27.1	6.7	32.1	93.0	-	-	Carrier
Hori	2400.000	PK	48.0	27.1	6.7	32.1	49.7	73.0	23.3	
Vert	2402.000	PK	92.9	27.1	6.7	32.1	94.6	-	-	Carrier
Vert	2400.000	PK	48.6	27.1	6.7	32.1	50.3	74.6	24.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - 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	43.3	31.0	9.0	31.3	-24.3	27.7	53.9	26.2	*
Vert	4804.000	AV	38.9	31.0	9.0	31.3	-24.3	23.3	53.9	30.6	*

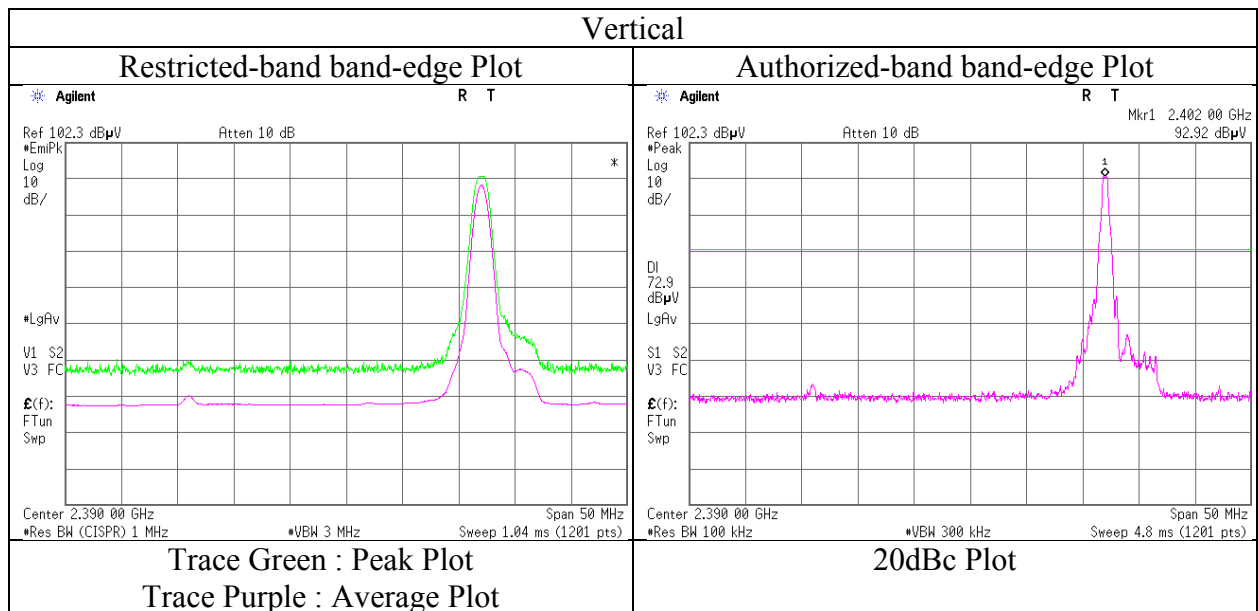
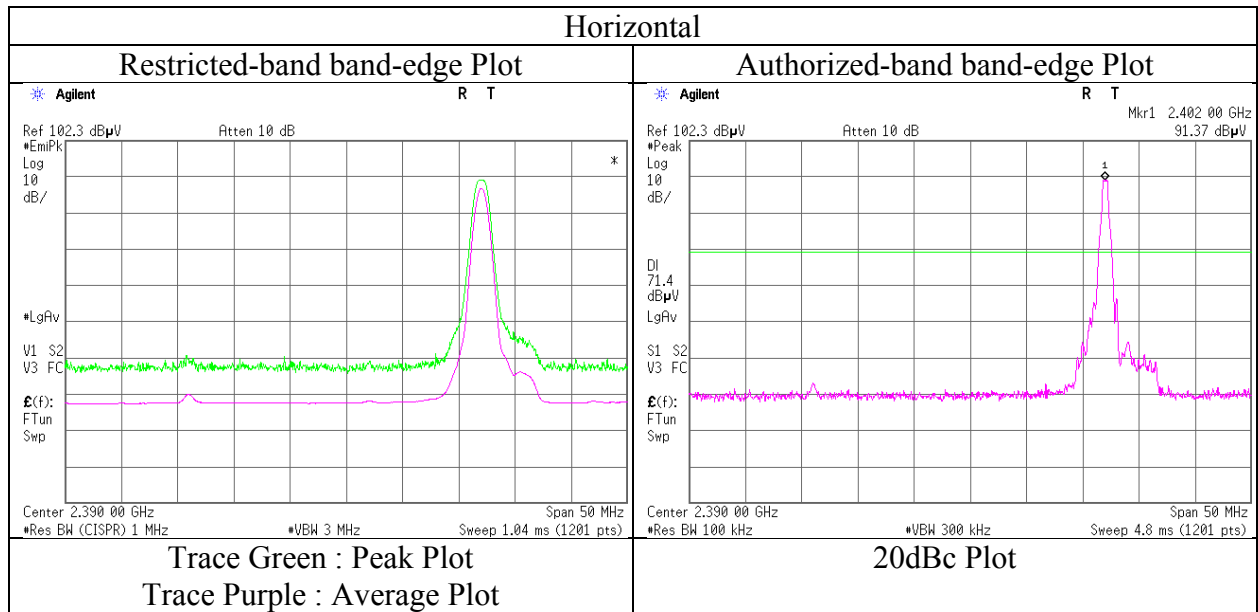
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz))

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

*Above noise was synchronized with carrier frequency.

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11425761H
Date	August 31, 2016
Temperature / Humidity	22 deg. C / 50 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, DH5 2402 MHz



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

UL Japan, Inc.

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	149.997	QP	36.0	14.9	8.7	32.0	27.6	43.5	15.9	
Hori	159.976	QP	36.1	15.3	8.8	32.0	28.2	43.5	15.3	
Hori	299.996	QP	51.6	13.4	9.8	31.8	43.0	46.0	3.0	
Hori	399.994	QP	41.8	15.6	10.5	32.1	35.8	46.0	10.2	
Hori	749.992	QP	30.9	20.3	12.3	31.9	31.6	46.0	14.4	
Hori	863.992	QP	29.2	21.4	12.8	31.3	32.1	46.0	13.9	
Hori	4882.000	PK	50.2	31.2	9.0	31.3	59.1	73.9	14.8	
Hori	7323.000	PK	40.7	35.6	10.1	32.6	53.8	73.9	20.1	Floor noise
Hori	9764.000	PK	40.3	37.2	11.0	32.7	55.8	73.9	18.1	Floor noise
Hori	7323.000	AV	28.5	35.6	10.1	32.6	41.6	53.9	12.3	Floor noise
Hori	9764.000	AV	28.2	37.2	11.0	32.7	43.7	53.9	10.2	Floor noise
Vert	149.998	QP	36.2	14.9	8.7	32.0	27.8	43.5	15.7	
Vert	159.993	QP	38.2	15.3	8.8	32.0	30.3	43.5	13.2	
Vert	299.995	QP	42.5	13.4	9.8	31.8	33.9	46.0	12.1	
Vert	399.995	QP	34.8	15.6	10.5	32.1	28.8	46.0	17.2	
Vert	749.990	QP	32.6	20.3	12.3	31.9	33.3	46.0	12.7	
Vert	935.991	QP	30.6	22.0	13.2	31.0	34.8	46.0	11.2	
Vert	4882.000	PK	47.8	31.2	9.0	31.3	56.7	73.9	17.2	
Vert	7323.000	PK	40.5	35.6	10.1	32.6	53.6	73.9	20.3	Floor noise
Vert	9764.000	PK	40.4	37.2	11.0	32.7	55.9	73.9	18.0	Floor noise
Vert	7323.000	AV	28.5	35.6	10.1	32.6	41.6	53.9	12.3	Floor noise
Vert	9764.000	AV	28.1	37.2	11.0	32.7	43.6	53.9	10.3	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 (4.5 m / 3.0 m) = 3.53 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	4882.000	AV	42.1	31.2	9.0	31.3	-24.3	26.7	53.9	27.2	*
Vert	4882.000	AV	40.3	31.2	9.0	31.3	-24.3	24.9	53.9	29.0	*

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 (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5dB

