RADIO TEST REPORT

Test Report No. : 14111002M-A

Applicant	:	**Panasonic Corporation**
Type of Equipment	:	**Digital Wireless Stereo Headphones**
Model No.	:	**RP-BTD5**
FCC ID	:	**ACJ-RP-BTD5**
Test regulation	:	**FCC Part 15 Subpart C: 2014**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Kashima, Inc.
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 any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Kashima has been accredited.

Date of test: November 17, 18, 20, December 9, 2014

Representative test engineer:
Kazuhiro Ando
Manager of EMC Testing Sec.,
Operation Dept.

Approved by:
Go Ishiwata
Department Manager
Operation Dept.

ACCREDITED
TESTING
CERTIFICATE 1266.01

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

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CONTENTS PAGE

REVISION HISTORY

Original Test Report No. 14111002M-A

Revision	Date	Page revised	Revision Description
00	December 11, 2014	-	Original
01	January 8, 2015	3	Correction of description for FCC 15.31 (e)
		5	Correction of reference standard in 3.3

SECTION 1: Customer information

Company Name	:	Panasonic Corporation
Address	:	1-15 Matsuo-cho, Kadoma-shi, Osaka, 571-8504 Japan
Telephone Number	:	+81-6-6906-2739
Facsimile Number	:	+81-6-6906-8405
Contact Person	:	Tsuyoshi Maruoka

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

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Wireless Stereo Headphones
Model No.	:	RP-BTD5
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC5.0V, (Internal battery: Li-Ion 3.6V)
Receipt Date of Sample	:	November 17, 2014
Country of Mass-production	:	China
Condition of EUT	:	Engineering 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	:	Crystal (BT) : 26MHz

Radio Specification

Bluetooth specification:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth / Channel spacing	:	79MHz / 1MHz
Type of modulation	:	FHSS (GFSK, π/4-DQPSK, 8DPSK)
Antenna type	:	IFA Pattern antenna
Antenna connector type	:	None
Antenna gain	:	2.12dBi
ITU code	:	F1D, G1D
Operation temperature range	:	0 to 40 deg.C

FCC 15.31 (e)

The EUT is a battery-operated device and test was performed with the full-charged battery.
Therefore, this EUT complies with the requirement.

FCC Part 15.203

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

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2014, final revised on August 15, 2014 and effective October 14, 2014
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.209 Radiated emission limits, general requirements Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	N/A *1)	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	7.3 dB Freq.: 2558.000 MHz Detection: AV Polarization: Horizontal Mode: Tx, 2402 MHz, Bluetooth, BDR, PRBS9	Complied

Note: UL Kashima's Work Procedures No. 13-EM-W0420 and 13-EM-W0422
*1) The EUT operates with a battery. AC Line can be connected to the EUT via PC; however, the EUT stops transmission during recharging. Therefore, the test is not applicable to the EUT.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 6.6	-	Conducted	-	-
Note: UL Kashima's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

*Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Confirmation

UL Kashima, Inc. hereby confirms the E.U.T., in the configuration tested, complies with the specifications FCC Part 15 Subpart C: 2014.

3.5 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Item	Frequency range	Uncertainty
Radiated emission	30 MHz-300 MHz	5.1 dB
	300 MHz-1 GHz	6.3 dB
	1 GHz-6 GHz	4.5 dB
	6 GHz-18 GHz	4.8 dB
	18 GHz-26.5 GHz	4.9 dB

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

Antenna port conducted test
Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.6dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB
Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB
Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB
Bandwidth measurement uncertainty for this test was: (±) 5.4%

3.6 Test Location

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Facsimile number : +81 478 82 3373
A2LA Accreditation No. : 1266-01

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane/horizontal conducting plane (m)	Maximum measurement distance
No.1 Open site	90558	IC 4659A-1	6.0 x 5.5 x 2.5	20 x 40	10 m
No.2 Open site	510504	IC 4659A-2	4.4 x 4.4 x 2.15	18 x 20	10 m
No.5 Open site	99356	IC 4659A-5	8.6 x 7.1 x 2.4	18 x 23	10 m
No.1 Shielded room	90558	IC 4659A-1	5.4 x 4.5 x 2.3	-	-
No.2 Shielded room	510504	IC 4659A-2	3.6 x 2.7 x 2.3	-	-
No.3 Shielded room	-	-	5.4 x 3.6 x 2.3	-	-
No.4 Shielded Room	-	-	6.1 x 6.1 x 3.1	-	-
No.5 Shielded Room	99356	IC 4659A-5	4.2 x 3.1 x 2.5	-	-
No.3 Fully Anechoic Chamber	-	-	7.0 x 3.5 x 3.5	-	-
No.6 Semi-anechoic Chamber	372431	IC 4659A-6	8.5 x 5.5 x 5.2	-	3 m
No.10 Semi-anechoic Chamber	682397	IC 4659A-10	18.4 x 9.9 x 7.7	-	10 m
No.11 Semi-anechoic Chamber	718605	IC 4659A-7	9.0 x 6.5 x 5.2	-	3 m
No.1 Measurement room	-	-	5.0 x 3.7 x 2.6	-	-
No.6 Measurement room	-	-	4.3 x 4.4 x 2.7	-	-

3.7 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation, 20dB Bandwidth,	Tx (Hopping on) DH5, 3DH5	2402MHz 2441MHz 2480MHz
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	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Radiated)	Tx DH5, 3DH5 -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
*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) *We removed 2DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3DH mode (3 Mb/s EDR:8DPSK) as a representative. *The EUT has no Inquiry mode. *EUT has the power settings by the software as follows; Power settings: BDR: 46, EDR: 63 Software: CSR BlueTest3 ver. 2.5.0.93 *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

*Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Wireless Stereo Headphones	RP-BTD5	28: RE 27:AT	Panasonic	EUT

RE: Radiated Spurious Emission test
AT: Antenna Terminal Conducted tests

SECTION 5: Carrier frequency separation

Test procedure
The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 6: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 7: Number of hopping frequency

Test procedure
The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 8: Dwell time

Test procedure
The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 9: Maximum peak output power

Test procedure
The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 10: Spurious emissions (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
The radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
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. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 11: Radiated emission

11.1 Operating environment

Test room : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

11.2 Test configuration

EUT was placed on a polystyrene platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

11.3 Test conditions

Frequency range : 30MHz - 25GHz
EUT position : Table top

11.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 13GHz) / 1m (above 13GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detection.

Frequency		30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	:	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz, VBW: 300kHz

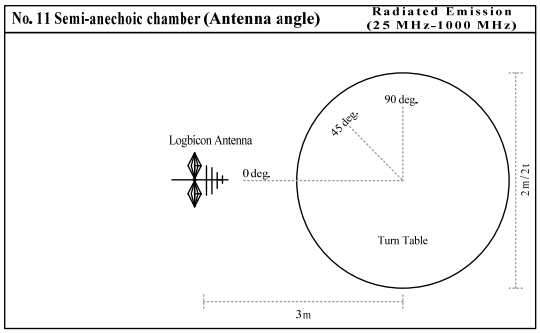
*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

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

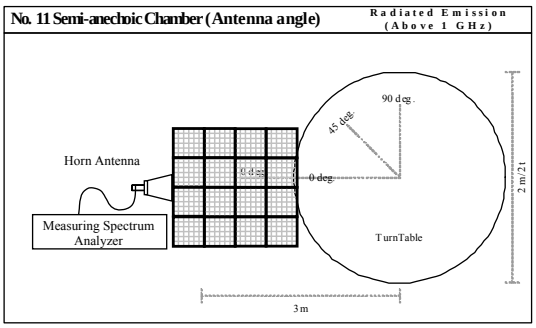
Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-13GHz)	Spurious (13-18GHz)	Spurious (18-25GHz)
Horizontal	Y	Y	Y	Y	Y
Vertical	Y	Y	Y	Y	Y

Figure 1. Antenna angle

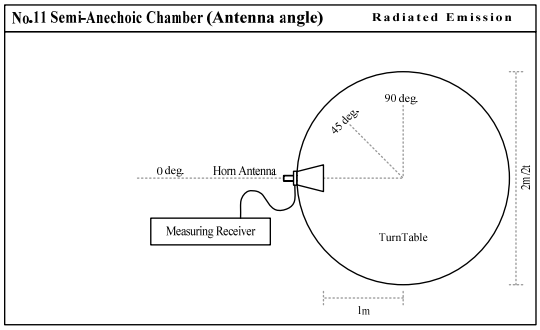
30-1000MHz



1-13GHz



Above13GHz



11.5 Band edge

Band edge level is below the limits of FCC 15.209. Refer to the data.

11.6 Results

Summary of the test results: Pass

*No noise was detected above the 4th order harmonics.

Refer to APPENDIX 1.

