



RADIO TEST REPORT

Test Report No.: 32FE0100-SH-01-A

Applicant : Sony Corporation
Type of Equipment : AV Center
Model No. : XAV-601BT
FCC ID : AK8XAV601BT
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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

Date of test: February 3 to 12, 2012

**Representative
test engineer:**

S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by :

I. Isozaki

Ichiro Isozaki
Leader of WiSE Japan,
UL Verification Service

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
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13-EM-F0429

Original Test Report No.: 32FE0100-SH-01-A

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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: Spurious emissions (Antenna port conducted).....	12
SECTION 6: Carrier frequency separation.....	12
SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)	12
SECTION 8: Number of hopping frequency	12
SECTION 9: Dwell time.....	12
SECTION 10: Maximum peak output power.....	12
SECTION 11: Radiated emission.....	13
Contents of appendixes.....	15
APPENDIX 1: Test data.....	16
APPENDIX 2: Test instruments	50
APPENDIX 3: Photographs of test setup	51

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SECTION 1: Customer information

Company Name : Sony Corporation
Brand Name : SONY
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 : Kazunaga Kinjo

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

2.1 Identification of E.U.T.

Type of Equipment : AV Center
Model No. : XAV-601BT
Serial No. : Refer to 4.2 of this report.
Rating : DC12V
Country of Mass-production : Thailand
Condition of EUT : Production 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 : February 3, 2012

2.2 Product description

Model: XAV-601BT (referred to as the EUT in this report) is an AV Center.

Clock frequency(ies) in the system : 32.768kHz, 6MHz, 10MHz, 11.2896MHz, 12MHz, 24MHz, 27MHz, 30MHz, 32MHz, 36.48MHz

Bluetooth specification:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS
Antenna type : Surface mountable chip (MITSUBISHI AMD0302-ST01 SMD)
Antenna connector type : None
Antenna gain with cable loss : -3.8dBi
ITU code : F1D, G1D
Operation temperature range : -20 to +60 deg.C.

FCC Part15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC 3.3 V), therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

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 has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 32FE0100-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	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	4.4dB Freq.: 960.000MHz Detection: Quasi-Peak Polarization: Vertical Mode: Tx 2441MHz, 3DH5	Complied

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

*1) The test is not applicable since the EUT does not have 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	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 report meets the limits unless the uncertainty is taken into consideration.

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
☐ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ 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

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

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

EUT has the power settings by the software as follows;

Power settings: BDR: Ext.=255, Int.=44

EDR: Ext.=255, Int.=48

Software: CSR BlueSuite BlueTest Version 1.24

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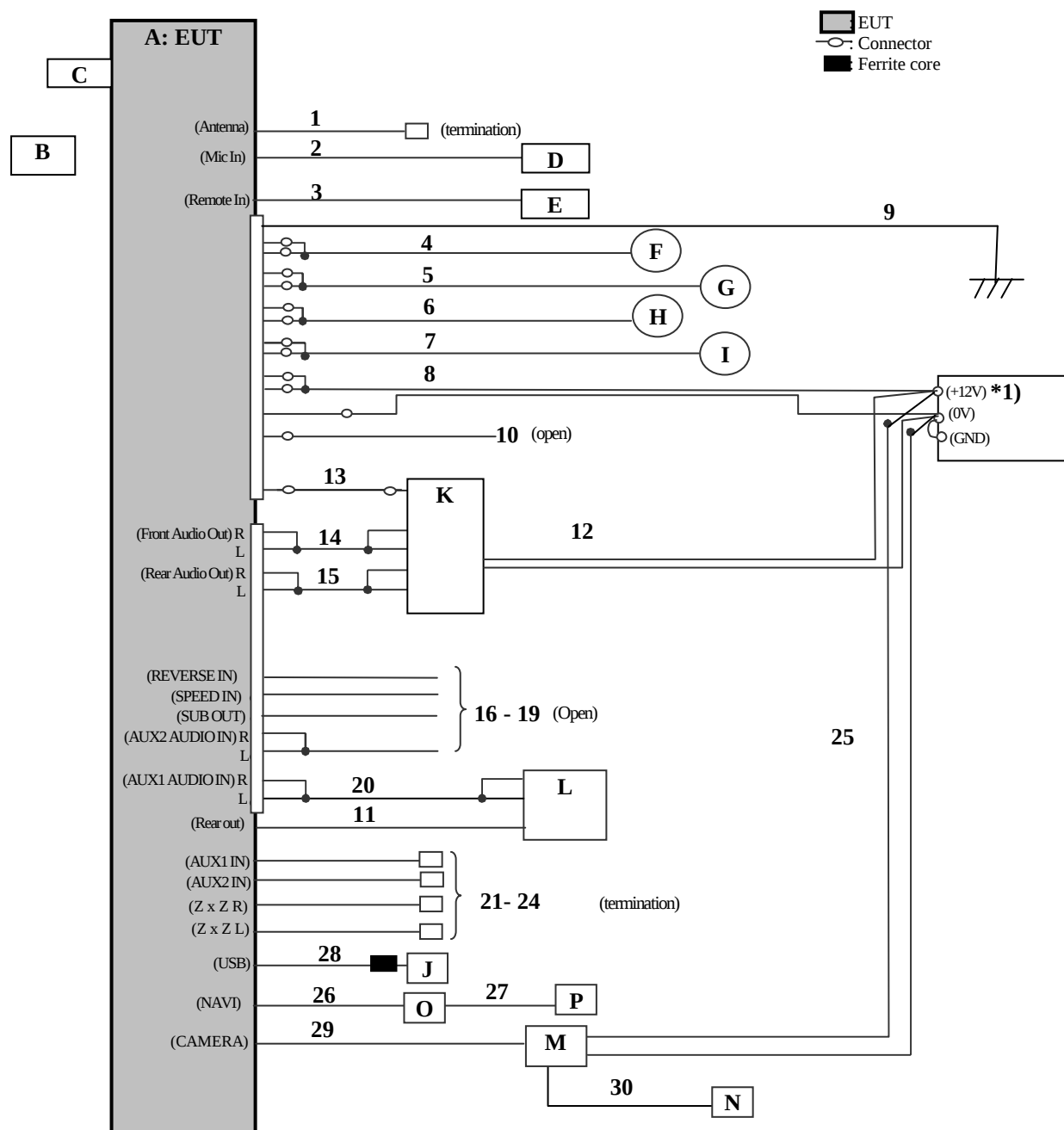
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4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	AV Center	XAV-601BT	61 *2) 62 *3)	Sony	EUT
B	Remote Controller	RM-X271	-	Sony	-
C	USB Memory	SDK-USM4GL(B)	10615MEDB	Sony	-
D	Microphone	XA-MC10	-	Sony	-
E	Wired Remote Controller	RM-X4S	-	Sony	-
F	Speaker 1	XS-F1611	-	Sony	-
G	Speaker 2	XS-F1611	-	Sony	-
H	Speaker 3	XS-F1611	-	Sony	-
I	Speaker 4	XS-F1611	-	Sony	-
J	GPS Unit	1MJ01/1MJ00	DJ1440K01566	TomTom	-
K	Stereo Power Amplifier	XM-423SL	0020316	Sony	-
L	VIDEO WALKMAN	GV-D900	30729	Sony	-
M	Rear View CCD Camera	HCE-C100	W80316932	ALPINE	-
N	Rear View CCD Camera	HCE-C100	W80316932	ALPINE	-
O	SIRIUS XM Connect Vehicle Tuner	SXV100	1113	SIRIUS	-
P	Antenna	XVANT1	1046	SIRIUS	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

*2) Used for Antenna terminal conducted tests

*3) Used for Radiated emission tests

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List of cables used

No.	Cable name	Length (m)	Shield		Remarks
			Cable	Connector	
1	FM antenna	1.0	Shielded	Shielded	-
2	External Microphone	4.0	Unshielded	Unshielded	-
3	Remote	2.0	Unshielded	Unshielded	-
4	Speaker (1)	0.15+2.0	Unshielded	Unshielded	-
5	Speaker (2)	0.15+2.0	Unshielded	Unshielded	-
6	Speaker (3)	0.15+2.0	Unshielded	Unshielded	-
7	Speaker (4)	0.15+2.0	Unshielded	Unshielded	-
8	DC Power	0.15+1.7	Unshielded	Unshielded	-
9	Parking Brake	0.15+2.0	Unshielded	Unshielded	-
10	Illumination	0.2	Unshielded	Unshielded	-
11	Rear out	1.5	Unshielded	Unshielded	-
12	DC Power	1.0	Unshielded	Unshielded	-
13	Amp Remote	0.15+1	Unshielded	Unshielded	-
14	Audio (Front Audio Out)	5.0	Unshielded	Shielded	-
15	Audio (Rear Audio Out)	5.0	Unshielded	Shielded	-
16	REVERSE IN	0.2	Unshielded	Unshielded	-
17	SPEED IN	0.2	Unshielded	Unshielded	-
18	SUB OUT	0.15	Shielded	Shielded	-
19	AUX2 AUDIO IN	0.15	Shielded	Shielded	-
20	AUX1 AUDIO IN	0.15+1.5	Shielded	Shielded	-
21	AUX1 IN	1.5	Shielded	Shielded	-
22	AUX2 IN	1.5	Shielded	Shielded	-
23	Z x Z R	1.5	Shielded	Shielded	-
24	Z x Z L	1.5	Shielded	Shielded	-
25	DC Power	1.0	Unshielded	Unshielded	-
26	Signal	0.6	Shielded	Shielded	-
27	Antenna	6.8	Shielded	Shielded	-
28	USB	1.5+0.1	Shielded	Shielded	-
29	CAMERA	5.0	Unshielded	Shielded	-
30	CCD CAMERA	3.0	Unshielded	Unshielded	-

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

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SECTION 5: Spurious emissions (Antenna port conducted)

Test procedure

The spurious emissions were 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 1

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 1

SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

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

The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Summary of the test results: Pass

Refer to APPENDIX 1

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 1

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 1

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 1

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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 2)
Humidity : See test data (APPENDIX 2)

11.2 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 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 0.3 to 0.4m long and were hanged at a 0.4m 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 1.

11.3 Test conditions

Frequency range : 30MHz to 25GHz
Test distance : 3m (below 13GHz) / 1m (above 13GHz)
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.

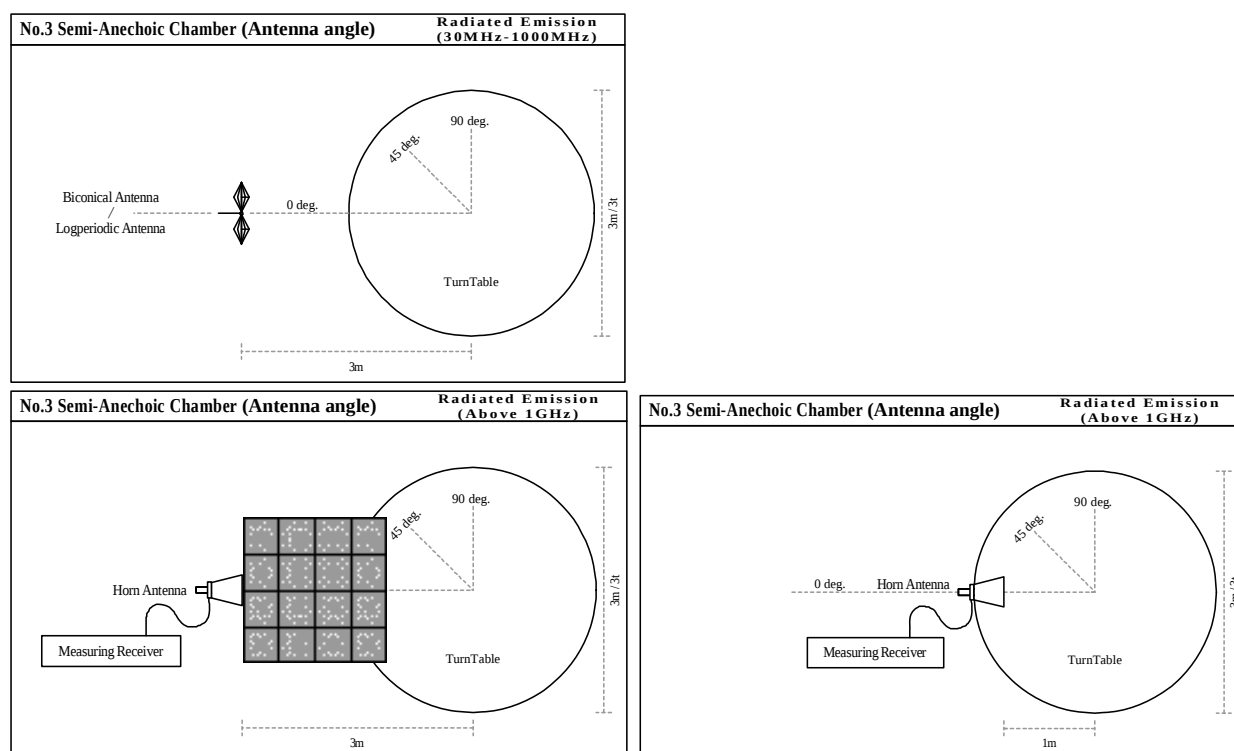
The radiated emission measurements were made with the following detection of the test receiver.

Frequency	30 - 1000MHz	1 - 25GHz	
Detection Type	: Quasi-Peak	Peak	* Average
IF Bandwidth	: 120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW:10Hz

* 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 angle of 0 to 45 deg. based on the product specification to see the position of maximum noise, and the test was made at the position (0 deg.) that has the maximum noise.

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 3rd order harmonics.

Refer to APPENDIX 1

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Contents of appendixes

APPENDIX 1: Test data

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

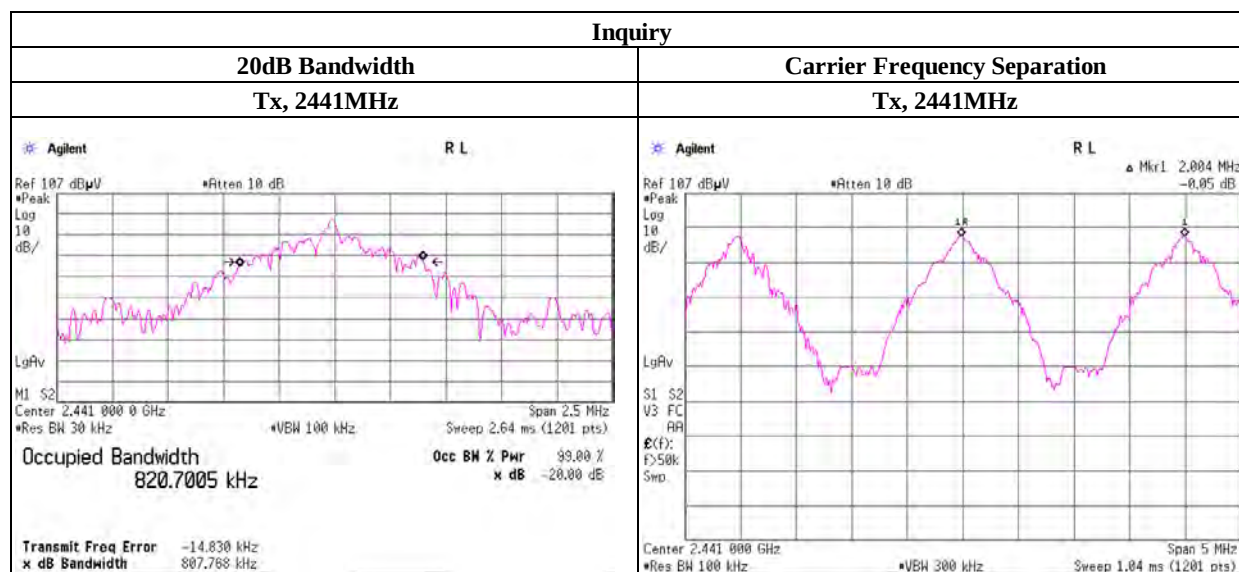
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 12, 2012	
Temperature / Humidity	23deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.931	0.990	>= 0.621
DH5	2441.0	0.934	1.003	>= 0.623
DH5	2480.0	0.942	1.003	>= 0.628
Inquiry	2441.0	0.808	2.004	>= 0.539

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

No limit applies to 20dB Bandwidth.



