



RADIO TEST REPORT

Test Report No.: 32DE0303-SH-01-A

Applicant : SMK Corporation
Type of Equipment : Remote control
Model No. : NSG-MR7U
FCC ID : GT3FC014
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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3. This sample tested is in compliance with the limits of the above regulation.
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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: March 7 to 10, 2012

Tested by: S. Takano
Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : G. Ishiwata
Go Ishiwata
Manager of WiSE Japan,
UL Verification Service

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 32DE0303-SH-01-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	32DE0303-SH-01-A	April 11, 2012	-	-

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SECTION 1: Customer information

Company Name : SMK Corporation
Address : 5-5, Togoshi 6-chome, Shinagawa-ku, Tokyo 142-8511 JAPAN
Telephone Number : +81-3-3785-1111
Facsimile Number : +81-3-3785-1878
Contact Person : Mitsuhiro Goto

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

2.1 Identification of E.U.T.

Type of Equipment : Remote control
Brand name : SONY
Model No. : NSG-MR7U
Serial No. : Refer to 4.2 in this report.
Rating : DC3V
Country of Mass-production : China, Japan
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.
Receipt Date of Sample : March 6, 2012

2.2 Product description

Model: NSG-MR7U (referred to as the EUT in this report) is a Remote control.

Clock Frequency: 26MHz, 7.37MHz, 500kHz

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 1MHz
Type of modulation : FHSS
Antenna type : Metal (Inverted F)
Antenna gain with cable loss : -2.23dBi (max)
Antenna connector type : None
Operation temperature range : -10 to +50 deg.C.

FCC 15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC3.3V). Therefore, the equipment complies with the requirement.

FCC 15.203

The equipment and its antenna comply with this requirement since this 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: 2012, final revised on February 1, 2012
 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 complies with FCC Part 15 Subpart B. Refer to the test report: 32DE0303-SH-01-C.

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)	-	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		9.1dB Freq.: 1603.00MHz Polarization: Horizontal Detection: Average Mode: Tx 2402MHz

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.

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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 4.6.1	-	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	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.8 dB	4.3 dB	4.4 dB

*1: SAC=Semi-Anechoic Chamber

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

Radiated emission test

The data listed in this test report has enough margin, more than 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: (±) 1.7dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB

Bandwidth measurement uncertainty for this test was: (±) 5.4%

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3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

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

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

JAB Accreditation No. : RTL02610

	FCC Registration No.	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	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	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	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-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	-

3.6 Test setup, Data of EMI & 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 (DH5/3DH5) Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5) Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5) Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5	-
Maximum peak output power	Transmitting (Hopping OFF), Payload: PRBS9 -DH5 -2DH5 -3DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), 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.

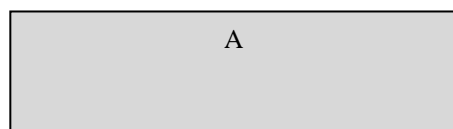
Power settings: DH5: 48, 3DH5: 51

Software: RF Test Tool for Bluetooth Device Ver1.2.4

*The EUT has no Inquiry mode.

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

4.2 Configuration of tested system



* Test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Remote control	NSG-MR7U	*1)	SMK	EUT

*1) 000190F06CE9: Radiated emissions, 000190F06C6D: Other tests

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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

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

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

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

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

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. In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, 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

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SECTION 11: Radiated emission

11.1 Operating environment

The test was carried out in No.3 Semi-Anechoic Chamber.

Temperature : See test data (APPENDIX)

Humidity : See test data (APPENDIX)

11.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in APPENDIX.

11.3 Test conditions

Frequency range : 30MHz to 25GHz

Test distance : 3m (below 15GHz) / 1m (above 15GHz)

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 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 of the test receiver.

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 to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Worst position:

	Carrier	Spurious (Below 1GHz)	Spurious (Above 1GHz)
Horizontal	X	Z	Y
Vertical	Y	Y	X

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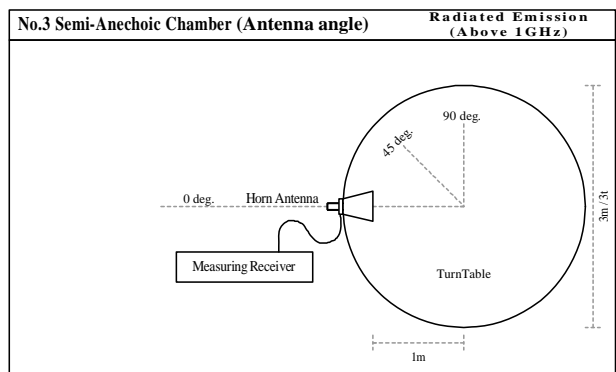
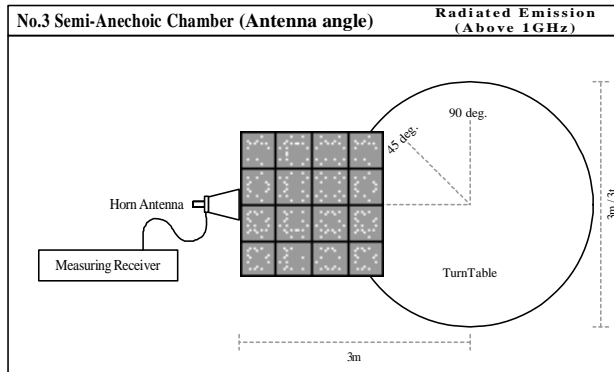
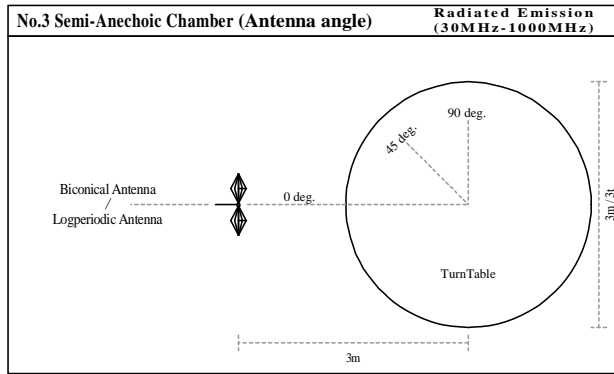
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Figure 1. Antenna angle



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 5th order harmonics.
Refer to APPENDIX

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APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission

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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 March 7, 2012
 Temperature / Humidity 24 deg.C , 42 %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	0.933	1.000	>= 0.622
DH5	2441.0	0.929	1.000	>= 0.619
DH5	2480.0	0.935	1.000	>= 0.623

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

No limit applies to 20dB Bandwidth.

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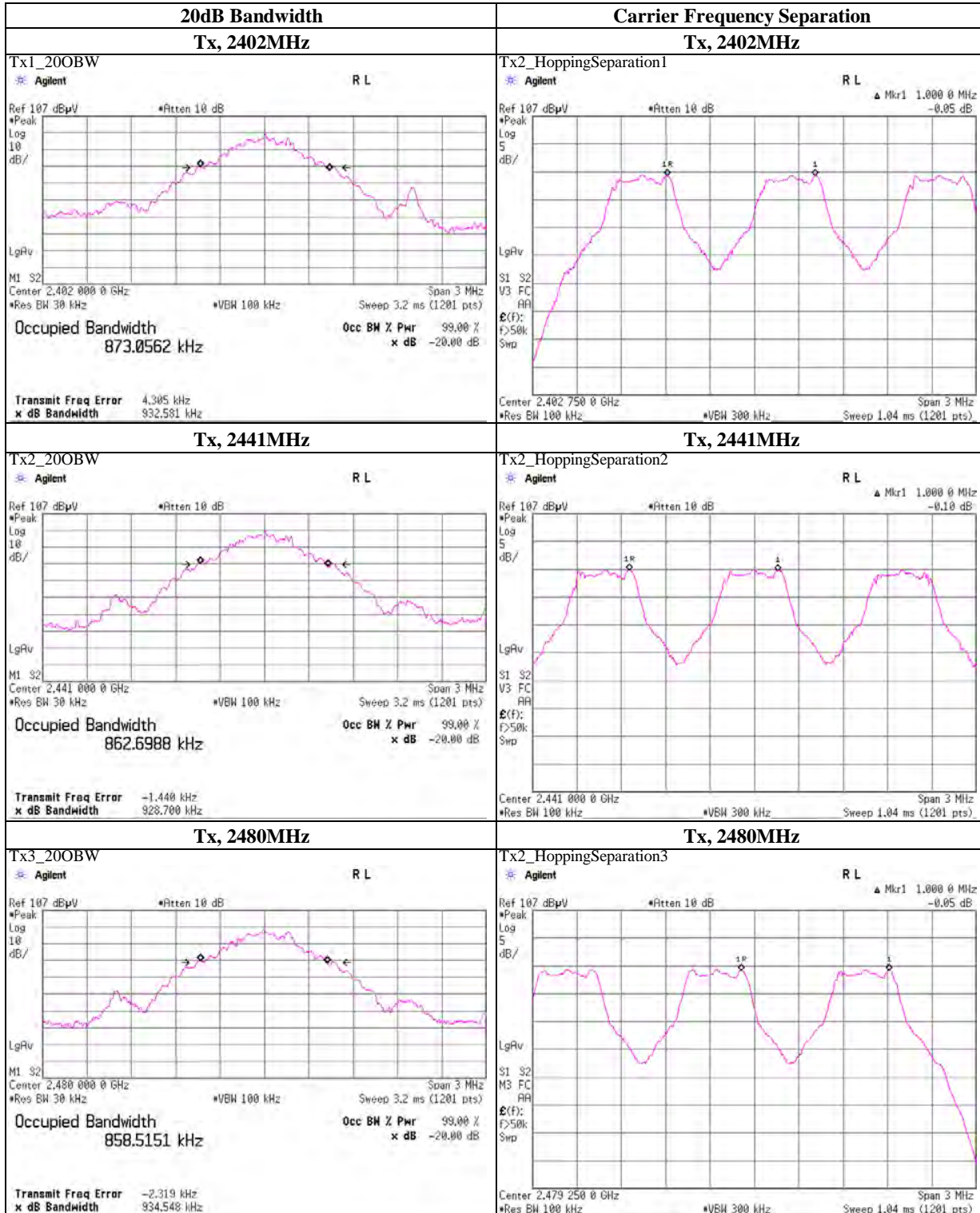
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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

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Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 7, 2012
 Temperature / Humidity 24 deg.C , 42 %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	1.295	1.000	>= 0.864
3-DH5	2441.0	1.262	1.000	>= 0.841
3-DH5	2480.0	1.258	1.000	>= 0.839

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

No limit applies to 20dB Bandwidth.