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20dB bandwidth and Carrier frequency separation
Number of hopping frequency
Dwell time
Maximum peak output power
Radiated emission
Spurious emission (Antenna port conducted)
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission
Pre-check of the worst position

APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.947	1.000	>= 0.632
DH5	2441.0	0.945	1.000	>= 0.630
DH5	2480.0	0.946	1.000	>= 0.631

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

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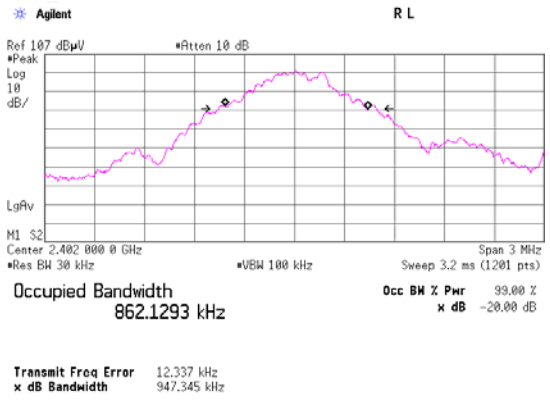
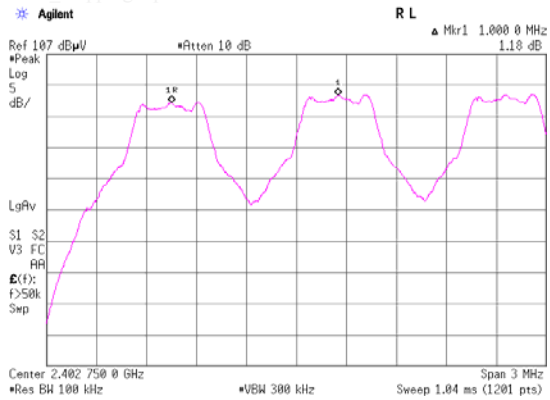
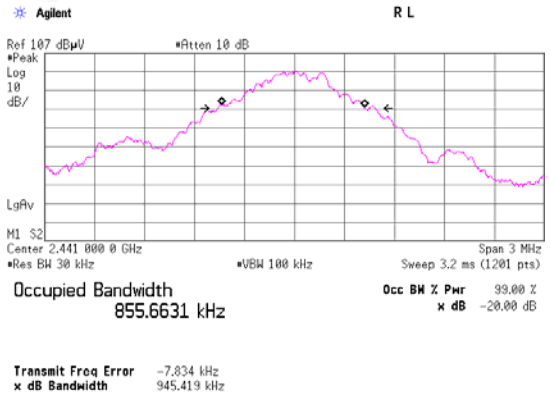
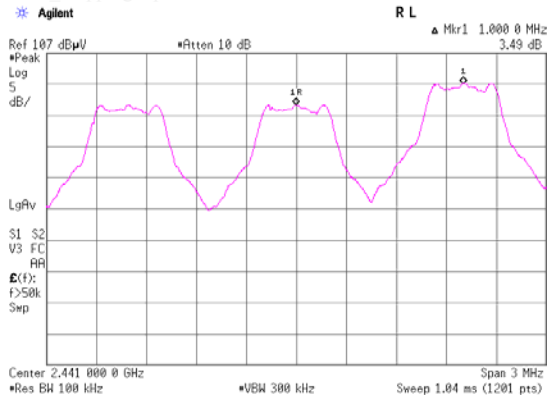
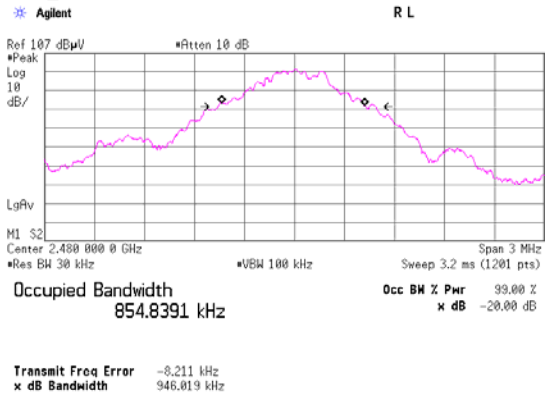
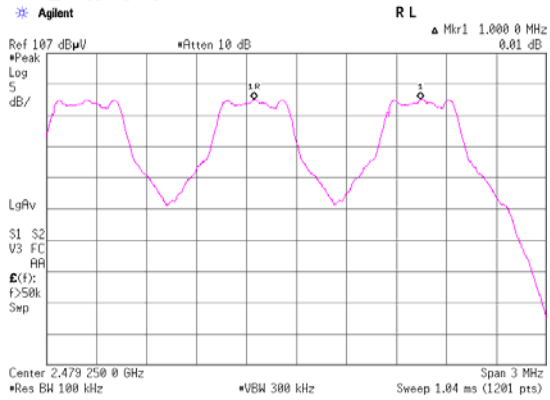
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, 2480MHz**
	

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20dB Bandwidth and Carrier Frequency Separation

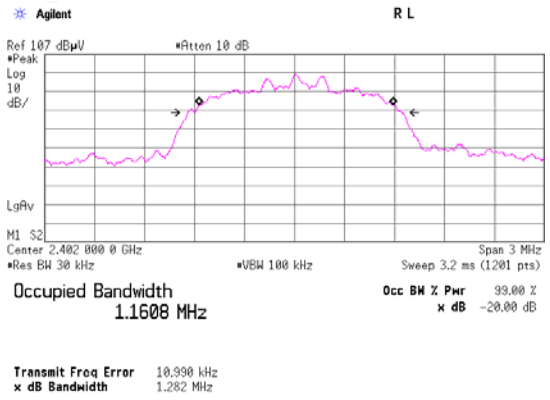
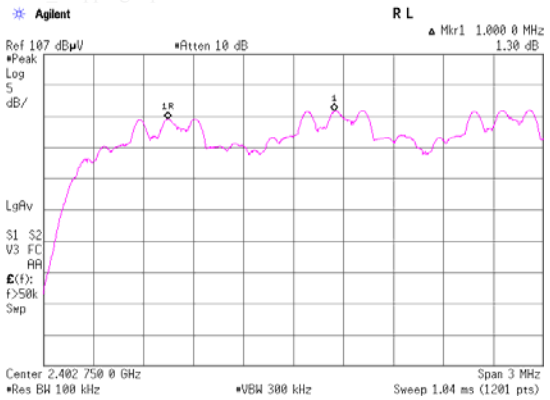
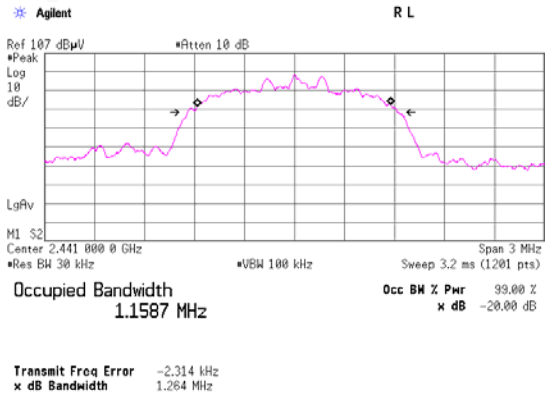
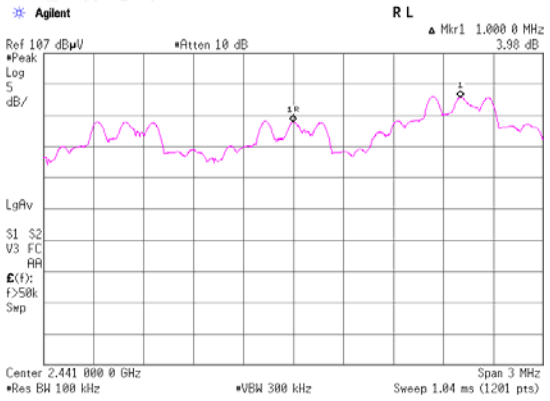
Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.282	1.000	>= 0.855
3-DH5	2441.0	1.264	1.000	>= 0.843
3-DH5	2480.0	1.265	1.000	>= 0.843

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
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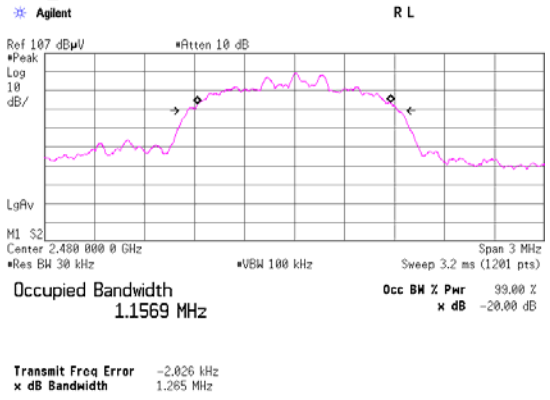	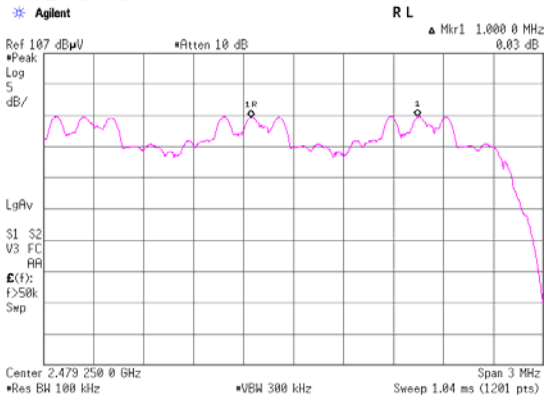

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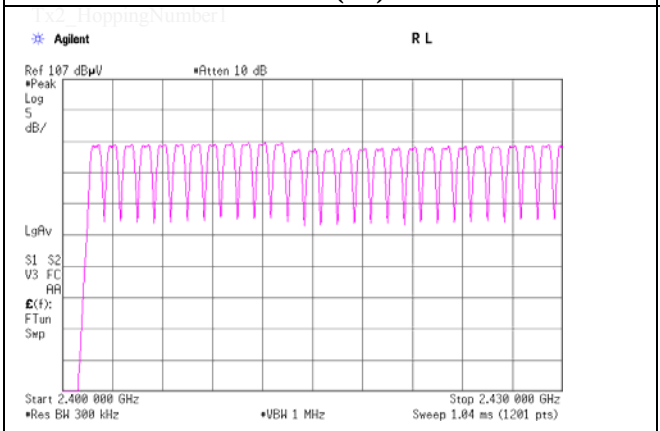
Number of Hopping Frequency

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	December 9, 2014	
Temperature / Humidity	23 deg.C , 40 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, BDR, PRBS9	

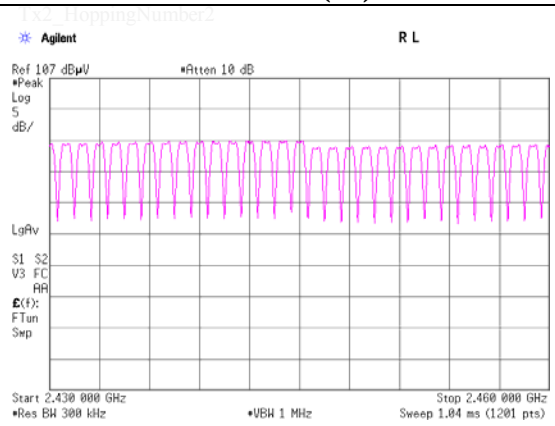
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* 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.

