



RADIO TEST REPORT

Test Report No. : 10941706S-A

Applicant : CASIO COMPUTER CO., LTD.
Type of Equipment : RF Module
Model No. : WSD-F10
FCC ID : BBQ-WSDF10
Test regulation : FCC Part 15 Subpart C: 2015
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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: October 28 to November 9, 2015

Representative test engineer:

S. Takano

Shinichi Takano
Engineer

Consumer Technology Division

Approved by:

T. Imamura

Toyokazu Imamura

Leader

Consumer Technology Division



JAB
Testing
RTL02610

- ☒ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☐ There is no testing item of "Non-accreditation".

UL Japan, Inc.

Shonan EMC Lab.

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 10941706S-A

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SECTION 1: Customer information

Company Name	:	CASIO COMPUTER CO., LTD.
Address	:	2-1, Sakaecho 3-chome, Hamura-shi, Tokyo, 205-8555 Japan
Telephone Number	:	+81-42-579-7249
Facsimile Number	:	+81-42-579-7744
Contact Person	:	Munetaka Seo

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

2.1 Identification of E.U.T.

Type of Equipment	:	RF Module
Model No.	:	WSD-F10
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.8 V (Battery), DC 5.0V (USB)
Receipt Date of Sample	:	October 27, 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

Model: WSD-F10 (referred to as the EUT in this report) is a RF Module.

General Specification

Clock frequency(ies) in the system	:	32.768 kHz
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Radio Specification

[Bluetooth]

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS
Antenna type	:	Reverse L type
Antenna Gain	:	-6.55 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: final revised on November 23, 2015

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

*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.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 7. AC powerline conducted emission measurements IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	20.3 dB, QP, N, (DC 3.8 V line) Tx, DH5, 2441 MHz 0.37168 MHz, Tx,3- DH5, 2441 MHz 0.37149 MHz, N	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
20 dB 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(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	6.2 dB Tx, DH5 2402 MHz 1201.000 MHz, AV, Horizontal	Complied	Conducted/ Radiated *1)

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

In case any questions arise about test procedure, ANSI C 63.10:2013 is also referred. (ANSI C63.10:2013 is Non-accreditation)

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

FCC Part 15.31 (e)

This EUT provides stable voltage(DC1.35V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203/212 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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Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	3.6 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB
	18 GHz-40 GHz	4.5 dB	4.3 dB	4.3 dB

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.76 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.79 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.08 dB
Spurious emission (Conducted) below 1GHz	1.5 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.4 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.5 dB
Bandwidth Measurement	0.66 %
Duty cycle and Time Measurement	0.012 %

Conducted Emission test

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

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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JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

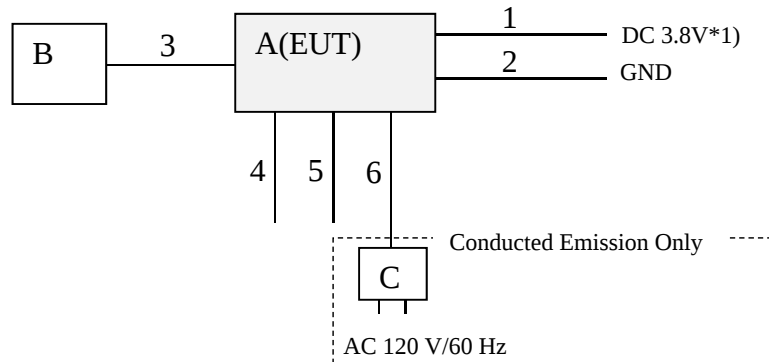
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3-DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3-DH5 Inquiry	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3-DH5 Inquiry	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3-DH5 Inquiry	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3-DH1, 3-DH3, 3-DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2-DH5, 3-DH5 Inquiry	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3-DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3-DH5 -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) *2-DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative. *EUT has the power settings by the software as follows; Power settings: Fixed Software: Broadcom BlueTool version 1.8.8.4 *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



*1) It is Open during Conducted Emission test with DC 5.0 V.

** 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	RF Module	WSD-F10	001 *1) 002 *2)	CASIO COMPUTER	EUT
B	LCD	-	-	CASIO COMPUTER	-
C	AC Adaptor	-	-	CASIO COMPUTER	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	0.3+1.5	Unshielded	Unshielded	-
2	DC	0.3+1.5	Unshielded	Unshielded	-
3	Signal	0.01	Unshielded	Unshielded	-
4	Signal	0.5	Unshielded	Unshielded	-
5	Signal	0.5	Unshielded	Unshielded	-
6	USB	0.5	Shielded	Shielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via DC power supply within a shielded room. The EUT via DC power supply was connected to a LISN (AMN). An overview sweep with peak detection has been performed.

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

Detector	: QP and CISPR AV
Measurement range	: 0.15 MHz - 30 MHz
Test data	: APPENDIX
Test result	: Pass

SECTION 6: Radiated Spurious Emission

Test Procedure

Below 1 GHz

EUT was placed on a platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

Above 1 GHz

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

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

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

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

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

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

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

Test Antennas are used as below;

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

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

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

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	4.45 m *2) (below 13 GHz), 1 m *3) (above 13 GHz),		4.45 m *2) (below 13 GHz), 1 m *3) (above 13 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: $20 \times \log \left(\frac{3.0 \text{ m} + (1.5 \text{ m} - 0.05 \text{ m})}{3.0 \text{ m}} \right) = 3.4 \text{ dB}$

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

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test Antenna	Frequency	Carrier	Spurious			
			30 MHz-1 GHz	1-13 GHz	13-18 GHz	18-26.5 GHz
Horizontal		X	X	X	X	X
Vertical		Y	Z	Z	Z	Z

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 7: 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
20 dB 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	Sample	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 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) The measurement was performed with Max Hold since the duty cycle was not 100 %. *2) In the frequency range below 30 MHz, 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.							

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

Conducted Emission (DC 3.8 V line)

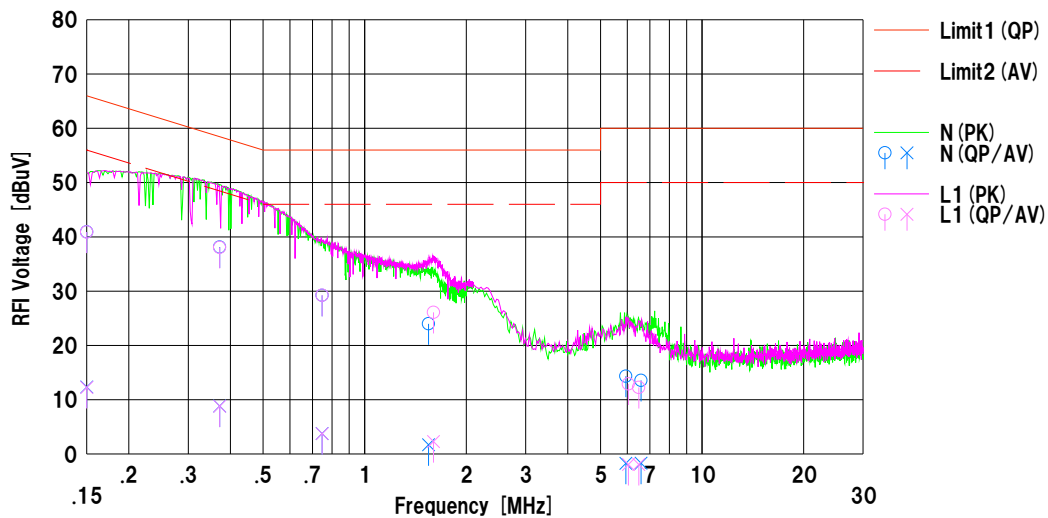
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/10/31

Mode : Tx. DH5. 2441 MHz
Power : AC 120 V / 60 Hz (EUT input:DC 3.8 V)
Temp./Humi. : 24 deg.C / 43 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	28.55	-0.01	12.35	40.90	12.34	66.00	56.00	25.1	43.6	N	
2	0.37168	25.75	-3.54	12.37	38.12	8.83	58.46	48.46	20.3	39.6	N	
3	0.74824	16.83	-8.64	12.40	29.23	3.76	56.00	46.00	26.7	42.2	N	
4	1.54654	11.54	-10.76	12.45	23.99	1.69	56.00	46.00	32.0	44.3	N	
5	5.94634	1.64	-14.41	12.69	14.33	-1.72	60.00	50.00	45.6	51.7	N	
6	6.59644	0.84	-14.42	12.72	13.56	-1.70	60.00	50.00	46.4	51.7	N	
7	0.15000	28.54	-0.10	12.35	40.89	12.25	66.00	56.00	25.1	43.7	L1	
8	0.37168	25.67	-3.56	12.37	38.04	8.81	58.46	48.46	20.4	39.6	L1	
9	0.74824	16.84	-8.66	12.40	29.24	3.74	56.00	46.00	26.7	42.2	L1	
10	1.60043	13.64	-10.15	12.45	26.09	2.30	56.00	46.00	29.9	43.7	L1	
11	6.04976	0.21	-14.62	12.69	12.90	-1.93	60.00	50.00	47.1	51.9	L1	
12	6.49445	-0.45	-14.64	12.71	12.26	-1.93	60.00	50.00	47.7	51.9	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN=SLS-05 (US)

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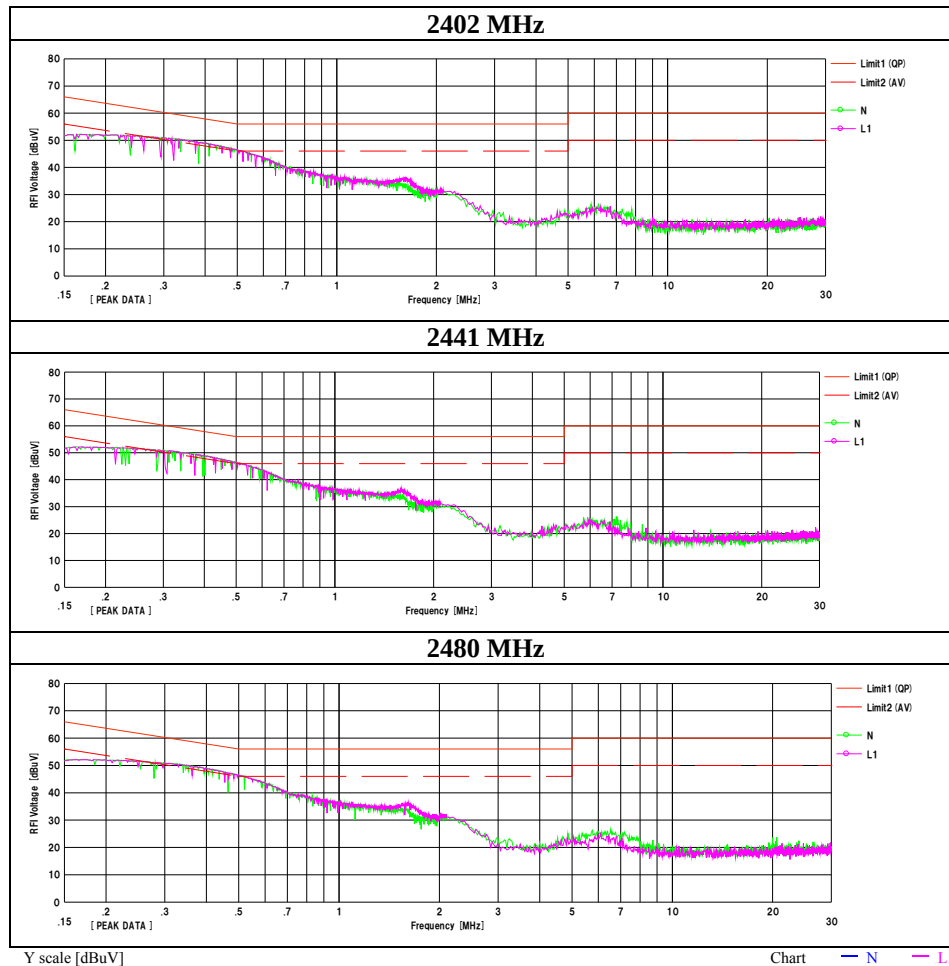
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Conducted Emission

(DC 3.8 V line)

Test place : Shonan EMC Lab. No.3 Shielded room
Report No. : 10941706S-A
Date : October 31, 2015
Temperature / Humidity : 24 deg. C / 43 % RH
Engineer : Kenichi Adachi
Mode : Tx, Hopping Off, DH5



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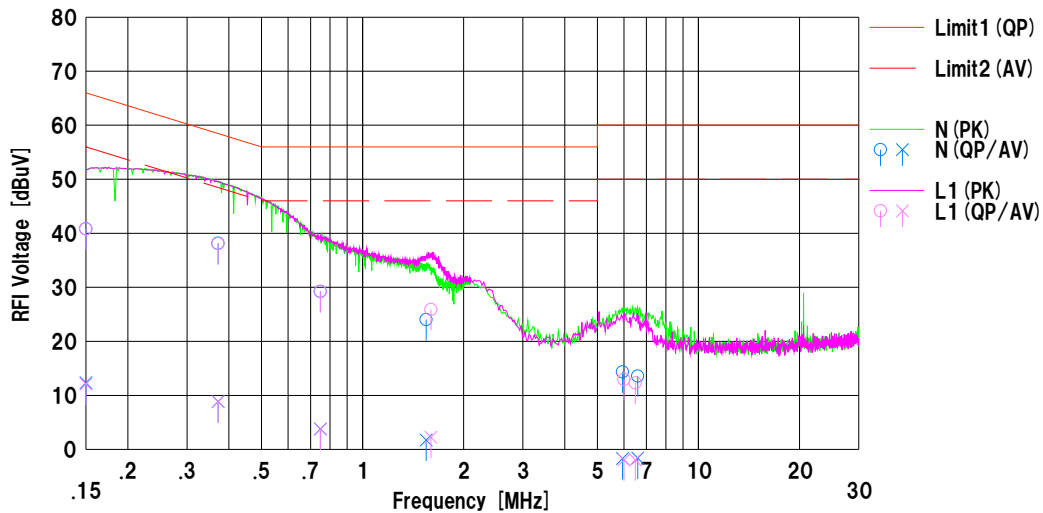
Conducted Emission (DC 3.8 V line) **DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/10/31

Mode : Tx. 3-DH5. 2441 MHz
Power : AC 120 V / 60 Hz (EUT input:DC 3.8 V)
Temp./Humi. : 24 deg.C / 43 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



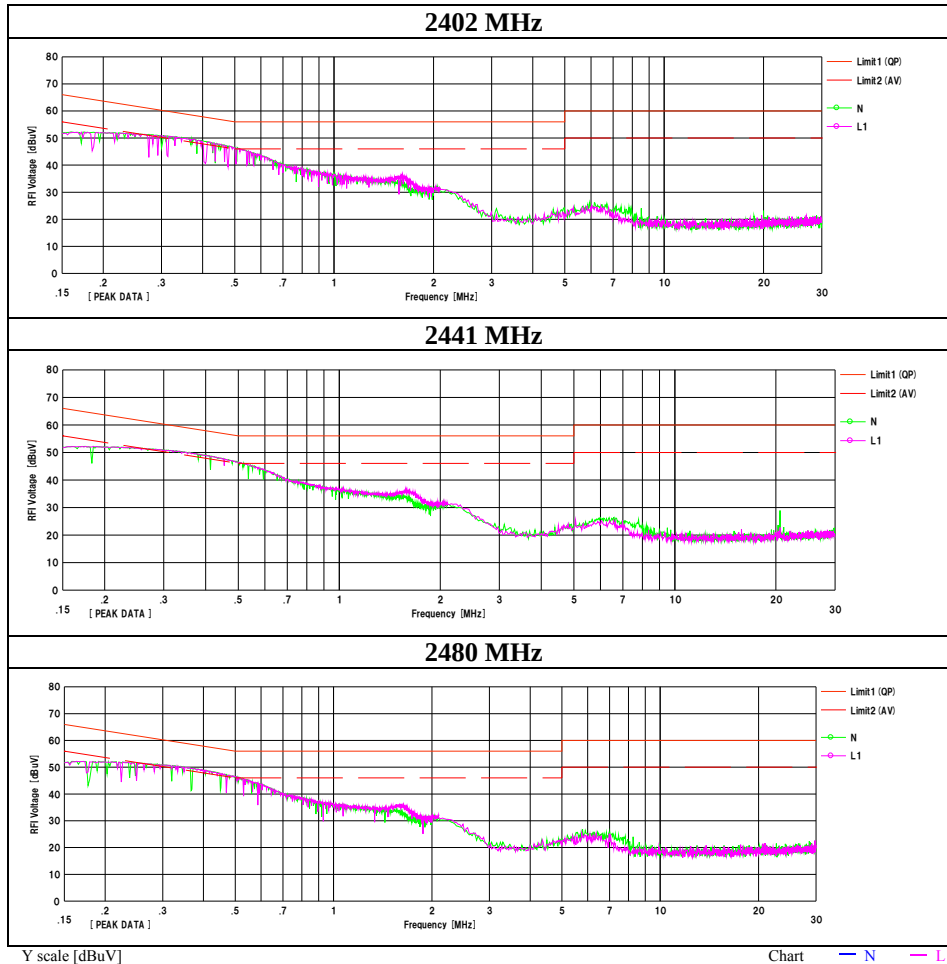
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	28.48	-0.01	12.35	40.83	12.34	66.00	56.00	25.1	43.6	N	
2	0.37149	25.77	-3.52	12.37	38.14	8.85	58.47	48.47	20.3	39.6	N	
3	0.74866	16.85	-8.62	12.40	29.25	3.78	56.00	46.00	26.7	42.2	N	
4	1.54677	11.56	-10.72	12.45	24.01	1.73	56.00	46.00	31.9	44.2	N	
5	5.94670	1.66	-14.38	12.69	14.35	-1.69	60.00	50.00	45.6	51.6	N	
6	6.59684	0.86	-14.34	12.72	13.58	-1.62	60.00	50.00	46.4	51.6	N	
7	0.15000	28.44	-0.24	12.35	40.79	12.11	66.00	56.00	25.2	43.8	L1	
8	0.37149	25.69	-3.58	12.37	38.06	8.80	58.47	48.47	20.4	39.6	L1	
9	0.74866	16.78	-8.68	12.40	29.18	3.72	56.00	46.00	26.8	42.2	L1	
10	1.59938	13.44	-10.21	12.45	25.89	2.24	56.00	46.00	30.1	43.7	L1	
11	6.00265	0.24	-14.61	12.69	12.93	-1.92	60.00	50.00	47.0	51.9	L1	
12	6.48937	-0.41	-14.66	12.71	12.30	-1.95	60.00	50.00	47.7	51.9	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN=SLS-05 (US)