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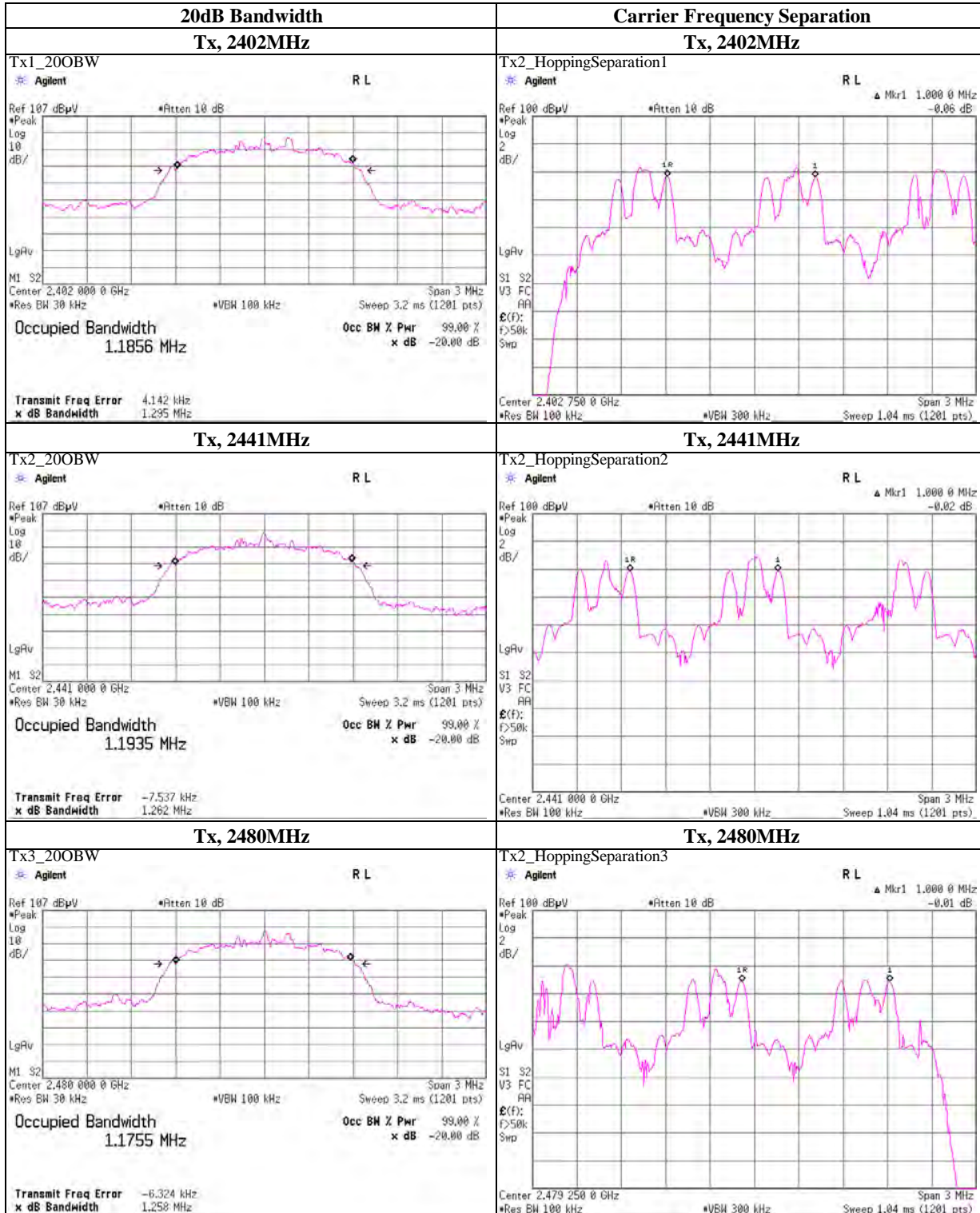
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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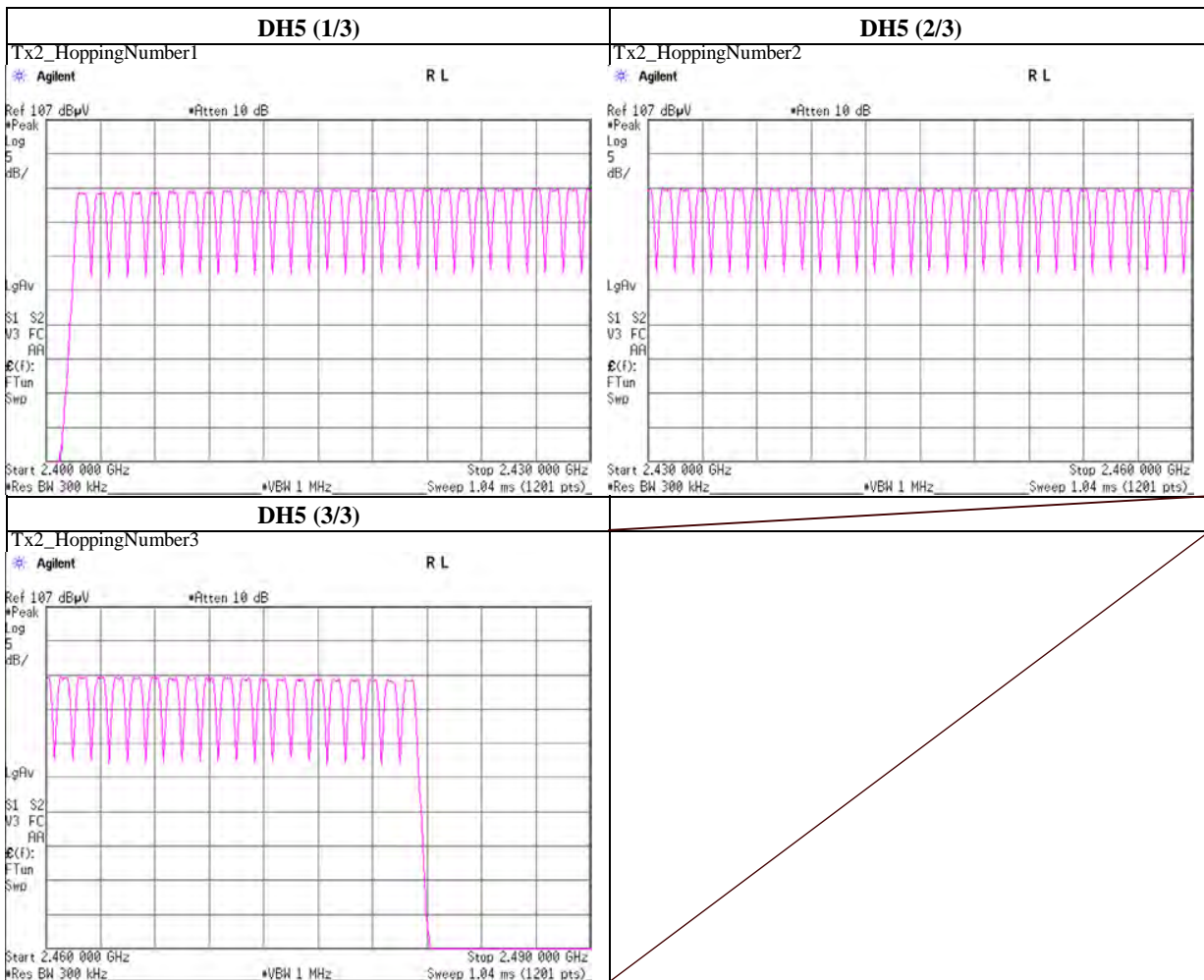
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 7, 2012	
Temperature / Humidity	24 deg.C , 42 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

4

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



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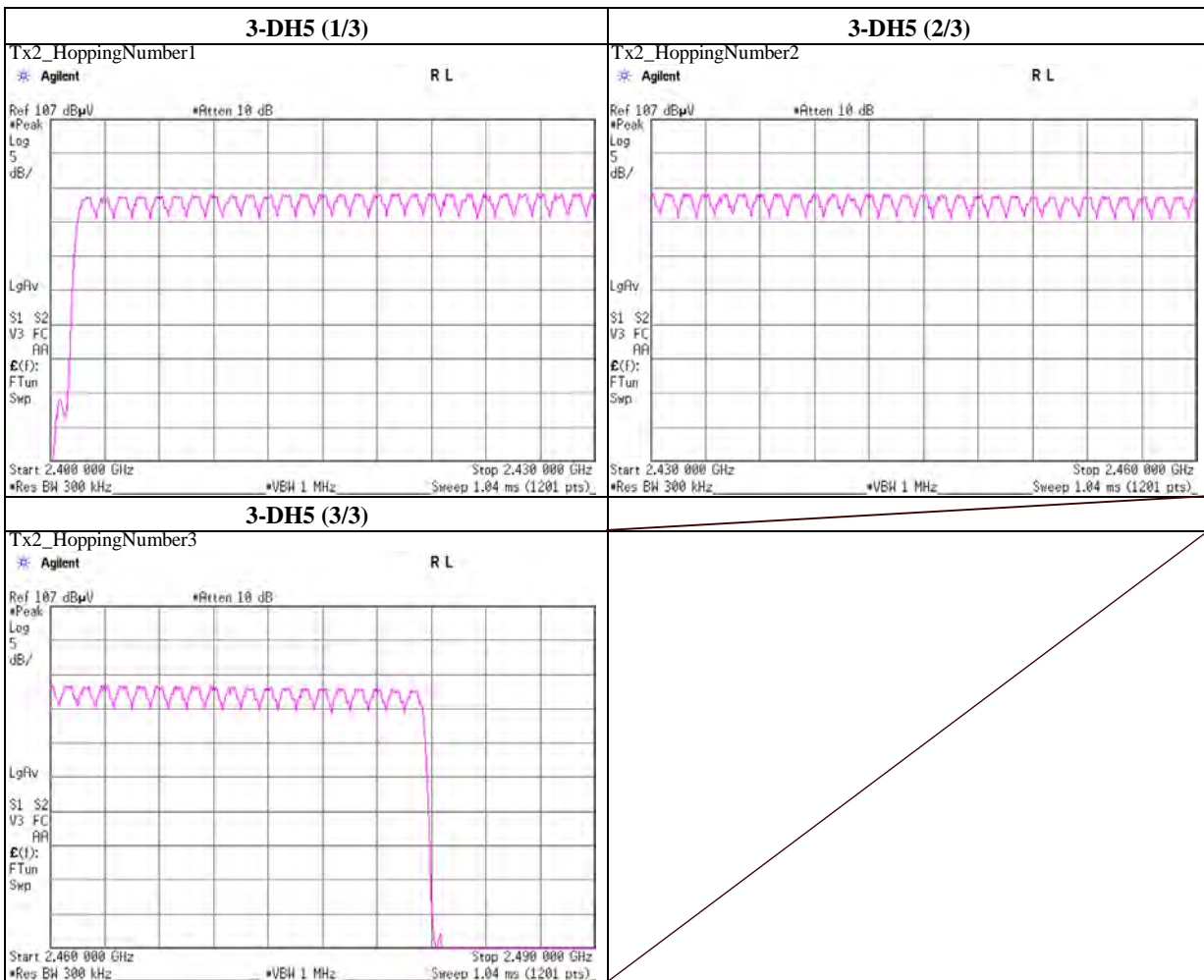
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 7, 2012	
Temperature / Humidity	24 deg.C , 42 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, EDR, PRBS9	

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



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Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 7, 2012
 Temperature / Humidity 24 deg.C , 42 %RH
 Engineer Shinichi Takano
 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	0.402	130	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.658	274	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.906	314	400

Sample Calculation

Result = Number of transmission x Length of transmission time

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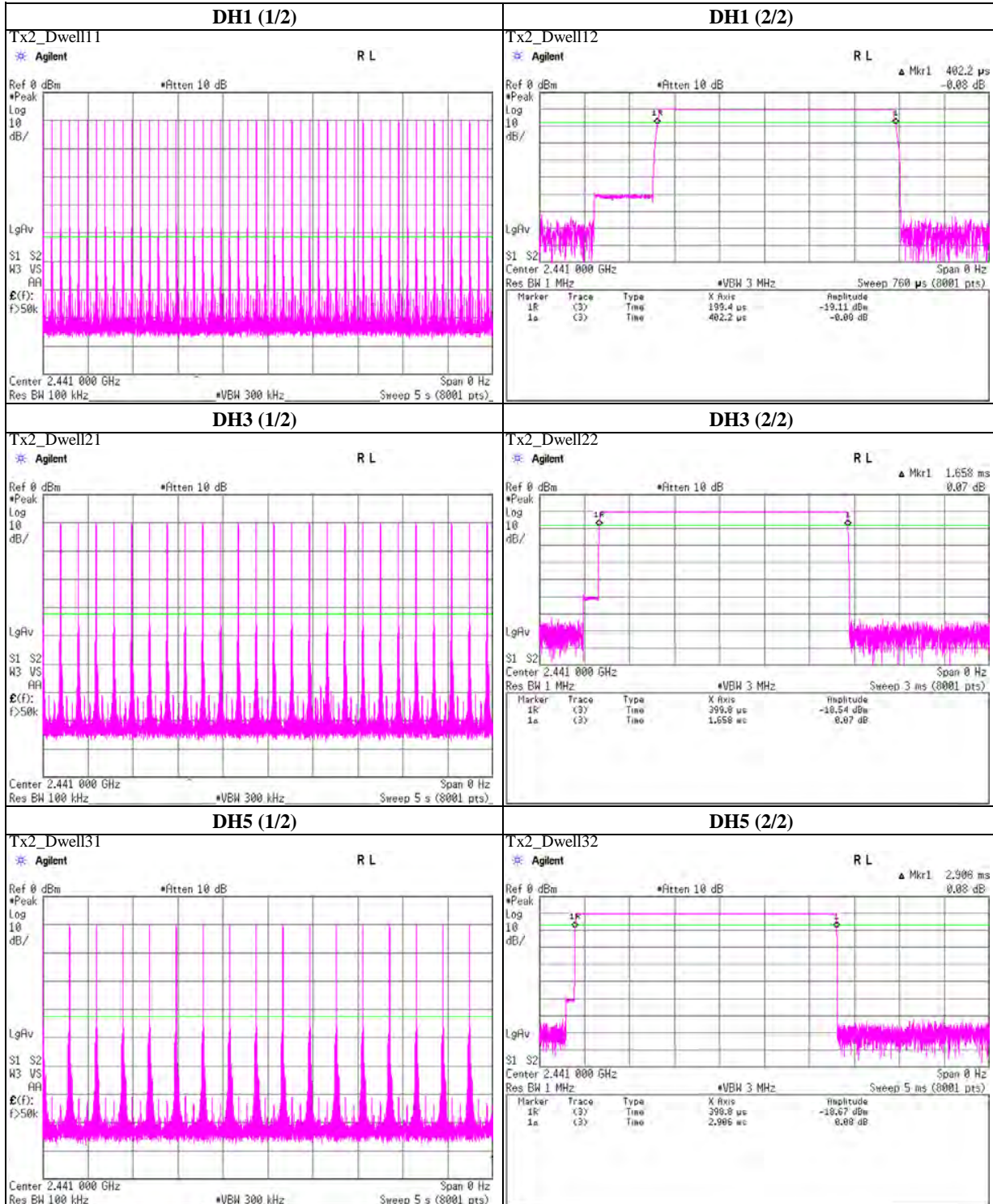
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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1-22-3 Megumiyaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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Facsimile : +81 463 50 6401

Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 7, 2012
 Temperature / Humidity 24 deg.C , 42 %RH
 Engineer Shinichi Takano
 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]
3-DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.416	134	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.667	275	400
3-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

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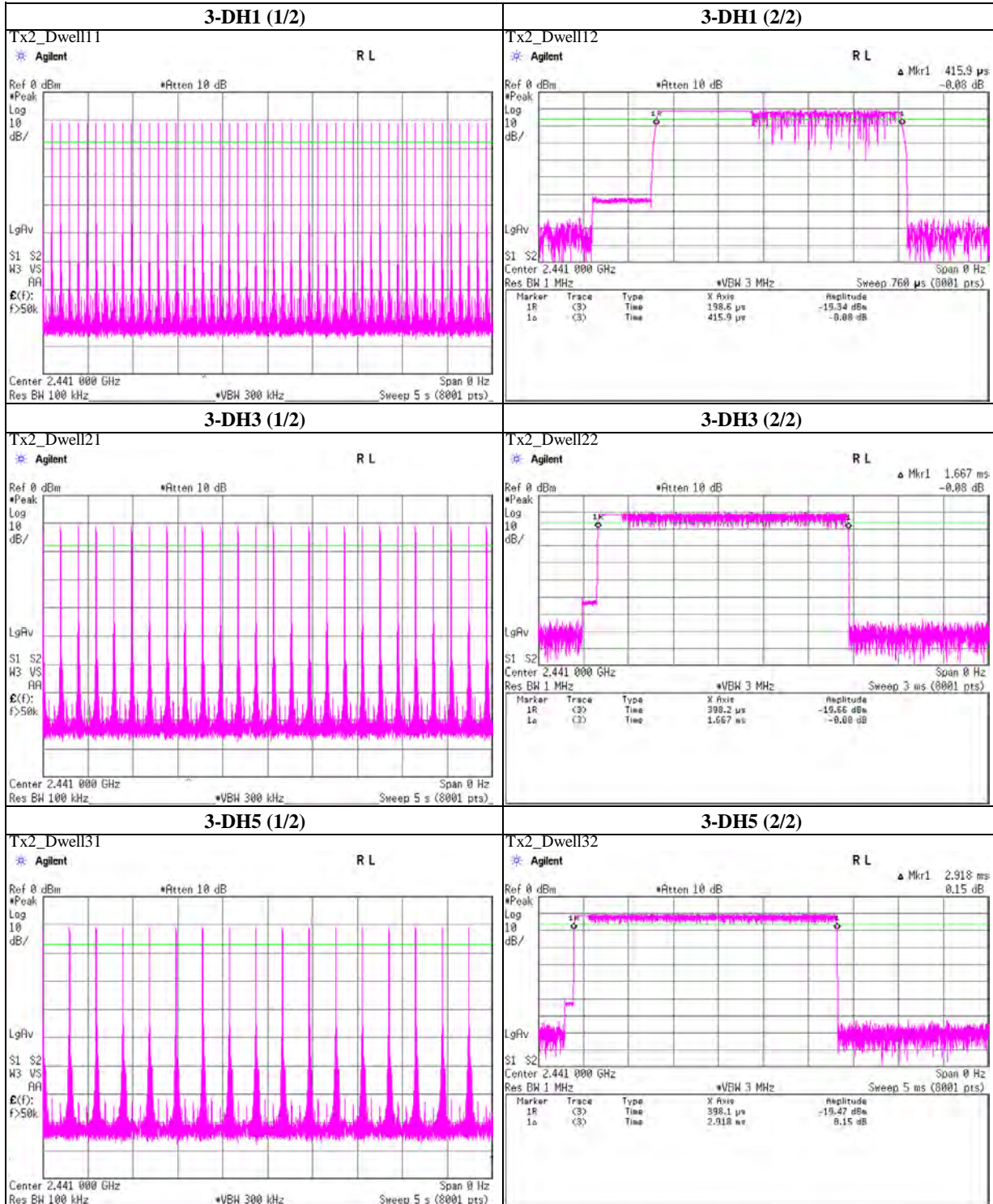
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date March 8, 2012
 Temperature / Humidity 21 deg.C , 47 %RH
 Engineer Tatsuya Arai
 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	-9.73	0.78	9.68	0.73	1.18	20.97	125	20.24
DH5	2441.0	-9.17	0.79	9.68	1.30	1.35	20.97	125	19.67
DH5	2480.0	-9.96	0.80	9.68	0.52	1.13	20.97	125	20.45
2-DH5	2402.0	-9.41	0.78	9.68	1.05	1.27	20.97	125	19.92
2-DH5	2441.0	-9.12	0.79	9.68	1.35	1.36	20.97	125	19.62
2-DH5	2480.0	-10.20	0.80	9.68	0.28	1.07	20.97	125	20.69
3-DH5	2402.0	-9.34	0.78	9.68	1.12	1.29	20.97	125	19.85
3-DH5	2441.0	-8.92	0.79	9.68	1.55	1.43	20.97	125	19.42
3-DH5	2480.0	-10.06	0.80	9.68	0.42	1.10	20.97	125	20.55

Sample Calculation:

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

UL Japan, Inc.
Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 9, 2012 March 10, 2012
 Temperature / Humidity 24deg.C , 26 %RH 23deg.C , 27 %RH
 Engineer Yasumasa Owaki Shinichi Takano
 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.	209.639	QP	22.7	16.2	8.0	32.0		14.9	43.5	28.6	200	359	PK:VBW 3MHz
Hori.	520.000	QP	24.9	18.0	9.6	31.9		20.6	46.0	25.4	187	359	AV:VBW 10Hz
Hori.	551.102	QP	24.5	18.4	9.7	31.9		20.7	46.0	25.3	165	359	
Hori.	1603.000	PK	48.1	25.4	23.4	40.9		56.0	73.9	17.9	106	2	
Hori.	2390.000	PK	44.8	27.2	24.1	41.1		55.0	73.9	18.9	100	234	
Hori.	2400.000	PK	48.3	27.3	24.1	41.1		58.6	73.9	15.3	100	234	
Hori.	3203.000	PK	50.2	29.0	5.4	41.5		43.1	73.9	30.8	100	29	
Hori.	4804.000	PK	59.2	31.1	5.9	41.1		55.1	73.9	18.8	118	127	
Hori.	7206.000	PK	47.2	36.5	7.4	41.3		49.8	73.9	24.1	100	0	
Hori.	9608.000	PK	43.8	38.2	8.6	38.8		51.8	73.9	22.1	100	0	
Hori.	12010.000	PK	45.3	39.3	10.2	39.2		55.6	73.9	18.3	100	0	
Hori.	1603.000	AV	36.9	25.4	23.4	40.9		44.8	53.9	9.1	106	2	
Hori.	3203.000	AV	41.5	29.0	5.4	41.5		34.4	53.9	19.5	100	29	
Vert.	99.129	QP	28.0	9.5	7.3	32.1		12.7	43.5	30.8	100	114	
Vert.	260.000	QP	22.6	17.5	8.4	32.0		16.5	46.0	29.5	100	234	
Vert.	737.000	QP	22.9	20.7	10.2	31.7		22.1	46.0	23.9	100	297	
Vert.	1603.000	PK	46.4	25.4	23.4	40.9		54.3	73.9	19.6	100	0	
Vert.	2390.000	PK	43.7	27.2	24.1	41.1		53.9	73.9	20.0	119	218	
Vert.	2400.000	PK	47.6	27.3	24.1	41.1		57.9	73.9	16.0	119	218	
Vert.	3203.000	PK	48.7	29.0	5.4	41.5		41.6	73.9	32.3	112	153	
Vert.	4804.000	PK	58.9	31.1	5.9	41.1		54.8	73.9	19.1	100	236	
Vert.	7206.000	PK	47.9	36.5	7.4	41.3		50.5	73.9	23.4	100	0	
Vert.	9608.000	PK	43.9	38.2	8.6	38.8		51.9	73.9	22.0	100	0	
Vert.	12010.000	PK	44.8	39.3	10.2	39.2		55.1	73.9	18.8	100	0	
Vert.	1603.000	AV	34.4	25.4	23.4	40.9		42.3	53.9	11.6	100	0	
Vert.	3203.000	AV	38.7	29.0	5.4	41.5		31.6	53.9	22.3	112	153	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	AV	34.3	27.2	24.1	41.1	-24.7	19.8	53.9	34.1	100	234	AV:VBW 10Hz
Hori.	2400.000	AV	38.7	27.3	24.1	41.1	-24.7	24.3	53.9	29.6	100	234	
Hori.	4804.000	AV	54.2	31.1	5.9	41.1	-24.7	25.4	53.9	28.5	118	127	
Hori.	7206.000	AV	35.6	36.5	7.4	41.3	-24.7	13.5	53.9	40.4	100	0	
Hori.	9608.000	AV	32.1	38.2	8.6	38.8	-24.7	15.4	53.9	38.5	100	0	
Hori.	12010.000	AV	33.4	39.3	10.2	39.2	-24.7	19.0	53.9	34.9	100	0	
Vert.	2390.000	AV	34.3	27.2	24.1	41.1	-24.7	19.8	53.9	34.1	119	218	
Vert.	2400.000	AV	38.6	27.3	24.1	41.1	-24.7	24.2	53.9	29.7	119	218	
Vert.	4804.000	AV	53.8	31.1	5.9	41.1	-24.7	25.0	53.9	28.9	100	236	
Vert.	7206.000	AV	35.8	36.5	7.4	41.3	-24.7	13.7	53.9	40.2	100	0	
Vert.	9608.000	AV	32.3	38.2	8.6	38.8	-24.7	15.6	53.9	38.3	100	0	
Vert.	12010.000	AV	33.4	39.3	10.2	39.2	-24.7	19.0	53.9	34.9	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	March 9, 2012	March 10, 2012
Temperature / Humidity	24deg.C , 26 %RH	23deg.C , 27 %RH
Engineer	Yasumasa Owaki	Shinichi Takano
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.	209.642	QP	22.8	16.2	8.0	32.0		15.0	43.5	28.5	200	340	PK:VBW 3MHz
Hori.	520.000	QP	25.2	18.0	9.6	31.9		20.9	46.0	25.1	187	359	AV:VBW 10Hz
Hori.	550.848	QP	24.4	18.4	9.7	31.9		20.6	46.0	25.4	168	358	
Hori.	1627.000	PK	47.6	25.4	23.4	40.9		55.5	73.9	18.4	104	1	
Hori.	3253.000	PK	49.9	29.0	5.4	41.6		42.7	73.9	31.2	100	154	
Hori.	4882.000	PK	58.7	31.2	5.9	40.9		54.9	73.9	19.0	122	126	
Hori.	7323.000	PK	46.4	36.8	7.5	41.4		49.3	73.9	24.6	100	0	
Hori.	9764.000	PK	43.9	38.5	8.6	38.8		52.2	73.9	21.7	100	0	
Hori.	12205.000	PK	44.5	39.3	10.2	39.2		54.8	73.9	19.1	100	0	
Hori.	1627.000	AV	36.7	25.4	23.4	40.9		44.6	53.9	9.3	104	1	
Hori.	3253.000	AV	41.0	29.0	5.4	41.6		33.8	53.9	20.1	100	154	
Vert.	99.245	QP	28.2	9.6	7.3	32.1		13.0	43.5	30.5	100	155	
Vert.	260.000	QP	22.3	17.5	8.4	32.0		16.2	46.0	29.8	100	199	
Vert.	737.000	QP	23.1	20.7	10.2	31.7		22.3	46.0	23.7	100	359	
Vert.	1627.000	PK	45.5	25.4	23.4	40.9		53.4	73.9	20.5	100	0	
Vert.	3253.000	PK	49.1	29.0	5.4	41.6		41.9	73.9	32.0	131	141	
Vert.	4882.000	PK	59.7	31.2	5.9	40.9		55.9	73.9	18.0	109	234	
Vert.	7323.000	PK	46.5	36.8	7.5	41.4		49.4	73.9	24.5	100	0	
Vert.	9764.000	PK	43.7	38.5	8.6	38.8		52.0	73.9	21.9	100	0	
Vert.	12205.000	PK	44.7	39.3	10.2	39.2		55.0	73.9	18.9	100	0	
Vert.	1627.000	AV	34.3	25.4	23.4	40.9		42.2	53.9	11.7	100	0	
Vert.	3253.000	AV	38.4	29.0	5.4	41.6		31.2	53.9	22.7	131	141	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	4882.000	AV	53.4	31.2	5.9	40.9	-24.7	24.9	53.9	29.0	122	126	AV:VBW 10Hz
Hori.	7323.000	AV	35.3	36.8	7.5	41.4	-24.7	13.5	53.9	40.4	100	0	
Hori.	9764.000	AV	32.3	38.5	8.6	38.8	-24.7	15.9	53.9	38.0	100	0	
Hori.	12205.000	AV	33.2	39.3	10.2	39.2	-24.7	18.8	53.9	35.1	100	0	
Vert.	4882.000	AV	54.5	31.2	5.9	40.9	-24.7	26.0	53.9	27.9	109	234	
Vert.	7323.000	AV	34.9	36.8	7.5	41.4	-24.7	13.1	53.9	40.8	100	0	
Vert.	9764.000	AV	32.1	38.5	8.6	38.8	-24.7	15.7	53.9	38.2	100	0	
Vert.	12205.000	AV	32.8	39.3	10.2	39.2	-24.7	18.4	53.9	35.5	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date March 9, 2012 March 10, 2012
Temperature / Humidity 24deg.C , 26 %RH 23deg.C , 27 %RH
Engineer Yasumasa Owaki Shinichi Takano
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.	209.672	QP	22.9	16.2	8.0	32.0		15.1	43.5	28.4	150	167	PK:VBW 3MHz
Hori.	520.000	QP	25.0	18.0	9.6	31.9		20.7	46.0	25.3	183	231	AV:VBW 10Hz
Hori.	551.293	QP	24.7	18.4	9.7	31.9		20.9	46.0	25.1	169	357	
Hori.	1653.000	PK	46.6	25.5	23.4	40.9		54.6	73.9	19.3	100	1	
Hori.	2483.500	PK	42.9	27.5	24.1	41.1		53.4	73.9	20.5	100	231	
Hori.	3307.000	PK	51.0	29.1	5.3	41.6		43.8	73.9	30.1	105	162	
Hori.	4960.000	PK	58.8	31.4	5.9	40.8		55.3	73.9	18.6	103	139	
Hori.	7440.000	PK	47.2	37.0	7.5	41.5		50.2	73.9	23.7	100	0	
Hori.	9920.000	PK	45.0	38.8	8.6	38.8		53.6	73.9	20.3	100	0	
Hori.	12400.000	PK	45.7	39.4	10.1	39.2		56.0	73.9	17.9	100	0	
Hori.	1653.000	AV	36.7	25.5	23.4	40.9		44.7	53.9	9.2	100	1	
Hori.	3307.000	AV	42.9	29.1	5.3	41.6		35.7	53.9	18.2	105	162	
Vert.	99.257	QP	28.1	9.6	7.3	32.1		12.9	43.5	30.6	100	275	
Vert.	260.000	QP	22.4	17.5	8.4	32.0		16.3	46.0	29.7	100	97	
Vert.	737.000	QP	23.4	20.7	10.2	31.7		22.6	46.0	23.4	100	277	
Vert.	1653.000	PK	45.7	25.5	23.4	40.9		53.7	73.9	20.2	100	0	
Vert.	2483.500	PK	44.4	27.5	24.1	41.1		54.9	73.9	19.0	109	212	
Vert.	3307.000	PK	49.9	29.1	5.3	41.6		42.7	73.9	31.2	105	150	
Vert.	4960.000	PK	60.1	31.4	5.9	40.8		56.6	73.9	17.3	107	225	
Vert.	7440.000	PK	47.1	37.0	7.5	41.5		50.1	73.9	23.8	100	0	
Vert.	9920.000	PK	44.1	38.8	8.6	38.8		52.7	73.9	21.2	100	0	
Vert.	12400.000	PK	46.5	39.4	10.1	39.2		56.8	73.9	17.1	100	0	
Vert.	1653.000	AV	34.3	25.5	23.4	40.9		42.3	53.9	11.6	100	0	
Vert.	3307.000	AV	41.0	29.1	5.3	41.6		33.8	53.9	20.1	105	150	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	AV	34.4	27.5	24.1	41.1	-24.7	20.2	53.9	33.7	100	231	AV:VBW 10Hz
Hori.	4960.000	AV	53.5	31.4	5.9	40.8	-24.7	25.3	53.9	28.6	103	139	
Hori.	7440.000	AV	35.4	37.0	7.5	41.5	-24.7	13.7	53.9	40.2	100	0	
Hori.	9920.000	AV	33.0	38.8	8.6	38.8	-24.7	16.9	53.9	37.0	100	0	
Hori.	12400.000	AV	33.7	39.4	10.1	39.2	-24.7	19.3	53.9	34.6	100	0	
Vert.	2483.500	AV	34.3	27.5	24.1	41.1	-24.7	20.1	53.9	33.8	109	212	
Vert.	4960.000	AV	55.1	31.4	5.9	40.8	-24.7	26.9	53.9	27.0	107	225	
Vert.	7440.000	AV	35.1	37.0	7.5	41.5	-24.7	13.4	53.9	40.5	100	0	
Vert.	9920.000	AV	32.8	38.8	8.6	38.8	-24.7	16.7	53.9	37.2	100	0	
Vert.	12400.000	AV	33.1	39.4	10.1	39.2	-24.7	18.7	53.9	35.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	March 9, 2012	March 10, 2012
Temperature / Humidity	24deg.C , 26 %RH	23deg.C , 27 %RH
Engineer	Yasumasa Owaki	Shinichi Takano
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.	209.677	QP	23.2	16.2	8.0	32.0		15.4	43.5	28.1	200	359	PK:VBW 3MHz
Hori.	520.000	QP	25.1	18.0	9.6	31.9		20.8	46.0	25.2	188	357	AV:VBW 10Hz
Hori.	551.391	QP	24.5	18.4	9.7	31.9		20.7	46.0	25.3	165	353	
Hori.	1603.000	PK	48.1	25.4	23.4	40.9		56.0	73.9	17.9	107	1	
Hori.	2390.000	PK	44.2	27.2	24.1	41.1		54.4	73.9	19.5	100	236	
Hori.	2400.000	PK	50.2	27.3	24.1	41.1		60.5	73.9	13.4	100	236	
Hori.	3203.000	PK	50.8	29.0	5.4	41.5		43.7	73.9	30.2	100	24	
Hori.	4804.000	PK	55.4	31.1	5.9	41.1		51.3	73.9	22.6	119	129	
Hori.	7206.000	PK	47.0	36.5	7.4	41.3		49.6	73.9	24.3	100	0	
Hori.	9608.000	PK	43.5	38.2	8.6	38.8		51.5	73.9	22.4	100	0	
Hori.	12010.000	PK	45.7	39.3	10.2	39.2		56.0	73.9	17.9	100	0	
Hori.	1603.000	AV	36.8	25.4	23.4	40.9		44.7	53.9	9.2	107	1	
Hori.	3203.000	AV	44.0	29.0	5.4	41.5		36.9	53.9	17.0	100	24	
Vert.	99.245	QP	28.2	9.6	7.3	32.1		13.0	43.5	30.5	100	121	
Vert.	260.000	QP	22.1	17.5	8.4	32.0		16.0	46.0	30.0	100	290	
Vert.	737.000	QP	23.2	20.7	10.2	31.7		22.4	46.0	23.6	100	152	
Vert.	1603.000	PK	46.3	25.4	23.4	40.9		54.2	73.9	19.7	100	0	
Vert.	2390.000	PK	45.0	27.2	24.1	41.1		55.2	73.9	18.7	121	206	
Vert.	2400.000	PK	49.2	27.3	24.1	41.1		59.5	73.9	14.4	121	206	
Vert.	3203.000	PK	49.5	29.0	5.4	41.5		42.4	73.9	31.5	112	152	
Vert.	4804.000	PK	55.3	31.1	5.9	41.1		51.2	73.9	22.7	100	233	
Vert.	7206.000	PK	46.6	36.5	7.4	41.3		49.2	73.9	24.7	100	0	
Vert.	9608.000	PK	43.0	38.2	8.6	38.8		51.0	73.9	22.9	100	0	
Vert.	12010.000	PK	45.2	39.3	10.2	39.2		55.5	73.9	18.4	100	0	
Vert.	1603.000	AV	34.3	25.4	23.4	40.9		42.2	53.9	11.7	100	0	
Vert.	3203.000	AV	40.8	29.0	5.4	41.5		33.7	53.9	20.2	112	152	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	AV	34.3	27.2	24.1	41.1	-24.6	19.8	53.9	34.1	100	236	AV:VBW 10Hz
Hori.	2400.000	AV	37.8	27.3	24.1	41.1	-24.6	23.4	53.9	30.5	100	236	
Hori.	4804.000	AV	42.7	31.1	5.9	41.1	-24.6	13.9	53.9	40.0	119	129	
Hori.	7206.000	AV	35.6	36.5	7.4	41.3	-24.6	13.5	53.9	40.4	100	0	
Hori.	9608.000	AV	32.0	38.2	8.6	38.8	-24.6	15.3	53.9	38.6	100	0	
Hori.	12010.000	AV	33.5	39.3	10.2	39.2	-24.6	19.1	53.9	34.8	100	0	
Vert.	2390.000	AV	34.3	27.2	24.1	41.1	-24.6	19.8	53.9	34.1	121	206	
Vert.	2400.000	AV	37.8	27.3	24.1	41.1	-24.6	23.4	53.9	30.5	121	206	
Vert.	4804.000	AV	42.0	31.1	5.9	41.1	-24.6	13.2	53.9	40.7	100	233	
Vert.	7206.000	AV	35.4	36.5	7.4	41.3	-24.6	13.3	53.9	40.6	100	0	
Vert.	9608.000	AV	32.0	38.2	8.6	38.8	-24.6	15.3	53.9	38.6	100	0	
Vert.	12010.000	AV	33.2	39.3	10.2	39.2	-24.6	18.8	53.9	35.1	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date March 9, 2012 March 10, 2012
Temperature / Humidity 24deg.C , 26 %RH 23deg.C , 27 %RH
Engineer Yasumasa Owaki Shinichi Takano
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.	209.574	QP	23.2	16.2	8.0	32.0		15.4	43.5	28.1	150	352	PK:VBW 3MHz
Hori.	520.000	QP	24.8	18.0	9.6	31.9		20.5	46.0	25.5	191	180	AV:VBW 10Hz
Hori.	550.916	QP	24.9	18.4	9.7	31.9		21.1	46.0	24.9	161	339	
Hori.	1627.000	PK	46.8	25.4	23.4	40.9		54.7	73.9	19.2	107	1	
Hori.	3253.000	PK	51.3	29.0	5.4	41.6		44.1	73.9	29.8	100	155	
Hori.	4882.000	PK	54.5	31.2	5.9	40.9		50.7	73.9	23.2	122	134	
Hori.	7323.000	PK	47.8	36.8	7.5	41.4		50.7	73.9	23.2	100	0	
Hori.	9764.000	PK	44.0	38.5	8.6	38.8		52.3	73.9	21.6	100	0	
Hori.	12205.000	PK	44.8	39.3	10.2	39.2		55.1	73.9	18.8	100	0	
Hori.	1627.000	AV	36.7	25.4	23.4	40.9		44.6	53.9	9.3	107	1	
Hori.	3253.000	AV	43.6	29.0	5.4	41.6		36.4	53.9	17.5	100	155	
Vert.	99.359	QP	28.2	9.6	7.3	32.1		13.0	43.5	30.5	100	200	
Vert.	260.000	QP	22.2	17.5	8.4	32.0		16.1	46.0	29.9	100	2	
Vert.	737.000	QP	23.2	20.7	10.2	31.7		22.4	46.0	23.6	100	80	
Vert.	1627.000	PK	46.3	25.4	23.4	40.9		54.2	73.9	19.7	100	0	
Vert.	3253.000	PK	49.9	29.0	5.4	41.6		42.7	73.9	31.2	132	144	
Vert.	4882.000	PK	55.0	31.2	5.9	40.9		51.2	73.9	22.7	110	230	
Vert.	7323.000	PK	46.5	36.8	7.5	41.4		49.4	73.9	24.5	100	0	
Vert.	9764.000	PK	43.5	38.5	8.6	38.8		51.8	73.9	22.1	100	0	
Vert.	12205.000	PK	44.7	39.3	10.2	39.2		55.0	73.9	18.9	100	0	
Vert.	1627.000	AV	34.3	25.4	23.4	40.9		42.2	53.9	11.7	100	0	
Vert.	3253.000	AV	40.9	29.0	5.4	41.6		33.7	53.9	20.2	132	144	