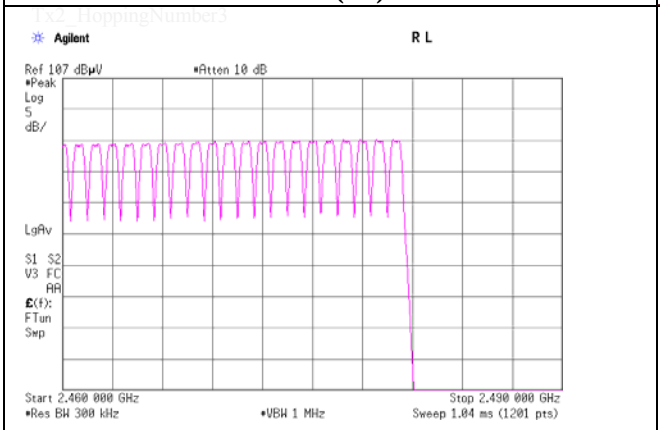
DH5 (1/3)

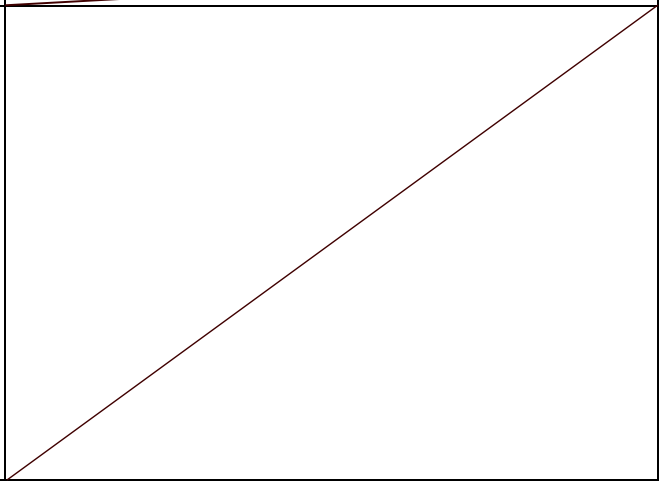


DH5 (2/3)



DH5 (3/3)





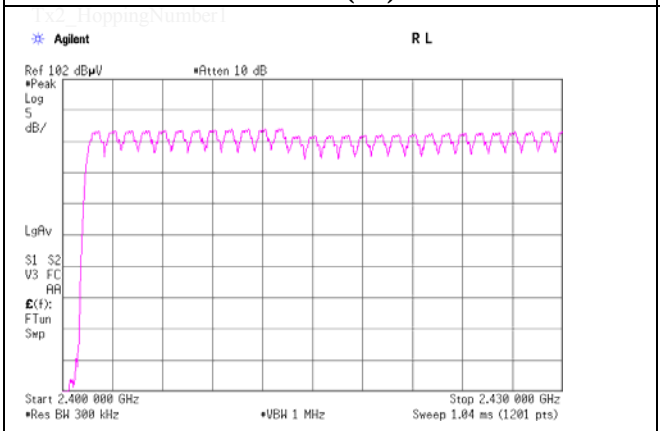
Number of Hopping Frequency

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	December 9, 2014	
Temperature / Humidity	23 deg.C , 40 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, EDR, PRBS9	

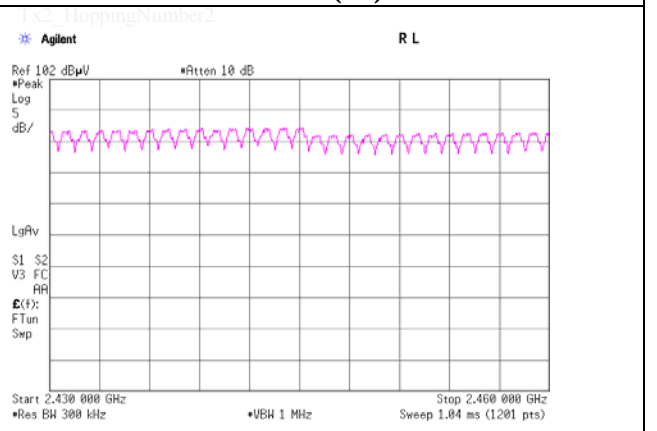
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* 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.

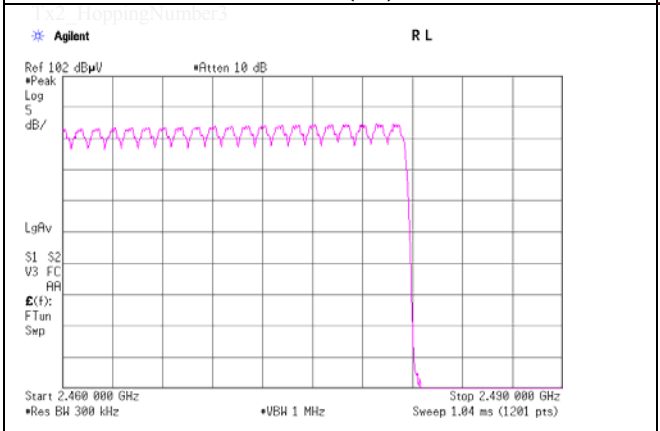
3-DH5 (1/3)



3-DH5 (2/3)



3-DH5 (3/3)



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Dwell Time

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4)			Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0	/ 5.0 sec. x 31.6 sec. =	323 times	0.434	140	400
DH3	26.0	/ 5.0 sec. x 31.6 sec. =	165 times	1.690	279	400
DH5	17.0	/ 5.0 sec. x 31.6 sec. =	108 times	2.940	317	400

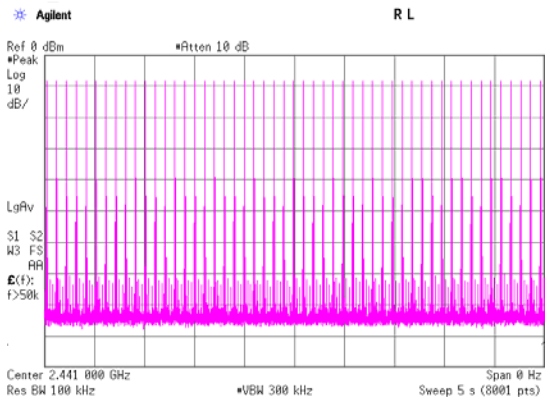
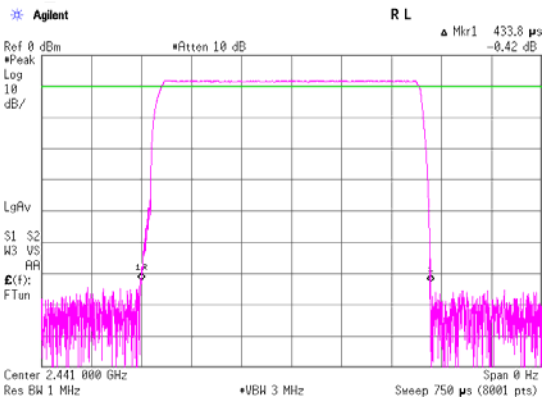
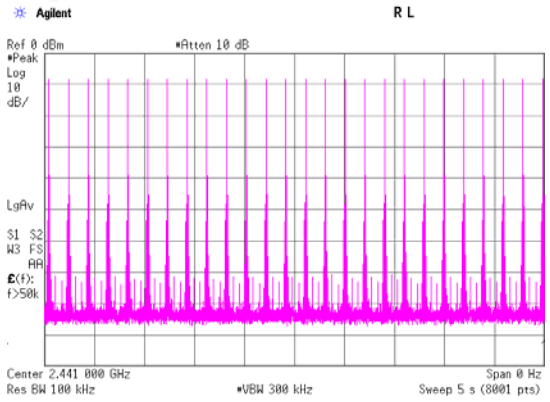
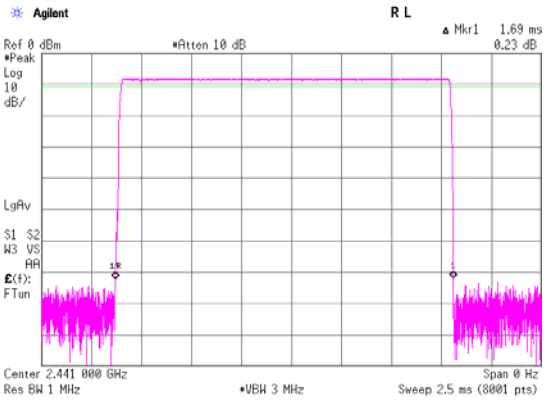
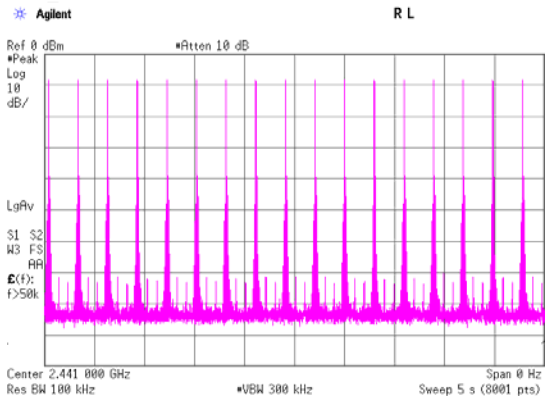
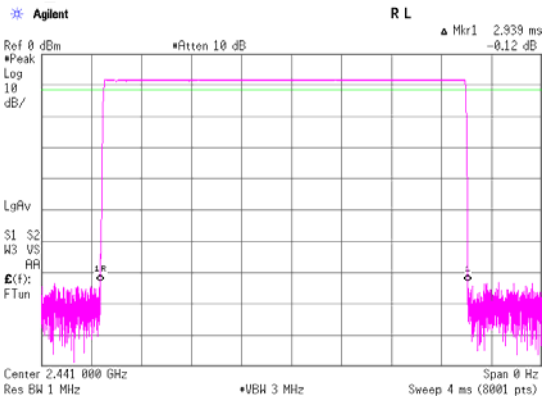
Sample Calculation

Result = Number of transmission x Length of transmition time

* 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 x 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 (DH1, DH3 or DH5). This is confirmed in the test report for N=79.