Conducted Emission

(DC 3.8 V line)

Test place : Shonan EMC Lab. No.3 Shielded room
Report No. : 10941706S-A
Date : October 31, 2015
Temperature / Humidity : 24 deg. C / 43 % RH
Engineer : Kenichi Adachi
Mode : Tx, Hopping Off, 3-DH5



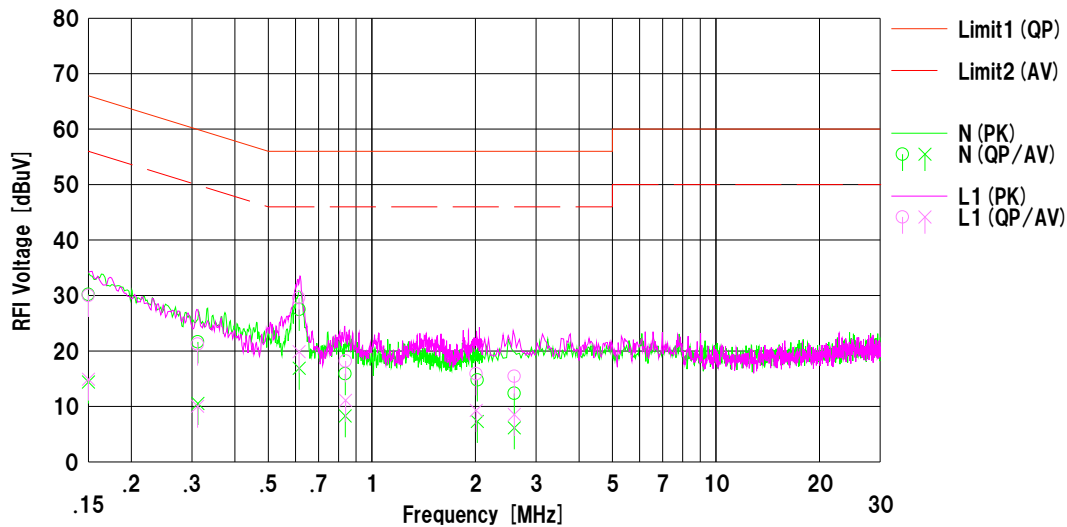
Conducted Emission
(DC 5.0 V line)
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/11/01

Mode : Tx, DH5, 2441 MHz
Power : DC 5 V (AC adapter input: AC 120 V / 60 Hz)
Temp./Humi. : 22 deg.C / 41 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa



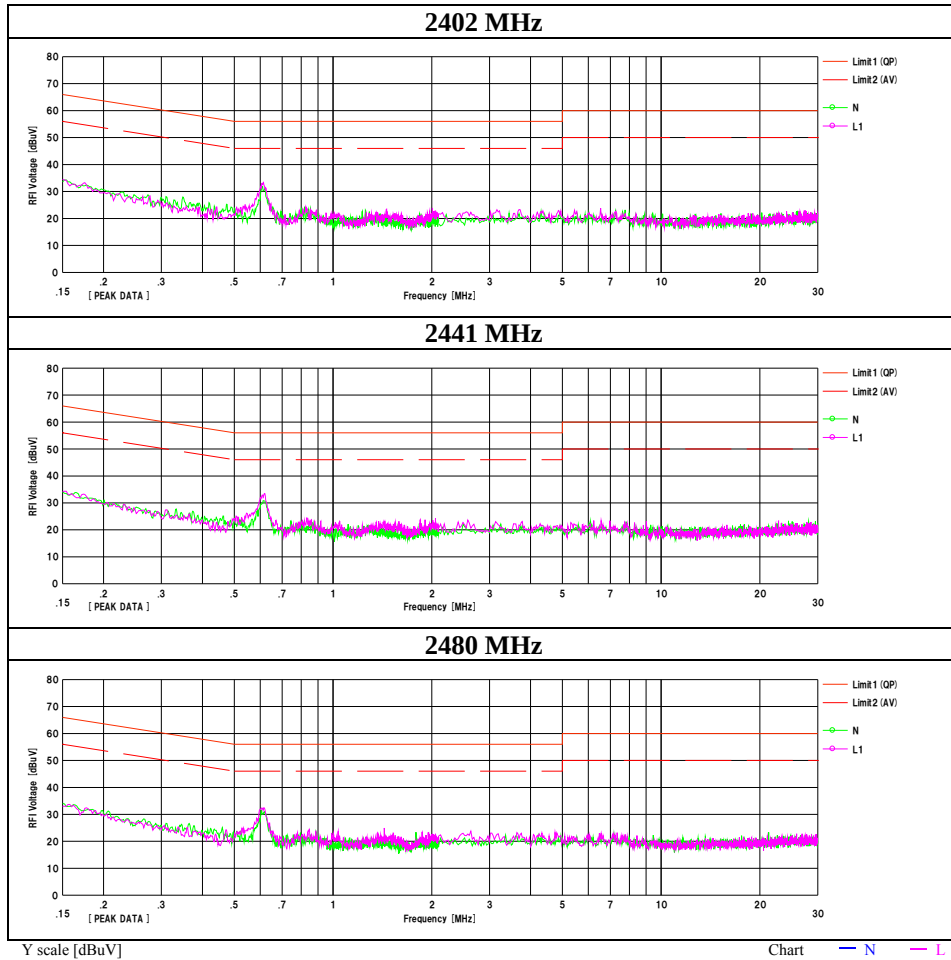
No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15001	17.70	1.90	12.50	30.20	14.40	56.00	56.00	35.8	41.6	N	
2	0.31210	9.10	-2.00	12.54	21.64	10.54	59.91	49.91	38.2	39.3	N	
3	0.61502	14.90	4.30	12.58	27.48	16.88	56.00	46.00	28.5	29.1	N	
4	0.83692	3.30	-4.30	12.59	15.89	8.29	56.00	46.00	40.1	37.7	N	
5	2.02526	2.10	-5.40	12.68	14.78	7.28	56.00	46.00	41.2	38.7	N	
6	2.59484	-0.40	-6.60	12.75	12.35	6.15	56.00	46.00	43.6	39.8	N	
7	0.15001	17.50	2.40	12.50	30.00	14.90	56.00	56.00	36.0	41.1	L1	
8	0.31172	8.70	-2.50	12.54	21.24	10.04	59.92	49.92	38.6	39.8	L1	
9	0.61394	17.00	7.30	12.58	29.58	19.88	56.00	46.00	26.4	26.1	L1	
10	0.83832	5.60	-1.50	12.59	18.19	11.09	56.00	46.00	37.8	34.9	L1	
11	2.01036	3.20	-3.40	12.68	15.88	9.28	56.00	46.00	40.1	36.7	L1	
12	2.59482	2.70	-4.20	12.75	15.45	8.55	56.00	46.00	40.5	37.4	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-02

Conducted Emission

(DC 5.0 V line)

Test place : Shonan EMC Lab. No.3 Shielded room
Report No. : 10941706S-A
Date : November 1, 2015
Temperature / Humidity : 22 deg. C / 41 % RH
Engineer : Yosuke Ishikawa
Mode : Tx, Hopping Off, DH5



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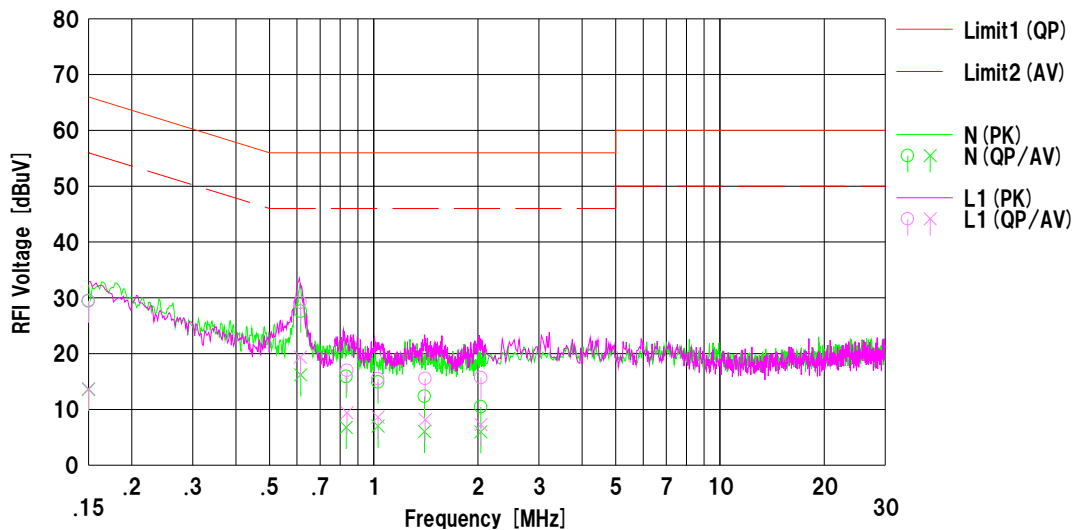
Conducted Emission (DC 5.0 V line) **DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2015/11/01

Mode : Tx. 3-DH5. 2441 MHz
Power : DC 5 V (AC adapter input: AC 120 V / 60 Hz)
Temp./Humi. : 22 deg.C / 41 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa



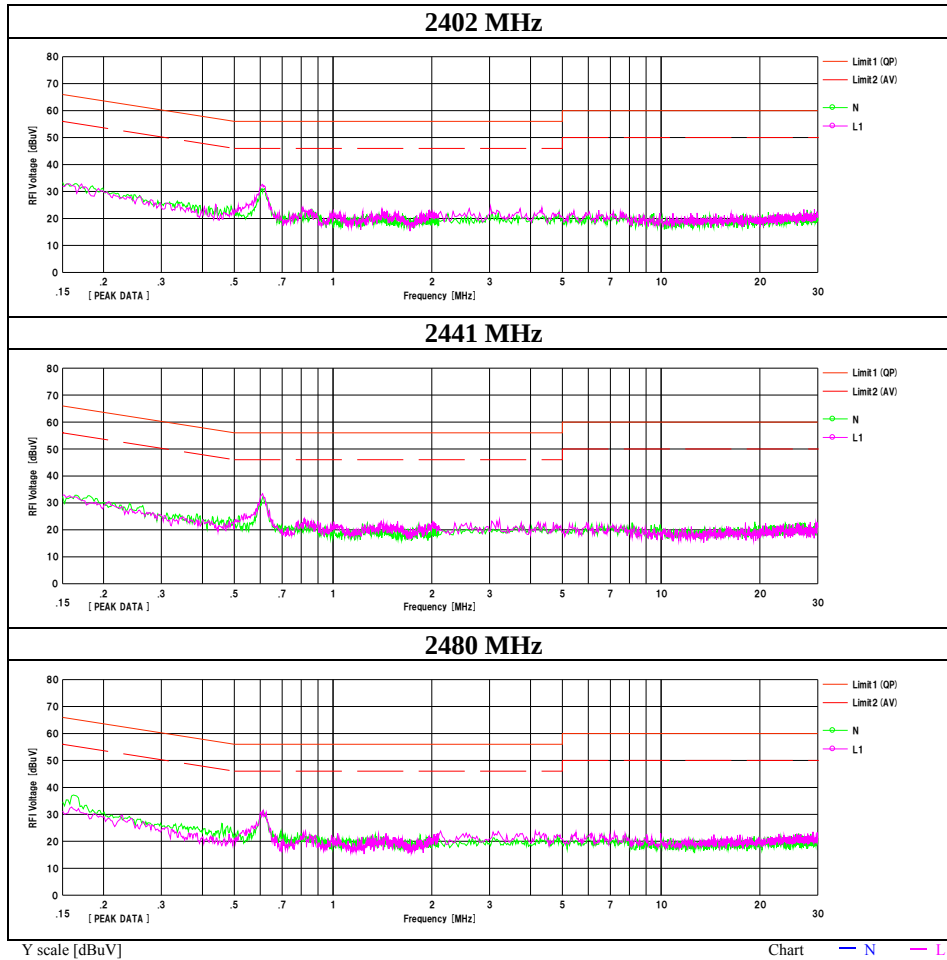
No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15001	17.00	1.10	12.50	29.50	13.60	66.00	56.00	36.5	42.4	N	
2	0.61532	15.00	3.60	12.58	27.58	16.18	56.00	46.00	28.4	29.8	N	
3	0.83347	3.30	-5.80	12.59	15.89	6.79	56.00	46.00	40.1	39.2	N	
4	1.02927	2.30	-5.60	12.61	14.91	7.01	56.00	46.00	41.0	38.9	N	
5	1.40100	-0.30	-6.60	12.65	12.35	6.05	56.00	46.00	43.6	39.9	N	
6	2.03867	-2.20	-6.70	12.68	10.48	5.98	56.00	46.00	45.5	40.0	N	
7	0.15001	16.90	1.20	12.50	29.40	13.70	66.00	56.00	36.6	42.3	L1	
8	0.61395	16.60	6.80	12.58	29.18	19.38	56.00	46.00	26.8	26.6	L1	
9	0.83722	4.40	-3.20	12.59	16.99	9.39	56.00	46.00	39.0	36.6	L1	
10	1.02912	2.90	-4.00	12.61	15.51	8.61	56.00	46.00	40.4	37.3	L1	
11	1.40877	2.90	-4.50	12.65	15.55	8.15	56.00	46.00	40.4	37.8	L1	
12	2.04067	3.00	-5.40	12.68	15.68	7.28	56.00	46.00	40.3	38.7	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN:SLS-02

Conducted Emission

(DC 5.0 V line)

Test place : Shonan EMC Lab. No.3 Shielded room
Report No. : 10941706S-A
Date : November 1, 2015
Temperature / Humidity : 22 deg. C / 41 % RH
Engineer : Yosuke Ishikawa
Mode : Tx, Hopping Off, 3-DH5



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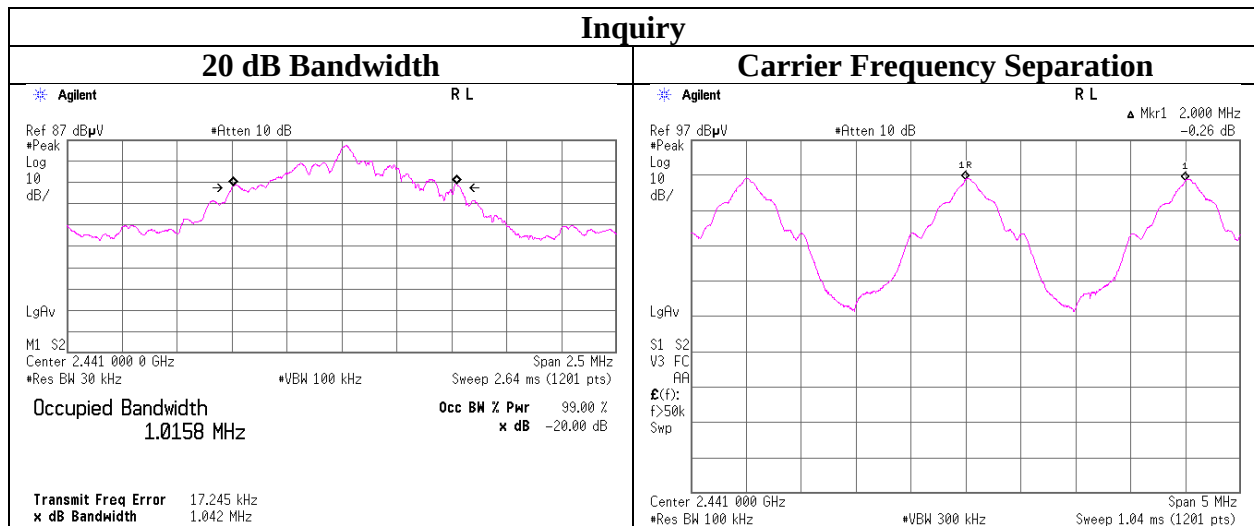
Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping On, Tx, Hopping Off

