



RADIO TEST REPORT

Test Report No. : 10582470S-A

Applicant : Sony Corporation
Type of Equipment : Wireless Stereo Headset
Model No. : MDR-ZX770BT
FCC ID : AK8ZX770BT
Test regulation : FCC Part 15 Subpart C: 2014
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
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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: December 5, 6, 16, 2014

Representative test engineer:

Kazuhiro Ando
Engineer of EMC/Wireless Group,
Consumer Technology Division

Approved by:

Go Ishiwata
Site Manager
Engineer of EMC/Wireless Group,
Consumer Technology Division



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

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13-EM-F0429

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REVISION HISTORY

Original Test Report No. 10582470S-A

Revision	Date	Page revised	Revision Description
00	January 8, 2015	-	Original
01	January 9, 2015	4	Update of 3.1
		7, 15, 18, 25-30	Correction of typo
02	January 14, 2015	1-12	Correction of FCC ID

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SECTION 1: Customer information

Company name	:	Sony Corporation
Brand name	:	SONY
Address	:	2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan
Telephone Number	:	+81-50-3750-7630
Facsimile Number	:	+81-50-3750-6574
Contact Person	:	Shigeru Higai

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Stereo Headset
Model No.	:	MDR-ZX770BT
Serial No.	:	Refer to Clause 4.2
Rating	:	DC3.7V
Receipt Date of Sample	:	November 19, 2014
Country of Mass-production	:	Malaysia
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

Model: MDR-ZX770BT (referred to as the EUT in this report) is a Wireless Stereo Headset.

Clock frequencies: 26MHz (Bluetooth)

Bluetooth specification:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth / Channel spacing	:	1MHz / 1MHz
Type of modulation	:	FHSS
Antenna type	:	Helical (Chip) Antenna
Antenna connector type	:	Integral
Antenna gain	:	-2.02dBi
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, the equipment complies with the requirement.

FCC 15.203

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2014, final revised on December 23, 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

* The revision on December 23, 2014 does not affect the test specification applied to the EUT.

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 10582470S-C.

3.2 Procedures and 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	11.5 dB Freq.: 472.001 MHz Polarization: Horizontal Detection: QP Mode: Tx 2402MHz, BDR	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						
*1) The test is not applicable since the EUT has no AC mains. During charging, the EUT doesn't perform BT operation.						

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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 Confirmation

UL Japan, 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	
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%

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3.6 Test Location

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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	-	-

Our company name was changed from “UL Japan, Inc.” to “UL Japan, Inc.” on January 1st, 2015.

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)

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

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

The EUT has no inquiry mode.

Software: CSR Blue Suite BlueTest 3

Power settings:

BDR: Ext.=23, Int.=32

EDR: Ext.=56, Int.=35

TX PA ATTEN settings:

BDR: 1

EDR: 0

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

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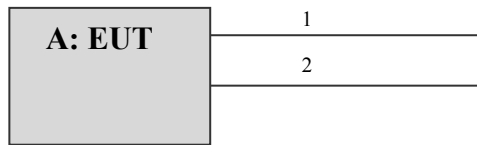
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Stereo Headset	MDR-ZX770BT	*1)	Sony	EUT

*1) 2000027: Antenna port conducted tests, 2000029: Radiated emission tests

List of cables used

No.	Cable name	Length(m)	Shield		Remarks
			Cable	Connector	
1	Audio	1.5	Unshielded	Unshielded	-
2	USB	0.5	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.

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	RBW:1MHz	RBW: 100kHz,
		VBW:3MHz	VBW:10Hz	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	X	Z	X	X	X
Vertical	Z	Y	Z	Z	Z

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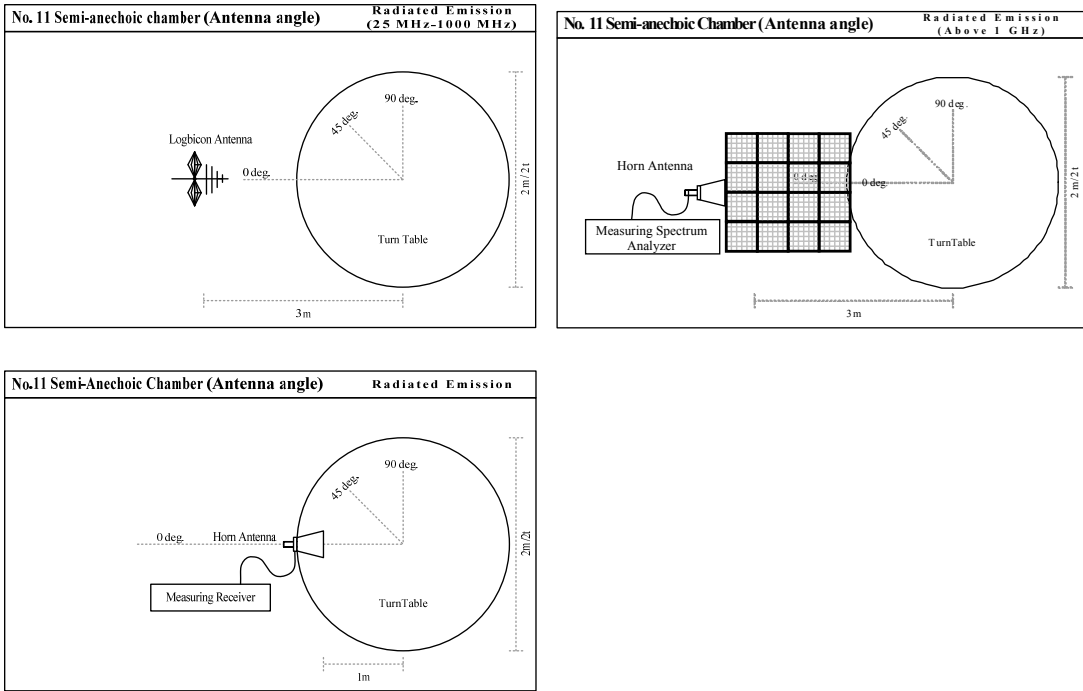
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Figure 1. Antenna angle



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 9th 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

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APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Kashima, Inc.	No.6 Measurement Room
Date	December 16, 2014	
Temperature / Humidity	22 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	>= 0.631
DH5	2441.0	0.941	1.000	>= 0.627
DH5	2480.0	0.943	1.000	>= 0.628

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

No limit applies to 20dB Bandwidth.

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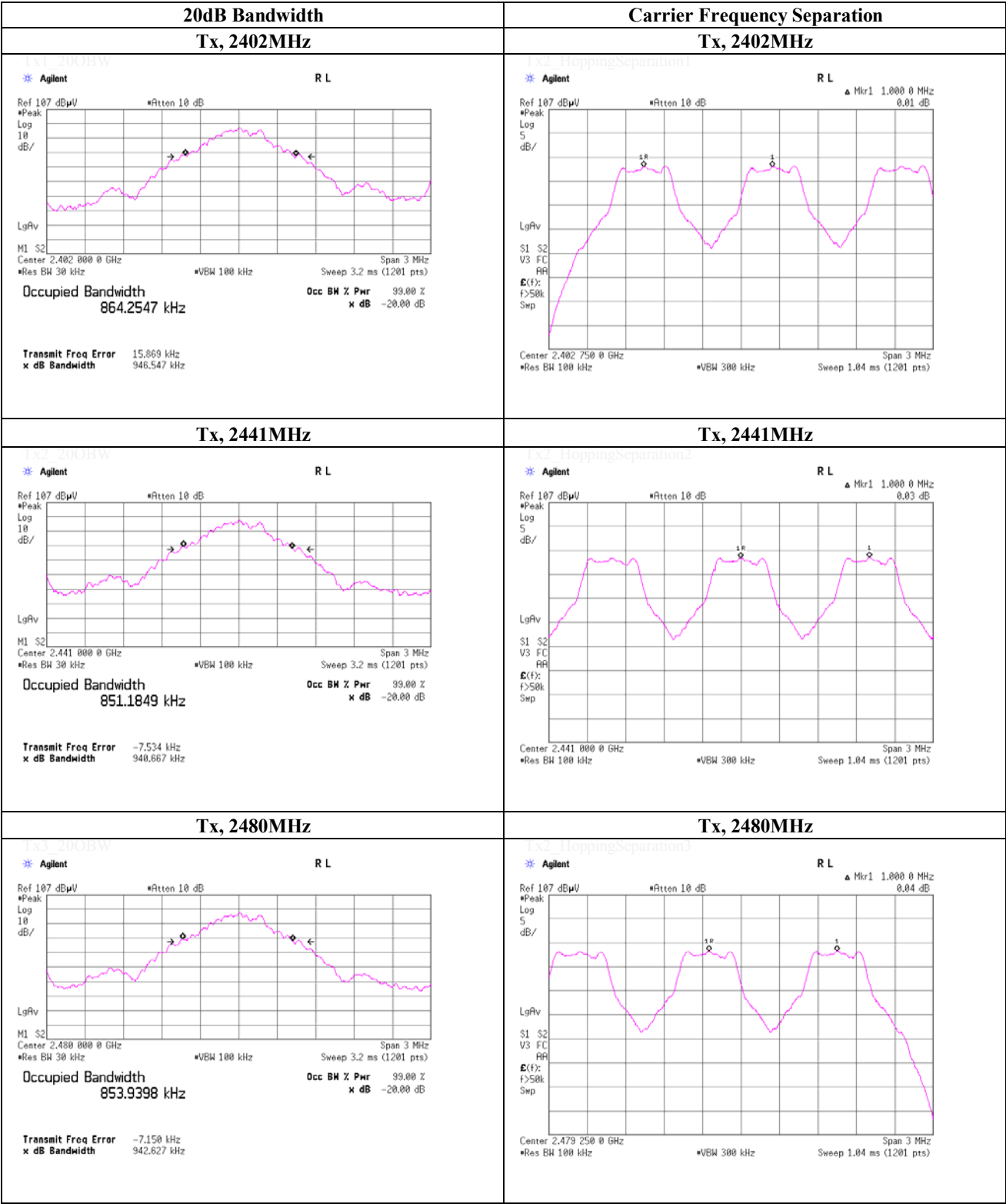
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



20dB Bandwidth and Carrier Frequency Separation

Test place UL Kashima, Inc. No.6 Measurement Room
Date December 16, 2014
Temperature / Humidity 22 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]
2-DH5	2402.0	1.257	1.000	>= 0.838
2-DH5	2441.0	1.235	1.000	>= 0.823
2-DH5	2480.0	1.240	1.000	>= 0.826