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

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	149.997	QP	34.4	14.9	8.7	32.0	26.0	43.5	17.5	
Hori	159.976	QP	36.2	15.3	8.8	32.0	28.3	43.5	15.2	
Hori	288.000	QP	40.2	13.2	9.8	31.8	31.4	46.0	14.6	
Hori	299.996	QP	52.0	13.4	9.8	31.8	43.4	46.0	2.6	
Hori	399.994	QP	40.0	15.6	10.5	32.1	34.0	46.0	12.0	
Hori	749.992	QP	31.4	20.3	12.3	31.9	32.1	46.0	13.9	
Hori	2483.500	PK	47.3	27.2	6.8	32.1	49.2	73.9	24.7	
Hori	4960.000	PK	47.3	31.4	9.1	31.2	56.6	73.9	17.3	
Hori	7440.000	PK	41.0	35.6	10.1	32.7	54.0	73.9	19.9	Floor noise
Hori	9920.000	PK	40.8	37.1	11.1	32.8	56.2	73.9	17.7	Floor noise
Hori	2483.500	AV	36.1	27.2	6.8	32.1	38.0	53.9	15.9	
Hori	7440.000	AV	29.1	35.6	10.1	32.7	42.1	53.9	11.8	Floor noise
Hori	9920.000	AV	28.5	37.1	11.1	32.8	43.9	53.9	10.0	Floor noise
Vert	149.998	QP	36.0	14.9	8.7	32.0	27.6	43.5	15.9	
Vert	159.993	QP	38.2	15.3	8.8	32.0	30.3	43.5	13.2	
Vert	299.995	QP	42.8	13.4	9.8	31.8	34.2	46.0	11.8	
Vert	399.995	QP	34.5	15.6	10.5	32.1	28.5	46.0	17.5	
Vert	749.990	QP	32.8	20.3	12.3	31.9	33.5	46.0	12.5	
Vert	935.991	QP	30.2	22.0	13.2	31.0	34.4	46.0	11.6	
Vert	2483.500	PK	46.8	27.2	6.8	32.1	48.7	73.9	25.2	
Vert	4960.000	PK	45.6	31.4	9.1	31.2	54.9	73.9	19.0	
Vert	7440.000	PK	40.9	35.6	10.1	32.7	53.9	73.9	20.0	Floor noise
Vert	9920.000	PK	40.4	37.1	11.1	32.8	55.8	73.9	18.1	Floor noise
Vert	2483.500	AV	35.6	27.2	6.8	32.1	37.5	53.9	16.4	
Vert	7440.000	AV	29.1	35.6	10.1	32.7	42.1	53.9	11.8	Floor noise
Vert	9920.000	AV	28.5	37.1	11.1	32.8	43.9	53.9	10.0	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 $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
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	4960.000	AV	39.6	31.4	9.1	31.2	-24.3	24.6	53.9	29.3	*
Vert	4960.000	AV	37.8	31.4	9.1	31.2	-24.3	22.8	53.9	31.1	*

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.

Distance factor: 1 GHz - 10 GHz $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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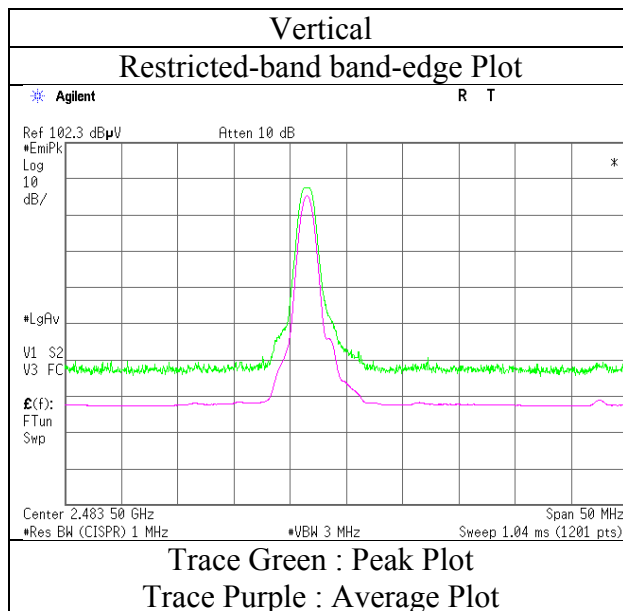
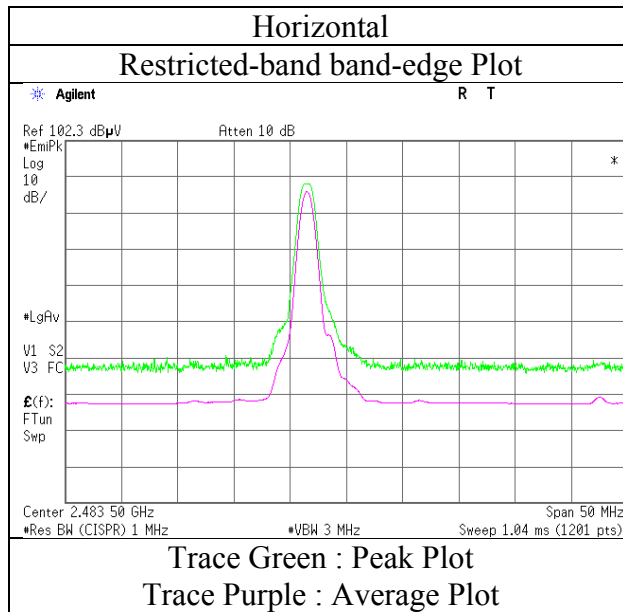
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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11425761H
Date	August 31, 2016
Temperature / Humidity	22 deg. C / 50 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, DH5 2480 MHz



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

UL Japan, Inc.

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	95.224	QP	49.0	9.2	8.2	32.1	34.3	43.5	9.2	
Hori	113.664	QP	46.9	12.0	8.4	32.1	35.2	43.5	8.3	
Hori	149.997	QP	47.3	14.9	8.7	32.0	38.9	43.5	4.6	
Hori	255.998	QP	47.5	12.5	9.6	31.9	37.7	46.0	8.3	
Hori	299.996	QP	51.1	13.4	9.8	31.8	42.5	46.0	3.5	
Hori	399.994	QP	39.9	15.6	10.5	32.1	33.9	46.0	12.1	
Hori	2390.000	PK	42.2	27.1	6.7	32.1	43.9	73.9	30.0	
Hori	4804.000	PK	40.4	31.0	9.0	31.3	49.1	73.9	24.8	Floor noise
Hori	7206.000	PK	41.6	35.7	10.1	32.6	54.8	73.9	19.1	Floor noise
Hori	9608.000	PK	41.3	37.3	10.9	32.6	56.9	73.9	17.0	Floor noise
Hori	2390.000	AV	29.4	27.1	6.7	32.1	31.1	53.9	22.8	
Hori	4804.000	AV	28.0	31.0	9.0	31.3	36.7	53.9	17.2	Floor noise
Hori	7206.000	AV	29.3	35.7	10.1	32.6	42.5	53.9	11.4	Floor noise
Hori	9608.000	AV	28.6	37.3	10.9	32.6	44.2	53.9	9.7	Floor noise
Vert	95.224	QP	50.1	9.2	8.2	32.1	35.4	43.5	8.1	
Vert	132.101	QP	42.6	13.9	8.6	32.0	33.1	43.5	10.4	
Vert	149.997	QP	47.6	14.9	8.7	32.0	39.2	43.5	4.3	
Vert	299.995	QP	43.2	13.4	9.8	31.8	34.6	46.0	11.4	
Vert	399.995	QP	34.8	15.6	10.5	32.1	28.8	46.0	17.2	
Vert	935.991	QP	30.2	22.0	13.2	31.0	34.4	46.0	11.6	
Vert	2390.000	PK	42.1	27.1	6.7	32.1	43.8	73.9	30.1	
Vert	4804.000	PK	40.4	31.0	9.0	31.3	49.1	73.9	24.8	Floor noise
Vert	7206.000	PK	41.6	35.7	10.1	32.6	54.8	73.9	19.1	Floor noise
Vert	9608.000	PK	41.5	37.3	10.9	32.6	57.1	73.9	16.8	Floor noise
Vert	2390.000	AV	29.3	27.1	6.7	32.1	31.0	53.9	22.9	
Vert	4804.000	AV	27.8	31.0	9.0	31.3	36.5	53.9	17.4	Floor noise
Vert	7206.000	AV	29.4	35.7	10.1	32.6	42.6	53.9	11.3	Floor noise
Vert	9608.000	AV	28.6	37.3	10.9	32.6	44.2	53.9	9.7	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 $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
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	87.8	27.1	6.7	32.1	89.5	-	-	Carrier
Hori	2400.000	PK	41.2	27.1	6.7	32.1	42.9	69.5	26.6	
Vert	2402.000	PK	87.4	27.1	6.7	32.1	89.1	-	-	Carrier
Vert	2400.000	PK	41.2	27.1	6.7	32.1	42.9	69.1	26.2	

