



RADIO TEST REPORT

Test Report No. : 11051899H-B

Applicant : FUJITSU TEN LIMITED
Type of Equipment : Car Navigation
Model No. : FT0102A
FCC ID : BABFT0102A
Test regulation : FCC Part 15 Subpart C: 2015
*Bluetooth part
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This 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: December 22, 2015 to
January 9, 2016

Representative test engineer:

Kazuya Yoshioka
Engineer
Consumer Technology Division

Approved by:

Takahiro Hatakeda
Leader
Consumer Technology Division



NVLAP LAB CODE: 200572-0

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Ise EMC Lab.

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11051899H-B

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SECTION 1: Customer information

Company Name	:	FUJITSU TEN LIMITED
Address	:	2-28, Goshō-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 Navigation
Model No.	:	FT0102A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	December 16, 2015
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system	:	389.49MHz, 26 MHz
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Radio Specification

[WLAN (IEEE802.11b/g/n-20)]

Radio Type	:	Transceiver
Frequency of Operation	:	2412-2462MHz
Modulation	:	DSSS / OFDM
Power Supply (radio part input)	:	DC 3.3V
Antenna type	:	Inverted F Antenna
Antenna Gain	:	-0.21dBi (MAX)

[Bluetooth (Ver. 3.0 with EDR function)]

Radio Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC 3.3V
Antenna type	:	Inverted F Antenna
Antenna Gain	:	0.03dBi (MAX)

[GPS]

Radio Type	:	Receiver
Frequency of Operation	:	1575.42MHz
Modulation	:	DSS
Power Supply (radio part input)	:	DC 12V

* This test report applies for Bluetooth.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on November 23, 2015
 *Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision does not affect the test specification applied to the EUT.

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

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)	Complied	-
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	5.1 dB 803.332 MHz, QP, Vertical.	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).

FCC 15.31 (e)

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

FCC Part 15.203 Antenna requirement

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

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.

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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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Polarity	Radiated emission (Below 1GHz)			
	(3 m*)(±dB)		(10 m*)(±dB)	
	30 – 300 MHz	300 – 1000MHz	30 – 300 MHz	300 – 1000MHz
Horizontal	4.8 dB	5.2 dB	4.8 dB	5.0 dB
Vertical	4.5 dB	5.9 dB	4.8 dB	5.1 dB

Radiated emission				
(3 m*)(±dB)		(1 m*)(±dB)	(0.5 m*)(±dB)	(10 m*)(±dB)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.1 dB	5.3 dB	5.1 dB	5.1 dB	5.3 dB

*Measurement distance

Radiated emission test

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

3.5 Test Location

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

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

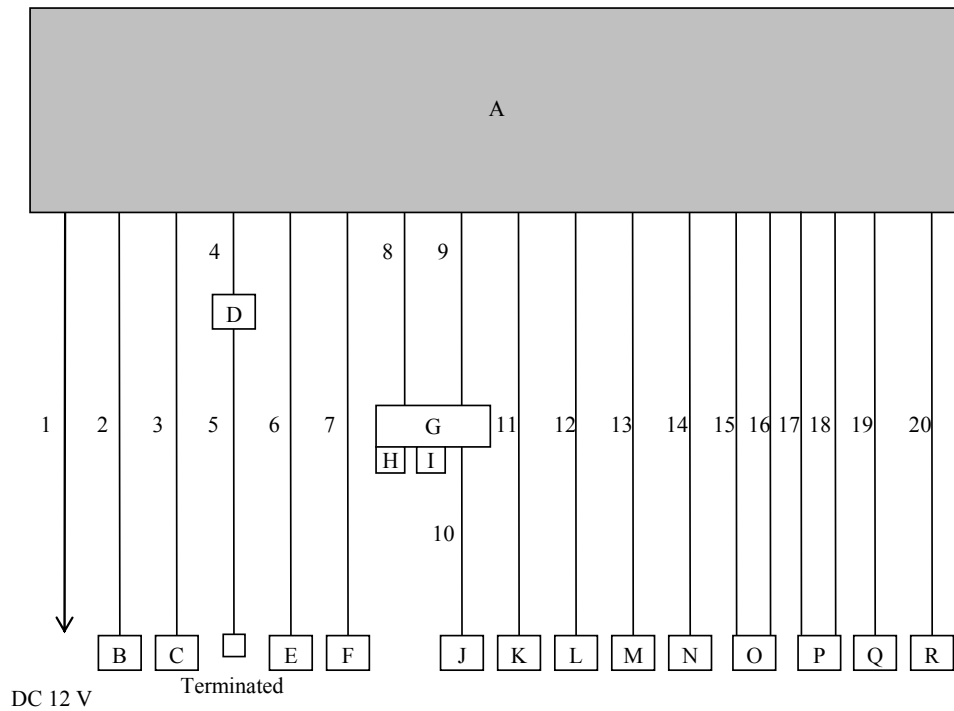
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
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: Power: Ext,Int, DH5: 0,51, 3DH5: 0,49 Software: Bluetest3 ver 2.4.0.0 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

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Navigation	FT0102A	AMA00007	FUJITSU TEN LIMITED	EUT
B	XM Antenna	A258124	-	-	-
C	GPS Antenna	195000-0180A700	OH59	FUJITSU TEN LIMITED	-
D	Impedance converter	-	-	-	-
E	Air-conditioner ECU	88650-50B70	KK1008011	DENSO	-
F	Steering Switch	-	-	Panasonic	-
G	VTR jack	86190-400AO	1158	-	-
H	USB memory	RUF-C256M/U2	A5040903538	BUFFALO	-
I	USB memory	RUF2-JV4GS-WH	I21101	BUFFALO	-
J	iPod touch	A1367	C3RJ4SLADT75	Apple	-
K	Speaker	E505SSP	47312	FUJITSU TEN LIMITED	-
L	Speaker	E503SSP	93214	FUJITSU TEN LIMITED	-
M	Mic	-	-	-	-
N	Switch	-	-	-	-
O	DCM	86741-48030	8KYKY930847	DENSO	-
P	Separate Display	86111-785A1	1006	Panasonic	-
Q	Haptic	84780-76040-CO	08P23	DENSO	-
R	Rear Camera	86790-76010	1ZCO1921	-	-

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List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	6.4	Unshielded	Unshielded	-
2	XM Antenna Cable	7.9	Shielded	Shielded	-
3	GPS Antenna Cable	6.8	Shielded	Shielded	-
4	FM Antenna Cable	0.3	Shielded	Shielded	-
5	BNC Cable	1.0	Shielded	Shielded	-
6	Signal Cable	3.4	Unshielded	Unshielded	-
7	Signal Cable	3.4	Unshielded	Unshielded	-
8	Signal Cable	3.4	Unshielded	Unshielded	-
9	USB Cable	2.0	Shielded	Shielded	-
10	Audio Cable	1.5	Unshielded	Unshielded	-
11	Speaker Cable	5.4	Unshielded	Unshielded	-
12	Speaker Cable	5.4	Unshielded	Unshielded	-
13	Signal Cable	4.9	Unshielded	Unshielded	-
14	Signal Cable	4.9	Unshielded	Unshielded	-
15	Signal Cable	3.4	Unshielded	Unshielded	-
16	Signal Cable	3.5	Unshielded	Unshielded	-
17	Signal Cable	3.4	Unshielded	Unshielded	-
18	Signal Cable	3.5	Unshielded	Unshielded	-
19	Signal Cable	3.4	Unshielded	Unshielded	-
20	Signal Cable	3.5	Unshielded	Unshielded	-

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

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	4.4 m *2)(below 10 GHz), 1 m*3) (above 10 GHz)		4.4 m *2) (below 10 GHz), 1 m*3) (above 10 GHz)

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

*2) Distance Factor: $20 \times \log(4.4 \text{ m} / 3.0 \text{ m}) = 3.3 \text{ dB}$

*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 M - 26.5 GHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

*2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

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

*3) Reference data

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

Test data : APPENDIX

Test result : Pass

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APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

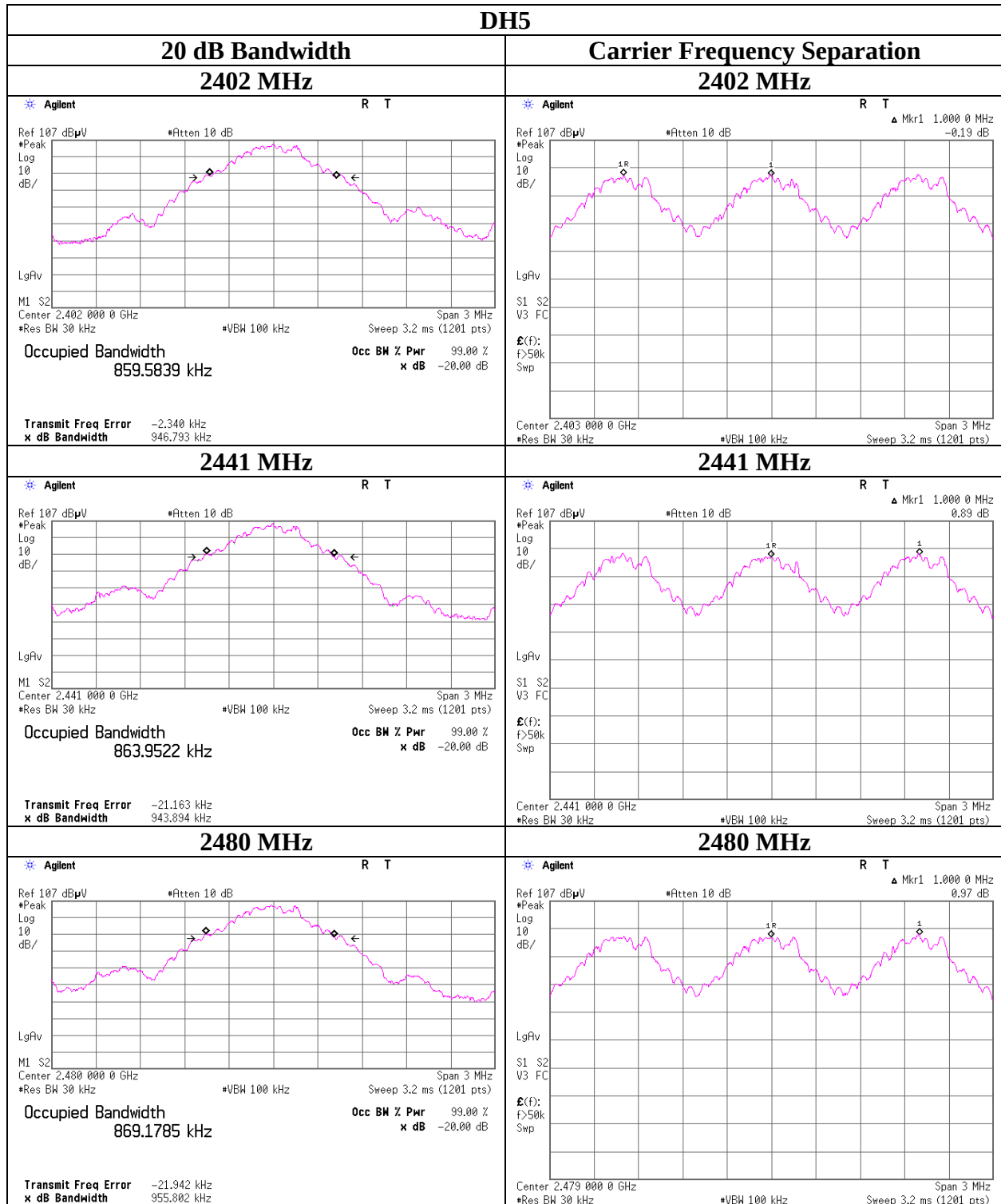
Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11051899H
Date December 22, 2015
Temperature / Humidity 23 deg. C / 40 % RH
Engineer Kazuya Yoshioka
Mode Tx, Hopping Off, DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.947	1.000	≥ 0.631
DH5	2441.0	0.944	1.000	≥ 0.629
DH5	2480.0	0.956	1.000	≥ 0.637
3DH5	2402.0	1.287	1.000	≥ 0.858
3DH5	2441.0	1.295	1.000	≥ 0.863
3DH5	2480.0	1.262	1.000	≥ 0.841