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	4882.000	AV	42.0	31.2	5.9	40.9	-24.6	13.5	53.9	40.4	122	134	AV:VBW 10Hz
Hori.	7323.000	AV	35.1	36.8	7.5	41.4	-24.6	13.3	53.9	40.6	100	0	
Hori.	9764.000	AV	32.3	38.5	8.6	38.8	-24.6	15.9	53.9	38.0	100	0	
Hori.	12205.000	AV	33.3	39.3	10.2	39.2	-24.6	18.9	53.9	35.0	100	0	
Vert.	4882.000	AV	42.3	31.2	5.9	40.9	-24.6	13.8	53.9	40.1	110	230	
Vert.	7323.000	AV	34.9	36.8	7.5	41.4	-24.6	13.1	53.9	40.8	100	0	
Vert.	9764.000	AV	32.1	38.5	8.6	38.8	-24.6	15.7	53.9	38.2	100	0	
Vert.	12205.000	AV	32.9	39.3	10.2	39.2	-24.6	18.5	53.9	35.4	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date March 9, 2012 March 10, 2012
 Temperature / Humidity 24deg.C , 26 %RH 23deg.C , 27 %RH
 Engineer Yasumasa Owaki Shinichi Takano
 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.	209.588	QP	22.9	16.2	8.0	32.0		15.1	43.5	28.4	200	359	PK:VBW 3MHz
Hori.	520.000	QP	24.9	18.0	9.6	31.9		20.6	46.0	25.4	188	11	AV:VBW 10Hz
Hori.	551.179	QP	24.7	18.4	9.7	31.9		20.9	46.0	25.1	165	166	
Hori.	1653.000	PK	47.0	25.5	23.4	40.9		55.0	73.9	18.9	100	2	
Hori.	2483.500	PK	43.6	27.5	24.1	41.1		54.1	73.9	19.8	100	235	
Hori.	3307.000	PK	52.6	29.1	5.3	41.6		45.4	73.9	28.5	105	156	
Hori.	4960.000	PK	55.0	31.4	5.9	40.8		51.5	73.9	22.4	109	138	
Hori.	7440.000	PK	46.8	37.0	7.5	41.5		49.8	73.9	24.1	100	0	
Hori.	9920.000	PK	44.6	38.8	8.6	38.8		53.2	73.9	20.7	100	0	
Hori.	12400.000	PK	45.6	39.4	10.1	39.2		55.9	73.9	18.0	100	0	
Hori.	1653.000	AV	36.6	25.5	23.4	40.9		44.6	53.9	9.3	100	2	
Hori.	3307.000	AV	45.5	29.1	5.3	41.6		38.3	53.9	15.6	105	156	
Vert.	99.426	QP	28.1	9.6	7.3	32.1		12.9	43.5	30.6	100	101	
Vert.	260.000	QP	22.4	17.5	8.4	32.0		16.3	46.0	29.7	100	274	
Vert.	737.000	QP	23.4	20.7	10.2	31.7		22.6	46.0	23.4	100	346	
Vert.	1653.000	PK	46.5	25.5	23.4	40.9		54.5	73.9	19.4	100	0	
Vert.	2483.500	PK	44.0	27.5	24.1	41.1		54.5	73.9	19.4	112	205	
Vert.	3307.000	PK	51.6	29.1	5.3	41.6		44.4	73.9	29.5	100	153	
Vert.	4960.000	PK	55.2	31.4	5.9	40.8		51.7	73.9	22.2	108	230	
Vert.	7440.000	PK	46.5	37.0	7.5	41.5		49.5	73.9	24.4	100	0	
Vert.	9920.000	PK	44.5	38.8	8.6	38.8		53.1	73.9	20.8	100	0	
Vert.	12400.000	PK	45.5	39.4	10.1	39.2		55.8	73.9	18.1	100	0	
Vert.	1653.000	AV	34.3	25.5	23.4	40.9		42.3	53.9	11.6	100	0	
Vert.	3307.000	AV	42.4	29.1	5.3	41.6		35.2	53.9	18.7	100	153	

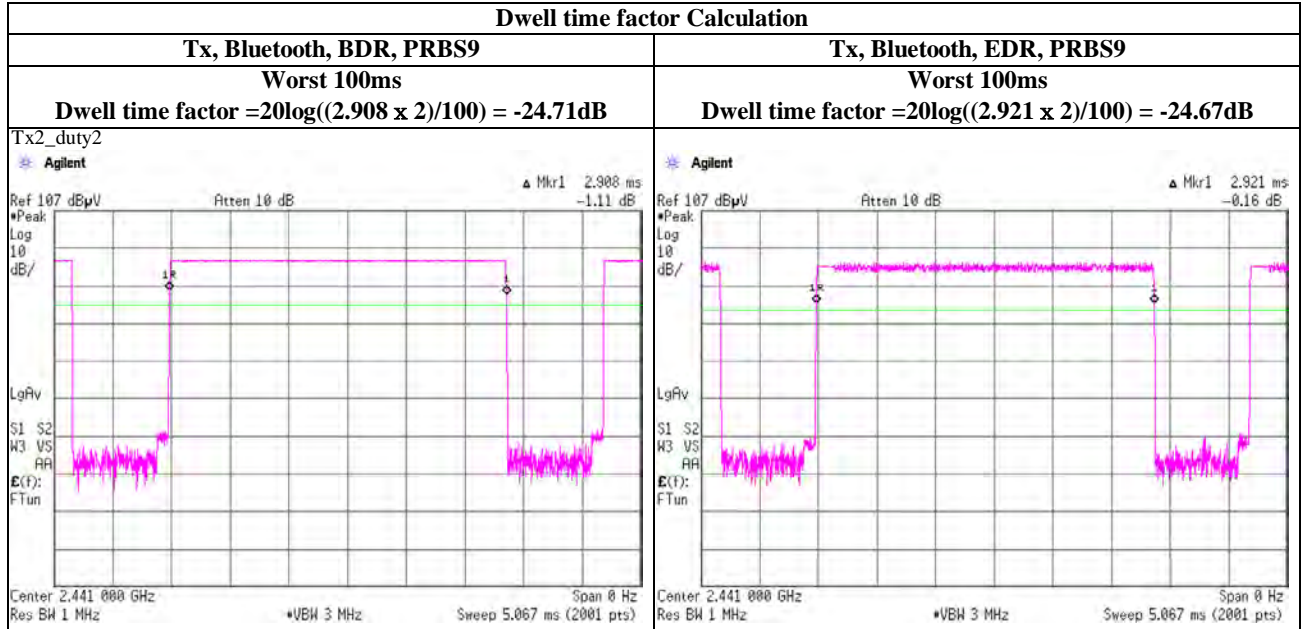
(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	AV	34.3	27.5	24.1	41.1	-24.6	20.1	53.9	33.8	100	235	AV:VBW 10Hz
Hori.	4960.000	AV	41.9	31.4	5.9	40.8	-24.6	13.7	53.9	40.2	109	138	
Hori.	7440.000	AV	35.4	37.0	7.5	41.5	-24.6	13.7	53.9	40.2	100	0	
Hori.	9920.000	AV	33.0	38.8	8.6	38.8	-24.6	16.9	53.9	37.0	100	0	
Hori.	12400.000	AV	33.6	39.4	10.1	39.2	-24.6	19.2	53.9	34.7	100	0	
Vert.	2483.500	AV	34.4	27.5	24.1	41.1	-24.6	20.2	53.9	33.7	112	205	
Vert.	4960.000	AV	42.6	31.4	5.9	40.8	-24.6	14.4	53.9	39.5	108	230	
Vert.	7440.000	AV	35.1	37.0	7.5	41.5	-24.6	13.4	53.9	40.5	100	0	
Vert.	9920.000	AV	32.8	38.8	8.6	38.8	-24.6	16.7	53.9	37.2	100	0	
Vert.	12400.000	AV	33.3	39.4	10.1	39.2	-24.6	18.9	53.9	35.0	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

Dwell time factor Calculation chart



ON time of some channel during 100ms: Twice
 This is the worst case in hopping sequence of Bluetooth.

UL Japan, Inc.

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

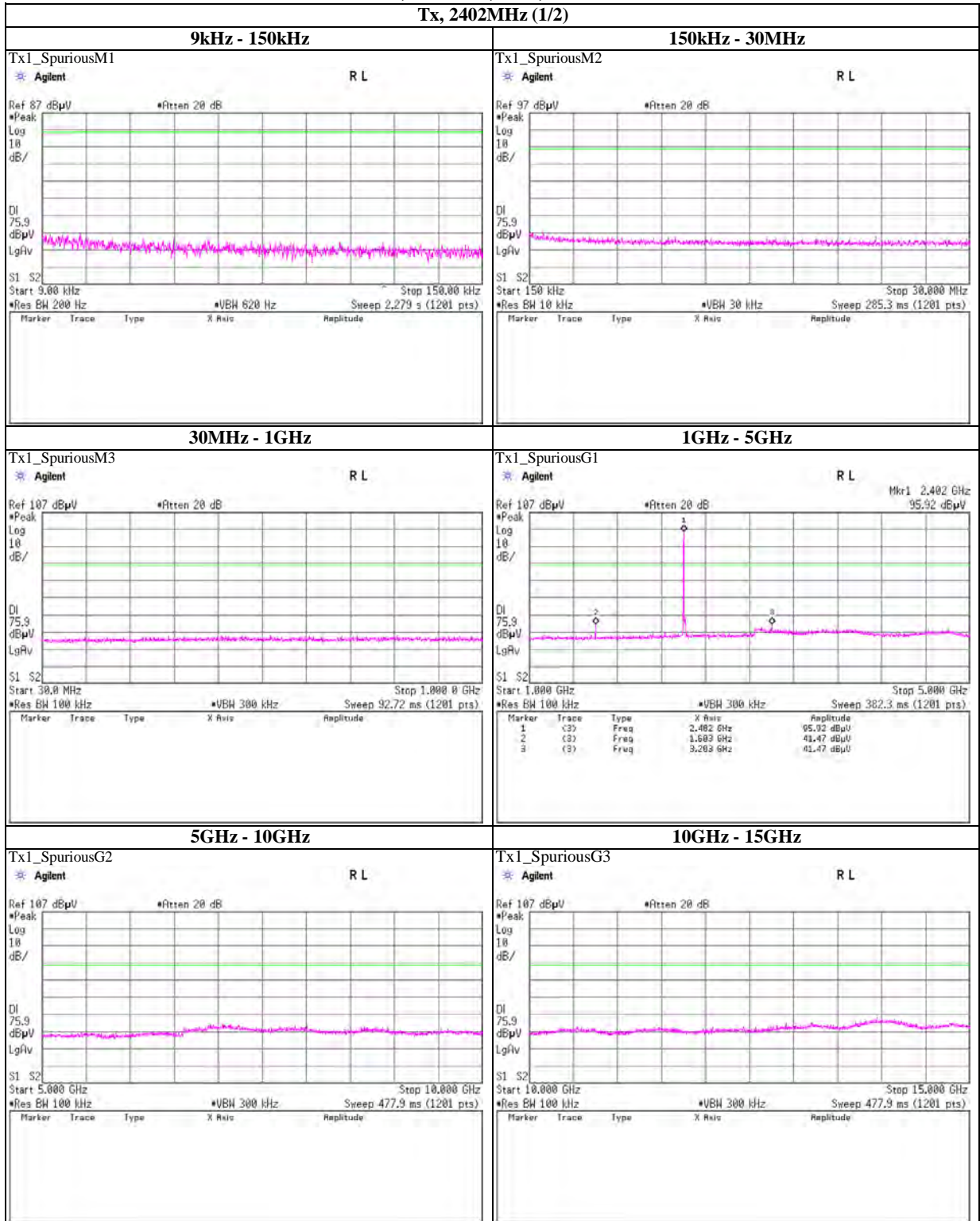
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)



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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (2/2)



