



Test report No. : 10768225S-A
Page : 1 of 44
Issued date : May 12, 2015
Revised date : May 18, 2015
FCC ID : AK8NWZX100

RADIO TEST REPORT

Test Report No.: 10768225S-A

Applicant : Sony Corporation
Type of Equipment : Digital Music Player
Model No. : NW-ZX100
FCC ID : AK8NWZX100
Test regulation : FCC Part15 Subpart C: 2015
Test result : Complied

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2. The results in this report apply only to the sample tested.
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4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: April 24 to May 2, 2015

Representative test engineer: S. Takano
Shinichi Takano
Engineer
Consumer Technology Division

Approved by : T. Imamura
Toyokazu Imamura
Leader
Consumer Technology Division



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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony EMCS Corporation
Address : 8-4 Shiomi, Kisarazu-shi, Chiba, 292-0834 Japan
Telephone Number : +81 438 37 3982

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

2.1 Identification of E.U.T.

Type of equipment : Digital Music Player
Model No. : NW-ZX100
Serial No. : Refer to 4.2.
Rating : DC3.7V
Country of Mass-production : Malaysia
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : April 22, 2015

2.2 Product description

Model: NW-ZX100 (referred to as the EUT in this report) is a Digital Music Player.

The Clock frequency(ies) used in the system : 26MHz(Crystal and oscillator), 533MHz (Max. in others)

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Radio Specification:

Bluetooth:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth : 79MHz
Channel spacing : 1MHz
Type of modulation : FHSS
Antenna type : Monopole (Chip)
Antenna connector type : None
Antenna gain with cable loss : 1.6dBi
ITU code : F1D, G1D

NFC:

Equipment type : Transceiver
Frequency of operation : 13.56MHz
Type of modulation : ASK
Antenna type : Loop (Pattern)
ITU code : A1D

* For NFC part, refer to the test report: 10768225S-B.

FCC 15.31 (e)

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

FCC 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.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2015, final revised on January 21, 2015
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

The EUT has been tested for compliance with FCC Part 15 Subpart B by the customer.

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 *1)	-	-
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		3.1 dB Freq.: 4804.000 MHz Detection: Average Polarization: Vertical Mode: Tx 2402MHz, BDR

Note: UL Japan'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.

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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 Japan'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 Uncertainty

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

Item	Frequency range	No.1 SAC*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.5 dB	3.5 dB
	30MHz-300MHz	4.9 dB	4.9 dB	4.7 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz-40GHz	4.5 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

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

Antenna port conducted test

Power Measurement uncertainty above 1GHz for this test was: (±) 0.68dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.5dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.7dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.4dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB

Bandwidth Measurement uncertainty for this test was: (±) 0.66%

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3.5 Test location

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JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.2 semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5 -Inquiry	-
Maximum peak output power	Transmitting Hopping OFF, Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Spurious emission (Conducted)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz Spurious emission: 2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	
99% occupied bandwidth	Transmitting (DH5 / 3-DH5), Payload: PRBS9 / Inquiry -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 (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.

The carrier separation may be less than 20 dB bandwidth, therefore 125mW power limit was applied to it.

We removed 2-DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative.

Power settings: Fixed

Software for the power setting: BT RADIO TEST ver. 1.14

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

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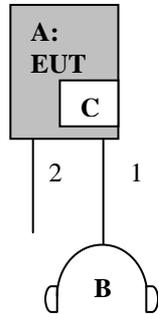
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4.2 Configuration and peripherals



*Cabling and setup 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	Digital Music Player	NW-ZX100	*1)	Sony	EUT
B	Headphones	MDR-NW750N	-	Sony	-
C	Micro SD Memory	SR-16A4	TPSN002554976	Sony	-

*1) Radiated emission tests: 001, Antenna port conducted tests at Inquiry mode: 003, Antenna port conducted tests at other modes: 002

List of cables used

No.	Item	Length(m)	Shield (Cable)	Shield (Connector)	Remarks
1	Headphones	1.1	Unshielded	Unshielded	-
2	USB	1.0	Shielded	Shielded	-

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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.

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SECTION 10: Radiated emission

10.1 Operating environment

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

10.2 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. The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Photographs of the set up are shown in APPENDIX 3.

10.3 Test conditions

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

10.4 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 15GHz) / 1m (above 15GHz) (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	Peak
IF Bandwidth	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz VBW: 300kHz

* 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 level and noise levels were confirmed at each position of X, Y and Z axes of EUT, and the test was made with the condition that has the maximum noise.

Worst axis:

Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (1-15GHz)	Spurious (15-18GHz)	Spurious (18-25GHz)
Horizontal	X	Z	Y	X	Y
Vertical	Y	Z	Z	X	X

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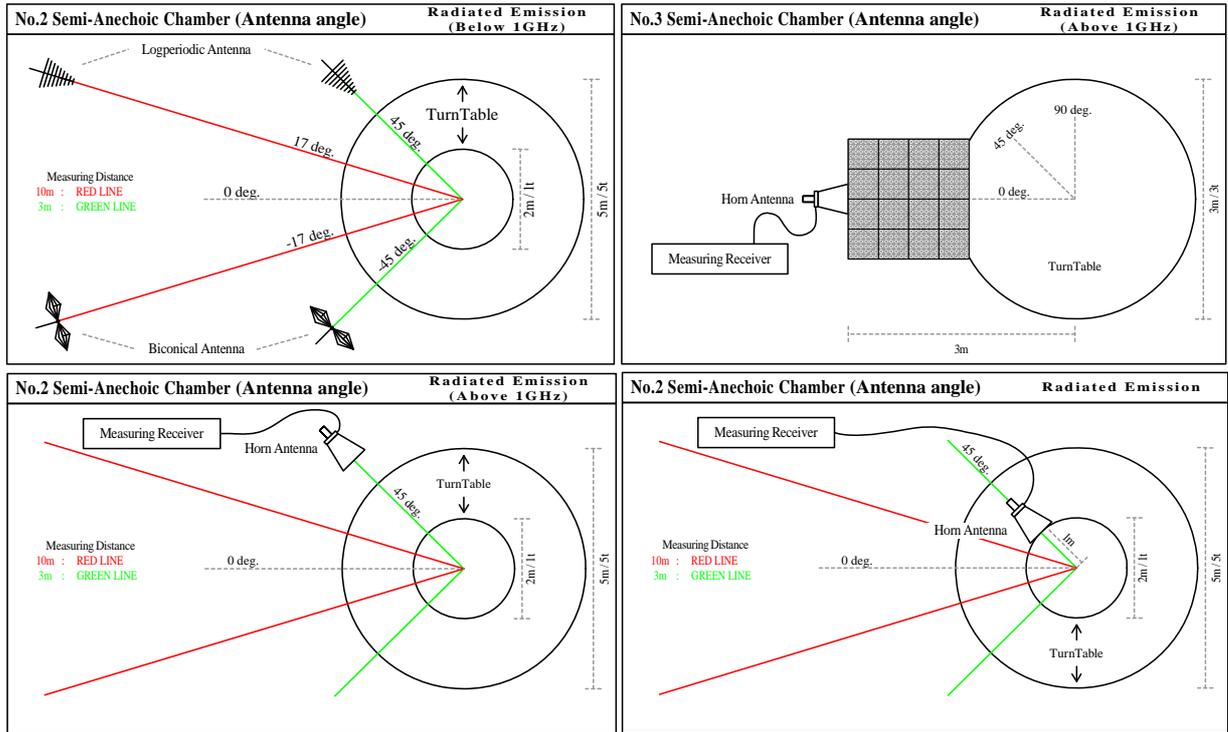
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Figure 1. Antenna angle



10.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

10.6 Results

Summary of the test results: Pass
*No noise was detected above the 8th order harmonics.

Refer to APPENDIX 1.

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SECTION 11: 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

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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

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APPENDIX 1: Data of Radio tests

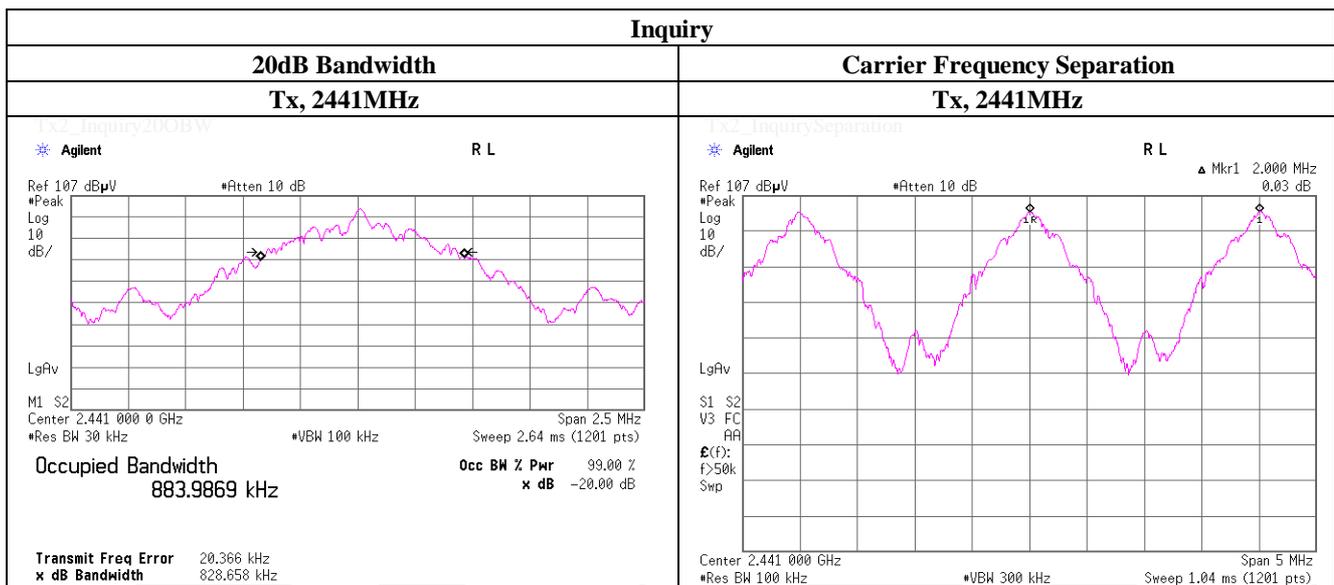
20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth, BDR, PRBS9

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.959	1.000	>= 0.640
DH5	2441.0	0.958	1.000	>= 0.639
DH5	2480.0	0.955	1.000	>= 0.637
Inquiry	2441.0	0.829	2.000	>= 0.552

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

No limit applies to 20dB Bandwidth.



