



RADIO TEST REPORT

Test Report No.: 32HE0239-SH-01-A

Applicant : Sony Corporation
Type of Equipment : Wireless Speaker System
Model No. : SRS-BTD70
FCC ID : AK8SRSTBD70
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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Date of test: April 5 to 10, 2012

Tested by: S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : T. Anamura

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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13-EM-F0429

Contents

	<u>Page</u>
SECTION 1: Customer information	4
SECTION 2: Equipment under test (E.U.T.)	4
SECTION 3: Test specification, procedures & results	5
SECTION 4: Operation of E.U.T. during testing	8
SECTION 5: Conducted emission	10
SECTION 6: Carrier frequency separation	11
SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)	11
SECTION 8: Number of hopping frequency	11
SECTION 9: Dwell time	11
SECTION 10: Maximum peak output power	11
SECTION 11: Spurious emissions (Antenna port conducted)	11
SECTION 12: Radiated emission	12
Contents of APPENDIXES	14
APPENDIX 1: Data of radio tests	15
APPENDIX 2: Test instruments	56
APPENDIX 3: Photographs of test setup	57

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SECTION 1: Customer information

Company Name : Sony Corporation
Address : Shinagawa INTERCITY C Tower 2-15-3, Konan, Minato-ku, Tokyo, 108-6201
Japan
Telephone Number : +81-3-5769-5640
Facsimile Number : +81-3-5769-5996
Contact Person : Toshihiro Maeda

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

2.1 Identification of E.U.T.

Type of equipment : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : Refer to clause 4.2
Rating : DC 5.2V
Country of Mass-production : China
Condition of EUT : Engineering prototype
(Not for sale: This sample is not mass-produced items.)
Receipt Date of Sample : March 26, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: SRS-BTD70 (referred to as the EUT in this report) is a Wireless Speaker System.

Clock frequency(ies) in the system : 26MHz, 12MHz, 16.368MHz

<Radio part>

[FHSS: Bluetooth]

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth / Channel spacing : 79MHz & 1MHz
Type of modulation : FHSS(GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Chip Antenna
Antenna connector type : None
Antenna gain : 2.5dBi
ITU code : F1D, G1D
Operation temperature range : 0 to +45 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 32HE0239-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	4.3dB Freq.: 0.40526MHz Detector: Average Phase: L1 Mode: Tx 2441MHz, DH5	Complied	
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		8.0dB Freq.: 319.999MHz Polarization: Horizontal Detection: Quasi-Peak Mode: Tx 2402MHz, DH5	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422							

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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	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 (±)
Conducted emission (AC Mains) AMN/LISN	9kHz-150kHz	4.0 dB	4.0 dB	3.9 dB
	150kHz-30MHz	3.6 dB	3.6 dB	3.6 dB
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

Conducted emission test

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

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

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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 (DH5/3-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
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3-DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3-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.

*EUT has the power settings by the software as follows;

Power settings: BDR:44, EDR:48

Software: CSR BlueTest 3 (Version: 2.4.00)

BTCLiCtrl (Version: 2.4.00)_Inquiry mode

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

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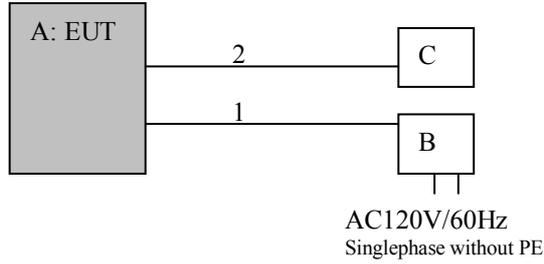
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4.2 Configuration of tested system



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Speaker System	SRS-BTD70	73 *1), 21 *2)	Sony Corporation	EUT
B	AC Adaptor	AC-E5212	AD71978	Sony Corporation	-
C	iPod nano	A1320	YM005VWJ71Y	Apple	-

*1) Used for Spurious emissions tests (Radiated)

*2) Used for Antenna Terminal Conducted tests

List of cables used

No.	Item	Length(m)	Shield		Remarks
			Cable	Connector	
1	DC	1.8	Unshielded	Unshielded	-
2	Stereo mini	3.6	Shielded	Shielded	-

*All cables used for the measurement are exclusive use or marketed.

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SECTION 5: Conducted emission

5.1 Operating environment

Temperature : See test data (APPENDIX)
Humidity : See test data (APPENDIX)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment. Photographs of the set up are shown in APPENDIX.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via AC Adapter within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX

SECTION 6: 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 7: 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 8: 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 9: 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 10: 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 11: 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 12: Radiated emission

12.1 Operating environment

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

Temperature : See test data (APPENDIX)

Humidity : See test data (APPENDIX)

12.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

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.

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.

12.3 Test conditions

Frequency range : 30MHz to 25GHz

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

EUT position : Table top

12.4 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 and spectrum analyzer.

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 and Y 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:

	Horizontal	Vertical
Carrier	Y	X
Below 1GHz	X	Y
1-2.8GHz	Y	X
2.8-25GHz	X	X

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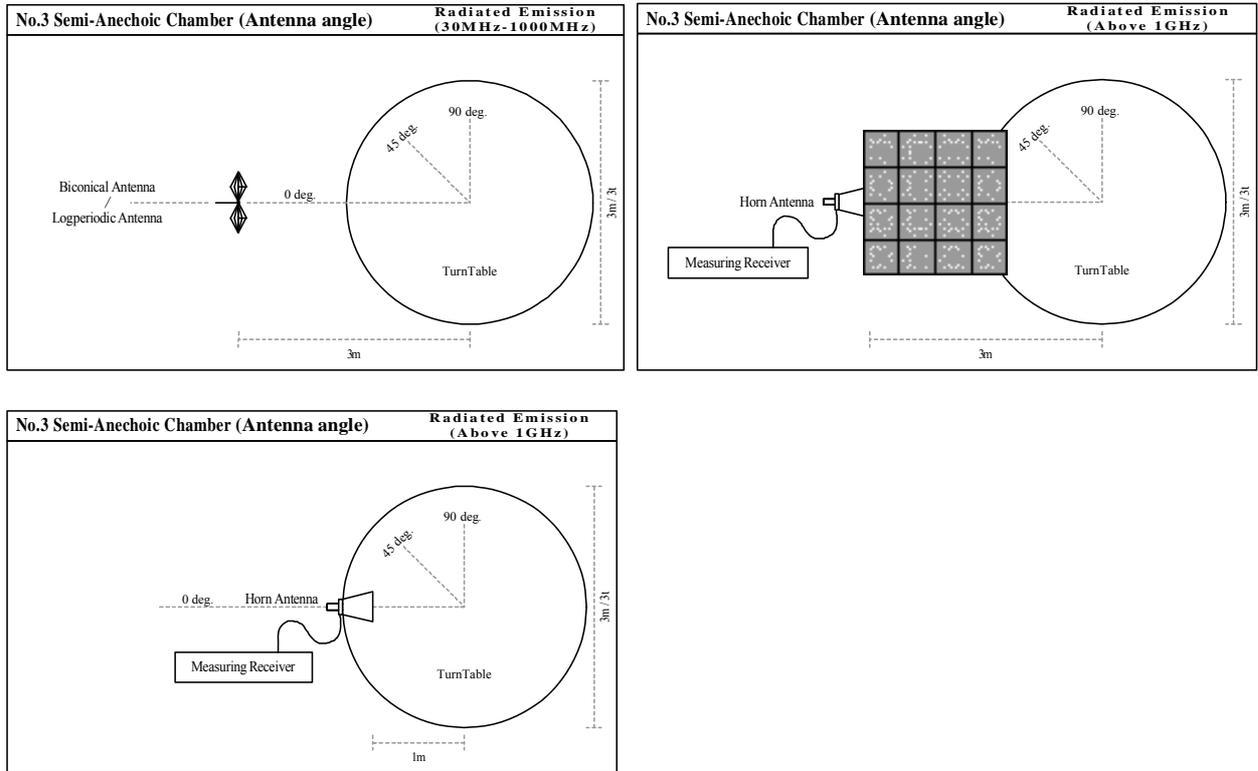
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Figure 1. Antenna angle



12.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data.

12.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
Refer to APPENDIX

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
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

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APPENDIX 1: Data of Radio tests

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/04/10

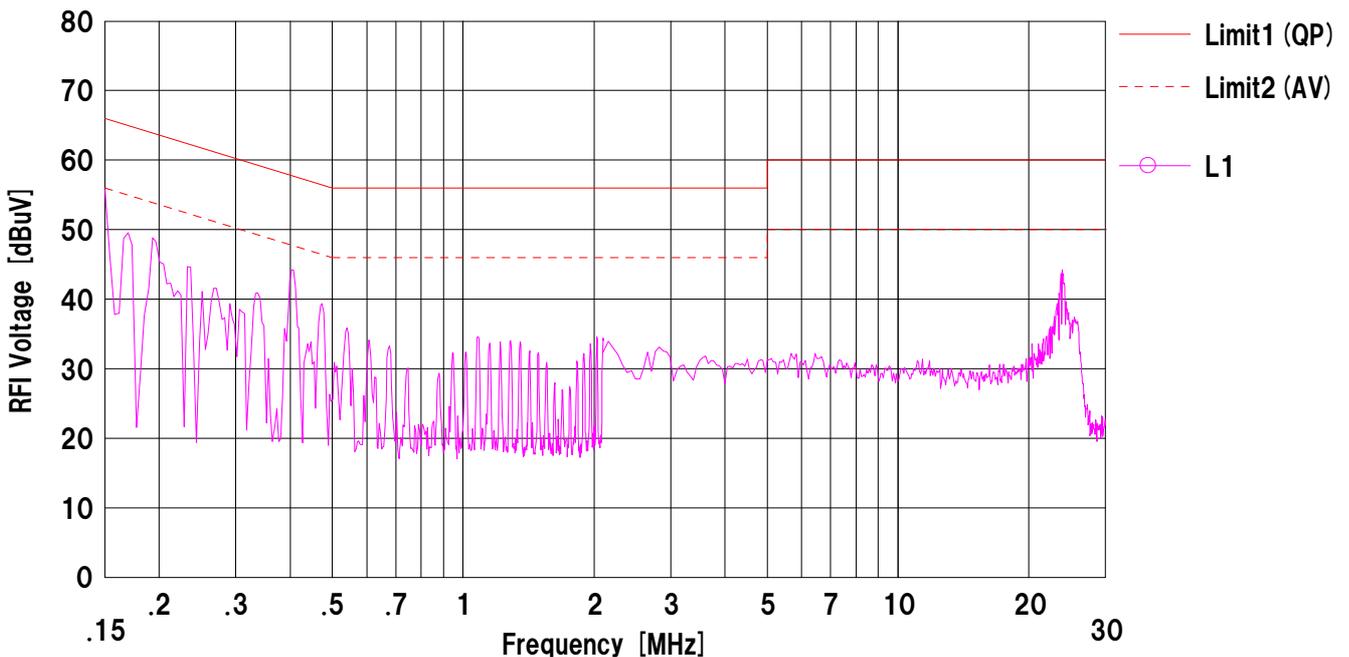
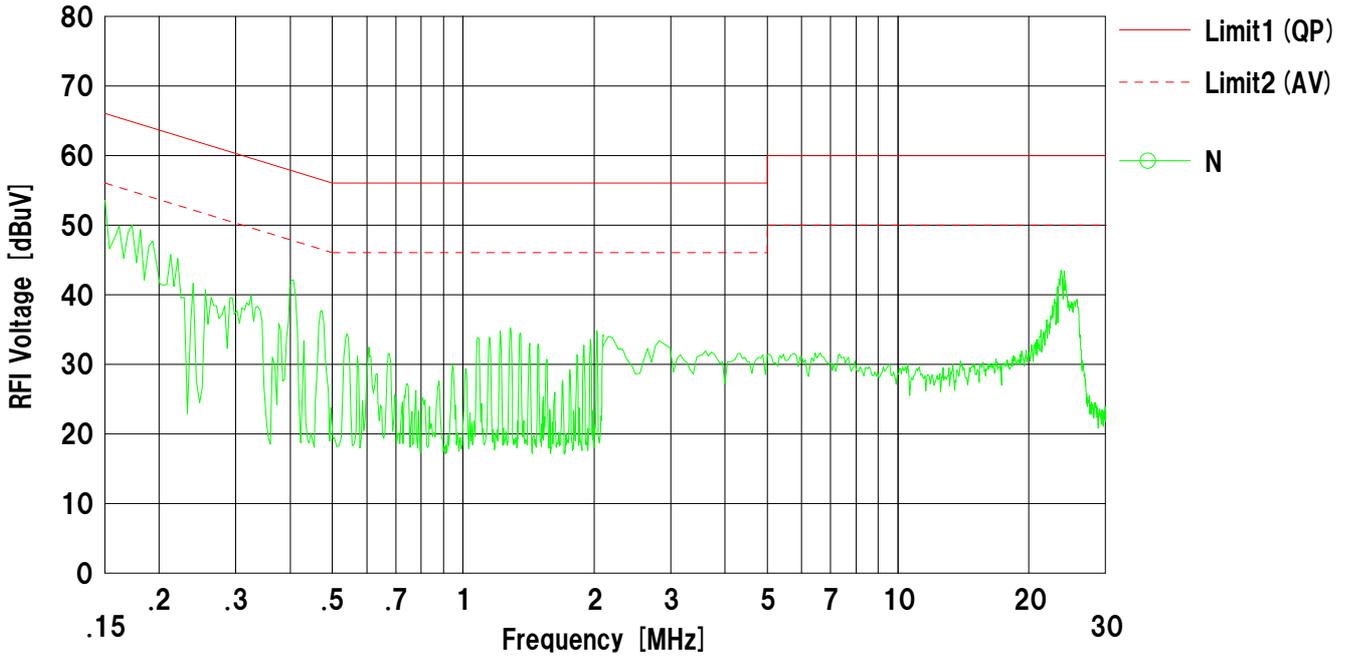
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2402MHz (DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



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

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/04/10

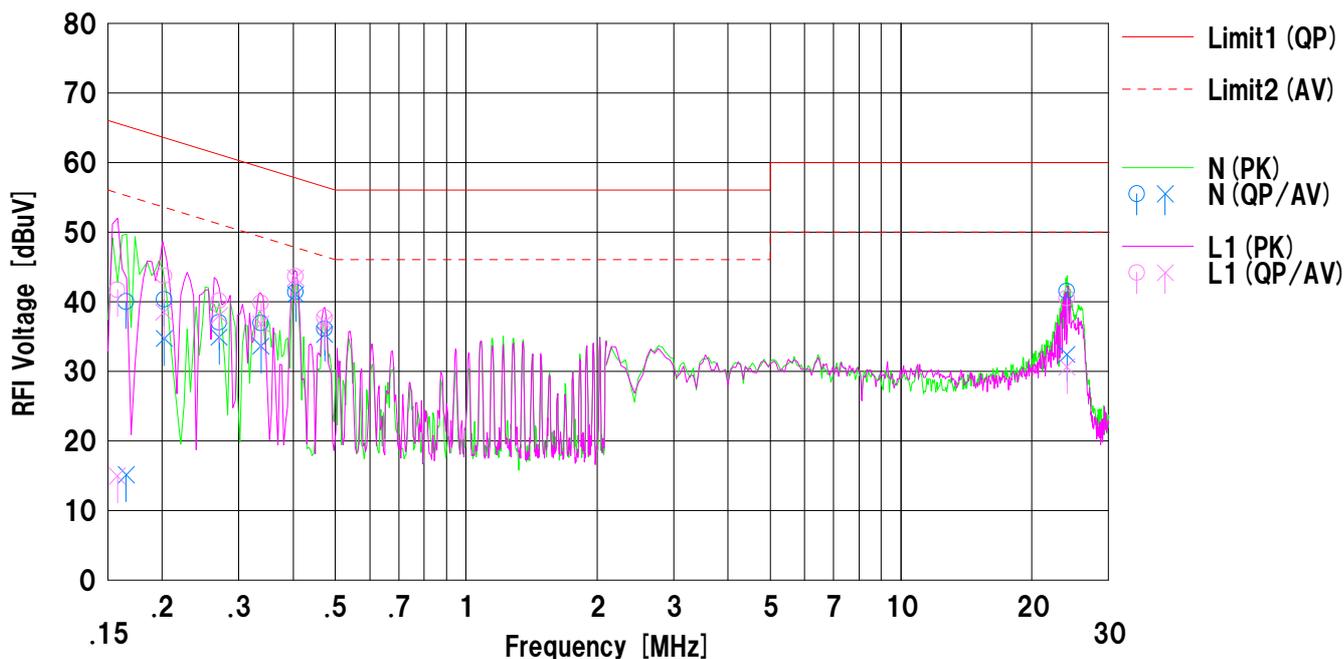
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2441MHz (DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.16522	27.2	2.3	12.8	40.0	15.1	65.1	55.1	25.1	40.0	N	
2	0.20213	27.5	21.9	12.8	40.3	34.7	63.5	53.5	23.2	18.8	N	
3	0.27021	24.2	22.1	12.8	37.0	34.9	61.1	51.1	24.1	16.2	N	
4	0.33760	24.1	20.8	12.8	36.9	33.6	59.2	49.2	22.3	15.6	N	
5	0.40545	28.6	28.2	12.8	41.4	41.0	57.7	47.7	16.3	6.7	N	
6	0.47284	23.3	22.5	12.8	36.1	35.3	56.4	46.4	20.3	11.1	N	
7	24.06214	27.4	18.3	14.1	41.5	32.4	60.0	50.0	18.5	17.6	N	
8	0.15779	28.9	2.1	12.8	41.7	14.9	65.5	55.5	23.8	40.6	L1	
9	0.20190	30.9	25.7	12.8	43.7	38.5	63.5	53.5	19.8	15.0	L1	
10	0.27058	27.3	25.2	12.8	40.1	38.0	61.1	51.1	21.0	13.1	L1	
11	0.33742	27.0	24.0	12.8	39.8	36.8	59.2	49.2	19.4	12.4	L1	
12	0.40526	30.8	30.6	12.8	43.8	43.4	57.7	47.7	14.1	4.3	L1	
13	0.47281	24.9	24.2	12.8	37.7	37.0	56.4	46.4	18.7	9.4	L1	
14	24.06012	26.4	16.5	14.1	40.5	30.6	60.0	50.0	19.5	19.4	L1	