Dwell time

Tx, Bluetooth, BDR, PRBS9

DH1 (1/2)	DH1 (2/2)
	
DH3 (1/2)	**DH3 (2/2)**
	
DH5 (1/2)	**DH5 (2/2)**
	

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Dwell Time

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4)				Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	51.0	/ 5.0 sec. x 31.6 sec. =	323 times		0.447	144	400
3-DH3	26.0	/ 5.0 sec. x 31.6 sec. =	165 times		1.696	280	400
3-DH5	17.0	/ 5.0 sec. x 31.6 sec. =	108 times		2.946	318	400

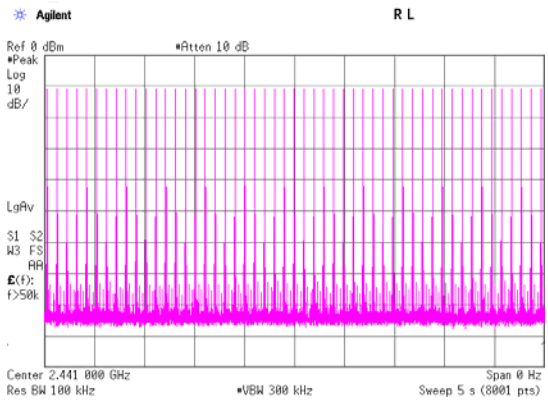
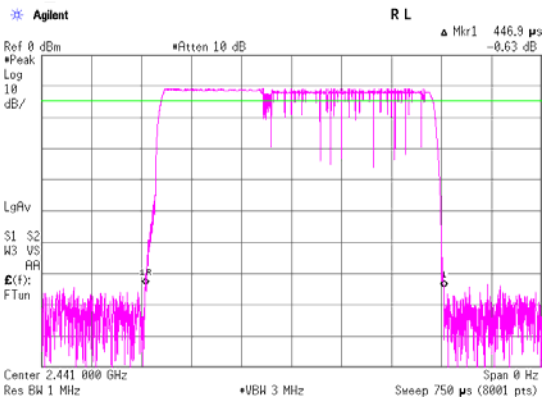
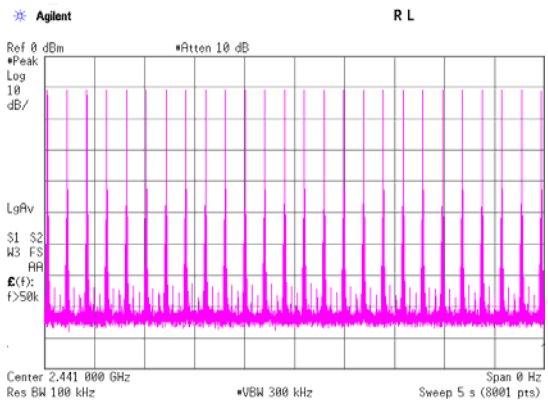
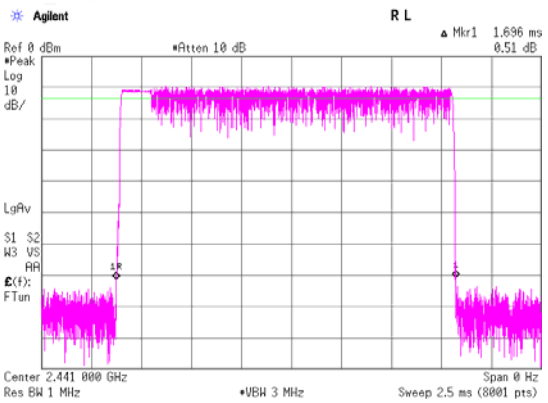
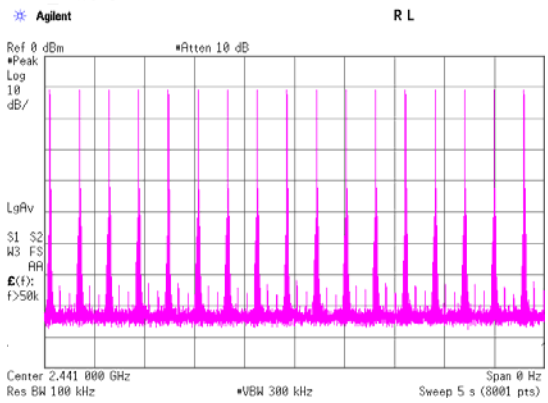
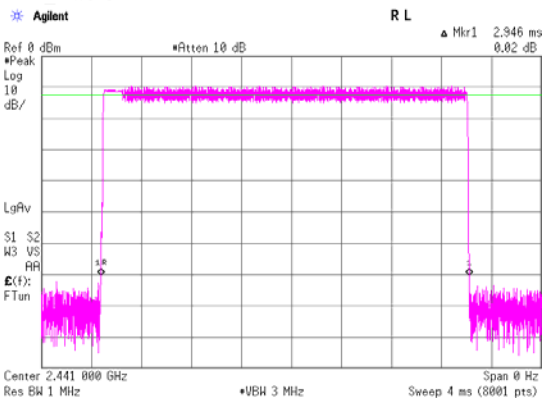
Sample Calculation

Result = Number of transmission x Length of transmition time

* 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 x 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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79.

Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH1 (1/2)	3-DH1 (2/2)
	
3-DH3 (1/2)	**3-DH3 (2/2)**
	
3-DH5 (1/2)	**3-DH5 (2/2)**
	

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Maximum Peak Conducted Output Power (Conducted)

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	December 9, 2014	
Temperature / Humidity	23 deg.C , 40 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth	

(* P/M: Power Meter with power sensor)

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-9.72	1.67	10.07	2.02	1.59	20.97	125	18.95
DH5	2441.0	-9.40	1.68	10.07	2.35	1.72	20.97	125	18.62
DH5	2480.0	-9.13	1.68	10.07	2.62	1.83	20.97	125	18.35
2-DH5	2402.0	-11.52	1.67	10.07	0.22	1.05	20.97	125	20.75
2-DH5	2441.0	-11.20	1.68	10.07	0.55	1.14	20.97	125	20.42
2-DH5	2480.0	-10.97	1.68	10.07	0.78	1.20	20.97	125	20.19
3-DH5	2402.0	-11.08	1.67	10.07	0.66	1.16	20.97	125	20.31
3-DH5	2441.0	-10.88	1.68	10.07	0.87	1.22	20.97	125	20.10
3-DH5	2480.0	-10.63	1.68	10.07	1.12	1.29	20.97	125	19.85

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

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Maximum Conducted Output Power (Reference data for SAR test)

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	December 9, 2014	
Temperature / Humidity	23 deg.C , 40 %RH	
Engineer	Kazuhiro Ando	
Mode	Tx, Bluetooth	

(* P/M: Power Meter with power sensor)

	Freq.	P/M (AV) Reading	Cable Loss	Atten. Loss	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
DH5	2402.0	-10.44	1.67	10.07	1.30	1.35
DH5	2441.0	-9.90	1.68	10.07	1.85	1.53
DH5	2480.0	-9.67	1.68	10.07	2.08	1.61
2-DH5	2402.0	-14.16	1.67	10.07	-2.42	0.57
2-DH5	2441.0	-13.84	1.68	10.07	-2.09	0.62
2-DH5	2480.0	-13.61	1.68	10.07	-1.86	0.65
3-DH5	2402.0	-14.16	1.67	10.07	-2.42	0.57
3-DH5	2441.0	-13.55	1.68	10.07	-1.80	0.66
3-DH5	2480.0	-13.55	1.68	10.07	-1.80	0.66