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

***These results have sufficient margin without taking account Dwell time factor.**

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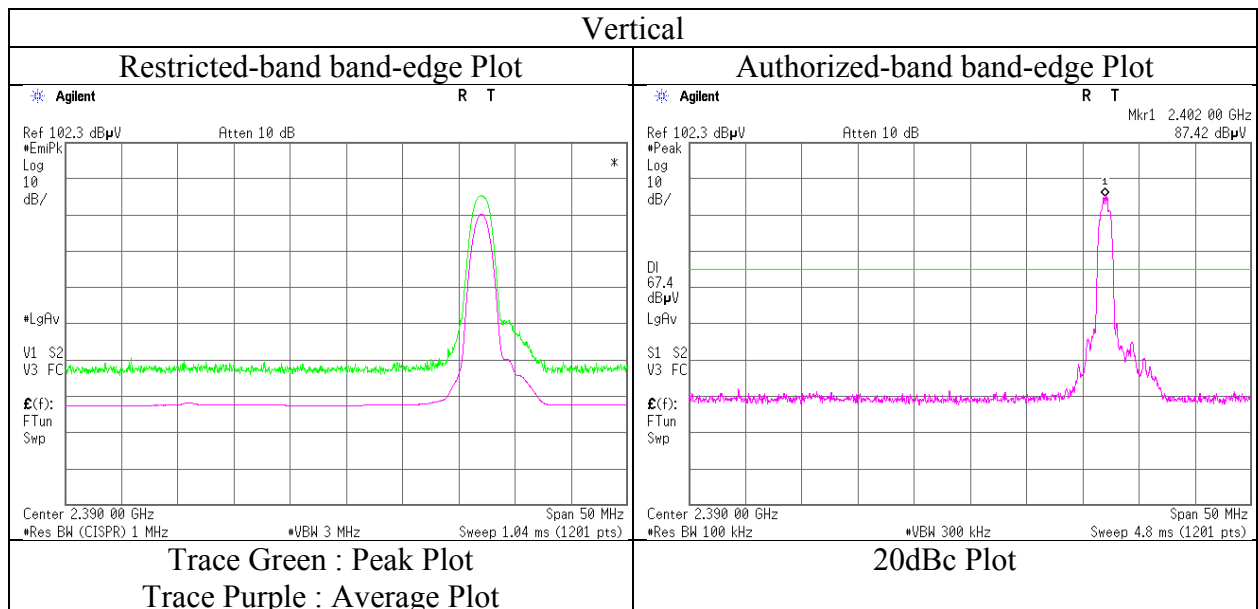
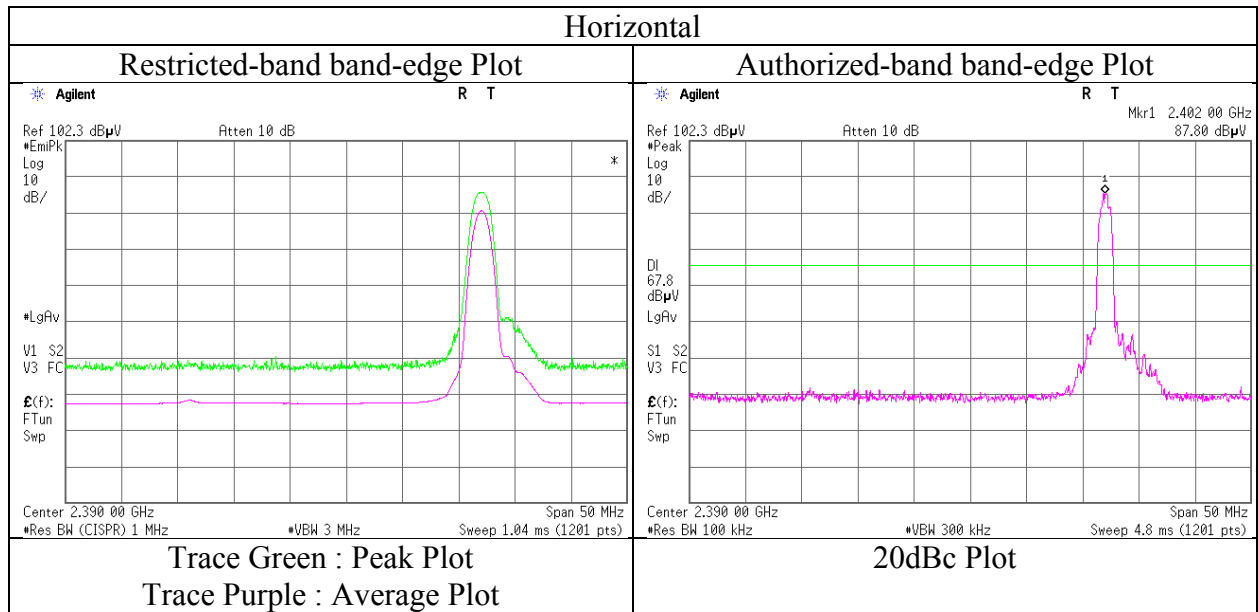
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11425761H
Date	August 31, 2016
Temperature / Humidity	22 deg. C / 50 % RH
Engineer	Tomoki Matsui
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

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	95.224	QP	49.2	9.2	8.2	32.1	34.5	43.5	9.0	
Hori	113.664	QP	48.4	12.0	8.4	32.1	36.7	43.5	6.8	
Hori	149.997	QP	47.7	14.9	8.7	32.0	39.3	43.5	4.2	
Hori	255.998	QP	50.9	12.5	9.6	31.9	41.1	46.0	4.9	
Hori	299.996	QP	47.9	13.4	9.8	31.8	39.3	46.0	6.7	
Hori	399.994	QP	41.2	15.6	10.5	32.1	35.2	46.0	10.8	
Hori	4882.000	PK	40.3	31.2	9.0	31.3	49.2	73.9	24.7	Floor noise
Hori	7323.000	PK	40.7	35.6	10.1	32.6	53.8	73.9	20.1	Floor noise
Hori	9764.000	PK	40.3	37.2	11.0	32.7	55.8	73.9	18.1	Floor noise
Hori	4882.000	AV	29.0	31.2	9.0	31.3	37.9	53.9	16.0	Floor noise
Hori	7323.000	AV	28.5	35.6	10.1	32.6	41.6	53.9	12.3	Floor noise
Hori	9764.000	AV	28.2	37.2	11.0	32.7	43.7	53.9	10.2	Floor noise
Vert	95.224	QP	50.6	9.2	8.2	32.1	35.9	43.5	7.6	
Vert	132.101	QP	43.3	13.9	8.6	32.0	33.8	43.5	9.7	
Vert	149.997	QP	48.0	14.9	8.7	32.0	39.6	43.5	3.9	
Vert	299.995	QP	43.3	13.4	9.8	31.8	34.7	46.0	11.3	
Vert	399.995	QP	37.9	15.6	10.5	32.1	31.9	46.0	14.1	
Vert	935.991	QP	29.9	22.0	13.2	31.0	34.1	46.0	11.9	
Vert	4882.000	PK	40.4	31.2	9.0	31.3	49.3	73.9	24.6	Floor noise
Vert	7323.000	PK	40.5	35.6	10.1	32.6	53.6	73.9	20.3	Floor noise
Vert	9764.000	PK	40.4	37.2	11.0	32.7	55.9	73.9	18.0	Floor noise
Vert	4882.000	AV	28.9	31.2	9.0	31.3	37.8	53.9	16.1	Floor noise
Vert	7323.000	AV	28.5	35.6	10.1	32.6	41.6	53.9	12.3	Floor noise
Vert	9764.000	AV	28.1	37.2	11.0	32.7	43.6	53.9	10.3	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 $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