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.985	1.000	≥ 0.657
DH5	2441.0	0.957	1.000	≥ 0.638
DH5	2480.0	0.952	1.000	≥ 0.635
3-DH5	2402.0	1.316	1.000	≥ 0.877
3-DH5	2441.0	1.316	1.000	≥ 0.877
3-DH5	2480.0	1.316	1.000	≥ 0.877
Inquiry	2441.0	1.042	2.000	≥ 0.694

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



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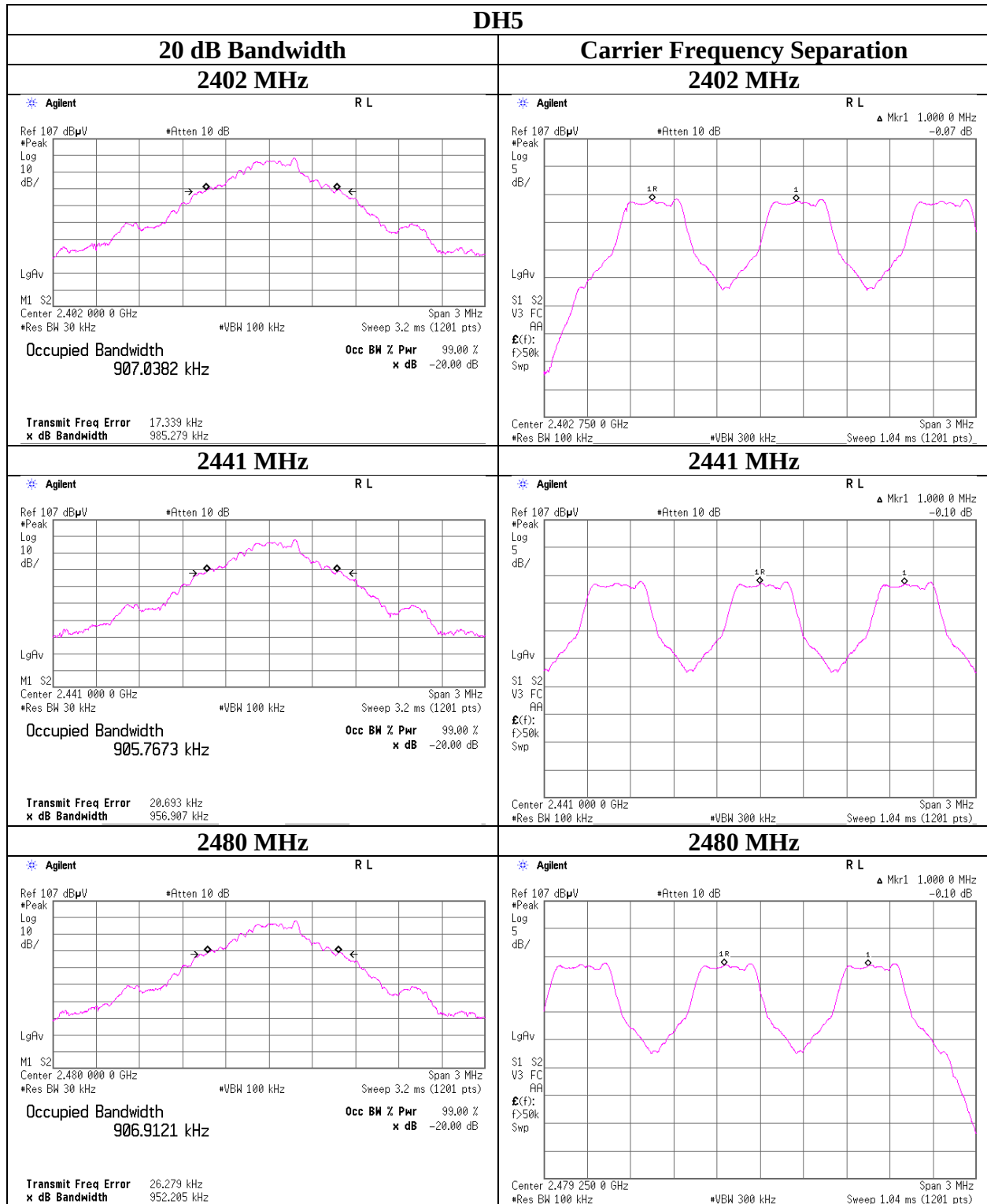
Shonan EMC Lab.

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Telephone : +81 463 50 6400

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20dB Bandwidth and Carrier Frequency Separation



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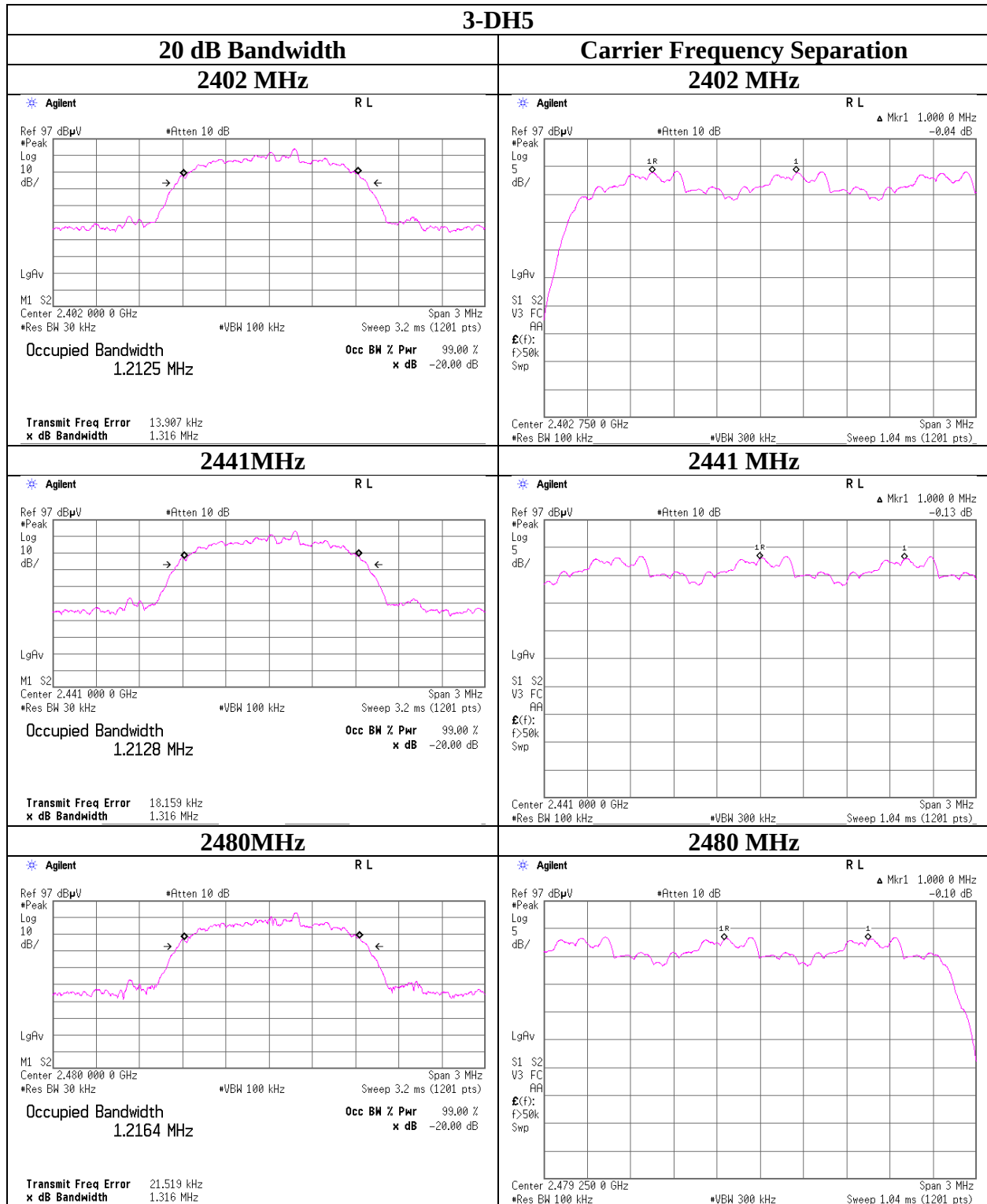
Shonan EMC Lab.

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Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation



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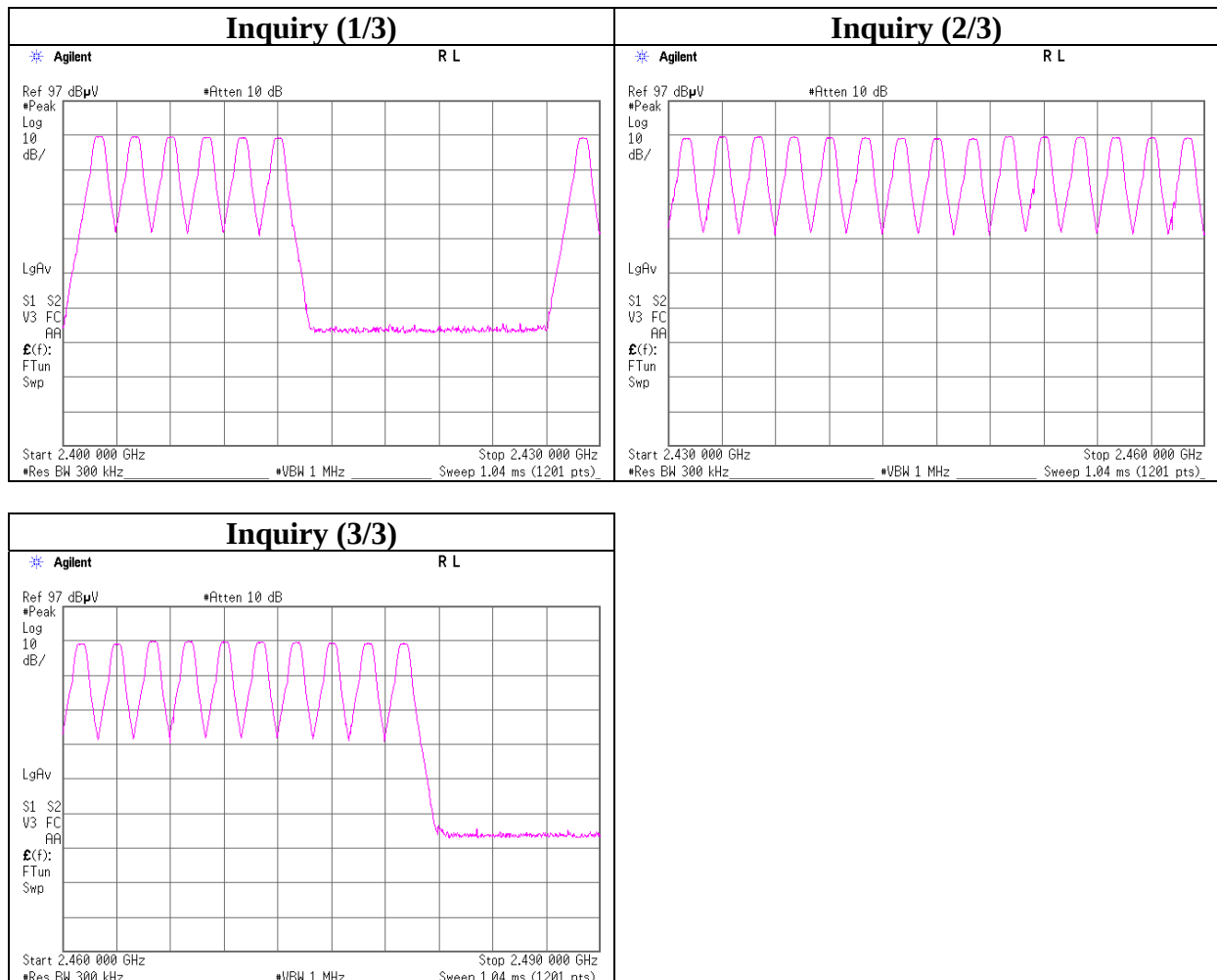
Facsimile : +81 463 50 6401

Number of Hopping Frequency

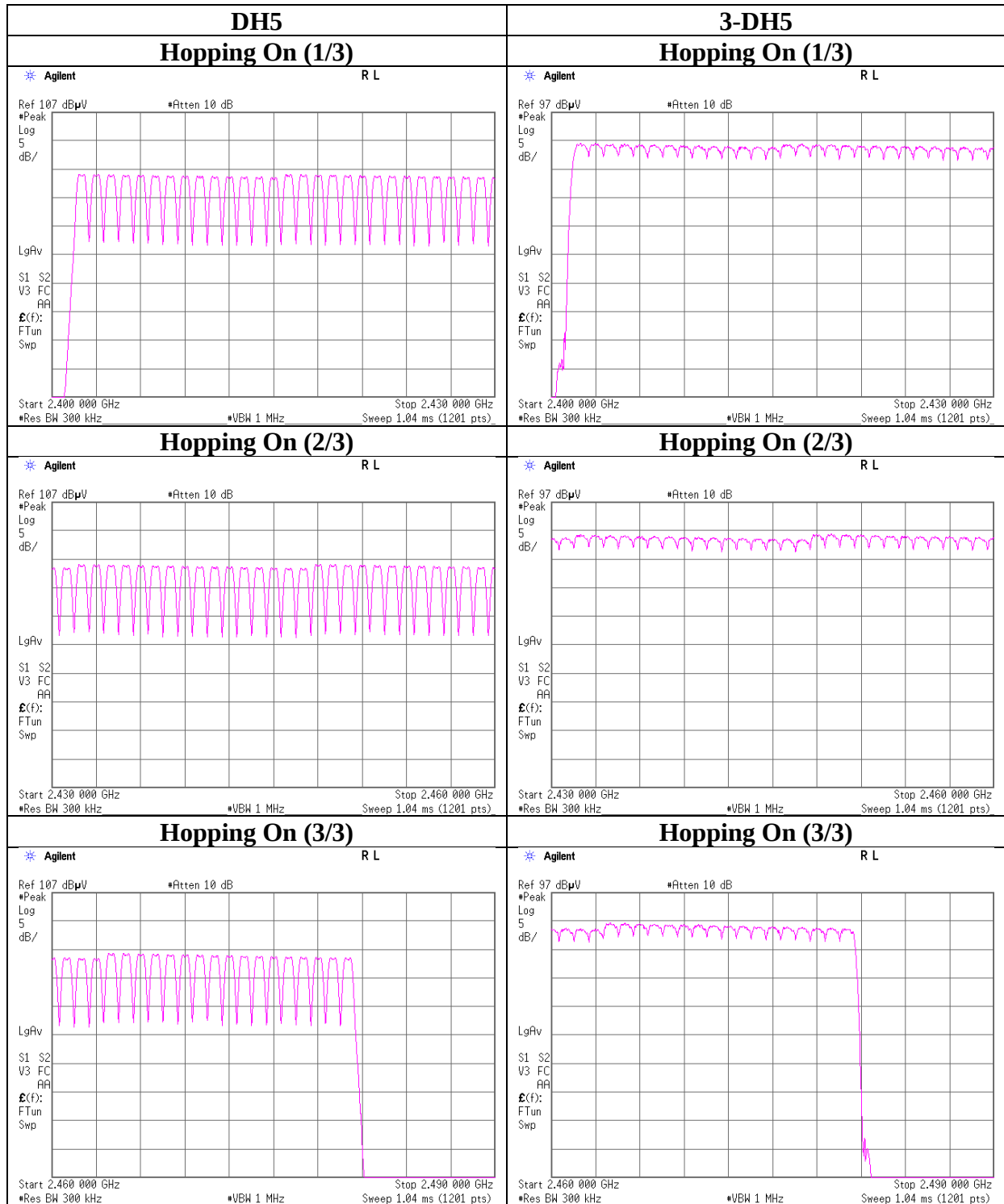
Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10941706S-A
Date	November 9, 2015
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
3DH5	79	≥ 15
Inquiry	32	≥ 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	Shonan EMC Lab. No.5 Shielded Room
Report No.	10941706S-A
Date	November 9, 2015
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Tomohiro Hara
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	50.8 times	/	5 sec. x	31.6 sec. = 322 times	0.408	131	400
DH3	24.2 times	/	5 sec. x	31.6 sec. = 153 times	1.667	255	400
DH5	16.0 times	/	5 sec. x	31.6 sec. = 102 times	2.928	299	400
3-DH1	51.0 times	/	5 sec. x	31.6 sec. = 323 times	0.429	139	400
3-DH3	24.6 times	/	5 sec. x	31.6 sec. = 156 times	1.687	263	400
3-DH5	17.8 times	/	5 sec. x	31.6 sec. = 113 times	2.944	333	400
Inquiry	100.0 times	/	1 sec. x	12.8 sec. = 1280 times	0.110	141	400

Sample Calculation

Result = Number of transmission x Length of transmission

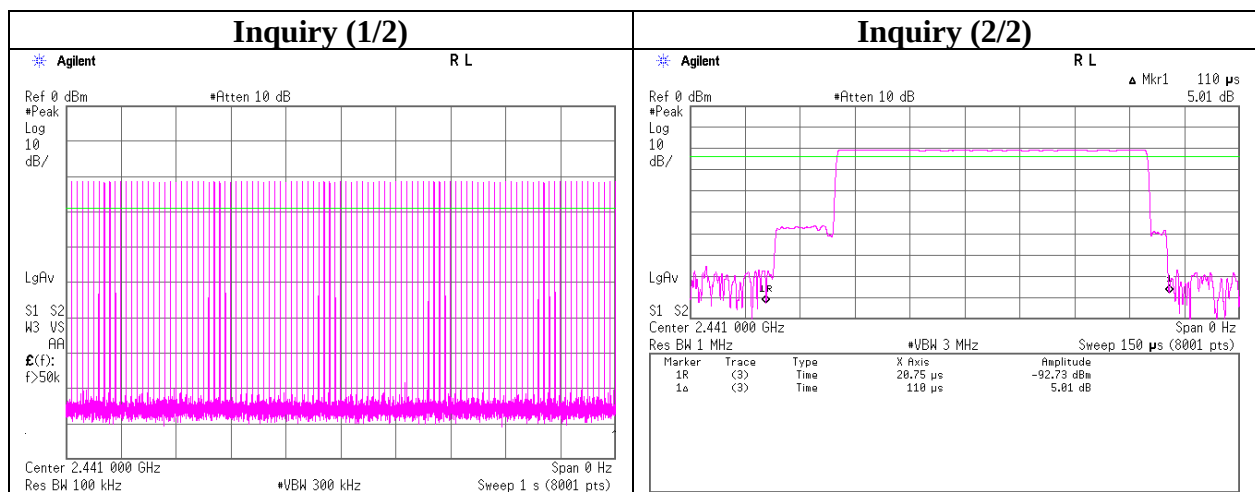
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	51	52	50	51	50.8
DH3	24	23	24	25	25	24.2
DH5	17	14	14	19	16	16
3-DH1	50	52	51	51	51	51
3-DH3	25	23	26	24	25	24.6
3-DH5	18	18	17	19	17	17.8

Sample Calculation

Average = Summation (Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for $N = 79$.