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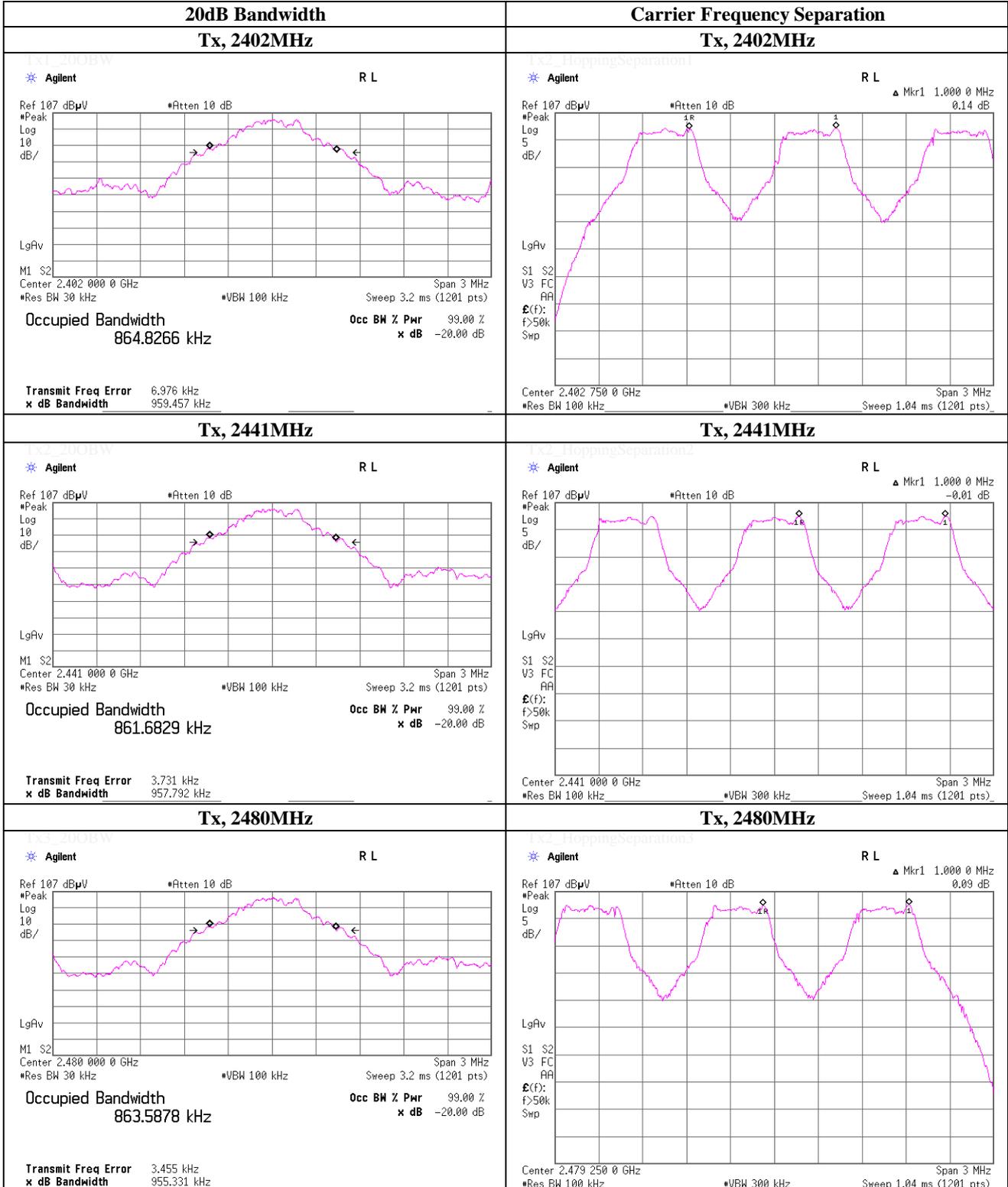
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano
 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	1.302	1.000	>= 0.868
3-DH5	2441.0	1.295	1.000	>= 0.863
3-DH5	2480.0	1.294	1.000	>= 0.862

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

No limit applies to 20dB Bandwidth.

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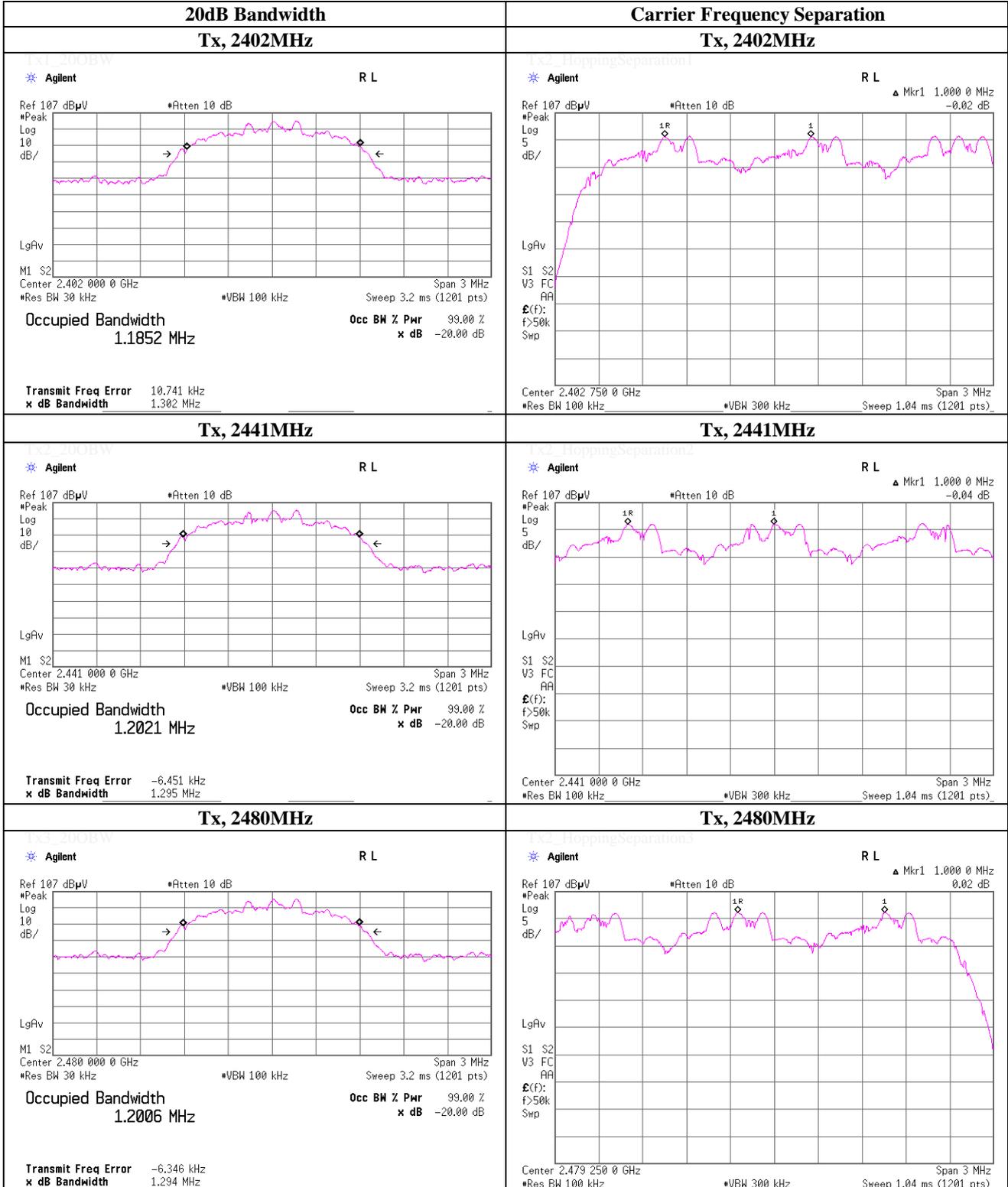
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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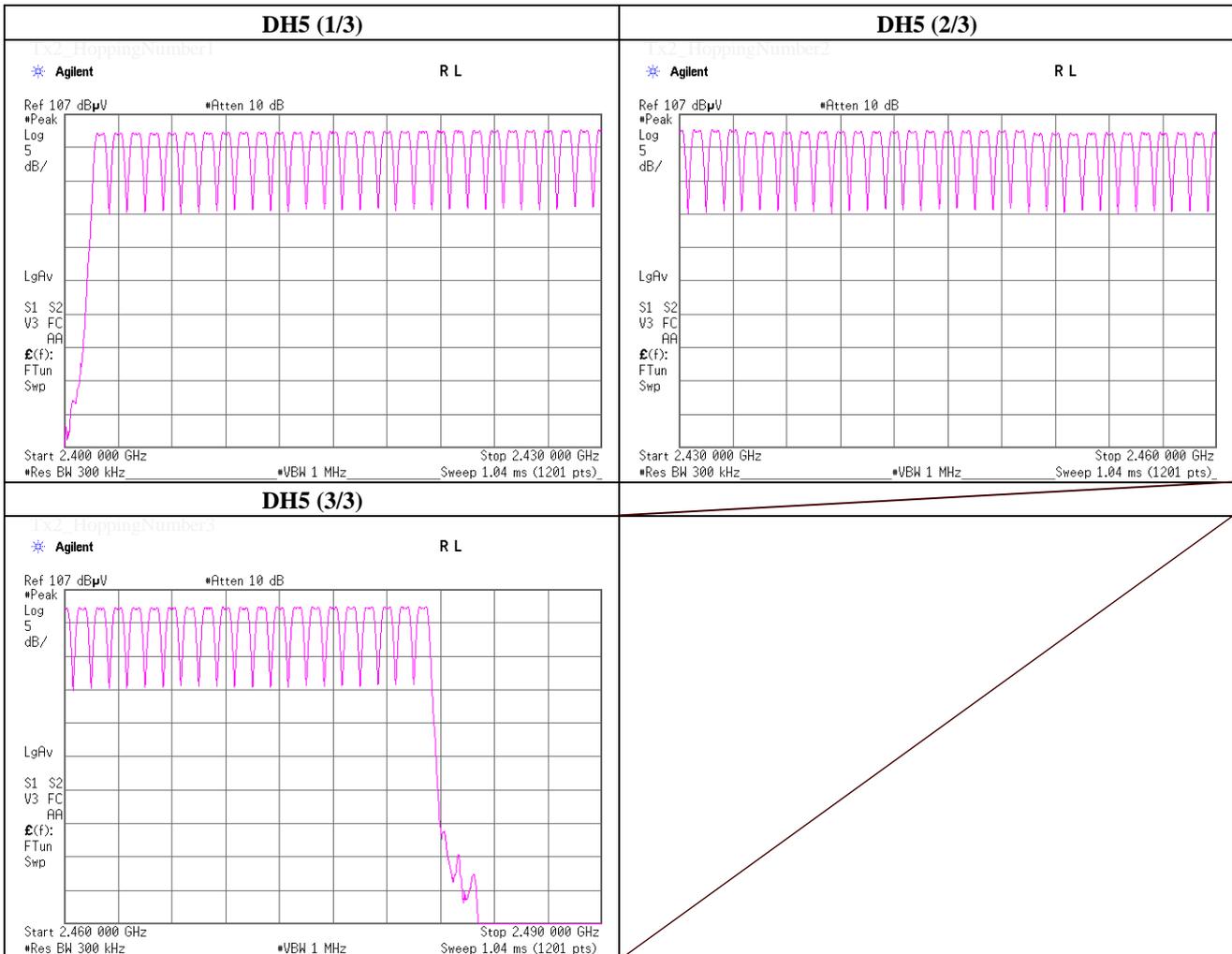
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 24, 2015	
Temperature / Humidity	26 deg.C , 44 %RH	
Engineer	Shinichi Takano	
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.