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

DATA OF CONDUCTED EMISSION TEST

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Date : 2012/04/10

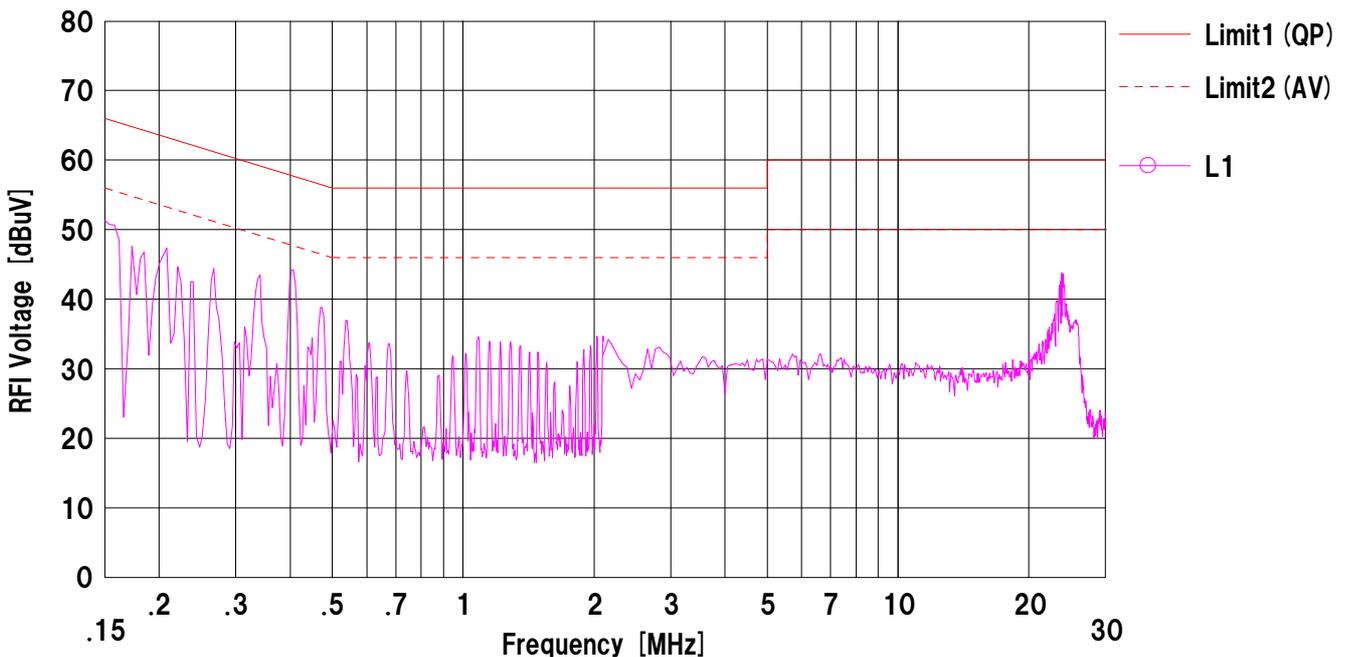
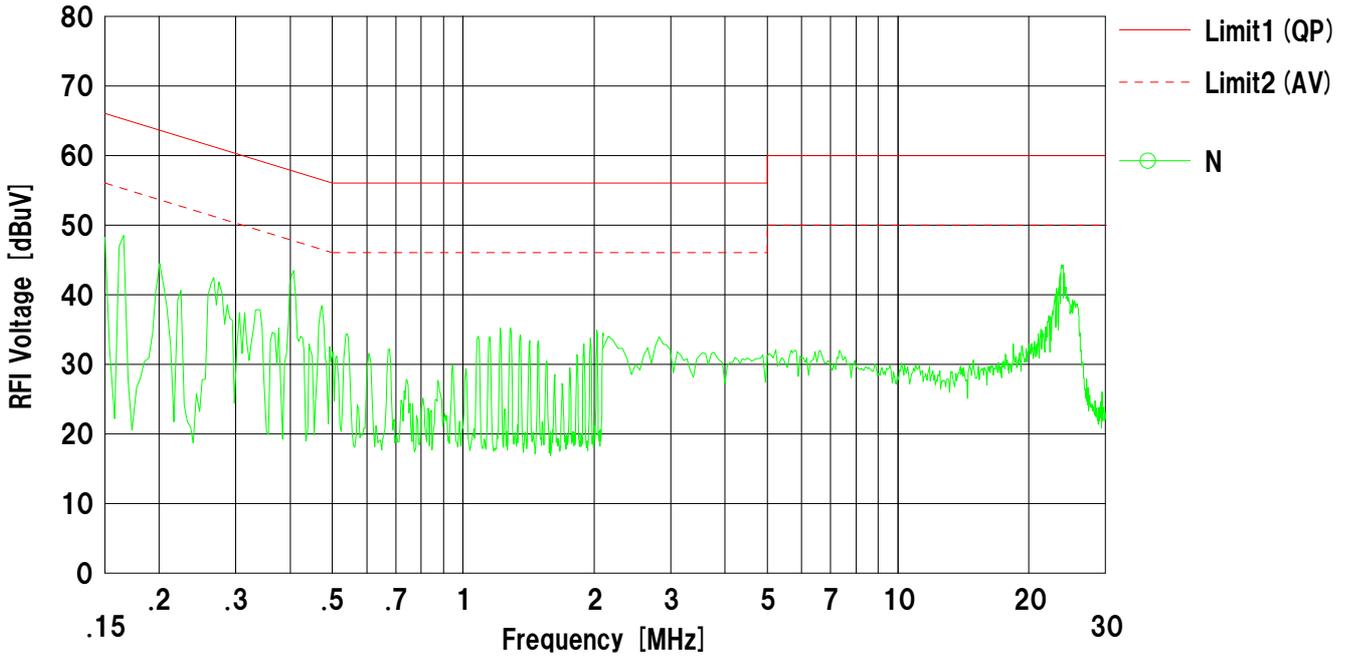
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2480MHz (DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



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

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/04/10

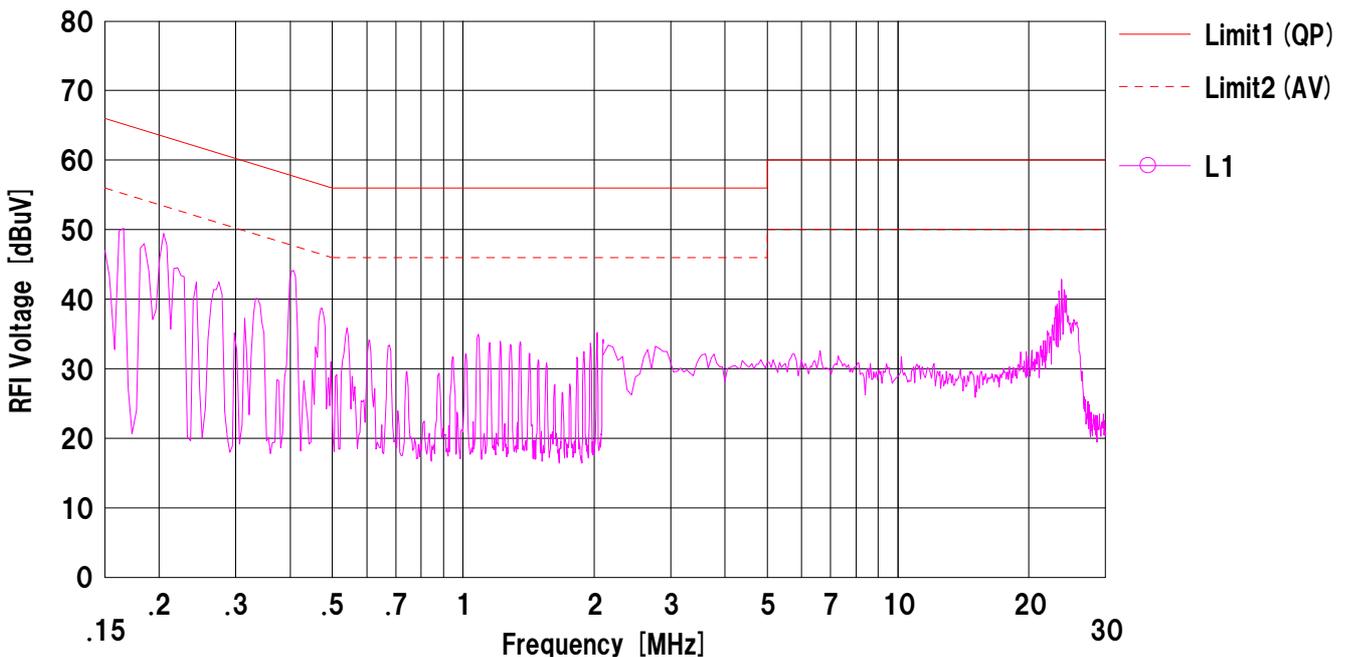
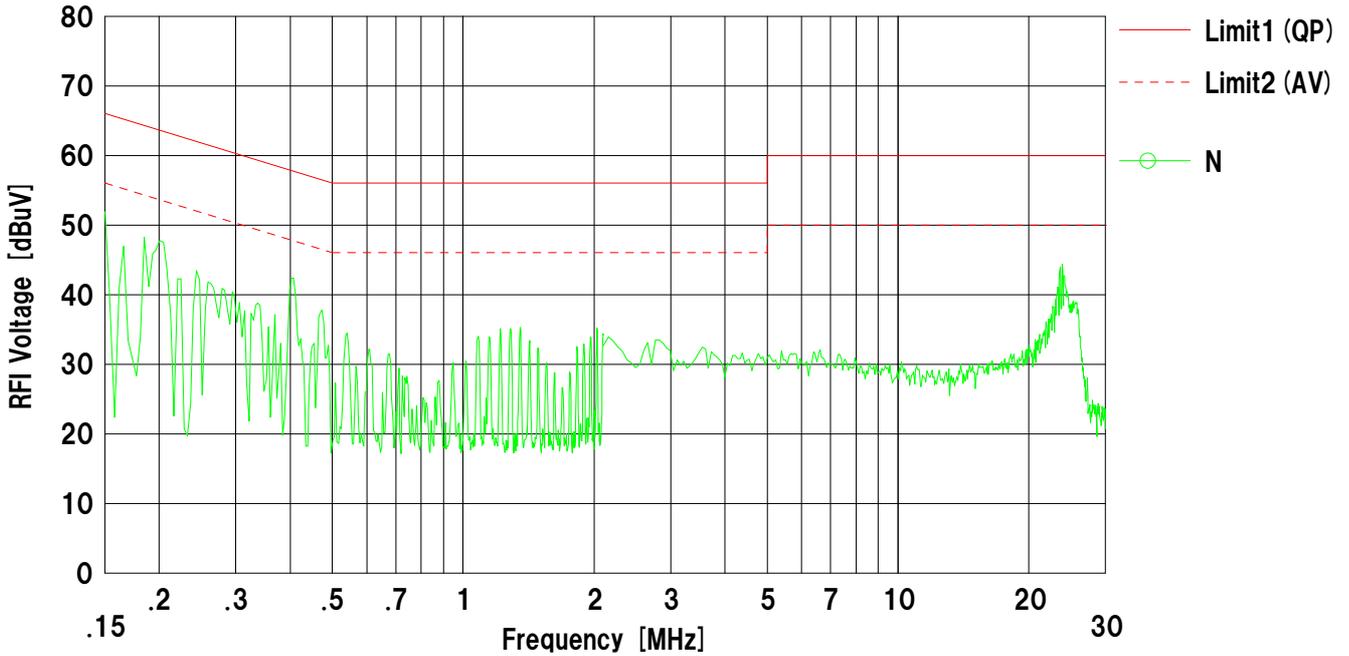
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2402MHz (3-DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



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

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/04/10

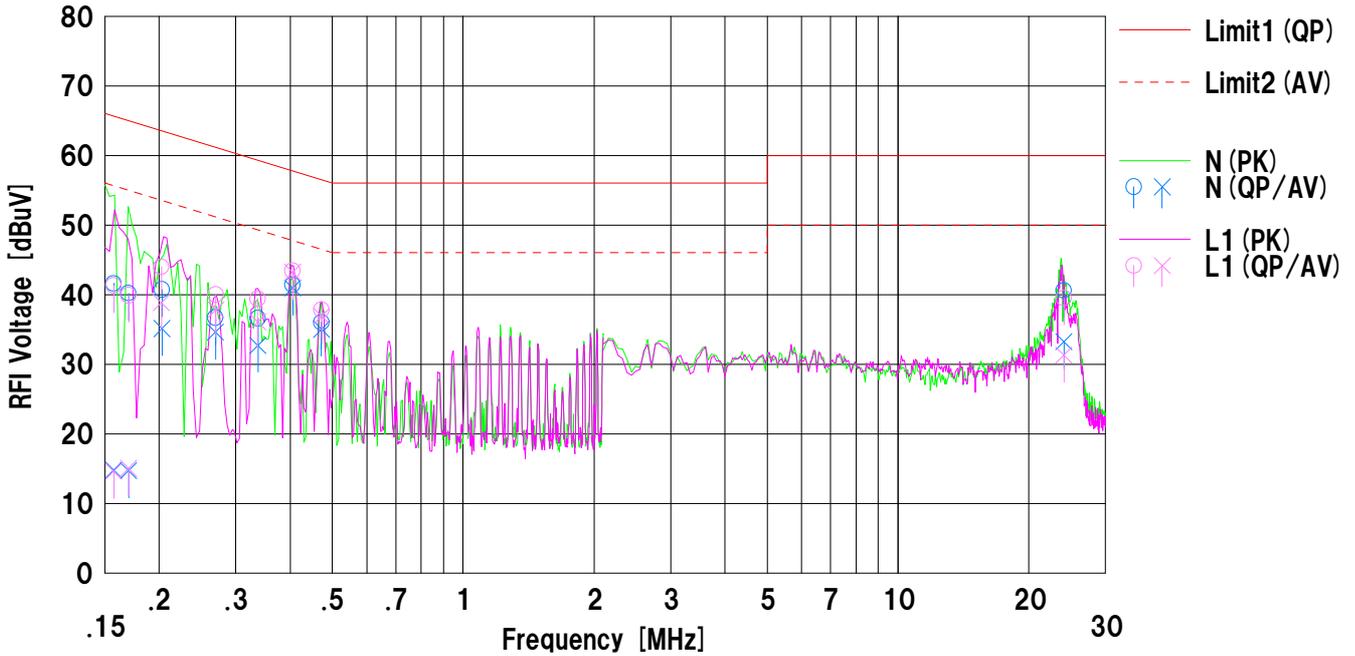
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2441MHz (3-DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15718	28.8	2.0	12.8	41.6	14.8	65.6	55.6	24.0	40.8	N	
2	0.17003	27.4	1.9	12.8	40.2	14.7	64.9	54.9	24.7	40.2	N	
3	0.20320	27.9	2.23	12.8	40.7	35.1	63.4	53.4	22.7	18.3	N	
4	0.26944	23.9	21.8	12.8	36.7	34.6	61.1	51.1	24.4	16.5	N	
5	0.33747	23.8	19.9	12.8	36.6	32.7	59.2	49.2	22.6	16.5	N	
6	0.40569	28.6	28.1	12.8	41.4	40.9	57.7	47.7	16.3	6.8	N	
7	0.47248	23.2	22.2	12.8	36.0	35.0	56.4	46.4	20.4	11.4	N	
8	24.07288	26.5	19.1	14.1	40.6	33.2	60.0	50.0	19.4	16.8	N	
9	0.15715	28.5	1.8	12.8	41.3	14.6	65.6	55.6	24.3	41.0	L1	
10	0.17015	27.1	2.2	12.8	39.9	15.0	64.9	54.9	25.0	39.9	L1	
11	0.20242	31.2	26.0	12.8	44.0	38.8	63.5	53.5	19.5	14.7	L1	
12	0.26984	27.2	25.0	12.8	40.0	37.8	61.1	51.1	21.1	13.3	L1	
13	0.33720	26.6	23.3	12.8	39.4	36.1	59.2	49.2	19.8	13.1	L1	
14	0.40540	30.6	30.4	12.8	43.4	43.2	57.7	47.7	14.3	4.5	L1	
15	0.47260	25.0	24.1	12.8	37.8	36.9	56.4	46.4	18.6	9.5	L1	
16	24.07072	25.4	17.2	14.1	39.5	31.3	60.0	50.0	20.5	18.7	L1	