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss

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Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, BDR, PRBS9 (Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.006	QP	36.5	11.1	8.2	32.1	23.7	43.5	19.8	141	1	
Hori.	188.001	QP	31.3	10.8	8.2	32.1	18.2	43.5	25.3	146	0	
Hori.	192.001	QP	31.5	10.5	8.3	32.1	18.2	43.5	25.3	134	182	
Hori.	2390.000	PK	43.8	27.6	14.0	38.5	46.9	73.9	27.0	100	0	
Hori.	2558.000	PK	48.2	27.5	14.1	38.6	51.2	73.9	22.7	100	0	
Hori.	4804.000	PK	48.2	31.3	6.0	39.6	45.9	73.9	28.0	100	302	
Hori.	7206.000	PK	46.7	36.0	7.5	38.7	51.5	73.9	22.4	100	220	
Hori.	2390.000	AV	33.4	27.6	14.0	38.5	36.5	53.9	17.4	100	0	
Hori.	2558.000	AV	43.6	27.5	14.1	38.6	46.6	53.9	**7.3**	100	0	
Hori.	4804.000	AV	42.3	31.3	6.0	39.6	40.0	53.9	13.9	100	302	
Hori.	7206.000	AV	38.7	36.0	7.5	38.7	43.5	53.9	10.4	100	220	
Vert.	73.728	QP	37.5	10.5	7.4	32.2	23.2	40.0	16.8	165	200	
Vert.	184.001	QP	29.3	11.1	8.2	32.1	16.5	43.5	27.0	100	141	
Vert.	367.988	QP	30.2	14.8	9.4	32.0	22.4	46.0	23.6	127	102	
Vert.	2390.000	PK	44.1	27.6	14.0	38.5	47.2	73.9	26.7	100	0	
Vert.	2558.000	PK	48.4	27.5	14.1	38.6	51.4	73.9	22.5	100	335	
Vert.	4804.000	PK	48.0	31.3	6.0	39.6	45.7	73.9	28.2	100	52	
Vert.	7206.000	PK	46.2	36.0	7.5	38.7	51.0	73.9	22.9	143	251	
Vert.	2390.000	AV	33.5	27.6	14.0	38.5	36.6	53.9	17.3	100	0	
Vert.	2558.000	AV	42.2	27.5	14.1	38.6	45.2	53.9	8.7	100	335	
Vert.	4804.000	AV	39.9	31.3	6.0	39.6	37.6	53.9	16.3	100	52	
Vert.	7206.000	AV	38.8	36.0	7.5	38.7	43.6	53.9	10.3	143	251	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	85.7	27.5	14.0	38.5	88.7	-	-	
Hori.	2400.000	PK	48.3	27.5	14.0	38.5	51.3	68.7	17.4	
Vert.	2402.000	PK	84.6	27.5	14.0	38.5	87.6	-	-	
Vert.	2400.000	PK	48.4	27.5	14.0	38.5	51.4	67.6	16.2	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, BDR, PRBS9 (Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.005	QP	36.8	11.1	8.2	32.1	24.0	43.5	19.5	100	181	
Hori.	188.049	QP	30.7	10.8	8.2	32.1	17.6	43.5	25.9	100	354	
Hori.	191.996	QP	31.3	10.5	8.3	32.1	18.0	43.5	25.5	100	342	
Hori.	2597.000	PK	50.8	27.5	14.1	38.6	53.8	73.9	20.1	100	40	
Hori.	4882.000	PK	47.5	31.2	6.0	39.6	45.1	73.9	28.8	100	45	
Hori.	7323.000	PK	45.0	36.2	7.6	38.7	50.1	73.9	23.8	100	116	
Hori.	2597.000	AV	38.9	27.5	14.1	38.6	41.9	53.9	**12.0**	100	40	
Hori.	4882.000	AV	37.0	31.2	6.0	39.6	34.6	53.9	19.3	100	45	
Hori.	7323.000	AV	35.3	36.2	7.6	38.7	40.4	53.9	13.5	100	116	
Vert.	73.741	QP	36.7	10.5	7.4	32.2	22.4	40.0	17.6	143	72	
Vert.	184.028	QP	30.1	11.1	8.2	32.1	17.3	43.5	26.2	100	81	
Vert.	367.989	QP	31.1	14.8	9.4	32.0	23.3	46.0	22.7	151	233	
Vert.	2597.000	PK	47.1	27.5	14.1	38.6	50.1	73.9	23.8	100	268	
Vert.	4882.000	PK	44.4	31.2	6.0	39.6	42.0	73.9	31.9	100	155	
Vert.	7323.000	PK	45.7	36.2	7.6	38.7	50.8	73.9	23.1	107	51	
Vert.	2597.000	AV	36.7	27.5	14.1	38.6	39.7	53.9	14.2	100	268	
Vert.	4882.000	AV	35.5	31.2	6.0	39.6	33.1	53.9	20.8	100	155	
Vert.	7323.000	AV	35.8	36.2	7.6	38.7	40.9	53.9	13.0	107	51	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, BDR, PRBS9 (Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.029	QP	34.1	11.1	8.2	32.1	21.3	43.5	22.2	142	211	
Hori.	188.015	QP	32.1	10.8	8.2	32.1	19.0	43.5	24.5	151	188	
Hori.	191.969	QP	29.7	10.5	8.3	32.1	16.4	43.5	27.1	151	12	
Hori.	2483.500	PK	43.3	27.5	14.1	38.5	46.4	73.9	27.5	100	33	
Hori.	2636.000	PK	48.1	27.6	14.2	38.6	51.3	73.9	22.6	100	36	
Hori.	4960.000	PK	51.3	31.5	6.1	39.6	49.3	73.9	24.6	100	80	
Hori.	7440.000	PK	44.5	36.3	7.6	38.6	49.8	73.9	24.1	100	53	
Hori.	2483.500	AV	34.1	27.5	14.1	38.5	37.2	53.9	16.7	100	33	
Hori.	2636.000	AV	40.5	27.6	14.2	38.6	43.7	53.9	10.2	100	36	
Hori.	4960.000	AV	46.2	31.5	6.1	39.6	44.2	53.9	**9.7**	100	80	
Hori.	7440.000	AV	36.3	36.3	7.6	38.6	41.6	53.9	12.3	100	53	
Vert.	73.705	QP	37.0	10.5	7.4	32.2	22.7	40.0	17.3	148	340	
Vert.	184.004	QP	29.2	11.1	8.2	32.1	16.4	43.5	27.1	100	112	
Vert.	367.989	QP	30.2	14.8	9.4	32.0	22.4	46.0	23.6	143	354	
Vert.	2483.500	PK	42.9	27.5	14.1	38.5	46.0	73.9	27.9	100	54	
Vert.	2636.000	PK	45.8	27.6	14.2	38.6	49.0	73.9	24.9	100	39	
Vert.	4960.000	PK	48.9	31.5	6.1	39.6	46.9	73.9	27.0	118	210	
Vert.	7440.000	PK	44.8	36.3	7.6	38.6	50.1	73.9	23.8	100	43	
Vert.	2483.500	AV	33.9	27.5	14.1	38.5	37.0	53.9	16.9	100	54	
Vert.	2636.000	AV	37.8	27.6	14.2	38.6	41.0	53.9	12.9	100	39	
Vert.	4960.000	AV	43.4	31.5	6.1	39.6	41.4	53.9	12.5	118	210	
Vert.	7440.000	AV	37.3	36.3	7.6	38.6	42.6	53.9	11.3	100	43	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, EDR, PRBS9(Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.000	QP	36.1	11.1	8.2	32.1	23.3	43.5	20.2	131	349	
Hori.	188.000	QP	32.4	10.8	8.2	32.1	19.3	43.5	24.2	141	188	
Hori.	192.001	QP	31.4	10.5	8.3	32.1	18.1	43.5	25.4	139	359	
Hori.	2390.000	PK	41.6	27.6	14.0	38.5	44.7	73.9	29.2	100	0	
Hori.	2558.000	PK	47.4	27.5	14.1	38.6	50.4	73.9	23.5	100	47	
Hori.	4804.000	PK	47.4	31.3	6.0	39.6	45.1	73.9	28.8	100	130	
Hori.	2390.000	AV	33.6	27.6	14.0	38.5	36.7	53.9	17.2	100	0	
Hori.	2558.000	AV	40.8	27.5	14.1	38.6	43.8	53.9	10.1	100	47	
Hori.	4804.000	AV	38.4	31.3	6.0	39.6	36.1	53.9	17.8	100	130	
Vert.	73.729	QP	36.9	10.5	7.4	32.2	22.6	40.0	17.4	160	353	
Vert.	184.038	QP	29.9	11.1	8.2	32.1	17.1	43.5	26.4	100	82	
Vert.	360.001	QP	28.6	14.6	9.3	32.0	20.5	46.0	25.5	152	321	
Vert.	2390.000	PK	42.5	27.6	14.0	38.5	45.6	73.9	28.3	100	0	
Vert.	2558.000	PK	49.1	27.5	14.1	38.6	52.1	73.9	21.8	104	148	
Vert.	4804.000	PK	41.6	31.3	6.0	39.6	39.3	73.9	34.6	129	220	
Vert.	2390.000	AV	33.5	27.6	14.0	38.5	36.6	53.9	17.3	100	0	
Vert.	2558.000	AV	41.3	27.5	14.1	38.6	44.3	53.9	**9.6**	104	148	
Vert.	4804.000	AV	36.3	31.3	6.0	39.6	34.0	53.9	19.9	129	220	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	81.3	27.5	14.0	38.5	84.3	-	-	
Hori.	2400.000	PK	45.1	27.5	14.0	38.5	48.1	64.3	16.2	
Vert.	2402.000	PK	83.3	27.5	14.0	38.5	86.3	-	-	
Vert.	2400.000	PK	43.7	27.5	14.0	38.5	46.7	66.3	19.6	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, EDR, PRBS9(Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.005	QP	36.3	11.1	8.2	32.1	23.5	43.5	20.0	142	24	
Hori.	188.025	QP	29.7	10.8	8.2	32.1	16.6	43.5	26.9	104	340	
Hori.	192.025	QP	31.9	10.5	8.3	32.1	18.6	43.5	24.9	125	359	
Hori.	2597.000	PK	46.5	27.5	14.1	38.6	49.5	73.9	24.4	100	38	
Hori.	4882.000	PK	44.7	31.2	6.0	39.6	42.3	73.9	31.6	100	22	
Hori.	7323.000	PK	41.9	36.2	7.6	38.7	47.0	73.9	26.9	100	205	
Hori.	2597.000	AV	38.2	27.5	14.1	38.6	41.2	53.9	**12.7**	100	38	
Hori.	4882.000	AV	36.1	31.2	6.0	39.6	33.7	53.9	20.2	100	22	
Hori.	7323.000	AV	32.9	36.2	7.6	38.7	38.0	53.9	15.9	100	205	
Vert.	73.738	QP	37.5	10.5	7.4	32.2	23.2	40.0	16.8	142	7	
Vert.	184.000	QP	30.2	11.1	8.2	32.1	17.4	43.5	26.1	100	136	
Vert.	367.988	QP	31.0	14.8	9.4	32.0	23.2	46.0	22.8	136	38	
Vert.	2597.000	PK	46.6	27.5	14.1	38.6	49.6	73.9	24.3	100	139	
Vert.	4882.000	PK	45.1	31.2	6.0	39.6	42.7	73.9	31.2	100	55	
Vert.	7323.000	PK	41.2	36.2	7.6	38.7	46.3	73.9	27.6	100	0	
Vert.	2597.000	AV	38.1	27.5	14.1	38.6	41.1	53.9	12.8	100	139	
Vert.	4882.000	AV	36.6	31.2	6.0	39.6	34.2	53.9	19.7	100	55	
Vert.	7323.000	AV	32.9	36.2	7.6	38.7	38.0	53.9	15.9	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	No.11 Semi Anechoic Chamber	
Date	November 17, 2014	November 18, 2014
Temperature / Humidity	22 deg.C, 45 %RH	23 deg.C, 43 %RH
Engineer	M.Jitsukawa	M.Jitsukawa
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, EDR, PRBS9 (Y-axis)	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	184.001	QP	34.1	11.1	8.2	32.1	21.3	43.5	22.2	137	163	
Hori.	188.013	QP	32.3	10.8	8.2	32.1	19.2	43.5	24.3	146	331	
Hori.	192.033	QP	29.0	10.5	8.3	32.1	15.7	43.5	27.8	100	358	
Hori.	2483.500	PK	42.8	27.5	14.1	38.5	45.9	73.9	28.0	100	30	
Hori.	2636.000	PK	45.0	27.6	14.2	38.6	48.2	73.9	25.7	100	37	
Hori.	4960.000	PK	44.8	31.5	6.1	39.6	42.8	73.9	31.1	100	90	
Hori.	7440.000	PK	42.8	36.3	7.6	38.6	48.1	73.9	25.8	100	0	
Hori.	2483.500	AV	33.6	27.5	14.1	38.5	36.7	53.9	17.2	100	30	
Hori.	2636.000	AV	35.7	27.6	14.2	38.6	38.9	53.9	**15.0**	100	37	
Hori.	4960.000	AV	35.7	31.5	6.1	39.6	33.7	53.9	20.2	100	90	
Hori.	7440.000	AV	33.4	36.3	7.6	38.6	38.7	53.9	15.2	100	0	
Vert.	73.740	QP	37.0	10.5	7.4	32.2	22.7	40.0	17.3	153	177	
Vert.	184.006	QP	28.3	11.1	8.2	32.1	15.5	43.5	28.0	100	290	
Vert.	367.981	QP	29.4	14.8	9.4	32.0	21.6	46.0	24.4	150	342	
Vert.	2483.500	PK	43.4	27.5	14.1	38.5	46.5	73.9	27.4	100	185	
Vert.	2636.000	PK	44.0	27.6	14.2	38.6	47.2	73.9	26.7	105	161	
Vert.	4960.000	PK	44.2	31.5	6.1	39.6	42.2	73.9	31.7	100	96	
Vert.	7440.000	PK	42.9	36.3	7.6	38.6	48.2	73.9	25.7	100	0	
Vert.	2483.500	AV	33.5	27.5	14.1	38.5	36.6	53.9	17.3	100	185	
Vert.	2636.000	AV	35.5	27.6	14.2	38.6	38.7	53.9	15.2	105	161	
Vert.	4960.000	AV	36.1	31.5	6.1	39.6	34.1	53.9	19.8	100	96	
Vert.	7440.000	AV	33.4	36.3	7.6	38.6	38.7	53.9	15.2	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amprifier)
Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