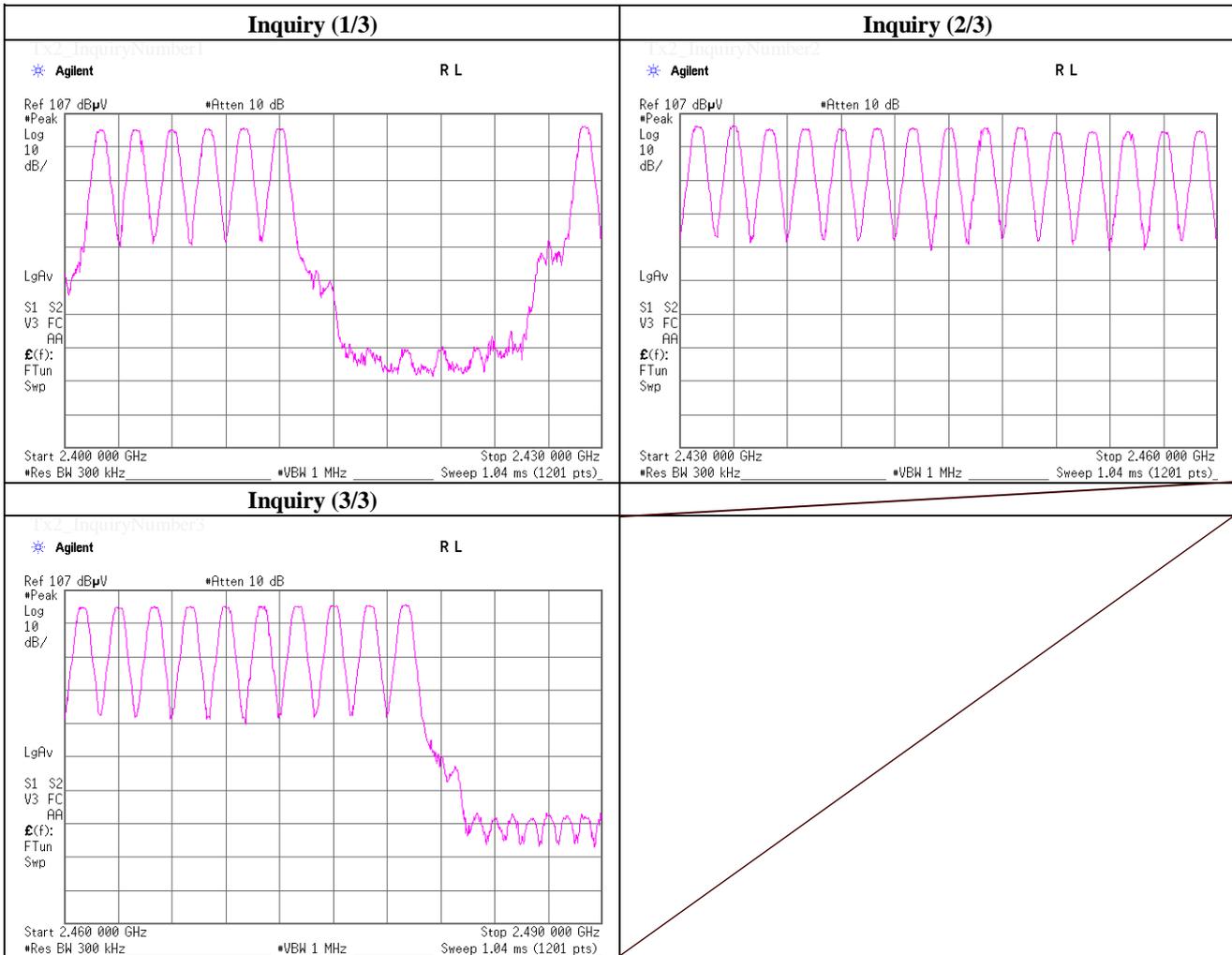


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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 24, 2015	
Temperature / Humidity	26 deg.C , 44 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, Inquiry	

Mode	Number of Channel [times]	Limit [times]
Inquiry	32	>= 15



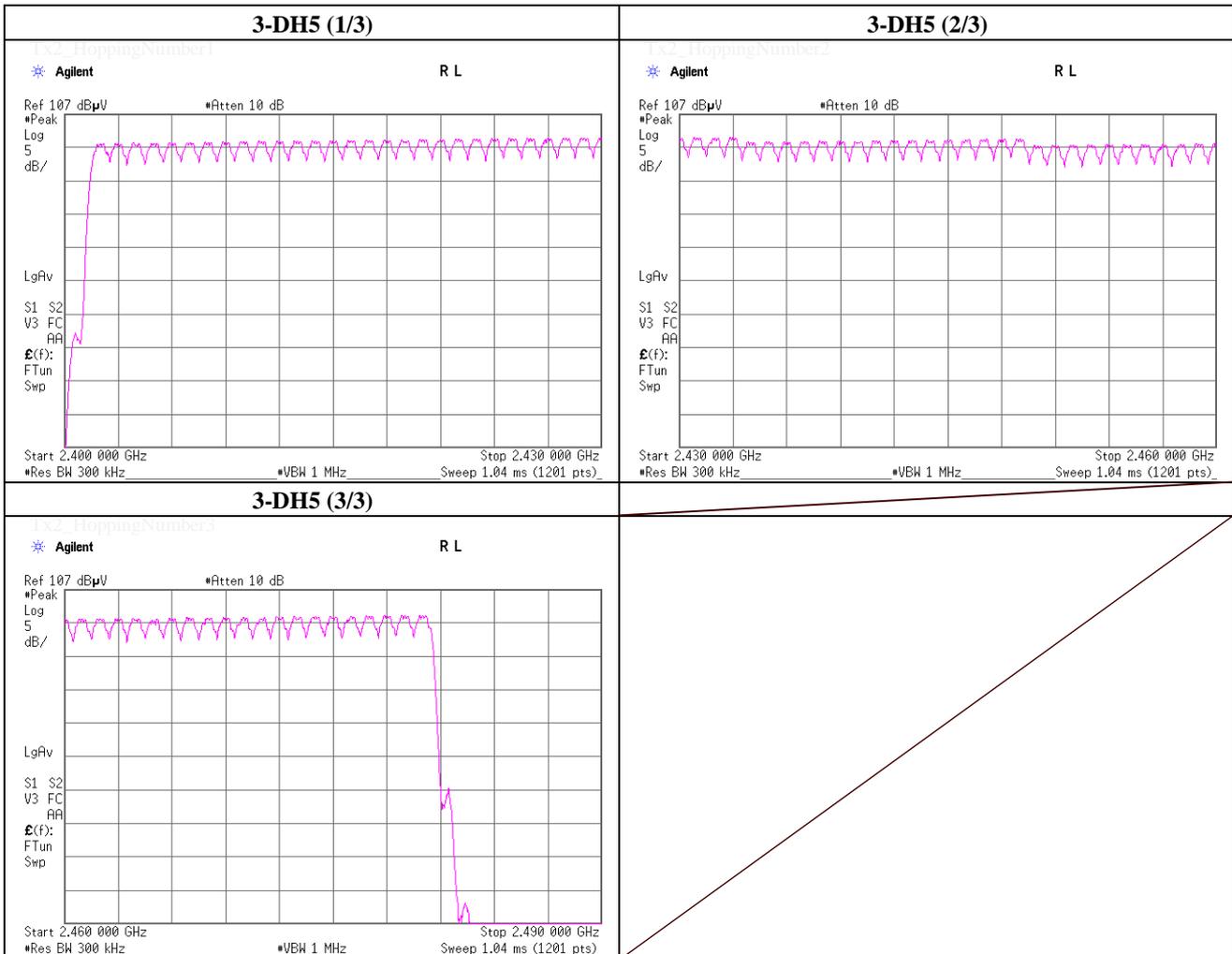
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 24, 2015	
Temperature / Humidity	26 deg.C , 44 %RH	
Engineer	Shinichi Takano	
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.