***These results have sufficient margin without taking account Dwell time factor.**

Radiated Spurious Emission

Test place : Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 11425761H
Date : August 31, 2016 September 1, 2016
Temperature / Humidity : 22 deg. C / 50 % RH 22 deg. C / 50 % RH
Engineer : Tomoki Matsui Tomoki Matsui
(Above 1GHz) (Below 1GHz)
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	95.224	QP	46.3	9.2	8.2	32.1	31.6	43.5	11.9	
Hori	113.664	QP	44.8	12.0	8.4	32.1	33.1	43.5	10.4	
Hori	149.997	QP	43.4	14.9	8.7	32.0	35.0	43.5	8.5	
Hori	255.998	QP	49.3	12.5	9.6	31.9	39.5	46.0	6.5	
Hori	299.996	QP	47.5	13.4	9.8	31.8	38.9	46.0	7.1	
Hori	399.994	QP	40.9	15.6	10.5	32.1	34.9	46.0	11.1	
Hori	2483.500	PK	49.9	27.2	6.8	32.1	51.8	73.9	22.1	
Hori	4960.000	PK	40.9	31.4	9.1	31.2	50.2	73.9	23.7	Floor noise
Hori	7440.000	PK	41.0	35.6	10.1	32.7	54.0	73.9	19.9	Floor noise
Hori	9920.000	PK	40.8	37.1	11.1	32.8	56.2	73.9	17.7	Floor noise
Hori	2483.500	AV	37.1	27.2	6.8	32.1	39.0	53.9	14.9	
Hori	4960.000	AV	29.0	31.4	9.1	31.2	38.3	53.9	15.6	Floor noise
Hori	7440.000	AV	29.1	35.6	10.1	32.7	42.1	53.9	11.8	Floor noise
Hori	9920.000	AV	28.5	37.1	11.1	32.8	43.9	53.9	10.0	Floor noise
Vert	58.366	QP	44.5	8.0	7.7	32.1	28.1	40.0	11.9	
Vert	95.224	QP	48.8	9.2	8.2	32.1	34.1	43.5	9.4	
Vert	149.997	QP	43.2	14.9	8.7	32.0	34.8	43.5	8.7	
Vert	299.995	QP	43.6	13.4	9.8	31.8	35.0	46.0	11.0	
Vert	749.988	QP	29.5	20.3	12.3	31.9	30.2	46.0	15.8	
Vert	935.991	QP	29.8	22.0	13.2	31.0	34.0	46.0	12.0	
Vert	2483.500	PK	49.2	27.2	6.8	32.1	51.1	73.9	22.8	
Vert	4960.000	PK	41.0	31.4	9.1	31.2	50.3	73.9	23.6	Floor noise
Vert	7440.000	PK	40.9	35.6	10.1	32.7	53.9	73.9	20.0	Floor noise
Vert	9920.000	PK	40.4	37.1	11.1	32.8	55.8	73.9	18.1	Floor noise
Vert	2483.500	AV	36.5	27.2	6.8	32.1	38.4	53.9	15.5	
Vert	4960.000	AV	29.1	31.4	9.1	31.2	38.4	53.9	15.5	Floor noise
Vert	7440.000	AV	29.1	35.6	10.1	32.7	42.1	53.9	11.8	Floor noise
Vert	9920.000	AV	28.5	37.1	11.1	32.8	43.9	53.9	10.0	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 $20\log(4.5\text{ m} / 3.0\text{ m}) = 3.53\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

***These results have sufficient margin without taking account Dwell time factor.**

UL Japan, Inc.

Ise EMC Lab.

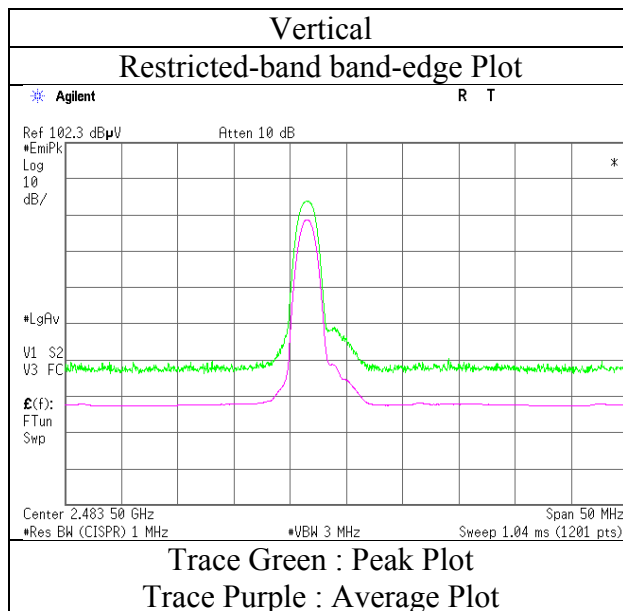
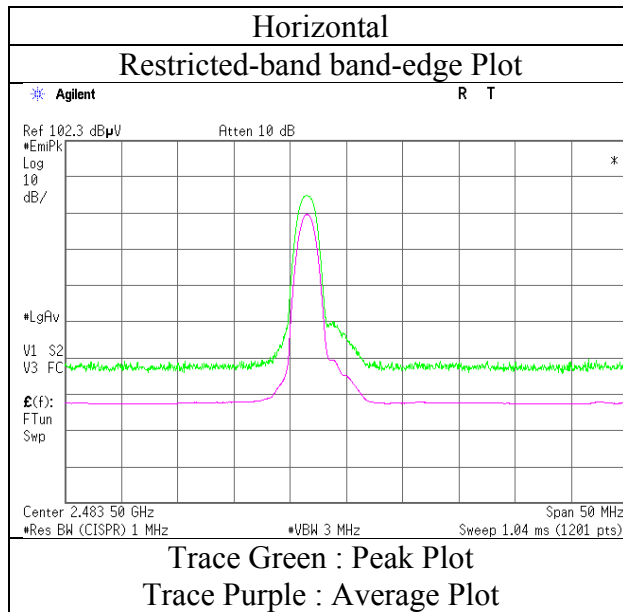
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Radiated Spurious Emission (Reference Plot for band-edge)

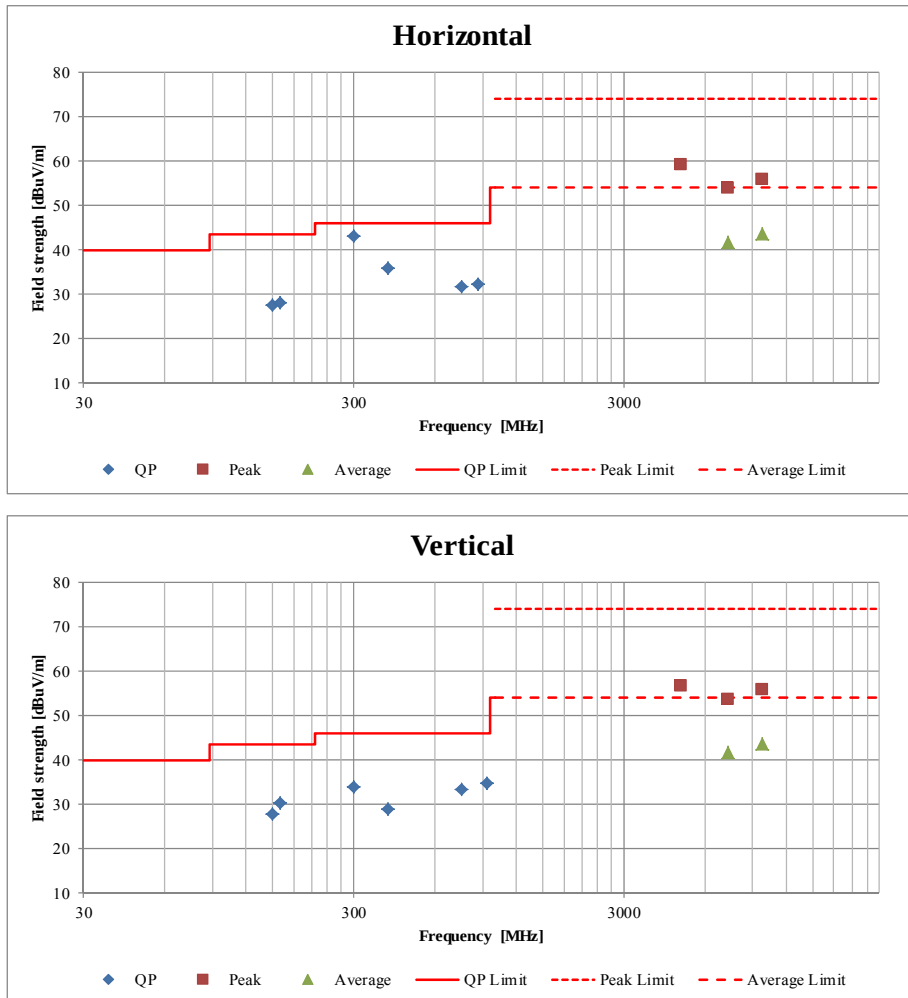
Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber
Report No.	11425761H
Date	August 31, 2016
Temperature / Humidity	22 deg. C / 50 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, 3DH5 2480 MHz



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

Radiated Spurious Emission **(Plot data, Worst case)**

Test place	Ise EMC Lab. No.4 Semi Anechoic Chamber		
Report No.	11425761H		
Date	August 31, 2016	September 1, 2016	
Temperature / Humidity	22 deg. C / 50 % RH	22 deg. C / 50 % RH	
Engineer	Tomoki Matsui	Tomoki Matsui	
	(Above 1GHz)	(Below 1GHz)	
Mode	Tx, Hopping Off, DH5 2441 MHz		