UL Kashima, Inc.
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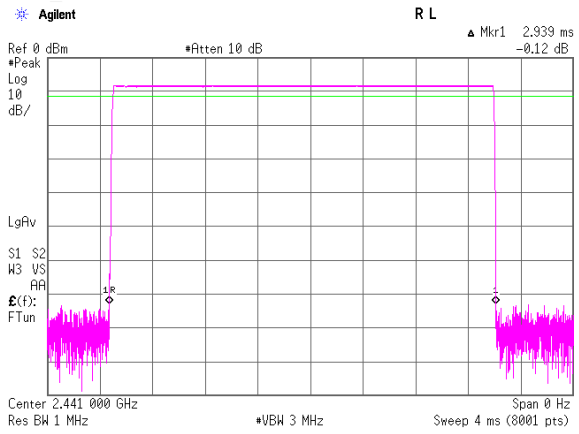
Telephone : +81 478 82 0963
Facsimile : +81 478 82 3373

Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

Dwell time factor Calculation chart

Dwell time factor Calculation

Tx, Bluetooth, BDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.94 x 2)/100) = -24.61dB**	**1cycle On time :** **2.94ms**
ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	

VBW (Average) setting

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

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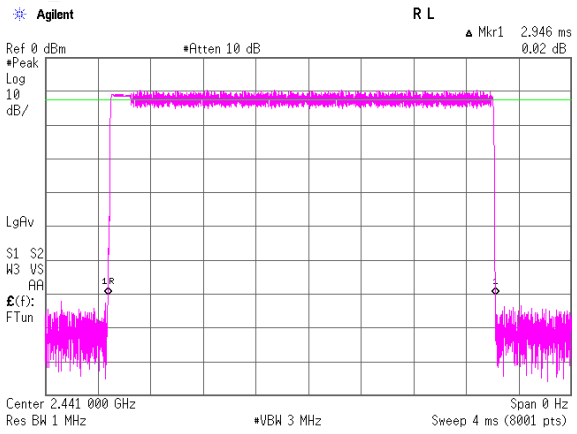
Engineer	Kazuhiro Ando	

Dwell time factor Calculation chart

Dwell time factor Calculation

Tx, Bluetooth, EDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.946 x 2)/100) = -24.59dB**	**1cycle On time :** **2.946ms**
ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	

VBW (Average) setting

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

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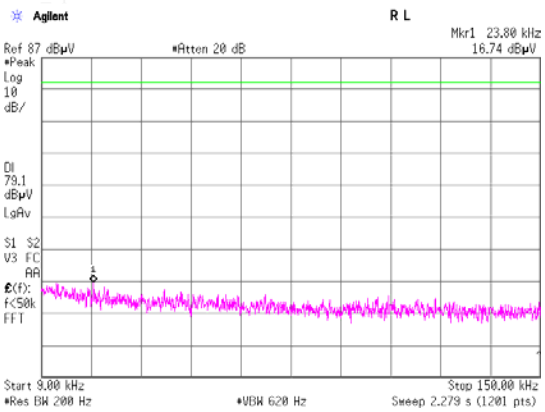
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

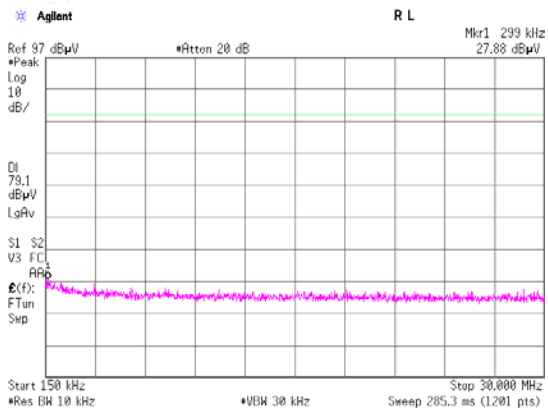
Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 30MHz)

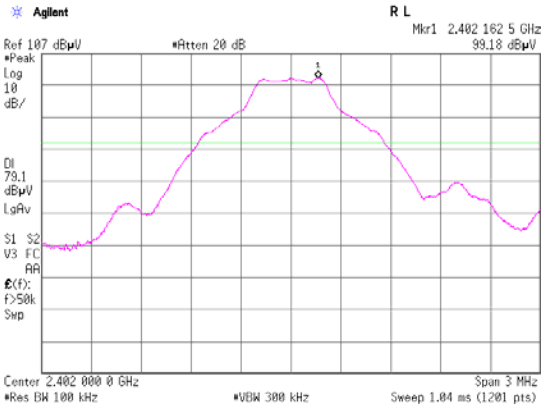
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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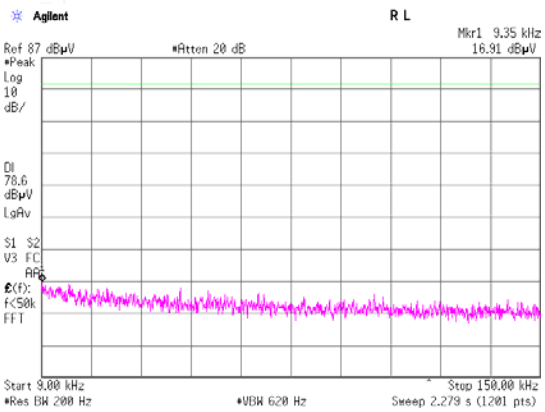
Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

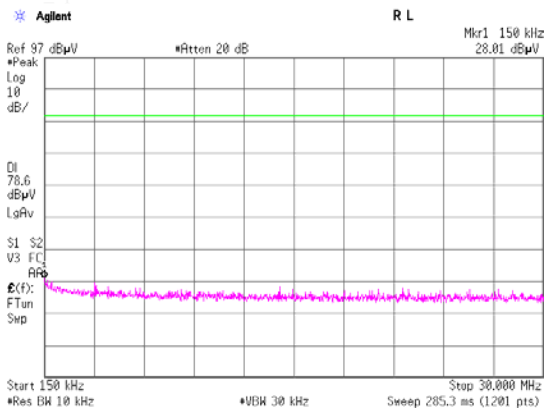
Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 30MHz)