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

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/04/10

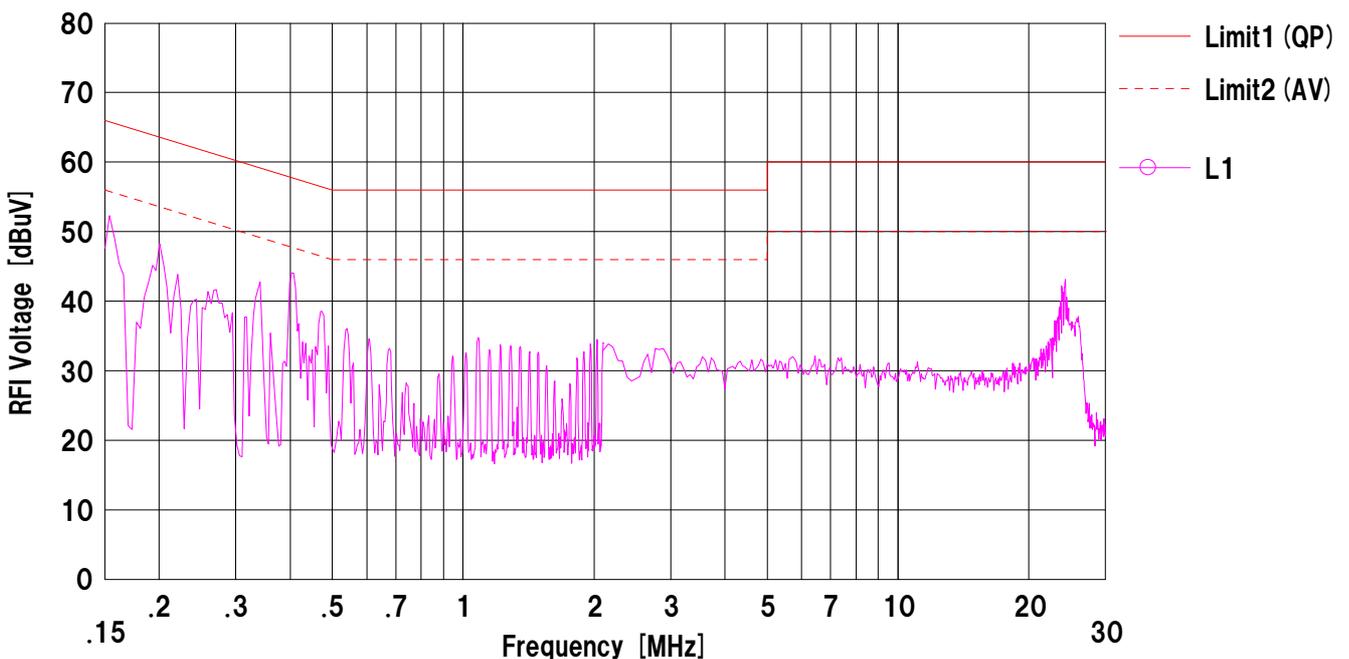
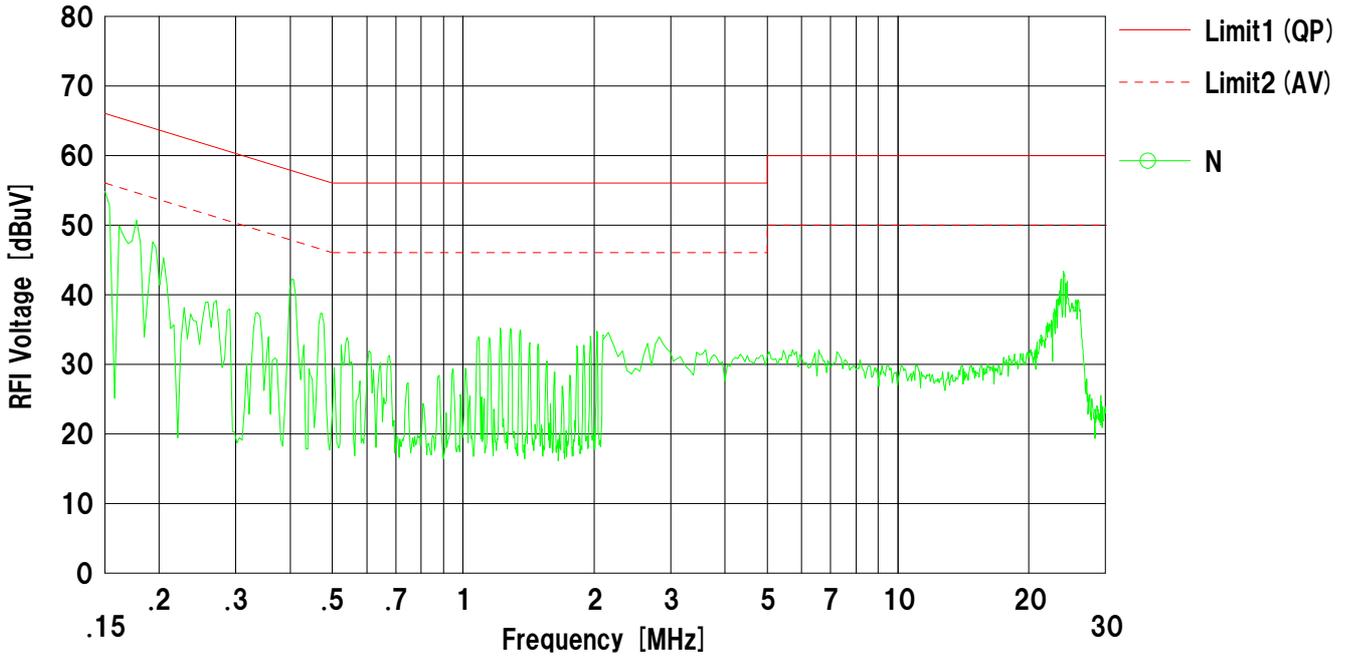
Company : Sony Corporation
Kind of EUT : Wireless Speaker System
Model No. : SRS-BTD70
Serial No. : 73

Mode : Transmitting 2480MHz (3-DH5)
Report No. : 32HE0239-SH-01-A
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 41%RH

Remarks : -

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

Engineer : Shinichi Takano



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

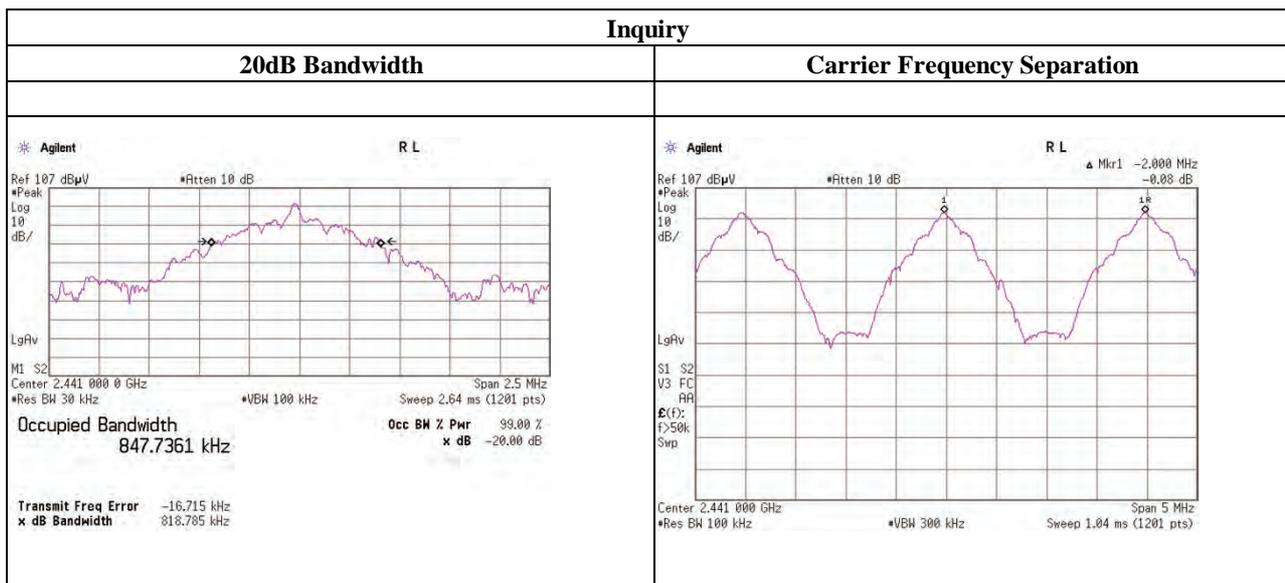
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/4/5	
Temperature / Humidity	21 deg.C , 38 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.930	1.000	≥ 0.620
DH5	2441.0	0.931	1.000	≥ 0.621
DH5	2480.0	0.928	1.000	≥ 0.619
Inquiry	2441.0	0.819	2.000	≥ 0.546

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

No limit applies to 20dB Bandwidth.



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Shonan EMC Lab.

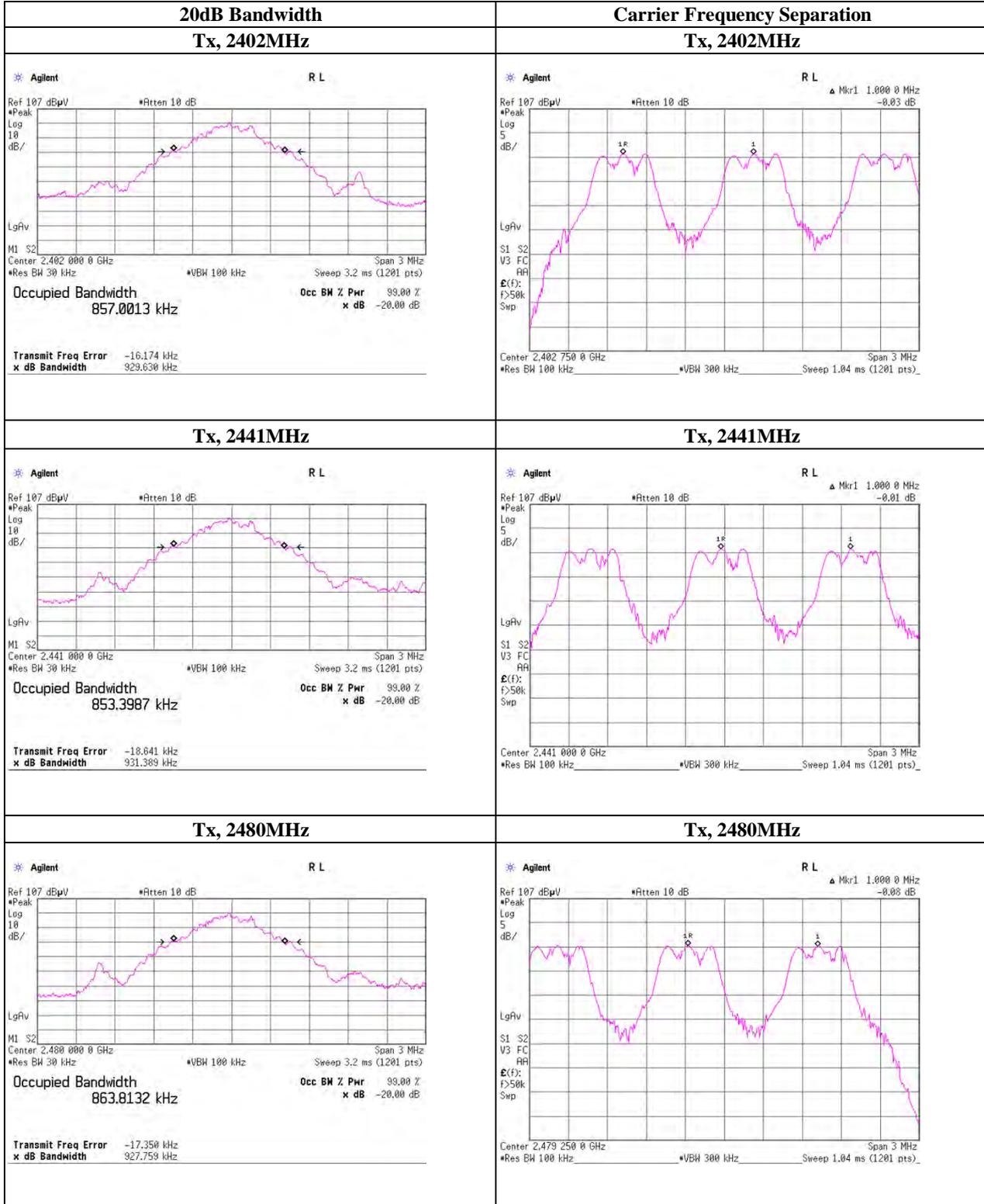
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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Shonan EMC Lab.

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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 2012/4/5
 Temperature / Humidity 21 deg.C , 38 %RH
 Engineer Makoto Hosaka
 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	1.292	1.000	>= 0.861
3-DH5	2441.0	1.263	1.000	>= 0.842
3-DH5	2480.0	1.260	1.000	>= 0.840

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

No limit applies to 20dB Bandwidth.

UL Japan, Inc.

Shonan EMC Lab.

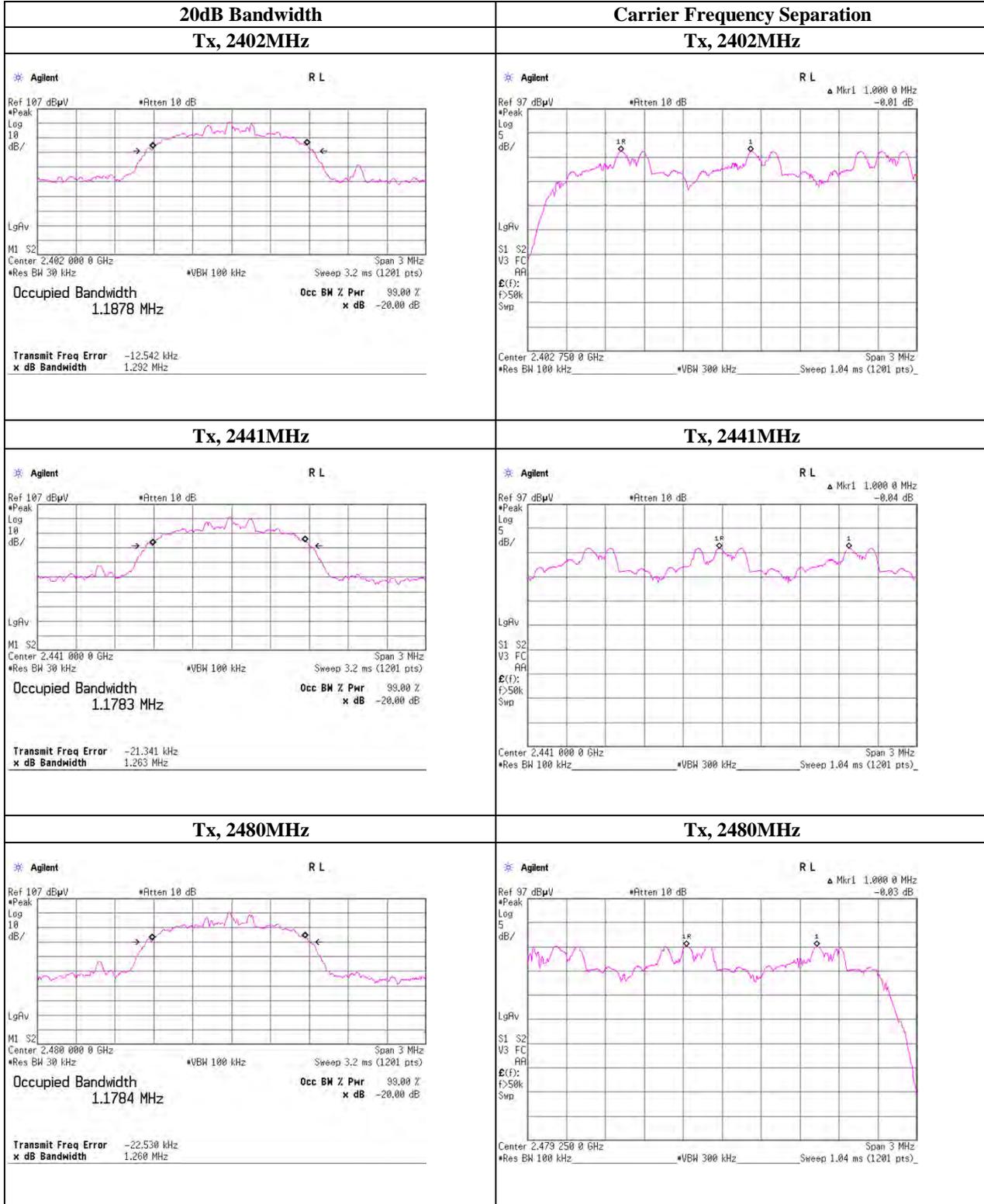
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



UL Japan, Inc.