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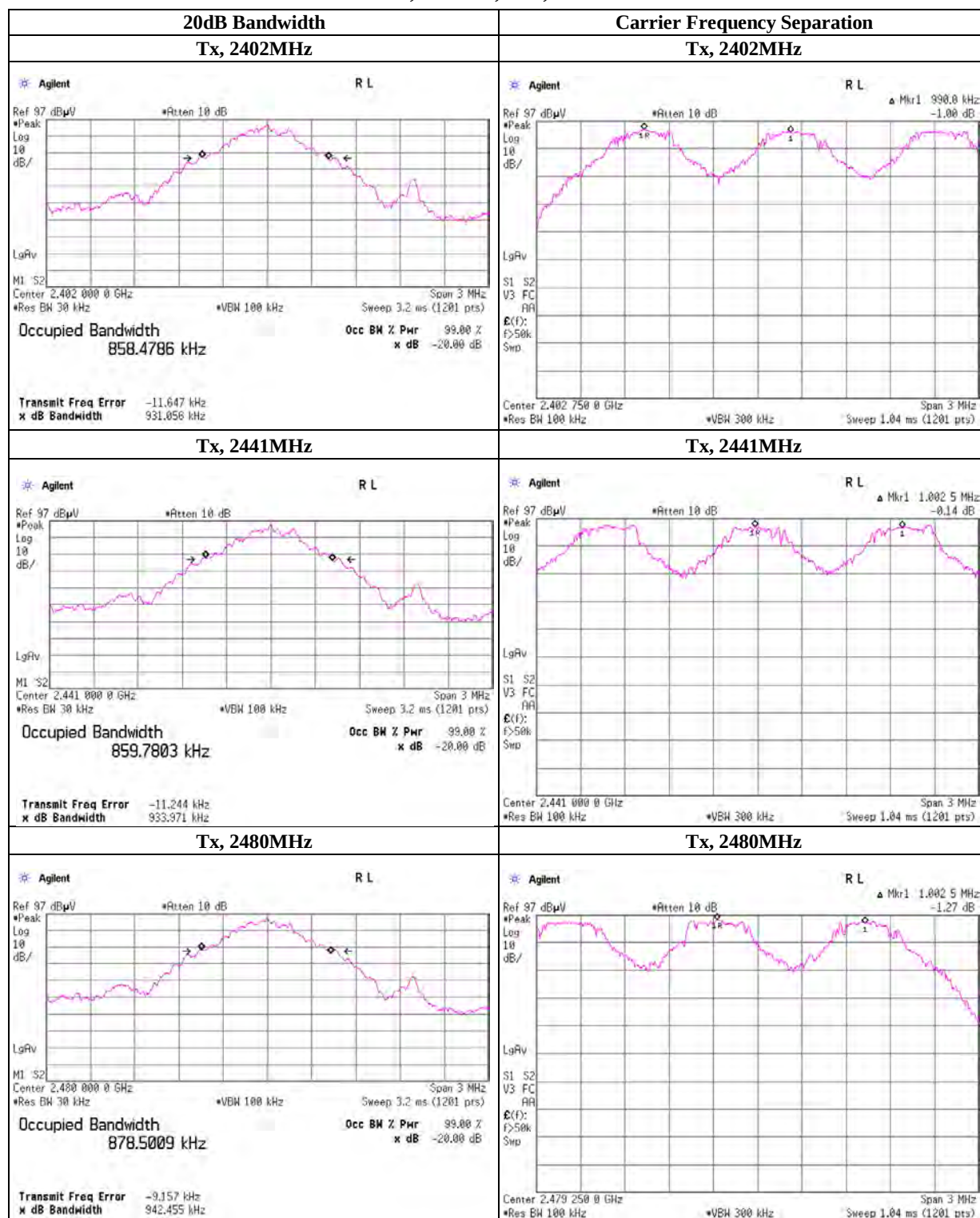
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date February 12, 2012
Temperature / Humidity 23deg.C , 50%RH
Engineer Kenichi Adachi
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	1.297	0.998	>= 0.864
3-DH5	2441.0	1.274	0.998	>= 0.849
3-DH5	2480.0	1.268	1.003	>= 0.845

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

No limit applies to 20dB Bandwidth.

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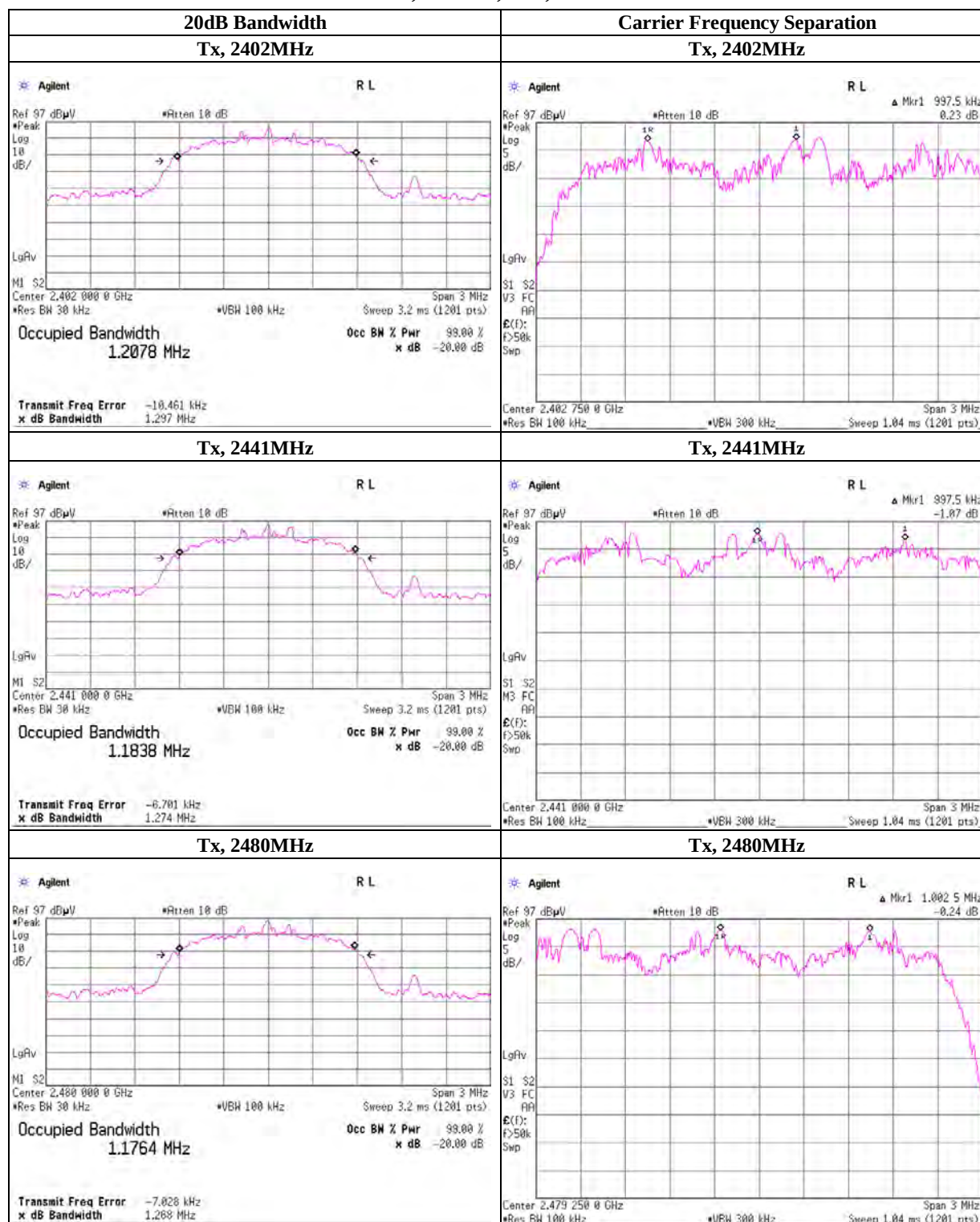
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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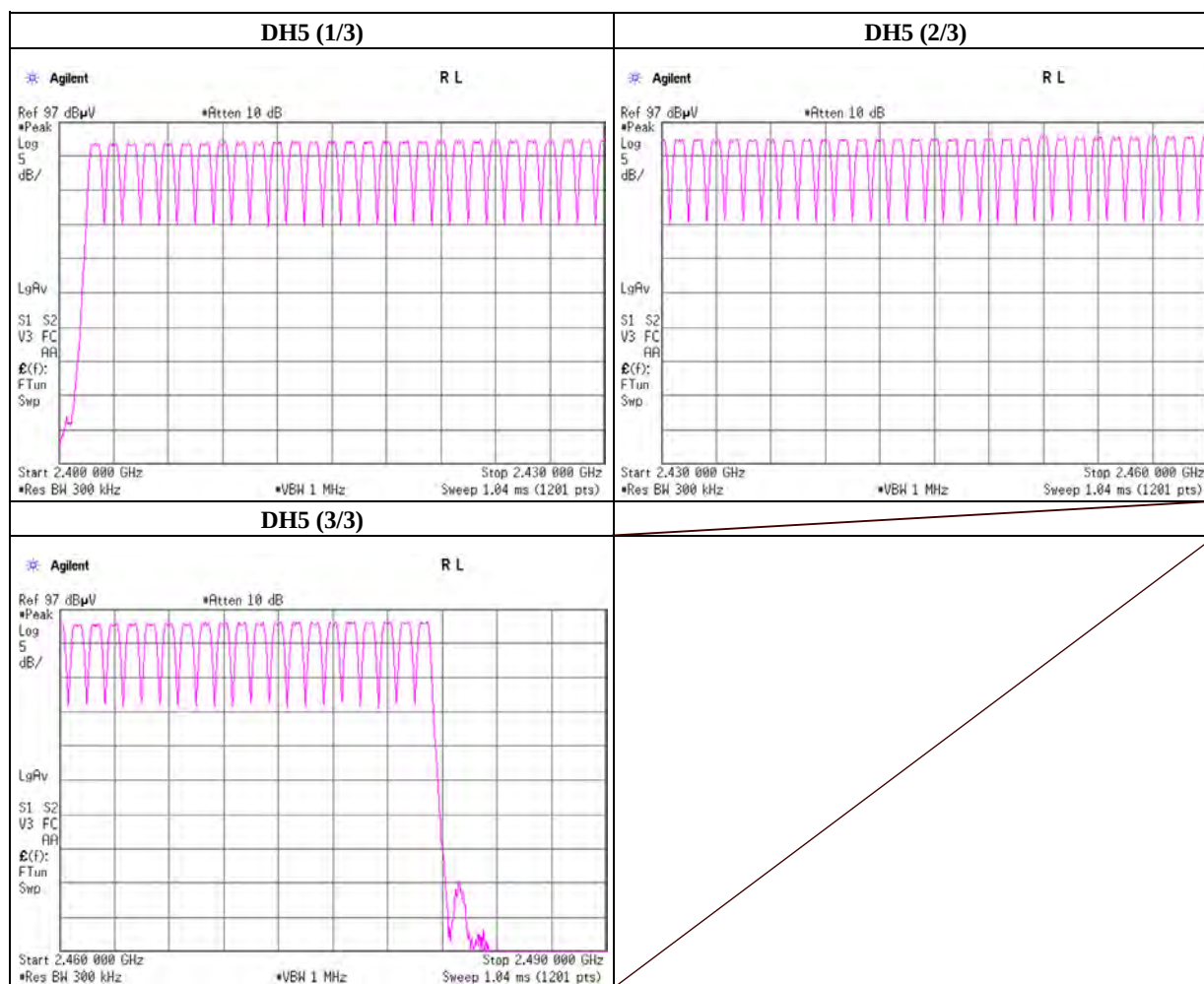
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 12, 2012	
Temperature / Humidity	23deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, BDR, PRBS9	

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



UL Japan, Inc.

Shonan EMC Lab.

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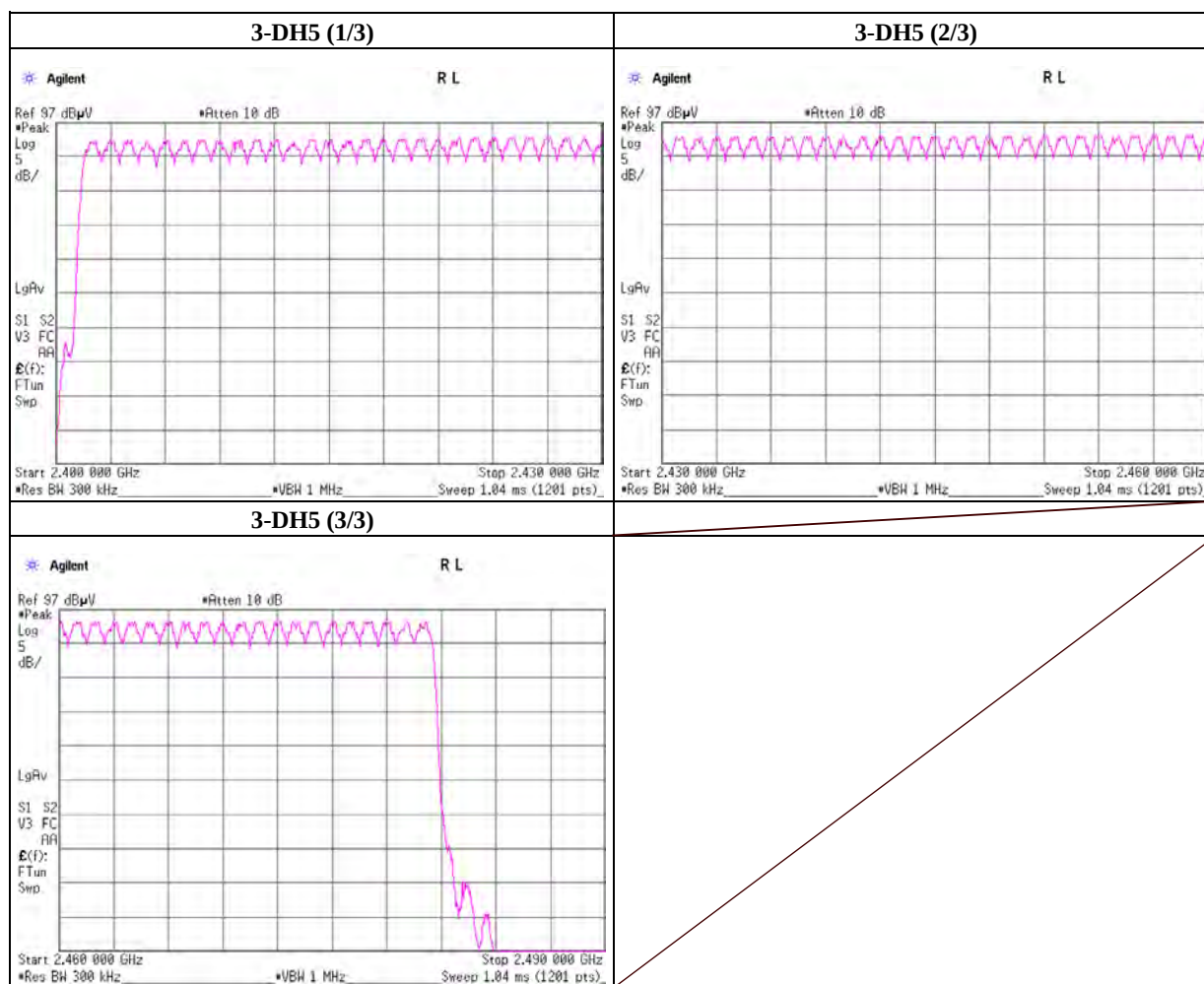
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 12, 2012	
Temperature / Humidity	23deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, EDR, PRBS9	

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



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Shonan EMC Lab.