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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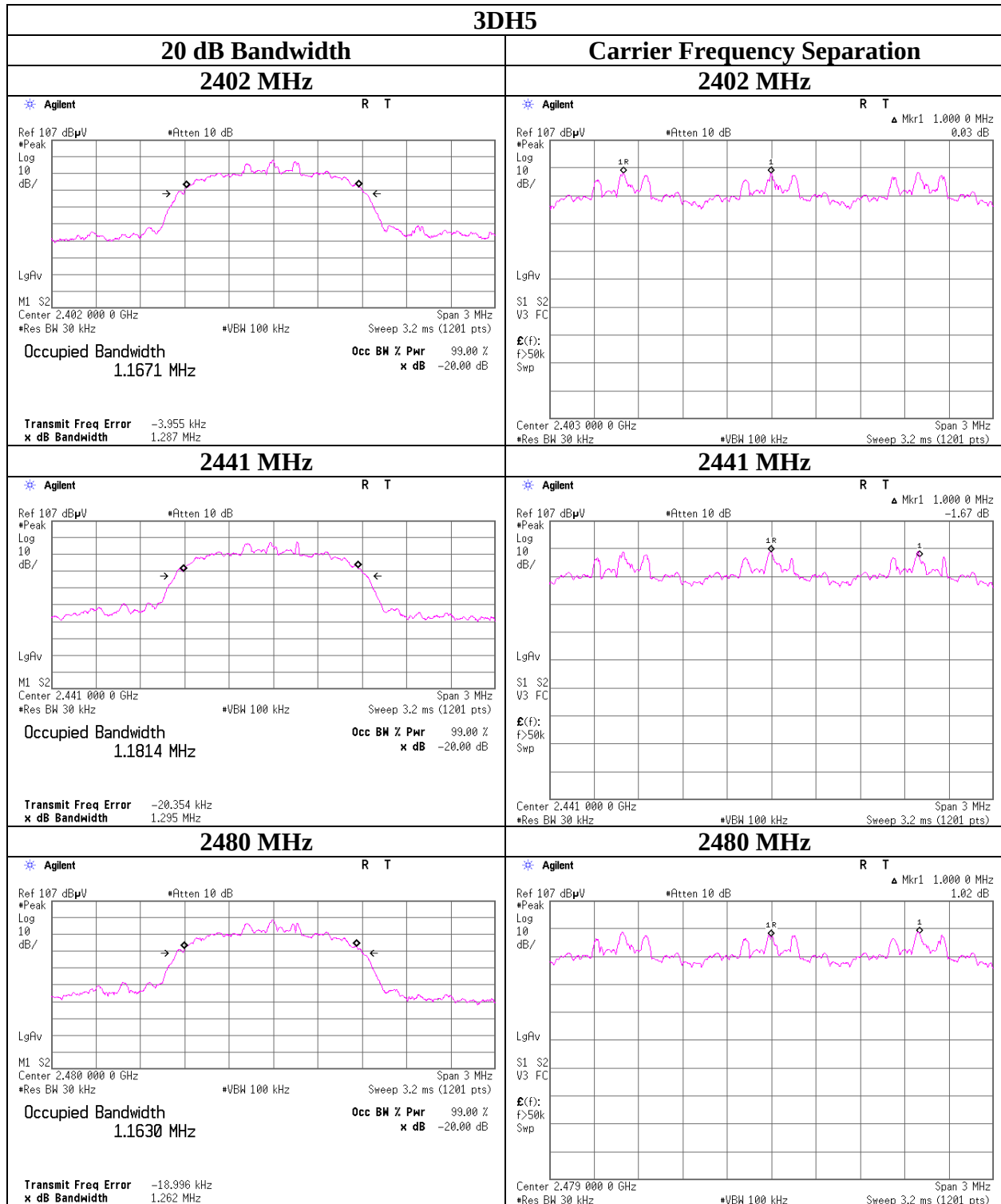
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20dB Bandwidth and Carrier Frequency Separation



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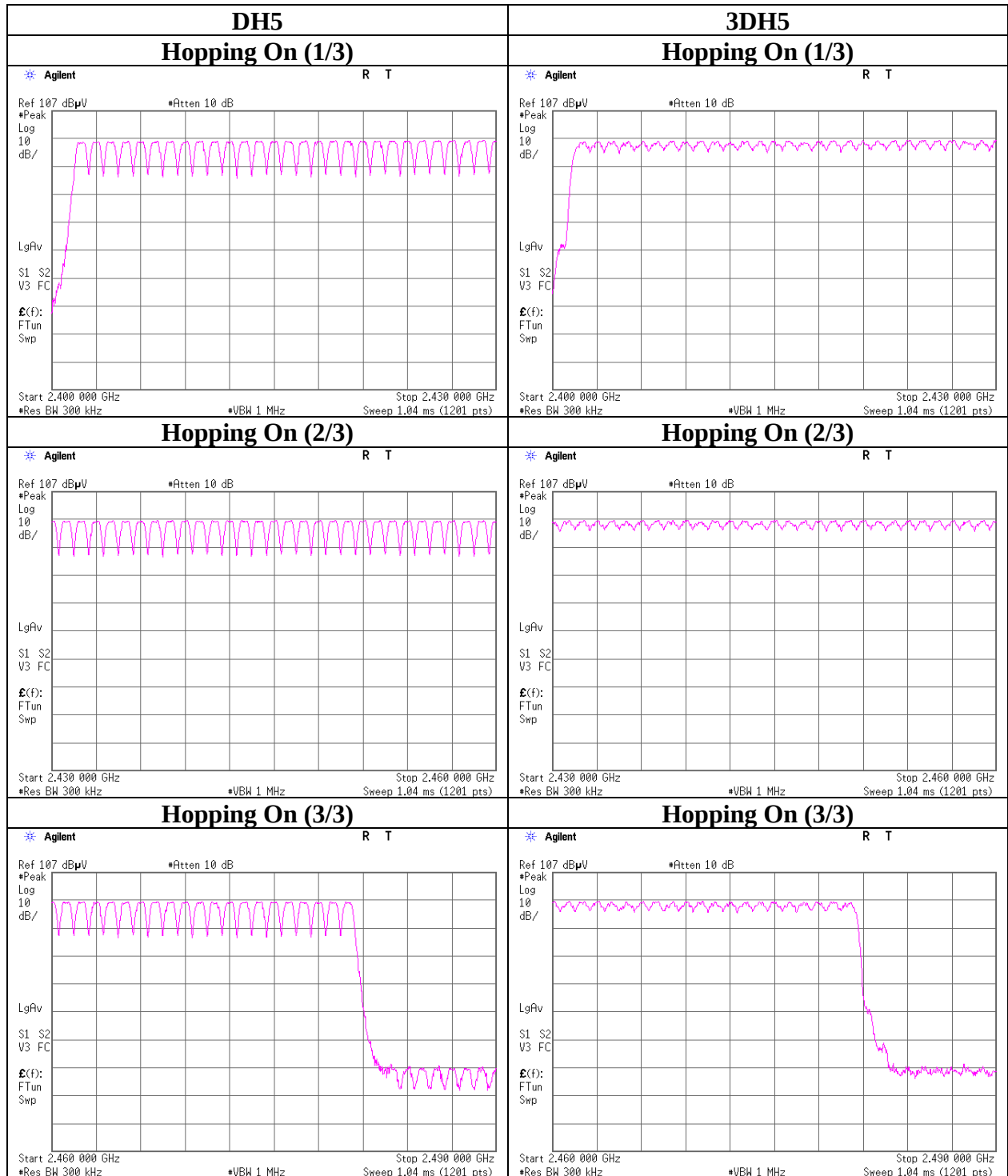
Number of Hopping Frequency

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11051899H
Date December 22, 2015
Temperature / Humidity 23 deg. C / 40 % RH
Engineer Kazuya Yoshioka
Mode Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
3DH5	79	≥ 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

Number of Hopping Frequency



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Dwell time

Test place Ise EMC Lab. No.7 Shielded Room
Report No. 11051899H
Date December 22, 2015
Temperature / Humidity 23 deg. C / 40 % RH
Engineer Kazuya Yoshioka
Mode Tx, Hopping On

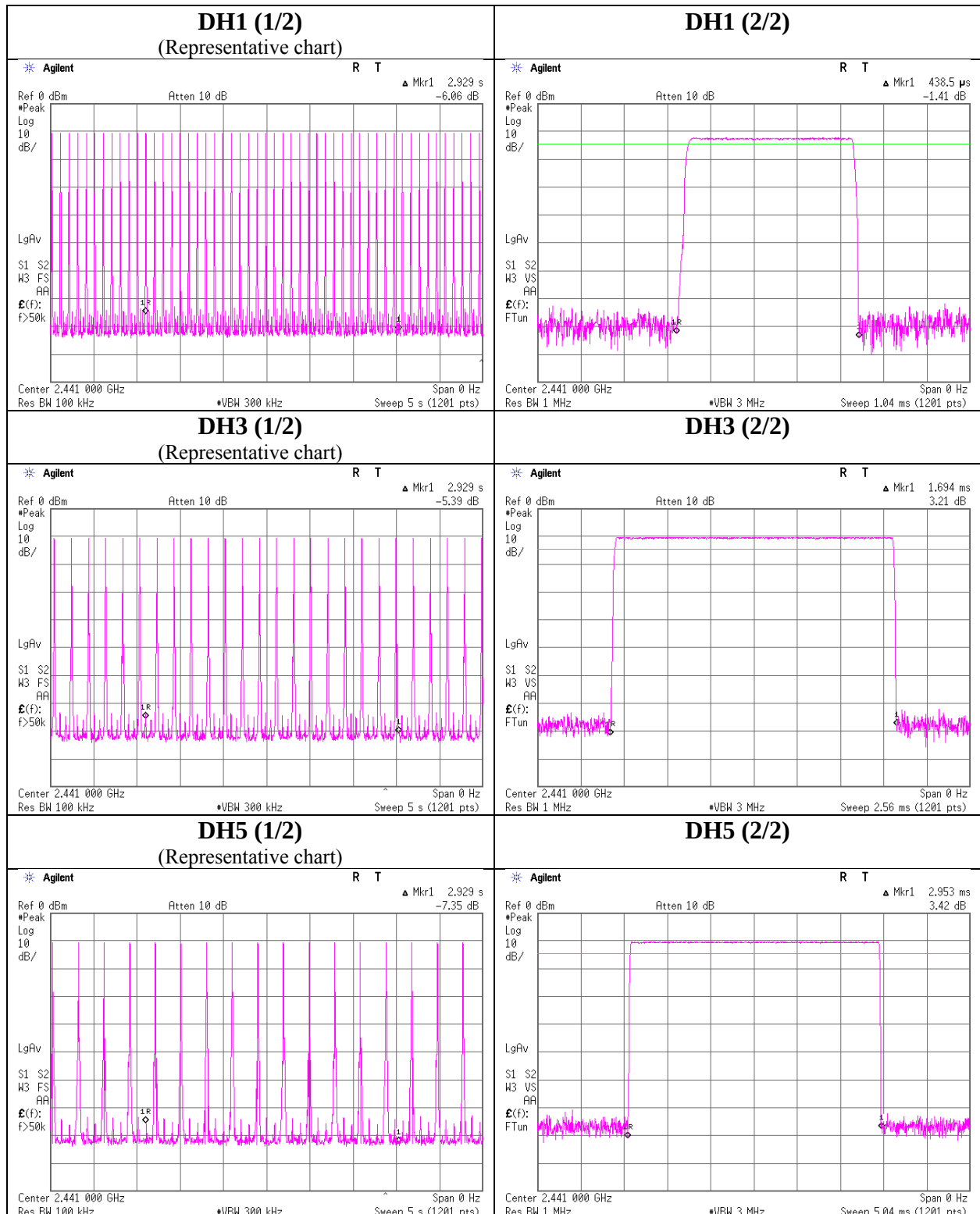
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period				Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.439	142	400
DH3	26.0 times	/	5 sec.	x 31.6 sec. = 165 times	1.694	280	400
DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	2.953	319	400
3DH1	51.0 times	/	5 sec.	x 31.6 sec. = 323 times	0.446	144	400
3DH3	26.0 times	/	5 sec.	x 31.6 sec. = 165 times	1.705	281	400
3DH5	17.0 times	/	5 sec.	x 31.6 sec. = 108 times	2.953	319	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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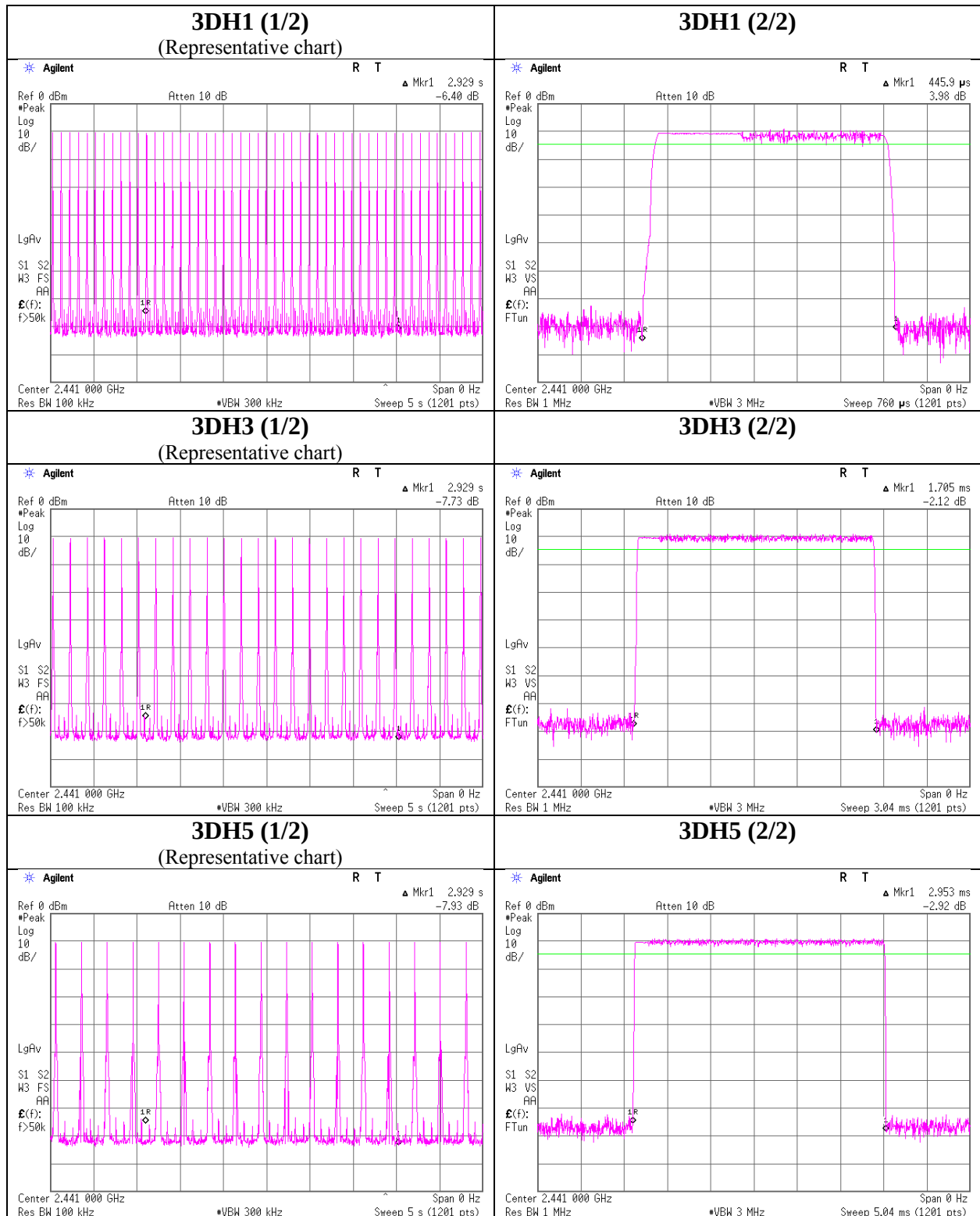
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Dwell time



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Maximum Peak Output Power

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
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	-1.29	1.60	0.00	0.31	1.07	20.96	125	20.65
DH5	2441.0	-0.52	1.61	0.00	1.09	1.29	20.96	125	19.87
DH5	2480.0	-0.59	1.62	0.00	1.03	1.27	20.96	125	19.93
2DH5	2402.0	0.00	1.60	0.00	1.60	1.45	20.96	125	19.36
2DH5	2441.0	0.78	1.61	0.00	2.39	1.73	20.96	125	18.57
2DH5	2480.0	0.67	1.62	0.00	2.29	1.69	20.96	125	18.67
3DH5	2402.0	0.36	1.60	0.00	1.96	1.57	20.96	125	19.00
3DH5	2441.0	1.05	1.61	0.00	2.66	1.85	20.96	125	18.30
3DH5	2480.0	0.99	1.62	0.00	2.61	1.82	20.96	125	18.35

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

*The equipment and cables were not used for factor 0 dB of the data sheets.