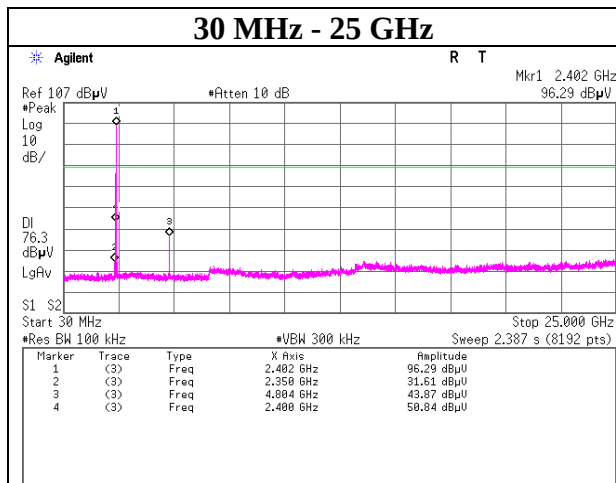
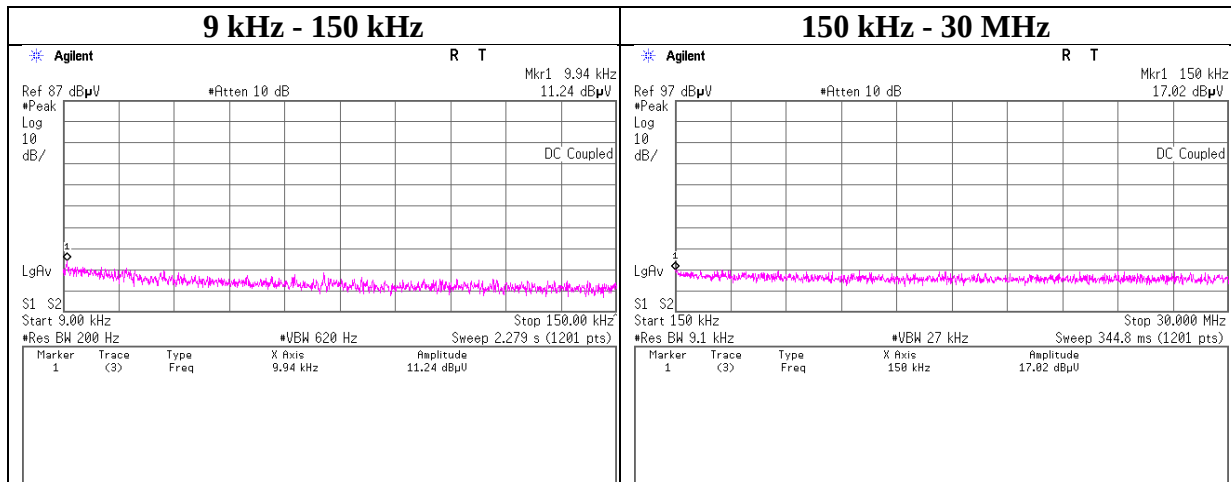


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11425761H
Date	September 6, 2016
Temperature / Humidity	24 deg. C / 64 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, DH5

2402 MHz



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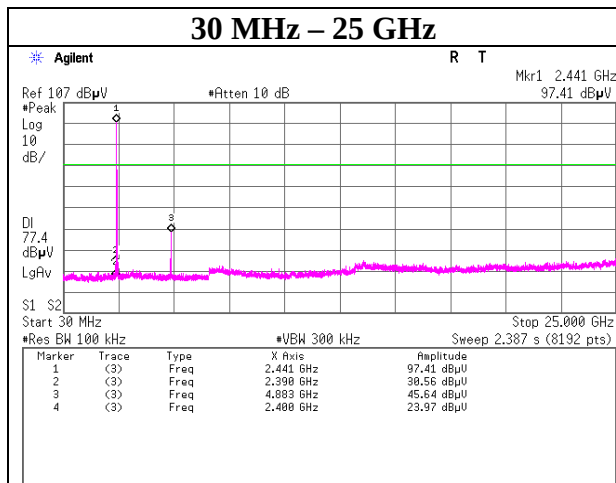
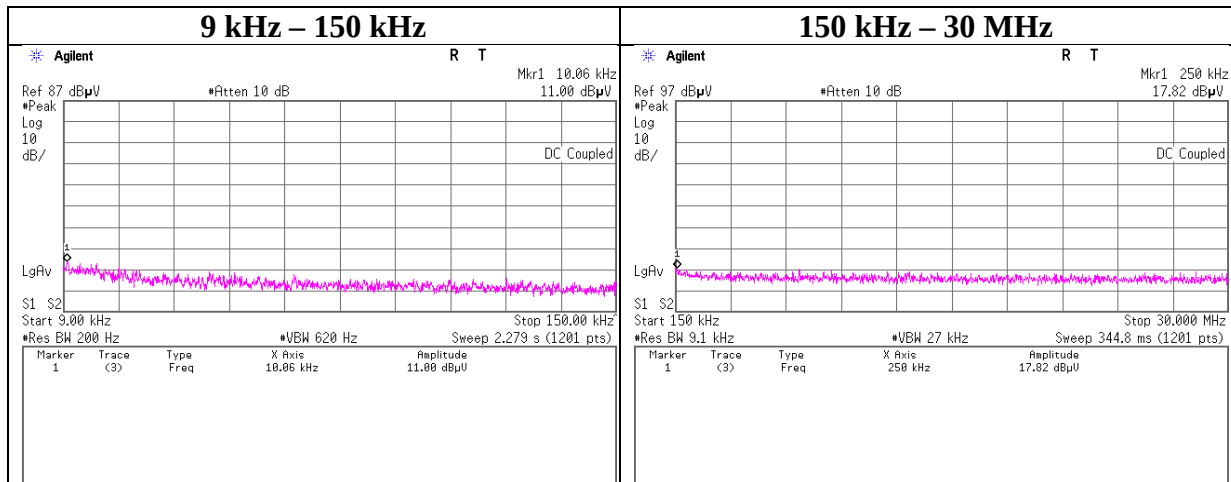
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, DH5

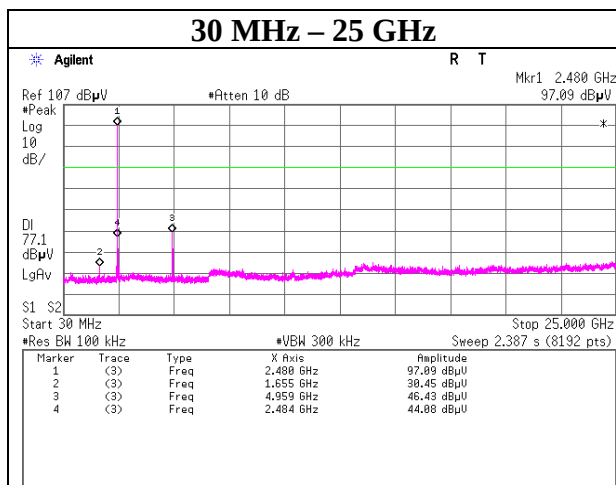
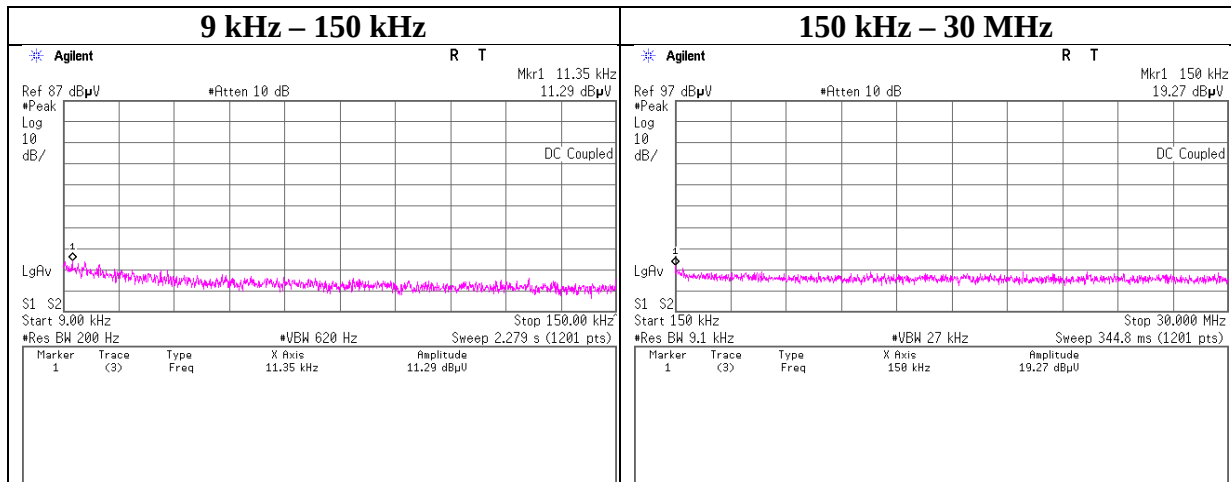
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, DH5