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Dwell Time

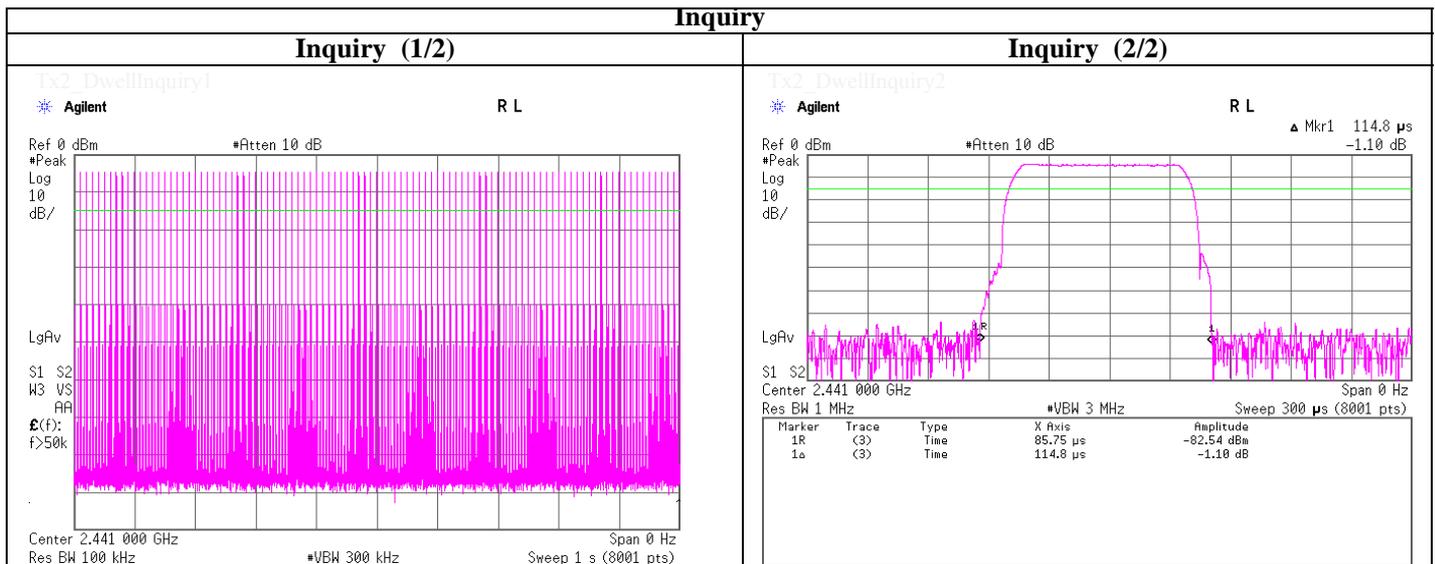
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 24, 2015	
Temperature / Humidity	26 deg.C , 44 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

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 time [msec]	Result [msec]	Limit [msec]
DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.426	138	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.681	277	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.929	316	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.115	147	400

Sample Calculation

Result = Number of transmission x Length of transmission 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 $N \times 0.4s$, 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 (DH1, DH3 or DH5). This is confirmed in the test report for $N=79$.



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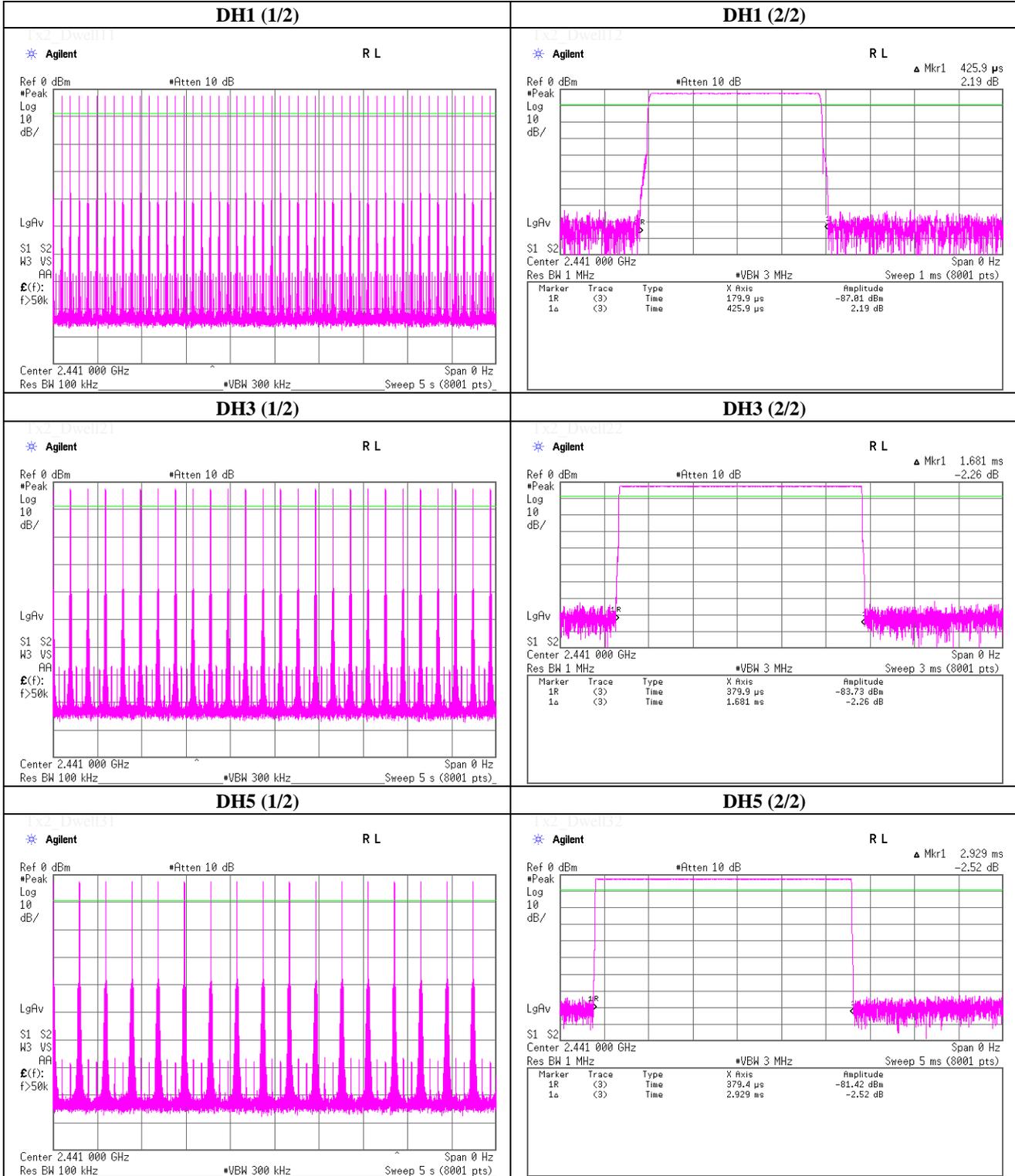
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth, EDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.439	142	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.691	279	400
3-DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.940	318	400

Sample Calculation

Result = Number of transmission x Length of transmission 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 $N \times 0.4s$, 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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for $N=79$.

UL Japan, Inc.

Shonan EMC Lab.