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.
As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Average Output Power
(Reference data)

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-2.58	1.60	0.00	-0.98	0.80	1.06	0.08	1.02
DH5	2441.0	-1.85	1.61	0.00	-0.24	0.95	1.06	0.82	1.21
DH5	2480.0	-1.94	1.62	0.00	-0.32	0.93	1.06	0.74	1.19
2DH5	2402.0	-3.60	1.60	0.00	-2.00	0.63	1.05	-0.95	0.80
2DH5	2441.0	-2.80	1.61	0.00	-1.19	0.76	1.05	-0.14	0.97
2DH5	2480.0	-2.96	1.62	0.00	-1.34	0.73	1.05	-0.29	0.94
3DH5	2402.0	-3.59	1.60	0.00	-1.99	0.63	1.05	-0.94	0.81
3DH5	2441.0	-2.79	1.61	0.00	-1.18	0.76	1.05	-0.13	0.97
3DH5	2480.0	-2.95	1.62	0.00	-1.33	0.74	1.05	-0.28	0.94

Sample Calculation:

Result (Frame power) = Reading + Cable Loss + Attenuator Loss

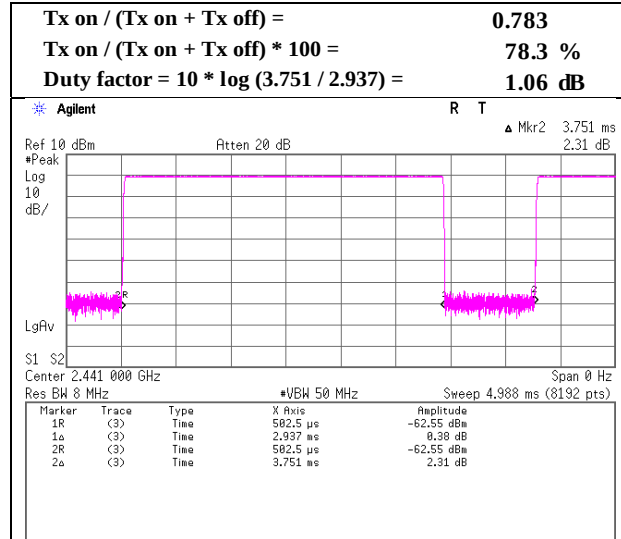
Result (Burst power) = Frame power + Duty factor

*The equipment and cables were not used for factor 0 dB of the data sheets.

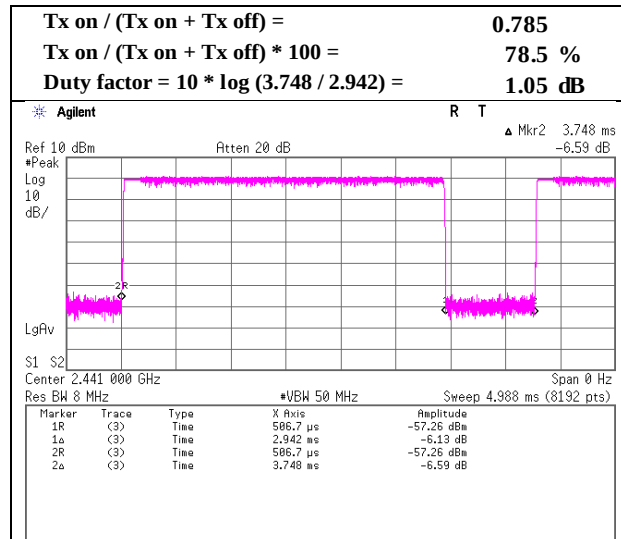
Burst Rate Confirmation

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 22, 2015
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off

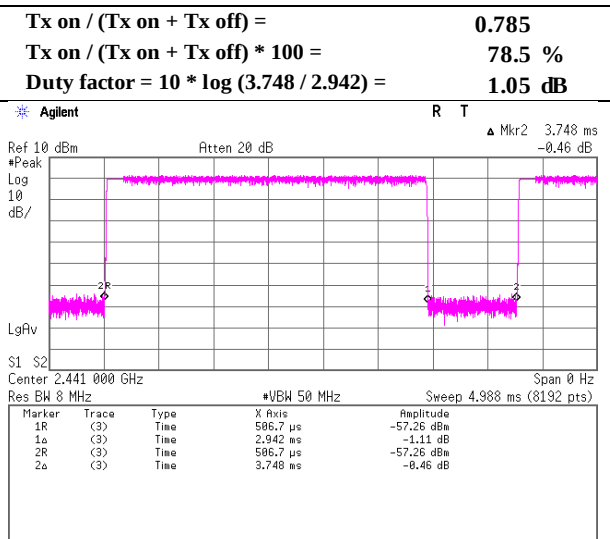
DH5



2DH5



3DH5



Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
(1-10GHz) (10-26.5GHz) (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	119.993	QP	43.2	12.8	8.3	32.0	32.3	43.5	11.2	
Hori	246.944	QP	36.8	17.9	9.5	31.8	32.4	46.0	13.6	
Hori	316.462	QP	34.5	17.8	10.0	31.8	30.5	46.0	15.5	
Hori	413.834	QP	35.1	18.5	10.7	31.9	32.4	46.0	13.6	
Hori	479.972	QP	39.5	19.3	11.1	31.9	38.0	46.0	8.0	
Hori	803.324	QP	31.8	23.1	12.8	31.6	36.1	46.0	9.9	
Hori	2390.000	PK	42.6	26.9	6.6	32.0	44.1	73.9	29.8	
Hori	2558.025	PK	47.4	27.1	6.6	31.9	49.2	73.9	24.7	
Hori	4804.000	PK	41.9	31.8	8.0	31.3	50.4	73.9	23.5	Floor Noise
Hori	7206.000	PK	42.0	36.0	9.2	32.0	55.2	73.9	18.7	Floor Noise
Hori	9608.000	PK	42.3	38.2	10.2	32.4	58.3	73.9	15.6	Floor Noise
Hori	2390.000	AV	28.7	26.9	6.6	32.0	30.2	53.9	23.7	
Hori	2558.025	AV	40.1	27.1	6.6	31.9	41.9	53.9	12.0	
Hori	4804.000	AV	30.2	31.8	8.0	31.3	38.7	53.9	15.2	Floor Noise
Hori	7206.000	AV	29.8	36.0	9.2	32.0	43.0	53.9	10.9	Floor Noise
Hori	9608.000	AV	29.7	38.2	10.2	32.4	45.7	53.9	8.2	Floor Noise
Vert	119.993	QP	42.8	12.8	8.3	32.0	31.9	43.5	11.6	
Vert	239.983	QP	35.5	17.7	9.4	31.8	30.8	46.0	15.2	
Vert	246.944	QP	37.9	17.9	9.5	31.8	33.5	46.0	12.5	
Vert	479.972	QP	34.7	19.3	11.1	31.9	33.2	46.0	12.8	
Vert	803.332	QP	36.5	23.1	12.8	31.6	40.8	46.0	5.2	
Vert	900.692	QP	32.1	24.2	13.3	31.2	38.4	46.0	7.6	
Vert	2390.000	PK	42.3	26.9	6.6	32.0	43.8	73.9	30.1	
Vert	2554.000	PK	46.7	27.1	6.6	31.9	48.5	73.9	25.4	
Vert	4804.000	PK	40.9	31.8	8.0	31.3	49.4	73.9	24.5	Floor Noise
Vert	7206.000	PK	41.2	36.0	9.2	32.0	54.4	73.9	19.5	Floor Noise
Vert	9608.000	PK	42.0	38.2	10.2	32.4	58.0	73.9	15.9	Floor Noise
Vert	2390.000	AV	28.7	26.9	6.6	32.0	30.2	53.9	23.7	
Vert	2554.000	AV	37.5	27.1	6.6	31.9	39.3	53.9	14.6	
Vert	4804.000	AV	29.1	31.8	8.0	31.3	37.6	53.9	16.3	Floor Noise
Vert	7206.000	AV	29.7	36.0	9.2	32.0	42.9	53.9	11.0	Floor Noise
Vert	9608.000	AV	29.4	38.2	10.2	32.4	45.4	53.9	8.5	Floor Noise

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

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

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

Distance factor: 1 GHz - 10 GHz $20\log(3.0\text{ m} / 4.4\text{ m}) = -3.3\text{ dB}$

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

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	88.3	26.9	6.6	32.0	89.8	-	-	Carrier
Hori	2400.000	PK	45.8	26.9	6.6	32.0	47.3	69.8	22.5	
Vert	2402.000	PK	86.1	26.9	6.6	32.0	87.6	-	-	Carrier
Vert	2400.000	PK	45.0	26.9	6.6	32.0	46.5	67.6	21.1	

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

UL Japan, Inc.

Ise EMC Lab.