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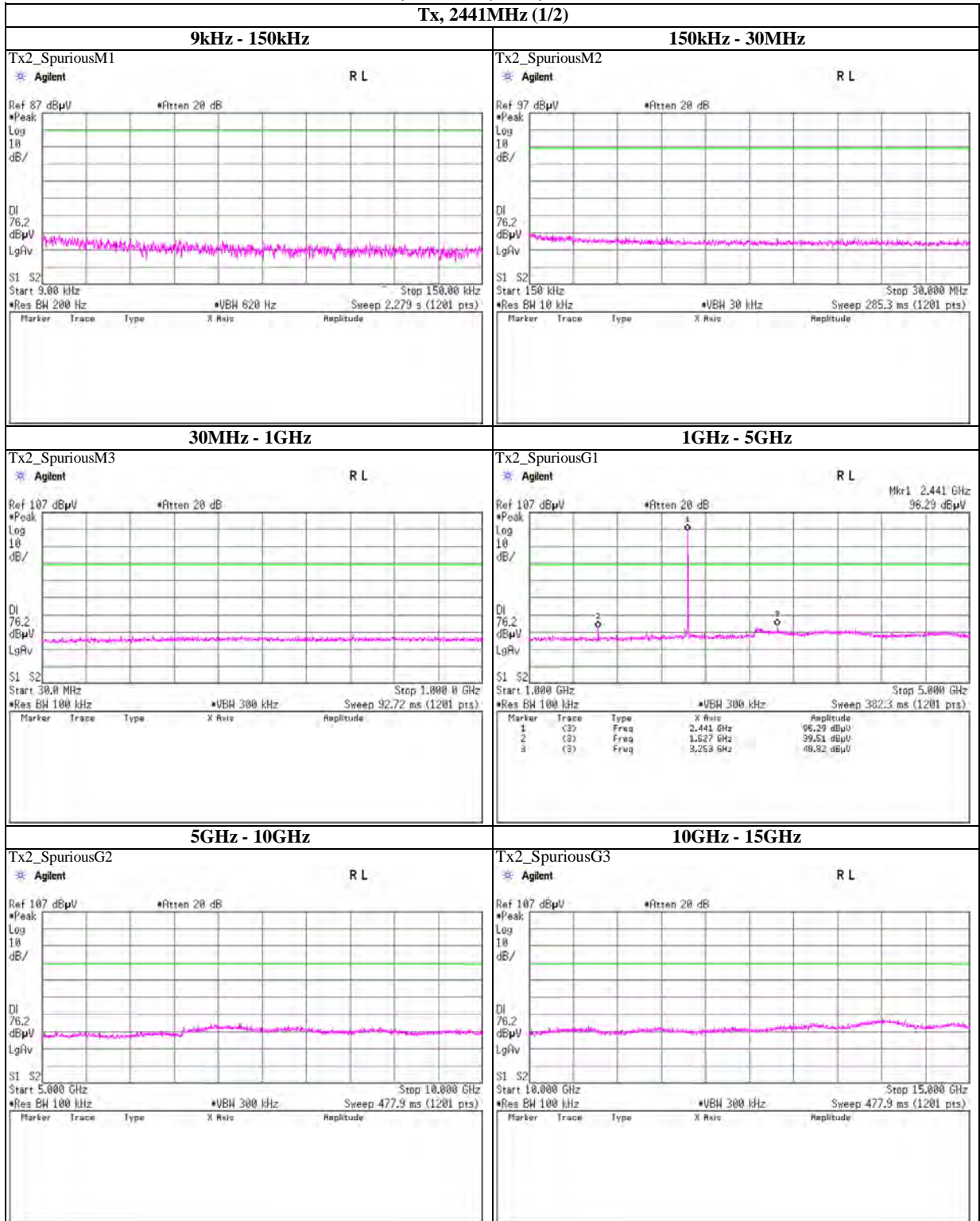
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (1/2)



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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (2/2)



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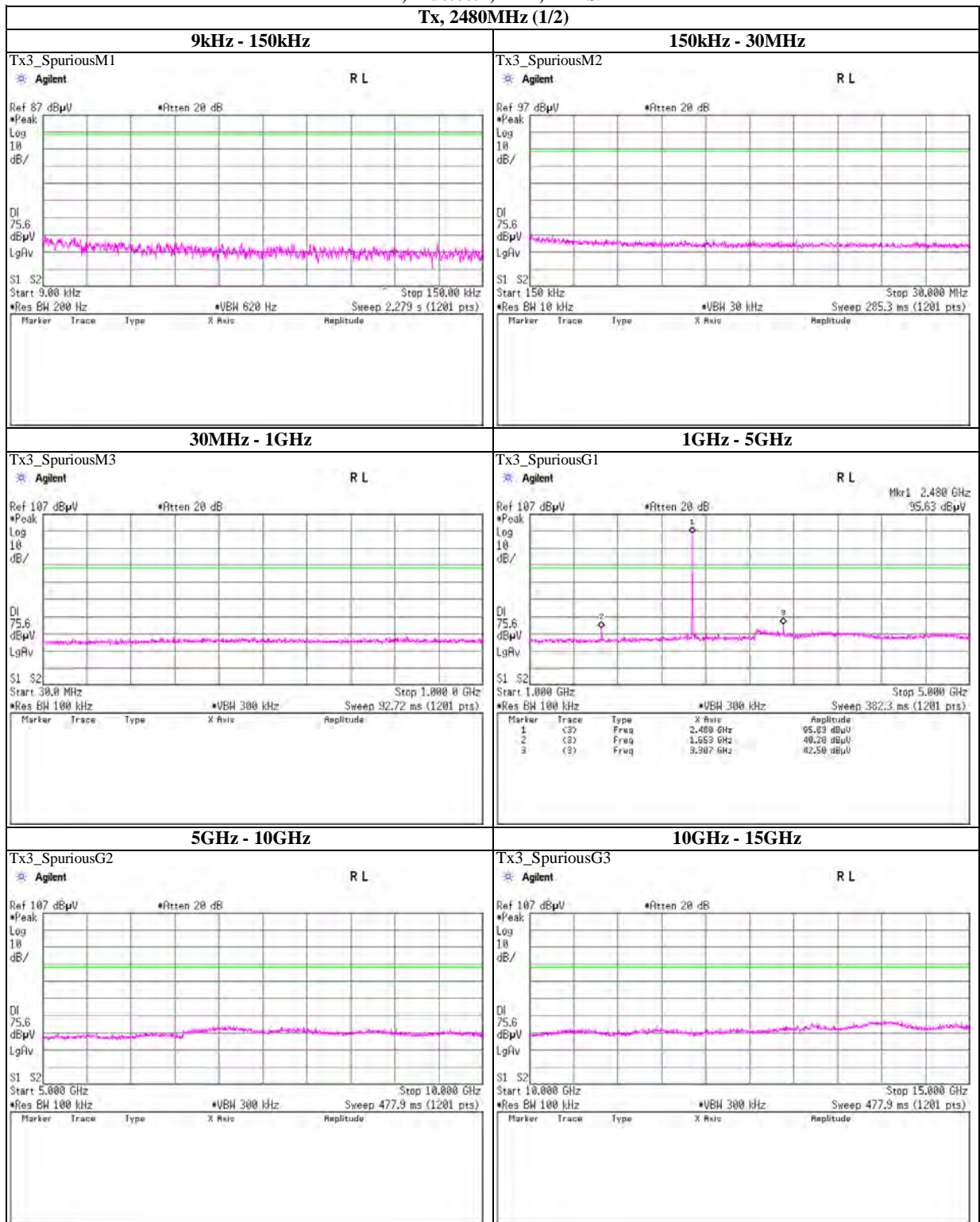
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (1/2)



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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (2/2)



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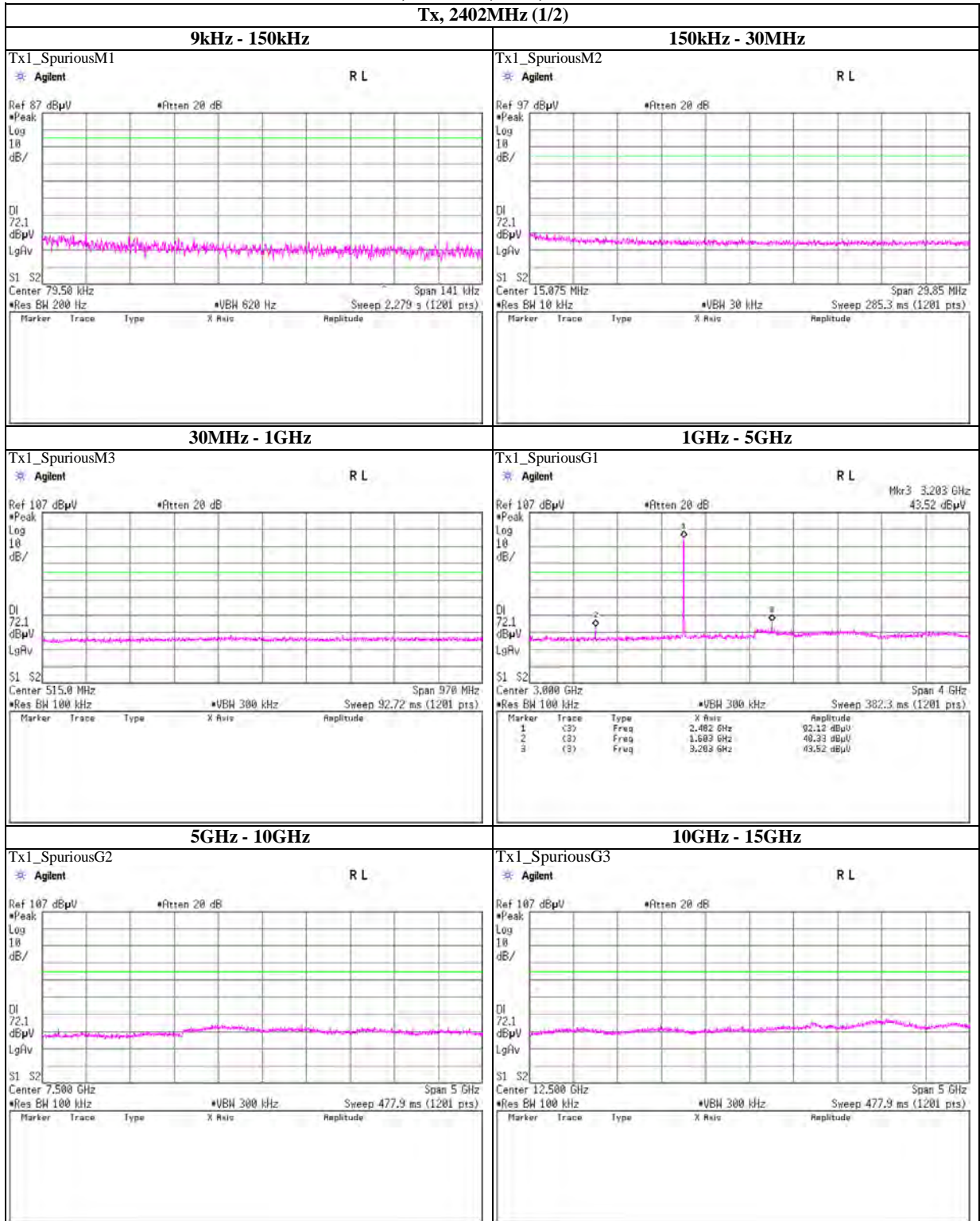
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)



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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (2/2)



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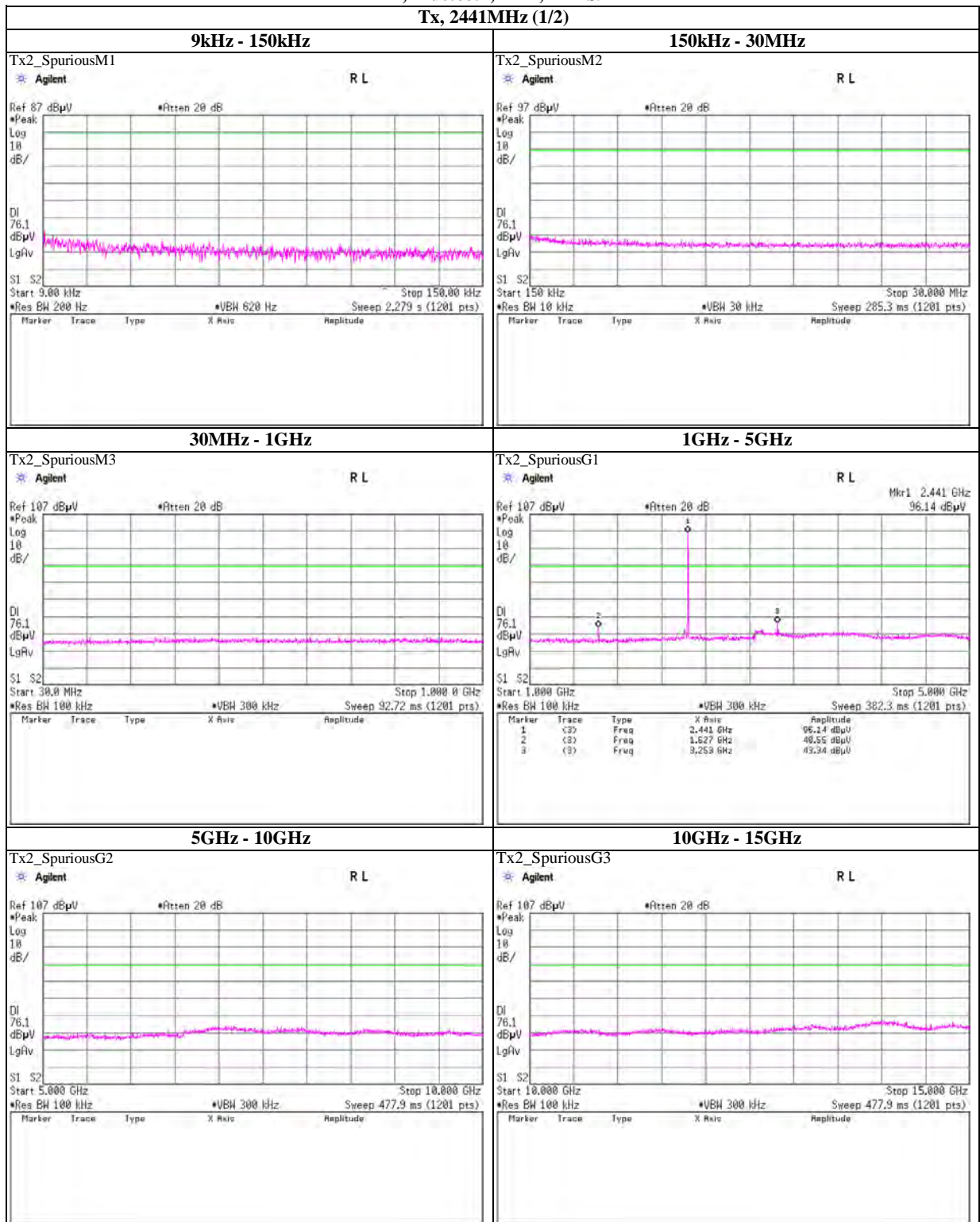
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (1/2)