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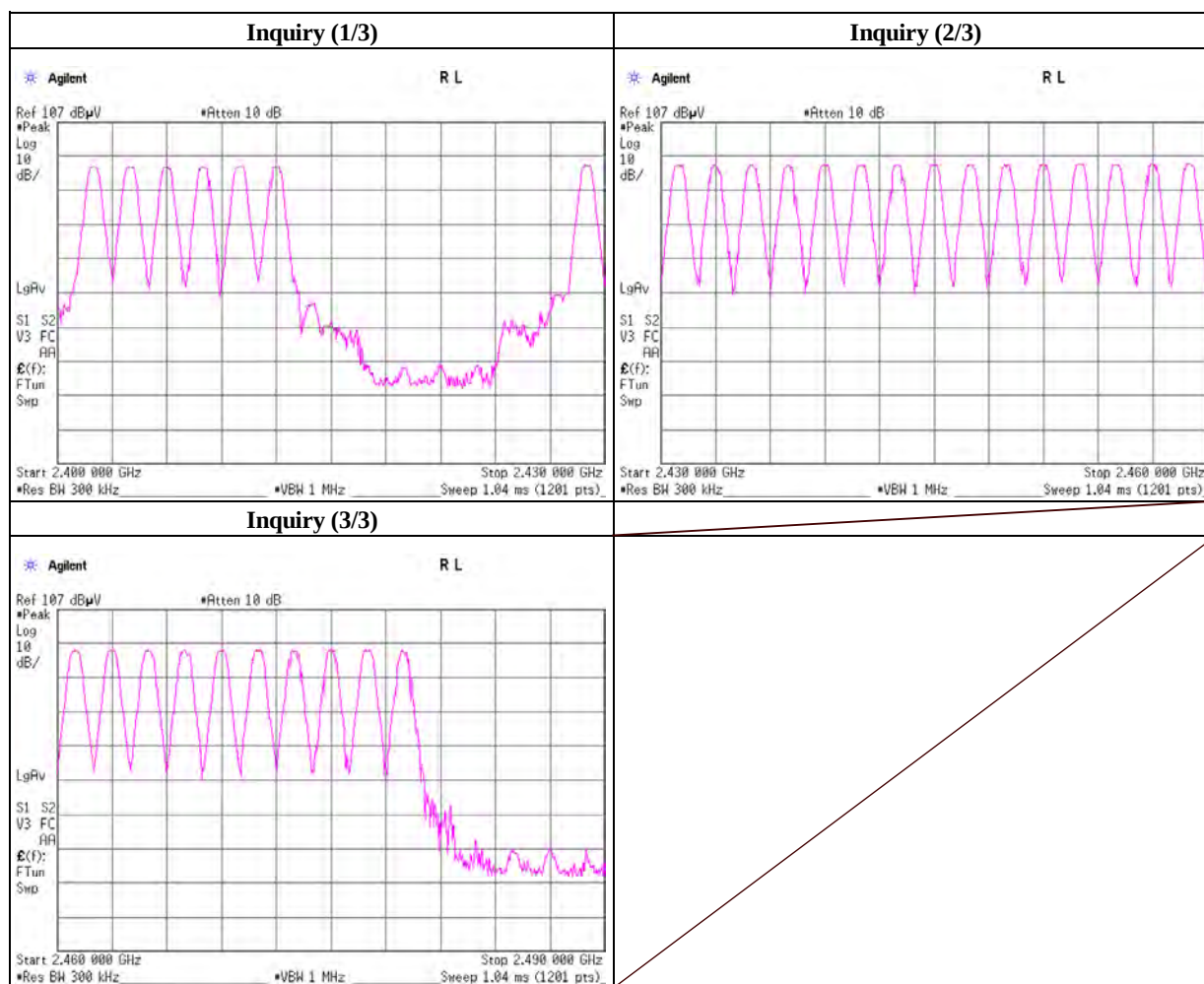
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 12, 2012	
Temperature / Humidity	23deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, Inquiry	

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



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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date February 12, 2012
 Temperature / Humidity 23deg.C , 50%RH
 Engineer Kenichi Adachi
 Mode Tx, Bluetooth, BDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period		Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0	/ 5.0 sec. x 31.6 sec. = 323 times	0.417	135	400
DH3	26.0	/ 5.0 sec. x 31.6 sec. = 165 times	1.676	277	400
DH5	17.0	/ 5.0 sec. x 31.6 sec. = 108 times	2.924	316	400
Inquiry	100.0	/ 1.0 sec. x 12.8 sec. = 1280 times	0.119	152	400

Sample Calculation

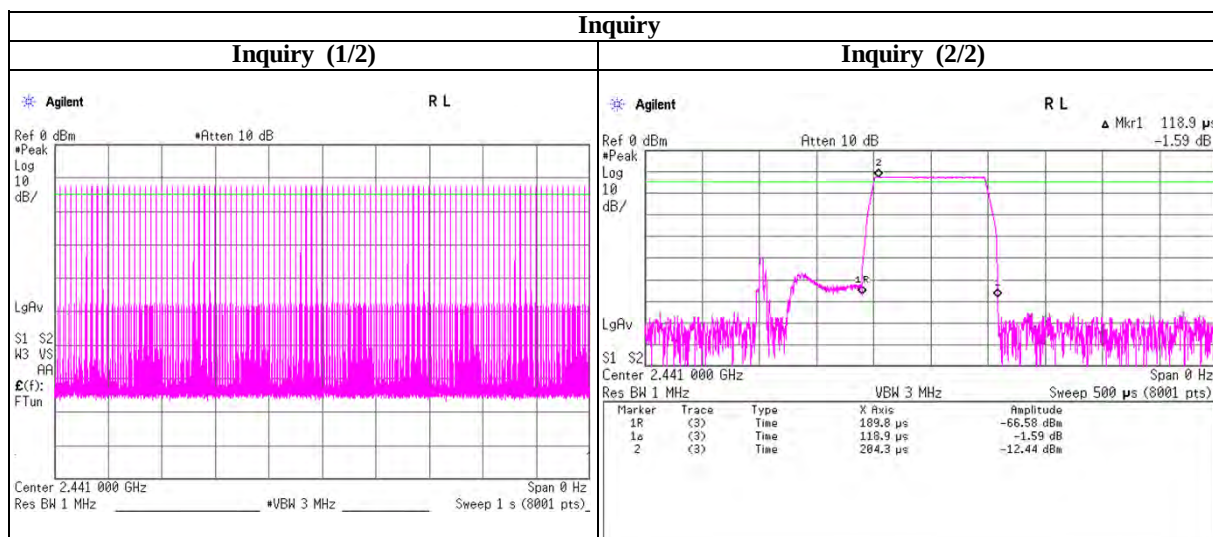
Result = Number of transmission x Length of transmission time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	51	51	51	51.0
DH3	26	26	26	26	26	26.0
DH5	17	17	17	17	17	17.0
Inquiry	100	100	100	100	100	100.0

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5



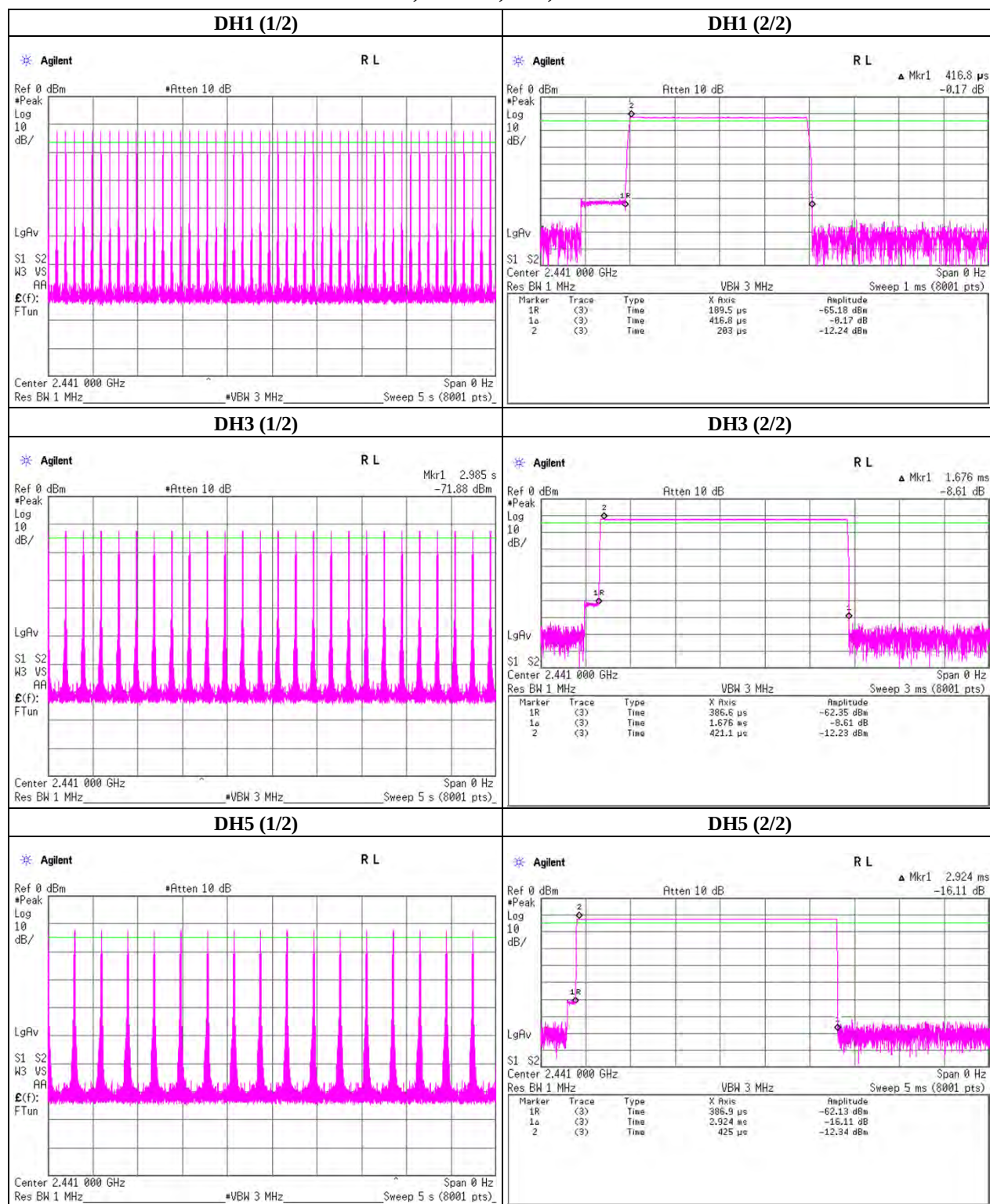
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Shonan EMC Lab.

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Dwell time**Tx, Bluetooth, BDR, PRBS9****UL Japan, Inc.****Shonan EMC Lab.**

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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date February 12, 2012
 Temperature / Humidity 23deg.C , 50%RH
 Engineer Kenichi Adachi
 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	0.432	140	400
3-DH3	26.0	/ 5.0 sec.	x 31.6 sec. = 165 times	1.683	278	400
3-DH5	17.0	/ 5.0 sec.	x 31.6 sec. = 108 times	2.934	317	400

Sample Calculation

Result = Number of transmission x Length of transmission time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
3-DH1	51	51	51	51	51	51.0
3-DH3	26	26	26	26	26	26.0
3-DH5	17	17	17	17	17	17.0

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

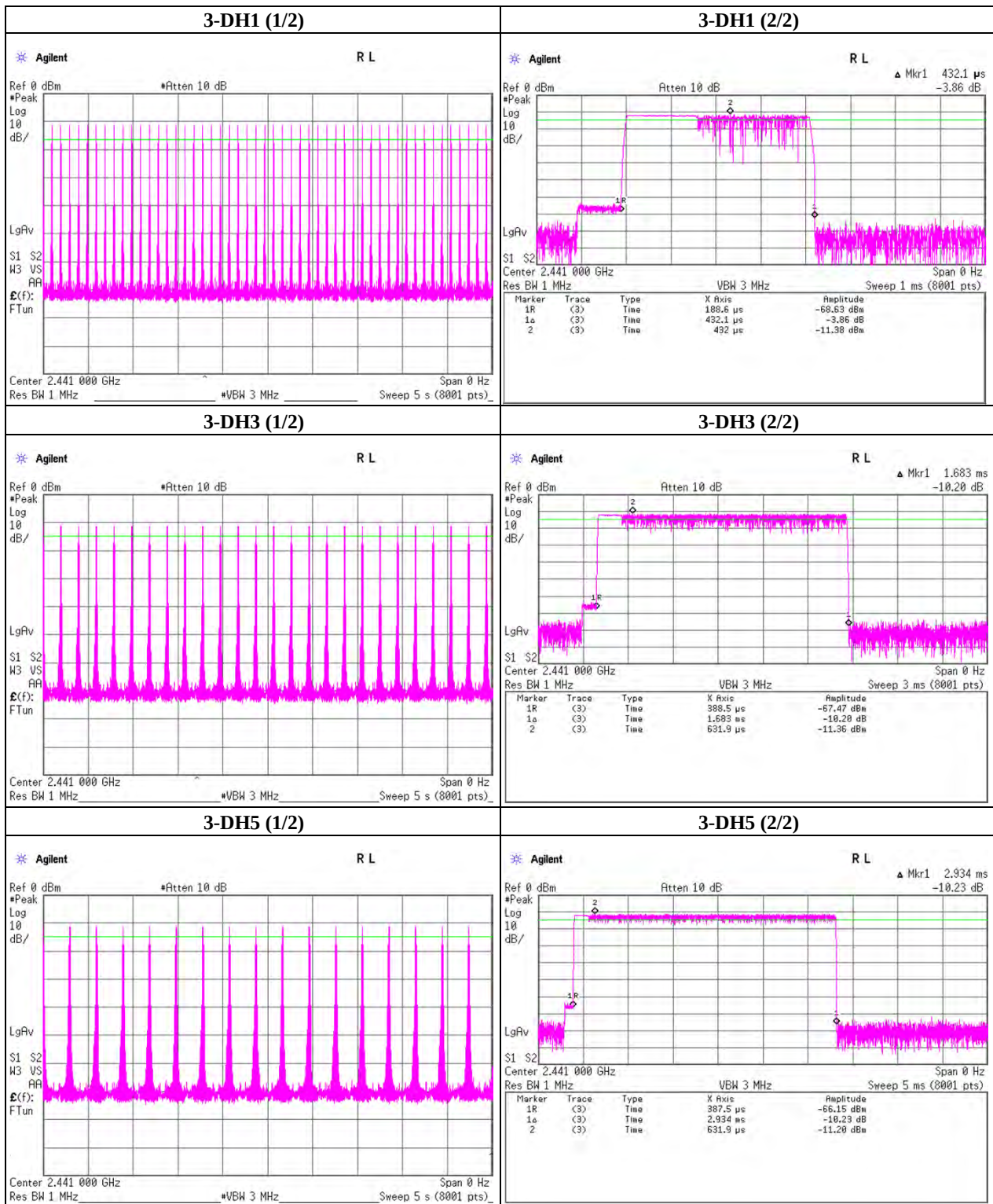
UL Japan, Inc.