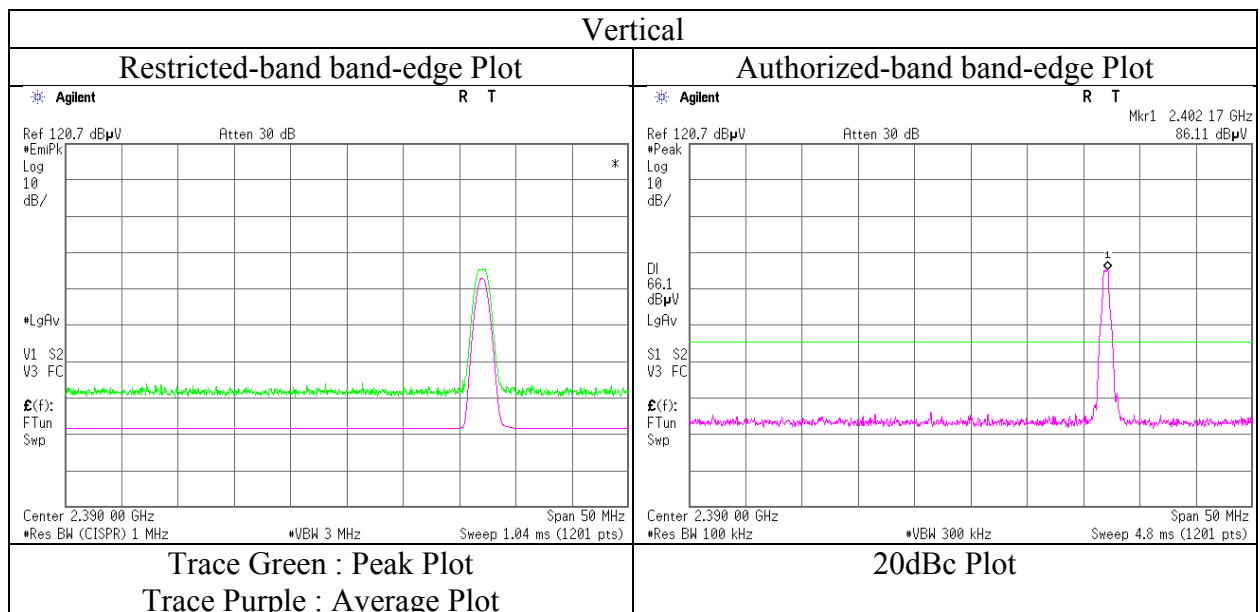
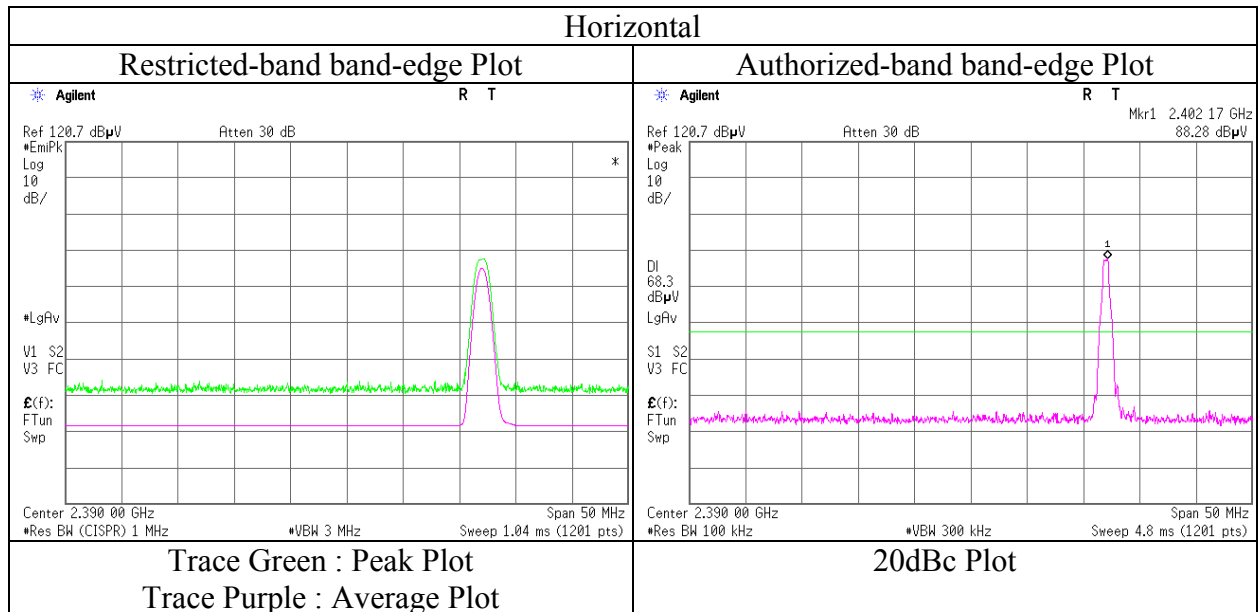
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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	21 deg. C / 41 % RH
Engineer	Ken Fujita (1-10GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
(1-10GHz) (10-26.5GHz) (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	119.993	QP	43.3	12.8	8.3	32.0	32.4	43.5	11.1	
Hori	246.944	QP	36.9	17.9	9.5	31.8	32.5	46.0	13.5	
Hori	316.462	QP	34.7	17.8	10.0	31.8	30.7	46.0	15.3	
Hori	413.834	QP	35.0	18.5	10.7	31.9	32.3	46.0	13.7	
Hori	479.972	QP	40.1	19.3	11.1	31.9	38.6	46.0	7.4	
Hori	803.324	QP	32.3	23.1	12.8	31.6	36.6	46.0	9.4	
Hori	2558.121	PK	46.9	27.1	6.6	31.9	48.7	73.9	25.2	
Hori	4882.000	PK	41.8	31.9	8.0	31.3	50.4	73.9	23.5	Floor Noise
Hori	7323.000	PK	42.0	36.0	9.3	32.0	55.3	73.9	18.6	Floor Noise
Hori	9764.000	PK	42.1	38.2	10.2	32.5	58.0	73.9	15.9	Floor Noise
Hori	2558.121	AV	38.5	27.1	6.6	31.9	40.3	53.9	13.6	
Hori	4882.000	AV	28.9	31.9	8.0	31.3	37.5	53.9	16.4	Floor Noise
Hori	7323.000	AV	29.2	36.0	9.3	32.0	42.5	53.9	11.4	Floor Noise
Hori	9764.000	AV	29.4	38.2	10.2	32.5	45.3	53.9	8.6	Floor Noise
Vert	119.993	QP	42.5	12.8	8.3	32.0	31.6	43.5	11.9	
Vert	239.983	QP	35.6	17.7	9.4	31.8	30.9	46.0	15.1	
Vert	246.944	QP	38.1	17.9	9.5	31.8	33.7	46.0	12.3	
Vert	479.972	QP	34.1	19.3	11.1	31.9	32.6	46.0	13.4	
Vert	803.332	QP	36.5	23.1	12.8	31.6	40.8	46.0	5.2	
Vert	900.692	QP	32.0	24.2	13.3	31.2	38.3	46.0	7.7	
Vert	2558.121	PK	44.5	27.1	6.6	31.9	46.3	73.9	27.6	
Vert	4882.000	PK	42.0	31.9	8.0	31.3	50.6	73.9	23.3	Floor Noise
Vert	7323.000	PK	41.8	36.0	9.3	32.0	55.1	73.9	18.8	Floor Noise
Vert	9764.000	PK	42.2	38.2	10.2	32.5	58.1	73.9	15.8	Floor Noise
Vert	2558.121	AV	34.5	27.1	6.6	31.9	36.3	53.9	17.6	
Vert	4882.000	AV	29.7	31.9	8.0	31.3	38.3	53.9	15.6	Floor Noise
Vert	7323.000	AV	29.9	36.0	9.3	32.0	43.2	53.9	10.7	Floor Noise
Vert	9764.000	AV	29.4	38.2	10.2	32.5	45.3	53.9	8.6	Floor Noise

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

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

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
(1-10GHz) (10-26.5GHz) (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	119.993	QP	43.5	12.8	8.3	32.0	32.6	43.5	10.9	
Hori	246.944	QP	37.5	17.9	9.5	31.8	33.1	46.0	12.9	
Hori	316.462	QP	34.3	17.8	10.0	31.8	30.3	46.0	15.7	
Hori	413.834	QP	34.6	18.5	10.7	31.9	31.9	46.0	14.1	
Hori	479.972	QP	39.5	19.3	11.1	31.9	38.0	46.0	8.0	
Hori	803.324	QP	31.7	23.1	12.8	31.6	36.0	46.0	10.0	
Hori	2483.500	PK	42.3	26.9	6.6	32.0	43.8	73.9	30.1	
Hori	2584.014	PK	47.0	27.2	6.7	31.9	49.0	73.9	24.9	
Hori	4960.000	PK	42.1	32.1	8.0	31.2	51.0	73.9	22.9	Floor Noise
Hori	7440.000	PK	41.9	36.0	9.3	32.1	55.1	73.9	18.8	Floor Noise
Hori	9920.000	PK	42.2	38.2	10.4	32.5	58.3	73.9	15.6	Floor Noise
Hori	2483.500	AV	29.1	26.9	6.6	32.0	30.6	53.9	23.3	
Hori	2584.014	AV	38.3	27.2	6.7	31.9	40.3	53.9	13.6	
Hori	4960.000	AV	28.8	32.1	8.0	31.2	37.7	53.9	16.2	Floor Noise
Hori	7440.000	AV	29.2	36.0	9.3	32.1	42.4	53.9	11.5	Floor Noise
Hori	9920.000	AV	29.1	38.2	10.4	32.5	45.2	53.9	8.7	Floor Noise
Vert	119.993	QP	42.4	12.8	8.3	32.0	31.5	43.5	12.0	
Vert	239.983	QP	36.0	17.7	9.4	31.8	31.3	46.0	14.7	
Vert	246.944	QP	37.6	17.9	9.5	31.8	33.2	46.0	12.8	
Vert	479.972	QP	33.2	19.3	11.1	31.9	31.7	46.0	14.3	
Vert	803.332	QP	35.6	23.1	12.8	31.6	39.9	46.0	6.1	
Vert	900.692	QP	31.5	24.2	13.3	31.2	37.8	46.0	8.2	
Vert	2581.750	PK	44.3	27.2	6.7	31.9	46.3	73.9	27.6	
Vert	4960.000	PK	41.8	32.1	8.0	31.2	50.7	73.9	23.2	Floor Noise
Vert	7440.000	PK	42.0	36.0	9.3	32.1	55.2	73.9	18.7	Floor Noise
Vert	9920.000	PK	42.0	38.2	10.4	32.5	58.1	73.9	15.8	Floor Noise
Vert	2581.750	AV	35.2	27.2	6.7	31.9	37.2	53.9	16.7	
Vert	4960.000	AV	29.7	32.1	8.0	31.2	38.6	53.9	15.3	Floor Noise
Vert	7440.000	AV	30.0	36.0	9.3	32.1	43.2	53.9	10.7	Floor Noise
Vert	9920.000	AV	29.6	38.2	10.4	32.5	45.7	53.9	8.2	Floor Noise

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

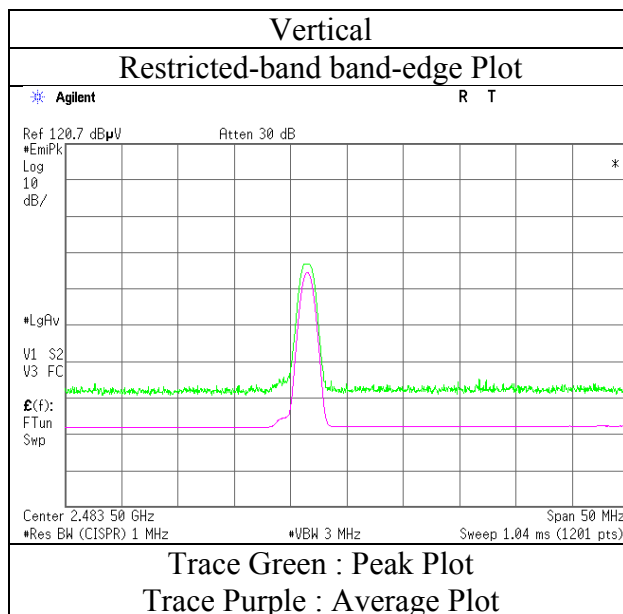
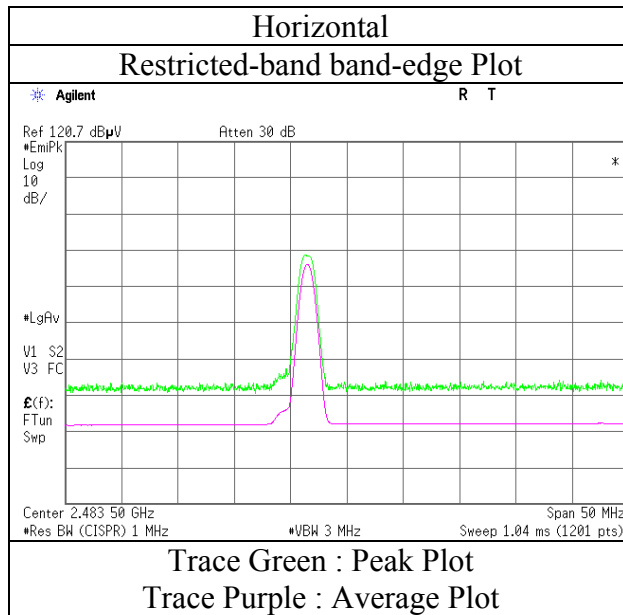
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	21 deg. C / 41 % RH
Engineer	Ken Fujita (1-10GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz



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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
 (1-10GHz) (10-26.5GHz) (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	119.993	QP	42.9	12.8	8.3	32.0	32.0	43.5	11.5	
Hori	246.944	QP	37.2	17.9	9.5	31.8	32.8	46.0	13.2	
Hori	316.462	QP	34.6	17.8	10.0	31.8	30.6	46.0	15.4	
Hori	413.833	QP	35.1	18.5	10.7	31.9	32.4	46.0	13.6	
Hori	479.972	QP	38.0	19.3	11.1	31.9	36.5	46.0	9.5	
Hori	803.324	QP	32.2	23.1	12.8	31.6	36.5	46.0	9.5	
Hori	2390.000	PK	42.3	26.9	6.6	32.0	43.8	73.9	30.1	
Hori	2554.122	PK	47.3	27.1	6.6	31.9	49.1	73.9	24.8	
Hori	4804.000	PK	41.5	31.8	8.0	31.3	50.0	73.9	23.9	Floor Noise
Hori	7206.000	PK	42.2	36.0	9.2	32.0	55.4	73.9	18.5	Floor Noise
Hori	9608.000	PK	42.3	38.2	10.2	32.4	58.3	73.9	15.6	Floor Noise
Hori	2390.000	AV	29.3	26.9	6.6	32.0	30.8	53.9	23.1	
Hori	2554.122	AV	40.2	27.1	6.6	31.9	42.0	53.9	11.9	
Hori	4804.000	AV	30.1	31.8	8.0	31.3	38.6	53.9	15.3	Floor Noise
Hori	7206.000	AV	29.6	36.0	9.2	32.0	42.8	53.9	11.1	Floor Noise
Hori	9608.000	AV	29.4	38.2	10.2	32.4	45.4	53.9	8.5	Floor Noise
Vert	119.993	QP	42.6	12.8	8.3	32.0	31.7	43.5	11.8	
Vert	239.983	QP	35.8	17.7	9.4	31.8	31.1	46.0	14.9	
Vert	246.944	QP	37.3	17.9	9.5	31.8	32.9	46.0	13.1	
Vert	479.972	QP	33.2	19.3	11.1	31.9	31.7	46.0	14.3	
Vert	803.332	QP	36.0	23.1	12.8	31.6	40.3	46.0	5.7	
Vert	900.692	QP	31.5	24.2	13.3	31.2	37.8	46.0	8.2	
Vert	2390.000	PK	41.6	26.9	6.6	32.0	43.1	73.9	30.8	
Vert	2554.120	PK	46.2	27.1	6.6	31.9	48.0	73.9	25.9	
Vert	4804.000	PK	40.2	31.8	8.0	31.3	48.7	73.9	25.2	Floor Noise
Vert	7206.000	PK	40.9	36.0	9.2	32.0	54.1	73.9	19.8	Floor Noise
Vert	9608.000	PK	41.8	38.2	10.2	32.4	57.8	73.9	16.1	Floor Noise
Vert	2390.000	AV	28.1	26.9	6.6	32.0	29.6	53.9	24.3	
Vert	2554.120	AV	37.3	27.1	6.6	31.9	39.1	53.9	14.8	
Vert	4804.000	AV	29.3	31.8	8.0	31.3	37.8	53.9	16.1	Floor Noise
Vert	7206.000	AV	29.9	36.0	9.2	32.0	43.1	53.9	10.8	Floor Noise
Vert	9608.000	AV	29.2	38.2	10.2	32.4	45.2	53.9	8.7	Floor Noise

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

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

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3dB
10 GHz - 26.5 GHz 20log (3.0 m / 1.0 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	87.9	26.9	6.6	32.0	89.4	-	-	Carrier
Hori	2400.000	PK	46.1	26.9	6.6	32.0	47.6	69.4	21.8	
Vert	2402.000	PK	86.4	26.9	6.6	32.0	87.9	-	-	Carrier
Vert	2400.000	PK	44.2	26.9	6.6	32.0	45.7	67.9	22.2	

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

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Ise EMC Lab.