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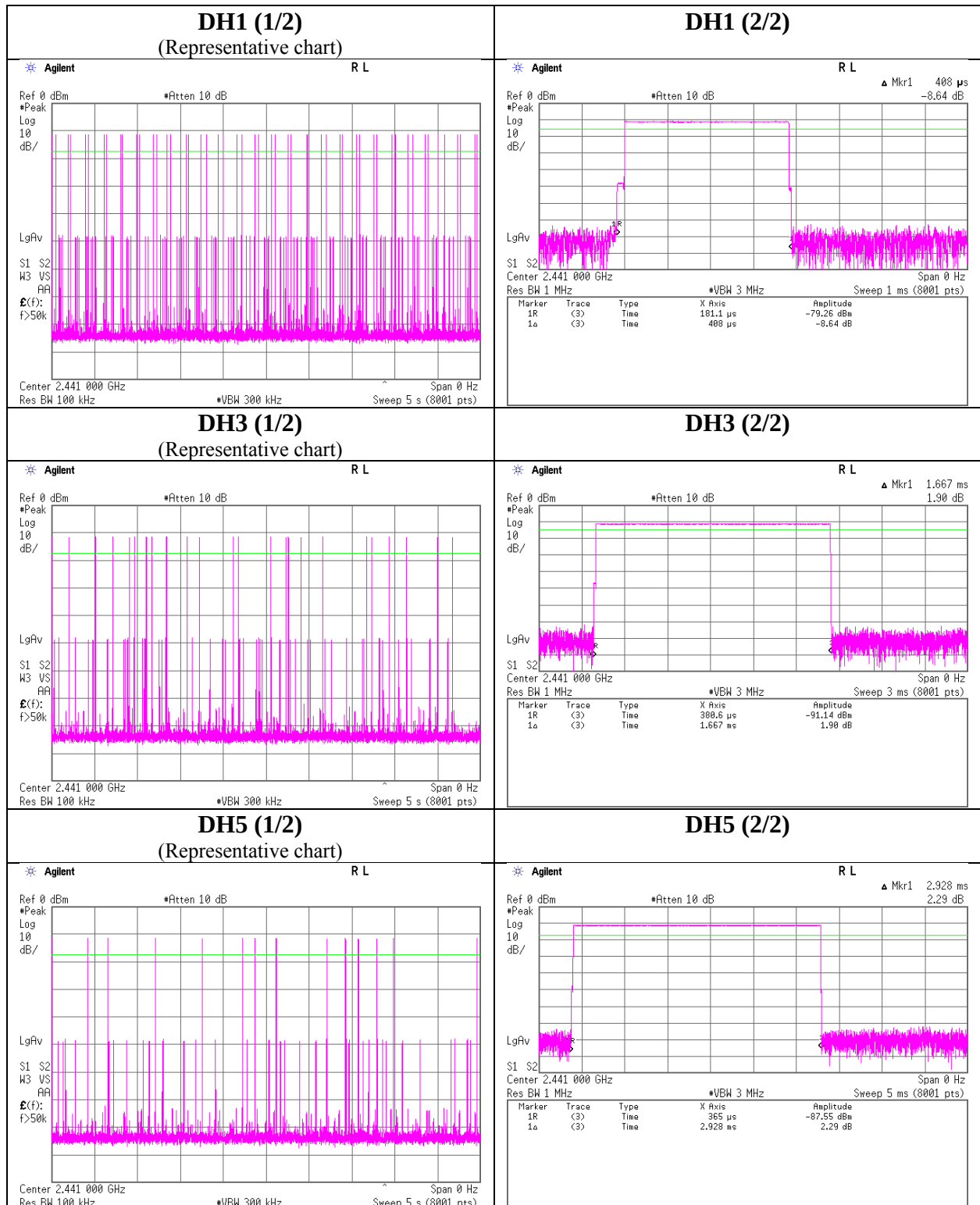
Shonan EMC Lab.

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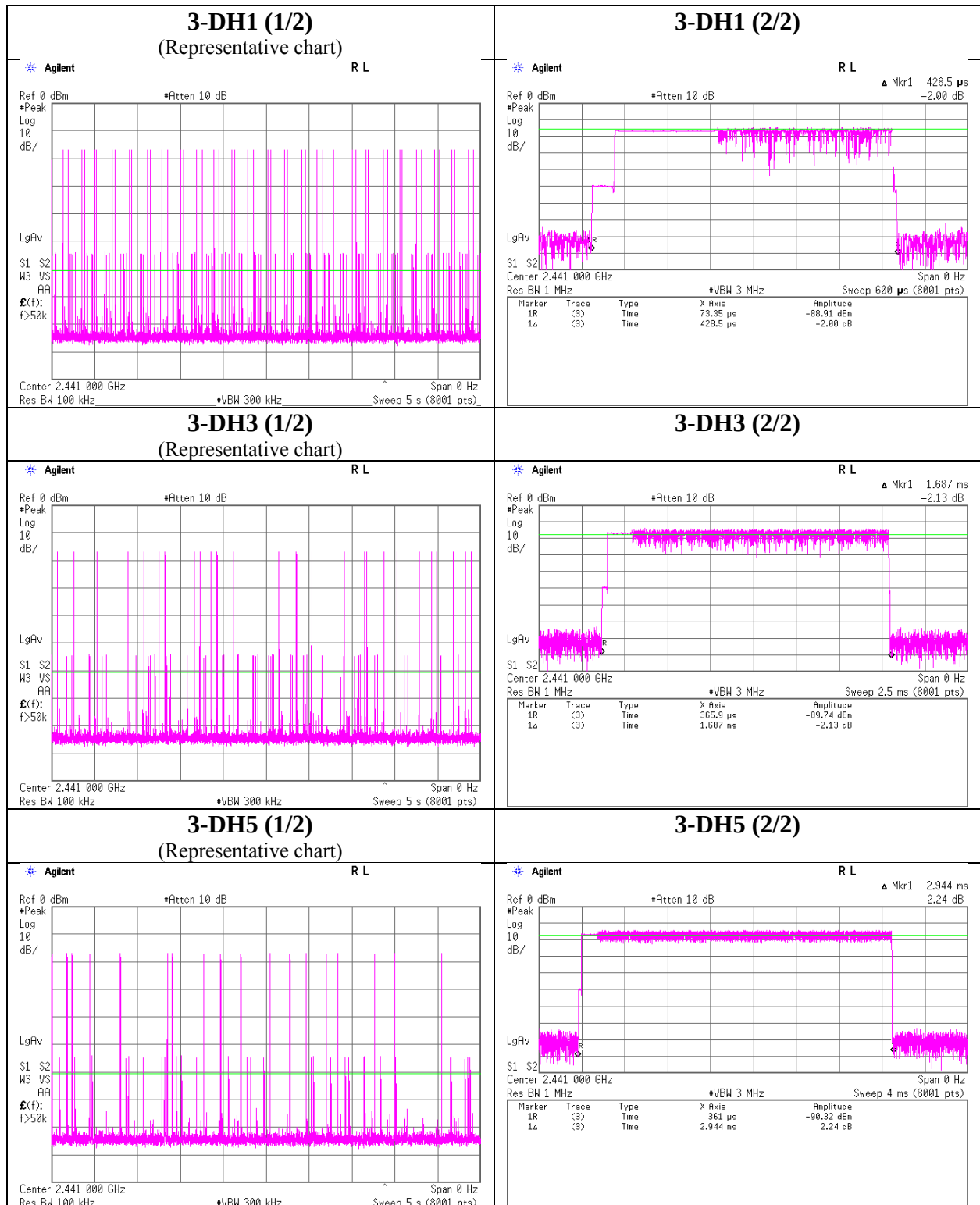
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Dwell time



Dwell time



Maximum Peak Output Power

Test place Shonan EMC Lab. No.1 Measurement Room
Report No. 10941706S-A
Date October 28, 2015
Temperature / Humidity 24 deg. C / 53 % RH
Engineer Tomohiro Hara
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	-10.78	0.89	9.93	0.04	1.01	20.96	125	20.92
DH5	2441.0	-11.18	0.89	9.93	-0.36	0.92	20.96	125	21.32
DH5	2480.0	-11.27	0.90	9.93	-0.44	0.90	20.96	125	21.40
2-DH5	2402.0	-12.79	0.89	9.93	-1.97	0.64	20.96	125	22.93
2-DH5	2441.0	-13.32	0.89	9.93	-2.50	0.56	20.96	125	23.46
2-DH5	2480.0	-13.52	0.90	9.93	-2.69	0.54	20.96	125	23.65
3-DH5	2402.0	-12.74	0.89	9.93	-1.92	0.64	20.96	125	22.88
3-DH5	2441.0	-13.30	0.89	9.93	-2.48	0.56	20.96	125	23.44
3-DH5	2480.0	-13.47	0.90	9.93	-2.64	0.54	20.96	125	23.60

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + 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	Shonan EMC Lab. No.1 Measurement Room
Report No.	10941706S-A
Date	October 28, 2015
Temperature / Humidity	24 deg. C / 53 % RH
Engineer	Tomohiro Hara
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	-12.14	0.89	9.93	-1.32	0.74	1.07	-0.25	0.94
DH5	2441.0	-12.60	0.89	9.93	-1.78	0.66	1.07	-0.71	0.85
DH5	2480.0	-12.71	0.90	9.93	-1.88	0.65	1.07	-0.81	0.83
2-DH5	2402.0	-16.75	0.89	9.93	-5.93	0.26	1.08	-4.85	0.33
2-DH5	2441.0	-17.39	0.89	9.93	-6.57	0.22	1.08	-5.49	0.28
2-DH5	2480.0	-17.53	0.90	9.93	-6.70	0.21	1.08	-5.62	0.27
3-DH5	2402.0	-16.74	0.89	9.93	-5.92	0.26	1.08	-4.84	0.33
3-DH5	2441.0	-17.36	0.89	9.93	-6.54	0.22	1.08	-5.46	0.28
3-DH5	2480.0	-17.50	0.90	9.93	-6.67	0.22	1.08	-5.59	0.28

Sample Calculation:

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

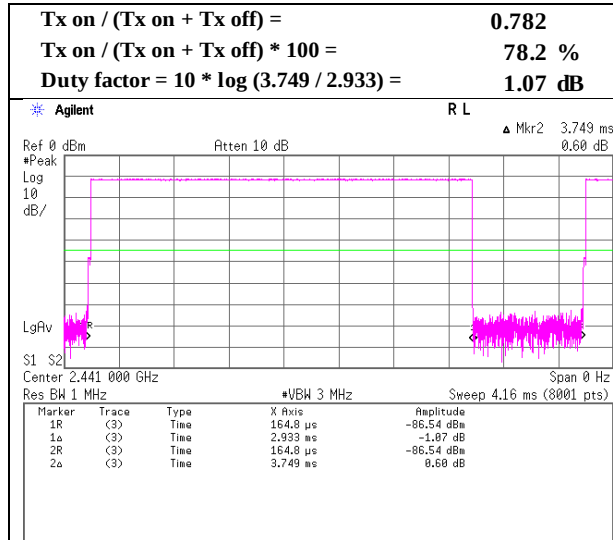
Result (Burst power) = Frame power + Duty factor

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

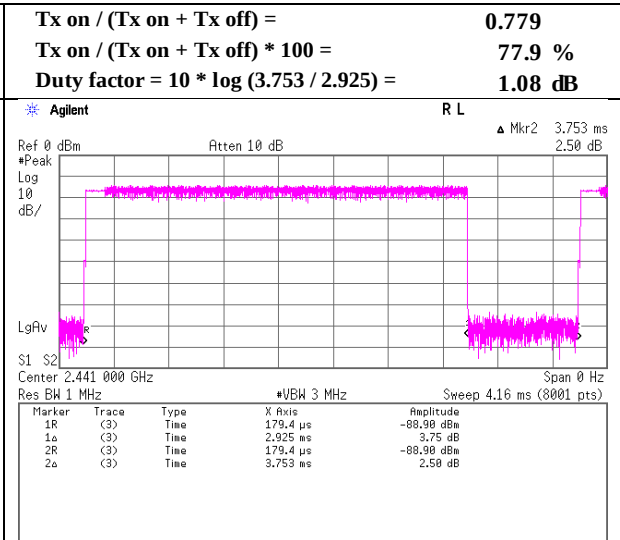
Burst Rate Confirmation

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10941706S-A
Date	November 9, 2015
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off

DH5



3-DH5



Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	181.603	QP	21.9	15.9	7.9	32.0	0.0	13.7	43.5	29.8	100	5	
Hori.	249.993	QP	21.9	17.1	8.4	32.0	0.0	15.4	46.0	30.6	100	348	
Hori.	318.285	QP	21.3	14.3	8.8	31.9	0.0	12.5	46.0	33.5	100	351	
Hori.	2390.000	PK	45.7	27.8	13.7	41.0	3.4	49.6	73.9	24.3	100	103	
Hori.	4804.000	PK	45.2	31.4	5.7	39.6	3.4	46.1	73.9	27.8	100	334	
Hori.	7206.000	PK	46.2	36.9	7.1	40.1	3.4	53.5	73.9	20.4	100	0	
Hori.	9608.000	PK	45.9	38.5	8.2	39.6	3.4	56.4	73.9	17.5	100	0	
Hori.	12010.000	PK	46.8	39.7	9.3	39.3	3.4	59.9	73.9	14.0	100	0	
Hori.	2390.000	AV	34.2	27.8	13.7	41.0	3.4	38.1	53.9	15.8	100	103	
Hori.	4804.000	AV	34.7	31.4	5.7	39.6	3.4	35.6	53.9	18.3	100	334	
Hori.	7206.000	AV	34.3	36.9	7.1	40.1	3.4	41.6	53.9	12.3	100	0	
Hori.	9608.000	AV	34.3	38.5	8.2	39.6	3.4	44.8	53.9	9.1	100	0	
Hori.	12010.000	AV	34.6	39.7	9.3	39.3	3.4	47.7	53.9	6.2	100	0	
Vert.	59.185	QP	25.6	7.5	6.7	32.1	0.0	7.7	40.0	32.3	100	143	
Vert.	149.974	QP	21.5	14.6	7.9	32.1	0.0	11.9	43.5	31.6	100	22	
Vert.	559.448	QP	21.1	18.3	9.8	31.9	0.0	17.3	46.0	28.7	100	13	
Vert.	2390.000	PK	46.0	27.8	13.7	41.0	3.4	49.9	73.9	24.0	100	97	
Vert.	4804.000	PK	45.4	31.4	5.7	39.6	3.4	46.3	73.9	27.6	100	128	
Vert.	7206.000	PK	45.9	36.9	7.1	40.1	3.4	53.2	73.9	20.7	100	0	
Vert.	9608.000	PK	45.6	38.5	8.2	39.6	3.4	56.1	73.9	17.8	100	0	
Vert.	12010.000	PK	46.1	39.7	9.3	39.3	3.4	59.2	73.9	14.7	100	0	
Vert.	2390.000	AV	34.1	27.8	13.7	41.0	3.4	38.0	53.9	15.9	100	97	
Vert.	4804.000	AV	34.7	31.4	5.7	39.6	3.4	35.6	53.9	18.3	100	128	
Vert.	7206.000	AV	34.1	36.9	7.1	40.1	3.4	41.4	53.9	12.5	100	0	
Vert.	9608.000	AV	34.5	38.5	8.2	39.6	3.4	45.0	53.9	8.9	100	0	
Vert.	12010.000	AV	34.5	39.7	9.3	39.3	3.4	47.6	53.9	6.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.4 \text{ dB}$