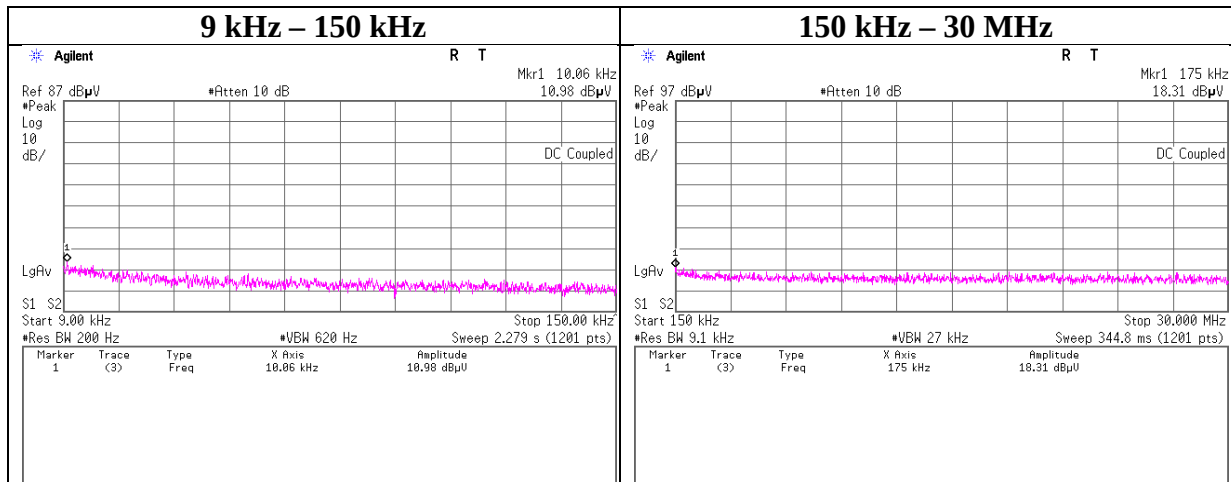
2480 MHz



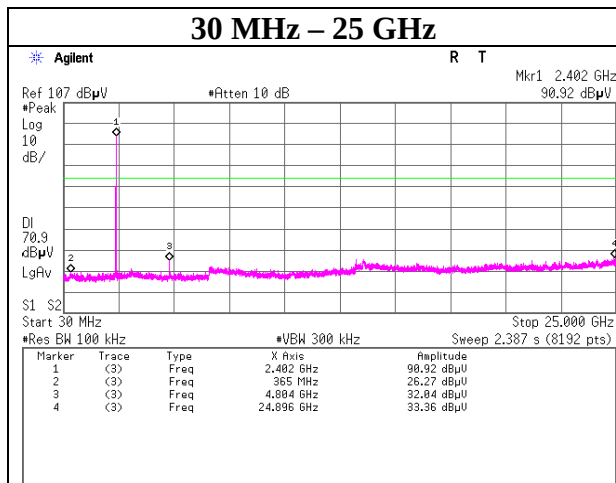
Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, 3DH5

2402 MHz



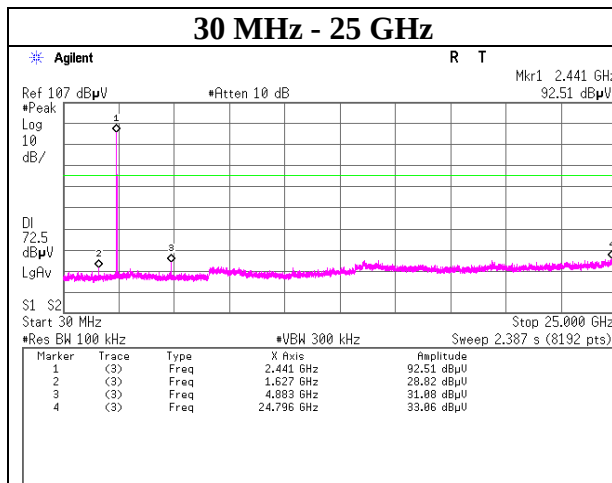
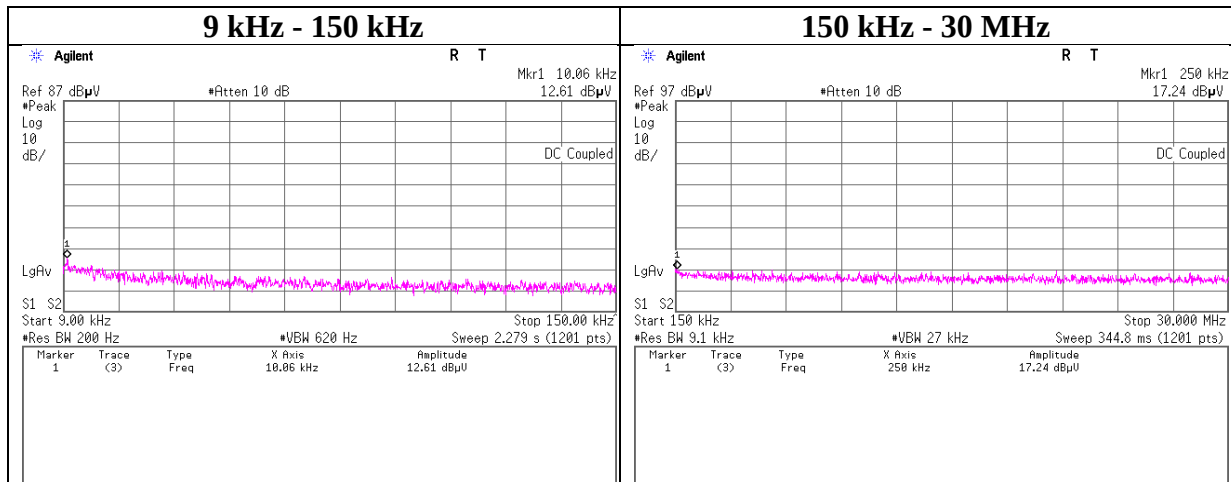
30 MHz – 25 GHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, 3DH5

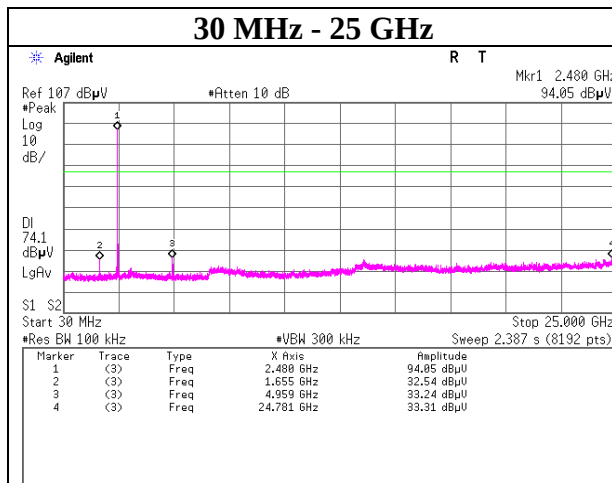
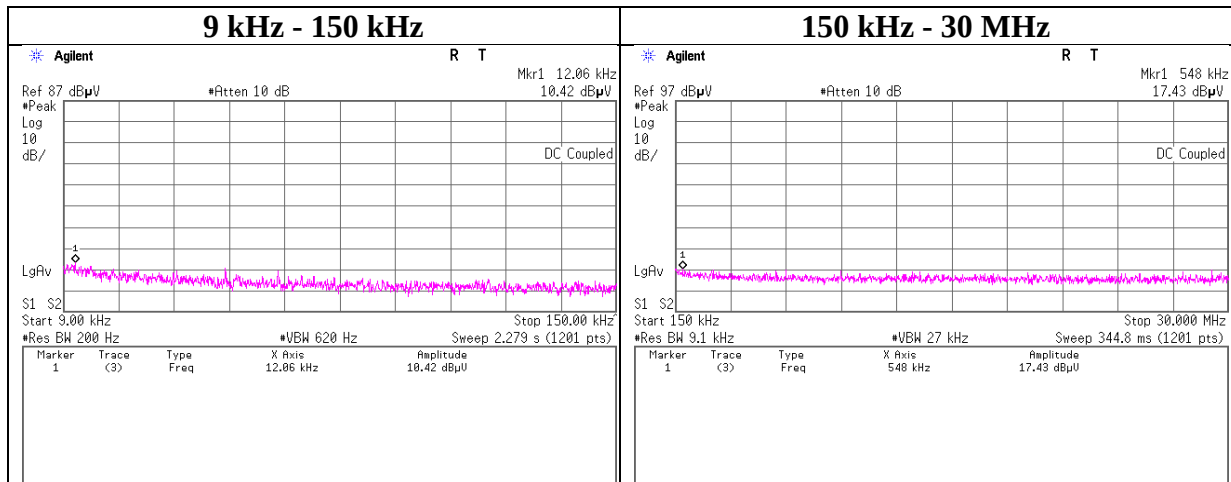
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx, Hopping Off, 3DH5