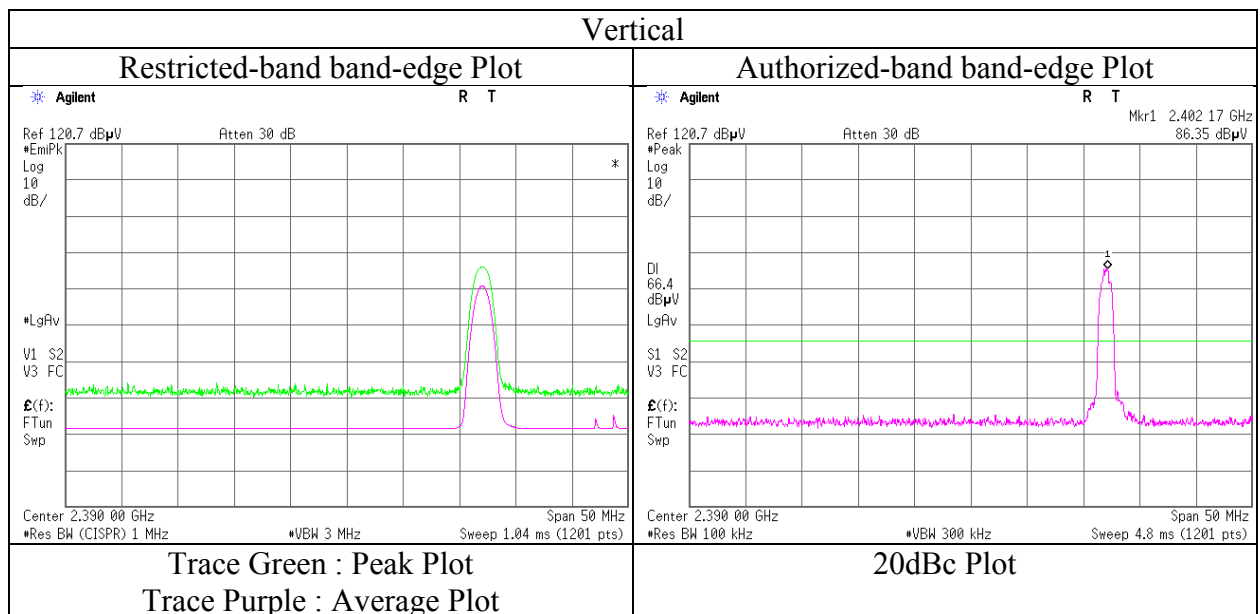
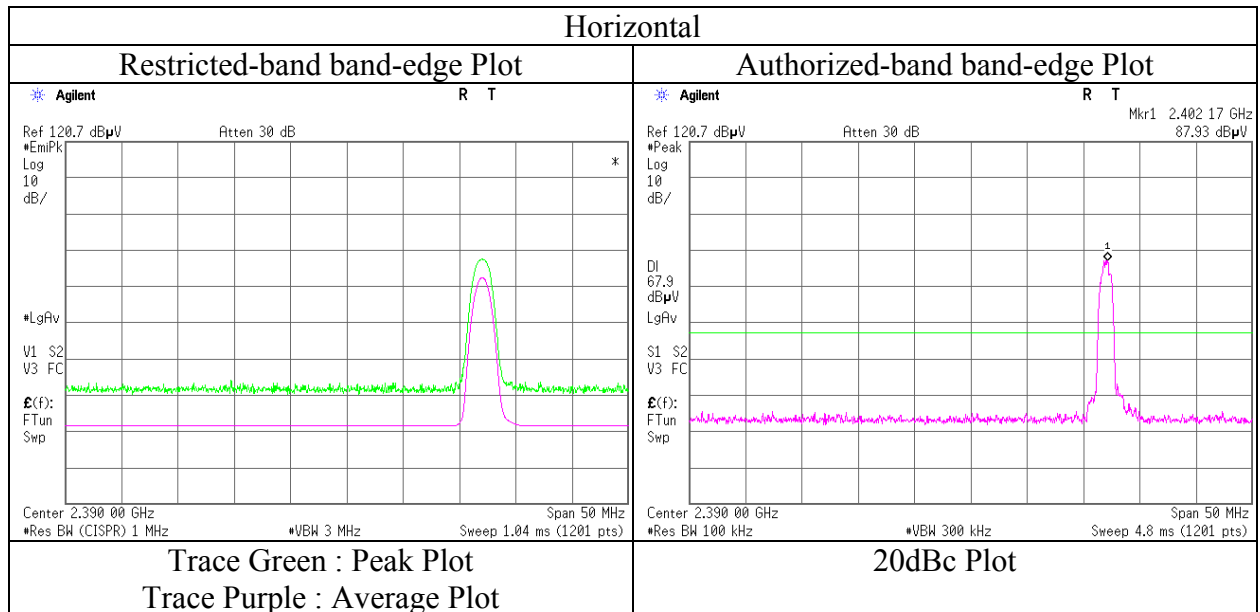
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	21 deg. C / 41 % RH
Engineer	Ken Fujita (1-10GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



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

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Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
 (1-10GHz) (10-26.5GHz) (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	119.993	QP	42.7	12.8	8.3	32.0	31.8	43.5	11.7	
Hori	246.944	QP	37.4	17.9	9.5	31.8	33.0	46.0	13.0	
Hori	316.462	QP	35.1	17.8	10.0	31.8	31.1	46.0	14.9	
Hori	413.833	QP	34.8	18.5	10.7	31.9	32.1	46.0	13.9	
Hori	479.972	QP	38.6	19.3	11.1	31.9	37.1	46.0	8.9	
Hori	803.324	QP	32.3	23.1	12.8	31.6	36.6	46.0	9.4	
Hori	2554.332	PK	46.3	27.1	6.6	31.9	48.1	73.9	25.8	
Hori	4882.000	PK	41.3	31.9	8.0	31.3	49.9	73.9	24.0	Floor Noise
Hori	7323.000	PK	42.1	36.0	9.3	32.0	55.4	73.9	18.5	Floor Noise
Hori	9764.000	PK	42.2	38.2	10.2	32.5	58.1	73.9	15.8	Floor Noise
Hori	2554.332	AV	38.2	27.1	6.6	31.9	40.0	53.9	13.9	
Hori	4882.000	AV	28.4	31.9	8.0	31.3	37.0	53.9	16.9	Floor Noise
Hori	7323.000	AV	29.4	36.0	9.3	32.0	42.7	53.9	11.2	Floor Noise
Hori	9764.000	AV	29.5	38.2	10.2	32.5	45.4	53.9	8.5	Floor Noise
Vert	119.993	QP	42.9	12.8	8.3	32.0	32.0	43.5	11.5	
Vert	239.983	QP	35.7	17.7	9.4	31.8	31.0	46.0	15.0	
Vert	246.944	QP	37.6	17.9	9.5	31.8	33.2	46.0	12.8	
Vert	479.972	QP	33.4	19.3	11.1	31.9	31.9	46.0	14.1	
Vert	803.332	QP	36.2	23.1	12.8	31.6	40.5	46.0	5.5	
Vert	900.692	QP	31.9	24.2	13.3	31.2	38.2	46.0	7.8	
Vert	2554.221	PK	44.2	27.1	6.6	31.9	46.0	73.9	27.9	
Vert	4882.000	PK	42.1	31.9	8.0	31.3	50.7	73.9	23.2	Floor Noise
Vert	7323.000	PK	41.7	36.0	9.3	32.0	55.0	73.9	18.9	Floor Noise
Vert	9764.000	PK	42.3	38.2	10.2	32.5	58.2	73.9	15.7	Floor Noise
Vert	2554.221	AV	34.3	27.1	6.6	31.9	36.1	53.9	17.8	
Vert	4882.000	AV	29.9	31.9	8.0	31.3	38.5	53.9	15.4	Floor Noise
Vert	7323.000	AV	29.7	36.0	9.3	32.0	43.0	53.9	10.9	Floor Noise
Vert	9764.000	AV	29.6	38.2	10.2	32.5	45.5	53.9	8.4	Floor Noise

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

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

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

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3dB

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

Radiated Spurious Emission

Test place : Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. : 11051899H
Date : December 23, 2015 January 7, 2016 January 9, 2016
Temperature / Humidity : 21 deg. C / 41 % RH 22 deg. C / 31 % RH 23 deg. C / 45 % RH
Engineer : Ken Fujita Takafumi Noguchi Koji Yamamoto
(1-10GHz) (10-26.5GHz) (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	119.993	QP	43.1	12.8	8.3	32.0	32.2	43.5	11.3	
Hori	246.944	QP	37.6	17.9	9.5	31.8	33.2	46.0	12.8	
Hori	316.462	QP	35.2	17.8	10.0	31.8	31.2	46.0	14.8	
Hori	413.833	QP	35.3	18.5	10.7	31.9	32.6	46.0	13.4	
Hori	479.972	QP	38.7	19.3	11.1	31.9	37.2	46.0	8.8	
Hori	803.324	QP	32.0	23.1	12.8	31.6	36.3	46.0	9.7	
Hori	2483.500	PK	42.1	26.9	6.6	32.0	43.6	73.9	30.3	
Hori	2584.312	PK	47.2	27.2	6.7	31.9	49.2	73.9	24.7	
Hori	4960.000	PK	42.2	32.1	8.0	31.2	51.1	73.9	22.8	Floor Noise
Hori	7440.000	PK	41.8	36.0	9.3	32.1	55.0	73.9	18.9	Floor Noise
Hori	9920.000	PK	42.3	38.2	10.4	32.5	58.4	73.9	15.5	Floor Noise
Hori	2483.500	AV	29.0	26.9	6.6	32.0	30.5	53.9	23.4	
Hori	2584.312	AV	38.5	27.2	6.7	31.9	40.5	53.9	13.4	
Hori	4960.000	AV	28.9	32.1	8.0	31.2	37.8	53.9	16.1	Floor Noise
Hori	7440.000	AV	29.4	36.0	9.3	32.1	42.6	53.9	11.3	Floor Noise
Hori	9920.000	AV	29.2	38.2	10.4	32.5	45.3	53.9	8.6	Floor Noise
Vert	119.993	QP	43.3	12.8	8.3	32.0	32.4	43.5	11.1	
Vert	239.983	QP	35.8	17.7	9.4	31.8	31.1	46.0	14.9	
Vert	246.944	QP	38.1	17.9	9.5	31.8	33.7	46.0	12.3	
Vert	479.972	QP	33.5	19.3	11.1	31.9	32.0	46.0	14.0	
Vert	803.332	QP	36.6	23.1	12.8	31.6	40.9	46.0	5.1	
Vert	900.692	QP	32.2	24.2	13.3	31.2	38.5	46.0	7.5	
Vert	2584.643	PK	42.7	27.2	6.7	31.9	44.7	73.9	29.3	
Vert	4960.000	PK	41.4	32.1	8.0	31.2	50.3	73.9	23.6	Floor Noise
Vert	7440.000	PK	42.1	36.0	9.3	32.1	55.3	73.9	18.6	Floor Noise
Vert	9920.000	PK	42.0	38.2	10.4	32.5	58.1	73.9	15.8	Floor Noise
Vert	2584.643	AV	34.3	27.2	6.7	31.9	36.3	53.9	17.6	
Vert	4960.000	AV	29.4	32.1	8.0	31.2	38.3	53.9	15.6	Floor Noise
Vert	7440.000	AV	30.0	36.0	9.3	32.1	43.2	73.9	30.7	Floor Noise
Vert	9920.000	AV	29.6	38.2	10.4	32.5	45.7	53.9	8.2	Floor Noise

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

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

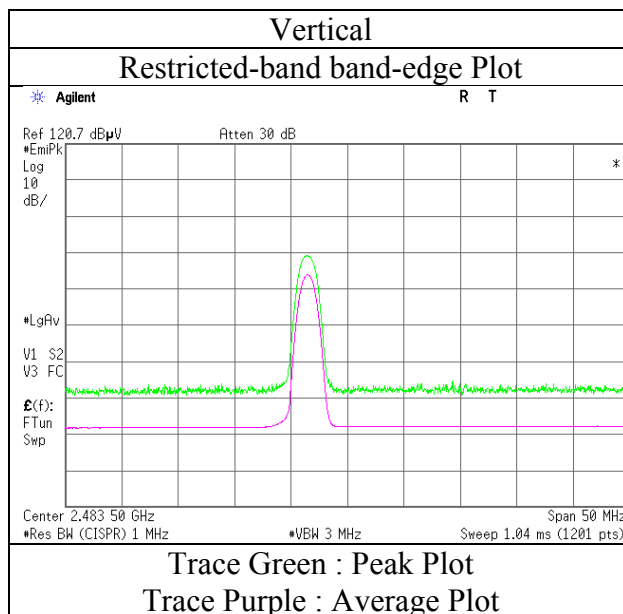
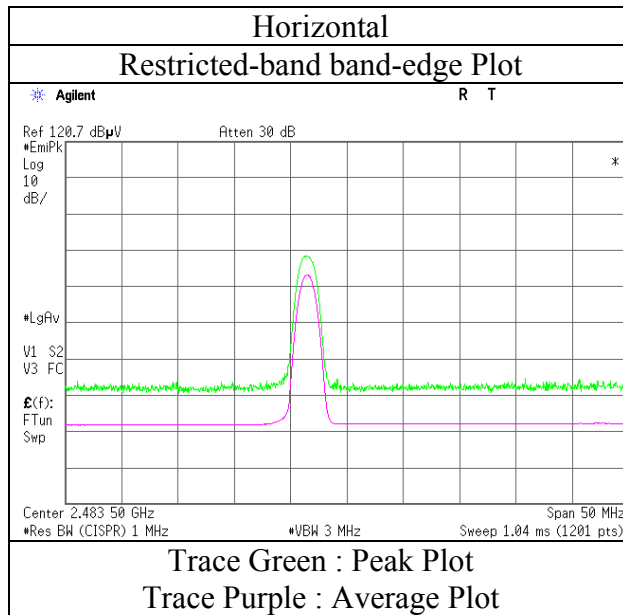
*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 1GHz - 10 GHz 20log (3.0 m / 4.4 m) = - 3.3 dB

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

Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11051899H
Date	December 23, 2015
Temperature / Humidity	21 deg. C / 41 % RH
Engineer	Ken Fujita (1-10GHz)
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.