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Dwell time**Tx, Bluetooth, EDR, PRBS9****UL Japan, Inc.****Shonan EMC Lab.**

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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date February 12, 2012
 Temperature / Humidity 23deg.C , 50%RH
 Engineer Kenichi Adachi
 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	-12.55	1.95	9.87	-0.73	0.85	20.97	125	21.70
DH5	2441.0	-12.02	1.96	9.87	-0.19	0.96	20.97	125	21.16
DH5	2480.0	-11.48	1.97	9.87	0.36	1.09	20.97	125	20.61
2-DH5	2402.0	-11.46	1.95	9.87	0.36	1.09	20.97	125	20.61
2-DH5	2441.0	-10.91	1.96	9.87	0.92	1.24	20.97	125	20.05
2-DH5	2480.0	-10.59	1.97	9.87	1.25	1.33	20.97	125	19.72
3-DH5	2402.0	-11.45	1.95	9.87	0.37	1.09	20.97	125	20.60
3-DH5	2441.0	-10.92	1.96	9.87	0.91	1.23	20.97	125	20.06
3-DH5	2480.0	-10.58	1.97	9.87	1.26	1.34	20.97	125	19.71

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	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.535	QP	49.0	6.3	7.0	32.1	30.2	40.0	9.8	232	276	
Hori.	330.016	QP	46.8	14.7	8.8	31.9	38.4	46.0	7.6	100	139	
Hori.	396.025	QP	43.6	16.3	9.2	31.9	37.2	46.0	8.8	100	236	
Hori.	960.000	QP	34.5	23.0	10.9	30.5	37.9	46.0	8.1	100	235	
Hori.	1601.992	PK	46.2	25.4	13.1	40.9	43.8	73.9	30.1	100	227	noise floor level
Hori.	1920.068	PK	50.7	26.0	13.4	41.1	49.0	73.9	24.9	100	309	
Hori.	2390.000	PK	47.6	27.2	13.8	41.1	47.5	73.9	26.4	118	86	noise floor level
Hori.	2400.000	PK	51.6	27.3	13.8	41.1	51.6	73.9	22.3	118	86	
Hori.	3203.982	PK	47.7	29.0	5.4	41.5	40.6	73.9	33.3	120	81	
Hori.	4005.997	PK	47.4	30.0	5.6	41.7	41.3	73.9	32.6	113	338	
Hori.	4804.000	PK	53.6	31.1	5.9	41.1	49.5	73.9	24.4	154	143	
Hori.	7206.000	PK	47.6	36.5	7.4	41.3	50.2	73.9	23.7	100	0	noise floor level
Hori.	9608.000	PK	45.0	38.2	8.6	38.8	53.0	73.9	20.9	100	0	noise floor level
Hori.	14412.000	PK	43.4	41.6	11.1	40.7	55.4	73.9	18.5	100	0	noise floor level
Hori.	24020.000	PK	44.8	40.2	-2.1	47.2	35.7	73.9	38.2	100	0	noise floor level
Hori.	1601.992	AV	34.8	25.4	13.1	40.9	32.4	53.9	21.5	100	227	noise floor level
Hori.	1920.068	AV	42.2	26.0	13.4	41.1	40.5	53.9	13.4	100	309	
Hori.	2390.000	AV	35.0	27.2	13.8	41.1	34.9	53.9	19.0	118	86	noise floor level
Hori.	2400.000	AV	41.5	27.3	13.8	41.1	41.5	53.9	12.4	118	86	
Hori.	3203.982	AV	35.4	29.0	5.4	41.5	28.3	53.9	25.6	120	81	
Hori.	4005.997	AV	37.1	30.0	5.6	41.7	31.0	53.9	22.9	113	338	
Hori.	4804.000	AV	47.2	31.1	5.9	41.1	43.1	53.9	10.8	154	143	
Hori.	7206.000	AV	35.0	36.5	7.4	41.3	37.6	53.9	16.3	100	0	noise floor level
Hori.	9608.000	AV	33.1	38.2	8.6	38.8	41.1	53.9	12.8	100	0	noise floor level
Hori.	14412.000	AV	31.7	41.6	11.1	40.7	43.7	53.9	10.2	100	0	noise floor level
Hori.	24020.000	AV	33.1	40.2	-2.1	47.2	24.0	53.9	29.9	100	0	noise floor level
Vert.	77.487	QP	44.3	6.3	7.0	32.1	25.5	40.0	14.5	156	353	
Vert.	330.018	QP	42.7	14.7	8.8	31.9	34.3	46.0	11.7	100	180	
Vert.	960.000	QP	37.6	23.0	10.9	30.5	41.0	46.0	5.0	100	353	
Vert.	1601.992	PK	46.5	25.4	13.1	40.9	44.1	73.9	29.8	100	27	
Vert.	1920.068	PK	49.2	26.0	13.4	41.1	47.5	73.9	26.4	100	336	
Vert.	2390.000	PK	47.6	27.2	13.8	41.1	47.5	73.9	26.4	100	187	noise floor level
Vert.	2400.000	PK	50.5	27.3	13.8	41.1	50.5	73.9	23.4	100	187	
Vert.	3203.982	PK	47.4	29.0	5.4	41.5	40.3	73.9	33.6	100	345	
Vert.	4005.997	PK	47.9	30.0	5.6	41.7	41.8	73.9	32.1	133	120	
Vert.	4804.000	PK	54.2	31.1	5.9	41.1	50.1	73.9	23.8	100	159	
Vert.	7206.000	PK	47.5	36.5	7.4	41.3	50.1	73.9	23.8	100	0	noise floor level
Vert.	9608.000	PK	44.9	38.2	8.6	38.8	52.9	73.9	21.0	100	0	noise floor level
Vert.	14412.000	PK	43.5	41.6	11.1	40.7	55.5	73.9	18.4	100	0	noise floor level
Vert.	24020.000	PK	44.7	40.2	-2.1	47.2	35.6	73.9	38.3	100	0	noise floor level
Vert.	1601.992	AV	35.0	25.4	13.1	40.9	32.6	53.9	21.3	100	27	
Vert.	1920.068	AV	40.0	26.0	13.4	41.1	38.3	53.9	15.6	100	336	
Vert.	2390.000	AV	34.9	27.2	13.8	41.1	34.8	53.9	19.1	100	187	noise floor level
Vert.	2400.000	AV	40.3	27.3	13.8	41.1	40.3	53.9	13.6	100	187	
Vert.	3203.982	AV	35.5	29.0	5.4	41.5	28.4	53.9	25.5	100	345	
Vert.	4005.997	AV	37.8	30.0	5.6	41.7	31.7	53.9	22.2	133	120	
Vert.	4804.000	AV	47.9	31.1	5.9	41.1	43.8	53.9	10.1	100	159	
Vert.	7206.000	AV	35.9	36.5	7.4	41.3	38.5	53.9	15.4	100	0	noise floor level
Vert.	9608.000	AV	33.0	38.2	8.6	38.8	41.0	53.9	12.9	100	0	noise floor level
Vert.	14412.000	AV	31.8	41.6	11.1	40.7	43.8	53.9	10.1	100	0	noise floor level
Vert.	24020.000	AV	33.0	40.2	-2.1	47.2	23.9	53.9	30.0	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.516	QP	48.1	6.3	7.0	32.1	29.3	40.0	10.7	230	272	
Hori.	330.029	QP	47.0	14.7	8.8	31.9	38.6	46.0	7.4	100	143	
Hori.	396.056	QP	45.5	16.3	9.2	31.9	39.1	46.0	6.9	100	238	
Hori.	960.000	QP	34.4	23.0	10.9	30.5	37.8	46.0	8.2	100	237	
Hori.	1627.984	PK	46.4	25.4	13.1	40.9	44.0	73.9	29.9	100	231	
Hori.	1920.072	PK	50.5	26.0	13.4	41.1	48.8	73.9	25.1	100	311	
Hori.	3255.982	PK	47.3	29.0	5.4	41.6	40.1	73.9	33.8	118	83	
Hori.	4069.999	PK	46.7	30.1	5.6	41.7	40.7	73.9	33.2	112	334	
Hori.	4882.000	PK	56.9	31.2	5.9	40.9	53.1	73.9	20.8	151	146	
Hori.	7323.000	PK	47.2	36.8	7.5	41.4	50.1	73.9	23.8	100	0	noise floor level
Hori.	9764.000	PK	45.0	38.5	8.6	38.8	53.3	73.9	20.6	100	0	noise floor level
Hori.	14646.000	PK	45.3	41.5	11.2	40.4	57.6	73.9	16.3	100	0	noise floor level
Hori.	24410.000	PK	45.0	40.2	-2.0	47.3	35.9	73.9	38.0	100	0	noise floor level
Hori.	1627.984	AV	34.9	25.4	13.1	40.9	32.5	53.9	21.4	100	231	
Hori.	1920.072	AV	42.1	26.0	13.4	41.1	40.4	53.9	13.5	100	311	
Hori.	3255.982	AV	35.4	29.0	5.4	41.6	28.2	53.9	25.7	118	83	
Hori.	4069.999	AV	35.1	30.1	5.6	41.7	29.1	53.9	24.8	112	334	
Hori.	4882.000	AV	50.6	31.2	5.9	40.9	46.8	53.9	7.1	151	146	
Hori.	7323.000	AV	35.7	36.8	7.5	41.4	38.6	53.9	15.3	100	0	noise floor level
Hori.	9764.000	AV	33.0	38.5	8.6	38.8	41.3	53.9	12.6	100	0	noise floor level
Hori.	14646.000	AV	33.0	41.5	11.2	40.4	45.3	53.9	8.6	100	0	noise floor level
Hori.	24410.000	AV	33.9	40.2	-2.0	47.3	24.8	53.9	29.1	100	0	noise floor level
Vert.	77.500	QP	44.2	6.3	7.0	32.1	25.4	40.0	14.6	100	359	
Vert.	330.020	QP	42.3	14.7	8.8	31.9	33.9	46.0	12.1	100	178	
Vert.	960.000	QP	37.8	23.0	10.9	30.5	41.2	46.0	4.8	100	347	
Vert.	1627.984	PK	46.6	25.4	13.1	40.9	44.2	73.9	29.7	100	25	
Vert.	1920.072	PK	48.9	26.0	13.4	41.1	47.2	73.9	26.7	100	335	
Vert.	3255.982	PK	47.2	29.0	5.4	41.6	40.0	73.9	33.9	100	341	
Vert.	4069.999	PK	46.8	30.1	5.6	41.7	40.8	73.9	33.1	131	119	
Vert.	4882.000	PK	57.1	31.2	5.9	40.9	53.3	73.9	20.6	100	160	
Vert.	7323.000	PK	47.3	36.8	7.5	41.4	50.2	73.9	23.7	100	0	noise floor level
Vert.	9764.000	PK	45.1	38.5	8.6	38.8	53.4	73.9	20.5	100	0	noise floor level
Vert.	14646.000	PK	45.4	41.5	11.2	40.4	57.7	73.9	16.2	100	0	noise floor level
Vert.	24410.000	PK	45.1	40.2	-2.0	47.3	36.0	73.9	37.9	100	0	noise floor level
Vert.	1627.984	AV	35.0	25.4	13.1	40.9	32.6	53.9	21.3	100	25	
Vert.	1920.072	AV	39.8	26.0	13.4	41.1	38.1	53.9	15.8	100	335	
Vert.	3255.982	AV	35.3	29.0	5.4	41.6	28.1	53.9	25.8	100	341	
Vert.	4069.999	AV	35.2	30.1	5.6	41.7	29.2	53.9	24.7	131	119	
Vert.	4882.000	AV	50.9	31.2	5.9	40.9	47.1	53.9	6.8	100	160	
Vert.	7323.000	AV	35.8	36.8	7.5	41.4	38.7	53.9	15.2	100	0	noise floor level
Vert.	9764.000	AV	33.1	38.5	8.6	38.8	41.4	53.9	12.5	100	0	noise floor level
Vert.	14646.000	AV	33.0	41.5	11.2	40.4	45.3	53.9	8.6	100	0	noise floor level
Vert.	24410.000	AV	34.0	40.2	-2.0	47.3	24.9	53.9	29.0	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.578	QP	48.7	6.3	7.0	32.1	29.9	40.0	10.1	245	276	
Hori.	330.037	QP	46.7	14.7	8.8	31.9	38.3	46.0	7.7	100	138	
Hori.	396.035	QP	44.2	16.3	9.2	31.9	37.8	46.0	8.2	100	245	
Hori.	960.000	QP	33.7	23.0	10.9	30.5	37.1	46.0	8.9	100	237	
Hori.	1653.992	PK	46.4	25.5	13.2	40.9	44.2	73.9	29.7	100	223	noise floor level
Hori.	1920.078	PK	50.6	26.0	13.4	41.1	48.9	73.9	25.0	100	306	
Hori.	2483.500	PK	48.1	27.5	13.8	41.1	48.3	73.9	25.6	117	85	
Hori.	3307.981	PK	47.3	29.1	5.3	41.6	40.1	73.9	33.8	121	84	noise floor level
Hori.	4132.999	PK	46.6	30.1	5.7	41.7	40.7	73.9	33.2	119	333	noise floor level
Hori.	4960.000	PK	55.5	31.4	5.9	40.8	52.0	73.9	21.9	152	144	
Hori.	7440.000	PK	46.8	37.0	7.5	41.5	49.8	73.9	24.1	100	0	noise floor level
Hori.	9920.000	PK	44.1	38.8	8.6	38.8	52.7	73.9	21.2	100	0	noise floor level
Hori.	14880.000	PK	44.7	41.5	11.0	39.8	57.4	73.9	16.5	100	0	noise floor level
Hori.	24800.000	PK	46.8	40.2	-1.8	47.1	38.1	73.9	35.8	100	0	noise floor level
Hori.	1653.992	AV	35.0	25.5	13.2	40.9	32.8	53.9	21.1	100	223	noise floor level
Hori.	1920.078	AV	42.1	26.0	13.4	41.1	40.4	53.9	13.5	100	306	
Hori.	2483.500	AV	37.9	27.5	13.8	41.1	38.1	53.9	15.8	117	85	
Hori.	3307.981	AV	35.2	29.1	5.3	41.6	28.0	53.9	25.9	121	84	noise floor level
Hori.	4132.999	AV	35.2	30.1	5.7	41.7	29.3	53.9	24.6	119	333	noise floor level
Hori.	4960.000	AV	49.1	31.4	5.9	40.8	45.6	53.9	8.3	152	144	
Hori.	7440.000	AV	35.4	37.0	7.5	41.5	38.4	53.9	15.5	100	0	noise floor level
Hori.	9920.000	AV	32.6	38.8	8.6	38.8	41.2	53.9	12.7	100	0	noise floor level
Hori.	14880.000	AV	33.6	41.5	11.0	39.8	46.3	53.9	7.6	100	0	noise floor level
Hori.	24800.000	AV	34.6	40.2	-1.8	47.1	25.9	53.9	28.0	100	0	noise floor level
Vert.	77.591	QP	44.3	6.3	7.0	32.1	25.5	40.0	14.5	100	357	
Vert.	330.014	QP	42.2	14.7	8.8	31.9	33.8	46.0	12.2	100	179	
Vert.	960.000	QP	37.9	23.0	10.9	30.5	41.3	46.0	4.7	100	349	
Vert.	1653.992	PK	46.7	25.5	13.2	40.9	44.5	73.9	29.4	100	31	noise floor level
Vert.	1920.078	PK	49.0	26.0	13.4	41.1	47.3	73.9	26.6	100	339	
Vert.	2483.500	PK	47.5	27.5	13.8	41.1	47.7	73.9	26.2	100	185	
Vert.	3307.981	PK	48.2	29.1	5.3	41.6	41.0	73.9	32.9	100	343	noise floor level
Vert.	4132.999	PK	46.9	30.1	5.7	41.7	41.0	73.9	32.9	132	117	noise floor level
Vert.	4960.000	PK	56.7	31.4	5.9	40.8	53.2	73.9	20.7	100	162	
Vert.	7440.000	PK	46.9	37.0	7.5	41.5	49.9	73.9	24.0	100	0	noise floor level
Vert.	9920.000	PK	44.0	38.8	8.6	38.8	52.6	73.9	21.3	100	0	noise floor level
Vert.	14880.000	PK	44.6	41.5	11.0	39.8	57.3	73.9	16.6	100	0	noise floor level
Vert.	24800.000	PK	46.9	40.2	-1.8	47.1	38.2	73.9	35.7	100	0	noise floor level
Vert.	1653.992	AV	35.0	25.5	13.2	40.9	32.8	53.9	21.1	100	31	noise floor level
Vert.	1920.078	AV	40.0	26.0	13.4	41.1	38.3	53.9	15.6	100	339	
Vert.	2483.500	AV	37.2	27.5	13.8	41.1	37.4	53.9	16.5	100	185	
Vert.	3307.981	AV	35.2	29.1	5.3	41.6	28.0	53.9	25.9	100	343	noise floor level
Vert.	4132.999	AV	35.1	30.1	5.7	41.7	29.2	53.9	24.7	132	117	noise floor level
Vert.	4960.000	AV	50.4	31.4	5.9	40.8	46.9	53.9	7.0	100	162	