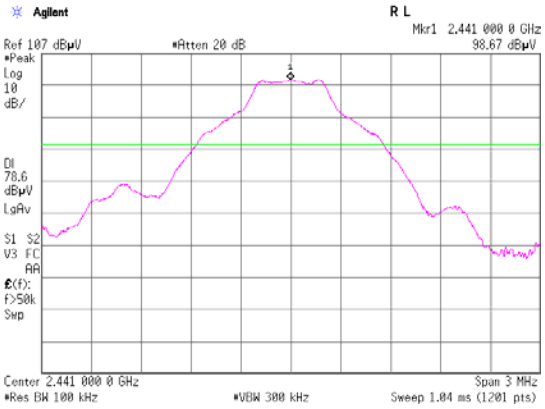
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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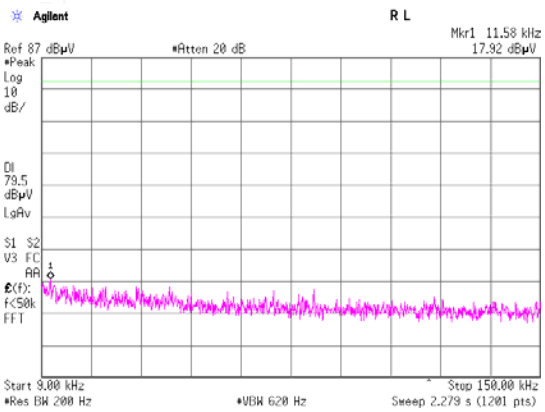
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

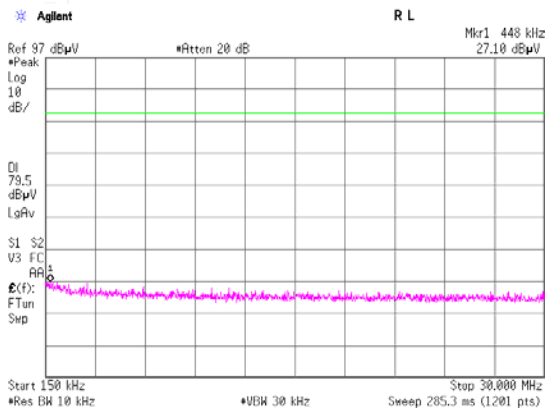
Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 30MHz)

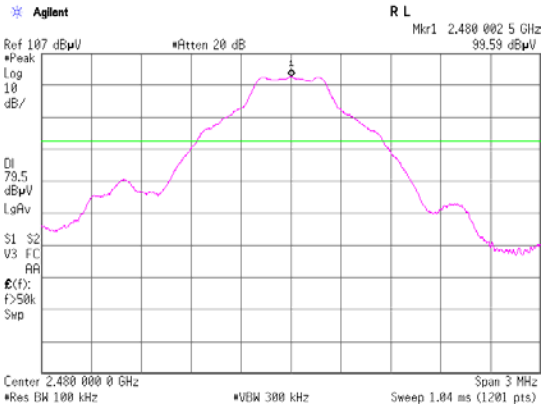
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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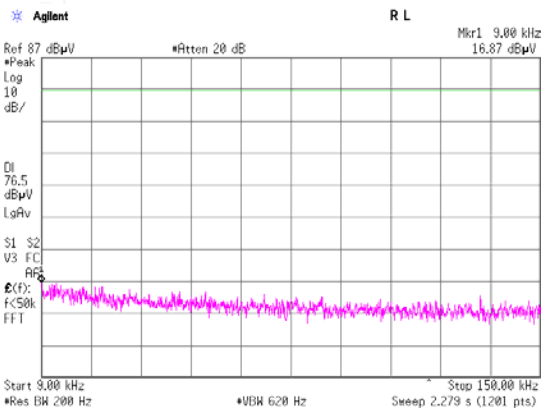
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

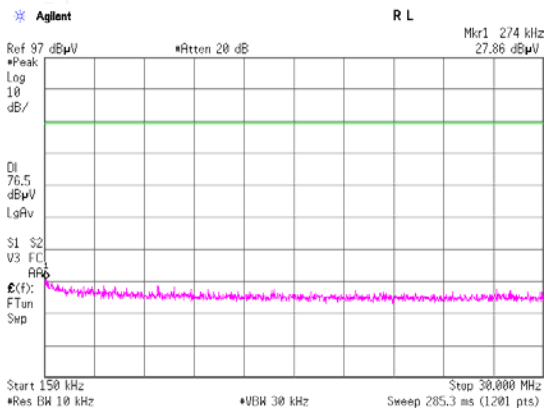
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 30MHz)

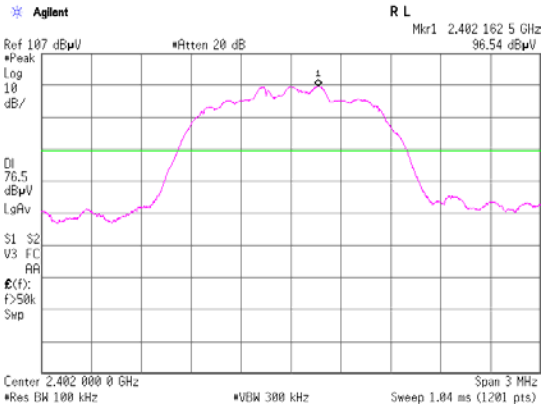
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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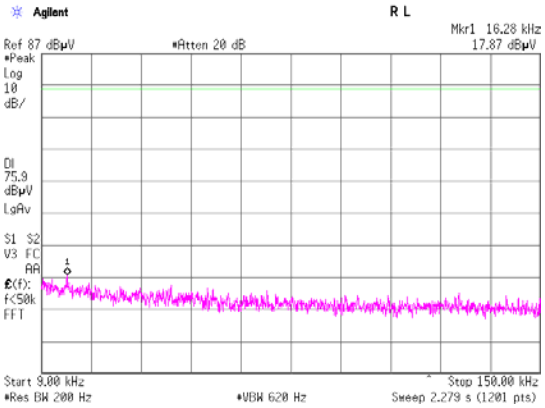
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

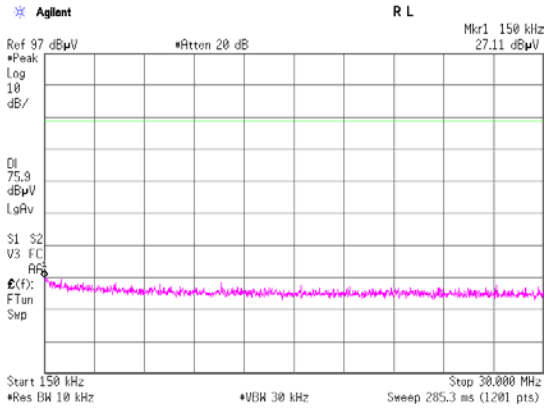
Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 30MHz)

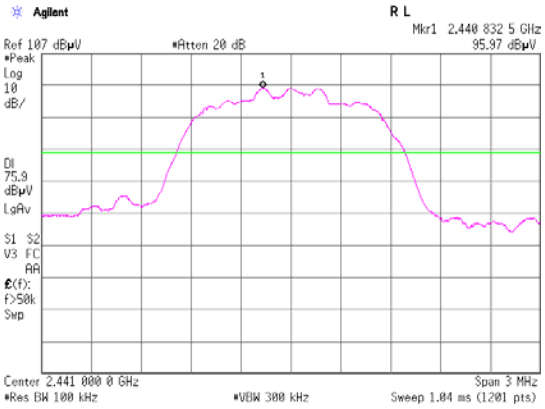
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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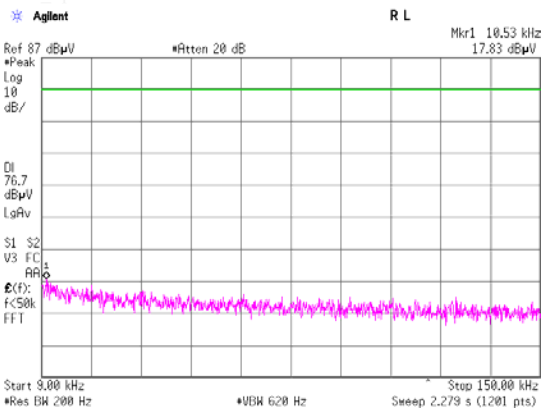
Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

Spurious emission (Conducted)

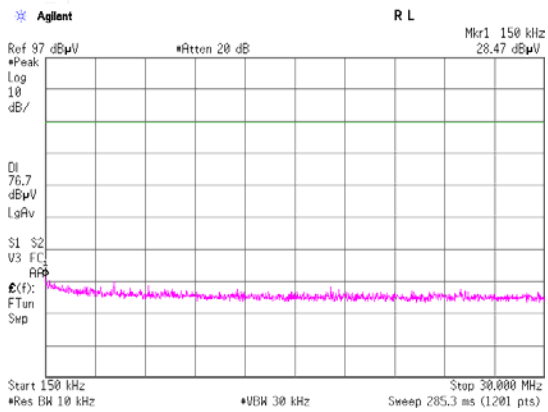
Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 30MHz)