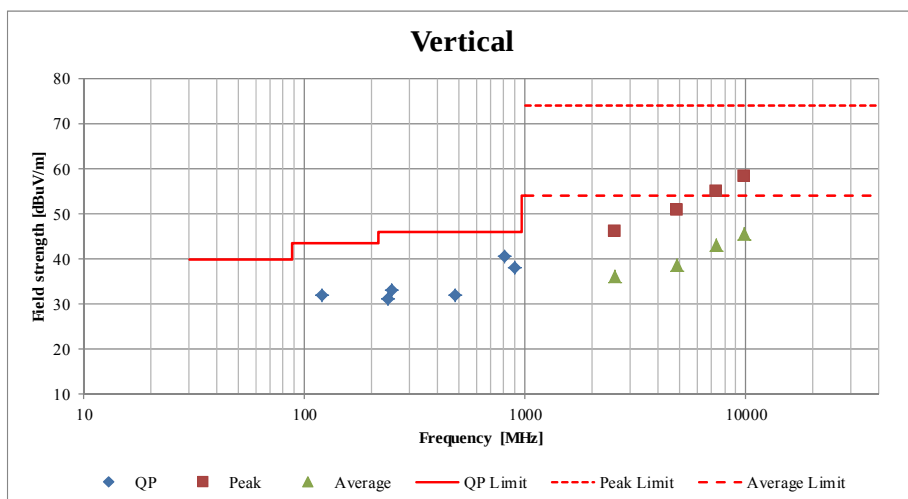
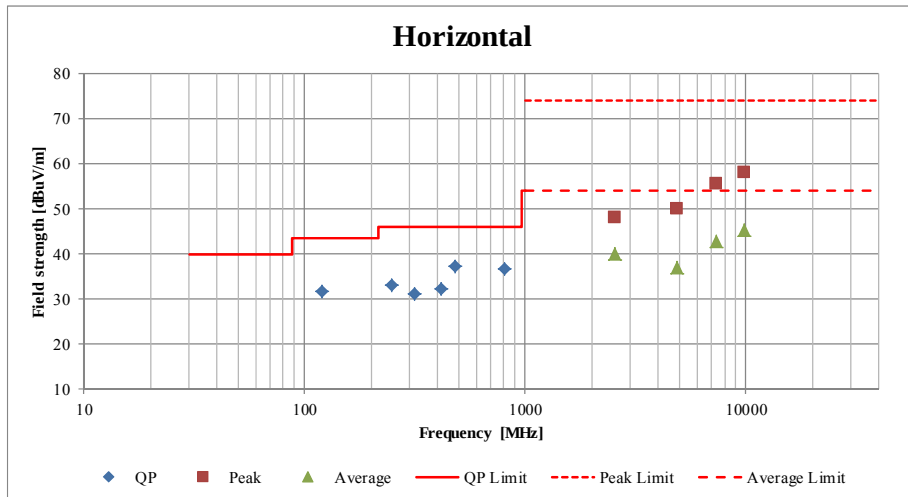
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Facsimile : +81 596 24 8124

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

Test place	Ise EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	11051899H		
Date	December 23, 2015	January 7, 2016	January 9, 2016
Temperature / Humidity	21 deg. C / 41 % RH	22 deg. C / 31 % RH	23 deg. C / 45 % RH
Engineer	Ken Fujita (1-10GHz)	Takafumi Noguchi (10-26.5GHz)	Koji Yamamoto (Below 1GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

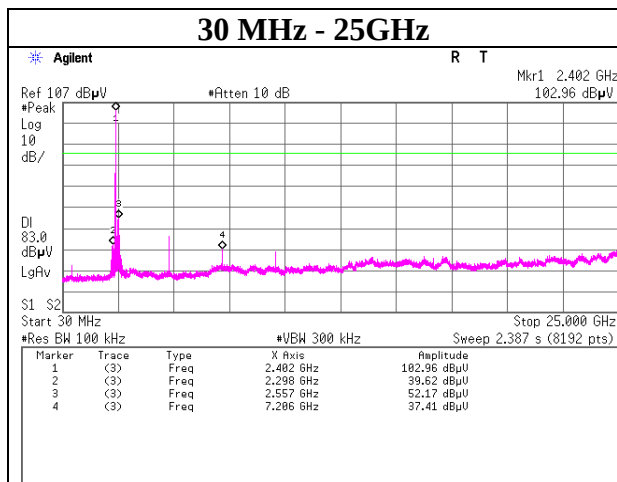
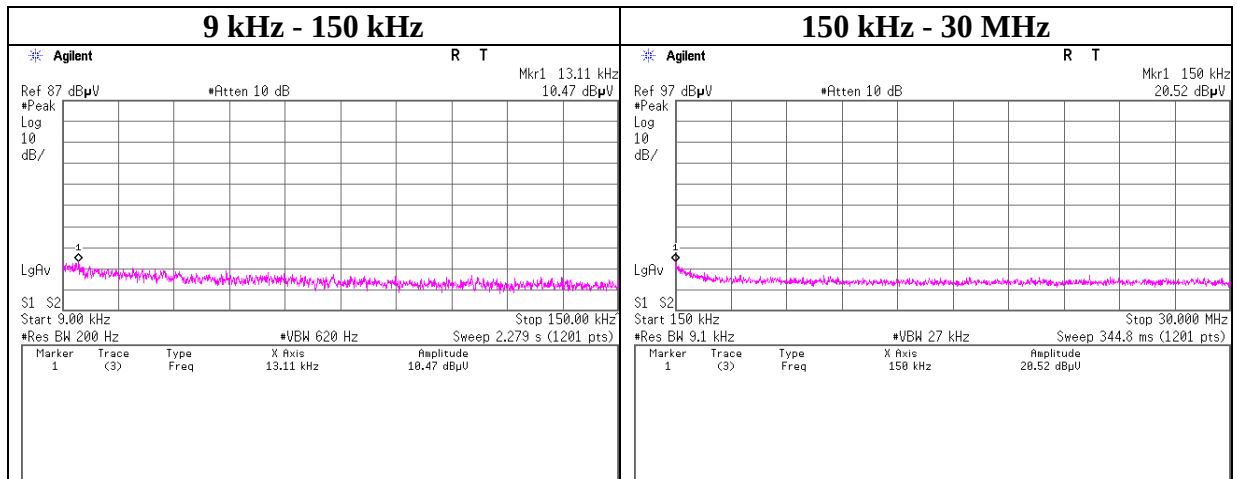


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

2402 MHz



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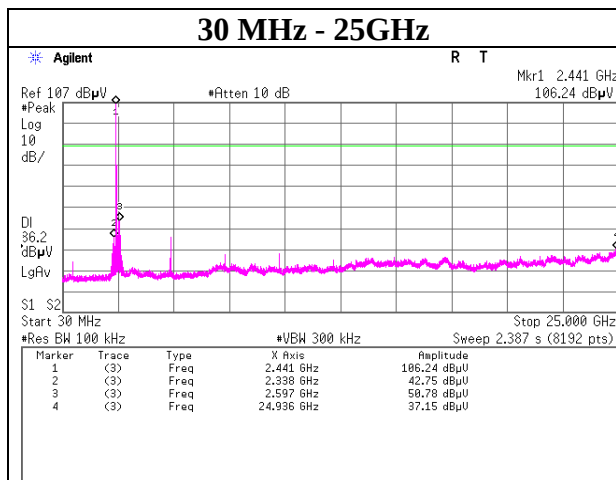
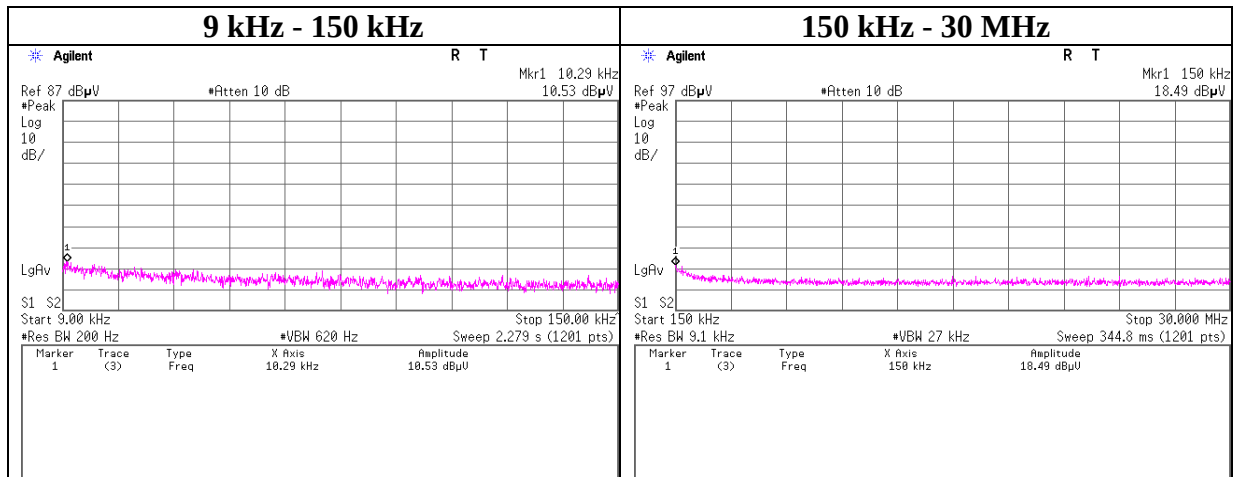
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

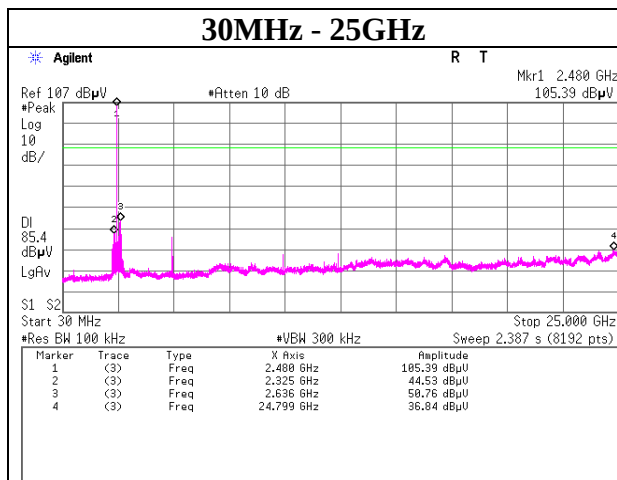
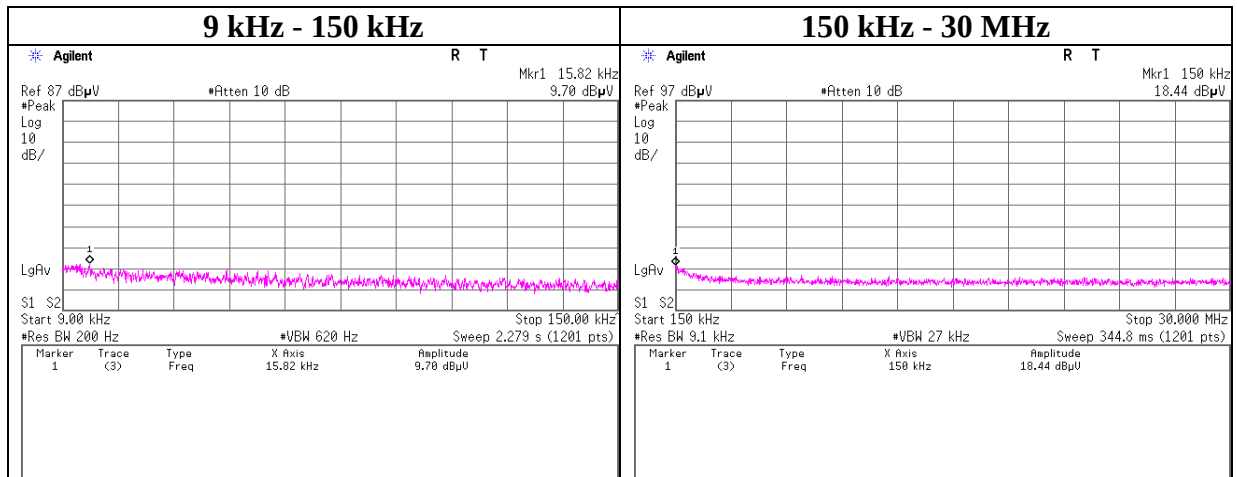
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, DH5