13 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	91.9	27.8	13.7	41.0	3.4	95.8	-	-	Carrier
Hori.	2400.000	PK	39.0	27.8	13.7	41.0	3.4	42.9	75.7	32.8	
Vert.	2402.000	PK	91.1	27.8	13.7	41.0	3.4	95.0	-	-	Carrier
Vert.	2400.000	PK	38.3	27.8	13.7	41.0	3.4	42.2	75.0	32.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.4 \text{ dB}$

13 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

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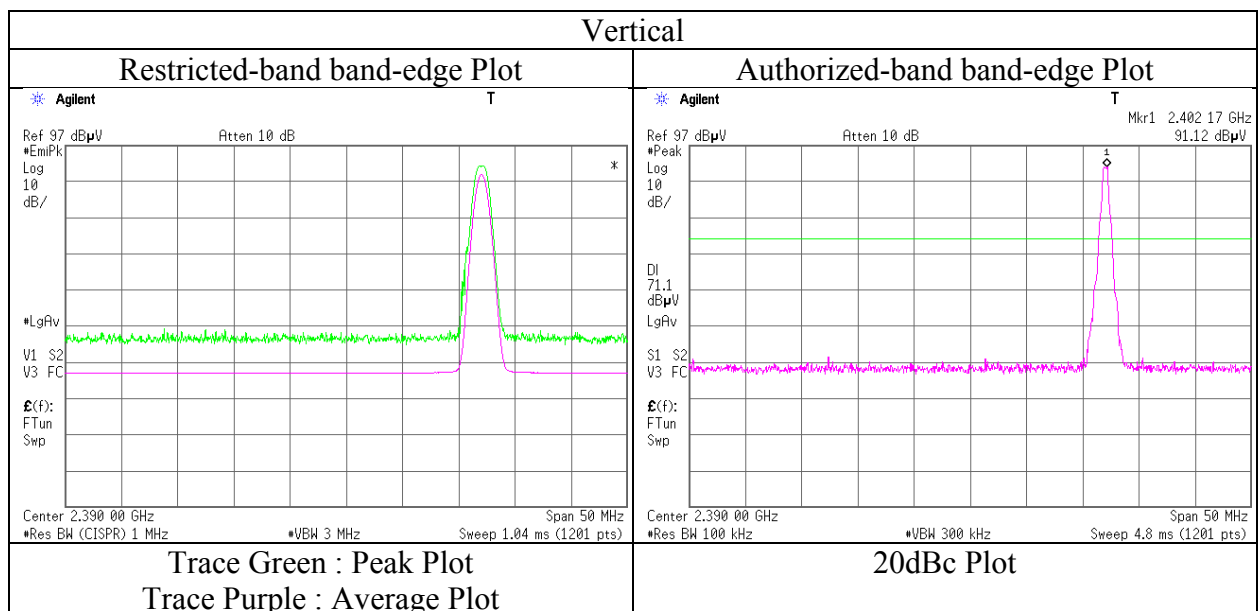
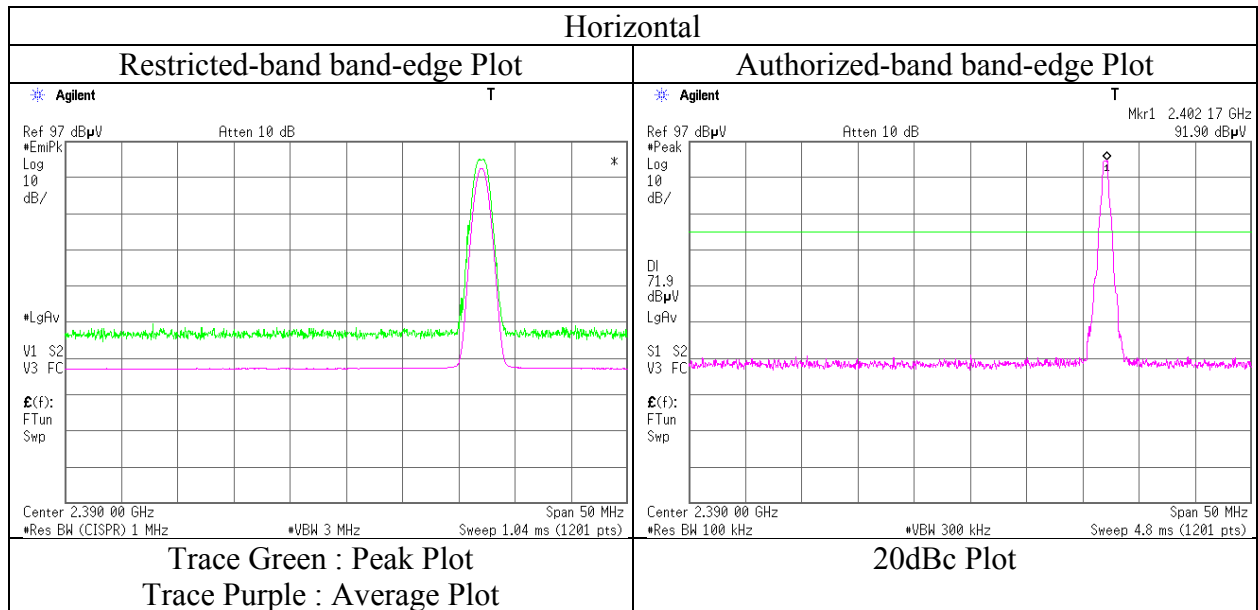
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10941706S-A
Date	October 31, 2015
Temperature / Humidity	25 deg.C, 38 %RH
Engineer	Shinichi Takano (1-26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	187.021	QP	21.7	16.0	7.9	32.0	0.0	13.6	43.5	29.9	100	90	
Hori.	308.030	QP	22.7	14.1	8.7	31.9	0.0	13.6	46.0	32.4	100	128	
Hori.	737.629	QP	21.5	20.5	10.4	31.7	0.0	20.7	46.0	25.3	100	23	
Hori.	828.988	QP	21.8	21.4	10.7	31.4	0.0	22.5	46.0	23.5	100	81	
Hori.	4882.000	PK	45.5	31.7	5.8	39.5	3.4	46.9	73.9	27.0	100	65	
Hori.	7323.000	PK	44.8	36.9	7.2	40.2	3.4	52.1	73.9	21.8	100	0	
Hori.	9764.000	PK	44.9	38.5	8.2	39.5	3.4	55.5	73.9	18.4	100	0	
Hori.	12205.000	PK	45.0	39.6	9.4	39.4	3.4	58.0	73.9	15.9	100	0	
Hori.	4882.000	AV	33.9	31.7	5.8	39.5	3.4	35.3	53.9	18.6	100	65	
Hori.	7323.000	AV	33.6	36.9	7.2	40.2	3.4	40.9	53.9	13.0	100	0	
Hori.	9764.000	AV	33.3	38.5	8.2	39.5	3.4	43.9	53.9	10.0	100	0	
Hori.	12205.000	AV	33.3	39.6	9.4	39.4	3.4	46.3	53.9	7.6	100	0	
Vert.	57.174	QP	25.9	8.1	6.8	32.1	0.0	8.7	40.0	31.3	100	311	
Vert.	447.846	QP	21.1	16.7	9.3	31.9	0.0	15.2	46.0	30.8	100	132	
Vert.	4882.000	PK	45.6	31.7	5.8	39.5	3.4	47.0	73.9	26.9	100	82	
Vert.	7323.000	PK	45.1	36.9	7.2	40.2	3.4	52.4	73.9	21.5	100	0	
Vert.	9764.000	PK	44.3	38.5	8.2	39.5	3.4	54.9	73.9	19.0	100	0	
Vert.	12205.000	PK	45.0	39.6	9.4	39.4	3.4	58.0	73.9	15.9	100	0	
Vert.	4882.000	AV	34.3	31.7	5.8	39.5	3.4	35.7	53.9	18.2	100	82	
Vert.	7323.000	AV	33.6	36.9	7.2	40.2	3.4	40.9	53.9	13.0	100	0	
Vert.	9764.000	AV	33.2	38.5	8.2	39.5	3.4	43.8	53.9	10.1	100	0	
Vert.	12205.000	AV	33.2	39.6	9.4	39.4	3.4	46.2	53.9	7.7	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45\text{ m} / 3.0\text{ m}) = 3.4\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, DH5 2480 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	201.679	QP	21.9	16.3	8.1	32.0	0.0	14.3	43.5	29.2	100	358	
Hori.	384.998	QP	22.2	15.7	9.1	31.9	0.0	15.1	46.0	30.9	100	97	
Hori.	932.560	QP	20.2	22.5	11.1	30.7	0.0	23.1	46.0	22.9	100	17	
Hori.	2483.500	PK	45.9	27.9	13.7	41.0	3.4	49.9	73.9	24.0	100	99	
Hori.	4960.000	PK	45.2	32.0	5.8	39.4	3.4	47.0	73.9	26.9	100	71	
Hori.	7440.000	PK	45.4	37.0	7.2	40.4	3.4	52.6	73.9	21.3	100	0	
Hori.	9920.000	PK	43.7	38.4	8.2	39.4	3.4	54.3	73.9	19.6	100	0	
Hori.	12400.000	PK	43.5	39.5	9.6	39.6	3.4	56.4	73.9	17.5	100	0	
Hori.	2483.500	AV	34.8	27.9	13.7	41.0	3.4	38.8	53.9	15.1	100	99	
Hori.	4960.000	AV	33.7	32.0	5.8	39.4	3.4	35.5	53.9	18.4	100	71	
Hori.	7440.000	AV	33.4	37.0	7.2	40.4	3.4	40.6	53.9	13.3	100	0	
Hori.	9920.000	AV	32.5	38.4	8.2	39.4	3.4	43.1	53.9	10.8	100	0	
Hori.	12400.000	AV	32.1	39.5	9.6	39.6	3.4	45.0	53.9	8.9	100	0	
Vert.	57.115	QP	25.7	8.1	6.8	32.1	0.0	8.5	40.0	31.5	100	122	
Vert.	184.619	QP	21.5	16.0	7.9	32.0	0.0	13.4	43.5	30.1	100	178	
Vert.	777.764	QP	21.1	20.8	10.6	31.6	0.0	20.9	46.0	25.1	100	22	
Vert.	2483.500	PK	45.6	27.9	13.7	41.0	3.4	49.6	73.9	24.3	100	86	
Vert.	4960.000	PK	46.2	32.0	5.8	39.4	3.4	48.0	73.9	25.9	192	83	
Vert.	7440.000	PK	45.1	37.0	7.2	40.4	3.4	52.3	73.9	21.6	100	0	
Vert.	9920.000	PK	44.7	38.4	8.2	39.4	3.4	55.3	73.9	18.6	100	0	
Vert.	12400.000	PK	43.6	39.5	9.6	39.6	3.4	56.5	73.9	17.4	100	0	
Vert.	2483.500	AV	34.6	27.9	13.7	41.0	3.4	38.6	53.9	15.3	100	86	
Vert.	4960.000	AV	34.5	32.0	5.8	39.4	3.4	36.3	53.9	17.6	192	83	
Vert.	7440.000	AV	33.5	37.0	7.2	40.4	3.4	40.7	53.9	13.2	100	0	
Vert.	9920.000	AV	32.5	38.4	8.2	39.4	3.4	43.1	53.9	10.8	100	0	
Vert.	12400.000	AV	32.1	39.5	9.6	39.6	3.4	45.0	53.9	8.9	100	0	

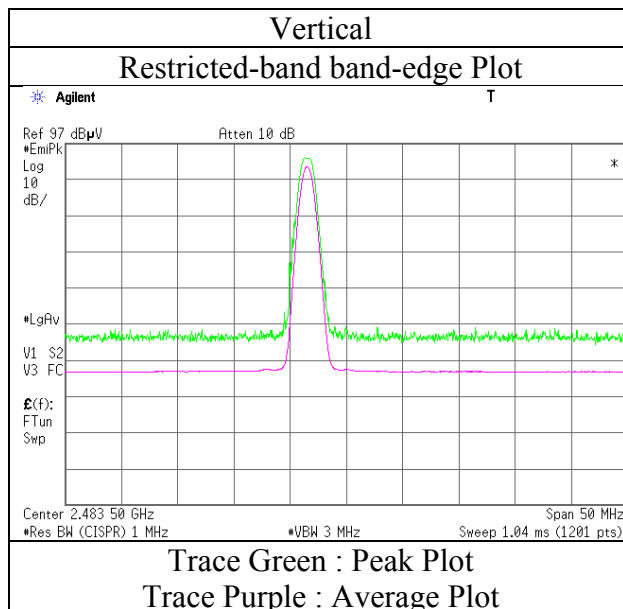
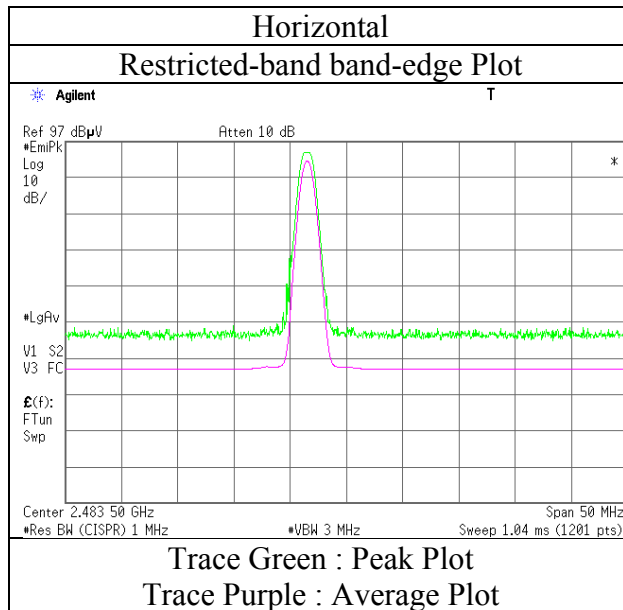
Result = Reading + Ant.Fac. + Loss (Cable+ (Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.4 \text{ dB}$

13 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. 10941706S-A
Date October 31, 2015
Temperature / Humidity 25 deg.C, 38 %RH
Engineer Shinichi Takano
(1-26.5 GHz)
Mode Tx, Hopping Off, DH5 2480 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, 3-DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	43.649	QP	21.9	12.5	6.9	32.1	0.0	9.2	40.0	30.8	100	7	
Hori.	211.002	QP	21.5	16.4	8.2	32.0	0.0	14.1	43.5	29.4	100	39	
Hori.	936.824	QP	20.3	22.5	11.1	30.7	0.0	23.2	46.0	22.8	100	265	
Hori.	2390.000	PK	45.4	27.8	13.7	41.0	3.4	49.3	73.9	24.6	100	103	
Hori.	4804.000	PK	45.2	31.4	5.7	39.6	3.4	46.1	73.9	27.8	100	260	
Hori.	7206.000	PK	45.5	36.9	7.1	40.1	3.4	52.8	73.9	21.1	100	0	
Hori.	9608.000	PK	46.1	38.5	8.2	39.6	3.4	56.6	73.9	17.3	100	0	
Hori.	12010.000	PK	46.8	39.7	9.3	39.3	3.4	59.9	73.9	14.0	100	0	
Hori.	2390.000	AV	34.1	27.8	13.7	41.0	3.4	38.0	53.9	15.9	100	103	
Hori.	4804.000	AV	33.8	31.4	5.7	39.6	3.4	34.7	53.9	19.2	100	260	
Hori.	7206.000	AV	34.1	36.9	7.1	40.1	3.4	41.4	53.9	12.5	100	0	
Hori.	9608.000	AV	34.4	38.5	8.2	39.6	3.4	44.9	53.9	9.0	100	0	
Hori.	12010.000	AV	34.5	39.7	9.3	39.3	3.4	47.6	53.9	6.3	100	0	
Vert.	57.249	QP	25.6	8.1	6.8	32.1	0.0	8.4	40.0	31.6	100	318	
Vert.	692.300	QP	21.3	20.1	10.3	31.8	0.0	19.9	46.0	26.1	100	23	
Vert.	904.797	QP	20.5	22.4	11.0	30.9	0.0	23.0	46.0	23.0	100	52	
Vert.	2390.000	PK	45.4	27.8	13.7	41.0	3.4	49.3	73.9	24.6	153	89	
Vert.	4804.000	PK	44.8	31.4	5.7	39.6	3.4	45.7	73.9	28.2	100	38	
Vert.	7206.000	PK	45.4	36.9	7.1	40.1	3.4	52.7	73.9	21.2	100	0	
Vert.	9608.000	PK	46.1	38.5	8.2	39.6	3.4	56.6	73.9	17.3	100	0	
Vert.	12010.000	PK	46.5	39.7	9.3	39.3	3.4	59.6	73.9	14.3	100	0	
Vert.	2390.000	AV	34.1	27.8	13.7	41.0	3.4	38.0	53.9	15.9	153	89	
Vert.	4804.000	AV	33.7	31.4	5.7	39.6	3.4	34.6	53.9	19.3	100	38	
Vert.	7206.000	AV	34.1	36.9	7.1	40.1	3.4	41.4	53.9	12.5	100	0	
Vert.	9608.000	AV	34.4	38.5	8.2	39.6	3.4	44.9	53.9	9.0	100	0	
Vert.	12010.000	AV	34.5	39.7	9.3	39.3	3.4	47.6	53.9	6.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.4 \text{ dB}$

13 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.3	27.8	13.7	41.0	3.4	92.2	-	-	Carrier
Hori.	2400.000	PK	36.8	27.8	13.7	41.0	3.4	40.7	72.1	31.4	
Vert.	2402.000	PK	86.0	27.8	13.7	41.0	3.4	89.9	-	-	Carrier
Vert.	2400.000	PK	37.3	27.8	13.7	41.0	3.4	41.2	69.9	28.7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45 \text{ m} / 3.0 \text{ m}) = 3.4 \text{ dB}$

13 GHz - 40 GHz : $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

UL Japan, Inc.