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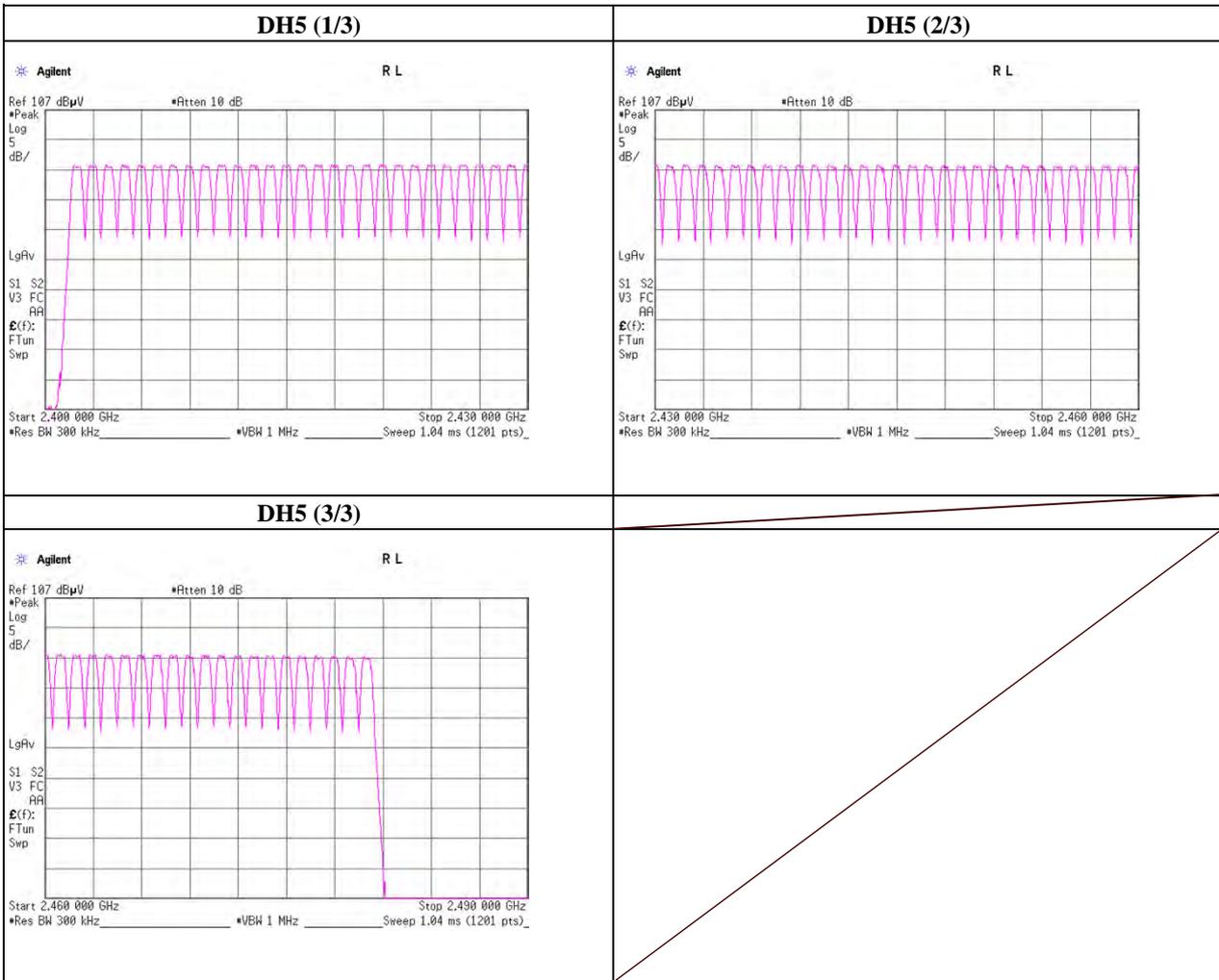
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/4/5	
Temperature / Humidity	21 deg.C , 38 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

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

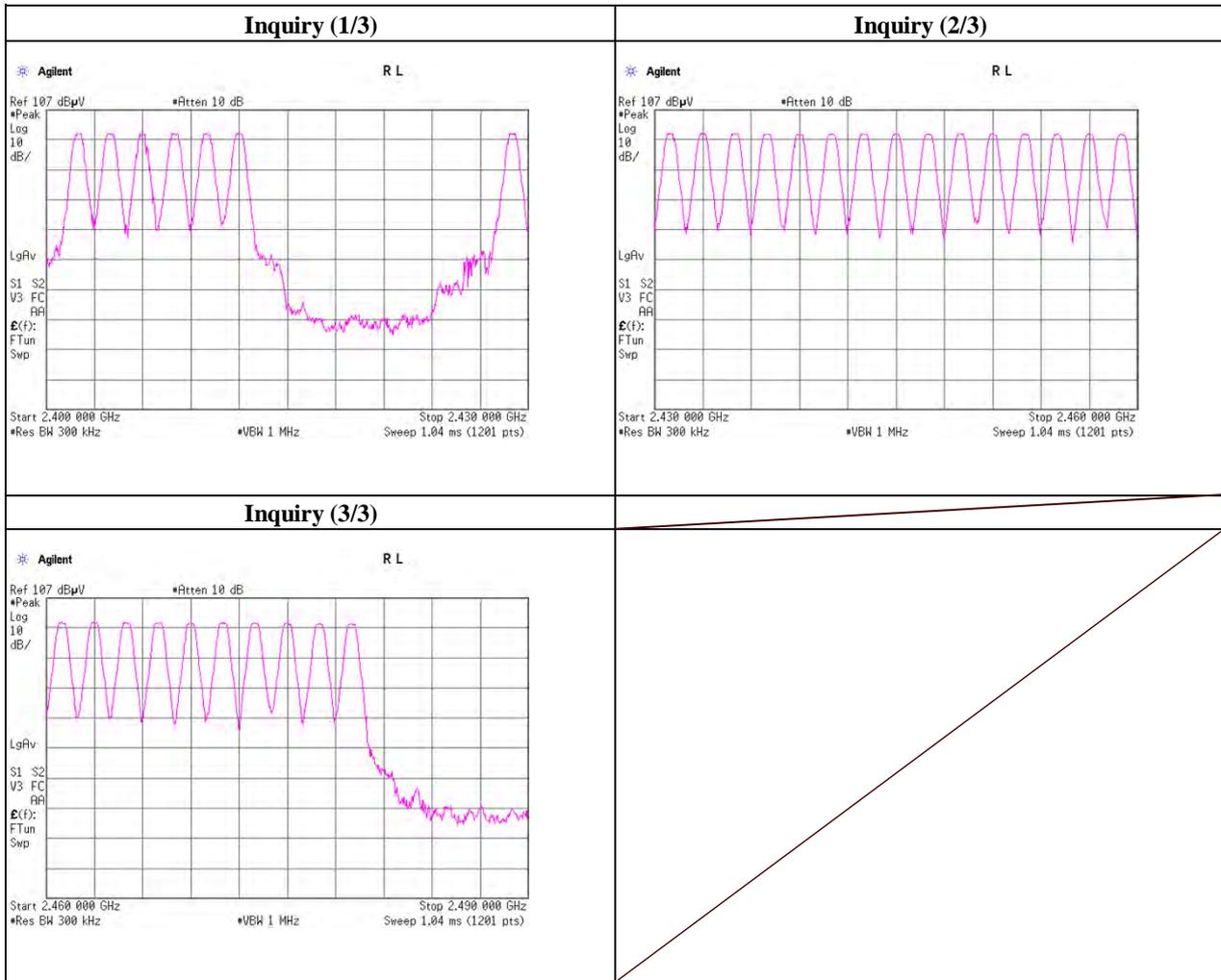


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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/4/5	
Temperature / Humidity	21 deg.C , 38 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, Inquiry	

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

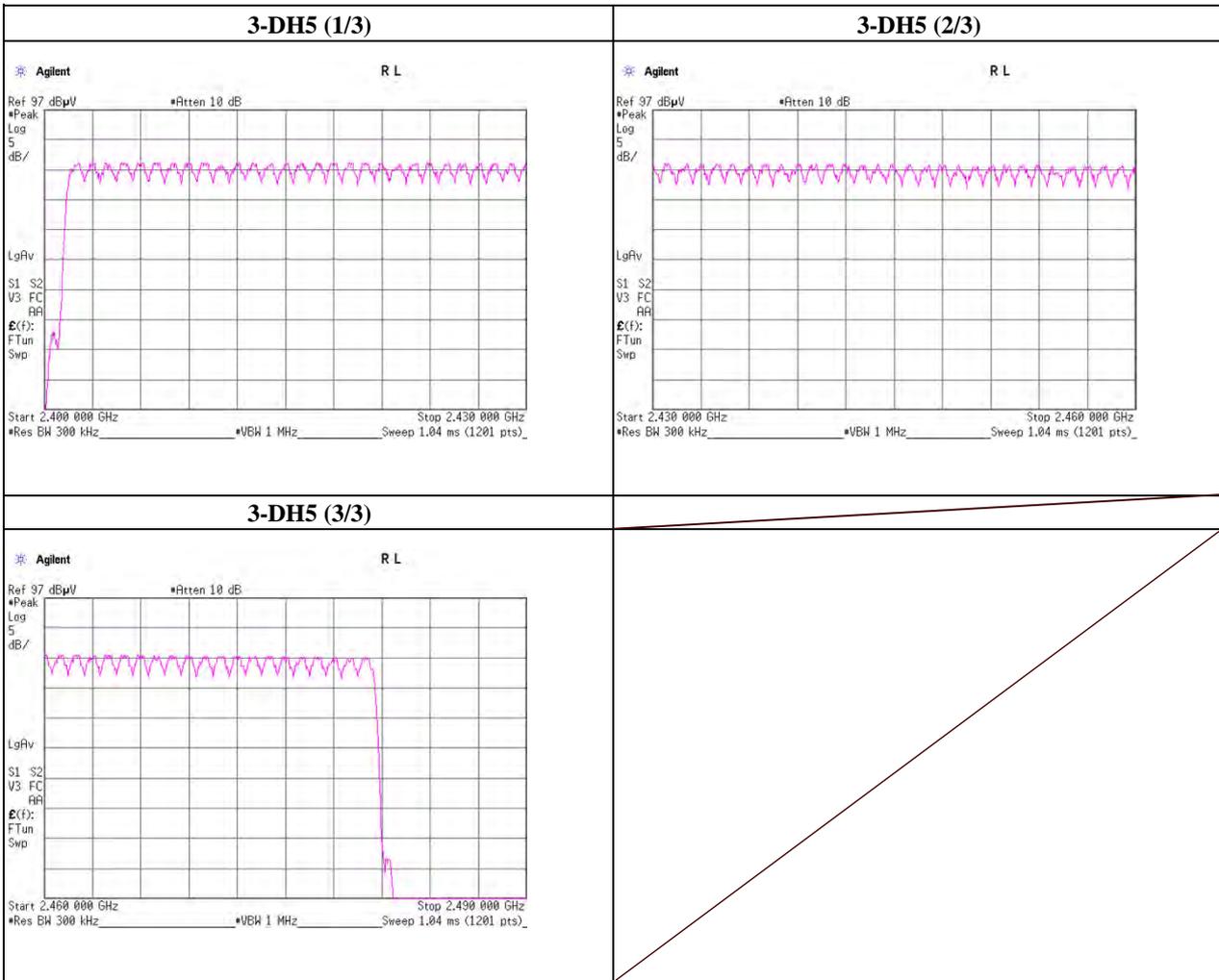


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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/4/5	
Temperature / Humidity	21 deg.C , 38 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

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



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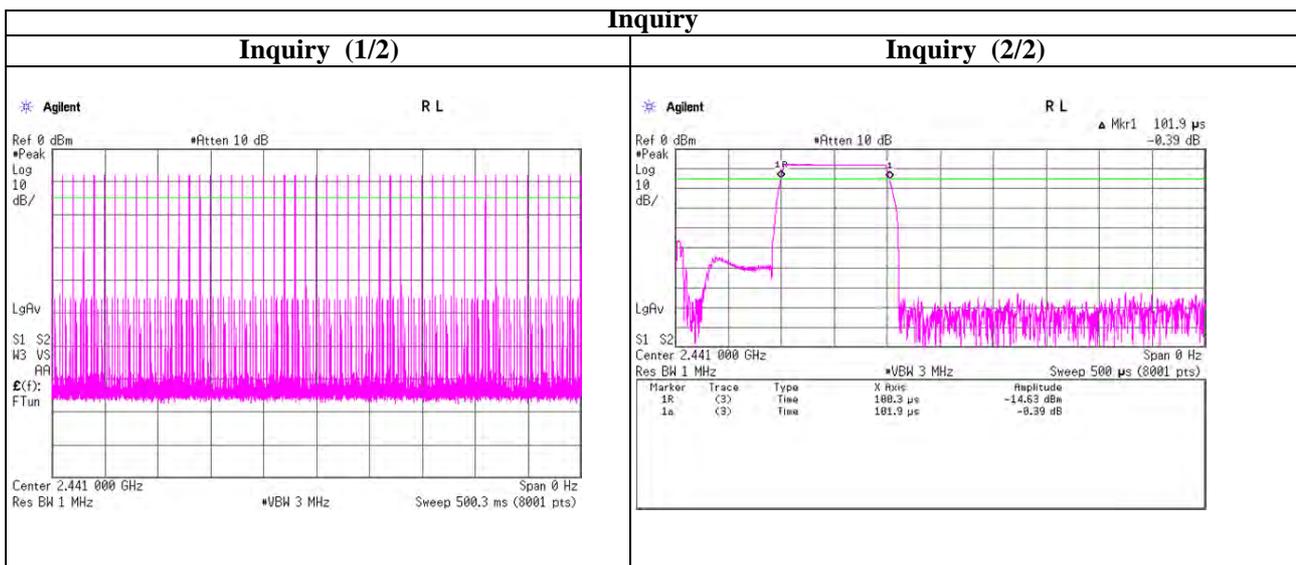
Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/4/5
 Temperature / Humidity 21 deg.C , 38 %RH
 Engineer Makoto Hosaka
 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	50.0 / 5.0 sec. x 31.6 sec. = 316 times	0.401	127	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.657	273	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.905	314	400
Inquiry	50.0 / 0.5 sec. x 12.8 sec. = 1280 times	0.102	130	400

Sample Calculation

Result = Number of transmission x Length of transmission time



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Shonan EMC Lab.

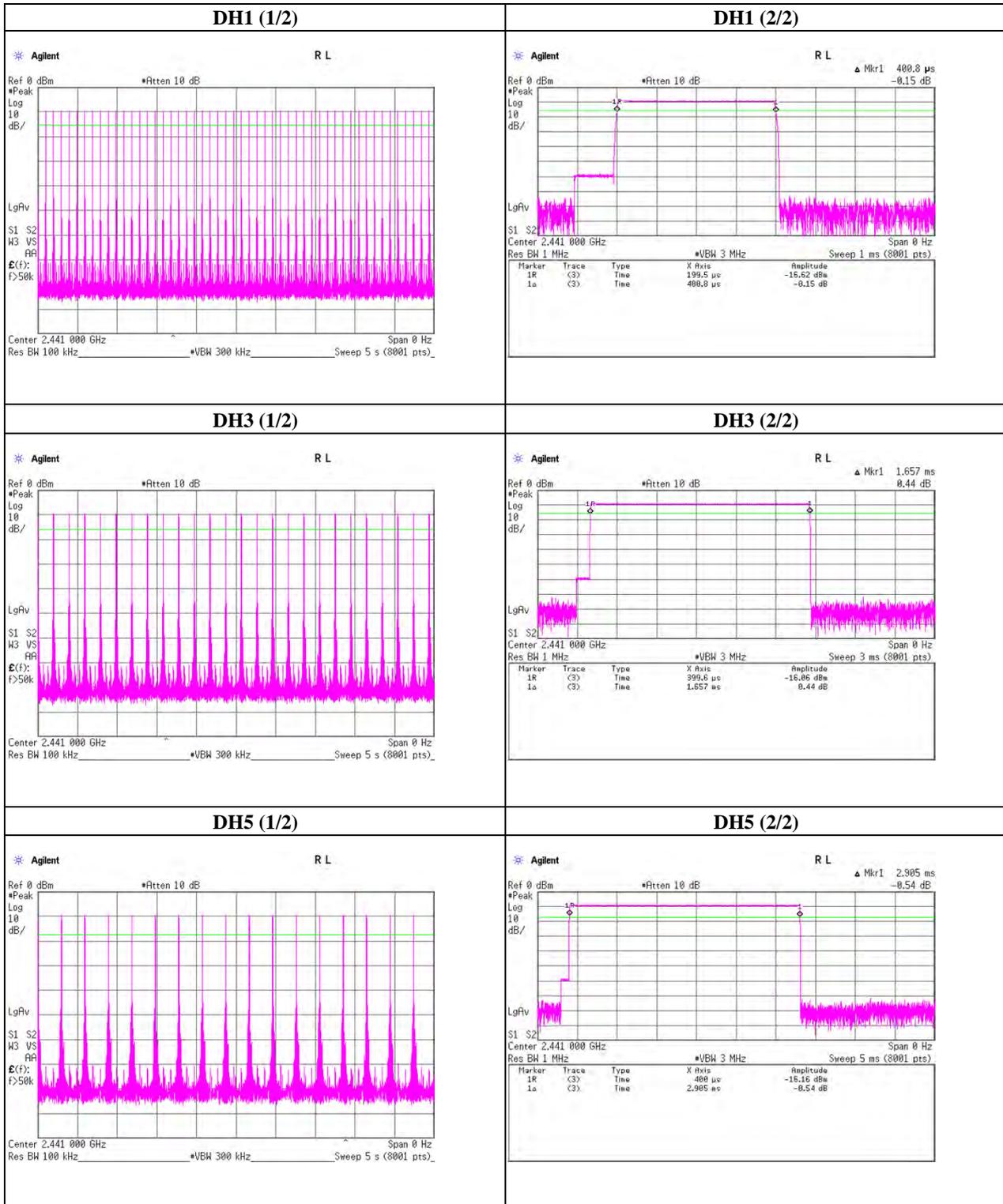
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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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 2012/4/5
 Temperature / Humidity 21 deg.C , 38 %RH
 Engineer Makoto Hosaka
 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	50.0 / 5.0 sec. x 31.6 sec. = 316 times	0.412	130	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.661	274	400
3-DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.911	314	400

Sample Calculation

Result = Number of transmission x Length of transmission time

UL Japan, Inc.

Shonan EMC Lab.