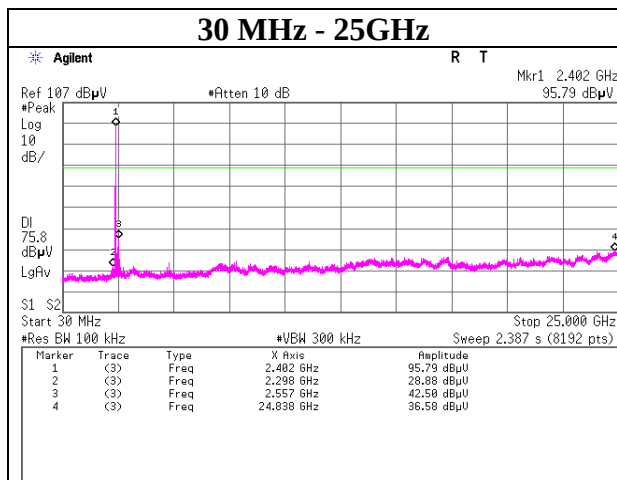
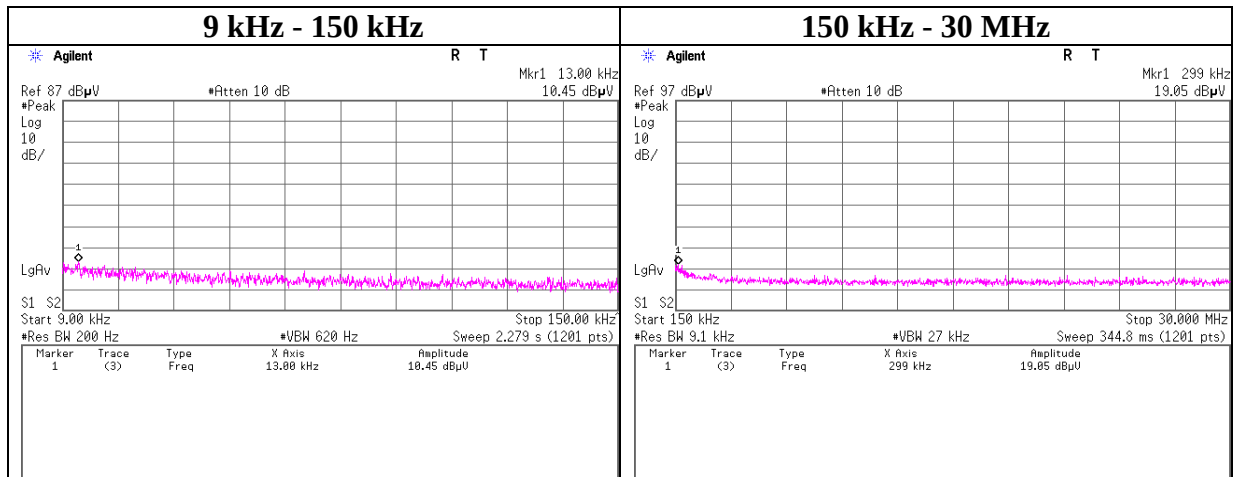
2480 MHz



Conducted Spurious Emission

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 22, 2015
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kazuya Yoshioka
Mode	Tx, Hopping Off, 3DH5

2402 MHz



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Ise EMC Lab.

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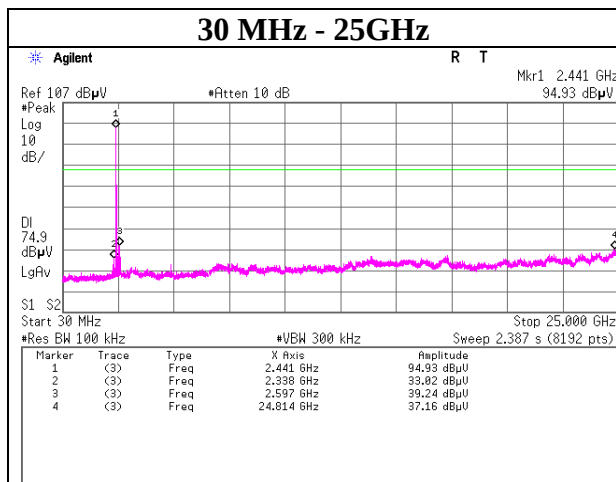
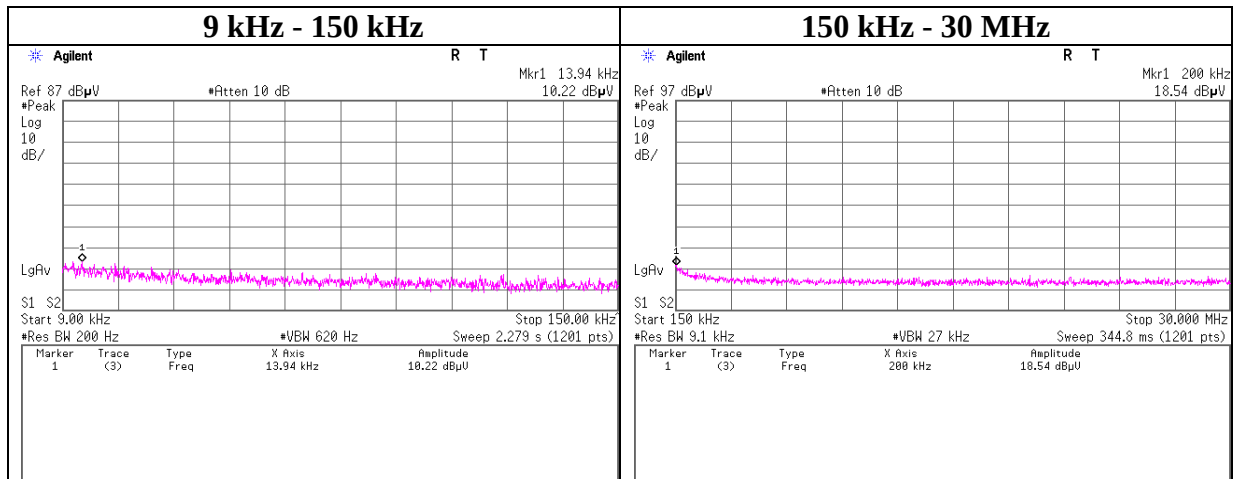
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

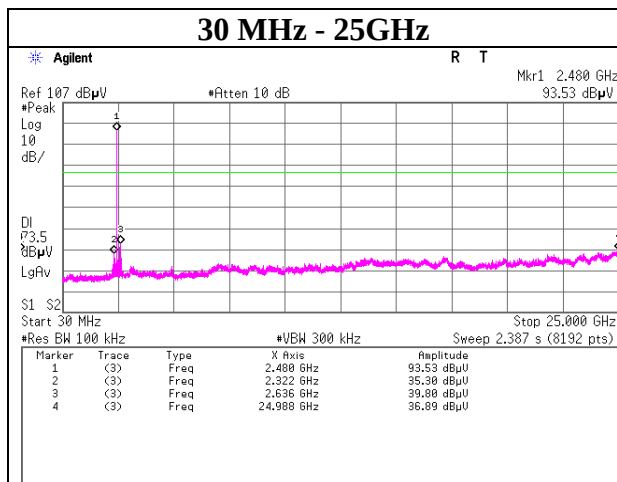
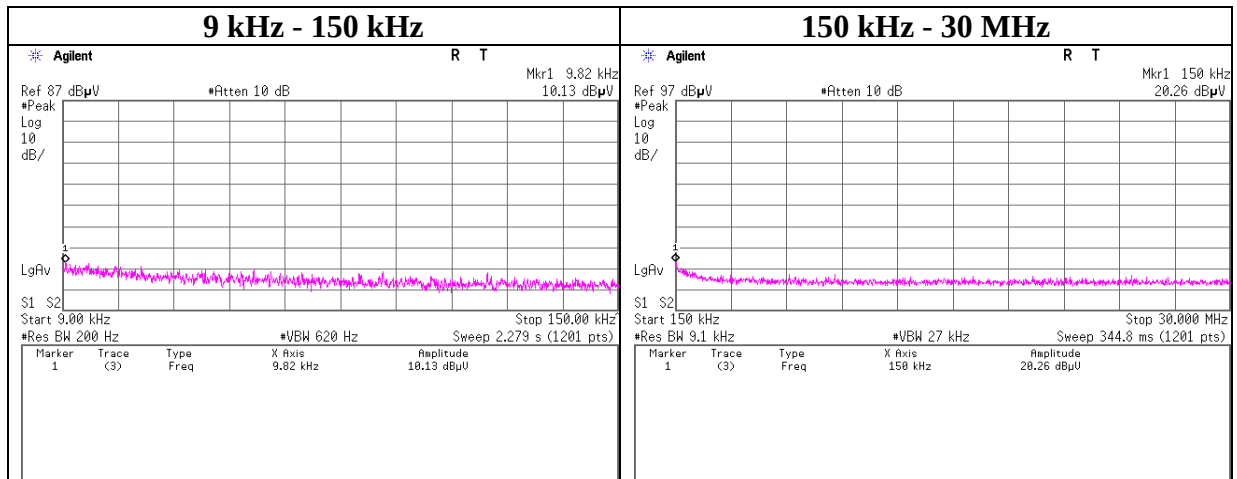
2441 MHz



Conducted Spurious Emission

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx, Hopping Off, 3DH5

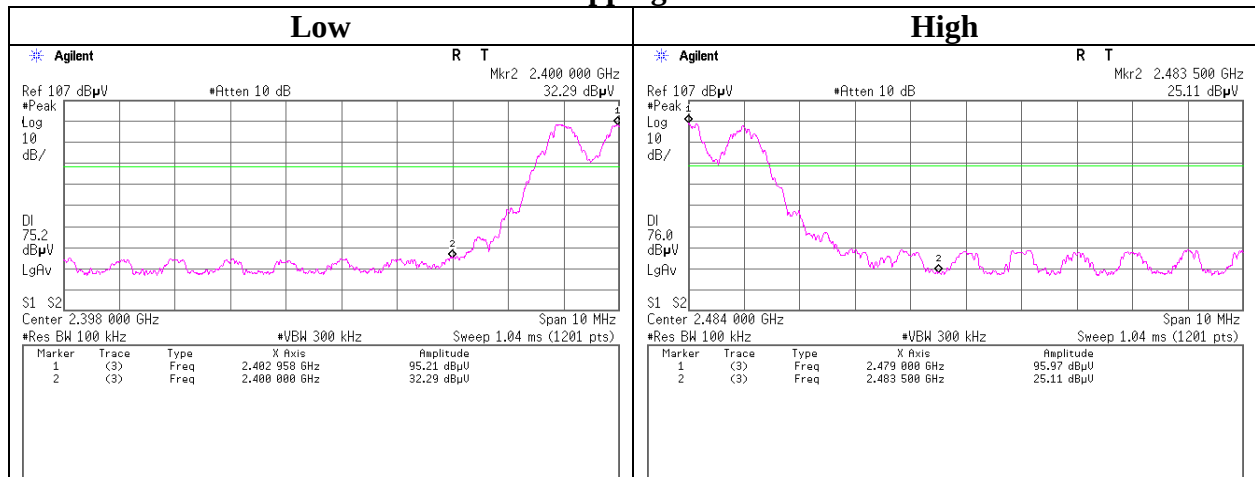
2480 MHz



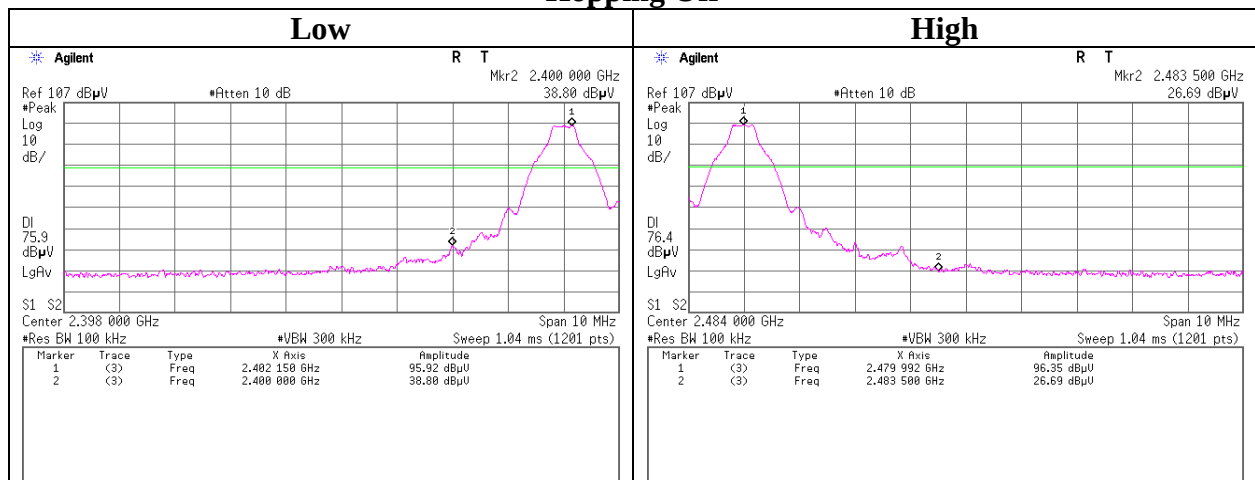
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx DH5