Shonan EMC Lab.

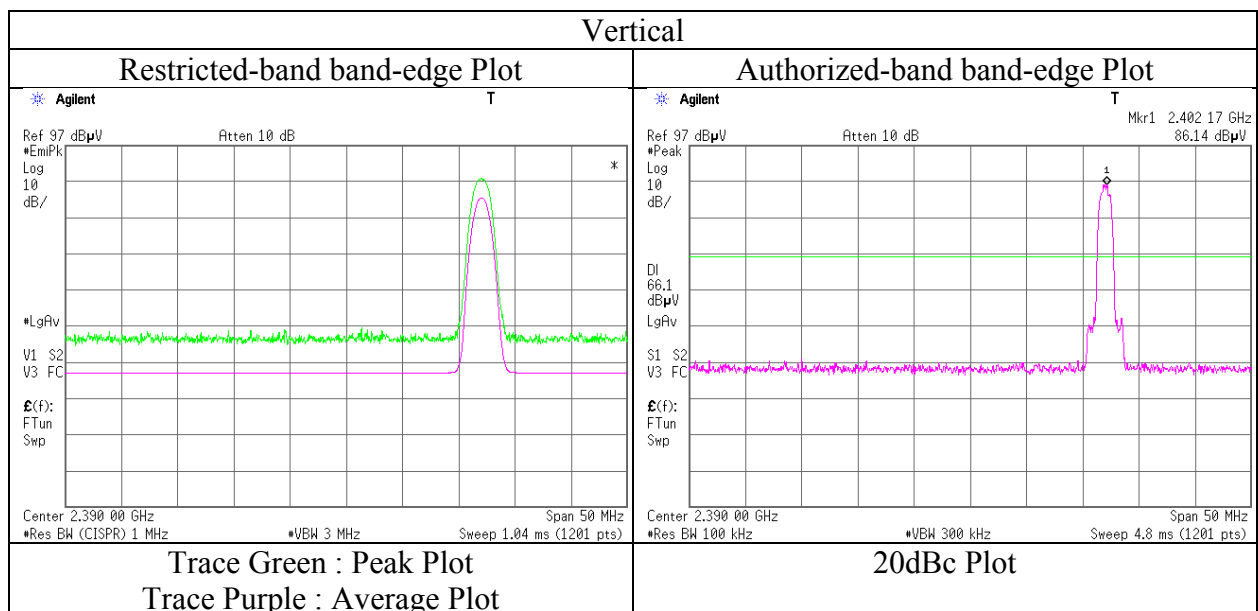
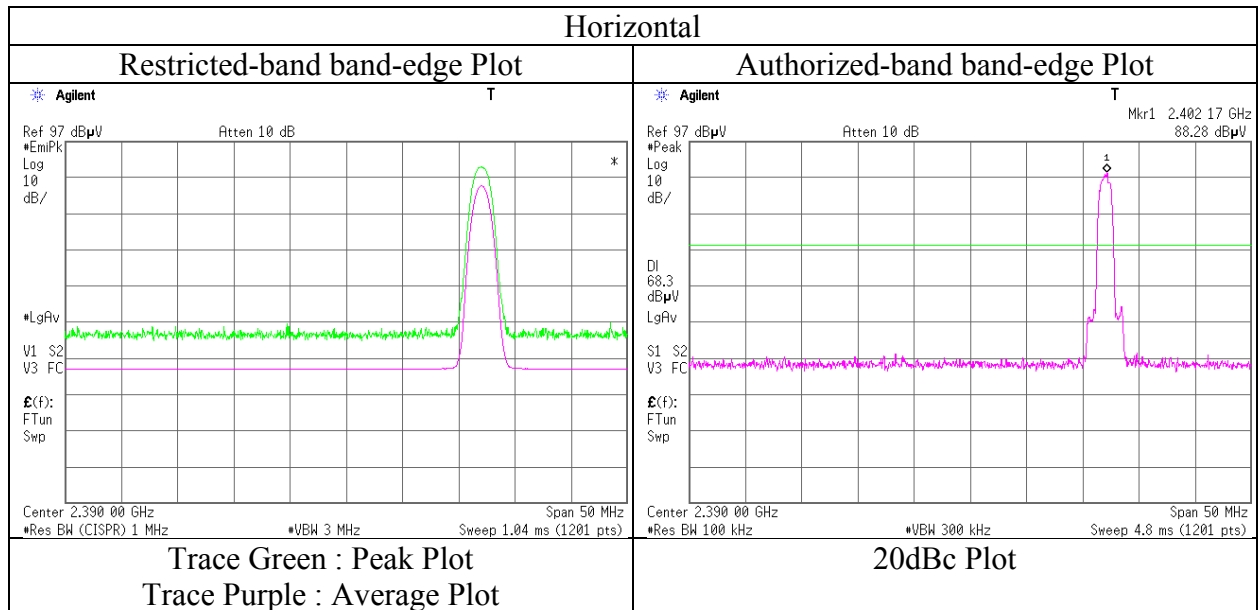
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	10941706S-A
Date	October 31, 2015
Temperature / Humidity	25 deg.C, 38 %RH
Engineer	Shinichi Takano
	(1-26.5 GHz)
Mode	Tx, Hopping Off, 3-DH5 2402 MHz



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

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, 3-DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	43.397	QP	22.4	12.6	6.9	32.1	0.0	9.8	40.0	30.2	100	62	
Hori.	202.145	QP	21.7	16.3	8.1	32.0	0.0	14.1	43.5	29.4	100	351	
Hori.	603.449	QP	21.1	19.0	9.9	31.9	0.0	18.1	46.0	27.9	100	235	
Hori.	4882.000	PK	45.6	31.7	5.8	39.5	3.4	47.0	73.9	26.9	116	157	
Hori.	7323.000	PK	45.1	36.9	7.2	40.2	3.4	52.4	73.9	21.5	100	0	
Hori.	9764.000	PK	46.5	38.5	8.2	39.5	3.4	57.1	73.9	16.8	100	0	
Hori.	12205.000	PK	45.7	39.6	9.4	39.4	3.4	58.7	73.9	15.2	100	0	
Hori.	4882.000	AV	33.8	31.7	5.8	39.5	3.4	35.2	53.9	18.7	116	157	
Hori.	7323.000	AV	33.7	36.9	7.2	40.2	3.4	41.0	53.9	12.9	100	0	
Hori.	9764.000	AV	33.6	38.5	8.2	39.5	3.4	44.2	53.9	9.7	100	0	
Hori.	12205.000	AV	33.9	39.6	9.4	39.4	3.4	46.9	53.9	7.0	100	0	
Vert.	57.163	QP	25.8	8.1	6.8	32.1	0.0	8.6	40.0	31.4	100	104	
Vert.	652.617	QP	21.4	19.6	10.1	31.9	0.0	19.2	46.0	26.8	100	318	
Vert.	926.314	QP	20.2	22.5	11.1	30.7	0.0	23.1	46.0	22.9	100	17	
Vert.	4882.000	PK	44.6	31.7	5.8	39.5	3.4	46.0	73.9	27.9	100	82	
Vert.	7323.000	PK	45.1	36.9	7.2	40.2	3.4	52.4	73.9	21.5	100	0	
Vert.	9764.000	PK	45.5	38.5	8.2	39.5	3.4	56.1	73.9	17.8	100	0	
Vert.	12205.000	PK	45.3	39.6	9.4	39.4	3.4	58.3	73.9	15.6	100	0	
Vert.	4882.000	AV	33.2	31.7	5.8	39.5	3.4	34.6	53.9	19.3	100	82	
Vert.	7323.000	AV	33.6	36.9	7.2	40.2	3.4	40.9	53.9	13.0	100	0	
Vert.	9764.000	AV	33.6	38.5	8.2	39.5	3.4	44.2	53.9	9.7	100	0	
Vert.	12205.000	AV	34.0	39.6	9.4	39.4	3.4	47.0	53.9	6.9	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45\text{ m} / 3.0\text{ m}) = 3.4\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015 November 1, 2015
Temperature / Humidity : 25 deg.C, 38 %RH 22 deg.C, 41 %RH
Engineer : Shinichi Takano Yosuke Ishikawa
(1-26.5 GHz) (30-1000 MHz)
Mode : Tx, Hopping Off, 3-DH5 2480 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	166.856	QP	21.9	15.4	8.0	32.0	0.0	13.3	43.5	30.2	100	20	
Hori.	510.783	QP	21.6	17.6	9.6	32.0	0.0	16.8	46.0	29.2	100	41	
Hori.	672.441	QP	21.4	19.9	10.2	31.8	0.0	19.7	46.0	26.3	100	163	
Hori.	2483.500	PK	45.2	27.9	13.7	41.0	3.4	49.2	73.9	24.7	100	103	
Hori.	4960.000	PK	44.6	32.0	5.8	39.4	3.4	46.4	73.9	27.5	110	5	
Hori.	7440.000	PK	45.3	37.0	7.2	40.4	3.4	52.5	73.9	21.4	100	0	
Hori.	9920.000	PK	44.1	38.4	8.2	39.4	3.4	54.7	73.9	19.2	100	0	
Hori.	12400.000	PK	44.3	39.5	9.6	39.6	3.4	57.2	73.9	16.7	100	0	
Hori.	2483.500	AV	33.9	27.9	13.7	41.0	3.4	37.9	53.9	16.0	100	103	
Hori.	4960.000	AV	33.2	32.0	5.8	39.4	3.4	35.0	53.9	18.9	110	5	
Hori.	7440.000	AV	33.5	37.0	7.2	40.4	3.4	40.7	53.9	13.2	100	0	
Hori.	9920.000	AV	32.6	38.4	8.2	39.4	3.4	43.2	53.9	10.7	100	0	
Hori.	12400.000	AV	32.6	39.5	9.6	39.6	3.4	45.5	53.9	8.4	100	0	
Vert.	57.223	QP	25.9	8.1	6.8	32.1	0.0	8.7	40.0	31.3	100	306	
Vert.	182.494	QP	21.8	15.9	7.9	32.0	0.0	13.6	43.5	29.9	100	16	
Vert.	750.239	QP	20.9	20.6	10.5	31.7	0.0	20.3	46.0	25.7	100	151	
Vert.	2483.500	PK	46.8	27.9	13.7	41.0	3.4	50.8	73.9	23.1	100	89	
Vert.	4960.000	PK	44.6	32.0	5.8	39.4	3.4	46.4	73.9	27.5	100	88	
Vert.	7440.000	PK	44.9	37.0	7.2	40.4	3.4	52.1	73.9	21.8	100	0	
Vert.	9920.000	PK	44.0	38.4	8.2	39.4	3.4	54.6	73.9	19.3	100	0	
Vert.	12400.000	PK	43.5	39.5	9.6	39.6	3.4	56.4	73.9	17.5	100	0	
Vert.	2483.500	AV	34.3	27.9	13.7	41.0	3.4	38.3	53.9	15.6	100	89	
Vert.	4960.000	AV	32.8	32.0	5.8	39.4	3.4	34.6	53.9	19.3	100	88	
Vert.	7440.000	AV	33.4	37.0	7.2	40.4	3.4	40.6	53.9	13.3	100	0	
Vert.	9920.000	AV	32.6	38.4	8.2	39.4	3.4	43.2	53.9	10.7	100	0	
Vert.	12400.000	AV	32.5	39.5	9.6	39.6	3.4	45.4	53.9	8.5	100	0	

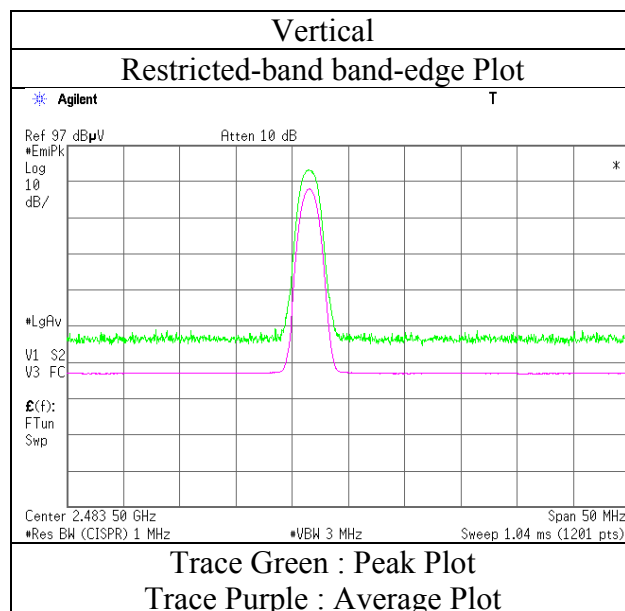
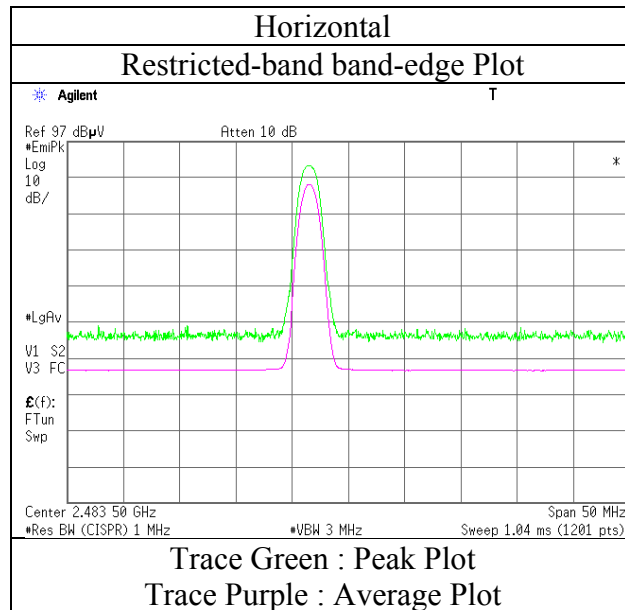
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(4.45\text{ m} / 3.0\text{ m}) = 3.4\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission **(Reference Plot for band-edge)**

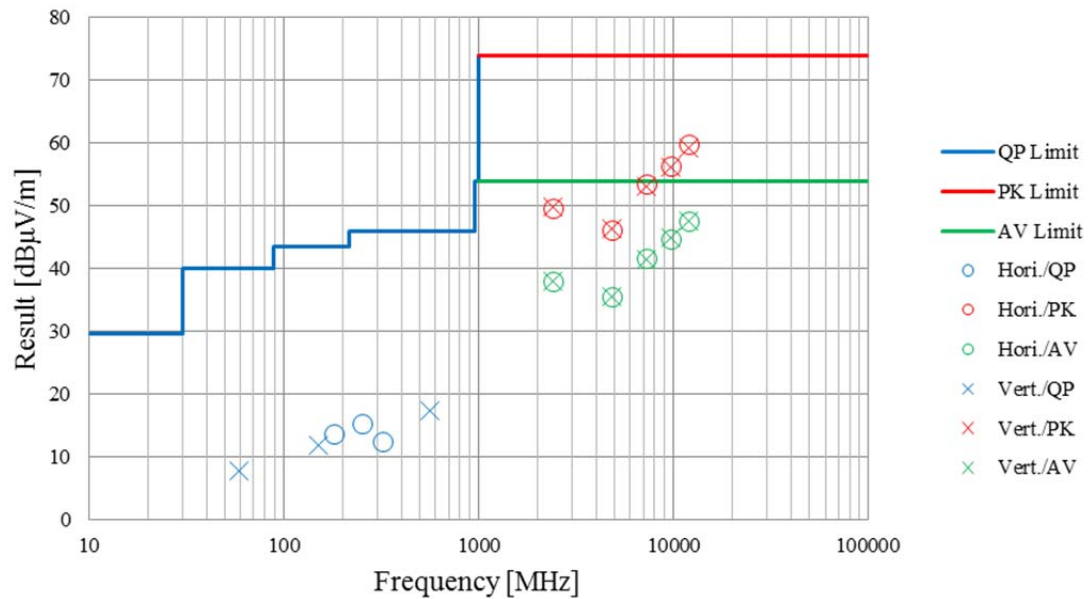
Test place : Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 10941706S-A
Date : October 31, 2015
Temperature / Humidity : 25 deg.C, 38 %RH
Engineer : Shinichi Takano
(1-26.5 GHz)
Mode : Tx, Hopping Off, 3-DH5 2480 MHz