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
Tx2_20DBW Agilent RL Ref 107 dBμV Peak Log 10 dB/ LgAv M1 S2 Center 2.402 000 0 GHz Res BW 30 kHz VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1720 MHz Transmit Freq Error 6.895 kHz x dB Bandwidth 1.257 MHz Atten 10 dB 99.00 % -20.00 dB	Tx2_HoppingSeparation2 Agilent RL Ref 107 dBμV Peak Log 5 dB/ LgAv S1 S2 V3 FC RA Center 2.402 750 0 GHz Res BW 100 kHz VBW 300 kHz Sweep 1.04 ms (1201 pts) Mix1 1.000 0 MHz -0.02 dB Atten 10 dB
Tx, 2441MHz	Tx, 2441MHz
Tx2_20DBW Agilent RL Ref 107 dBμV Peak Log 10 dB/ LgAv M1 S2 Center 2.441 000 0 GHz Res BW 30 kHz VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1687 MHz Transmit Freq Error -4.257 kHz x dB Bandwidth 1.235 MHz Atten 10 dB 99.00 % -20.00 dB	Tx2_HoppingSeparation2 Agilent RL Ref 107 dBμV Peak Log 5 dB/ LgAv S1 S2 V3 FC RA Center 2.441 000 0 GHz Res BW 100 kHz VBW 300 kHz Sweep 1.04 ms (1201 pts) Mix1 1.000 0 MHz 0.01 dB Atten 10 dB
Tx, 2480MHz	Tx, 2480MHz
Tx3_20DBW Agilent RL Ref 107 dBμV Peak Log 10 dB/ LgAv M1 S2 Center 2.480 000 0 GHz Res BW 30 kHz VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1689 MHz Transmit Freq Error -3.334 kHz x dB Bandwidth 1.240 MHz Atten 10 dB 99.00 % -20.00 dB	Tx2_HoppingSeparation3 Agilent RL Ref 107 dBμV Peak Log 5 dB/ LgAv S1 S2 V3 FC RA Center 2.479 250 0 GHz Res BW 100 kHz VBW 300 kHz Sweep 1.04 ms (1201 pts) Mix1 1.000 0 MHz -0.04 dB Atten 10 dB

Number of Hopping Frequency

Test place

UL Kashima, Inc.

No.6 Measurement Room

Date

December 16, 2014

Temperature / Humidity

22 deg.C , 36 %RH

Engineer

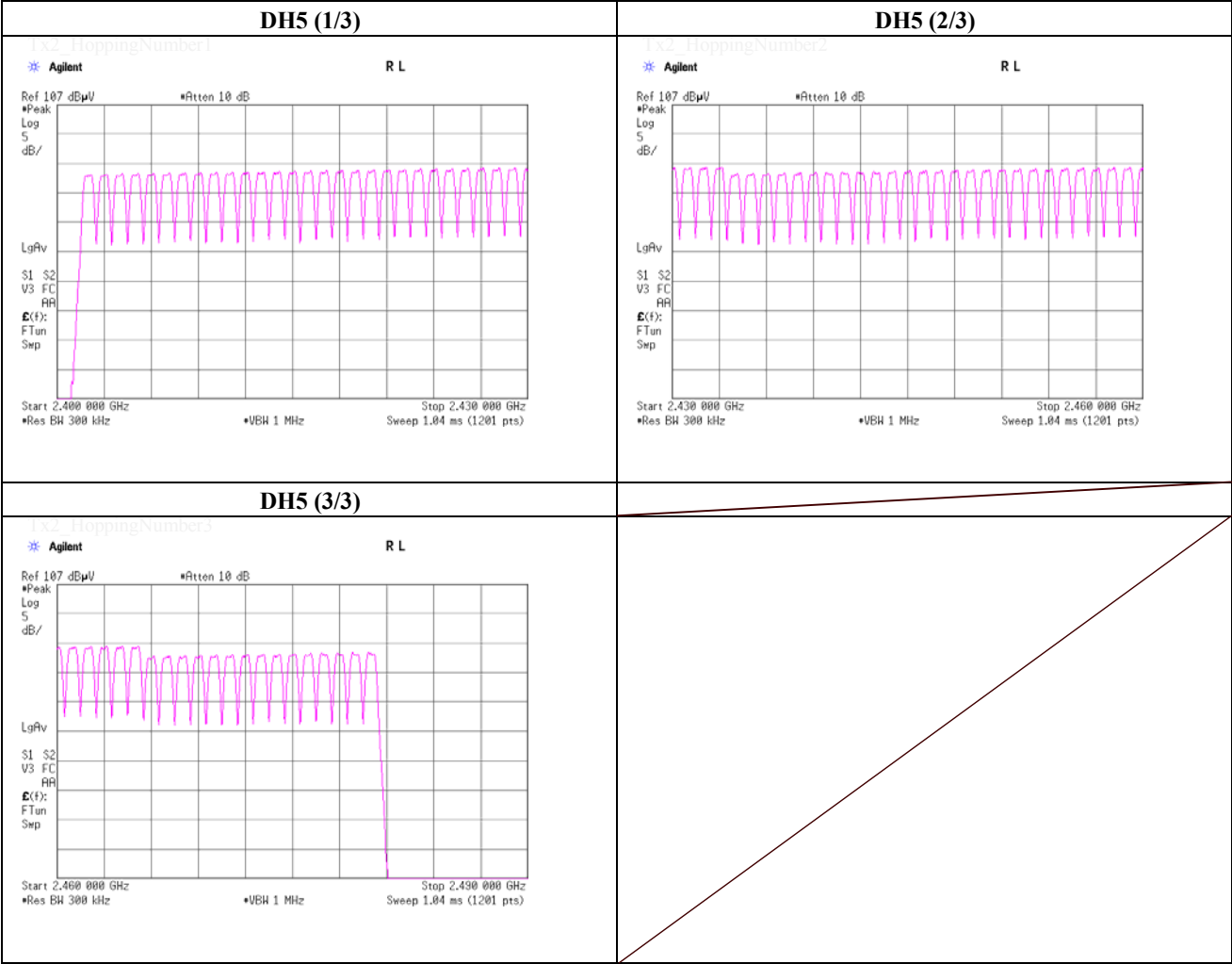
Kazuhiro Ando

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.



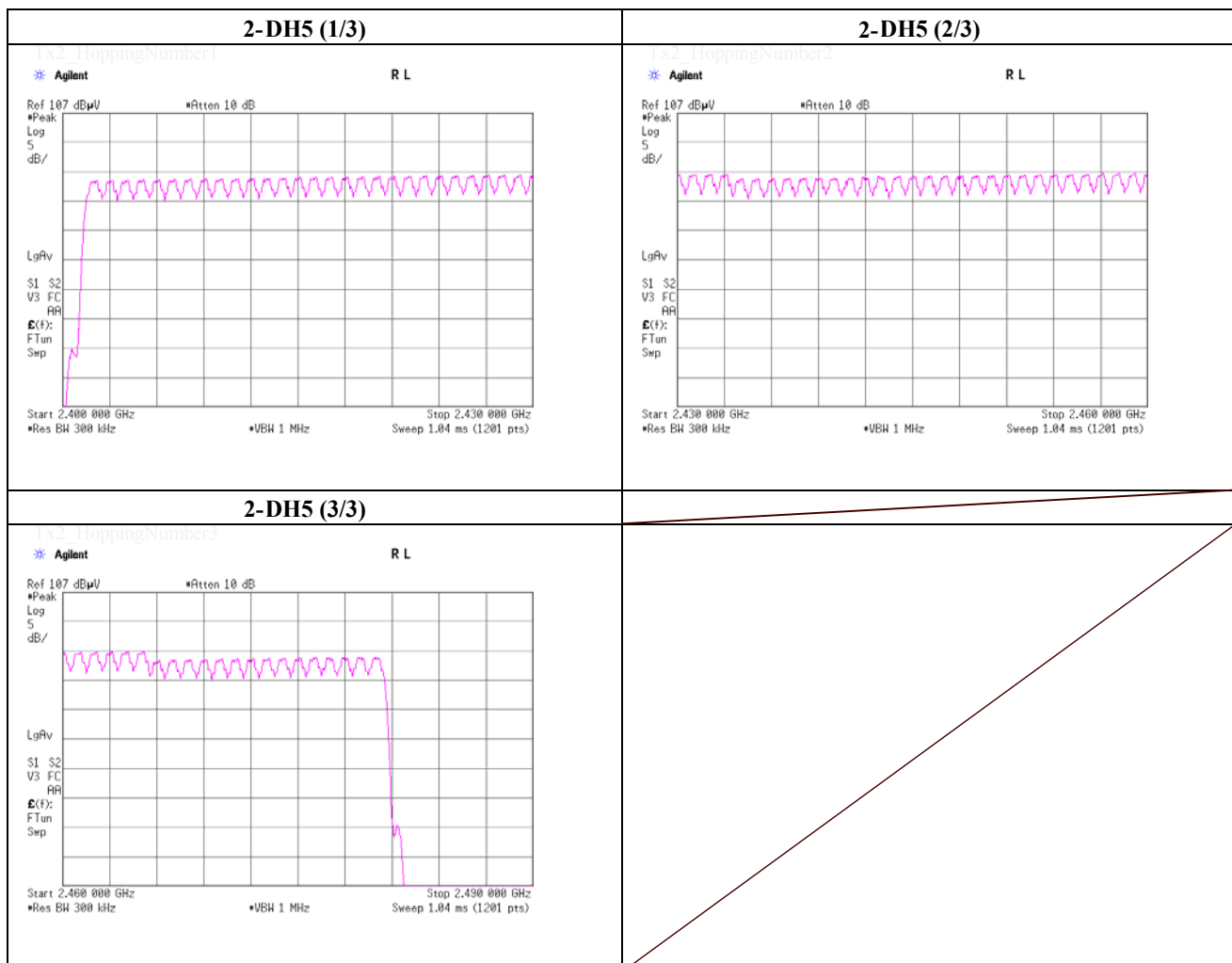
Number of Hopping Frequency

Test place	UL Kashima, Inc.
Date	December 16, 2014
Temperature / Humidity	22 deg.C , 36 %RH
Engineer	Kazuhiro Ando
Mode	Tx, Bluetooth, EDR, PRBS9