Hopping On



Hopping Off



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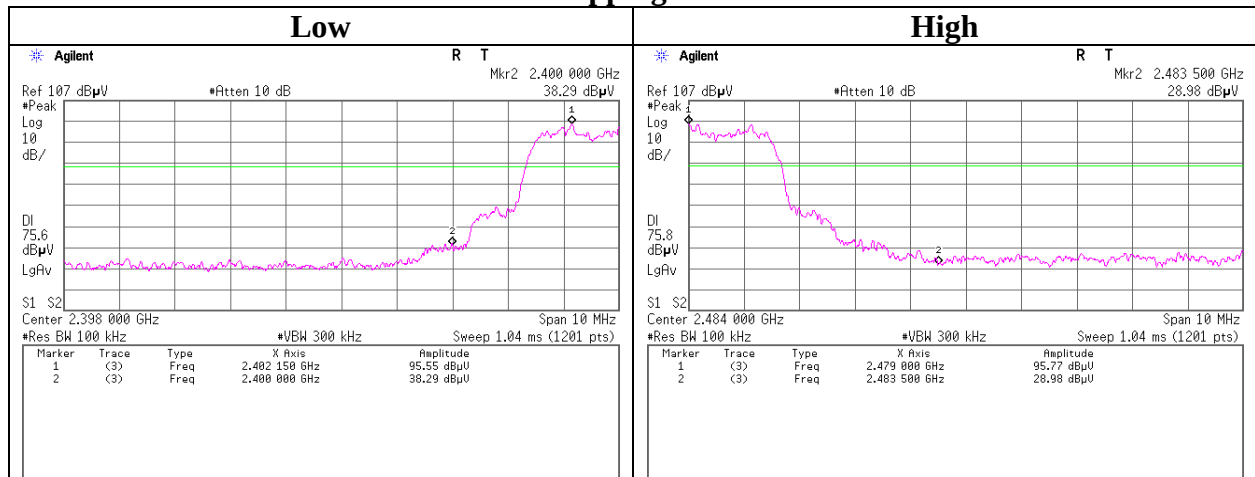
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

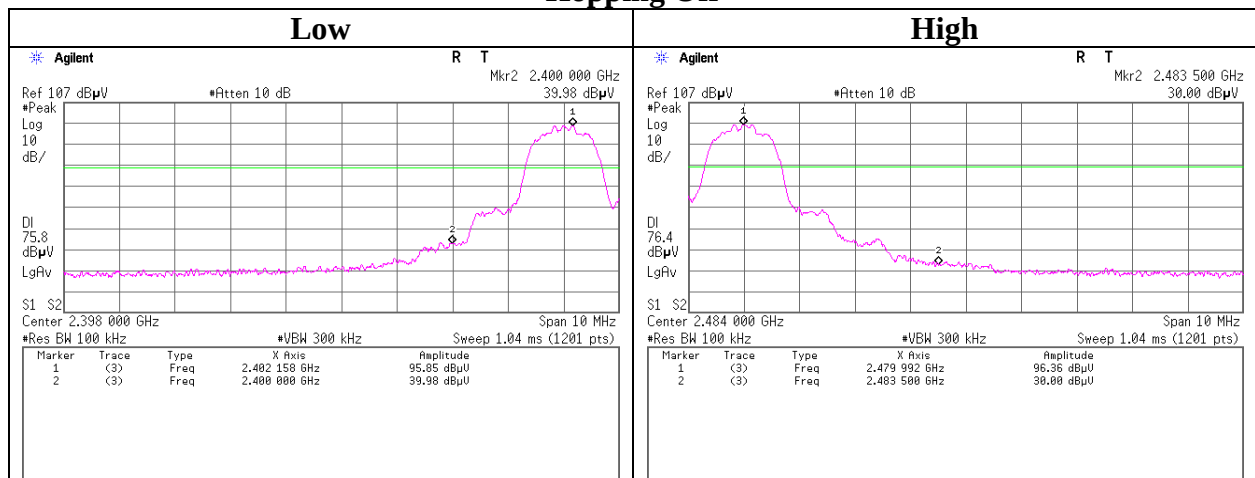
Conducted Emission Band Edge compliance

Test place : Ise EMC Lab. No.7 Shielded Room
Report No. : 11051899H
Date : December 22, 2015
Temperature / Humidity : 23 deg. C / 40 % RH
Engineer : Kazuya Yoshioka
Mode : Tx 3DH5

Hopping On



Hopping Off



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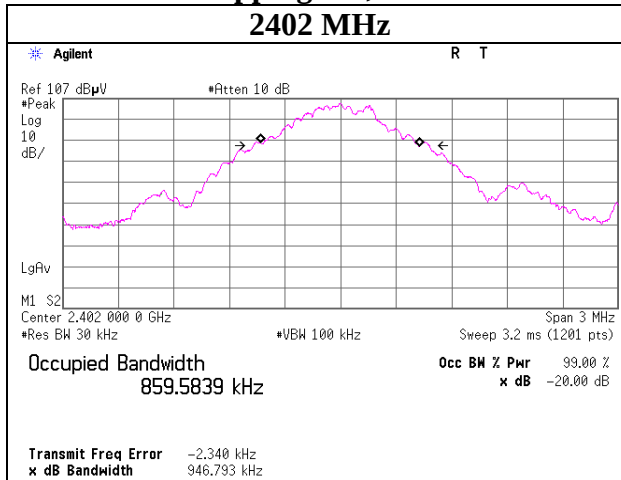
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

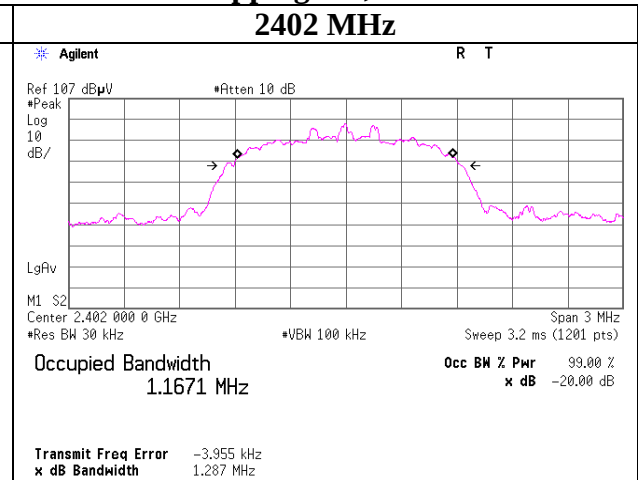
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 22, 2015
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kazuya Yoshioka
Mode	Tx Hopping Off

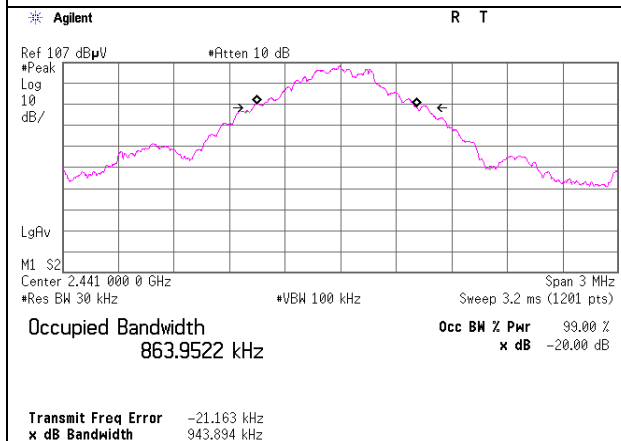
Hopping Off, DH5



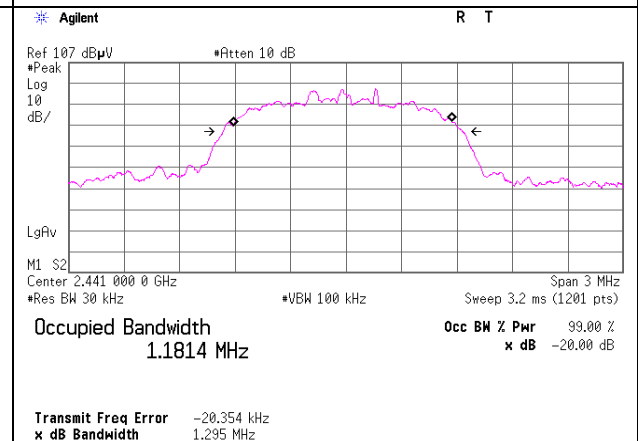
Hopping Off, 3DH5



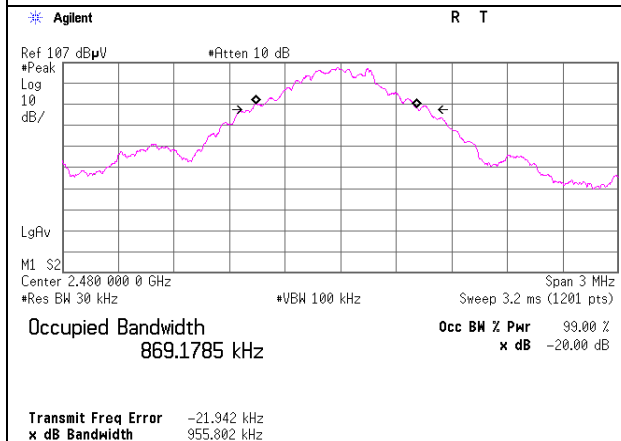
2441 MHz



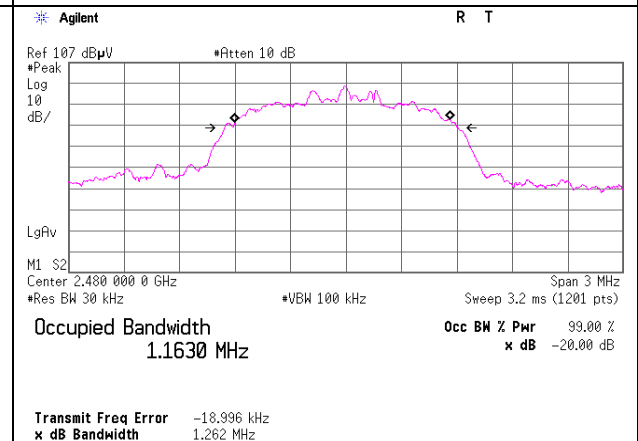
2441 MHz



2480 MHz



2480 MHz



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Ise EMC Lab.

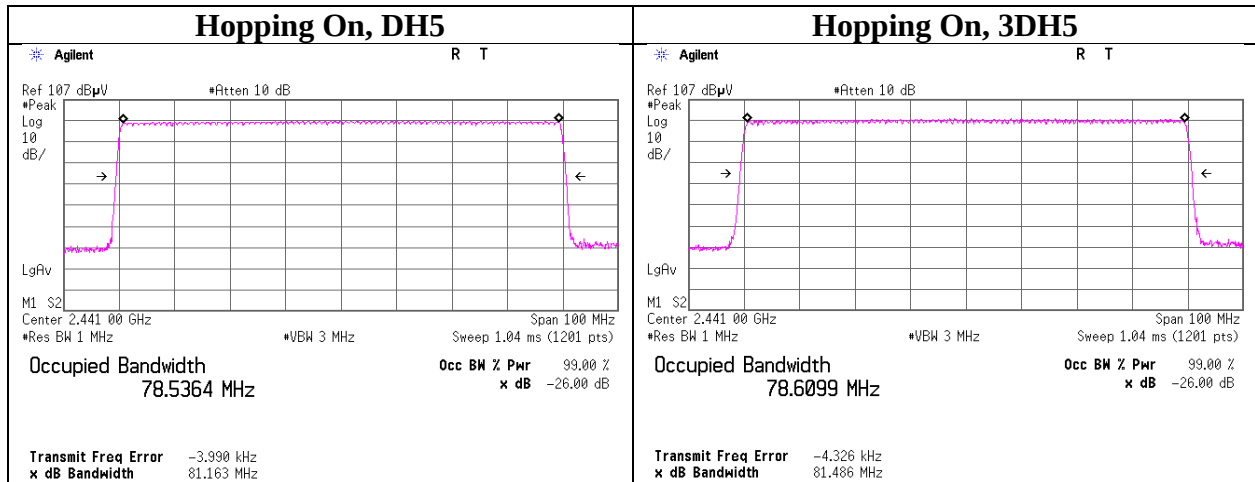
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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99% Occupied Bandwidth

Test place	Ise EMC Lab. No.7 Shielded Room
Report No.	11051899H
Date	December 22, 2015
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Kazuya Yoshioka
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)
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2015/05/18 * 12
MCC-170	Microwave Cable	Junkosha	MWX221	1409S493	AT	2015/03/04 * 12
MCC-105	Microwave Cable	Hirose Electric	U.FL-2LP-066J1-A (200)	-	AT	2015/06/08 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2015/06/18 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2015/03/06 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2015/11/10 * 12
MTA-45	Terminator	Mini-Circuits	ANNE-50X+	MUU3460142	AT	Pre Check
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2015/10/08 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2015/10/08 * 12
MOS-34	Thermo-Hygrometer	Custom	CTH-201	3401	AT	2015/01/13 * 12
MMM-16	DIGITAL HiTESTER	Hioki	3805	070900532	AT	2015/01/16 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/10/01 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2015/06/02 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2015/05/18 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2015/05/21 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2015/01/16 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2015/09/16 * 12
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	2015/01/13 * 12
MJM-26	Measure	KOMELON	KMC-36	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2015/02/26 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2015/08/10 * 12
MCC-141	Microwave Cable	Junkosha	MWX221	1305S002R(1m) / 1405S146(5m)	RE	2015/06/22 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	00650	RE	2015/10/01 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2015/06/06 * 12
MMM-10	DIGITAL HiTESTER	Hioki	3805	051201148	RE	2015/01/16 * 12
MHF-26	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	RE	2015/09/17 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2015/09/02 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2015/11/02 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2015/11/03 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2015/06/19 * 12
MAT-68	Attenuator	Anritsu	MP721B	6200961025	RE	2015/11/12 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2015/03/09 * 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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