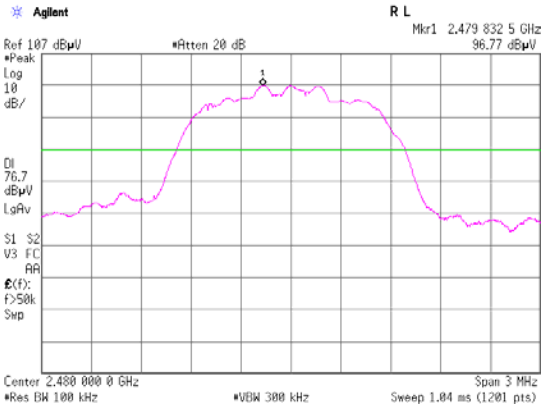
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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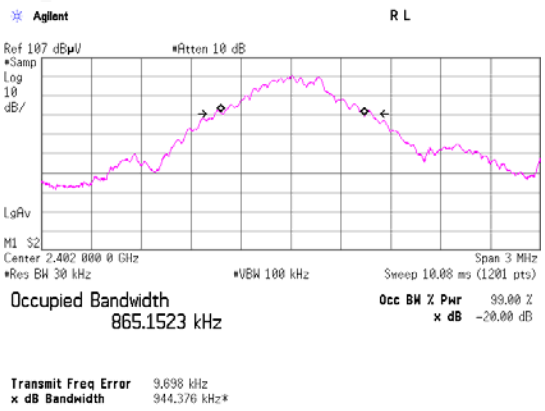
Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

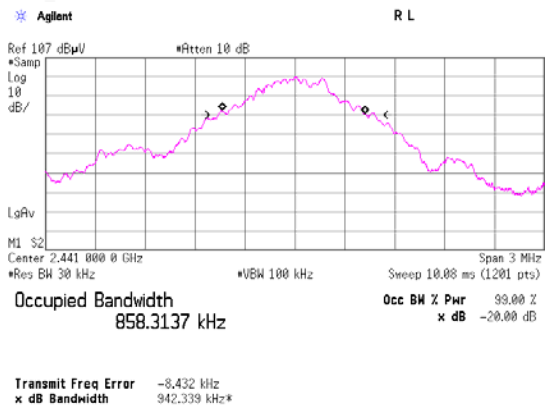
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9

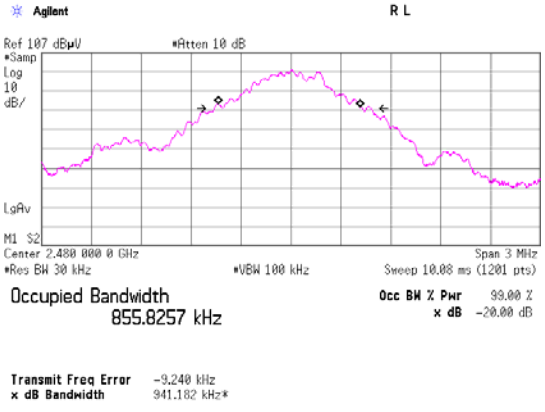
Tx, 2402MHz



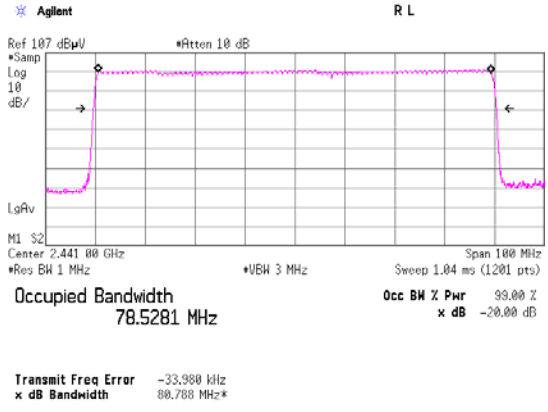
Tx, 2441MHz



Tx, 2480MHz



Tx, Hopping On



UL Kashima, Inc.
1614 Mushihata, Katori-shi, Chiba-ken 289-0341 JAPAN
Telephone : +81 478 82 0963
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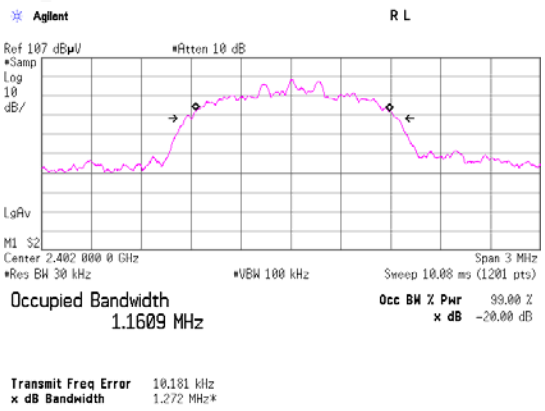
Test place	UL Kashima, Inc.	No.1 Measurement Room
Date	November 20, 2014	
Temperature / Humidity	23 deg.C , 36 %RH	
Engineer	Kazuhiro Ando	

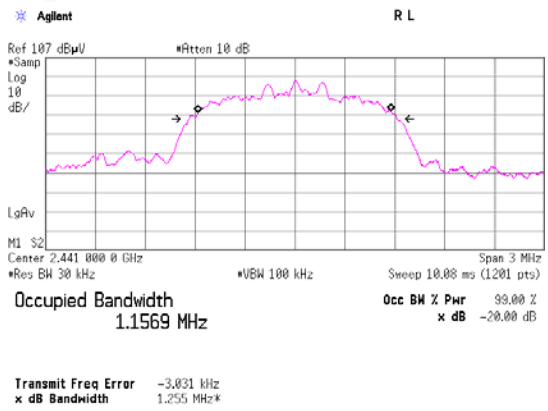
99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9

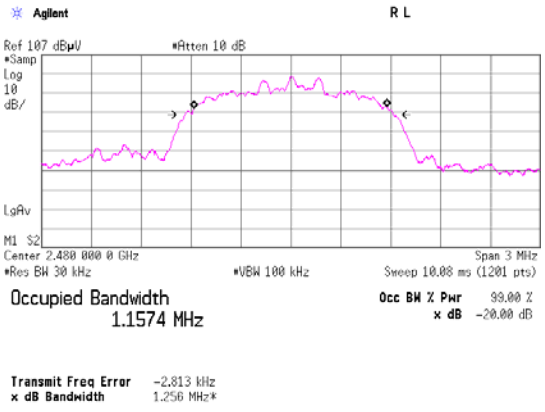
Tx, 2402MHz



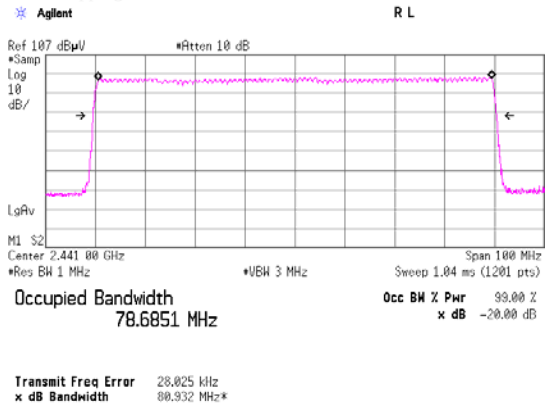
Tx, 2441MHz



Tx, 2480MHz



Tx, Hopping On



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Test Report No :14111002M-A

APPENDIX
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
CTR-06	Test Receiver	Rohde & Schwarz	ESCI	100107 Rev 4.32	RE	2014/09/03 * 12
CSA-06	Spectrum Analyzer	Agilent	N9030A	MY53310670	RE	2014/05/20 * 12
CBL-09	LOGBICON	Schwarzbeck	VULB 9168	508	RE	2014/04/25 * 12
CHA-20	Broad Band Horn	Schwarzbeck	BBHA 9120D	9120D-1270	RE	2014/07/12 * 12
CHA-07	Double Ridged Horn	TOYO	HAP18-26W	00000035	RE	2014/06/26 * 12
CAF-16	Pre-Amplifier	Sonoma Instrument	310N	325015	RE	2014/05/23 * 12
CAF-18	Pre-Amplifier	TOYO	TPA0118-36	A-1001	RE	2014/07/14 * 12
CAT10-16	10dB Fixed Atten.	Weinschel	54A-10	56246	RE	2014/05/23 * 12
CHF-03	HPF	Micro-Tronics	HPM50111-02	008	RE	2014/05/23 * 12
CCC-S11-R(1/4/5/CATS12-13/6/7/8/10)	Coaxial Cable	Fujikura,Suhner,Suhner, Agilent,Suhner,-,Suhner	5D-2W,SF106,SF104,8496B+8494B,SF106,-,SF106	MY42143380,US00431042(Step Att)	RE	2014/11/09 * 12
CCC-W05	Micro Wave Cable	Junkosha	MWX241	MRA-12-14-145	RE	2014/05/23 * 12
CCC-W07	Micro Wave Cable	Junkosha	MWX221	MRA-12-14-148	RE	2014/05/23 * 12
CCC-W09	Micro Wave Cable	SUHNER	SUCOFLEX104	MY588/4	RE	2014/07/17 * 12
CSCL-16	Ruler	Tajima	G3 gold	none	RE	2014/02/03 * 12
COS-11	Temperature, Humidity & Atmospheric Logger	T&D	TR-73U	F8060468	RE	2014/05/07 * 12
COTS-CEMI-02	EMI Software	TSJ	TEPTO-DV(RE,CE,MF,PE)	Ver.2.5.0128	RE	-
CSA-07	Spectrum Analyzer	Agilent	E4448A	MY52490024	AT	2014/05/19 * 12
CAT10-17	10dB Fixed Atten.	Weinschel	54A-10	56251	AT	2014/05/23 * 12
CCC-W06	Micro Wave Cable	Junkosha	MWX241	MRA-12-14-146	AT	2014/05/23 * 12
CPM-16	Peak Power Analyzer	Agilent	8990B	MY51000276	AT	2014/06/26 * 12
CPSO-24	Power Sensor	Agilent	N1923A	MY54070024	AT	2014/06/26 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards.
Test Item :

RE: Radiated emission,