No.6 Measurement Room

Mode	Number of Channel [times]	Limit [times]
2-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 Kashima, Inc.	No.6 Measurement Room
Date	December 16, 2014	
Temperature / Humidity	22 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) second period			Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0	/ 5.0 sec. x	31.6 sec. = 323 times	0.414	134	400
DH3	26.0	/ 5.0 sec. x	31.6 sec. = 165 times	1.671	276	400
DH5	17.0	/ 5.0 sec. x	31.6 sec. = 108 times	2.918	315	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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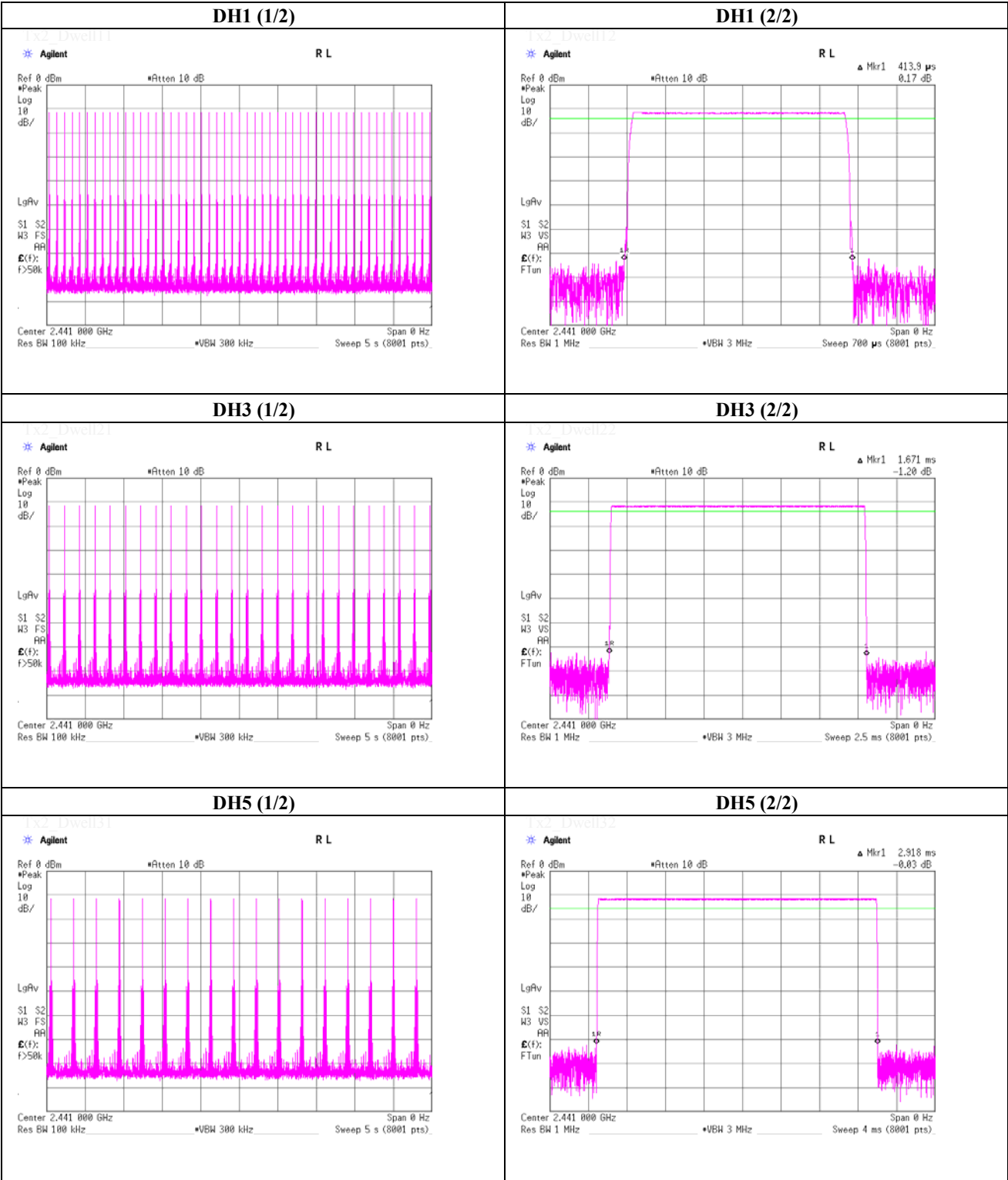
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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Dwell Time

Test place	UL Kashima, Inc.	No.6 Measurement Room
Date	December 16, 2014	
Temperature / Humidity	22 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) second period			Length of transmission time [msec]	Result [msec]	Limit [msec]
2-DH1	51.0	/ 5.0 sec. x	31.6 sec. = 323 times	0.429	139	400
2-DH3	26.0	/ 5.0 sec. x	31.6 sec. = 165 times	1.683	278	400
2-DH5	17.0	/ 5.0 sec. x	31.6 sec. = 108 times	2.928	316	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 (2-DH1, 2-DH3 or 2-DH5). This is confirmed in the test report for $N=79$.

UL Japan, Inc.

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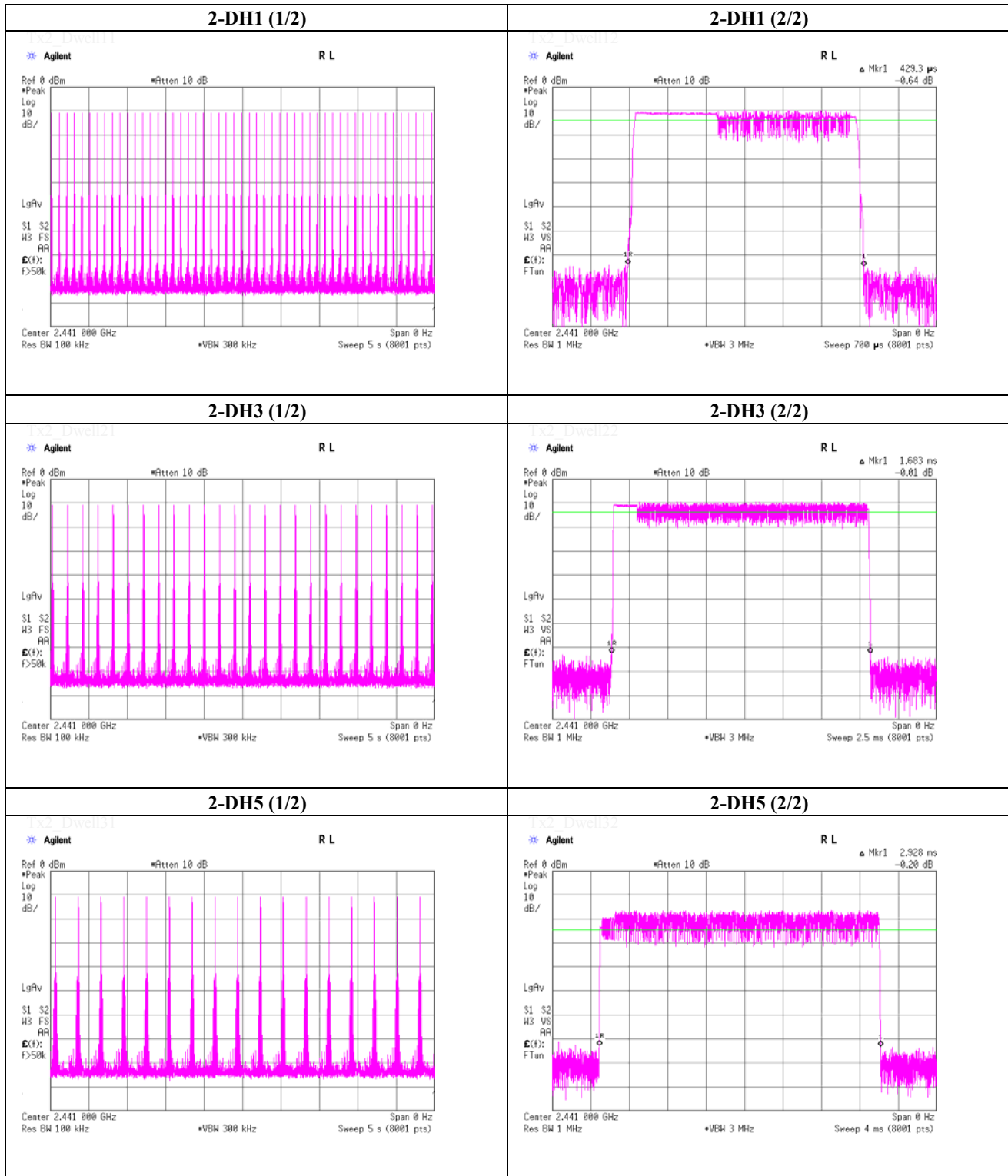
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Maximum Peak Conducted Output Power (Conducted)

Test place UL Kashima, Inc. No.6 Measurement Room
 Date December 16, 2014
 Temperature / Humidity 22 deg.C , 36 %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	-11.28	0.97	10.07	-0.24	0.95	20.97	125	21.21
DH5	2441.0	-10.96	0.98	10.07	0.09	1.02	20.97	125	20.88
DH5	2480.0	-11.08	0.98	10.07	-0.03	0.99	20.97	125	21.00
2-DH5	2402.0	-9.16	0.97	10.07	1.88	1.54	20.97	125	19.09
2-DH5	2441.0	-8.65	0.98	10.07	2.40	1.74	20.97	125	18.57
2-DH5	2480.0	-8.75	0.98	10.07	2.30	1.70	20.97	125	18.67

Sample Calculation:

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

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Kashima EMC Lab.