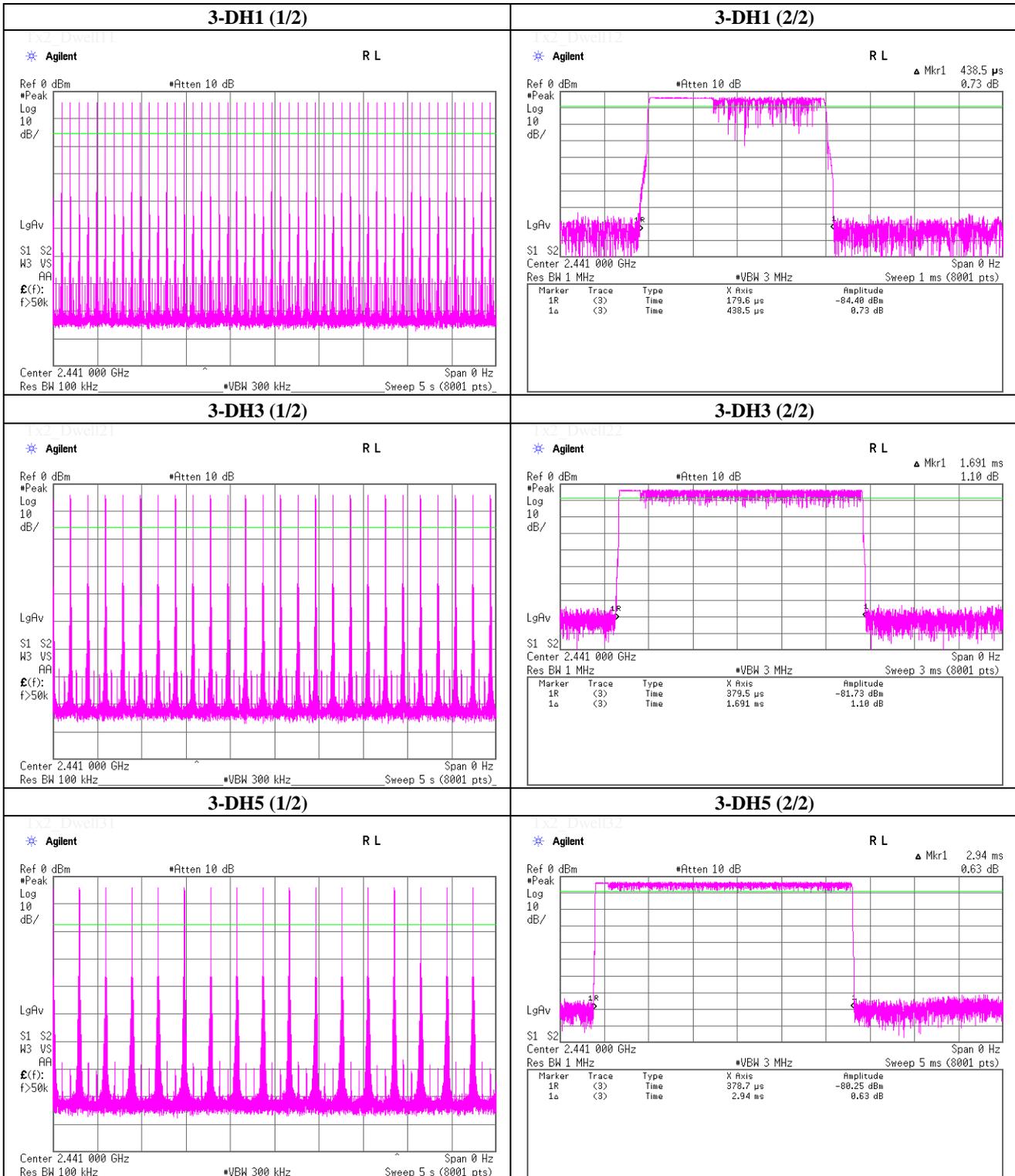
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Maximum Peak Conducted Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-2.16	0.91	9.90	8.65	7.33	20.97	125	12.32
DH5	2441.0	-2.02	0.91	9.90	8.79	7.57	20.97	125	12.18
DH5	2480.0	-2.01	0.92	9.90	8.81	7.60	20.97	125	12.16
2-DH5	2402.0	-2.94	0.91	9.90	7.87	6.12	20.97	125	13.10
2-DH5	2441.0	-2.69	0.91	9.90	8.12	6.49	20.97	125	12.85
2-DH5	2480.0	-2.66	0.92	9.90	8.16	6.55	20.97	125	12.81
3-DH5	2402.0	-2.74	0.91	9.90	8.07	6.41	20.97	125	12.90
3-DH5	2441.0	-2.52	0.91	9.90	8.29	6.75	20.97	125	12.68
3-DH5	2480.0	-2.50	0.92	9.90	8.32	6.79	20.97	125	12.65

Sample Calculation:

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

(Reference maximum conducted power (average))

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

	Freq. [MHz]	P/M (Average) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result	
						[dBm]	[mW]
DH5	2402.0	-2.31	0.91	9.90	0.00	8.50	7.08
DH5	2441.0	-2.14	0.91	9.90	0.00	8.67	7.36
DH5	2480.0	-2.13	0.92	9.90	0.00	8.69	7.40
2-DH5	2402.0	-4.72	0.91	9.90	0.00	6.09	4.06
2-DH5	2441.0	-4.32	0.91	9.90	0.00	6.49	4.46
2-DH5	2480.0	-4.23	0.92	9.90	0.00	6.59	4.56
3-DH5	2402.0	-4.70	0.91	9.90	0.00	6.11	4.08
3-DH5	2441.0	-4.31	0.91	9.90	0.00	6.50	4.47
3-DH5	2480.0	-4.24	0.92	9.90	0.00	6.58	4.55

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

(*1) Power was measured with using the gate function of power meter.

It was means that the intervals during which the transmitter is off or is transmitting at reduced power level is not included in the average.
 Therefore, there is no need to add duty cycle correction to the result.

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2402 MHz Tx, Bluetooth, BDR, PRBS9	

(* 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.	130.777	QP	22.3	13.7	8.2	31.8	12.4	43.5	31.1	234	4	
Hori.	324.093	QP	27.6	14.5	6.7	31.7	17.1	46.0	28.9	168	212	
Hori.	876.396	QP	21.2	22.1	9.6	30.9	22.0	46.0	24.0	100	316	
Hori.	2376.030	PK	46.4	26.4	13.5	41.1	45.2	73.9	28.7	100	41	
Hori.	2390.000	PK	45.1	26.4	13.6	41.1	44.0	73.9	29.9	100	41	
Hori.	2558.024	PK	50.9	26.7	13.7	41.0	50.3	73.9	23.6	122	348	
Hori.	4804.000	PK	57.2	30.6	5.6	39.8	53.6	73.9	20.3	103	218	
Hori.	7206.000	PK	45.3	36.6	7.1	40.2	48.8	73.9	25.1	100	0	
Hori.	9608.000	PK	45.6	38.5	8.1	40.1	52.1	73.9	21.8	129	351	
Hori.	12010.000	PK	45.3	39.5	9.2	39.6	54.4	73.9	19.5	100	0	
Hori.	19220.440	PK	48.9	40.5	2.0	45.3	46.1	73.9	27.8	100	101	
Hori.	2376.030	AV	34.8	26.4	13.5	41.1	33.6	53.9	20.3	100	41	
Hori.	2390.000	AV	34.3	26.4	13.6	41.1	33.2	53.9	20.7	100	41	
Hori.	2558.024	AV	42.2	26.7	13.7	41.0	41.6	53.9	12.3	122	348	
Hori.	4804.000	AV	52.5	30.6	5.6	39.8	48.9	53.9	5.0	103	218	
Hori.	7206.000	AV	33.2	36.6	7.1	40.2	36.7	53.9	17.2	100	0	
Hori.	9608.000	AV	33.8	38.5	8.1	40.1	40.3	53.9	13.6	129	351	
Hori.	12010.000	AV	33.2	39.5	9.2	39.6	42.3	53.9	11.6	100	0	
Hori.	19220.440	AV	42.5	40.5	2.0	45.3	39.7	53.9	14.2	100	101	
Vert.	72.387	QP	35.5	6.3	7.6	31.9	17.5	40.0	22.5	100	220	
Vert.	107.995	QP	25.5	11.2	8.0	31.8	12.9	43.5	30.6	100	234	
Vert.	887.505	QP	21.2	22.3	9.6	30.8	22.3	46.0	23.7	100	231	
Vert.	2376.030	PK	47.3	26.4	13.5	41.1	46.1	73.9	27.8	100	238	
Vert.	2390.000	PK	45.2	26.4	13.6	41.1	44.1	73.9	29.8	100	238	
Vert.	2558.024	PK	51.1	26.7	13.7	41.0	50.5	73.9	23.4	121	236	
Vert.	4804.000	PK	58.9	30.6	5.6	39.8	55.3	73.9	18.6	114	221	
Vert.	7206.000	PK	45.2	36.6	7.1	40.2	48.7	73.9	25.2	100	0	
Vert.	9608.000	PK	45.9	38.5	8.1	40.1	52.4	73.9	21.5	154	232	
Vert.	12010.000	PK	45.4	39.5	9.2	39.6	54.5	73.9	19.4	100	0	
Vert.	19220.140	PK	50.6	40.5	2.0	45.3	47.8	73.9	26.1	100	8	
Vert.	2376.030	AV	35.5	26.4	13.5	41.1	34.3	53.9	19.6	100	238	
Vert.	2390.000	AV	34.3	26.4	13.6	41.1	33.2	53.9	20.7	100	238	
Vert.	2558.024	AV	44.5	26.7	13.7	41.0	43.9	53.9	10.0	121	236	
Vert.	4804.000	AV	54.4	30.6	5.6	39.8	50.8	53.9	3.1	114	221	
Vert.	7206.000	AV	33.2	36.6	7.1	40.2	36.7	53.9	17.2	100	0	
Vert.	9608.000	AV	33.9	38.5	8.1	40.1	40.4	53.9	13.5	154	232	
Vert.	12010.000	AV	33.3	39.5	9.2	39.6	42.4	53.9	11.5	100	0	
Vert.	19220.140	AV	45.2	40.5	2.0	45.3	42.4	53.9	11.5	100	8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -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	99.7	26.4	13.6	41.1	98.6	-	-	Carrier
Hori.	2399.182	PK	50.3	26.4	13.6	41.1	49.2	78.6	29.4	
Hori.	2400.000	PK	52.7	26.4	13.6	41.1	51.6	78.6	27.0	
Vert.	2402.000	PK	100.9	26.4	13.6	41.1	99.8	-	-	Carrier
Vert.	2399.182	PK	54.0	26.4	13.6	41.1	52.9	79.8	26.9	
Vert.	2400.000	PK	55.7	26.4	13.6	41.1	54.6	79.8	25.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2441 MHz Tx, Bluetooth, BDR, PRBS9	