Vert.	7440.000	AV	35.5	37.0	7.5	41.5	38.5	53.9	15.4	100	0	
Vert.	9920.000	AV	32.5	38.8	8.6	38.8	41.1	53.9	12.8	100	0	
Vert.	14880.000	AV	33.6	41.5	11.0	39.8	46.3	53.9	7.6	100	0	
Vert.	24800.000	AV	34.7	40.2	-1.8	47.1	26.0	53.9	27.9	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.491	QP	49.3	6.3	7.0	32.1	30.5	40.0	9.5	236	276	
Hori.	330.010	QP	46.3	14.7	8.8	31.9	37.9	46.0	8.1	100	142	
Hori.	396.033	QP	44.0	16.3	9.2	31.9	37.6	46.0	8.4	100	241	
Hori.	960.000	QP	33.9	23.0	10.9	30.5	37.3	46.0	8.7	100	237	
Hori.	1601.999	PK	46.3	25.4	13.1	40.9	43.9	73.9	30.0	100	233	noise floor level
Hori.	1920.064	PK	50.4	26.0	13.4	41.1	48.7	73.9	25.2	100	312	
Hori.	2390.000	PK	47.5	27.2	13.8	41.1	47.4	73.9	26.5	115	84	noise floor level
Hori.	2400.000	PK	51.4	27.3	13.8	41.1	51.4	73.9	22.5	115	84	
Hori.	3203.984	PK	47.1	29.0	5.4	41.5	40.0	73.9	33.9	122	82	noise floor level
Hori.	4005.996	PK	46.7	30.0	5.6	41.7	40.6	73.9	33.3	111	341	noise floor level
Hori.	4804.000	PK	46.9	31.1	5.9	41.1	42.8	73.9	31.1	149	147	noise floor level
Hori.	7206.000	PK	47.5	36.5	7.4	41.3	50.1	73.9	23.8	100	0	
Hori.	9608.000	PK	45.0	38.2	8.6	38.8	53.0	73.9	20.9	100	0	
Hori.	14412.000	PK	43.6	41.6	11.1	40.7	55.6	73.9	18.3	100	0	
Hori.	24020.000	PK	44.8	40.2	-2.1	47.2	35.7	73.9	38.2	100	0	noise floor level
Hori.	1601.999	AV	34.9	25.4	13.1	40.9	32.5	53.9	21.4	100	233	noise floor level
Hori.	1920.064	AV	41.8	26.0	13.4	41.1	40.1	53.9	13.8	100	312	
Hori.	2390.000	AV	34.9	27.2	13.8	41.1	34.8	53.9	19.1	115	84	noise floor level
Hori.	2400.000	AV	38.6	27.3	13.8	41.1	38.6	53.9	15.3	115	84	
Hori.	3203.984	AV	35.8	29.0	5.4	41.5	28.7	53.9	25.2	122	82	noise floor level
Hori.	4005.996	AV	35.1	30.0	5.6	41.7	29.0	53.9	24.9	111	341	noise floor level
Hori.	4804.000	AV	37.1	31.1	5.9	41.1	33.0	53.9	20.9	149	147	noise floor level
Hori.	7206.000	AV	35.7	36.5	7.4	41.3	38.3	53.9	15.6	100	0	noise floor level
Hori.	9608.000	AV	33.0	38.2	8.6	38.8	41.0	53.9	12.9	100	0	noise floor level
Hori.	14412.000	AV	31.8	41.6	11.1	40.7	43.8	53.9	10.1	100	0	noise floor level
Hori.	24020.000	AV	33.1	40.2	-2.1	47.2	24.0	53.9	29.9	100	0	noise floor level
Vert.	77.512	QP	45.4	6.3	7.0	32.1	26.6	40.0	13.4	100	351	
Vert.	330.017	QP	42.4	14.7	8.8	31.9	34.0	46.0	12.0	100	178	
Vert.	960.000	QP	38.1	23.0	10.9	30.5	41.5	46.0	4.5	100	354	
Vert.	1601.999	PK	46.9	25.4	13.1	40.9	44.5	73.9	29.4	100	28	noise floor level
Vert.	1920.064	PK	49.0	26.0	13.4	41.1	47.3	73.9	26.6	100	334	
Vert.	2390.000	PK	46.9	27.2	13.8	41.1	46.8	73.9	27.1	100	184	noise floor level
Vert.	2400.000	PK	48.5	27.3	13.8	41.1	48.5	73.9	25.4	100	184	
Vert.	3203.984	PK	47.4	29.0	5.4	41.5	40.3	73.9	33.6	100	344	noise floor level
Vert.	4005.996	PK	46.8	30.0	5.6	41.7	40.7	73.9	33.2	131	118	noise floor level
Vert.	4804.000	PK	47.0	31.1	5.9	41.1	42.9	73.9	31.0	100	154	noise floor level
Vert.	7206.000	PK	47.4	36.5	7.4	41.3	50.0	73.9	23.9	100	0	
Vert.	9608.000	PK	45.0	38.2	8.6	38.8	53.0	73.9	20.9	100	0	
Vert.	14412.000	PK	43.7	41.6	11.1	40.7	55.7	73.9	18.2	100	0	
Vert.	24020.000	PK	44.9	40.2	-2.1	47.2	35.8	73.9	38.1	100	0	noise floor level
Vert.	1601.999	AV	35.0	25.4	13.1	40.9	32.6	53.9	21.3	100	28	noise floor level
Vert.	1920.064	AV	39.9	26.0	13.4	41.1	38.2	53.9	15.7	100	334	
Vert.	2390.000	AV	35.0	27.2	13.8	41.1	34.9	53.9	19.0	100	184	noise floor level
Vert.	2400.000	AV	37.8	27.3	13.8	41.1	37.8	53.9	16.1	100	184	
Vert.	3203.984	AV	35.9	29.0	5.4	41.5	28.8	53.9	25.1	100	344	noise floor level
Vert.	4005.996	AV	35.0	30.0	5.6	41.7	28.9	53.9	25.0	131	118	noise floor level
Vert.	4804.000	AV	37.2	31.1	5.9	41.1	33.1	53.9	20.8	100	154	noise floor level
Vert.	7206.000	AV	35.6	36.5	7.4	41.3	38.2	53.9	15.7	100	0	noise floor level
Vert.	9608.000	AV	33.1	38.2	8.6	38.8	41.1	53.9	12.8	100	0	noise floor level
Vert.	14412.000	AV	31.9	41.6	11.1	40.7	43.9	53.9	10.0	100	0	noise floor level
Vert.	24020.000	AV	33.2	40.2	-2.1	47.2	24.1	53.9	29.8	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.493	QP	51.5	6.3	7.0	32.1	32.7	40.0	7.3	235	287	
Hori.	330.015	QP	46.0	14.7	8.8	31.9	37.6	46.0	8.4	100	139	
Hori.	396.027	QP	42.3	16.3	9.2	31.9	35.9	46.0	10.1	100	238	
Hori.	960.000	QP	33.1	23.0	10.9	30.5	36.5	46.0	9.5	100	234	
Hori.	1627.983	PK	46.5	25.4	13.1	40.9	44.1	73.9	29.8	100	228	noise floor level
Hori.	1920.071	PK	50.6	26.0	13.4	41.1	48.9	73.9	25.0	100	313	
Hori.	3255.983	PK	47.4	29.0	5.4	41.6	40.2	73.9	33.7	115	85	noise floor level
Hori.	4069.999	PK	46.6	30.1	5.6	41.7	40.6	73.9	33.3	113	0	noise floor level
Hori.	4882.000	PK	47.2	31.2	5.9	40.9	43.4	73.9	30.5	148	144	noise floor level
Hori.	7323.000	PK	47.5	36.8	7.5	41.4	50.4	73.9	23.5	100	0	
Hori.	9764.000	PK	45.3	38.5	8.6	38.8	53.6	73.9	20.3	100	0	
Hori.	14646.000	PK	45.4	41.5	11.2	40.4	57.7	73.9	16.2	100	0	
Hori.	24410.000	PK	45.1	40.2	-2.0	47.3	36.0	73.9	37.9	100	0	noise floor level
Hori.	1627.983	AV	35.0	25.4	13.1	40.9	32.6	53.9	21.3	100	228	noise floor level
Hori.	1920.071	AV	42.0	26.0	13.4	41.1	40.3	53.9	13.6	100	313	
Hori.	3255.983	AV	35.3	29.0	5.4	41.6	28.1	53.9	25.8	115	85	noise floor level
Hori.	4069.999	AV	35.1	30.1	5.6	41.7	29.1	53.9	24.8	113	0	noise floor level
Hori.	4882.000	AV	37.1	31.2	5.9	40.9	33.3	53.9	20.6	148	144	noise floor level
Hori.	7323.000	AV	35.8	36.8	7.5	41.4	38.7	53.9	15.2	100	0	noise floor level
Hori.	9764.000	AV	33.1	38.5	8.6	38.8	41.4	53.9	12.5	100	0	noise floor level
Hori.	14646.000	AV	33.0	41.5	11.2	40.4	45.3	53.9	8.6	100	0	noise floor level
Hori.	24410.000	AV	33.9	40.2	-2.0	47.3	24.8	53.9	29.1	100	0	noise floor level
Vert.	77.507	QP	45.2	6.3	7.0	32.1	26.4	40.0	13.6	100	353	
Vert.	330.011	QP	42.2	14.7	8.8	31.9	33.8	46.0	12.2	100	182	
Vert.	960.000	QP	38.2	23.0	10.9	30.5	41.6	46.0	4.4	100	352	
Vert.	1627.983	PK	47.0	25.4	13.1	40.9	44.6	73.9	29.3	100	30	noise floor level
Vert.	1920.071	PK	48.8	26.0	13.4	41.1	47.1	73.9	26.8	100	333	
Vert.	3255.983	PK	47.2	29.0	5.4	41.6	40.0	73.9	33.9	100	339	
Vert.	4069.999	PK	47.0	30.1	5.6	41.7	41.0	73.9	32.9	129	115	noise floor level
Vert.	4882.000	PK	47.5	31.2	5.9	40.9	43.7	73.9	30.2	100	155	noise floor level
Vert.	7323.000	PK	47.4	36.8	7.5	41.4	50.3	73.9	23.6	100	0	noise floor level
Vert.	9764.000	PK	45.2	38.5	8.6	38.8	53.5	73.9	20.4	100	0	noise floor level
Vert.	14646.000	PK	45.5	41.5	11.2	40.4	57.8	73.9	16.1	100	0	noise floor level
Vert.	24410.000	PK	45.2	40.2	-2.0	47.3	36.1	73.9	37.8	100	0	noise floor level
Vert.	1627.983	AV	35.0	25.4	13.1	40.9	32.6	53.9	21.3	100	30	noise floor level
Vert.	1920.071	AV	39.8	26.0	13.4	41.1	38.1	53.9	15.8	100	333	
Vert.	3255.983	AV	35.5	29.0	5.4	41.6	28.3	53.9	25.6	100	339	
Vert.	4069.999	AV	35.0	30.1	5.6	41.7	29.0	53.9	24.9	129	115	noise floor level
Vert.	4882.000	AV	37.2	31.2	5.9	40.9	33.4	53.9	20.5	100	155	noise floor level
Vert.	7323.000	AV	35.7	36.8	7.5	41.4	38.6	53.9	15.3	100	0	noise floor level
Vert.	9764.000	AV	33.0	38.5	8.6	38.8	41.3	53.9	12.6	100	0	noise floor level
Vert.	14646.000	AV	33.1	41.5	11.2	40.4	45.4	53.9	8.5	100	0	noise floor level
Vert.	24410.000	AV	34.0	40.2	-2.0	47.3	24.9	53.9	29.0	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	February 5, 2012	February 6, 2012
Temperature / Humidity	23deg.C , 30%RH	26deg.C , 25%RH
Engineer	Kenichi Adachi	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.	77.530	QP	51.1	6.3	7.0	32.1	32.3	40.0	7.7	249	275	
Hori.	330.037	QP	46.8	14.7	8.8	31.9	38.4	46.0	7.6	100	140	
Hori.	396.035	QP	42.7	16.3	9.2	31.9	36.3	46.0	9.7	100	239	
Hori.	960.000	QP	33.1	23.0	10.9	30.5	36.5	46.0	9.5	100	237	
Hori.	1653.991	PK	46.5	25.5	13.2	40.9	44.3	73.9	29.6	100	222	noise floor level
Hori.	1920.070	PK	50.3	26.0	13.4	41.1	48.6	73.9	25.3	100	310	
Hori.	2483.500	PK	49.5	27.5	13.8	41.1	49.7	73.9	24.2	116	88	
Hori.	3307.982	PK	47.2	29.1	5.3	41.6	40.0	73.9	33.9	124	81	
Hori.	4132.999	PK	47.0	30.1	5.7	41.7	41.1	73.9	32.8	117	330	
Hori.	4960.000	PK	48.9	31.4	5.9	40.8	45.4	73.9	28.5	151	149	
Hori.	7440.000	PK	46.7	37.0	7.5	41.5	49.7	73.9	24.2	100	0	noise floor level
Hori.	9920.000	PK	44.1	38.8	8.6	38.8	52.7	73.9	21.2	100	0	noise floor level
Hori.	14880.000	PK	44.9	41.5	11.0	39.8	57.6	73.9	16.3	100	0	noise floor level
Hori.	24800.000	PK	47.0	40.2	-1.8	47.1	38.3	73.9	35.6	100	0	noise floor level
Hori.	1653.991	AV	35.0	25.5	13.2	40.9	32.8	53.9	21.1	100	222	noise floor level
Hori.	1920.070	AV	41.9	26.0	13.4	41.1	40.2	53.9	13.7	100	310	
Hori.	2483.500	AV	38.0	27.5	13.8	41.1	38.2	53.9	15.7	116	88	
Hori.	3307.982	AV	35.1	29.1	5.3	41.6	27.9	53.9	26.0	124	81	
Hori.	4132.999	AV	35.0	30.1	5.7	41.7	29.1	53.9	24.8	117	330	
Hori.	4960.000	AV	38.0	31.4	5.9	40.8	34.5	53.9	19.4	151	149	
Hori.	7440.000	AV	35.4	37.0	7.5	41.5	38.4	53.9	15.5	100	0	noise floor level
Hori.	9920.000	AV	32.5	38.8	8.6	38.8	41.1	53.9	12.8	100	0	noise floor level
Hori.	14880.000	AV	33.7	41.5	11.0	39.8	46.4	53.9	7.5	100	0	noise floor level
Hori.	24800.000	AV	34.7	40.2	-1.8	47.1	26.0	53.9	27.9	100	0	noise floor level
Vert.	77.482	QP	44.8	6.3	7.0	32.1	26.0	40.0	14.0	100	351	
Vert.	330.040	QP	42.7	14.7	8.8	31.9	34.3	46.0	11.7	100	183	
Vert.	960.000	QP	38.0	23.0	10.9	30.5	41.4	46.0	4.6	100	349	
Vert.	1653.991	PK	46.8	25.5	13.2	40.9	44.6	73.9	29.3	100	26	noise floor level
Vert.	1920.070	PK	48.8	26.0	13.4	41.1	47.1	73.9	26.8	100	335	
Vert.	2483.500	PK	49.2	27.5	13.8	41.1	49.4	73.9	24.5	100	183	
Vert.	3307.982	PK	47.1	29.1	5.3	41.6	39.9	73.9	34.0	100	344	
Vert.	4132.999	PK	46.9	30.1	5.7	41.7	41.0	73.9	32.9	128	119	
Vert.	4960.000	PK	49.2	31.4	5.9	40.8	45.7	73.9	28.2	100	158	
Vert.	7440.000	PK	46.8	37.0	7.5	41.5	49.8	73.9	24.1	100	0	noise floor level
Vert.	9920.000	PK	44.2	38.8	8.6	38.8	52.8	73.9	21.1	100	0	noise floor level
Vert.	14880.000	PK	45.0	41.5	11.0	39.8	57.7	73.9	16.2	100	0	noise floor level
Vert.	24800.000	PK	46.9	40.2	-1.8	47.1	38.2	73.9	35.7	100	0	noise floor level
Vert.	1653.991	AV	35.1	25.5	13.2	40.9	32.9	53.9	21.0	100	26	noise floor level
Vert.	1920.070	AV	39.8	26.0	13.4	41.1	38.1	53.9	15.8	100	335	
Vert.	2483.500	AV	37.8	27.5	13.8	41.1	38.0	53.9	15.9	100	183	
Vert.	3307.982	AV	35.0	29.1	5.3	41.6	27.8	53.9	26.1	100	344	
Vert.	4132.999	AV	35.0	30.1	5.7	41.7	29.1	53.9	24.8	128	119	
Vert.	4960.000	AV	38.2	31.4	5.9	40.8	34.7	53.9	19.2	100	158	
Vert.	7440.000	AV	35.4	37.0	7.5	41.5	38.4	53.9	15.5	100	0	noise floor level
Vert.	9920.000	AV	32.6	38.8	8.6	38.8	41.2	53.9	12.7	100	0	noise floor level
Vert.	14880.000	AV	33.8	41.5	11.0	39.8	46.5	53.9	7.4	100	0	noise floor level
Vert.	24800.000	AV	34.6	40.2	-1.8	47.1	25.9	53.9	28.0	100	0	noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