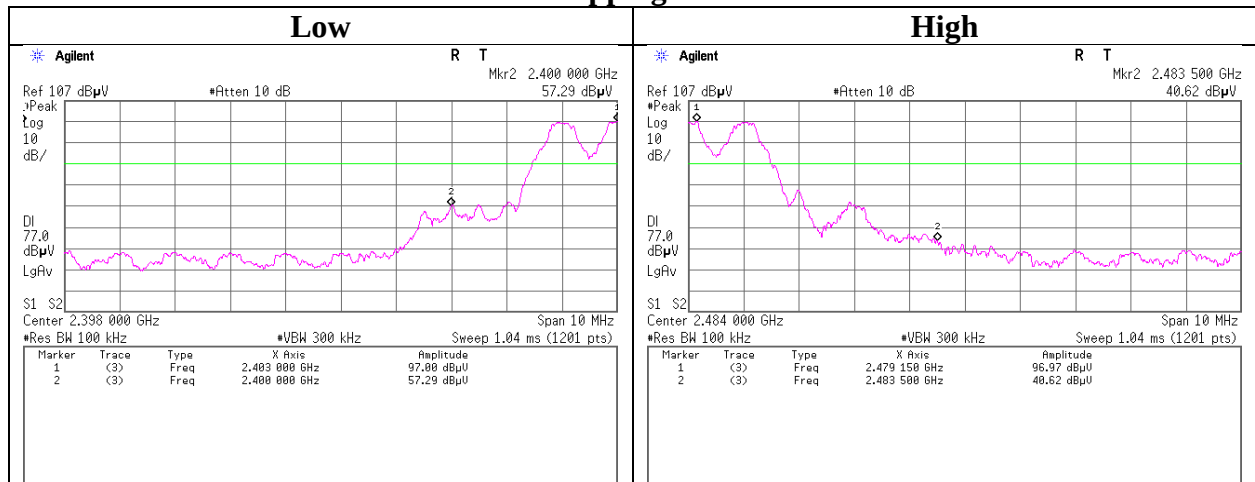
2480 MHz



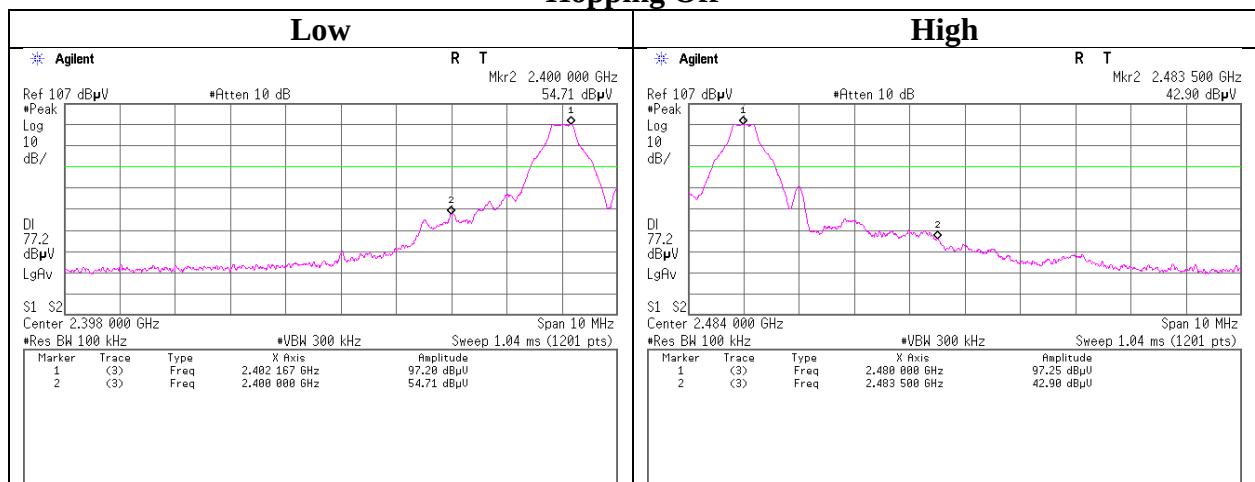
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx DH5

Hopping On



Hopping Off



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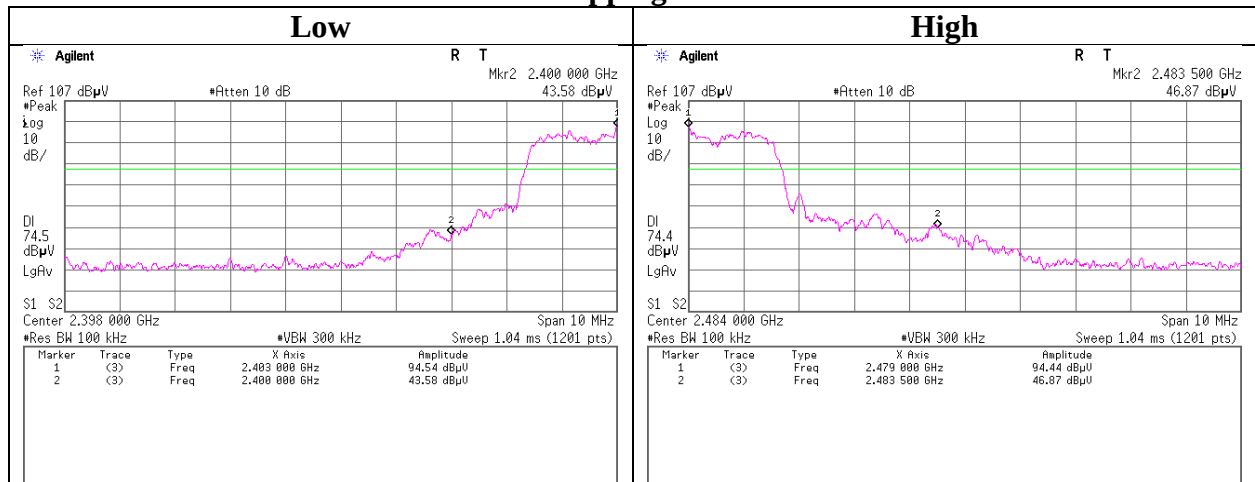
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

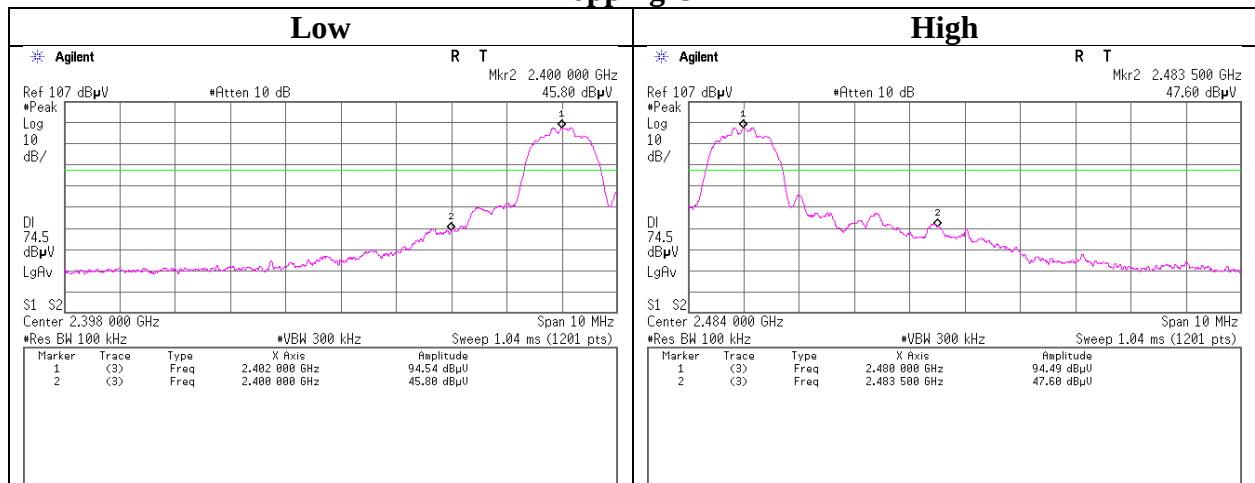
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11425761H
Date : September 6, 2016
Temperature / Humidity : 24 deg. C / 64 % RH
Engineer : Tomoki Matsui
Mode : Tx 3DH5