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Maximum Average Output Power (Conducted)

(Reference data for SAR testing)

Test place UL Kashima, Inc. No.6 Measurement Room
Date December 16, 2014
Temperature / Humidity 22 deg.C , 36 %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	-12.11	0.97	10.07	-1.07	0.78
DH5	2441.0	-11.68	0.98	10.07	-0.63	0.86
DH5	2480.0	-11.84	0.98	10.07	-0.79	0.83
2-DH5	2402.0	-12.80	0.97	10.07	-1.76	0.67
2-DH5	2441.0	-12.29	0.98	10.07	-1.24	0.75
2-DH5	2480.0	-12.34	0.98	10.07	-1.29	0.74

Sample Calculation:

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

Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date December 5, 2014 December 6, 2014
 Temperature / Humidity 22 deg.C, 40 %RH 21 deg.C, 41 %RH
 Engineer Makoto Ebato Hiromitsu Tanabe
 Mode Tx, 2402 MHz
 Tx, Bluetooth, BDR, PRBS9 30-1000MHz : Hor Z Axis, Ver Y Axis
 1-25GHz : Hor X Axis, Ver Z 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.	128.000	QP	32.0	11.9	7.9	32.1	19.7	43.5	23.8	231	85	
Hori.	472.001	QP	39.5	17.1	9.9	32.0	34.5	46.0	11.5	162	259	
Hori.	480.000	QP	38.6	17.3	10.0	32.0	33.9	46.0	12.1	162	259	
Hori.	484.001	QP	38.6	17.4	10.0	32.0	34.0	46.0	12.0	162	259	
Hori.	2390.000	PK	47.5	27.6	14.0	38.5	50.6	73.9	23.3	100	0	
Hori.	4803.971	PK	51.5	31.3	6.0	39.6	49.2	73.9	24.7	100	103	
Hori.	7206.000	PK	46.6	36.0	7.5	38.7	51.4	73.9	22.5	100	0	
Hori.	19219.990	PK	53.8	40.3	-3.3	46.1	44.7	73.9	29.2	100	109	
Hori.	2390.000	AV	34.1	27.6	14.0	38.5	37.2	53.9	16.7	100	0	
Hori.	4803.971	AV	40.3	31.3	6.0	39.6	38.0	53.9	15.9	100	103	
Hori.	7206.000	AV	33.1	36.0	7.5	38.7	37.9	53.9	16.0	100	0	
Hori.	19219.990	AV	44.2	40.3	-3.3	46.1	35.1	53.9	18.8	100	109	
Vert.	128.000	QP	35.5	11.9	7.9	32.1	23.2	43.5	20.3	100	60	
Vert.	484.000	QP	38.6	17.4	10.0	32.0	34.0	46.0	12.0	100	0	
Vert.	492.001	QP	38.4	17.5	10.0	32.0	33.9	46.0	12.1	100	0	
Vert.	2390.000	PK	47.1	27.6	14.0	38.5	50.2	73.9	23.7	100	0	
Vert.	4803.971	PK	50.4	31.3	6.0	39.6	48.1	73.9	25.8	100	171	
Vert.	7206.615	PK	47.1	36.0	7.5	38.7	51.9	73.9	22.0	100	0	
Vert.	19219.990	PK	54.3	40.3	-3.3	46.1	45.2	73.9	28.7	100	168	
Vert.	2390.000	AV	34.1	27.6	14.0	38.5	37.2	53.9	16.7	100	0	
Vert.	4803.971	AV	38.2	31.3	6.0	39.6	35.9	53.9	18.0	100	171	
Vert.	7206.615	AV	33.1	36.0	7.5	38.7	37.9	53.9	16.0	100	0	
Vert.	19219.990	AV	46.6	40.3	-3.3	46.1	37.5	53.9	16.4	100	168	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

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	87.7	27.5	14.0	38.5	90.7	-	-	
Hori.	2400.000	PK	41.9	27.5	14.0	38.5	44.9	70.7	25.8	
Vert.	2402.000	PK	88.8	27.5	14.0	38.5	91.8	-	-	
Vert.	2400.000	PK	42.8	27.5	14.0	38.5	45.8	71.8	26.0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

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 December 5, 2014 December 6, 2014
 Temperature / Humidity 22 deg.C, 40 %RH 21 deg.C, 41 %RH
 Engineer Makoto Ebato Hiromitsu Tanabe
 Mode Tx, 2441 MHz
 Tx, Bluetooth, BDR, PRBS9 30-1000MHz : Hor Z Axis, Ver Y Axis
 1-25GHz : Hor X Axis, Ver Z 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.	128.000	QP	31.6	11.9	7.9	32.1	19.3	43.5	24.2	231	93	
Hori.	472.000	QP	39.2	17.1	9.9	32.0	34.2	46.0	11.8	159	270	
Hori.	476.000	QP	38.3	17.2	9.9	32.0	33.4	46.0	12.6	159	270	
Hori.	484.000	QP	38.2	17.4	10.0	32.0	33.6	46.0	12.4	159	270	
Hori.	4882.011	PK	51.4	31.2	6.0	39.6	49.0	73.9	24.9	100	110	
Hori.	7323.000	PK	46.3	36.2	7.6	38.7	51.4	73.9	22.5	100	0	
Hori.	19523.990	PK	52.8	40.3	-3.2	46.1	43.8	73.9	30.1	100	24	
Hori.	4882.011	AV	40.2	31.2	6.0	39.6	37.8	53.9	16.1	100	110	
Hori.	7323.000	AV	32.9	36.2	7.6	38.7	38.0	53.9	15.9	100	0	
Hori.	19523.990	AV	43.6	40.3	-3.2	46.1	34.6	53.9	19.3	100	24	
Vert.	128.000	QP	35.8	11.9	7.9	32.1	23.5	43.5	20.0	100	62	
Vert.	484.000	QP	38.7	17.4	10.0	32.0	34.1	46.0	11.9	100	0	
Vert.	492.001	QP	37.9	17.5	10.0	32.0	33.4	46.0	12.6	100	0	
Vert.	4882.030	PK	50.0	31.2	6.0	39.6	47.6	73.9	26.3	100	207	
Vert.	7323.000	PK	46.5	36.2	7.6	38.7	51.6	73.9	22.3	100	0	
Vert.	19523.990	PK	52.5	40.3	-3.2	46.1	43.5	73.9	30.4	100	163	
Vert.	4882.030	AV	37.9	31.2	6.0	39.6	35.5	53.9	18.4	100	207	
Vert.	7323.000	AV	33.0	36.2	7.6	38.7	38.1	53.9	15.8	100	0	
Vert.	19523.990	AV	42.6	40.3	-3.2	46.1	33.6	53.9	20.3	100	163	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

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

Radiated Emission

Test place No.11 Semi Anechoic Chamber
 Date December 5, 2014 December 6, 2014
 Temperature / Humidity 22 deg.C, 40 %RH 21 deg.C, 41 %RH
 Engineer Makoto Ebato Hiromitsu Tanabe
 Mode Tx, 2480 MHz
 Tx, Bluetooth, BDR, PRBS9 30-1000MHz : Hor Z Axis, Ver Y Axis
 1-25GHz : Hor X Axis, Ver Z 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.	128.000	QP	32.6	11.9	7.9	32.1	20.3	43.5	23.2	229	87	
Hori.	472.000	QP	39.1	17.1	9.9	32.0	34.1	46.0	11.9	170	272	
Hori.	476.000	QP	38.1	17.2	9.9	32.0	33.2	46.0	12.8	170	272	
Hori.	484.000	QP	38.5	17.4	10.0	32.0	33.9	46.0	12.1	170	272	
Hori.	2483.500	PK	49.3	27.5	14.1	38.5	52.4	73.9	21.5	110	261	
Hori.	4960.002	PK	51.1	31.5	6.1	39.6	49.1	73.9	24.8	100	108	
Hori.	7440.000	PK	46.5	36.3	7.6	38.6	51.8	73.9	22.1	100	0	
Hori.	19835.980	PK	53.4	40.2	-3.1	46.1	44.4	73.9	29.5	100	22	
Hori.	2483.500	AV	34.6	27.5	14.1	38.5	37.7	53.9	16.2	110	261	
Hori.	4960.002	AV	39.7	31.5	6.1	39.6	37.7	53.9	16.2	100	108	
Hori.	7440.000	AV	33.7	36.3	7.6	38.6	39.0	53.9	14.9	100	0	
Hori.	19835.980	AV	44.7	40.2	-3.1	46.1	35.7	53.9	18.2	100	22	
Vert.	128.000	QP	35.7	11.9	7.9	32.1	23.4	43.5	20.1	100	58	
Vert.	484.000	QP	38.8	17.4	10.0	32.0	34.2	46.0	11.8	100	0	
Vert.	492.001	QP	37.8	17.5	10.0	32.0	33.3	46.0	12.7	100	0	
Vert.	2483.500	PK	50.4	27.5	14.1	38.5	53.5	73.9	20.4	100	313	
Vert.	4960.002	PK	50.0	31.5	6.1	39.6	48.0	73.9	25.9	100	182	
Vert.	7440.000	PK	46.3	36.3	7.6	38.6	51.6	73.9	22.3	100	0	
Vert.	19835.980	PK	53.6	40.2	-3.1	46.1	44.6	73.9	29.3	100	156	
Vert.	2483.500	AV	35.5	27.5	14.1	38.5	38.6	53.9	15.3	100	313	
Vert.	4960.002	AV	39.7	31.5	6.1	39.6	37.7	53.9	16.2	100	182	
Vert.	7440.000	AV	33.4	36.3	7.6	38.6	38.7	53.9	15.2	100	0	
Vert.	19835.980	AV	43.7	40.2	-3.1	46.1	34.7	53.9	19.2	100	156	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

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 December 5, 2014 December 6, 2014
 Temperature / Humidity 22 deg.C, 40 %RH 21 deg.C, 41 %RH
 Engineer Makoto Ebato Hiromitsu Tanabe
 Mode Tx, 2402 MHz
 Tx, Bluetooth, EDR, PRBS9 30-1000MHz : Hor Z Axis, Ver Y Axis
 1-25GHz : Hor X Axis, Ver Z 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.	128.000	QP	32.7	11.9	7.9	32.1	20.4	43.5	23.1	232	87	
Hori.	472.000	QP	39.2	17.1	9.9	32.0	34.2	46.0	11.8	175	264	
Hori.	476.000	QP	37.4	17.2	9.9	32.0	32.5	46.0	13.5	175	264	
Hori.	484.000	QP	37.9	17.4	10.0	32.0	33.3	46.0	12.7	175	264	
Hori.	2390.000	PK	45.7	27.6	14.0	38.5	48.8	73.9	25.1	100	0	
Hori.	4803.971	PK	50.1	31.3	6.0	39.6	47.8	73.9	26.1	100	96	
Hori.	7206.000	PK	46.8	36.0	7.5	38.7	51.6	73.9	22.3	100	0	
Hori.	19221.200	PK	53.5	40.3	-3.3	46.1	44.4	73.9	29.5	100	111	
Hori.	2390.000	AV	34.0	27.6	14.0	38.5	37.1	53.9	16.8	100	0	
Hori.	4803.971	AV	36.3	31.3	6.0	39.6	34.0	53.9	19.9	100	96	
Hori.	7206.000	AV	33.0	36.0	7.5	38.7	37.8	53.9	16.1	100	0	
Hori.	19221.200	AV	41.1	40.3	-3.3	46.1	32.0	53.9	21.9	100	111	
Vert.	128.000	QP	35.7	11.9	7.9	32.1	23.4	43.5	20.1	100	70	
Vert.	484.000	QP	38.7	17.4	10.0	32.0	34.1	46.0	11.9	100	0	
Vert.	492.001	QP	38.1	17.5	10.0	32.0	33.6	46.0	12.4	100	0	
Vert.	2390.000	PK	44.0	27.6	14.0	38.5	47.1	73.9	26.8	100	0	
Vert.	4803.996	PK	50.0	31.3	6.0	39.6	47.7	73.9	26.2	100	178	
Vert.	7206.000	PK	46.4	36.0	7.5	38.7	51.2	73.9	22.7	100	0	
Vert.	19221.200	PK	53.8	40.3	-3.3	46.1	44.7	73.9	29.2	100	169	
Vert.	2390.000	AV	32.1	27.6	14.0	38.5	35.2	53.9	18.7	100	0	
Vert.	4803.996	AV	35.9	31.3	6.0	39.6	33.6	53.9	20.3	100	178	
Vert.	7206.000	AV	33.1	36.0	7.5	38.7	37.9	53.9	16.0	100	0	
Vert.	19221.200	AV	41.4	40.3	-3.3	46.1	32.3	53.9	21.6	100	169	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