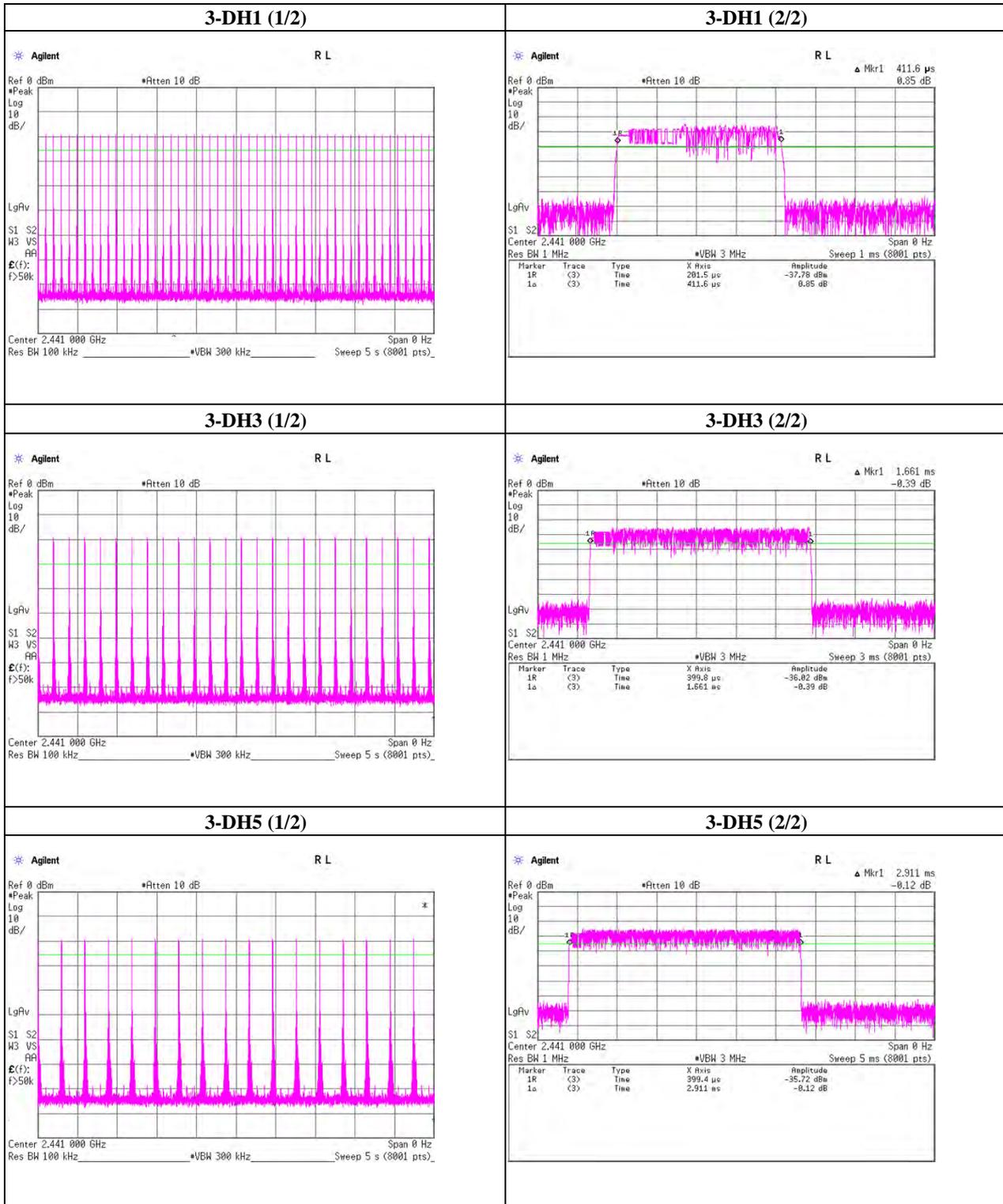
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/4/5
 Temperature / Humidity 21 deg.C , 38 %RH
 Engineer Makoto Hosaka
 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	-9.11	1.73	9.68	2.30	1.70	20.97	125	18.67
DH5	2441.0	-9.04	1.74	9.68	2.38	1.73	20.97	125	18.59
DH5	2480.0	-9.59	1.75	9.68	1.84	1.53	20.97	125	19.13
2-DH5	2402.0	-7.43	1.73	9.68	3.98	2.50	20.97	125	16.99
2-DH5	2441.0	-7.79	1.74	9.68	3.63	2.31	20.97	125	17.34
2-DH5	2480.0	-8.63	1.75	9.68	2.80	1.91	20.97	125	18.17
3-DH5	2402.0	-7.55	1.73	9.68	3.86	2.43	20.97	125	17.11
3-DH5	2441.0	-7.77	1.74	9.68	3.65	2.32	20.97	125	17.32
3-DH5	2480.0	-8.67	1.75	9.68	2.76	1.89	20.97	125	18.21

Sample Calculation:

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date April 9, 2012 April 10, 2012
Temperature / Humidity 25 deg.C , 27 %RH 23 deg.C , 48 %RH
Engineer Shinichi Takano 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.	319.991	QP	46.4	14.4	8.8	31.9		37.7	46.0	8.3	133	10	PK:VBW 3MHz
Hori.	328.073	QP	39.1	14.6	8.8	31.9		30.6	46.0	15.4	100	186	AV:VBW 10Hz
Hori.	1626.659	PK	49.6	25.4	13.1	40.9		47.2	73.9	26.7	119	216	
Hori.	3253.296	PK	51.5	29.0	5.4	41.6		44.3	73.9	29.6	124	158	
Hori.	4882.000	PK	59.2	31.2	5.9	40.9		55.4	73.9	18.5	111	201	
Hori.	7323.000	PK	46.6	36.8	7.5	41.4		49.5	73.9	24.4	100	0	
Hori.	9764.000	PK	45.7	38.5	8.6	38.8		54.0	73.9	19.9	100	0	
Hori.	12205.000	PK	45.1	39.3	10.2	39.2		55.4	73.9	18.5	100	0	
Hori.	1626.659	AV	43.5	25.4	13.1	40.9		41.1	53.9	12.8	119	216	
Hori.	3253.296	AV	45.8	29.0	5.4	41.6		38.6	53.9	15.3	124	158	
Vert.	30.003	QP	33.9	18.0	6.4	32.2		26.1	40.0	13.9	100	17	
Vert.	160.007	QP	39.6	15.2	7.8	32.1		30.5	43.5	13.0	100	264	
Vert.	288.102	QP	35.4	18.6	8.6	32.0		30.6	46.0	15.4	100	130	
Vert.	319.994	QP	44.7	14.4	8.8	31.9		36.0	46.0	10.0	100	33	
Vert.	1626.649	PK	49.5	25.4	13.1	40.9		47.1	73.9	26.8	100	144	
Vert.	3254.475	PK	52.7	29.0	5.4	41.6		45.5	73.9	28.4	100	156	
Vert.	4882.000	PK	56.0	31.2	5.9	40.9		52.2	73.9	21.7	100	263	
Vert.	7323.000	PK	45.1	36.8	7.5	41.4		48.0	73.9	25.9	100	0	
Vert.	9764.000	PK	45.6	38.5	8.6	38.8		53.9	73.9	20.0	100	0	
Vert.	12205.000	PK	45.1	39.3	10.2	39.2		55.4	73.9	18.5	100	0	
Vert.	1626.649	AV	41.9	25.4	13.1	40.9		39.5	53.9	14.4	100	144	
Vert.	3254.475	AV	47.4	29.0	5.4	41.6		40.2	53.9	13.7	100	156	

(* 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	55.2	31.2	5.9	40.9	-24.7	26.7	53.9	27.2	111	201	AV:VBW 10Hz
Hori.	7323.000	AV	36.3	36.8	7.5	41.4	-24.7	14.5	53.9	39.4	100	0	
Hori.	9764.000	AV	34.2	38.5	8.6	38.8	-24.7	17.8	53.9	36.1	100	0	
Hori.	12205.000	AV	35.0	39.3	10.2	39.2	-24.7	20.6	53.9	33.3	100	0	
Vert.	4882.000	AV	51.2	31.2	5.9	40.9	-24.7	22.7	53.9	31.2	100	263	
Vert.	7323.000	AV	35.0	36.8	7.5	41.4	-24.7	13.2	53.9	40.7	100	0	
Vert.	9764.000	AV	34.3	38.5	8.6	38.8	-24.7	17.9	53.9	36.0	100	0	
Vert.	12205.000	AV	35.0	39.3	10.2	39.2	-24.7	20.6	53.9	33.3	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 April 9, 2012 April 10, 2012
Temperature / Humidity 25 deg.C , 27 %RH 23 deg.C , 48 %RH
Engineer Shinichi Takano 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.	319.991	QP	45.5	14.4	8.8	31.9		36.8	46.0	9.2	122	358	PK:VBW 3MHz
Hori.	328.079	QP	39.0	14.6	8.8	31.9		30.5	46.0	15.5	100	159	AV:VBW 10Hz
Hori.	1652.681	PK	49.6	25.5	13.1	40.9		47.3	73.9	26.6	108	234	
Hori.	2483.500	PK	51.2	27.5	13.8	41.1		51.4	73.9	22.5	103	136	
Hori.	3305.332	PK	51.9	29.1	5.3	41.6		44.7	73.9	29.2	105	182	
Hori.	4960.000	PK	56.3	31.4	5.9	40.8		52.8	73.9	21.1	100	167	
Hori.	7440.000	PK	46.3	37.0	7.5	41.5		49.3	73.9	24.6	100	0	
Hori.	9920.000	PK	43.3	38.8	8.6	38.8		51.9	73.9	22.0	100	226	
Hori.	12400.000	PK	45.1	39.4	10.1	39.2		55.4	73.9	18.5	100	0	
Hori.	1652.681	AV	40.9	25.5	13.1	40.9		38.6	53.9	15.3	108	234	
Hori.	3305.332	AV	46.6	29.1	5.3	41.6		39.4	53.9	14.5	105	182	
Vert.	30.005	QP	33.8	18.0	6.4	32.2		26.0	40.0	14.0	100	19	
Vert.	159.987	QP	40.2	15.2	7.8	32.1		31.1	43.5	12.4	100	254	
Vert.	287.984	QP	35.4	18.6	8.6	32.0		30.6	46.0	15.4	100	224	
Vert.	319.982	QP	45.1	14.4	8.8	31.9		36.4	46.0	9.6	100	44	
Vert.	1652.664	PK	48.9	25.5	13.1	40.9		46.6	73.9	27.3	128	176	
Vert.	2483.500	PK	51.6	27.5	13.8	41.1		51.8	73.9	22.1	132	152	
Vert.	3305.311	PK	54.5	29.1	5.3	41.6		47.3	73.9	26.6	100	161	
Vert.	4960.000	PK	53.3	31.4	5.9	40.8		49.8	73.9	24.1	100	216	
Vert.	7440.000	PK	46.7	37.0	7.5	41.5		49.7	73.9	24.2	100	0	
Vert.	9920.000	PK	42.9	38.8	8.6	38.8		51.5	73.9	22.4	125	293	
Vert.	12400.000	PK	43.7	39.4	10.1	39.2		54.0	73.9	19.9	100	0	
Vert.	1652.664	AV	41.9	25.5	13.1	40.9		39.6	53.9	14.3	128	176	
Vert.	3305.311	AV	50.1	29.1	5.3	41.6		42.9	53.9	11.0	100	161	

(* 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	39.0	27.5	13.8	41.1	-24.7	14.5	53.9	39.4	103	136	AV:VBW 10Hz
Hori.	4960.000	AV	51.9	31.4	5.9	40.8	-24.7	23.7	53.9	30.2	100	167	
Hori.	7440.000	AV	36.6	37.0	7.5	41.5	-24.7	14.9	53.9	39.0	100	0	
Hori.	9920.000	AV	34.5	38.8	8.6	38.8	-24.7	18.4	53.9	35.5	100	226	
Hori.	12400.000	AV	34.0	39.4	10.1	39.2	-24.7	19.6	53.9	34.3	100	0	
Vert.	2483.500	AV	40.0	27.5	13.8	41.1	-24.7	15.5	53.9	38.4	132	152	
Vert.	4960.000	AV	48.3	31.4	5.9	40.8	-24.7	20.1	53.9	33.8	100	216	
Vert.	7440.000	AV	36.2	37.0	7.5	41.5	-24.7	14.5	53.9	39.4	100	0	
Vert.	9920.000	AV	34.0	38.8	8.6	38.8	-24.7	17.9	53.9	36.0	125	293	
Vert.	12400.000	AV	33.9	39.4	10.1	39.2	-24.7	19.5	53.9	34.4	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).

UL Japan, Inc.**Shonan EMC Lab.**

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date April 9, 2012 April 10, 2012
Temperature / Humidity 25 deg.C , 27 %RH 23 deg.C , 48 %RH
Engineer Shinichi Takano 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.	319.987	QP	46.1	14.4	8.8	31.9		37.4	46.0	8.6	133	355	PK:VBW 3MHz
Hori.	328.073	QP	39.9	14.6	8.8	31.9		31.4	46.0	14.6	100	169	AV:VBW 10Hz
Hori.	1626.648	PK	50.3	25.4	13.1	40.9		47.9	73.9	26.0	119	217	
Hori.	3254.395	PK	52.2	29.0	5.4	41.6		45.0	73.9	28.9	126	157	
Hori.	4882.000	PK	53.7	31.2	5.9	40.9		49.9	73.9	24.0	113	200	
Hori.	7323.000	PK	41.5	36.8	7.5	41.4		44.4	73.9	29.5	100	0	
Hori.	9764.000	PK	44.1	38.5	8.6	38.8		52.4	73.9	21.5	100	0	
Hori.	12205.000	PK	45.3	39.3	10.2	39.2		55.6	73.9	18.3	100	0	
Hori.	1626.648	AV	43.2	25.4	13.1	40.9		40.8	53.9	13.1	119	217	
Hori.	3254.395	AV	47.2	29.0	5.4	41.6		40.0	53.9	13.9	126	157	
Vert.	30.003	QP	33.3	18.0	6.4	32.2		25.5	40.0	14.5	100	18	
Vert.	160.009	QP	40.5	15.2	7.8	32.0		31.5	43.5	12.0	100	259	
Vert.	288.023	QP	35.5	18.6	8.6	32.0		30.7	46.0	15.3	100	225	
Vert.	319.893	QP	45.1	14.4	8.8	31.9		36.4	46.0	9.6	100	33	
Vert.	1626.671	PK	49.5	25.4	13.1	40.9		47.1	73.9	26.8	134	167	
Vert.	3253.312	PK	54.3	29.0	5.4	41.6		47.1	73.9	26.8	100	155	
Vert.	4882.000	PK	50.9	31.2	5.9	40.9		47.1	73.9	26.8	100	264	
Vert.	7323.000	PK	47.5	36.8	7.5	41.4		50.4	73.9	23.5	100	0	
Vert.	9764.000	PK	44.8	38.5	8.6	38.8		53.1	73.9	20.8	100	0	
Vert.	12205.000	PK	46.8	39.3	10.2	39.2		57.1	73.9	16.8	100	0	
Vert.	1626.671	AV	42.7	25.4	13.1	40.9		40.3	53.9	13.6	134	167	
Vert.	3253.312	AV	50.1	29.0	5.4	41.6		42.9	53.9	11.0	100	155	

(* 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	45.4	31.2	5.9	40.9	-24.7	16.9	53.9	37.0	113	200	AV:VBW 10Hz
Hori.	7323.000	AV	36.1	36.8	7.5	41.4	-24.7	14.3	53.9	39.6	100	0	
Hori.	9764.000	AV	33.7	38.5	8.6	38.8	-24.7	17.3	53.9	36.6	100	0	
Hori.	12205.000	AV	34.5	39.3	10.2	39.2	-24.7	20.1	53.9	33.8	100	0	
Vert.	4882.000	AV	41.6	31.2	5.9	40.9	-24.7	13.1	53.9	40.8	100	264	
Vert.	7323.000	AV	36.0	36.8	7.5	41.4	-24.7	14.2	53.9	39.7	100	0	
Vert.	9764.000	AV	33.7	38.5	8.6	38.8	-24.7	17.3	53.9	36.6	100	0	
Vert.	12205.000	AV	34.5	39.3	10.2	39.2	-24.7	20.1	53.9	33.8	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 April 9, 2012 April 10, 2012
Temperature / Humidity 25 deg.C , 27 %RH 23 deg.C , 48 %RH
Engineer Shinichi Takano 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.	319.992	QP	46.6	14.4	8.8	31.9		37.9	46.0	8.1	129	3	PK:VBW 3MHz
Hori.	328.077	QP	39.9	14.6	8.8	31.9		31.4	46.0	14.6	100	160	AV:VBW 10Hz
Hori.	1652.664	PK	48.6	25.5	13.1	40.9		46.3	73.9	27.6	100	293	
Hori.	1957.000	PK	45.9	26.1	13.4	41.1		44.3	73.9	29.6	100	0	
Hori.	2483.500	PK	51.3	27.5	13.8	41.1		51.5	73.9	22.4	100	146	
Hori.	3305.315	PK	54.1	29.1	5.3	41.6		46.9	73.9	27.0	103	169	
Hori.	4960.000	PK	50.8	31.4	5.9	40.8		47.3	73.9	26.6	100	169	
Hori.	7440.000	PK	47.5	37.0	7.5	41.5		50.5	73.9	23.4	100	0	
Hori.	9920.000	PK	43.5	38.8	8.6	38.8		52.1	73.9	21.8	100	0	
Hori.	12400.000	PK	44.8	39.4	10.1	39.2		55.1	73.9	18.8	100	0	
Hori.	1652.664	AV	40.8	25.5	13.1	40.9		38.5	53.9	15.4	100	293	
Hori.	1957.000	AV	35.5	26.1	13.4	41.1		33.9	53.9	20.0	100	0	
Hori.	3305.315	AV	49.5	29.1	5.3	41.6		42.3	53.9	11.6	103	169	
Vert.	30.008	QP	34.3	18.0	6.4	32.2		26.5	40.0	13.5	100	13	
Vert.	160.009	QP	40.9	15.2	7.8	32.0		31.9	43.5	11.6	100	251	
Vert.	288.019	QP	35.9	18.6	8.6	32.0		31.1	46.0	14.9	100	222	
Vert.	319.998	QP	45.4	14.4	8.8	31.9		36.7	46.0	9.3	100	28	
Vert.	1652.661	PK	48.8	25.5	13.1	40.9		46.5	73.9	27.4	128	178	
Vert.	1957.000	PK	46.0	26.1	13.4	41.1		44.4	73.9	29.5	100	0	
Vert.	2483.500	PK	52.4	27.5	13.8	41.1		52.6	73.9	21.3	160	194	
Vert.	3305.329	PK	56.4	29.1	5.3	41.6		49.2	73.9	24.7	100	183	
Vert.	4960.000	PK	48.1	31.4	5.9	40.8		44.6	73.9	29.3	100	241	
Vert.	7440.000	PK	48.2	37.0	7.5	41.5		51.2	73.9	22.7	100	0	
Vert.	9920.000	PK	44.0	38.8	8.6	38.8		52.6	73.9	21.3	100	0	
Vert.	12400.000	PK	43.7	39.4	10.1	39.2		54.0	73.9	19.9	100	0	
Vert.	1652.661	AV	42.4	25.5	13.1	40.9		40.1	53.9	13.8	128	178	
Vert.	1957.000	AV	35.5	26.1	13.4	41.1		33.9	53.9	20.0	100	0	
Vert.	3305.329	AV	52.9	29.1	5.3	41.6		45.7	53.9	8.2	100	183	