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

Radiated Spurious Emission (Plot data, Worst case)

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10941706S-A	
Date	October 31, 2015	November 1, 2015
Temperature / Humidity	25 deg.C, 38 %RH	22 deg.C, 41 %RH
Engineer	Shinichi Takano (1-26.5 GHz)	Yosuke Ishikawa (30-1000 MHz)
Mode	Tx, Hopping Off, DH5 2402 MHz	

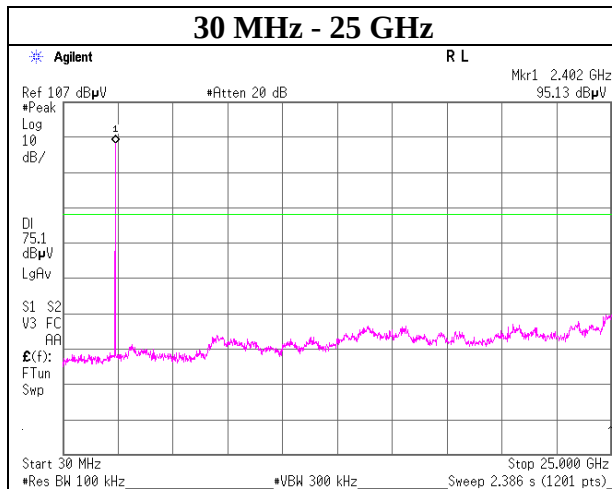
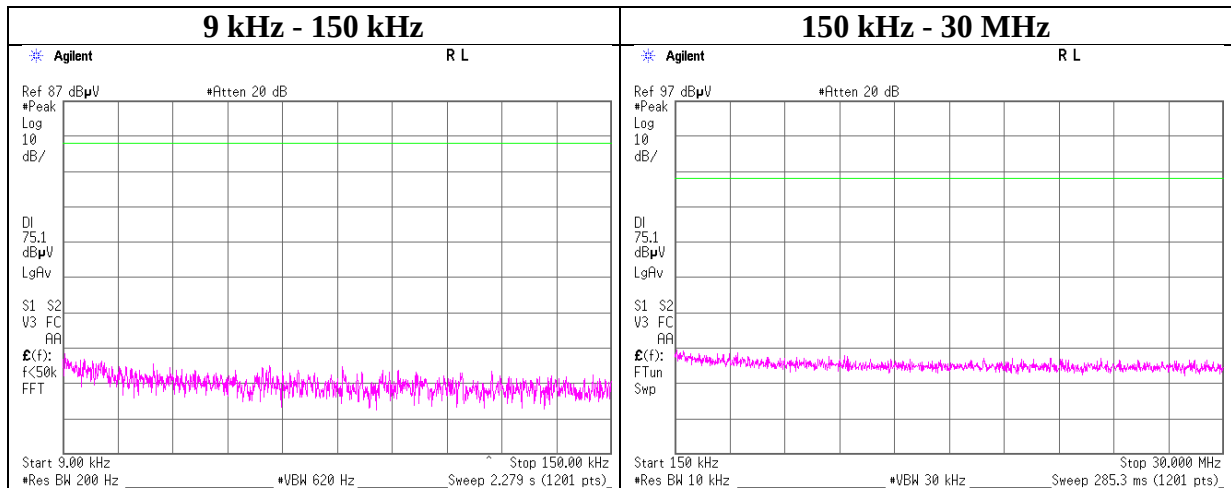


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, DH5

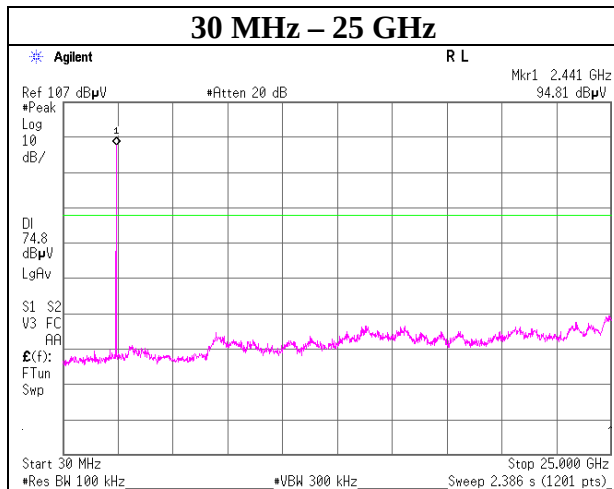
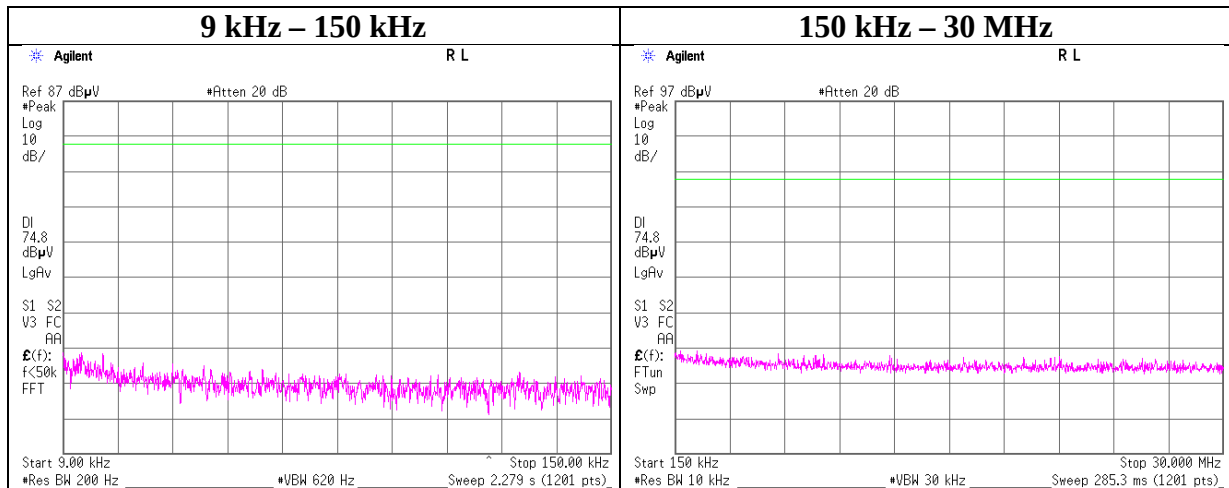
2402 MHz



Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, DH5

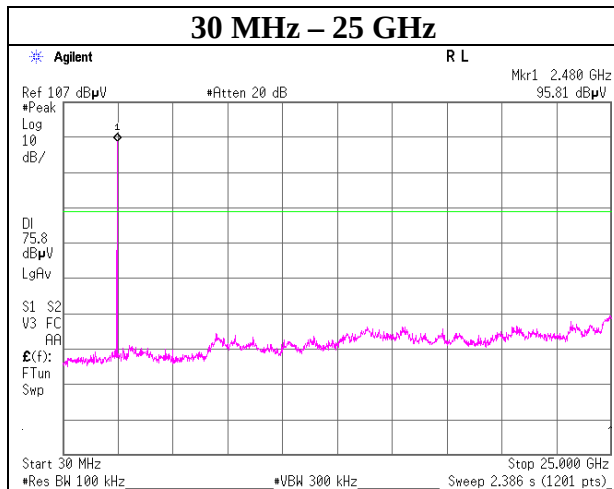
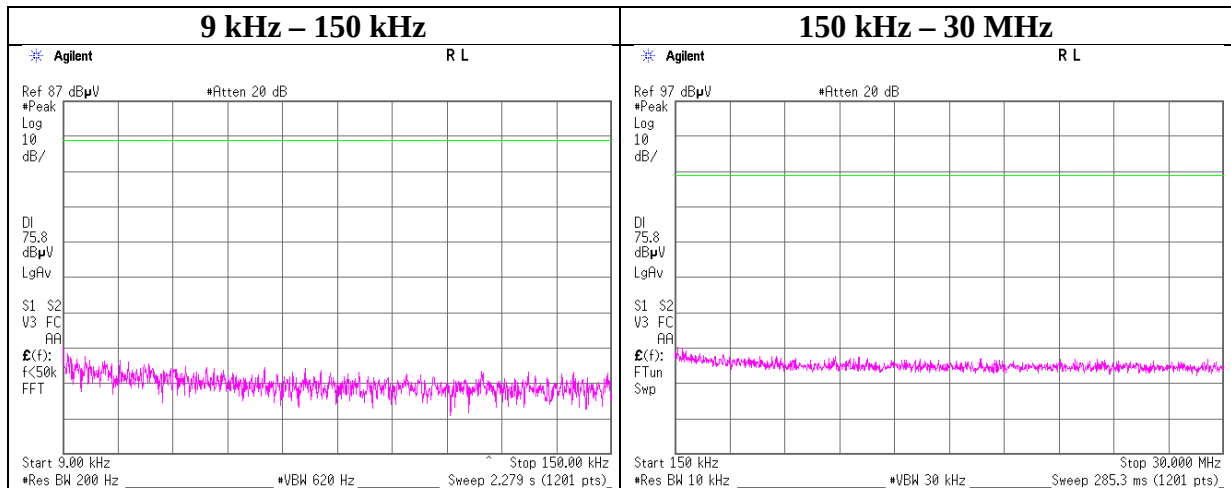
2441 MHz



Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, DH5

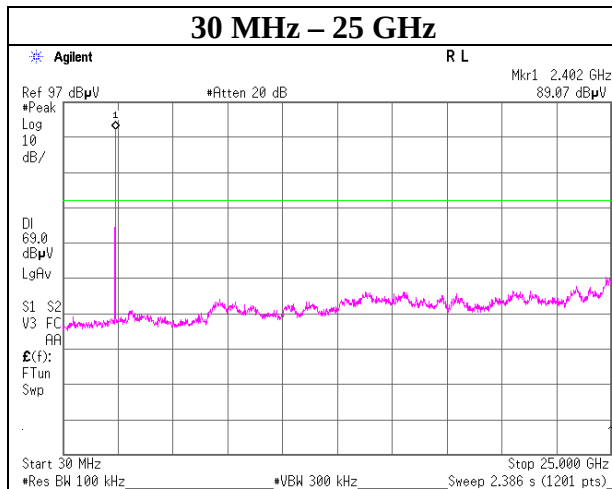
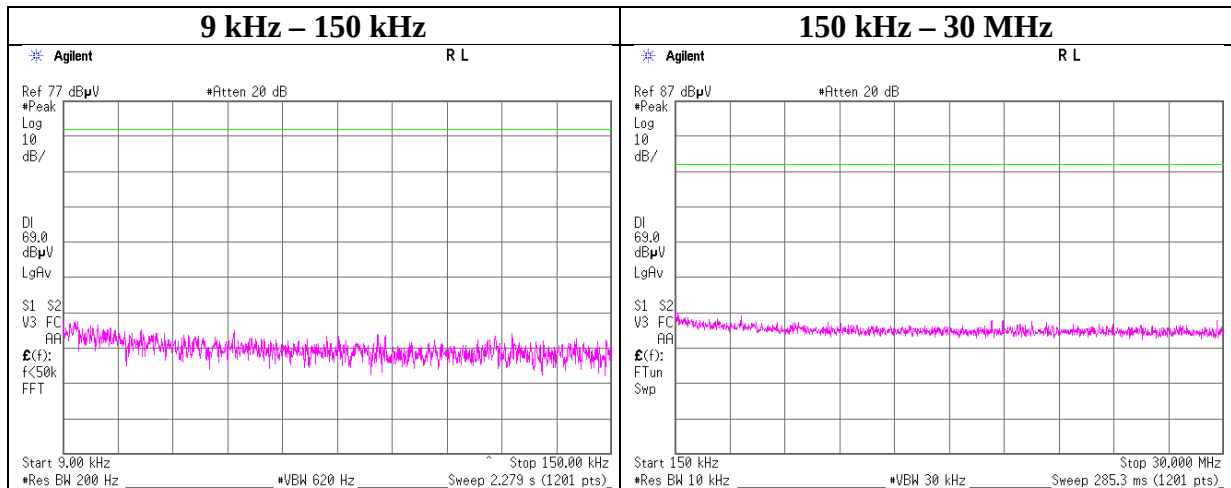
2480 MHz



Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, 3-DH5

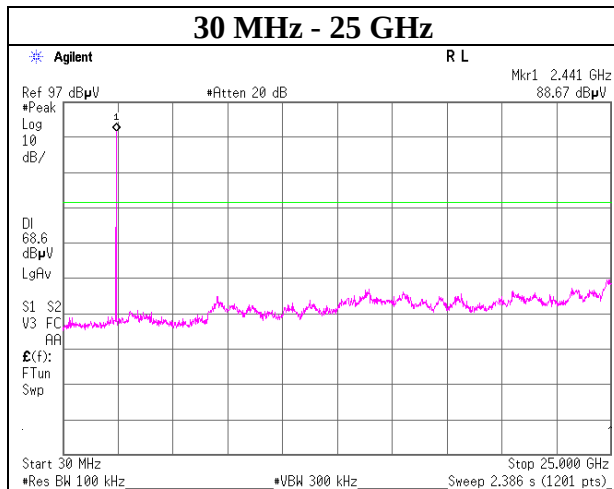
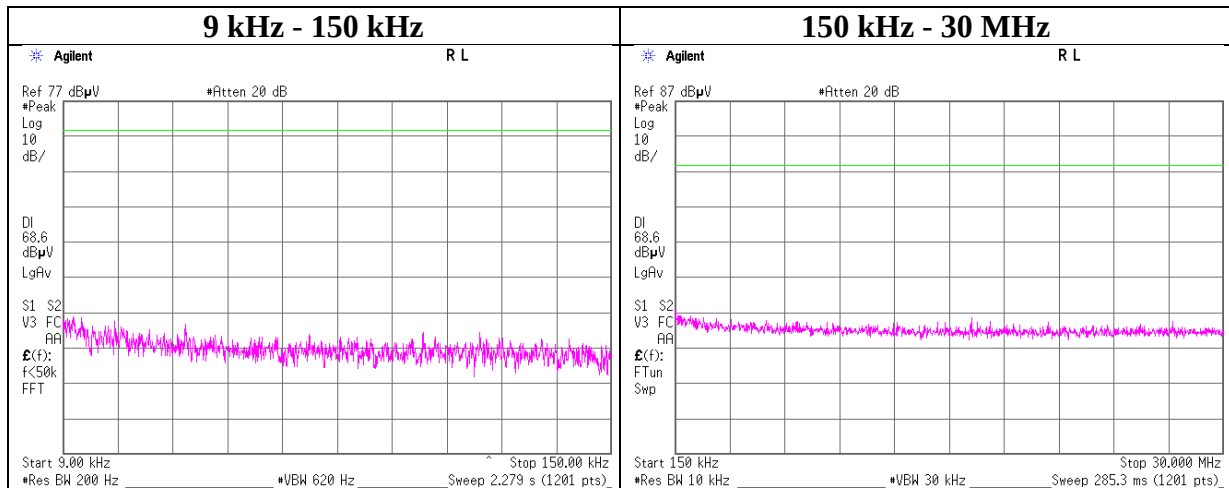
2402 MHz



Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, 3-DH5

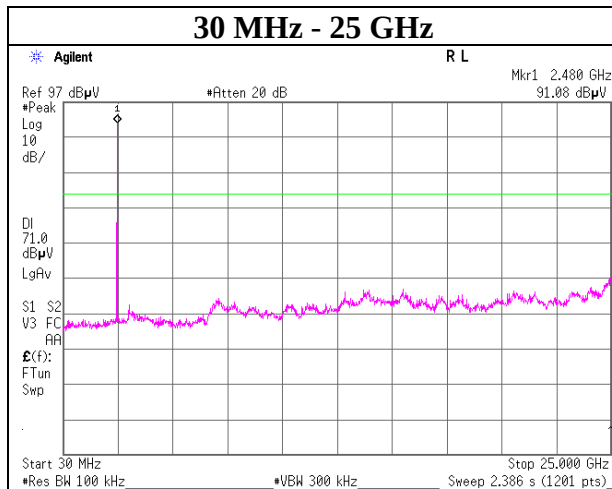
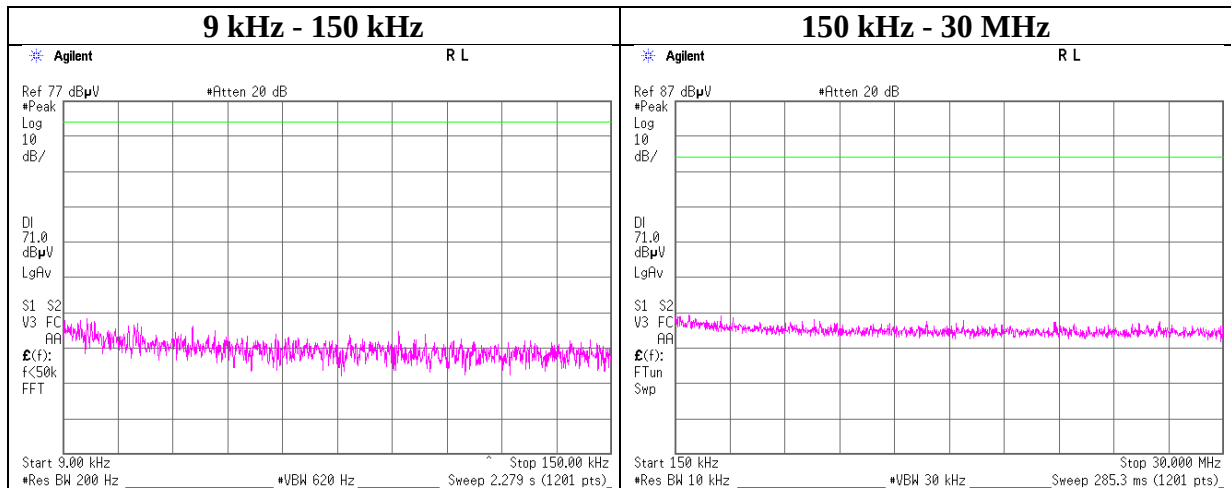
2441 MHz