(* 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.	42.160	QP	22.6	13.5	7.1	31.9	11.3	40.0	28.7	190	348	
Hori.	320.106	QP	30.2	14.4	6.7	31.7	19.6	46.0	26.4	164	51	
Hori.	915.131	QP	20.9	22.5	9.7	30.7	22.4	46.0	23.6	100	7	
Hori.	2597.029	PK	49.9	26.8	13.7	41.0	49.4	73.9	24.5	100	350	
Hori.	4882.000	PK	55.6	30.9	5.6	39.7	52.4	73.9	21.5	102	224	
Hori.	7323.000	PK	45.2	36.8	7.0	40.3	48.7	73.9	25.2	100	0	
Hori.	9764.000	PK	45.3	38.6	8.1	40.0	52.0	73.9	21.9	125	343	
Hori.	12205.000	PK	45.2	39.4	9.3	39.8	54.1	73.9	19.8	100	0	
Hori.	19524.050	PK	48.8	40.4	2.1	45.6	45.7	73.9	28.2	100	105	
Hori.	2597.029	AV	40.5	26.8	13.7	41.0	40.0	53.9	13.9	100	350	
Hori.	4882.000	AV	50.2	30.9	5.6	39.7	47.0	53.9	6.9	102	224	
Hori.	7323.000	AV	33.5	36.8	7.0	40.3	37.0	53.9	16.9	100	0	
Hori.	9764.000	AV	34.0	38.6	8.1	40.0	40.7	53.9	13.2	125	343	
Hori.	12205.000	AV	33.3	39.4	9.3	39.8	42.2	53.9	11.7	100	0	
Hori.	19524.050	AV	41.8	40.4	2.1	45.6	38.7	53.9	15.2	100	105	
Vert.	73.886	QP	36.4	6.3	7.6	31.9	18.4	40.0	21.6	100	226	
Vert.	107.541	QP	25.7	11.2	8.0	31.8	13.1	43.5	30.4	100	240	
Vert.	908.236	QP	21.2	22.5	9.7	30.7	22.7	46.0	23.3	100	144	
Vert.	2597.029	PK	51.2	26.8	13.7	41.0	50.7	73.9	23.2	123	234	
Vert.	4882.000	PK	55.4	30.9	5.6	39.7	52.2	73.9	21.7	112	264	
Vert.	7323.000	PK	45.1	36.8	7.0	40.3	48.6	73.9	25.3	100	0	
Vert.	9764.000	PK	45.5	38.6	8.1	40.0	52.2	73.9	21.7	150	233	
Vert.	12205.000	PK	45.1	39.4	9.3	39.8	54.0	73.9	19.9	100	0	
Vert.	19524.120	PK	50.6	40.4	2.1	45.6	47.5	73.9	26.4	100	2	
Vert.	2597.029	AV	43.4	26.8	13.7	41.0	42.9	53.9	11.0	123	234	
Vert.	4882.000	AV	49.9	30.9	5.6	39.7	46.7	53.9	7.2	112	264	
Vert.	7323.000	AV	33.5	36.8	7.0	40.3	37.0	53.9	16.9	100	0	
Vert.	9764.000	AV	34.2	38.6	8.1	40.0	40.9	53.9	13.0	150	233	
Vert.	12205.000	AV	33.2	39.4	9.3	39.8	42.1	53.9	11.8	100	0	
Vert.	19524.120	AV	44.8	40.4	2.1	45.6	41.7	53.9	12.2	100	2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2480 MHz Tx, Bluetooth, BDR, PRBS9	

(* 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.	151.496	QP	22.4	14.9	8.5	31.8	14.0	43.5	29.5	145	90	
Hori.	324.107	QP	27.6	14.5	6.7	31.7	17.1	46.0	28.9	178	242	
Hori.	878.778	QP	21.4	22.1	9.6	30.9	22.2	46.0	23.8	132	322	
Hori.	2483.500	PK	46.4	26.6	13.6	41.1	45.5	73.9	28.4	100	44	
Hori.	2636.026	PK	50.3	26.8	13.7	41.0	49.8	73.9	24.1	124	352	
Hori.	4960.000	PK	55.9	31.2	5.7	39.6	53.2	73.9	20.7	103	220	
Hori.	7440.000	PK	45.4	37.0	7.0	40.4	49.0	73.9	24.9	100	0	
Hori.	9920.000	PK	45.7	38.6	8.0	39.9	52.4	73.9	21.5	126	340	
Hori.	12400.000	PK	45.0	39.3	9.4	40.0	53.7	73.9	20.2	100	0	
Hori.	19836.140	PK	48.1	40.3	2.2	45.7	44.9	73.9	29.0	100	110	
Hori.	2483.500	AV	37.5	26.6	13.6	41.1	36.6	53.9	17.3	100	44	
Hori.	2636.026	AV	42.2	26.8	13.7	41.0	41.7	53.9	12.2	124	352	
Hori.	4960.000	AV	50.9	31.2	5.7	39.6	48.2	53.9	5.7	103	220	
Hori.	7440.000	AV	34.3	37.0	7.0	40.4	37.9	53.9	16.0	100	0	
Hori.	9920.000	AV	34.7	38.6	8.0	39.9	41.4	53.9	12.5	126	340	
Hori.	12400.000	AV	33.9	39.3	9.4	40.0	42.6	53.9	11.3	100	0	
Hori.	19836.140	AV	40.6	40.3	2.2	45.7	37.4	53.9	16.5	100	110	
Vert.	72.999	QP	35.8	6.3	7.6	31.9	17.8	40.0	22.2	100	225	
Vert.	108.859	QP	25.3	11.3	8.0	31.8	12.8	43.5	30.7	100	243	
Vert.	940.816	QP	20.8	22.6	9.8	30.5	22.7	46.0	23.3	100	37	
Vert.	2483.500	PK	48.8	26.6	13.6	41.1	47.9	73.9	26.0	100	237	
Vert.	2636.026	PK	51.0	26.8	13.7	41.0	50.5	73.9	23.4	122	235	
Vert.	4960.000	PK	54.5	31.2	5.7	39.6	51.8	73.9	22.1	126	274	
Vert.	7440.000	PK	45.3	37.0	7.0	40.4	48.9	73.9	25.0	100	0	
Vert.	9920.000	PK	46.2	38.6	8.0	39.9	52.9	73.9	21.0	152	234	
Vert.	12400.000	PK	44.9	39.3	9.4	40.0	53.6	73.9	20.3	100	0	
Vert.	19836.120	PK	50.0	40.3	2.2	45.7	46.8	73.9	27.1	100	10	
Vert.	2483.500	AV	38.8	26.6	13.6	41.1	37.9	53.9	16.0	100	237	
Vert.	2636.026	AV	43.9	26.8	13.7	41.0	43.4	53.9	10.5	122	235	
Vert.	4960.000	AV	48.6	31.2	5.7	39.6	45.9	53.9	8.0	126	274	
Vert.	7440.000	AV	34.2	37.0	7.0	40.4	37.8	53.9	16.1	100	0	
Vert.	9920.000	AV	34.9	38.6	8.0	39.9	41.6	53.9	12.3	152	234	
Vert.	12400.000	AV	33.8	39.3	9.4	40.0	42.5	53.9	11.4	100	0	
Vert.	19836.120	AV	43.7	40.3	2.2	45.7	40.5	53.9	13.4	100	10	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2402 MHz Tx, Bluetooth, EDR, PRBS9	