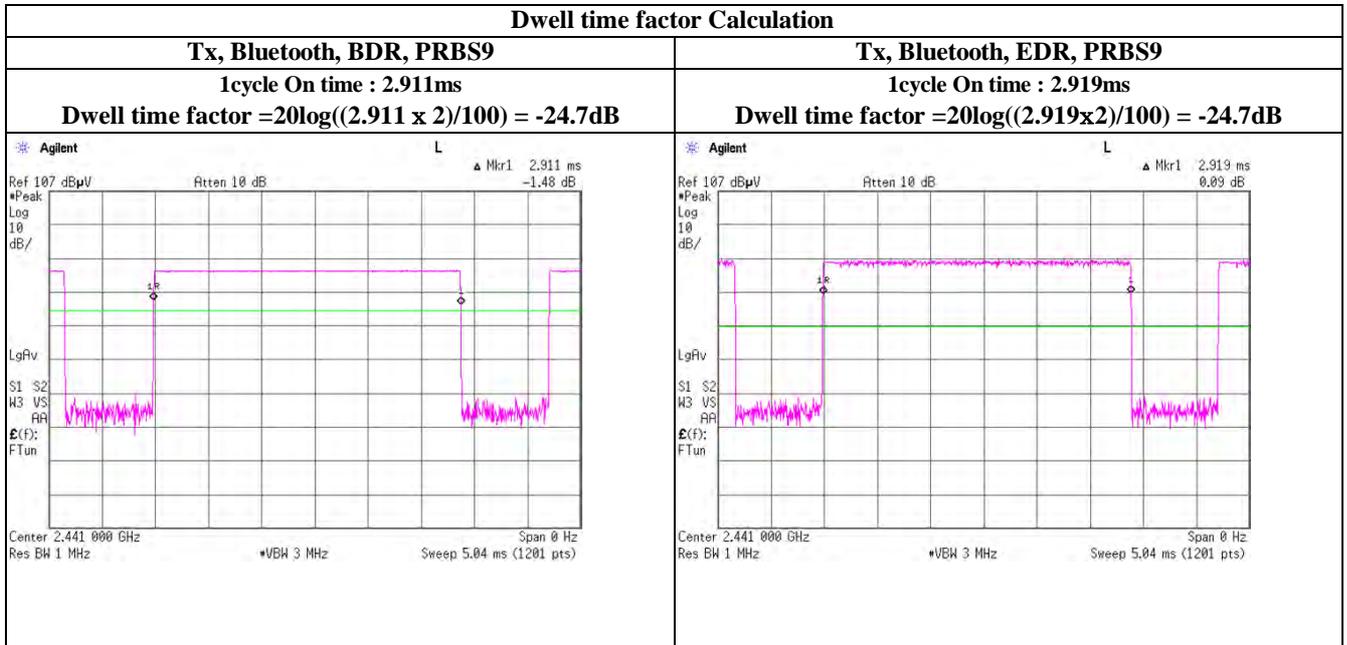
(* PK: Peak, AV: Average, QP: Quasi-Peak)

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	39.3	27.5	13.8	41.1	-24.7	14.8	53.9	39.1	100	146	AV:VBW 10Hz
Hori.	4960.000	AV	40.9	31.4	5.9	40.8	-24.7	12.7	53.9	41.2	100	169	
Hori.	7440.000	AV	36.6	37.0	7.5	41.5	-24.7	14.9	53.9	39.0	100	0	
Hori.	9920.000	AV	33.6	38.8	8.6	38.8	-24.7	17.5	53.9	36.4	100	0	
Hori.	12400.000	AV	33.9	39.4	10.1	39.2	-24.7	19.5	53.9	34.4	100	0	
Vert.	2483.500	AV	40.1	27.5	13.8	41.1	-24.7	15.6	53.9	38.3	160	194	
Vert.	4960.000	AV	38.7	31.4	5.9	40.8	-24.7	10.5	53.9	43.4	100	241	
Vert.	7440.000	AV	36.4	37.0	7.5	41.5	-24.7	14.7	53.9	39.2	100	0	
Vert.	9920.000	AV	33.5	38.8	8.6	38.8	-24.7	17.4	53.9	36.5	100	0	
Vert.	12400.000	AV	33.8	39.4	10.1	39.2	-24.7	19.4	53.9	34.5	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).

Dwell time factor Calculation chart

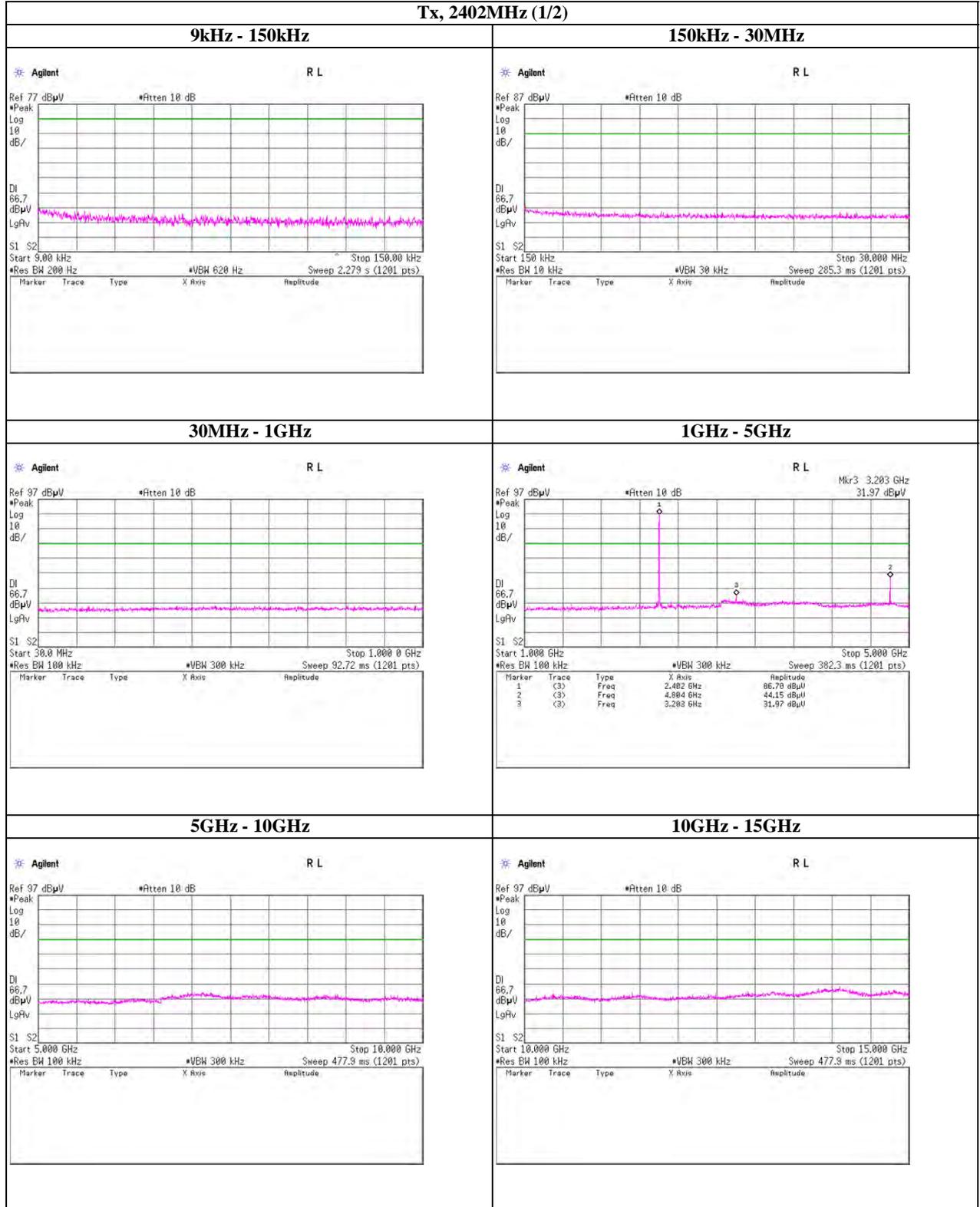


ON time of some channel during 100ms: Twice
 This is the worst case in hopping sequence of Bluetooth.

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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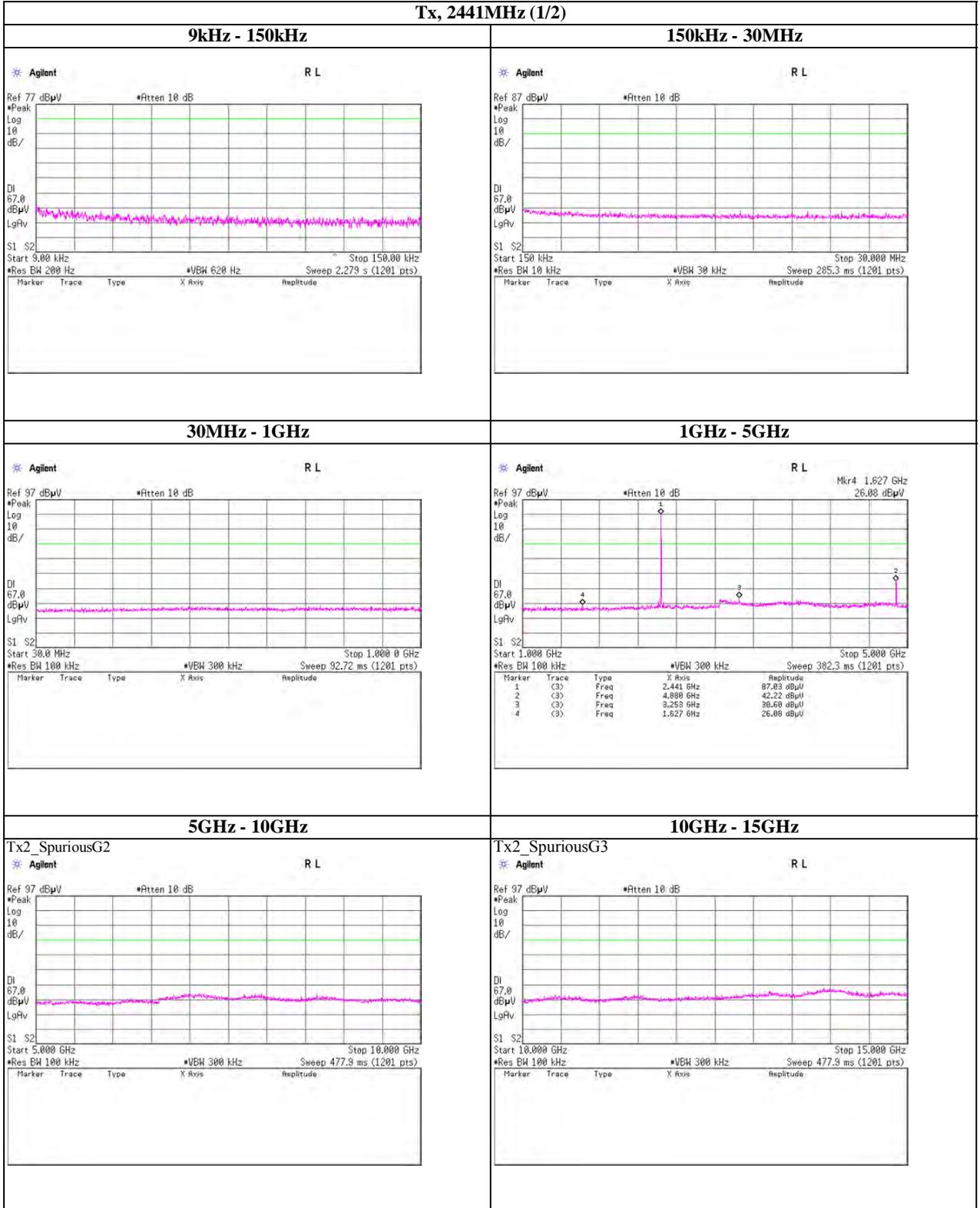
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Facsimile : +81 463 50 6401

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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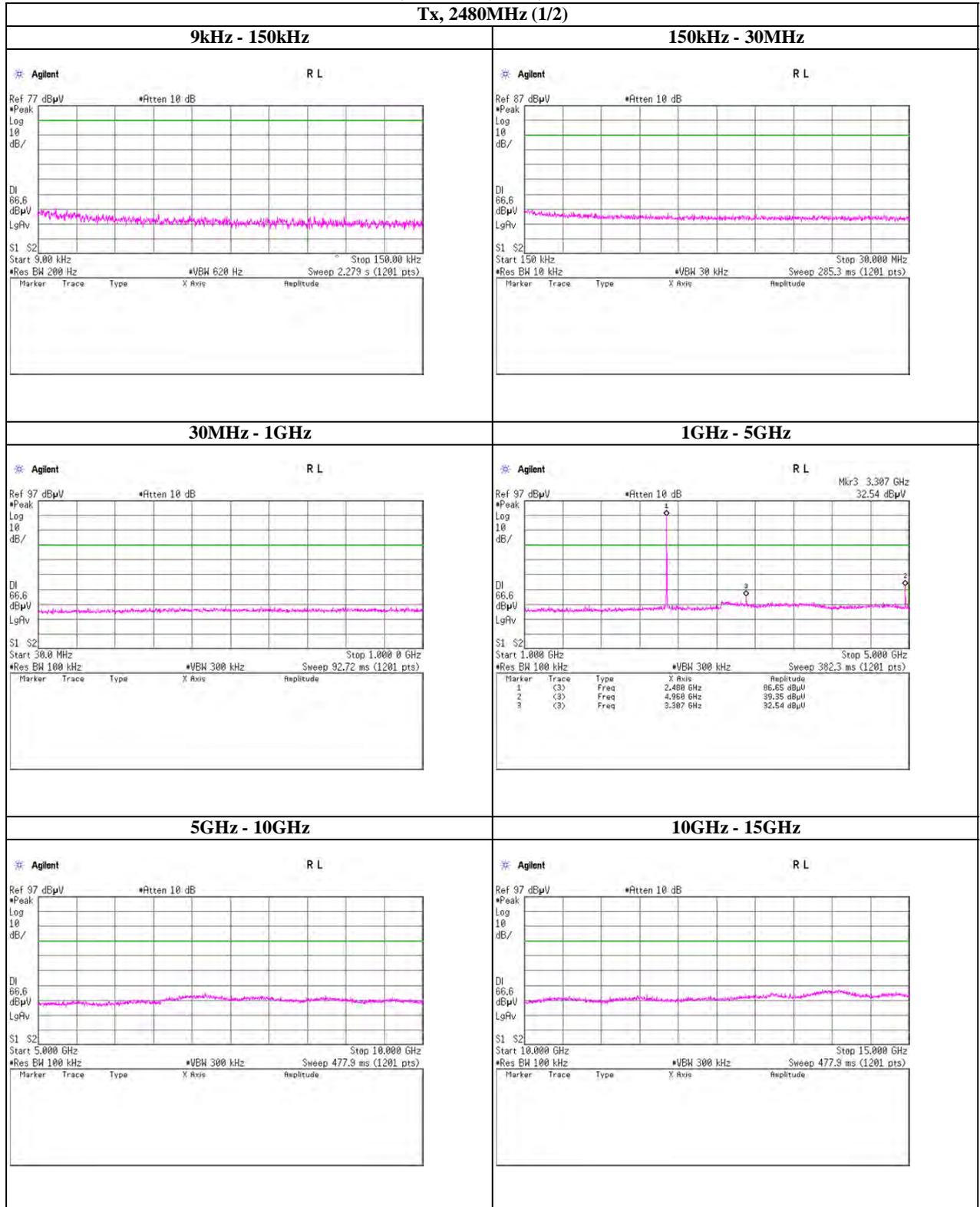
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Spurious emission (Conducted)