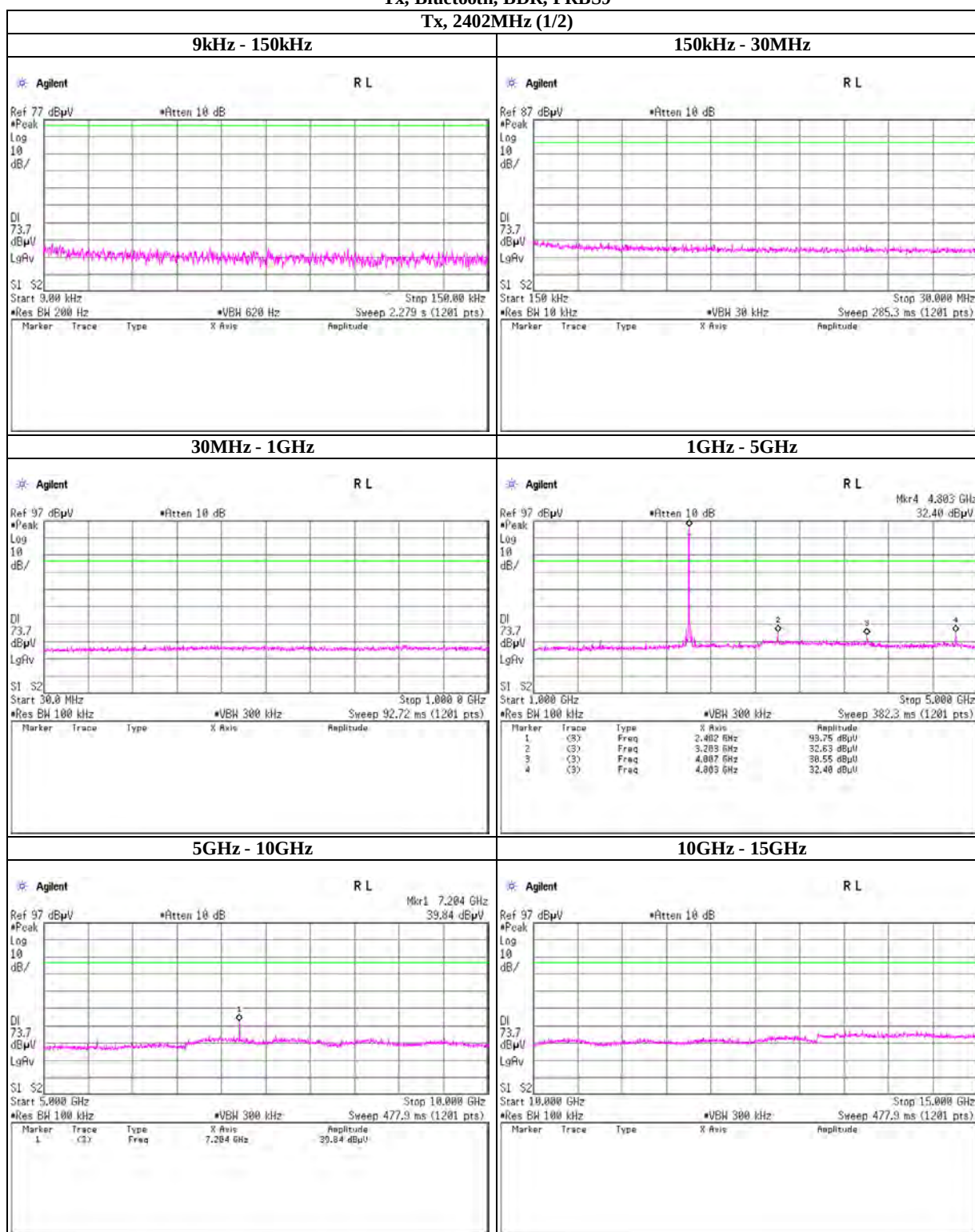
Distance factor: 15GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)

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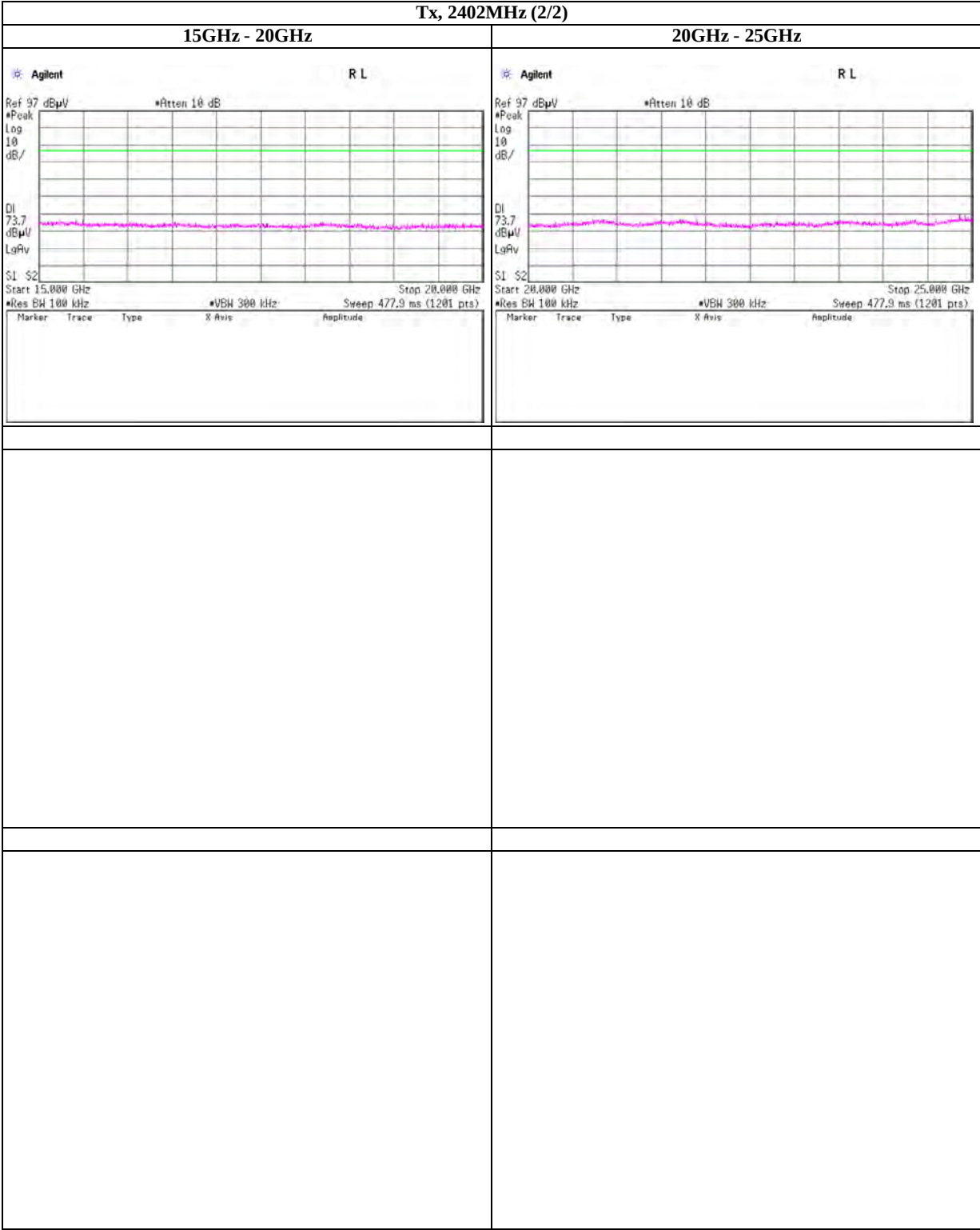
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (2/2)



Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (1/2)

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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