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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (2/2)



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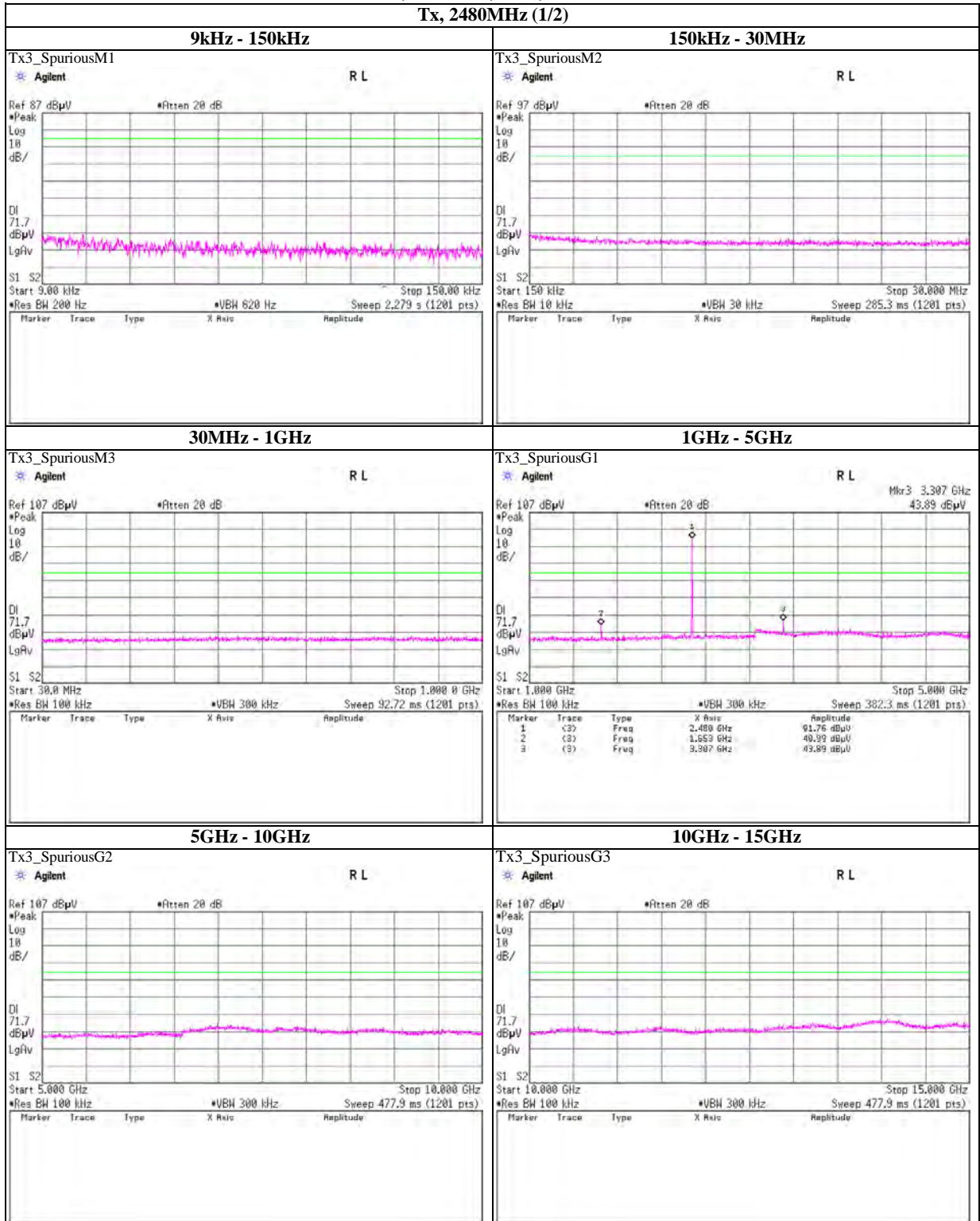
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)



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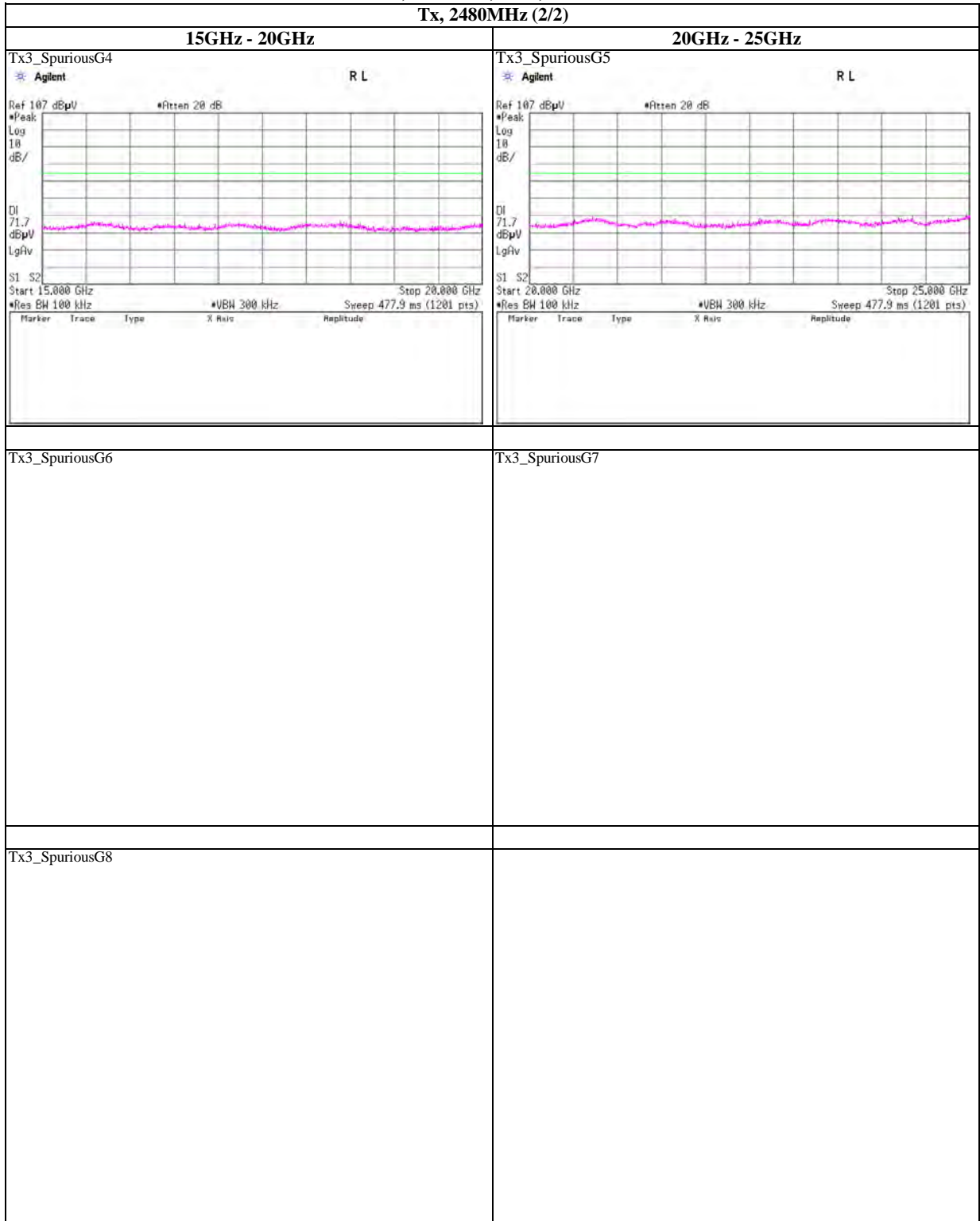
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)



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Shonan EMC Lab.

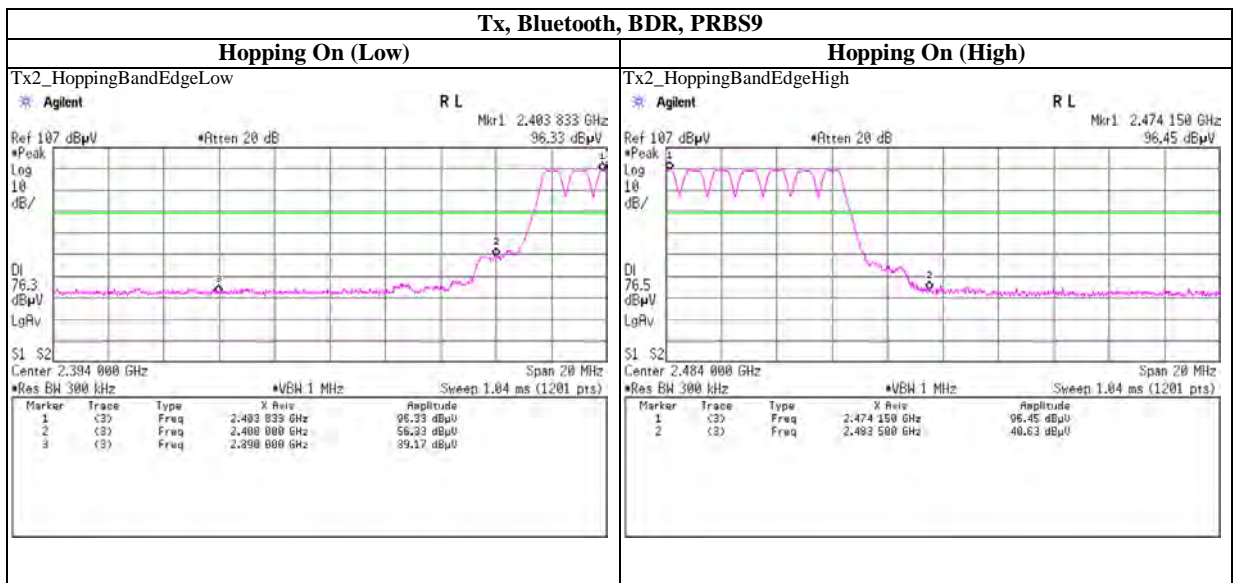
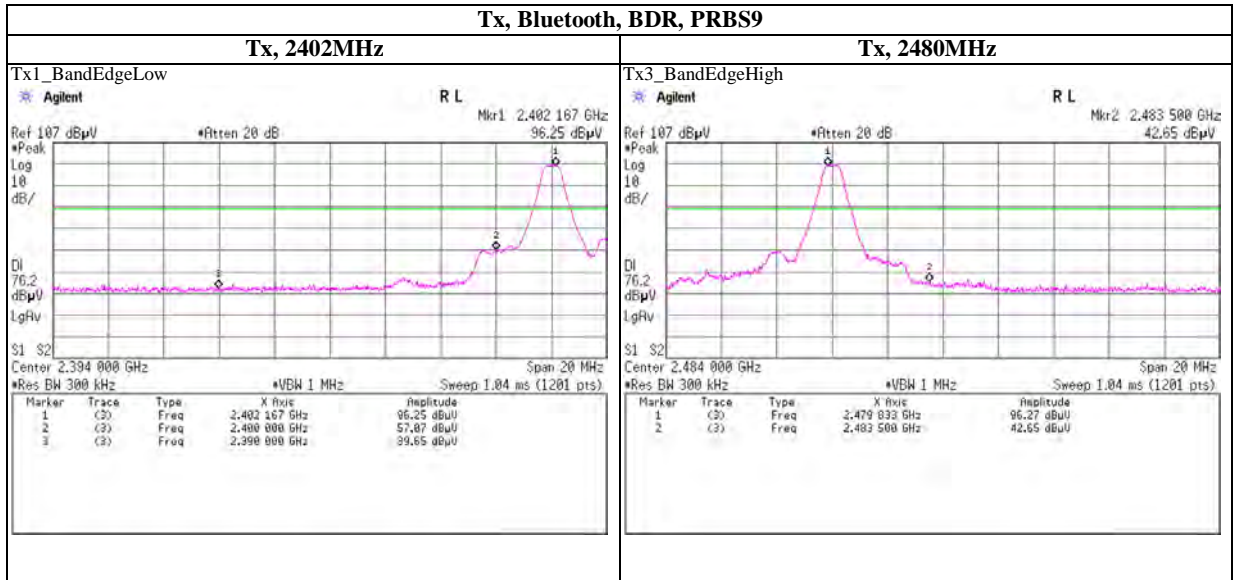
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