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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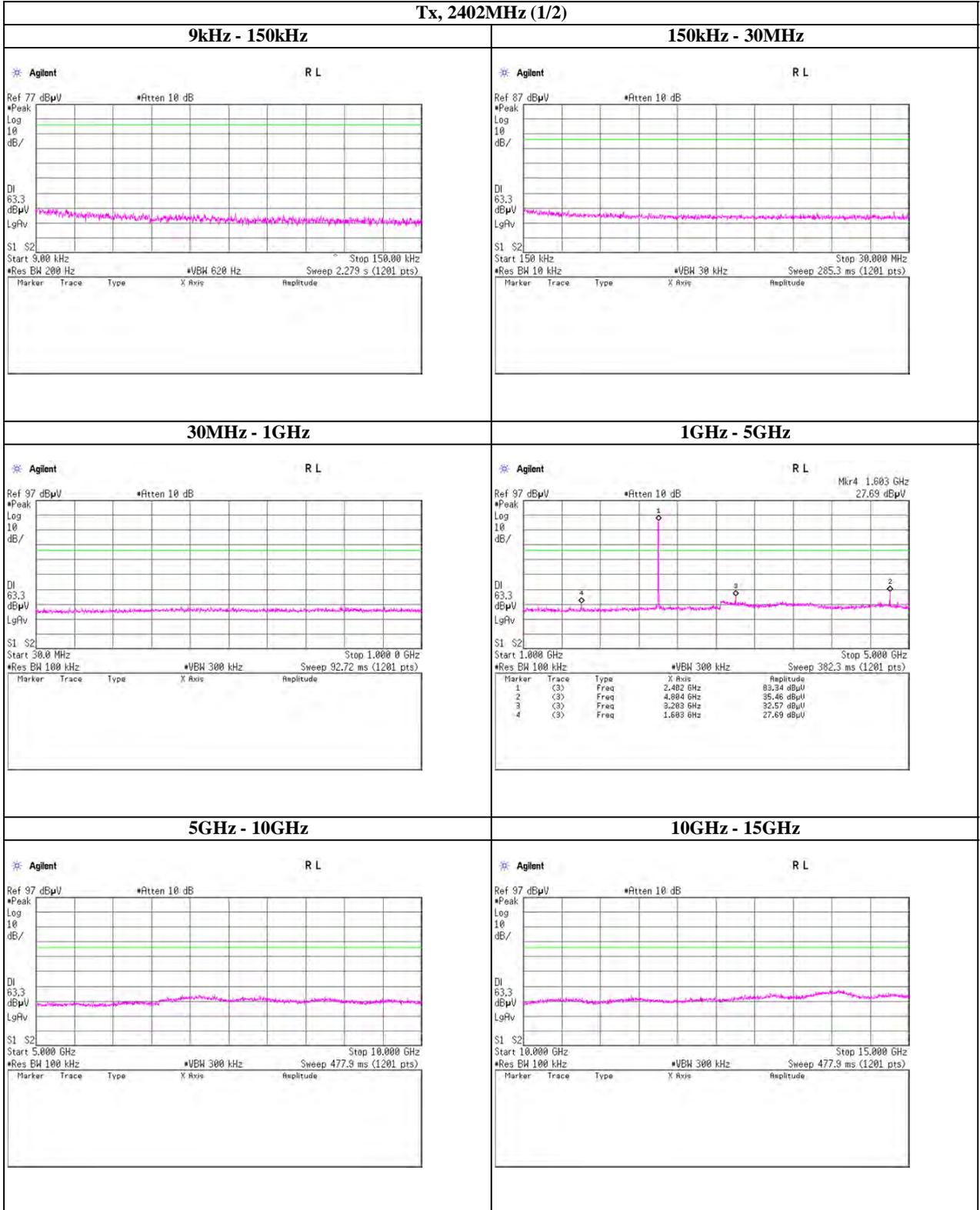
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)



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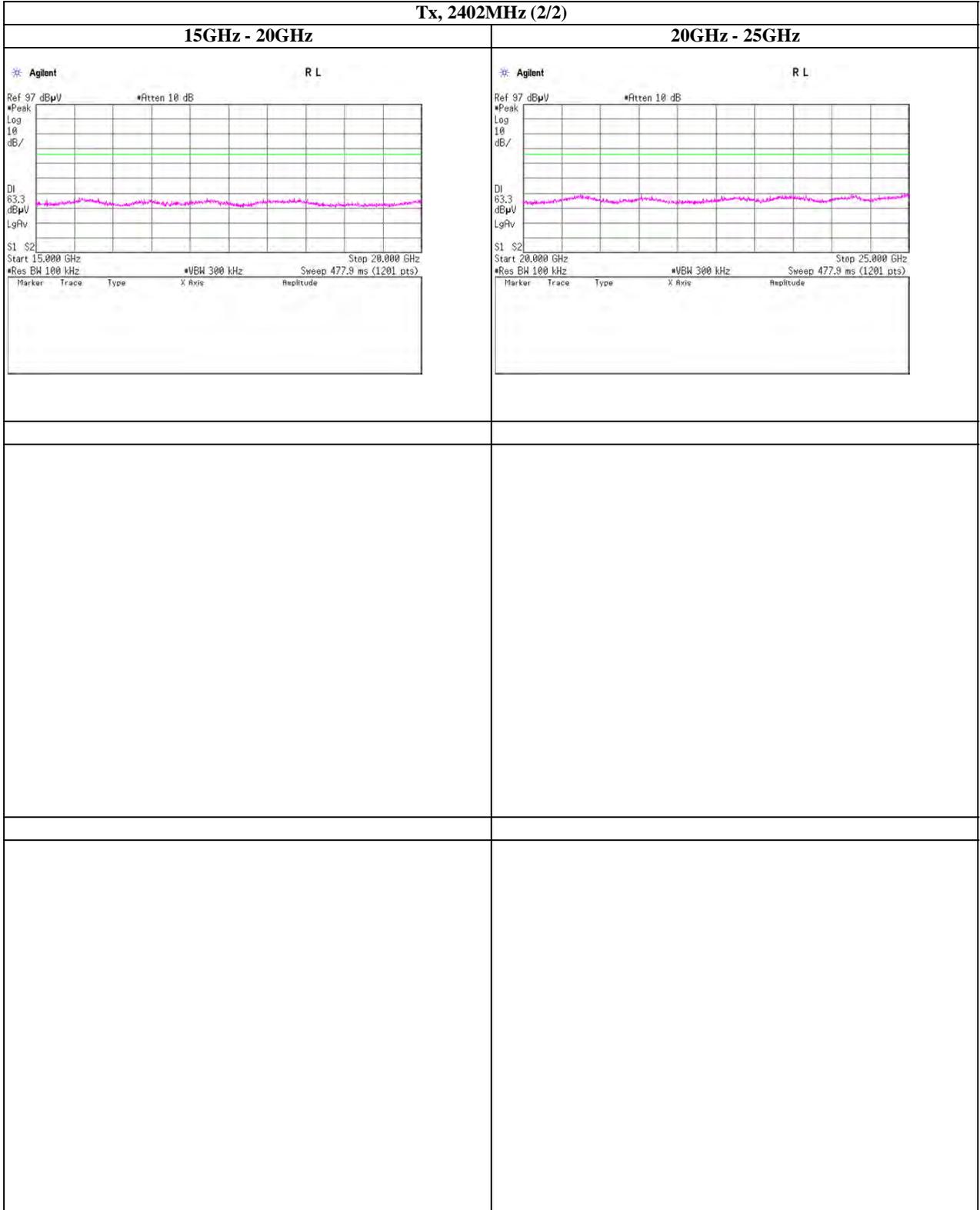
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (2/2)



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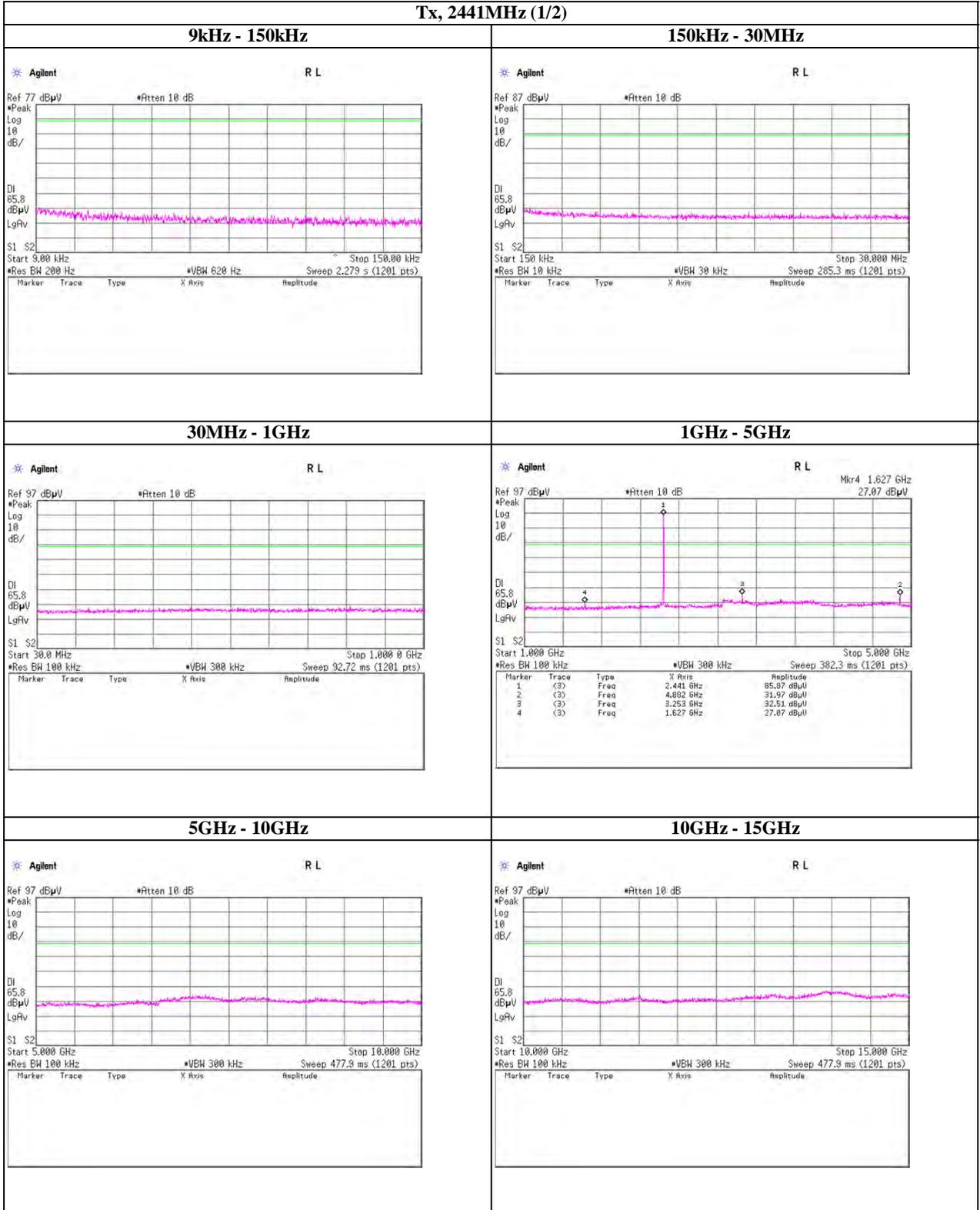
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Facsimile : +81 463 50 6401

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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Shonan EMC Lab.

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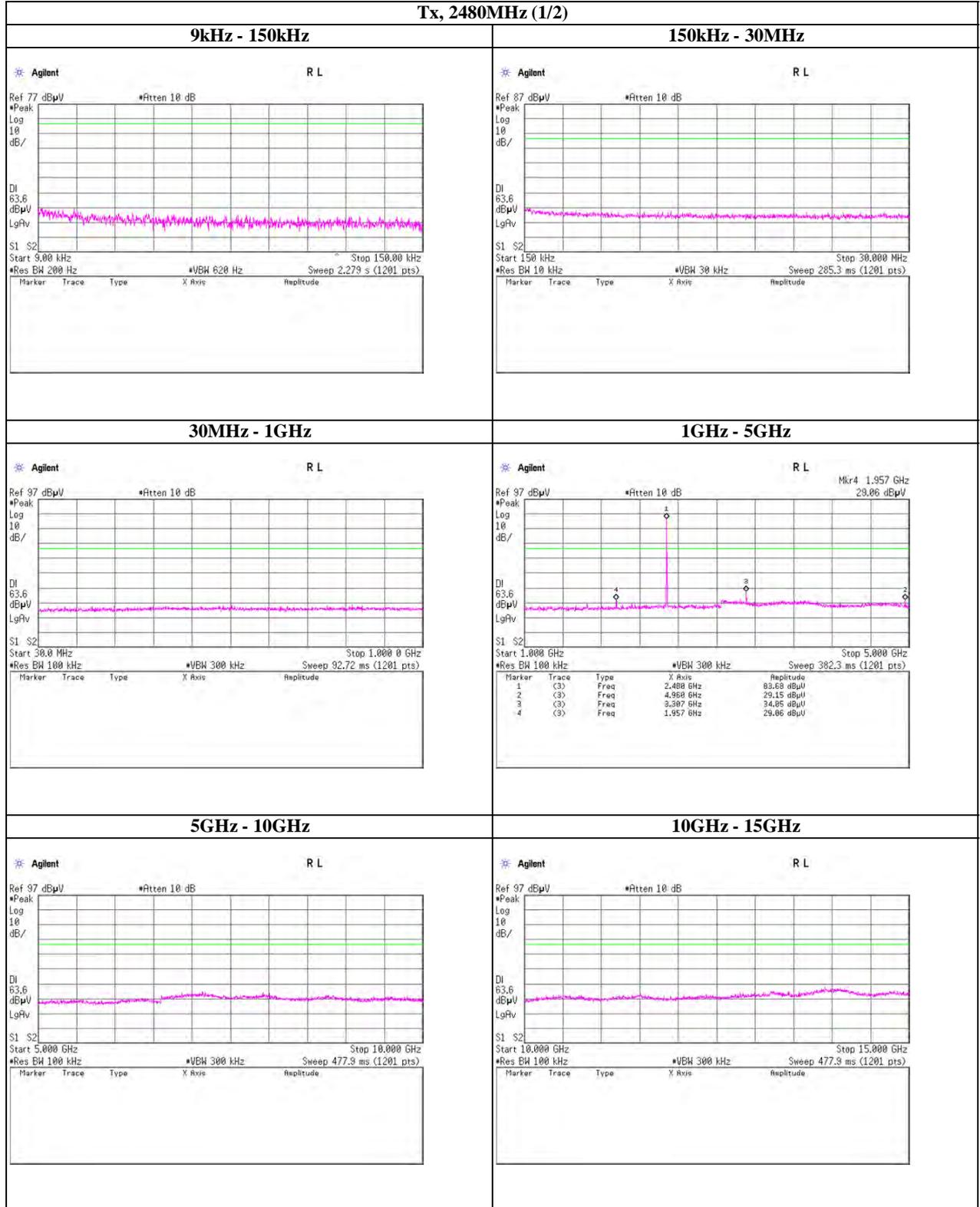
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)



UL Japan, Inc.

Shonan EMC Lab.

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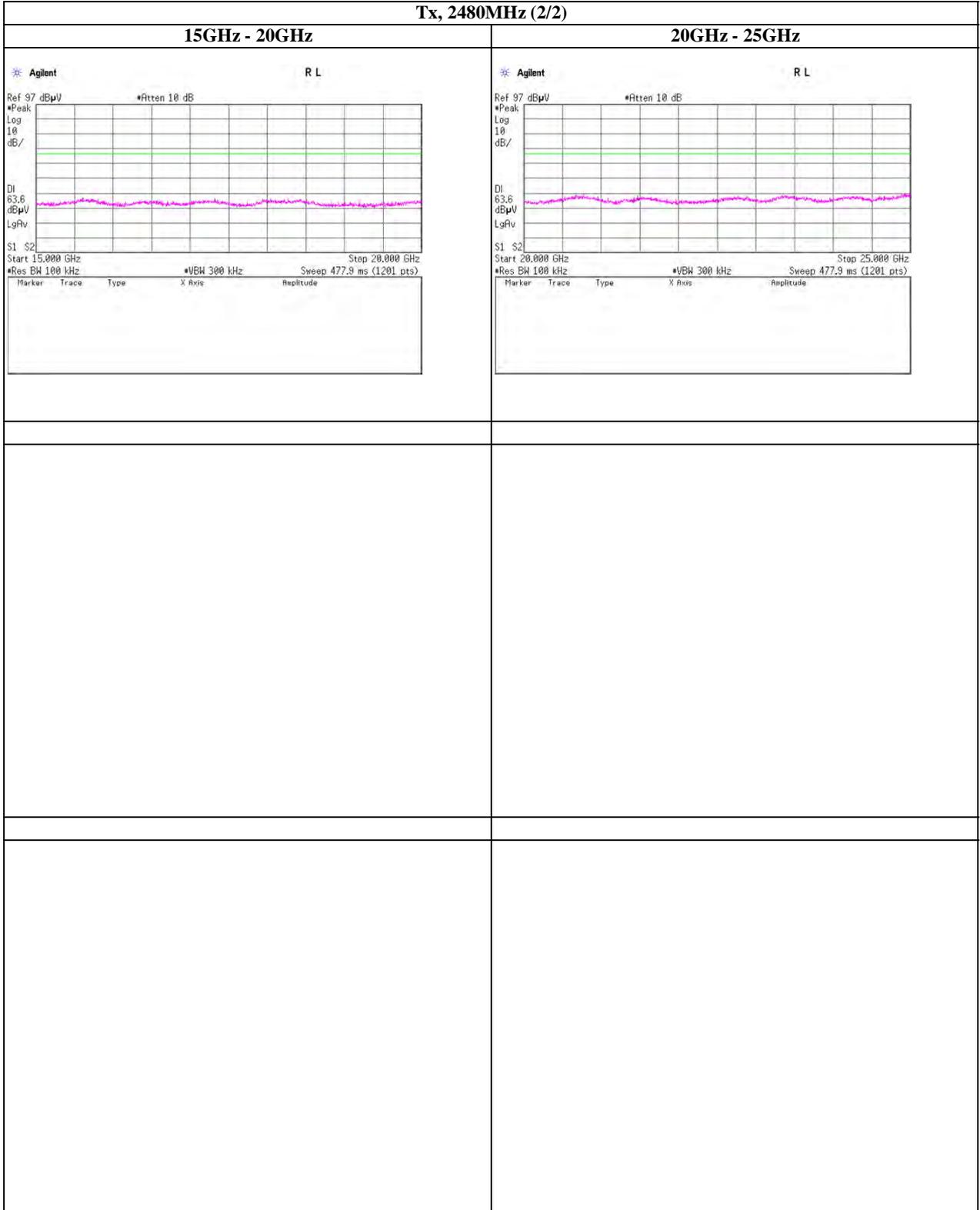
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)



UL Japan, Inc.