Hopping On



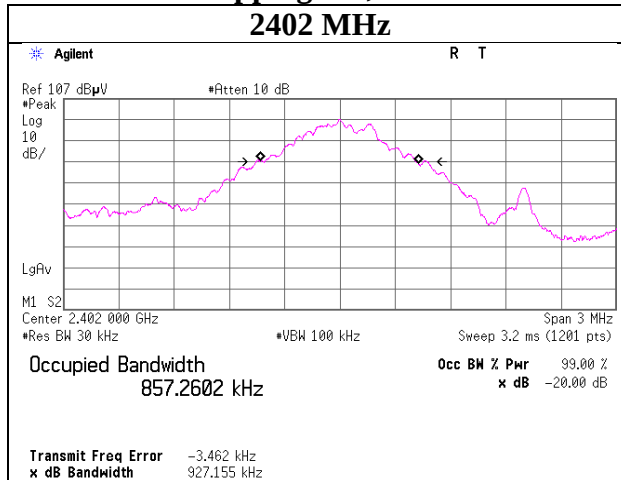
Hopping Off



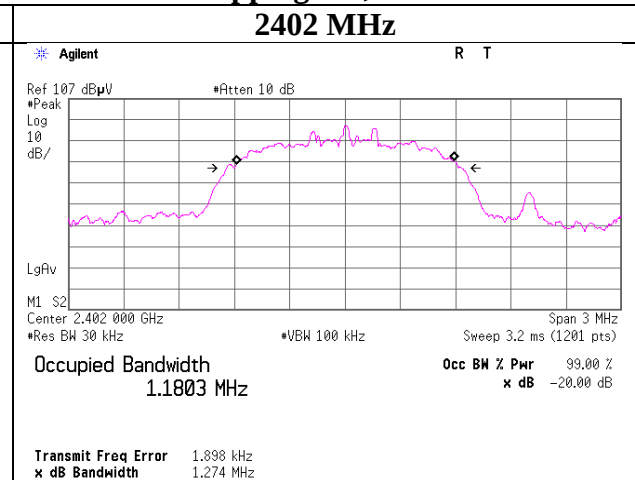
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11425761H
Date	September 6, 2016
Temperature / Humidity	24 deg. C / 64 % RH
Engineer	Tomoki Matsui
Mode	Tx Hopping Off

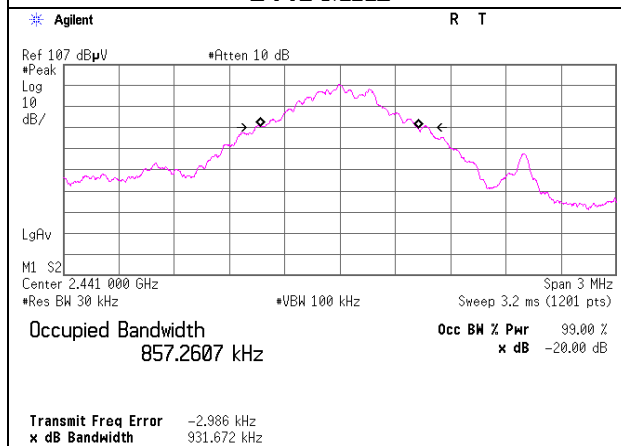
Hopping Off, DH5



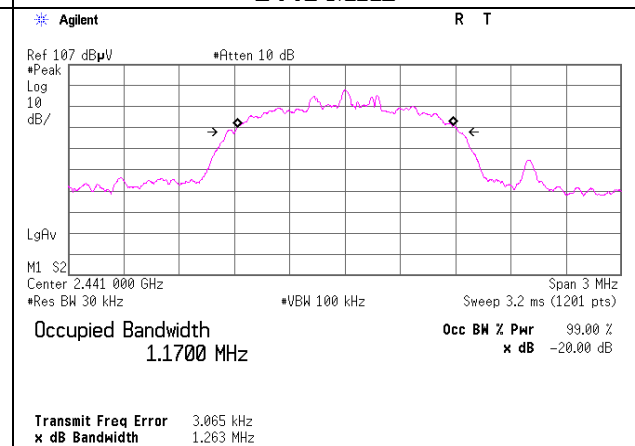
Hopping Off, 3DH5



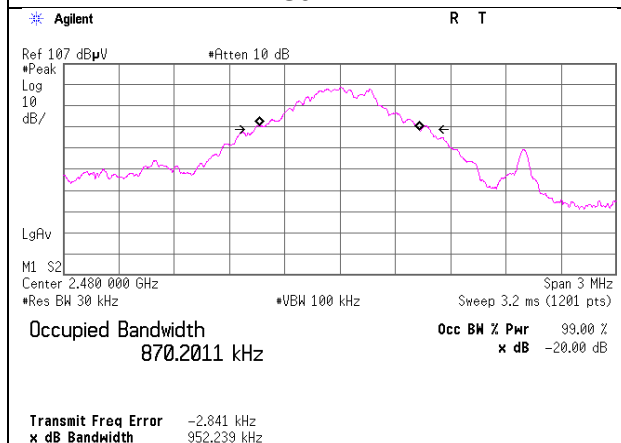
2441 MHz



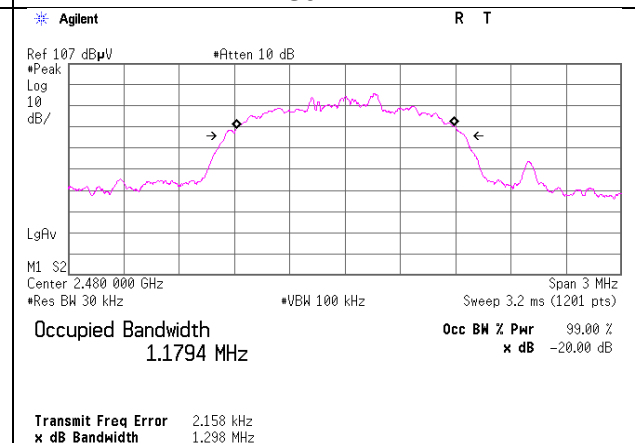
2441 MHz



2480 MHz



2480 MHz



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Ise EMC Lab.

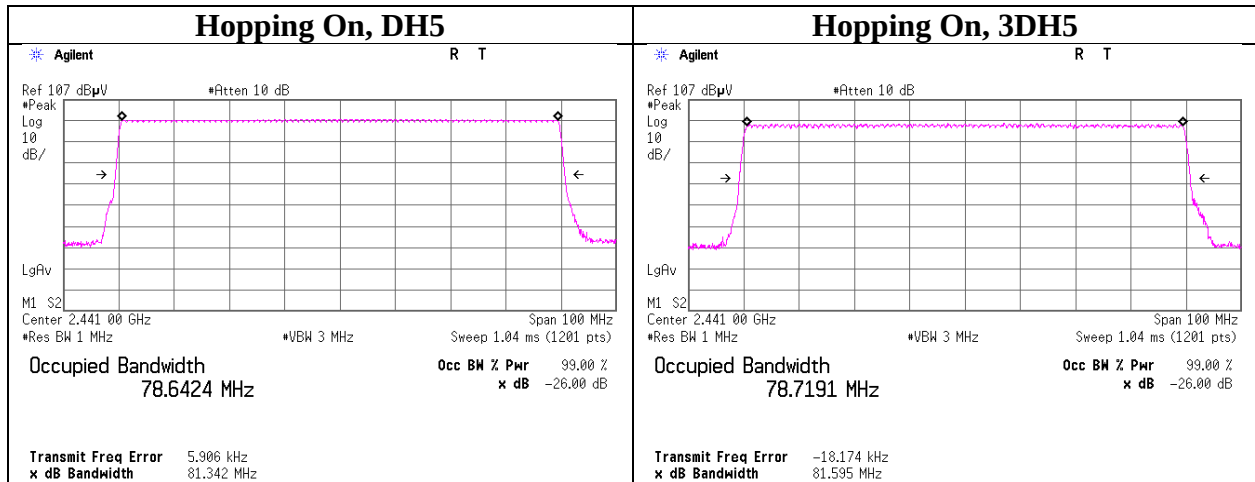
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11425761H
Date	September 6, 2016
Temperature / Humidity	24 deg. C / 64 % 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	2015/10/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	1501	RE	2016/01/21 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2016/08/17 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2016/05/29 * 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	2015/10/01 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2016/06/24 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2016/01/18 * 12
MTR-10	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	RE	2016/01/29 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2015/11/02 * 12
MLA-23	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-192	RE	2016/01/30 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2016/06/20 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2016/03/18 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 12
MSA-15	Spectrum Analyzer	Agilent	E4440A	MY46187105	AT	2015/11/11 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2016/06/06 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2016/06/06 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2016/04/18 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2016/03/18 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2016/01/21 * 12
MMM-16	DIGITAL HiTESTER	Hioki	3805	070900532	AT	2016/01/13 * 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**

UL Japan, Inc.

Ise EMC Lab.

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