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	91.0	27.5	14.0	38.5	94.0	-	-	
Hori.	2400.000	PK	41.0	27.5	14.0	38.5	44.0	74.0	30.0	
Vert.	2402.000	PK	93.9	27.5	14.0	38.5	96.9	-	-	
Vert.	2400.000	PK	43.7	27.5	14.0	38.5	46.7	76.9	30.2	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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(* 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.	128.000	QP	32.5	11.9	7.9	32.1	20.2	43.5	23.3	236	82	
Hori.	472.000	QP	39.1	17.1	9.9	32.0	34.1	46.0	11.9	171	264	
Hori.	480.000	QP	38.6	17.3	10.0	32.0	33.9	46.0	12.1	171	264	
Hori.	484.001	QP	37.2	17.4	10.0	32.0	32.6	46.0	13.4	171	264	
Hori.	4881.999	PK	50.8	31.2	6.0	39.6	48.4	73.9	25.5	100	120	
Hori.	7323.000	PK	45.8	36.2	7.6	38.7	50.9	73.9	23.0	100	0	
Hori.	19523.980	PK	53.2	40.3	-3.2	46.1	44.2	73.9	29.7	100	21	
Hori.	4881.999	AV	36.6	31.2	6.0	39.6	34.2	53.9	19.7	100	120	
Hori.	7323.000	AV	32.9	36.2	7.6	38.7	38.0	53.9	15.9	100	0	
Hori.	19523.980	AV	40.8	40.3	-3.2	46.1	31.8	53.9	22.1	100	21	
Vert.	128.000	QP	35.4	11.9	7.9	32.1	23.1	43.5	20.4	100	56	
Vert.	484.001	QP	37.9	17.4	10.0	32.0	33.3	46.0	12.7	100	0	
Vert.	492.001	QP	38.4	17.5	10.0	32.0	33.9	46.0	12.1	100	0	
Vert.	4882.006	PK	49.4	31.2	6.0	39.6	47.0	73.9	26.9	100	189	
Vert.	7323.000	PK	46.1	36.2	7.6	38.7	51.2	73.9	22.7	100	0	
Vert.	19523.980	PK	52.9	40.3	-3.2	46.1	43.9	73.9	30.0	100	151	
Vert.	4882.006	AV	35.5	31.2	6.0	39.6	33.1	53.9	20.8	100	189	
Vert.	7323.000	AV	33.0	36.2	7.6	38.7	38.1	53.9	15.8	100	0	
Vert.	19523.980	AV	40.9	40.3	-3.2	46.1	31.9	53.9	22.0	100	151	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz) - Gain(Amplifier)

Distance factor : 13GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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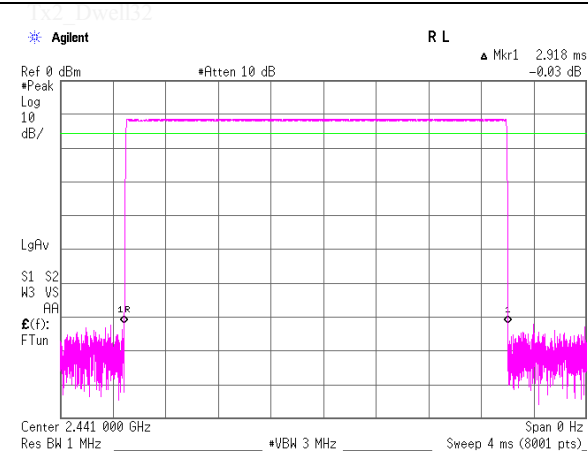
Test place	No.11 Semi Anechoic Chamber	
Date	December 5, 2014	December 6, 2014
Temperature / Humidity	22 deg.C, 40 %RH	21 deg.C, 41 %RH
Engineer	Makoto Ebato	Hiromitsu Tanabe
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, EDR, PRBS9	30-1000MHz : Hor Z Axis, Ver Y Axis

(* 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.	128.000	QP	32.6	11.9	7.9	32.1	20.3	43.5	23.2	229	83	
Hori.	472.001	QP	38.9	17.1	9.9	32.0	33.9	46.0	12.1	173	255	
Hori.	480.000	QP	38.2	17.3	10.0	32.0	33.5	46.0	12.5	173	255	
Hori.	484.001	QP	37.2	17.4	10.0	32.0	32.6	46.0	13.4	173	255	
Hori.	2483.500	PK	46.2	27.5	14.1	38.5	49.3	73.9	24.6	100	261	
Hori.	4960.009	PK	50.6	31.5	6.1	39.6	48.6	73.9	25.3	100	111	
Hori.	7440.000	PK	47.0	36.3	7.6	38.6	52.3	73.9	21.6	100	0	
Hori.	19835.990	PK	53.3	40.2	-3.1	46.1	44.3	73.9	29.6	100	24	
Hori.	2483.500	AV	34.3	27.5	14.1	38.5	37.4	53.9	16.5	100	261	
Hori.	4960.009	AV	36.7	31.5	6.1	39.6	34.7	53.9	19.2	100	111	
Hori.	7440.000	AV	33.4	36.3	7.6	38.6	38.7	53.9	15.2	100	0	
Hori.	19835.990	AV	41.1	40.2	-3.1	46.1	32.1	53.9	21.8	100	24	
Vert.	128.000	QP	35.2	11.9	7.9	32.1	22.9	43.5	20.6	100	64	
Vert.	484.001	QP	37.8	17.4	10.0	32.0	33.2	46.0	12.8	100	0	
Vert.	492.001	QP	38.0	17.5	10.0	32.0	33.5	46.0	12.5	100	0	
Vert.	2483.500	PK	51.0	27.5	14.1	38.5	54.1	73.9	19.8	100	313	
Vert.	4959.983	PK	50.4	31.5	6.1	39.6	48.4	73.9	25.5	100	189	
Vert.	7440.000	PK	46.7	36.3	7.6	38.6	52.0	73.9	21.9	100	0	
Vert.	19835.990	PK	52.7	40.2	-3.1	46.1	43.7	73.9	30.2	100	211	
Vert.	2483.500	AV	37.6	27.5	14.1	38.5	40.7	53.9	13.2	100	313	
Vert.	4959.983	AV	36.1	31.5	6.1	39.6	34.1	53.9	19.8	100	189	
Vert.	7440.000	AV	33.5	36.3	7.6	38.6	38.8	53.9	15.1	100	0	
Vert.	19835.990	AV	40.1	40.2	-3.1	46.1	31.1	53.9	22.8	100	211	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter)(below 18GHz)-Distance factor(above 13GHz)) - Gain(Amplifier)

Dwell time factor Calculation chart

Dwell time factor Calculation	
Tx, Bluetooth, BDR, PRBS9	
Worst 100ms Dwell time factor =$20\log((2.918 \times 2)/100) = -24.68\text{dB}$ 1x2_duty2 ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	1cycle On time : 2.918ms 

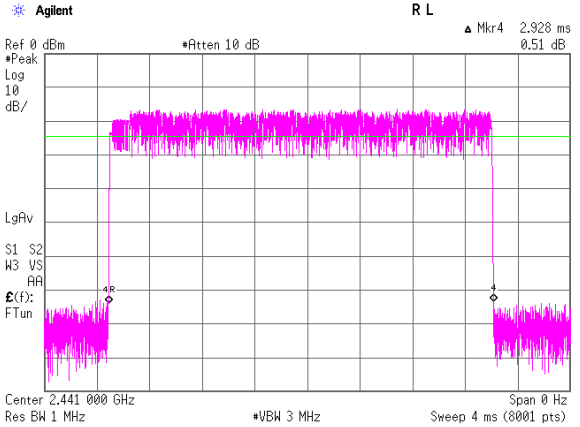
VBW (Average) setting

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

Dwell time factor Calculation chart

Dwell time factor Calculation

Tx, Bluetooth, EDR, PRBS9

Worst 100ms Dwell time factor = $20\log((2.93 \times 2)/100) = -24.64\text{dB}$	1cycle On time : 2.93ms
1x2_duty2 ON time of some channel during 100ms: Twice This is the worst case in hopping sequence of Bluetooth.	1x2_Dwell32  Agilent R L Ref 0 dBm *Atten 10 dB Mk4 2.928 ms *Peak Log 10 dB/ 0.51 dB LgRv S1 S2 W3 VS AA Ⓔ(f): FTun Center 2.441 000 GHz *VBW 3 MHz Span 0 Hz Res BW 1 MHz Sweep 4 ms (8001 pts)