Conducted Spurious Emission

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx, Hopping Off, 3-DH5

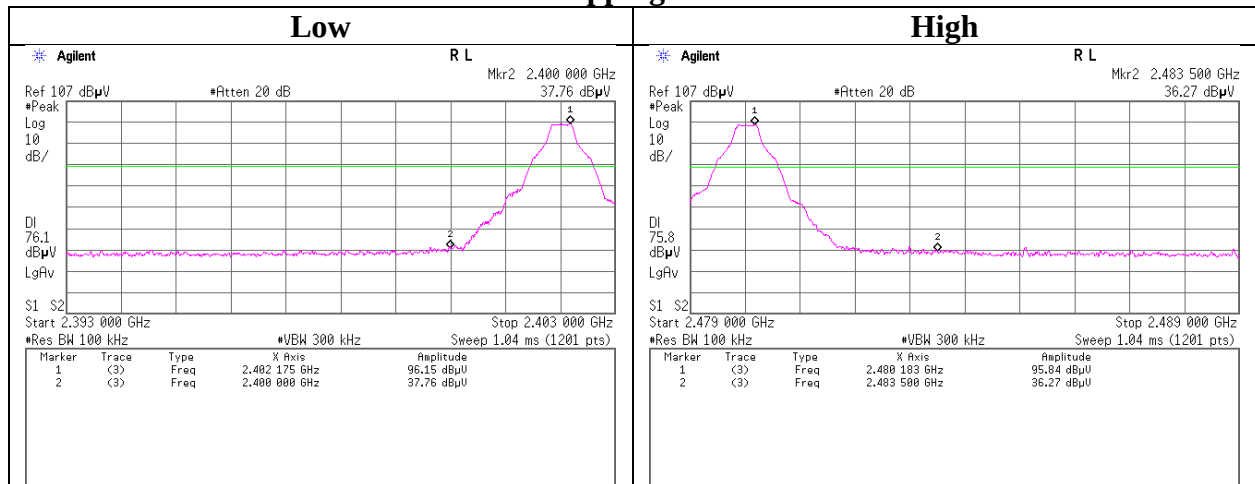
2480 MHz



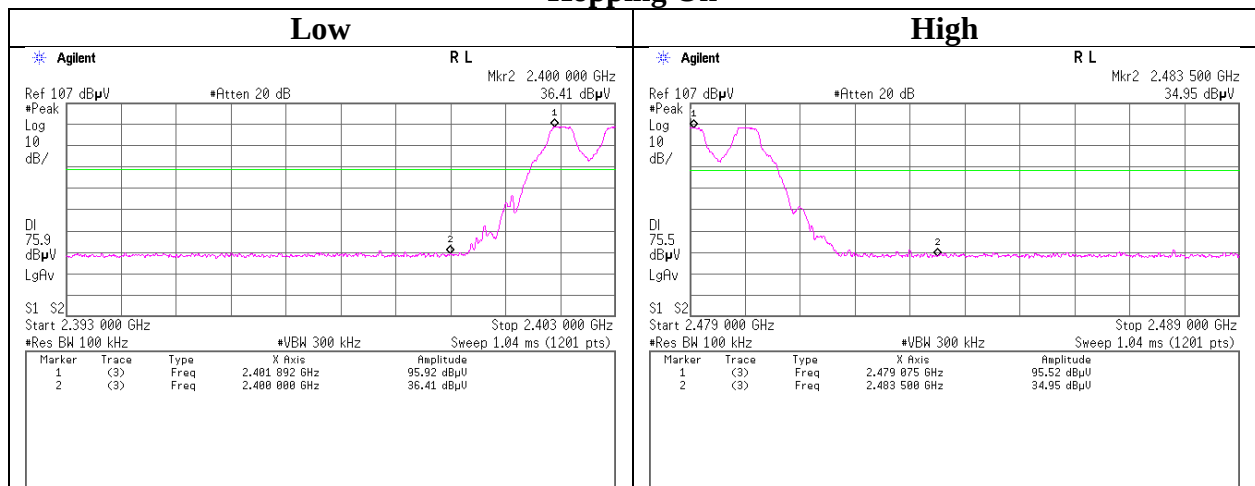
Conducted Emission Band Edge compliance

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx DH5

Hopping Off



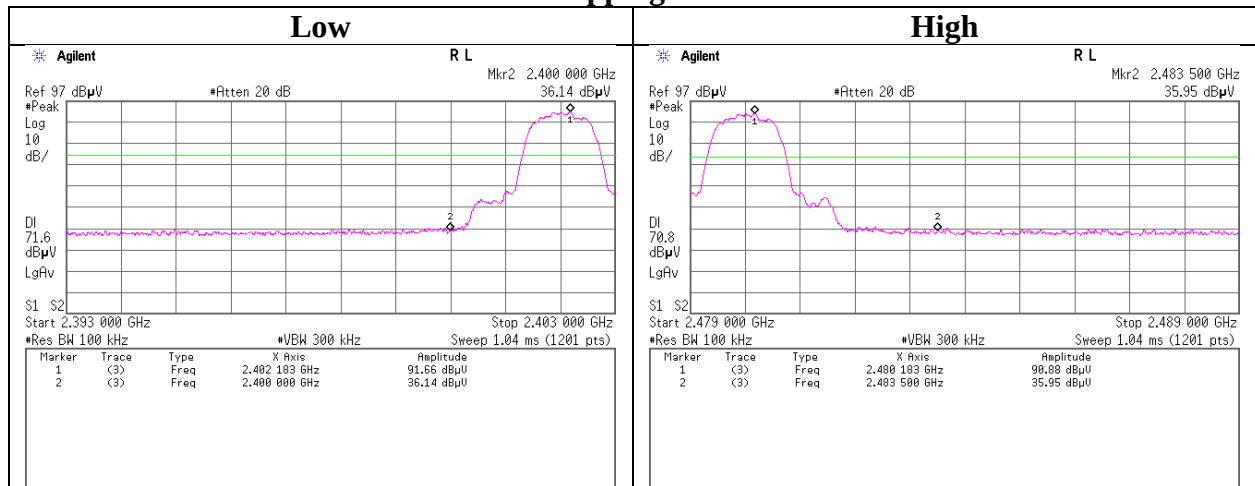
Hopping On



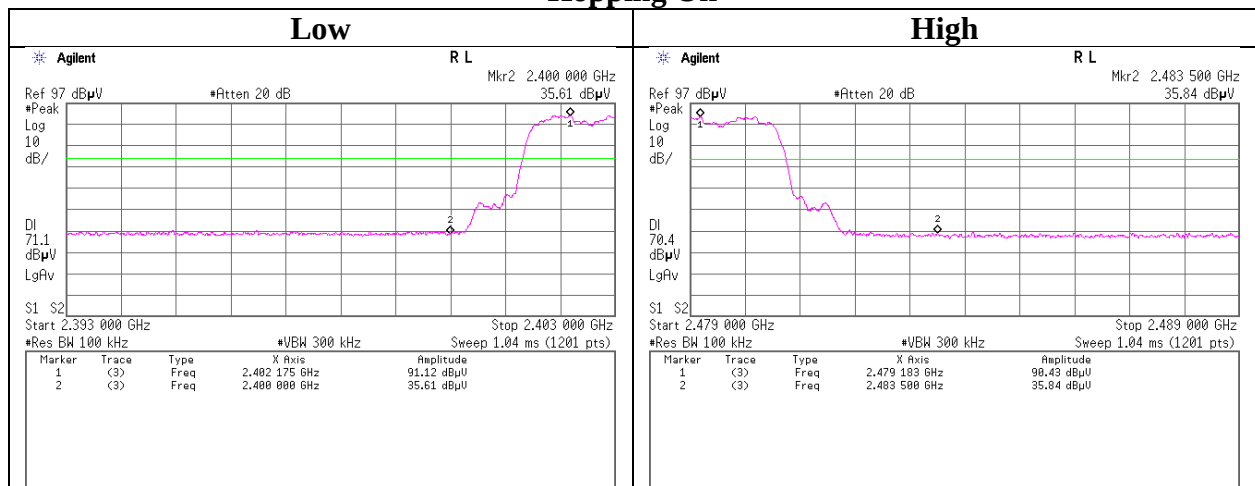
Conducted Emission Band Edge compliance

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10941706S-A
Date : November 9, 2015
Temperature / Humidity : 23 deg. C / 68 % RH
Engineer : Tomohiro Hara
Mode : Tx 3-DH5

Hopping Off



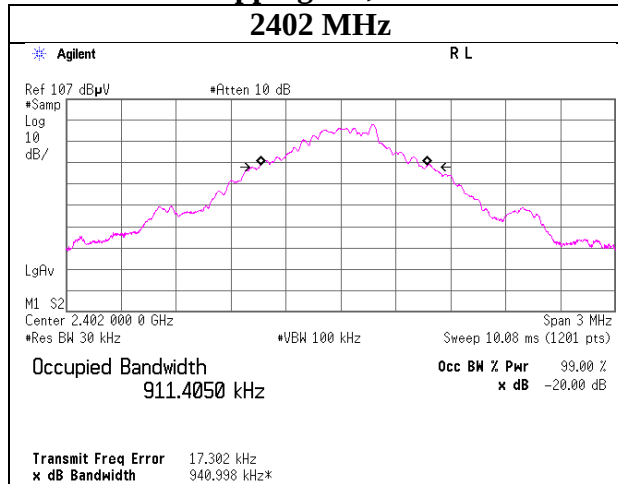
Hopping On



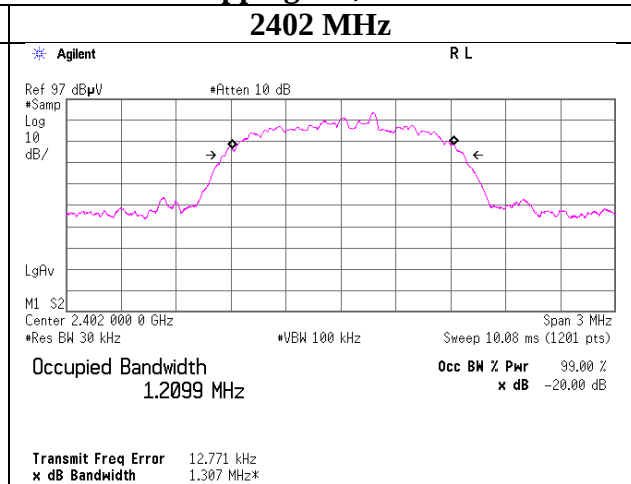
99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10941706S-A
Date	November 9, 2015
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Tomohiro Hara
Mode	Tx, Hopping Off

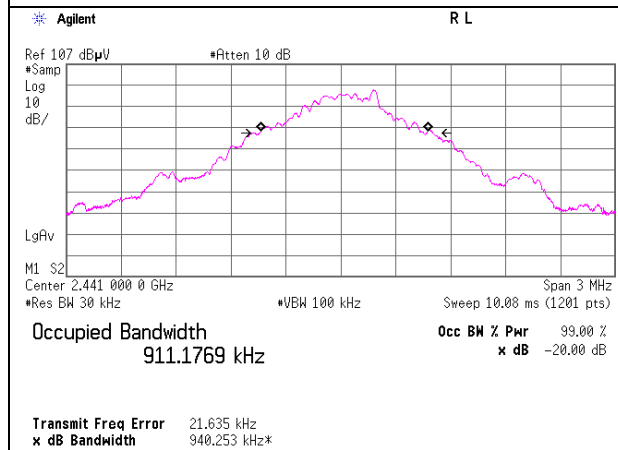
Hopping Off, DH5



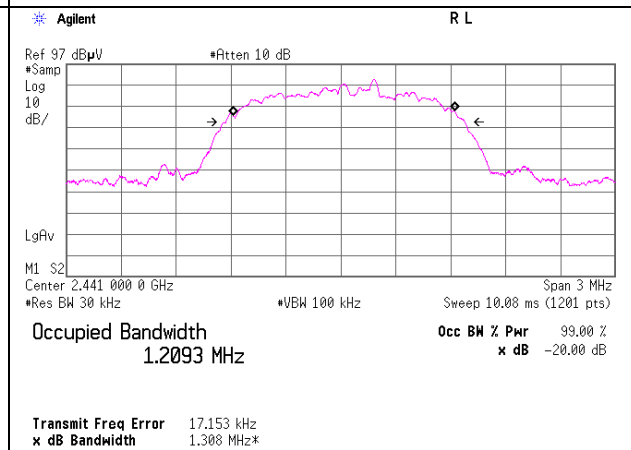
Hopping Off, 3-DH5



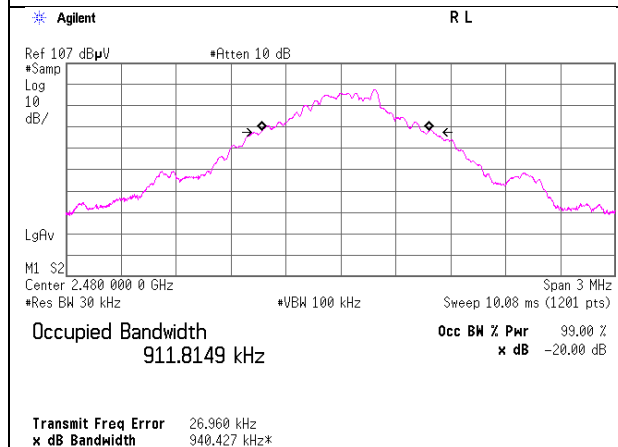
2441 MHz



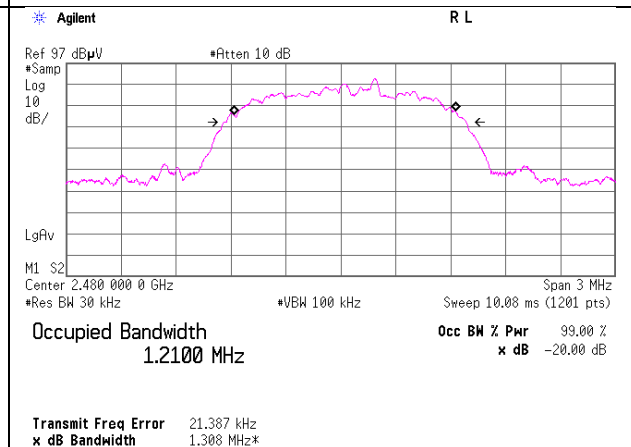
2441 MHz



2480 MHz



2480 MHz



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APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE,CE	2015/03/24 * 12
SCC-C9/C10/S RSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141 PE/NS4906	-/0901-271(RF Selector)	CE	2015/04/17 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2015/09/18 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2015/02/24 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,M F)	-	CE, RE	
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2014/12/24 * 12
SJM-15	Measure	ASKUL	-	-	CE, RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	CE, RE	2014/11/11 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-0 0	JUN-12-14- 018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2015/10/22 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY482501 06	RE	2015/03/26 * 12
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SV SWR)	3	RE	2015/08/28 * 12
SAT10-05	Attenuator(above1GH z)	Agilent	8493C-010	74864	RE	2015/11/04 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2014/11/21 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NS A)	3	RE	2015/07/16 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2015/10/11 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108 A	UHALP 9108-A 0901	RE	2015/10/11 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2015/08/31 * 12
SCC-C1/C2/C3 /C4/C5/C10/SR SE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Su hner/Suhner/Suhner/Su hner/TOYO	8D2W/12DSF A/141PE/141 PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
SCC-C1/C2/C3 /C4/C5/C10/SR SE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Su hner/Suhner/Suhner/Su hner/TOYO	8D2W/12DSF A/141PE/141 PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2015/02/24 * 12
SAT3-10	Attenuator	JFW	50HF-003N	-	CE	2015/08/31 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY482501 52	AT	2015/09/16 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2015/03/11 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2015/04/09 * 12
SPM-07	Power Meter	Agilent	8990B	MY510027 2	AT	2015/04/02 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY532600 9	AT	2015/04/02 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
KTS-07	Digital Tester	SANWA	PC500	7019232	AT	2015/05/20 * 12

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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: CE: Conducted Emission test
 RE: Radiated Emission test
 AT: Antenna Terminal Conducted test