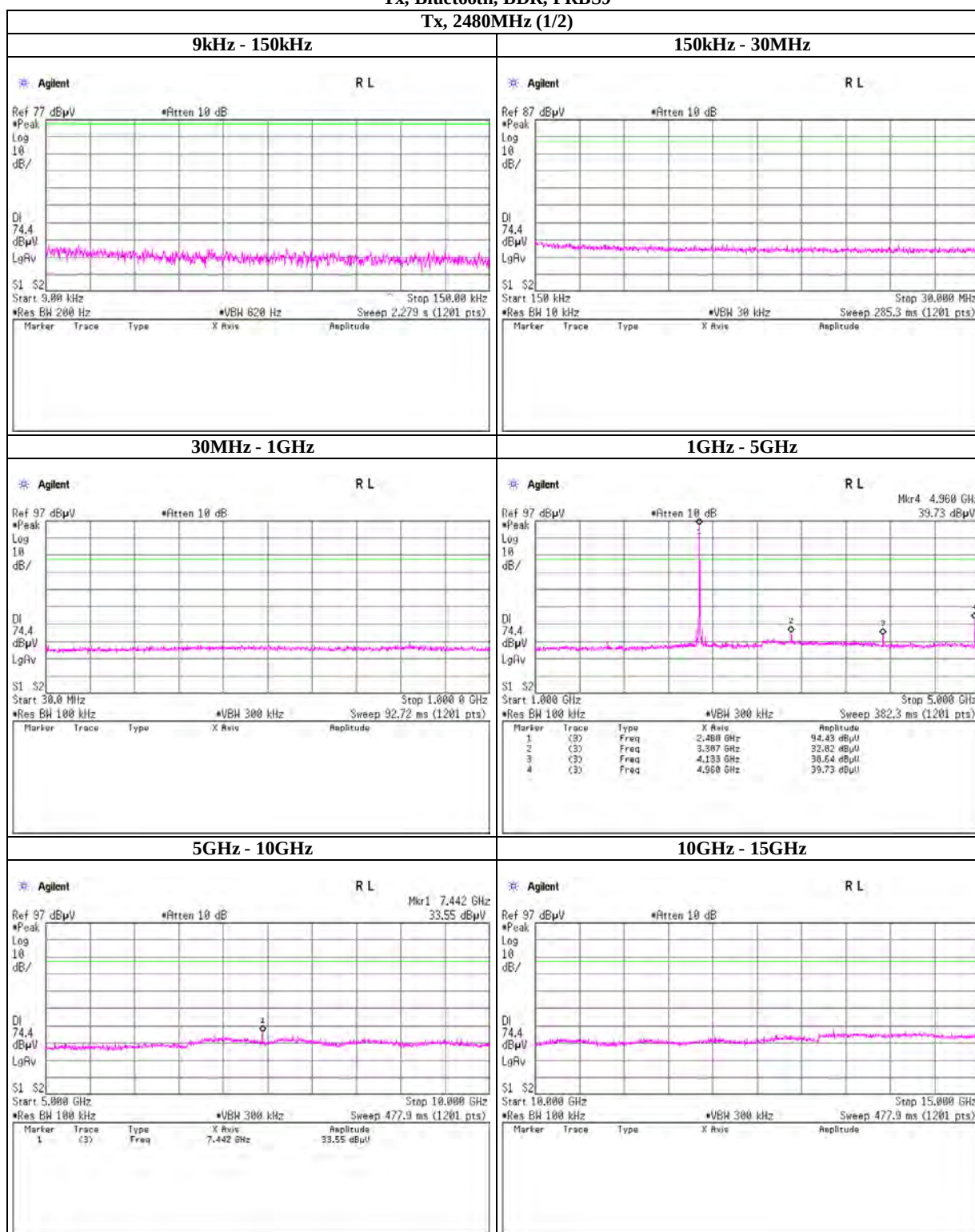
Tx, 2441MHz (2/2)



Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (1/2)



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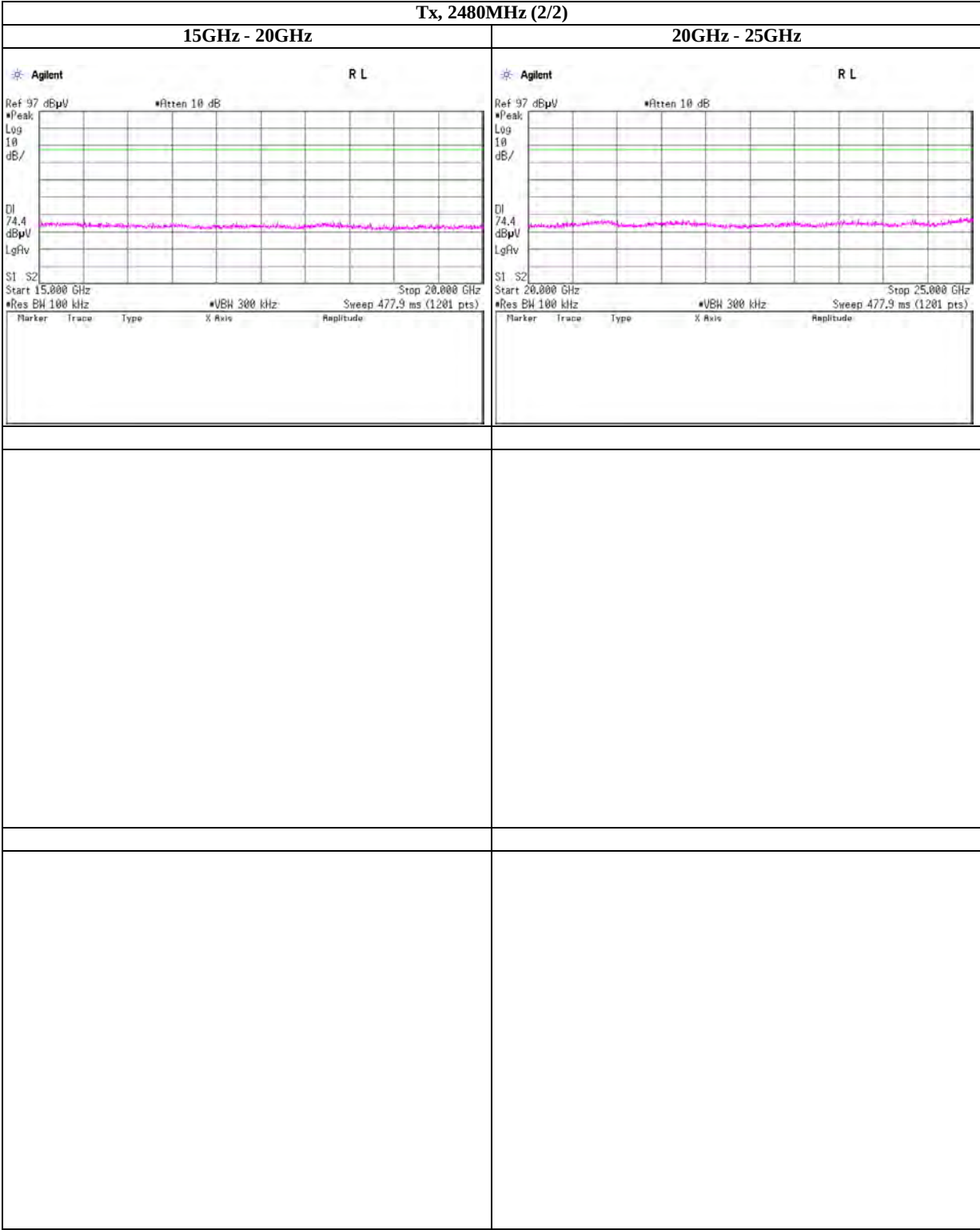
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

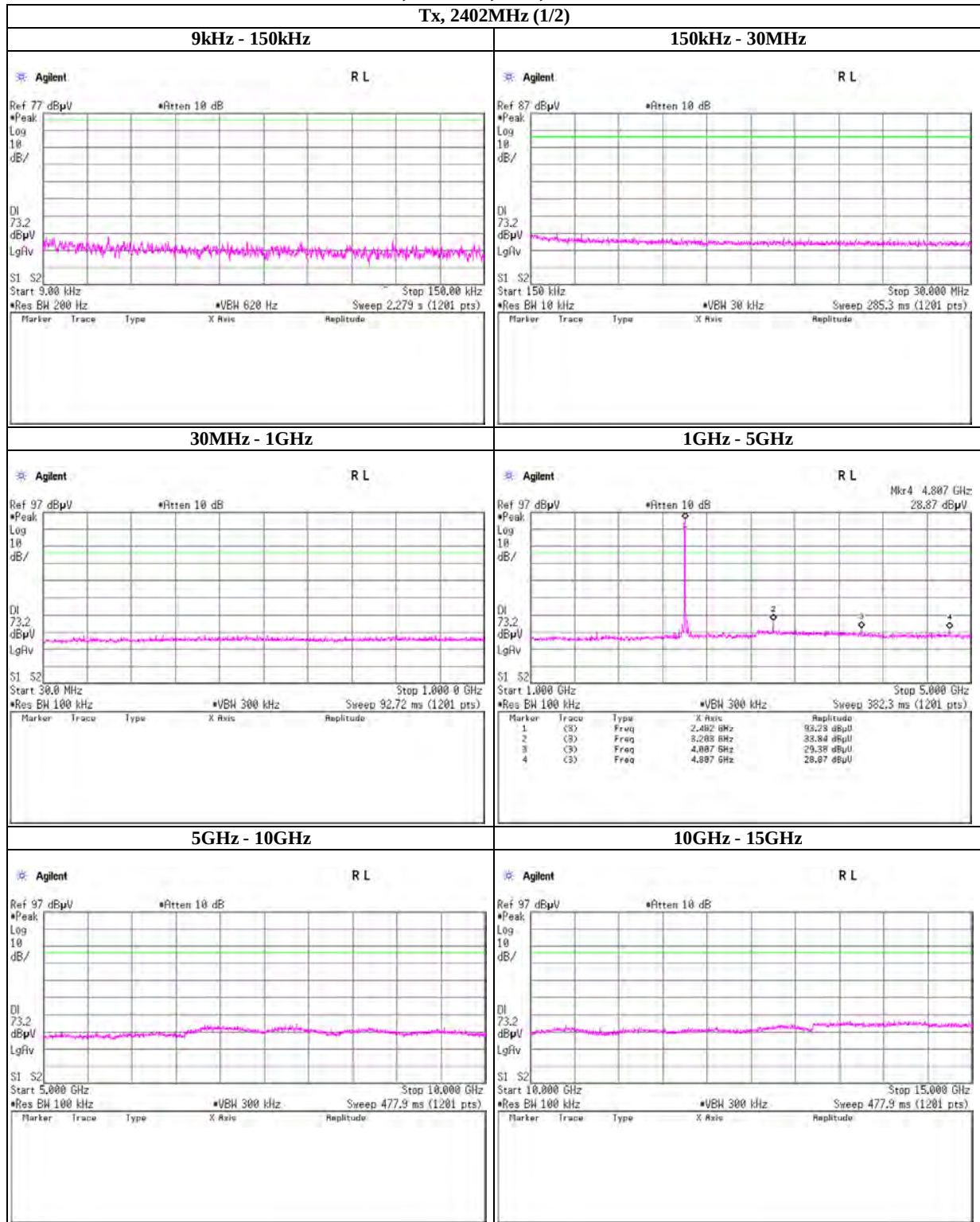
Tx, 2480MHz (2/2)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)



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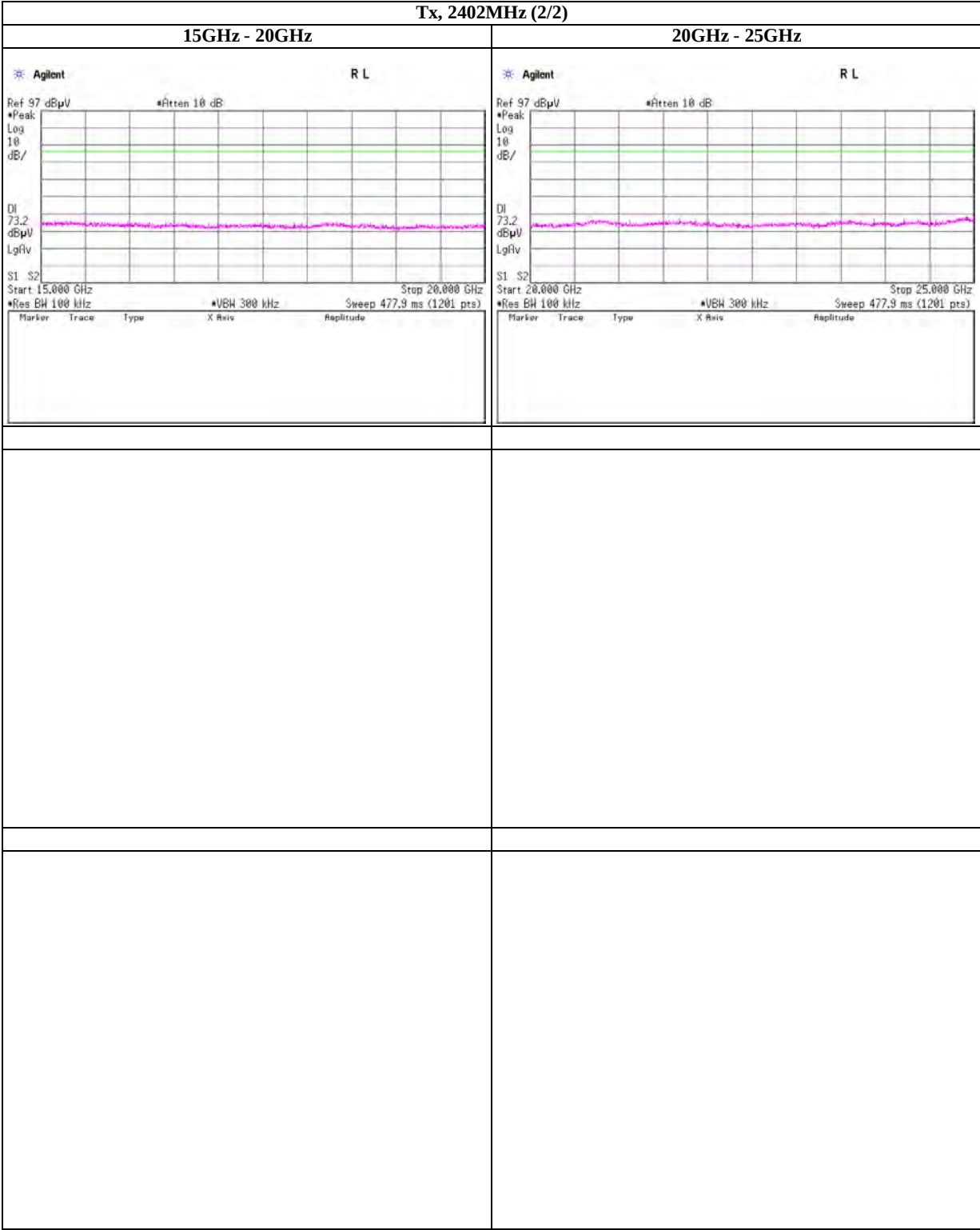
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