VBW (Average) setting

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

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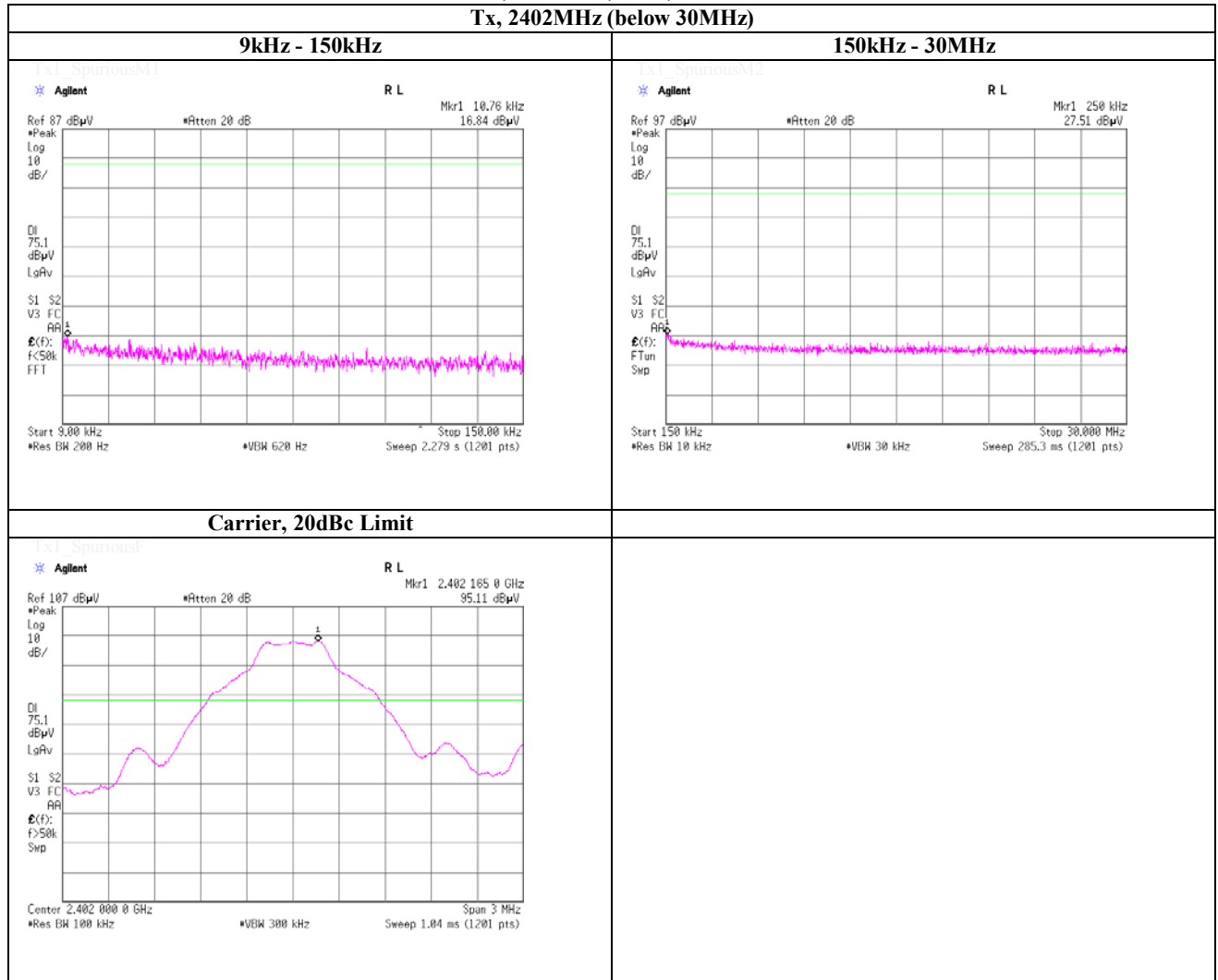
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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

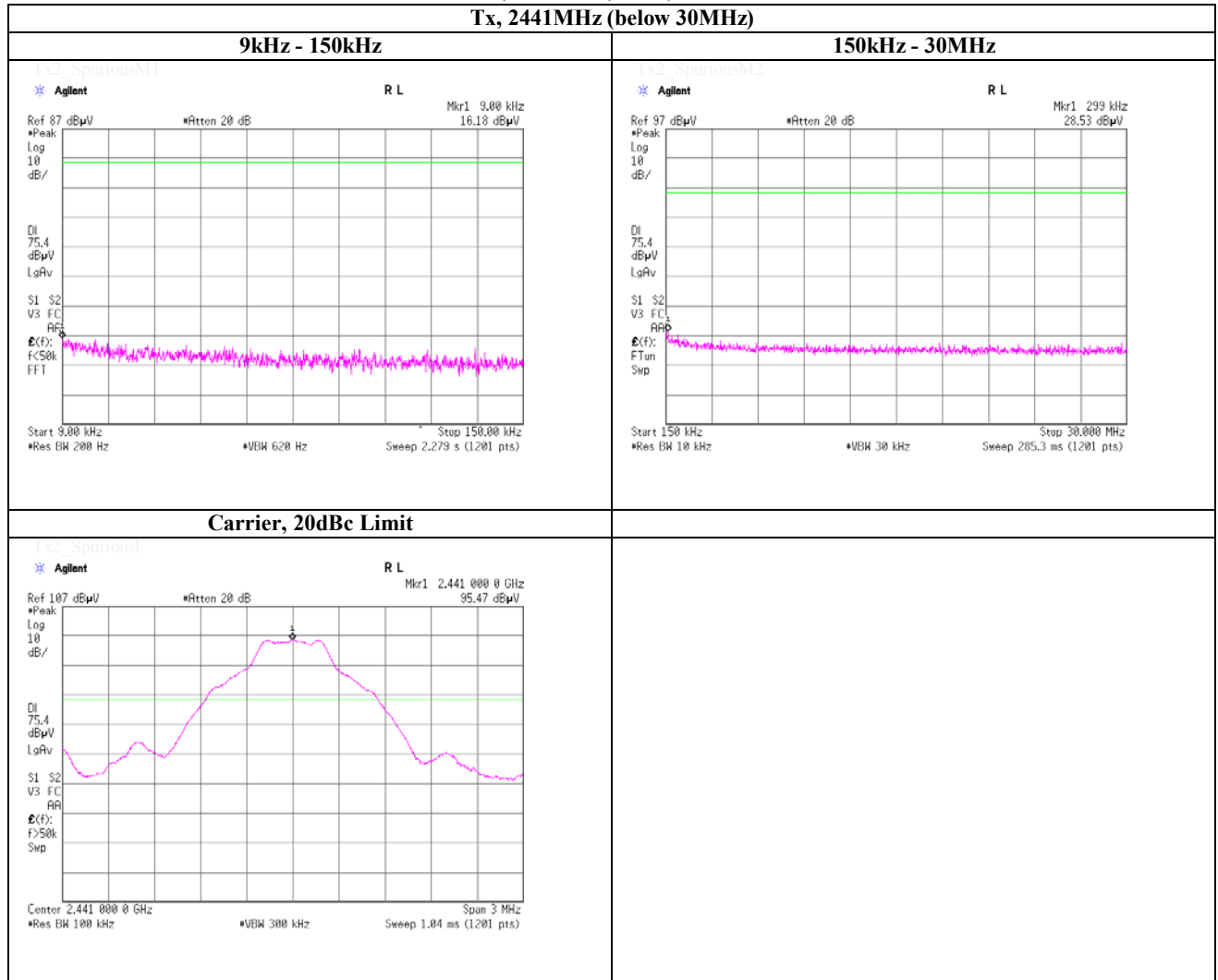
Tx, 2402MHz (below 30MHz)



Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

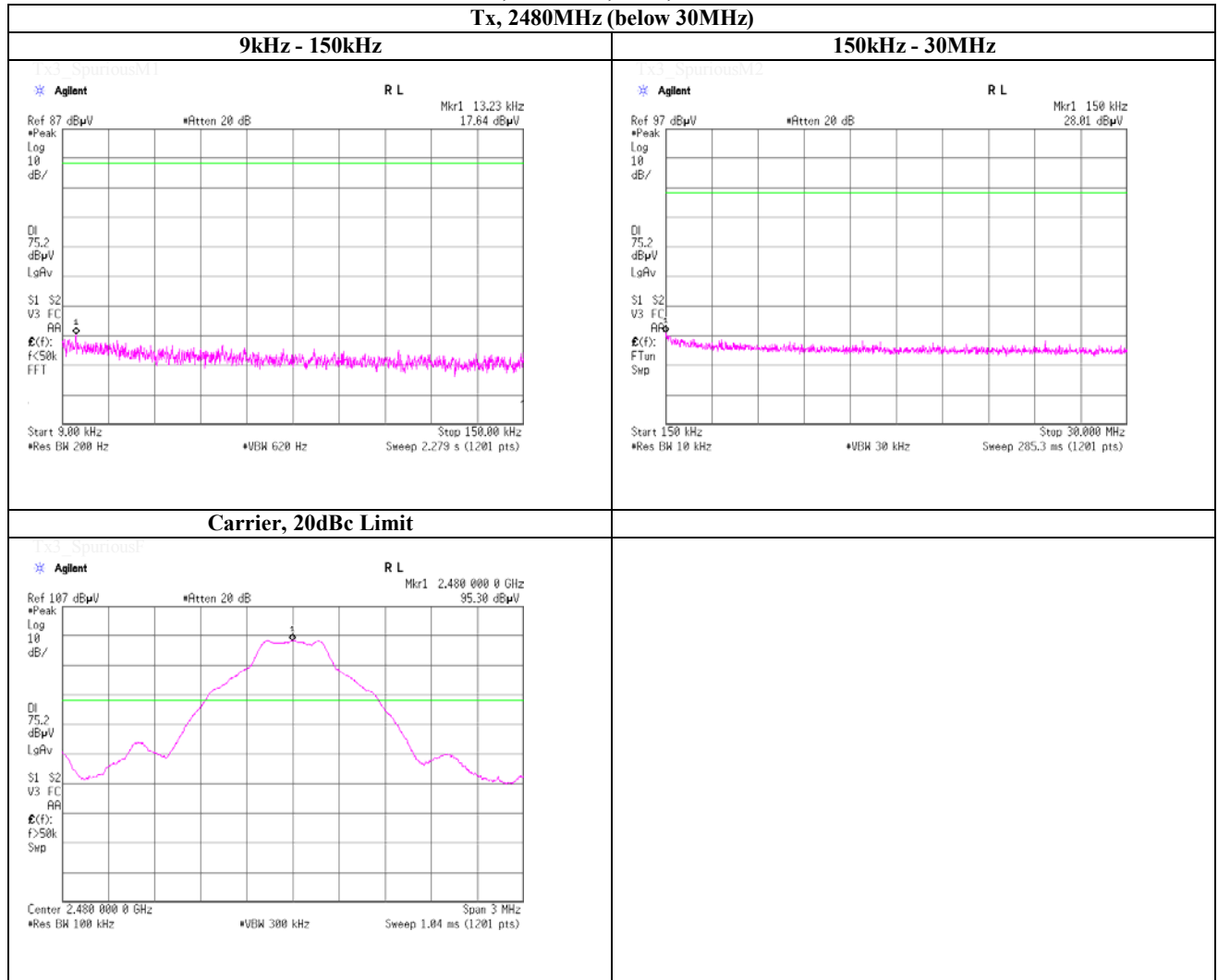
Tx, 2441MHz (below 30MHz)



Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

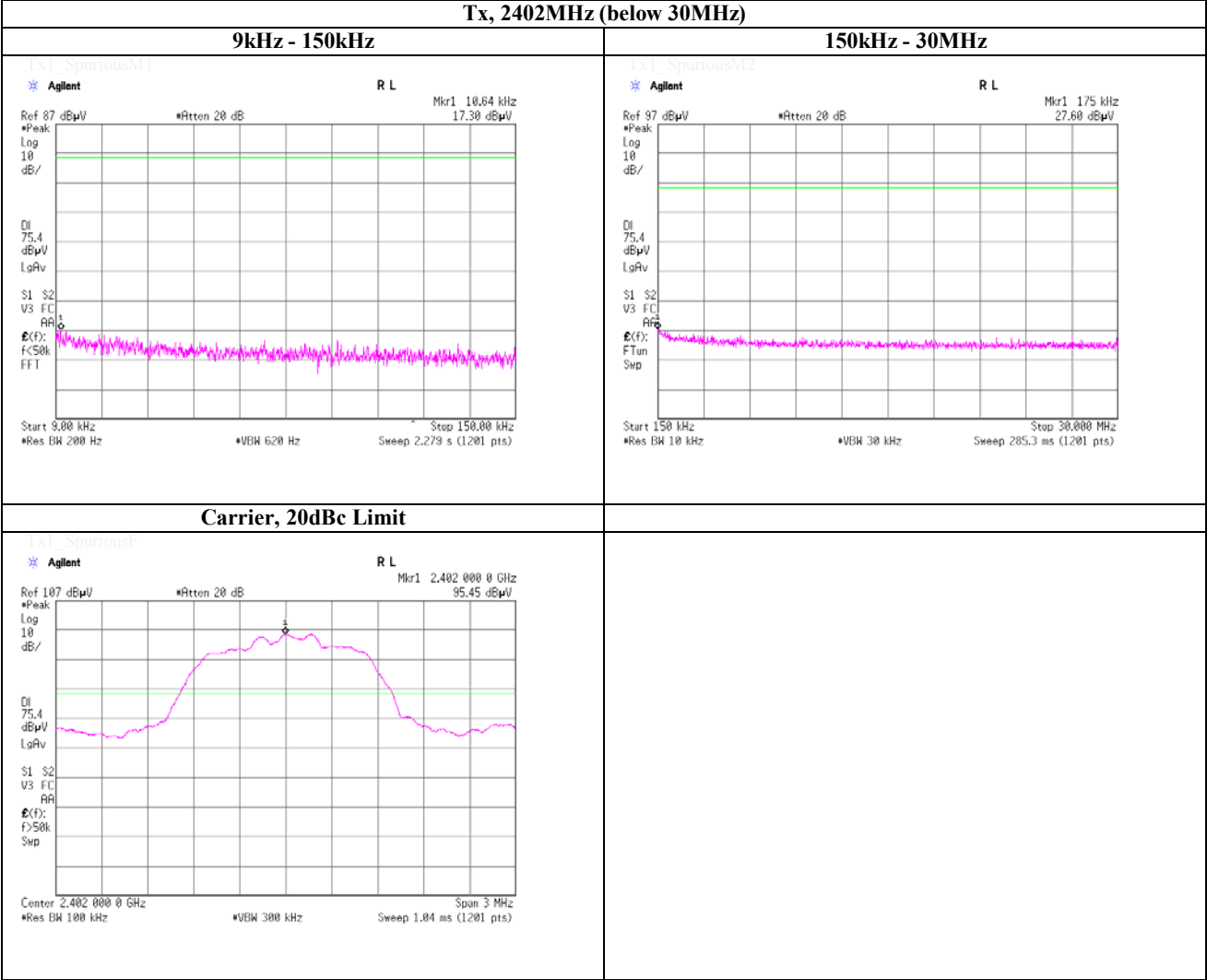
Tx, 2480MHz (below 30MHz)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

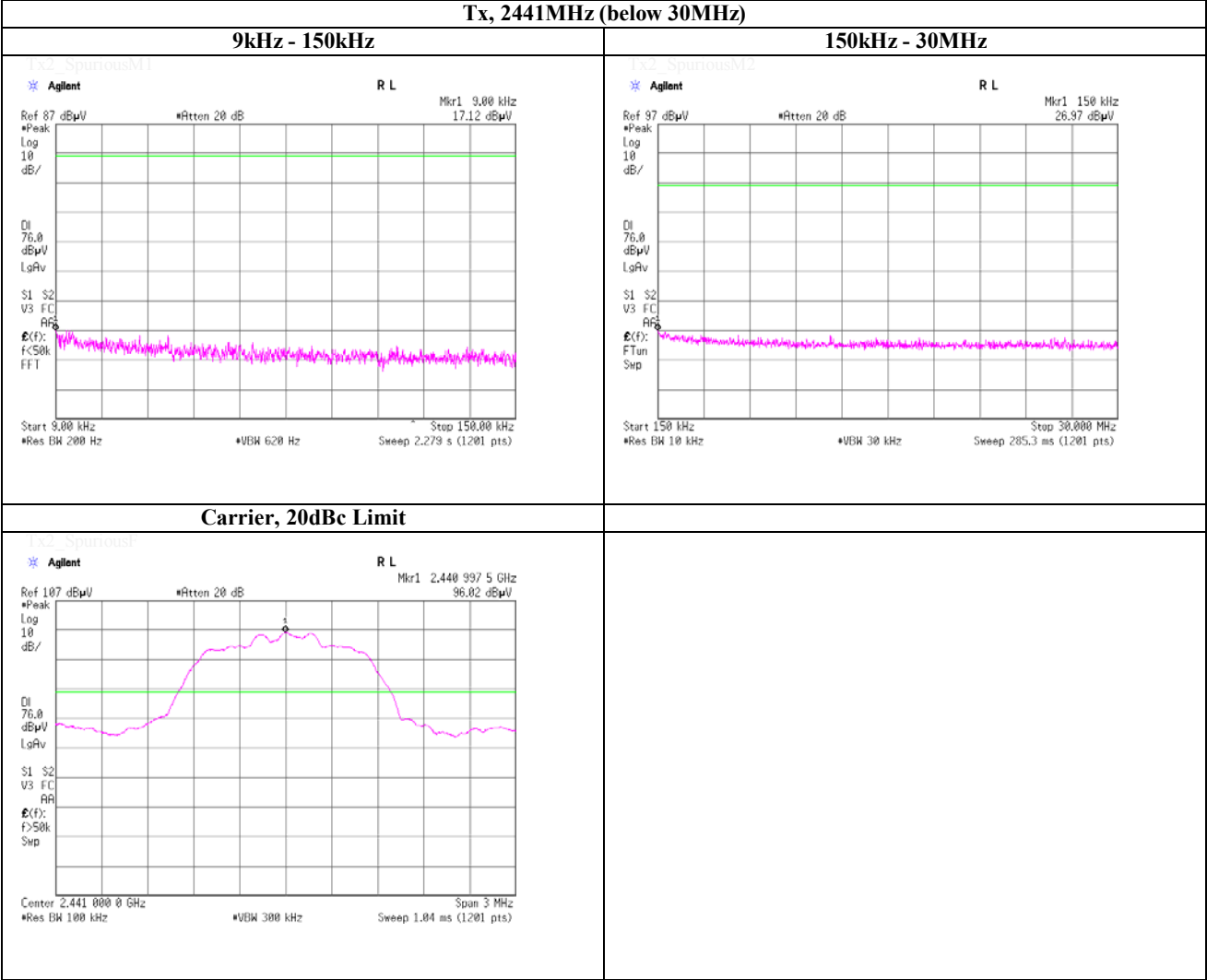
Tx, 2402MHz (below 30MHz)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

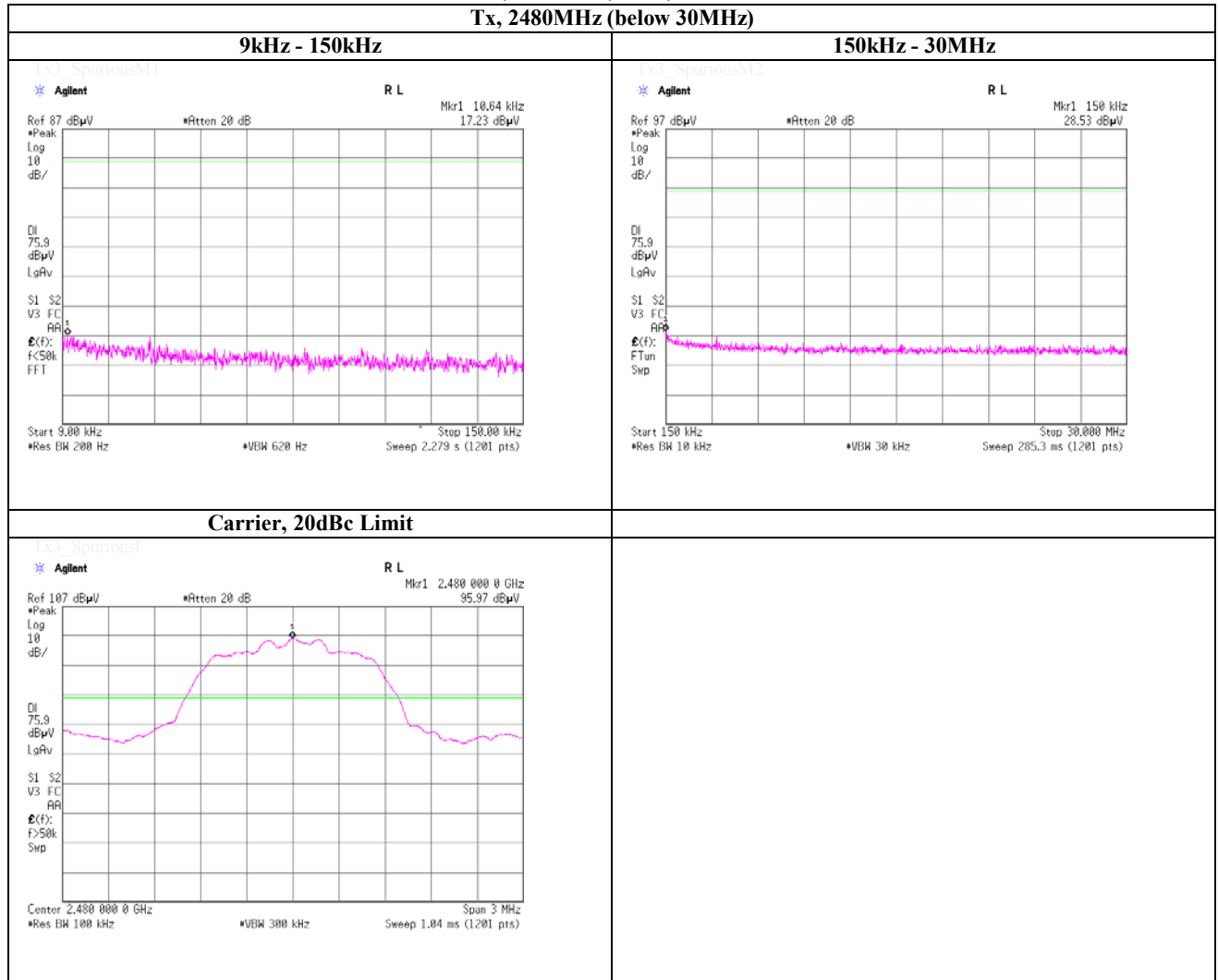
Tx, 2441MHz (below 30MHz)