(* 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.	177.843	QP	23.3	15.9	8.7	31.8	16.1	43.5	27.4	179	326	
Hori.	324.106	QP	27.8	14.5	6.7	31.7	17.3	46.0	28.7	168	216	
Hori.	927.373	QP	20.8	22.5	9.8	30.6	22.5	46.0	23.5	124	241	
Hori.	2376.032	PK	45.4	26.4	13.5	41.1	44.2	73.9	29.7	100	42	
Hori.	2390.000	PK	45.2	26.4	13.6	41.1	44.1	73.9	29.8	100	42	
Hori.	2558.025	PK	49.0	26.7	13.7	41.0	48.4	73.9	25.5	124	356	
Hori.	4804.000	PK	54.0	30.6	5.6	39.8	50.4	73.9	23.5	107	227	
Hori.	7206.000	PK	45.2	36.6	7.1	40.2	48.7	73.9	25.2	100	0	
Hori.	9608.000	PK	45.9	38.5	8.1	40.1	52.4	73.9	21.5	127	354	
Hori.	12010.000	PK	45.4	39.5	9.2	39.6	54.5	73.9	19.4	100	0	
Hori.	19220.170	PK	48.9	40.5	2.0	45.3	46.1	73.9	27.8	100	118	
Hori.	2376.032	AV	34.4	26.4	13.5	41.1	33.2	53.9	20.7	100	42	
Hori.	2390.000	AV	34.2	26.4	13.6	41.1	33.1	53.9	20.8	100	42	
Hori.	2558.025	AV	39.0	26.7	13.7	41.0	38.4	53.9	15.5	124	356	
Hori.	4804.000	AV	45.2	30.6	5.6	39.8	41.6	53.9	12.3	107	227	
Hori.	7206.000	AV	33.2	36.6	7.1	40.2	36.7	53.9	17.2	100	0	
Hori.	9608.000	AV	34.1	38.5	8.1	40.1	40.6	53.9	13.3	127	354	
Hori.	12010.000	AV	33.3	39.5	9.2	39.6	42.4	53.9	11.5	100	0	
Hori.	19220.170	AV	42.4	40.5	2.0	45.3	39.6	53.9	14.3	100	118	
Vert.	72.545	QP	35.4	6.3	7.6	31.9	17.4	40.0	22.6	100	214	
Vert.	108.379	QP	25.4	11.3	8.0	31.8	12.9	43.5	30.6	100	253	
Vert.	900.879	QP	21.3	22.5	9.7	30.8	22.7	46.0	23.3	100	244	
Vert.	2376.032	PK	45.3	26.4	13.5	41.1	44.1	73.9	29.8	100	238	
Vert.	2390.000	PK	45.0	26.4	13.6	41.1	43.9	73.9	30.0	100	238	
Vert.	2558.025	PK	48.6	26.7	13.7	41.0	48.0	73.9	25.9	149	237	
Vert.	4804.000	PK	52.6	30.6	5.6	39.8	49.0	73.9	24.9	118	266	
Vert.	7206.000	PK	45.3	36.6	7.1	40.2	48.8	73.9	25.1	100	0	
Vert.	9608.000	PK	45.7	38.5	8.1	40.1	52.2	73.9	21.7	151	239	
Vert.	12010.000	PK	45.3	39.5	9.2	39.6	54.4	73.9	19.5	100	0	
Vert.	19220.120	PK	51.0	40.5	2.0	45.3	48.2	73.9	25.7	100	10	
Vert.	2376.032	AV	34.5	26.4	13.5	41.1	33.3	53.9	20.6	100	238	
Vert.	2390.000	AV	34.2	26.4	13.6	41.1	33.1	53.9	20.8	100	238	
Vert.	2558.025	AV	39.1	26.7	13.7	41.0	38.5	53.9	15.4	149	237	
Vert.	4804.000	AV	44.2	30.6	5.6	39.8	40.6	53.9	13.3	118	266	
Vert.	7206.000	AV	33.3	36.6	7.1	40.2	36.8	53.9	17.1	100	0	
Vert.	9608.000	AV	34.2	38.5	8.1	40.1	40.7	53.9	13.2	151	239	
Vert.	12010.000	AV	33.2	39.5	9.2	39.6	42.3	53.9	11.6	100	0	
Vert.	19220.120	AV	45.5	40.5	2.0	45.3	42.7	53.9	11.2	100	10	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -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	94.9	26.4	13.6	41.1	93.8	-	-	Carrier
Hori.	2400.000	PK	44.7	26.4	13.6	41.1	43.6	73.8	30.2	
Vert.	2402.000	PK	96.6	26.4	13.6	41.1	95.5	-	-	Carrier
Vert.	2400.000	PK	45.8	26.4	13.6	41.1	44.7	75.5	30.8	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2441 MHz Tx, Bluetooth, EDR, PRBS9	

(* 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.	34.288	QP	22.2	16.0	7.0	31.9	13.3	40.0	26.7	289	34	
Hori.	324.103	QP	28.3	14.5	6.7	31.7	17.8	46.0	28.2	195	48	
Hori.	614.297	QP	21.7	19.2	8.3	31.6	17.6	46.0	28.4	185	88	
Hori.	2597.031	PK	47.6	26.8	13.7	41.0	47.1	73.9	26.8	123	352	
Hori.	4882.000	PK	53.2	30.9	5.6	39.7	50.0	73.9	23.9	104	219	
Hori.	7323.000	PK	45.2	36.8	7.0	40.3	48.7	73.9	25.2	100	0	
Hori.	9764.000	PK	45.4	38.6	8.1	40.0	52.1	73.9	21.8	124	354	
Hori.	12205.000	PK	45.1	39.4	9.3	39.8	54.0	73.9	19.9	100	0	
Hori.	19524.040	PK	48.4	40.4	2.1	45.6	45.3	73.9	28.6	100	105	
Hori.	2597.031	AV	38.6	26.8	13.7	41.0	38.1	53.9	15.8	123	352	
Hori.	4882.000	AV	44.4	30.9	5.6	39.7	41.2	53.9	12.7	104	219	
Hori.	7323.000	AV	33.4	36.8	7.0	40.3	36.9	53.9	17.0	100	0	
Hori.	9764.000	AV	34.1	38.6	8.1	40.0	40.8	53.9	13.1	124	354	
Hori.	12205.000	AV	33.2	39.4	9.3	39.8	42.1	53.9	11.8	100	0	
Hori.	19524.040	AV	41.0	40.4	2.1	45.6	37.9	53.9	16.0	100	105	
Vert.	72.631	QP	35.4	6.3	7.6	31.9	17.4	40.0	22.6	100	225	
Vert.	108.308	QP	25.3	11.3	8.0	31.8	12.8	43.5	30.7	100	222	
Vert.	895.814	QP	21.0	22.4	9.7	30.8	22.3	46.0	23.7	100	229	
Vert.	2597.031	PK	48.8	26.8	13.7	41.0	48.3	73.9	25.6	129	233	
Vert.	4882.000	PK	51.4	30.9	5.6	39.7	48.2	73.9	25.7	124	277	
Vert.	7323.000	PK	45.3	36.8	7.0	40.3	48.8	73.9	25.1	100	0	
Vert.	9764.000	PK	45.7	38.6	8.1	40.0	52.4	73.9	21.5	148	236	
Vert.	12205.000	PK	45.2	39.4	9.3	39.8	54.1	73.9	19.8	100	0	
Vert.	19524.110	PK	49.8	40.4	2.1	45.6	46.7	73.9	27.2	100	7	
Vert.	2597.031	AV	38.9	26.8	13.7	41.0	38.4	53.9	15.5	129	233	
Vert.	4882.000	AV	42.7	30.9	5.6	39.7	39.5	53.9	14.4	124	277	
Vert.	7323.000	AV	33.5	36.8	7.0	40.3	37.0	53.9	16.9	100	0	
Vert.	9764.000	AV	34.3	38.6	8.1	40.0	41.0	53.9	12.9	148	236	
Vert.	12205.000	AV	33.3	39.4	9.3	39.8	42.2	53.9	11.7	100	0	
Vert.	19524.110	AV	44.6	40.4	2.1	45.6	41.5	53.9	12.4	100	7	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	No.2 Semi Anechoic Chamber
Date	April 26, 2015	May 2, 2015
Temperature / Humidity	24 deg.C, 42 %RH	22 deg.C, 56 %RH
Engineer	Kenichi Adachi	Takahiro Suzuki
Mode	Tx, 2480 MHz Tx, Bluetooth, EDR, PRBS9	