Shonan EMC Lab.

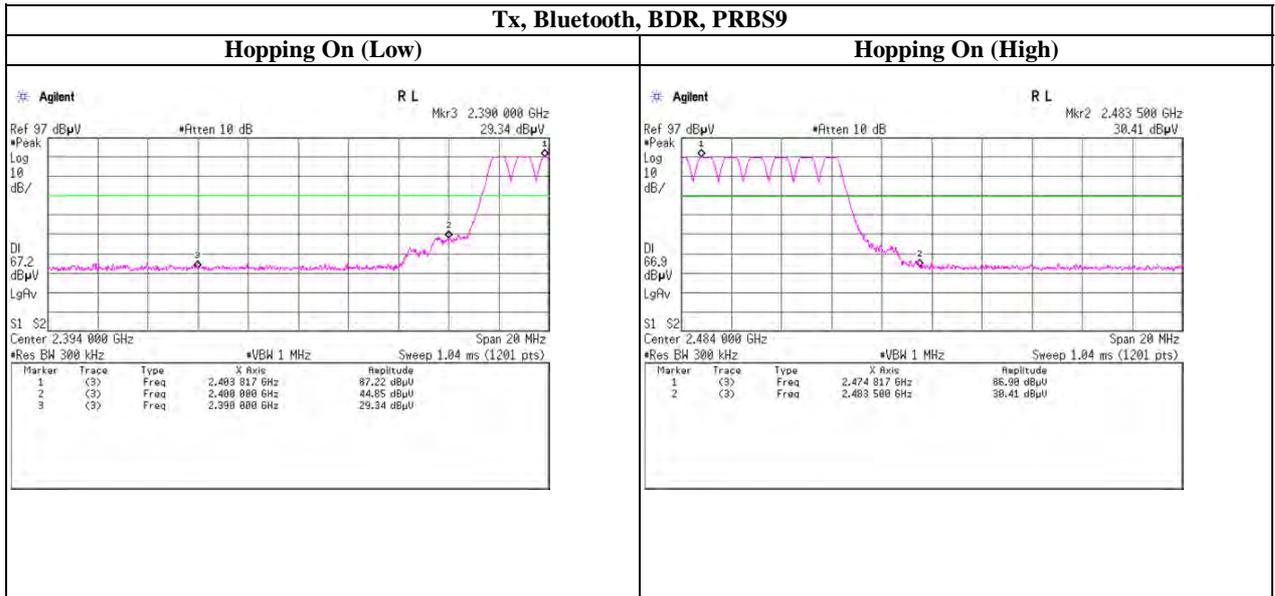
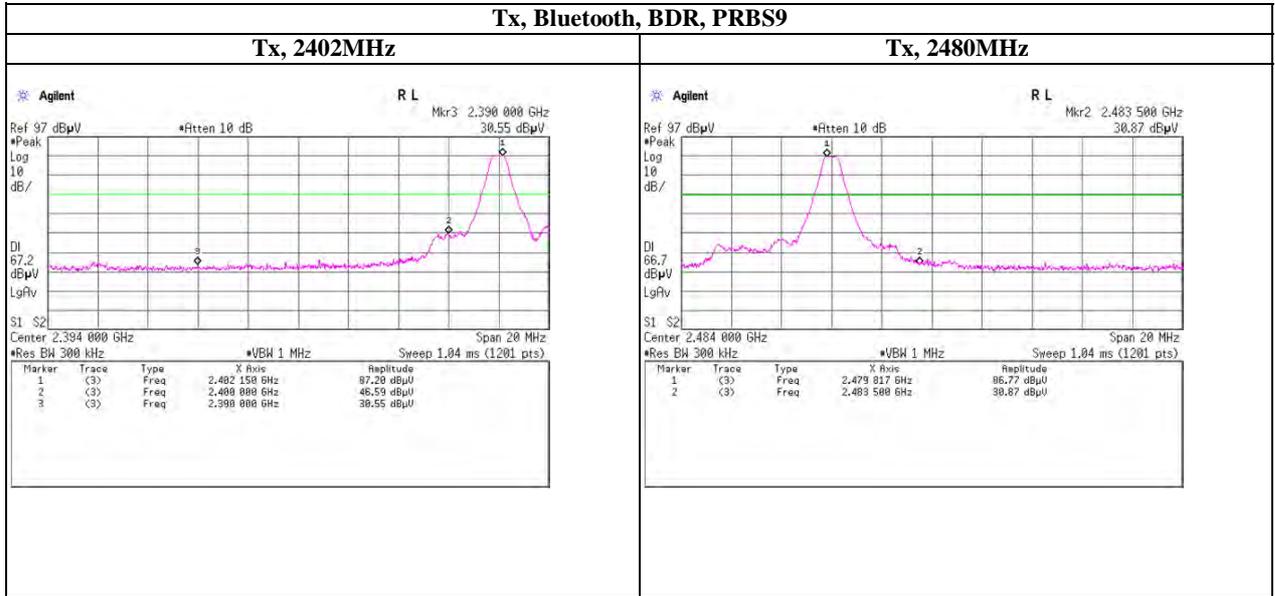
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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

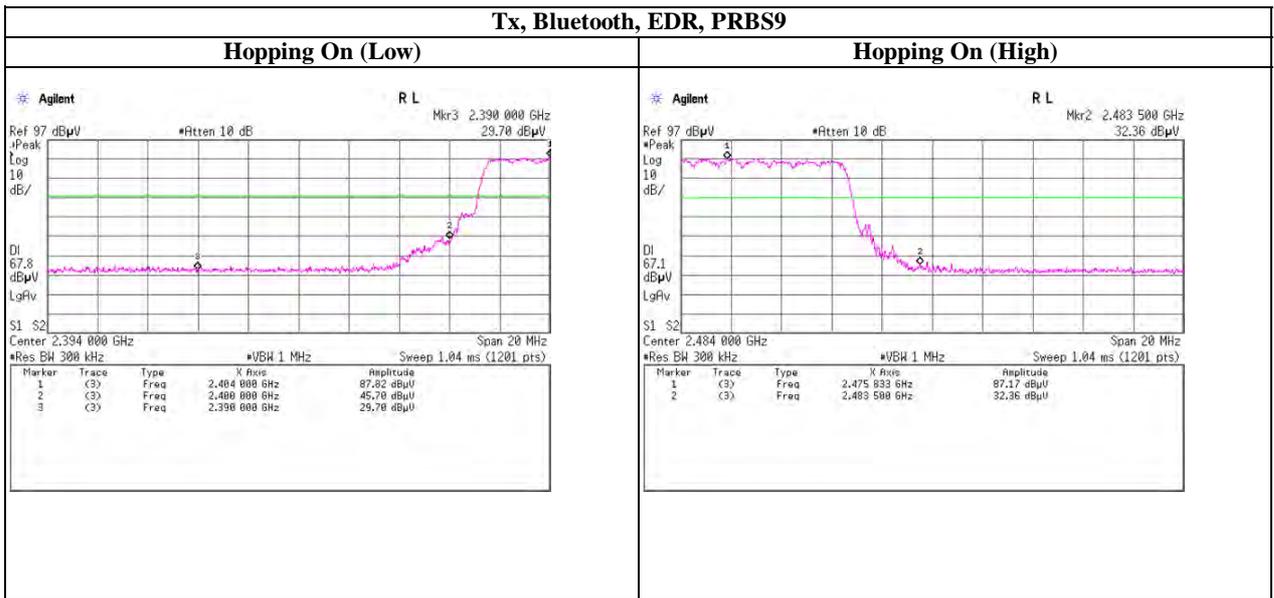
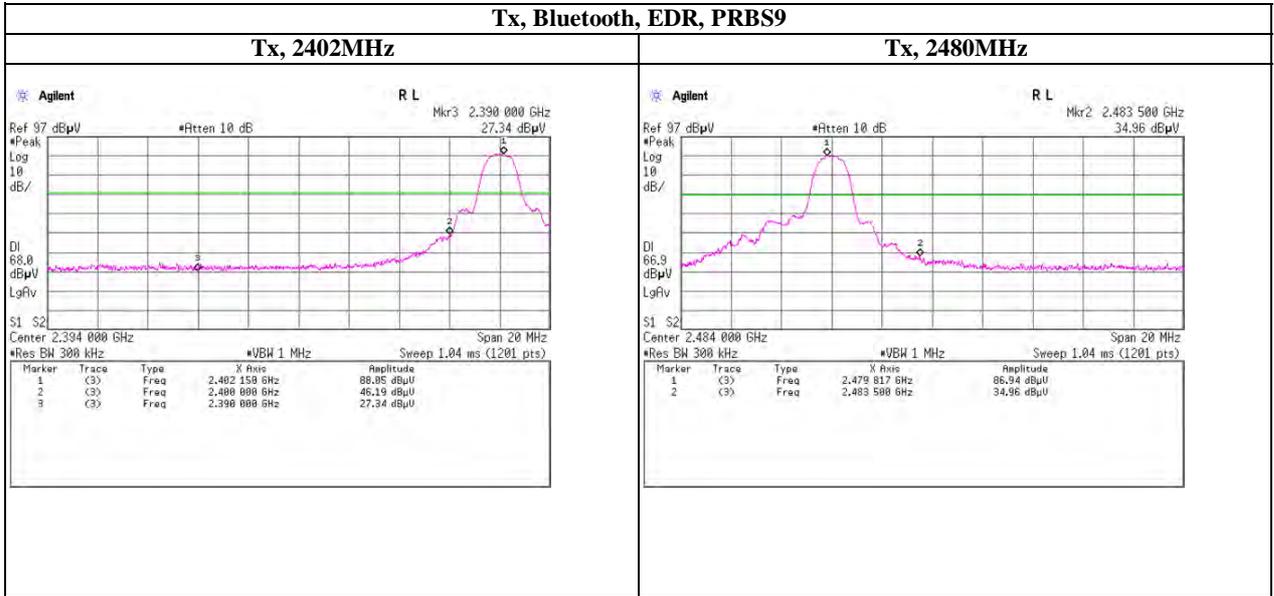
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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

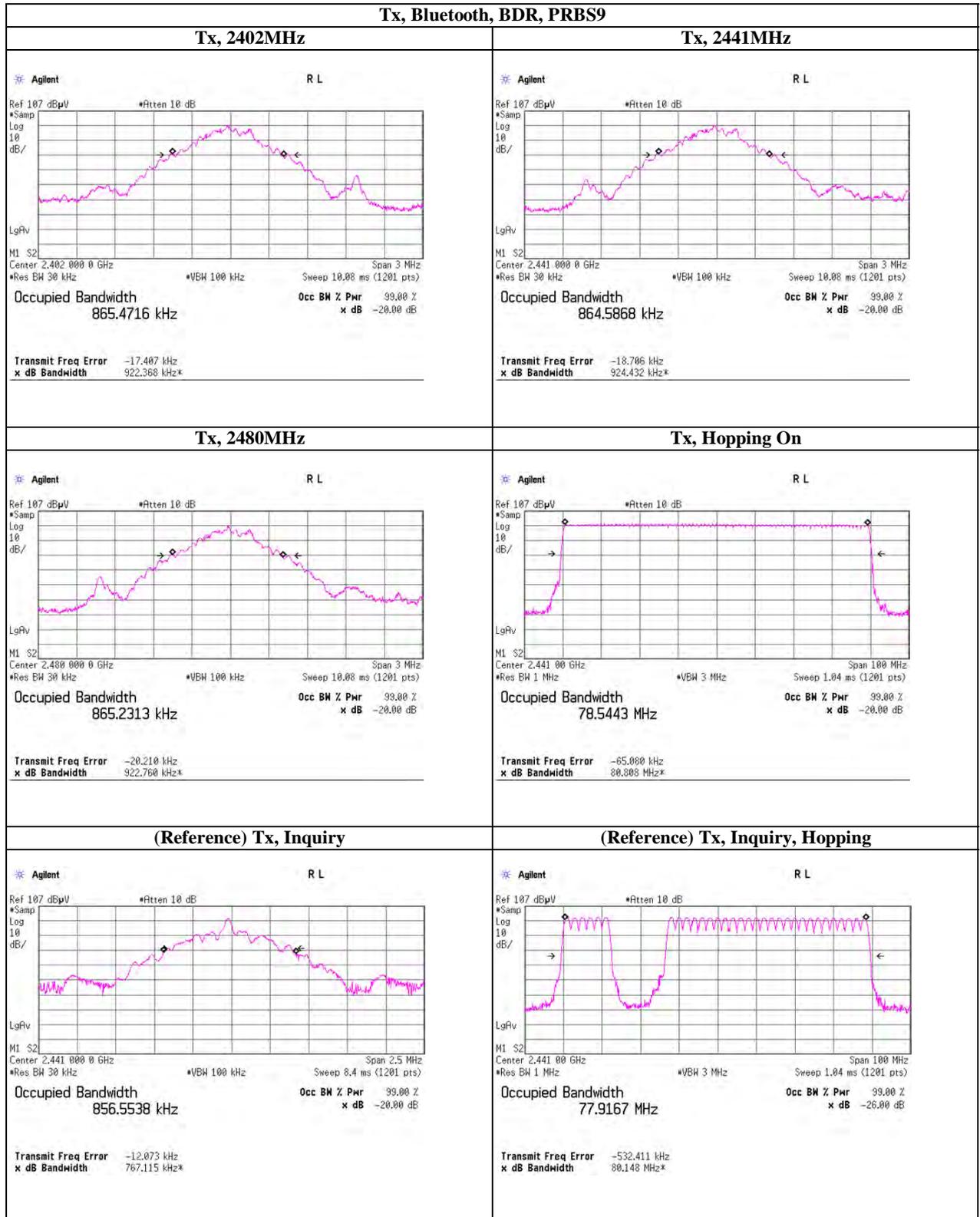
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99% Occupied Bandwidth



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99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	Tx, 2441MHz
<div style="text-align: center;"> </div> <p style="text-align: center;">Agilent RL</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgRv</p> <p>M1 S2</p> <p>Center 2,402 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1804 MHz</p> <p style="text-align: right;">Occ BN % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -12.817 kHz x dB Bandwidth 1.264 MHz*</p>	<div style="text-align: center;"> </div> <p style="text-align: center;">Agilent RL</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgRv</p> <p>M1 S2</p> <p>Center 2,441 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1758 MHz</p> <p style="text-align: right;">Occ BN % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -21.793 kHz x dB Bandwidth 1.258 MHz*</p>
Tx, 2480MHz	Tx, Hopping On
<div style="text-align: center;"> </div> <p style="text-align: center;">Agilent RL</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgRv</p> <p>M1 S2</p> <p>Center 2,480 000 0 GHz Span 3 MHz</p> <p>*Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1703 MHz</p> <p style="text-align: right;">Occ BN % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -22.317 kHz x dB Bandwidth 1.256 MHz*</p>	<div style="text-align: center;"> </div> <p style="text-align: center;">Agilent RL</p> <p>Ref 97 dBμV *Atten 10 dB</p> <p>*Samp Log 10 dB/</p> <p>LgRv</p> <p>M1 S2</p> <p>Center 2,441 00 GHz Span 100 MHz</p> <p>*Res BW 1 MHz *VBW 3 MHz Sweep 1.04 ms (1201 pts)</p> <p>Occupied Bandwidth 78.6715 MHz</p> <p style="text-align: right;">Occ BN % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -65.335 kHz x dB Bandwidth 81.080 MHz*</p>

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APPENDIX 3 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
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2011/11/09 * 12
SAT20-02	Attenuator	Agilent	8493C-020	74890	AT	2012/03/12 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2012/03/12 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 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	2012/04/10 * 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
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE,CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,LF)	-	RE,CE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 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	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A0901	RE	2011/10/23 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE,CE	2012/02/07 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2012/04/10 * 12
SLS-02	LISN	Rohde & Schwarz	ENV216	100512	CE	2012/02/28 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2012/03/26 * 12

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

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

Test Item :

- CE: Conducted emission ,
- RE: Radiated emission ,
- AT: Antenna terminal disturbance voltage