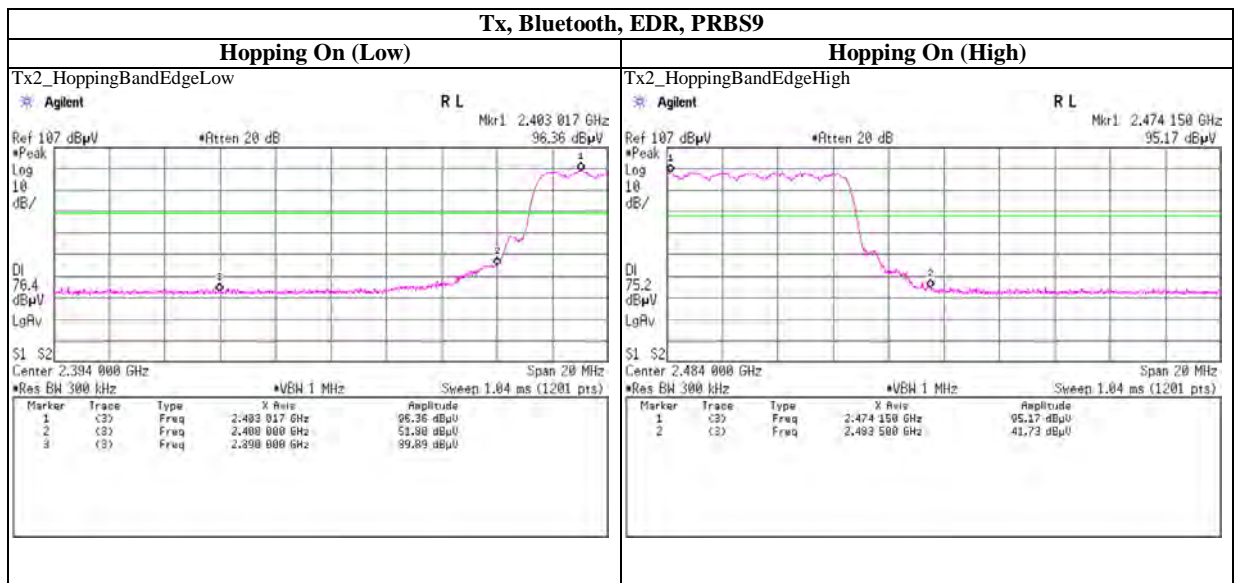
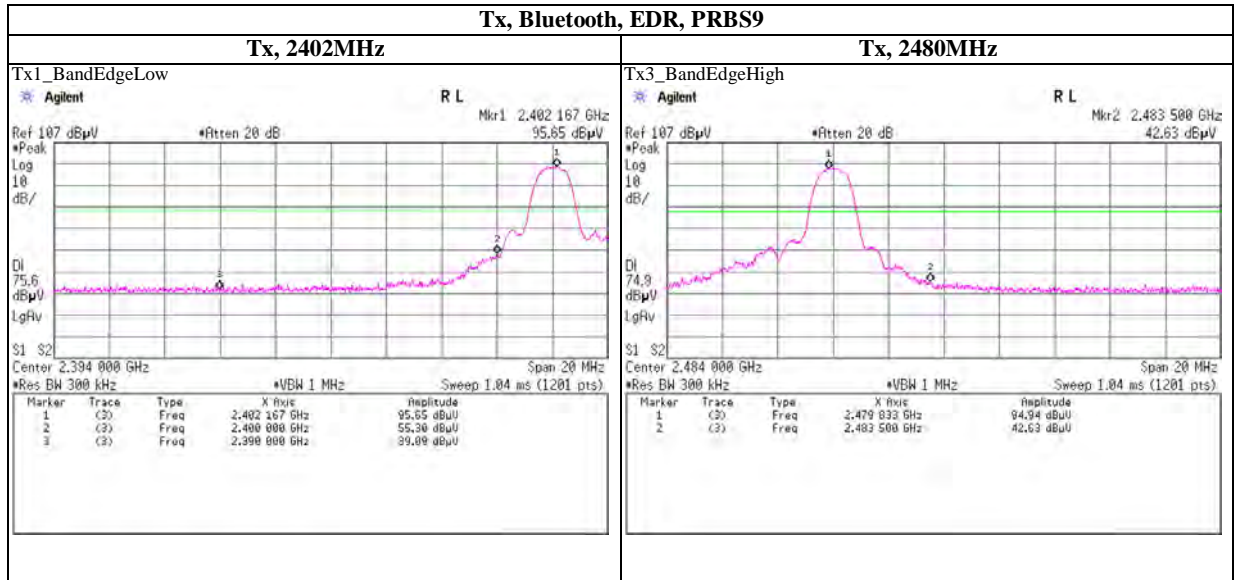
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

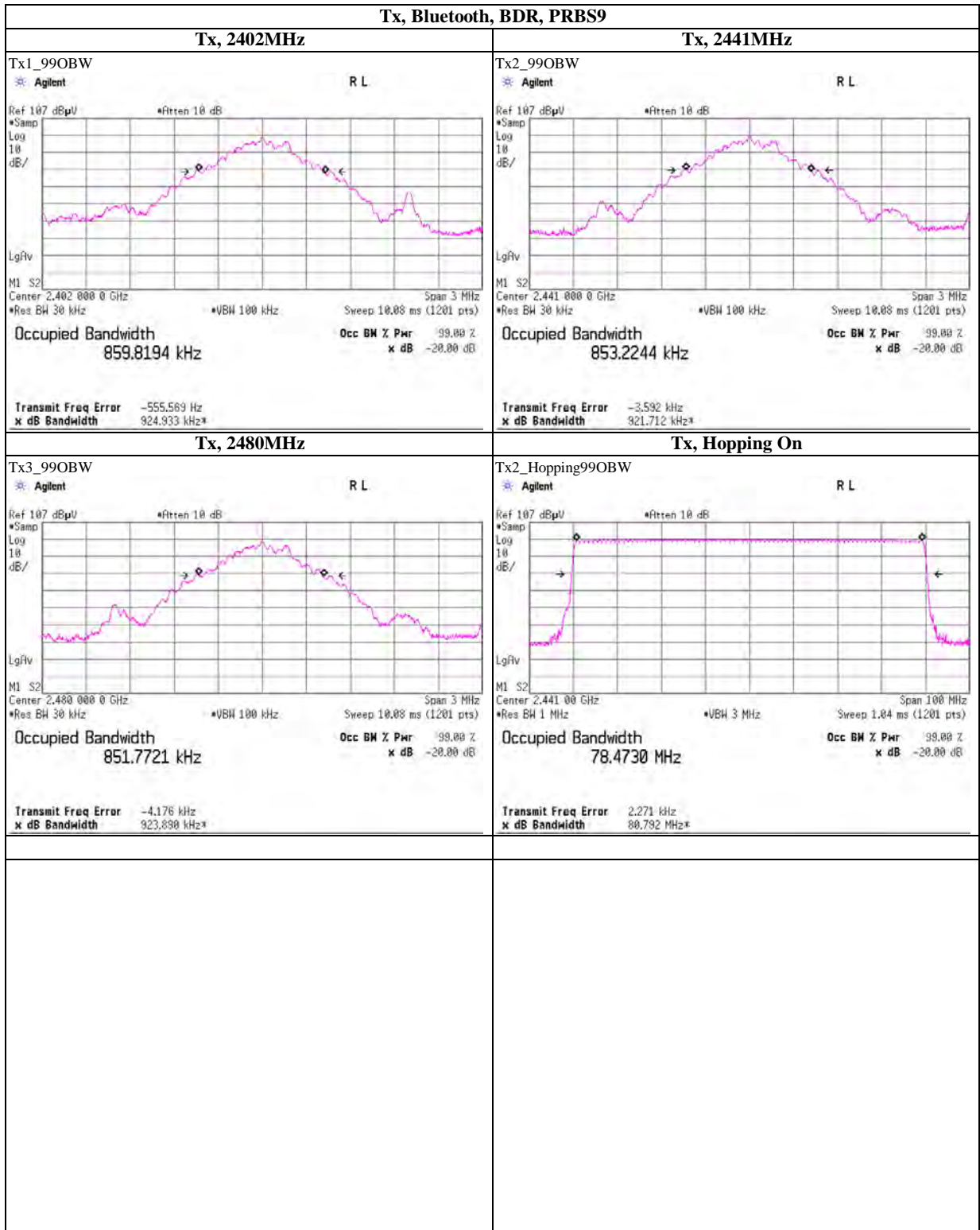
Shonan EMC Lab.

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99% Occupied Bandwidth



UL Japan, Inc.

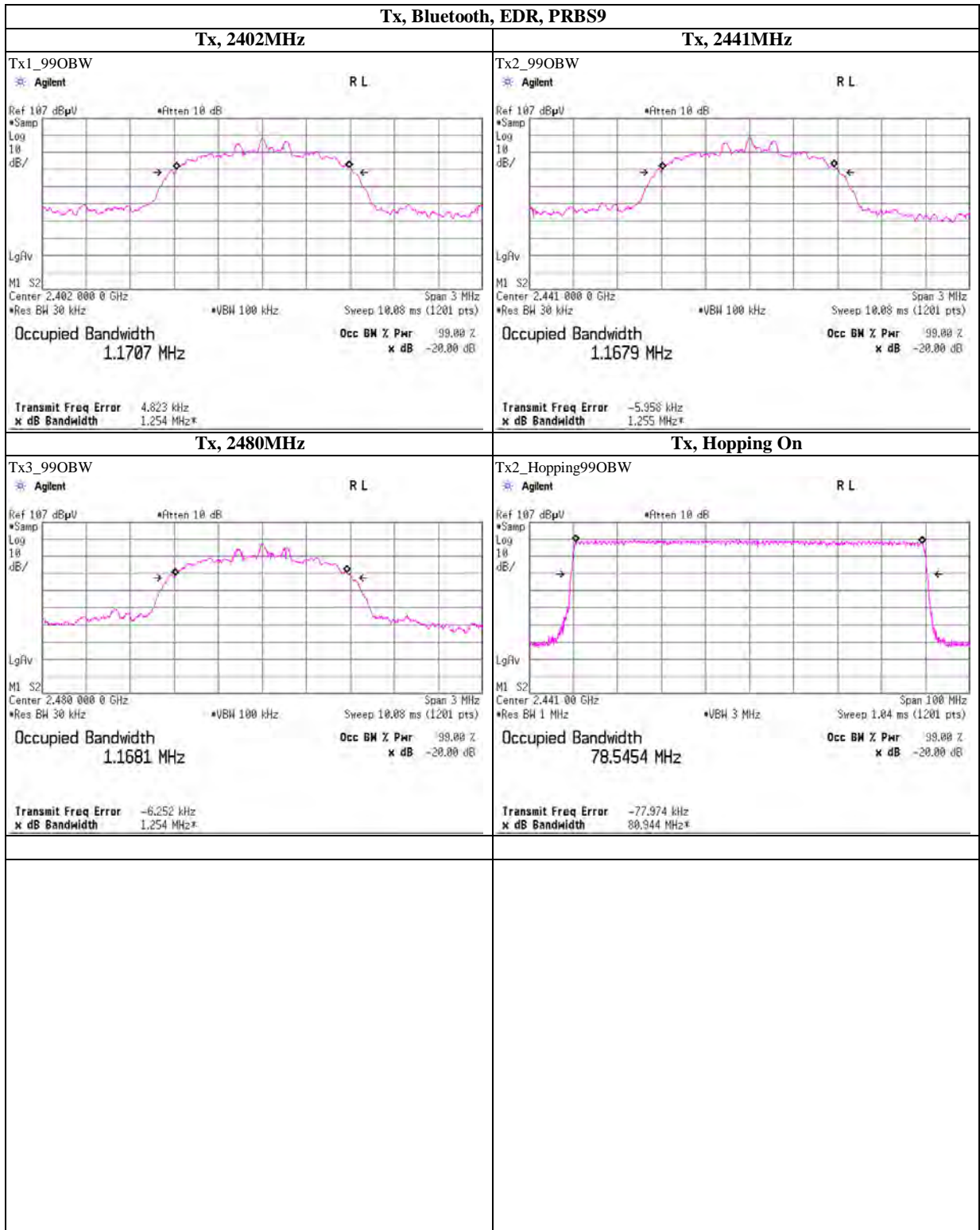
Shonan EMC Lab.

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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	2011/12/05 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2011/03/23 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2011/11/09 * 12
SOS-08	Humidity Indicator	A&D	AD-5681	4060109	AT	2011/03/02 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2011/04/12 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2011/04/12 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2011/07/19 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2011/04/28 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2011/05/27 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2011/08/28 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2012/02/16 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RF1,MF)	-	RE	-
SAT20-01	Attenuator(above 1GHz)	Agilent	8493C-020	74889	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2011/03/15 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2011/03/16 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2011/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271 (RF Selector)	RE	2011/04/28 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	RE	2011/07/28 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 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 .

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 conducted tests