(* 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.	139.926	QP	22.2	14.3	8.3	31.8	13.0	43.5	30.5	265	221	
Hori.	324.101	QP	27.8	14.5	6.7	31.7	17.3	46.0	28.7	176	225	
Hori.	766.919	QP	21.6	20.5	9.1	31.4	19.8	46.0	26.2	100	76	
Hori.	2483.500	PK	46.1	26.6	13.6	41.1	45.2	73.9	28.7	100	38	
Hori.	2636.025	PK	47.6	26.8	13.7	41.0	47.1	73.9	26.8	121	356	
Hori.	4960.000	PK	52.1	31.2	5.7	39.6	49.4	73.9	24.5	102	223	
Hori.	7440.000	PK	45.3	37.0	7.0	40.4	48.9	73.9	25.0	100	0	
Hori.	9920.000	PK	45.6	38.6	8.0	39.9	52.3	73.9	21.6	128	341	
Hori.	12400.000	PK	44.9	39.3	9.4	40.0	53.6	73.9	20.3	100	0	
Hori.	19836.140	PK	47.7	40.3	2.2	45.7	44.5	73.9	29.4	100	106	
Hori.	2483.500	AV	35.3	26.6	13.6	41.1	34.4	53.9	19.5	100	38	
Hori.	2636.025	AV	38.2	26.8	13.7	41.0	37.7	53.9	16.2	121	356	
Hori.	4960.000	AV	44.2	31.2	5.7	39.6	41.5	53.9	12.4	102	223	
Hori.	7440.000	AV	34.2	37.0	7.0	40.4	37.8	53.9	16.1	100	0	
Hori.	9920.000	AV	34.6	38.6	8.0	39.9	41.3	53.9	12.6	128	341	
Hori.	12400.000	AV	33.8	39.3	9.4	40.0	42.5	53.9	11.4	100	0	
Hori.	19836.140	AV	41.0	40.3	2.2	45.7	37.8	53.9	16.1	100	106	
Vert.	72.477	QP	35.4	6.3	7.6	31.9	17.4	40.0	22.6	100	221	
Vert.	108.408	QP	25.4	11.3	8.0	31.8	12.9	43.5	30.6	100	237	
Vert.	921.571	QP	21.0	22.5	9.8	30.6	22.7	46.0	23.3	100	36	
Vert.	2483.500	PK	46.4	26.6	13.6	41.1	45.5	73.9	28.4	100	236	
Vert.	2636.025	PK	49.0	26.8	13.7	41.0	48.5	73.9	25.4	121	233	
Vert.	4960.000	PK	50.3	31.2	5.7	39.6	47.6	73.9	26.3	123	271	
Vert.	7440.000	PK	45.2	37.0	7.0	40.4	48.8	73.9	25.1	100	0	
Vert.	9920.000	PK	46.4	38.6	8.0	39.9	53.1	73.9	20.8	151	235	
Vert.	12400.000	PK	45.0	39.3	9.4	40.0	53.7	73.9	20.2	100	0	
Vert.	19836.090	PK	49.8	40.3	2.2	45.7	46.6	73.9	27.3	100	13	
Vert.	2483.500	AV	35.4	26.6	13.6	41.1	34.5	53.9	19.4	100	236	
Vert.	2636.025	AV	39.3	26.8	13.7	41.0	38.8	53.9	15.1	121	233	
Vert.	4960.000	AV	41.5	31.2	5.7	39.6	38.8	53.9	15.1	123	271	
Vert.	7440.000	AV	34.1	37.0	7.0	40.4	37.7	53.9	16.2	100	0	
Vert.	9920.000	AV	35.6	38.6	8.0	39.9	42.3	53.9	11.6	151	235	
Vert.	12400.000	AV	33.9	39.3	9.4	40.0	42.6	53.9	11.3	100	0	
Vert.	19836.090	AV	43.9	40.3	2.2	45.7	40.7	53.9	13.2	100	13	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amplifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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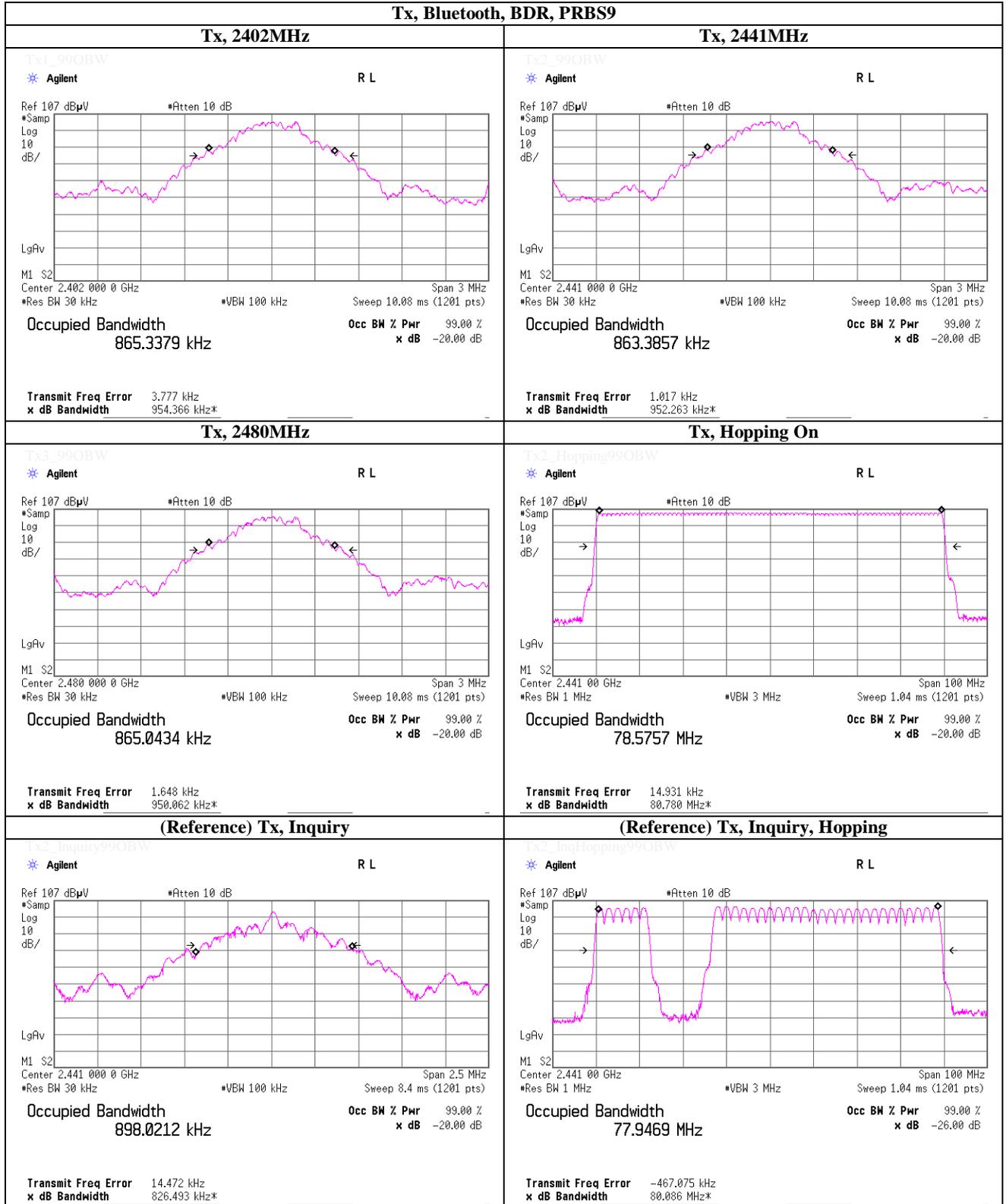
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Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano

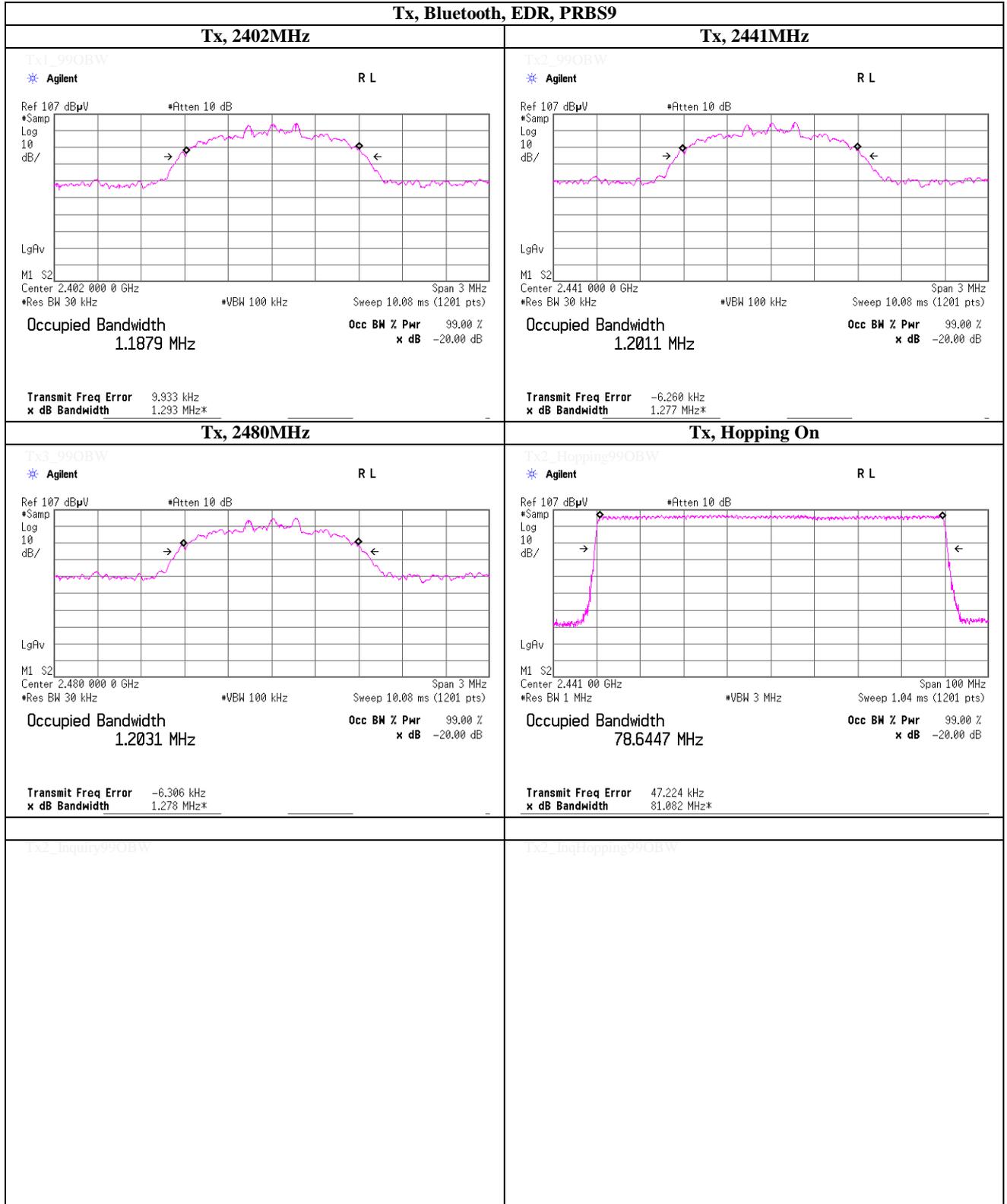
99% Occupied Bandwidth



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Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 24, 2015
 Temperature / Humidity 26 deg.C , 44 %RH
 Engineer Shinichi Takano

99% Occupied Bandwidth



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APPENDIX 2 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2015/02/24 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2015/04/02 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2015/04/02 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
SCC-G31	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	OCT-08-13-04 6	AT	2015/04/09 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2015/04/09 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2014/06/24 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2014/11/21 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2014/11/21 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2014/05/23 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2014/05/15 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2015/03/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
COTS-SEMI-1	EMI Software	TJSJ	TEPTO-DV(RE,CE, RF,LF)	-	RE	-
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2015/02/18 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2015/02/18 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2014/08/27 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2014/11/22 * 12
SCC-B1/B3/B5 /B7/B8/B13/S RSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/ TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SCC-B2/B4/B6 /B7/B8/B13/S RSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/ TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2014/11/22 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2014/10/30 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2014/09/03 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2014/07/08 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2015/03/23 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2015/04/17 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2014/05/15 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2014/08/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 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 .