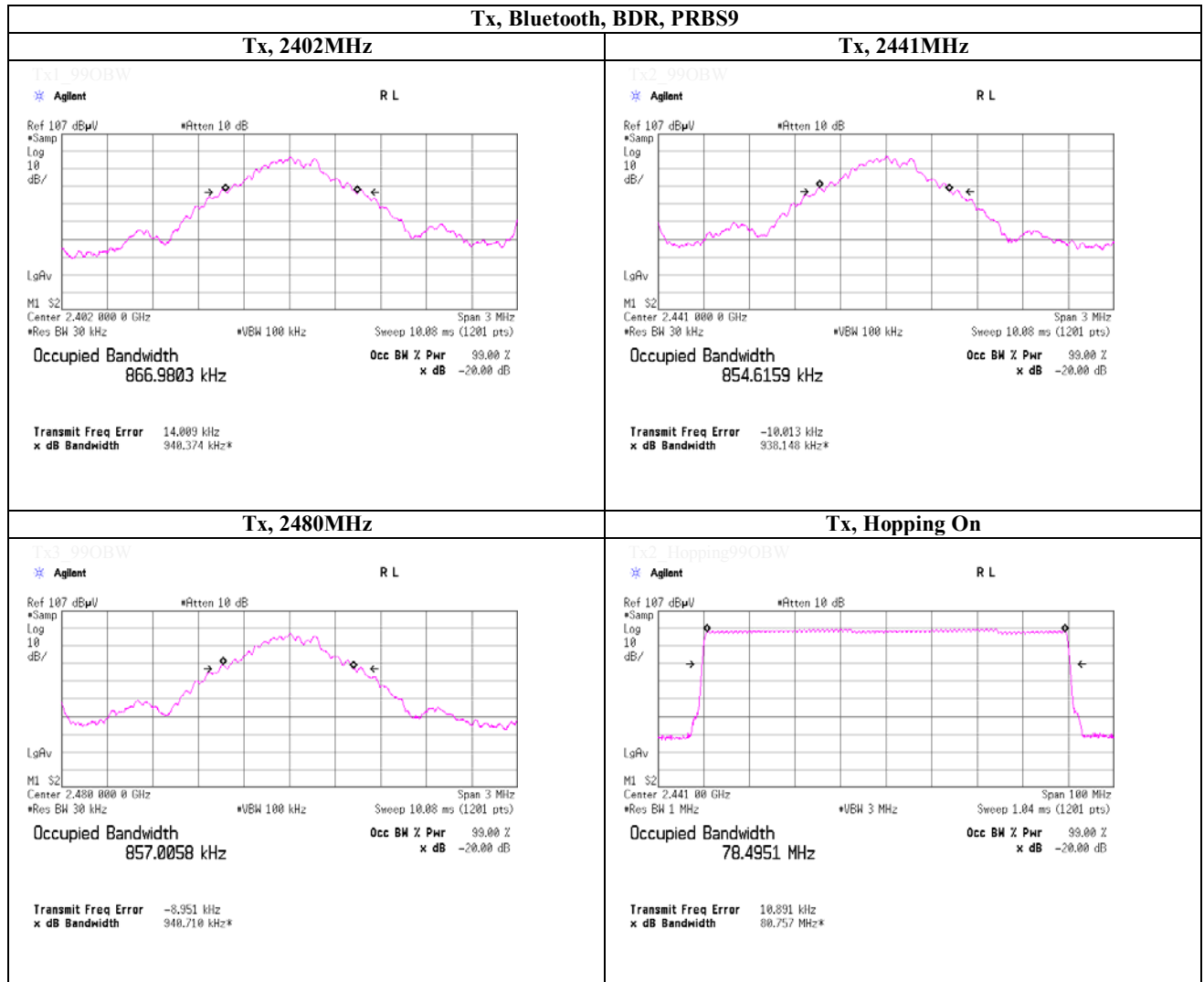
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 30MHz)



99% Occupied Bandwidth



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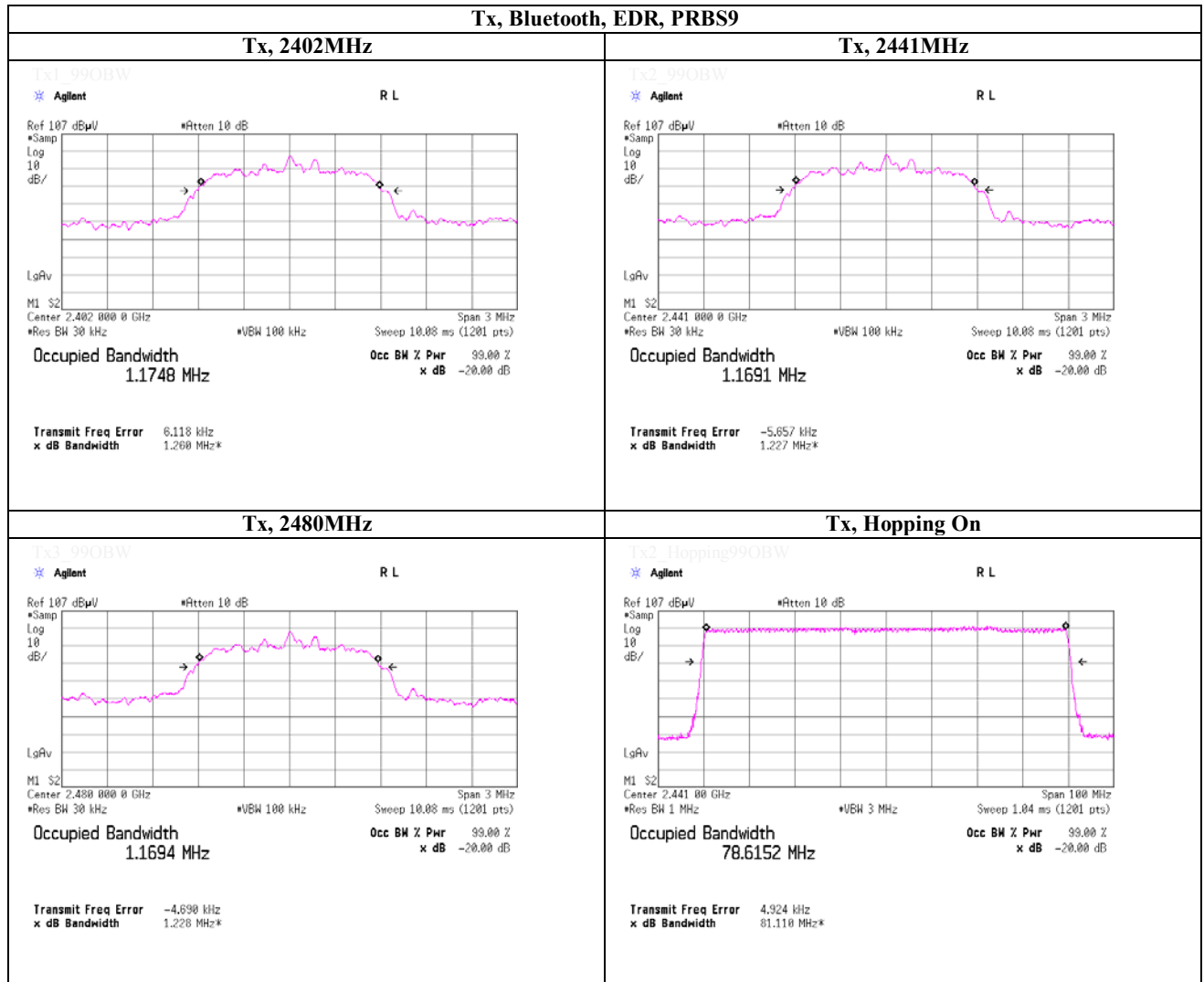
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99% Occupied Bandwidth



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
CCC-S11-R(1/ 4/5/CATS12-1 3/6/7/8/10)	Coaxial Cable	Fujikura,Suhner,Suhner, Agilent,Suhner,-,Suhner	5D-2W,SF106,SF10 4,8496B+8494B,SF 106,-,SF106	MY42143380,US 00431042(Step Att)	RE	2014/11/09 * 12
CBL-09	LOGBICON	Schwarzbeck	VULB 9168	508	RE	2014/04/25 * 12
CAF-16	Pre-Amplifier	Sonoma Instrument	310N	325015	RE	2014/05/23 * 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.2.5.0130	RE	-
CAT6-11	6dB Fixed Atten.	TAMAGAWA	UFA-01	none	RE	2014/09/18 * 12
CSA-06	Spectrum Analyzer	Agilent	N9030A	MY53310670	RE	2014/05/20 * 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
CHA-08	Double Ridged Horn	TOYO	HAP26-40W	00000005	RE	2014/06/26 * 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-W05	Micro Wave Cable	Junkosha	MWX241	MRA-12-14-14 5	RE	2014/05/23 * 12
CCC-W07	Micro Wave Cable	Junkosha	MWX221	MRA-12-14-14 8	RE	2014/05/23 * 12
CCC-W09	Micro Wave Cable	SUHNER	SUCOFLEX104	MY588/4	RE	2014/07/17 * 12
CSA-07	Spectrum Analyzer	Agilent	E4448A	MY52490024	AT	2014/05/19 * 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
COS-12	Temperature & Humidity Indicator	A&D	AD-5681	6876017	AT	2014/07/01 * 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,
AT: Antenna terminal disturbance voltage

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