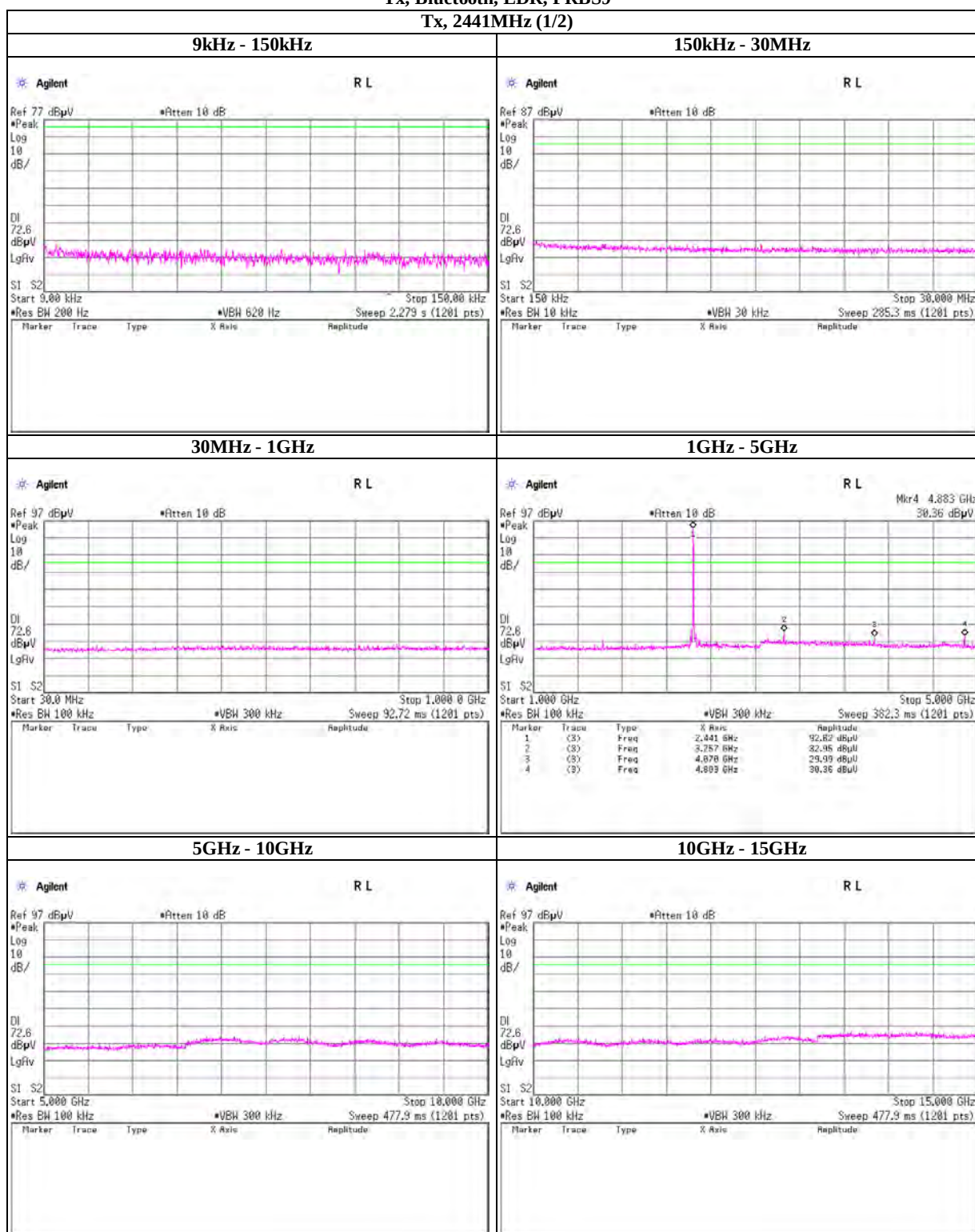
Tx, 2402MHz (2/2)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (1/2)

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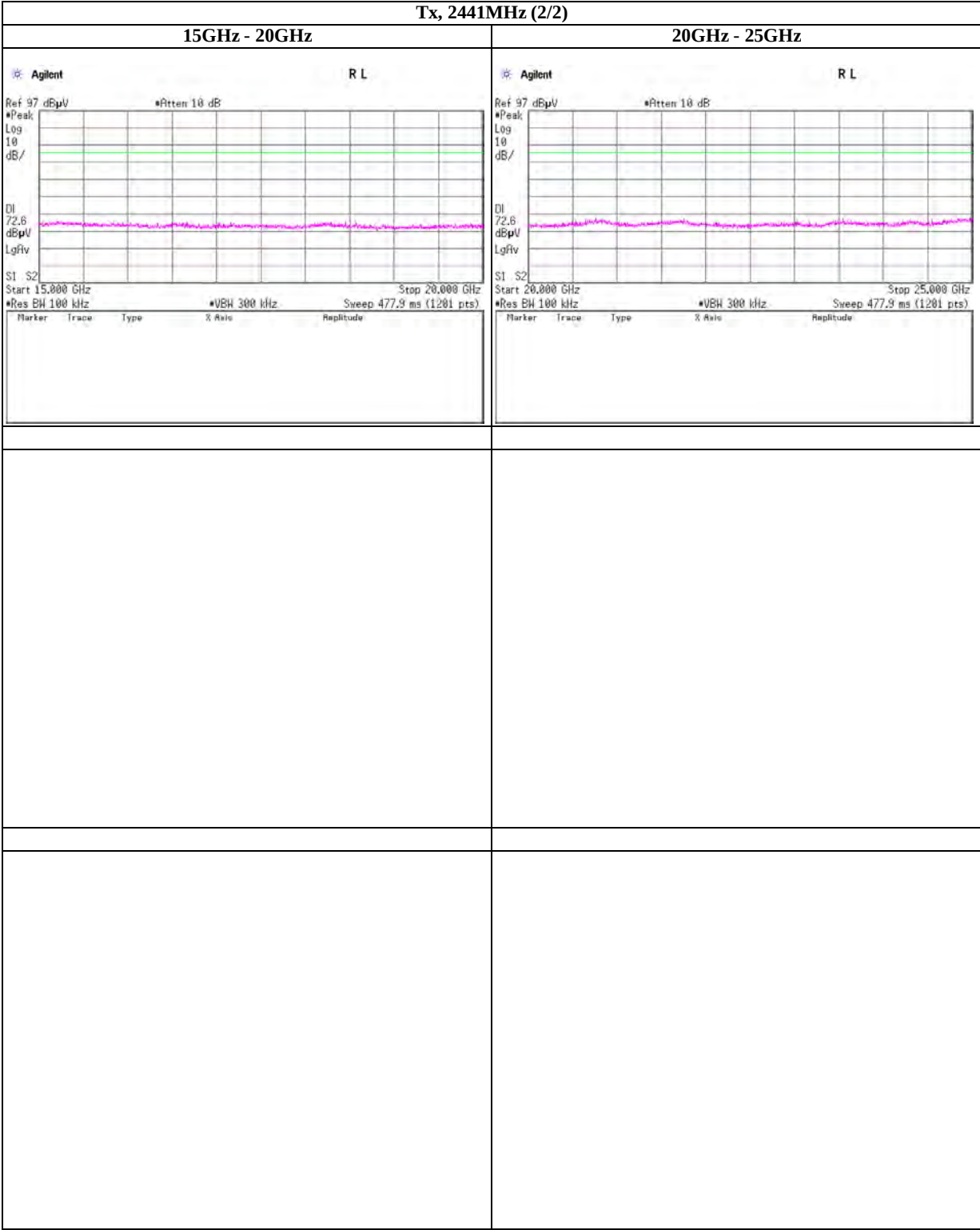
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

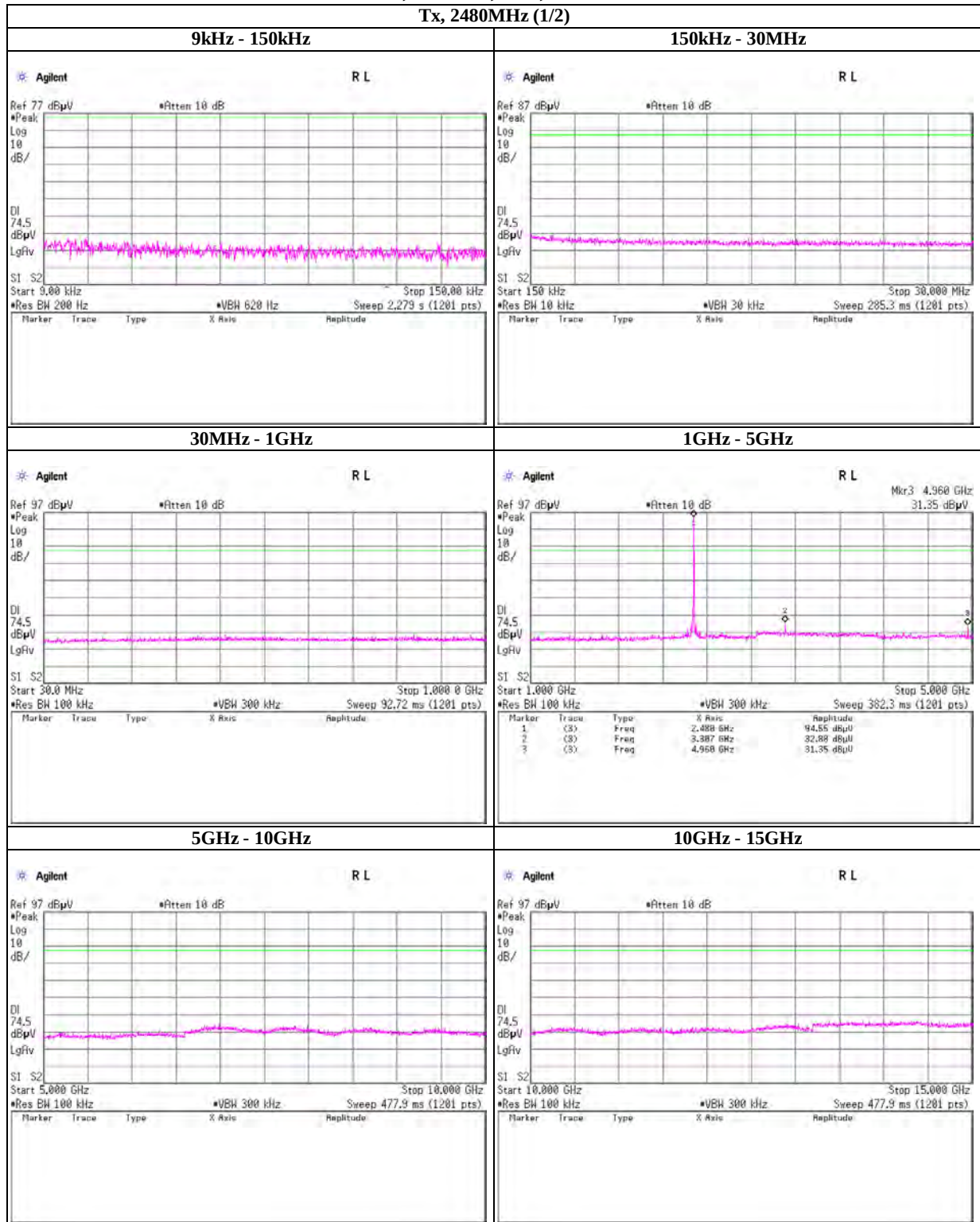
Tx, 2441MHz (2/2)



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)



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Spurious emission (Conducted)

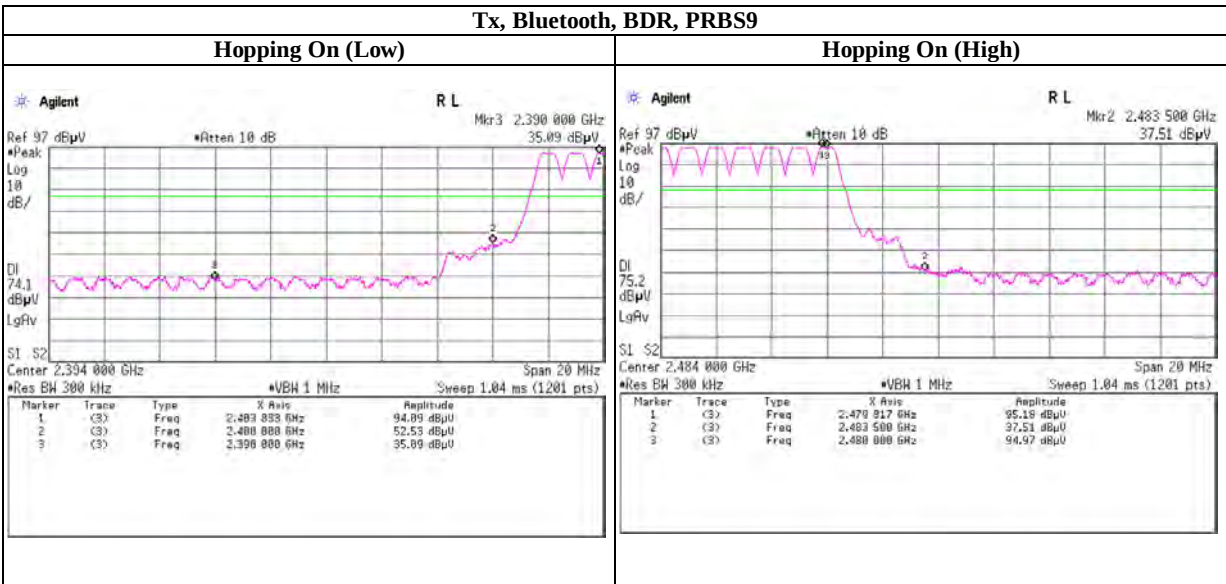
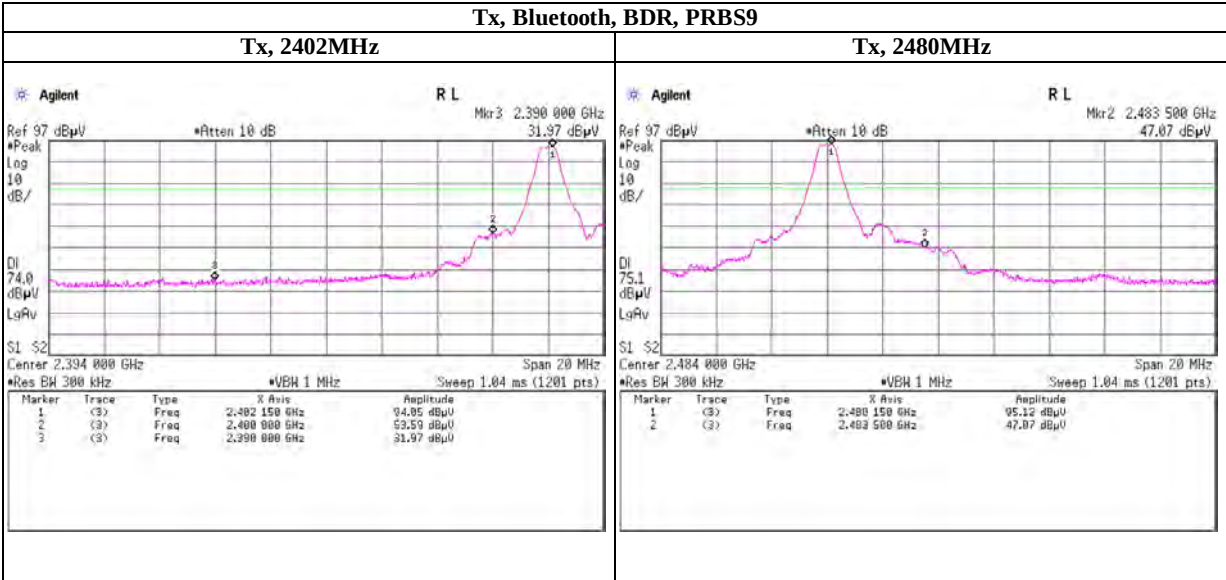
Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)



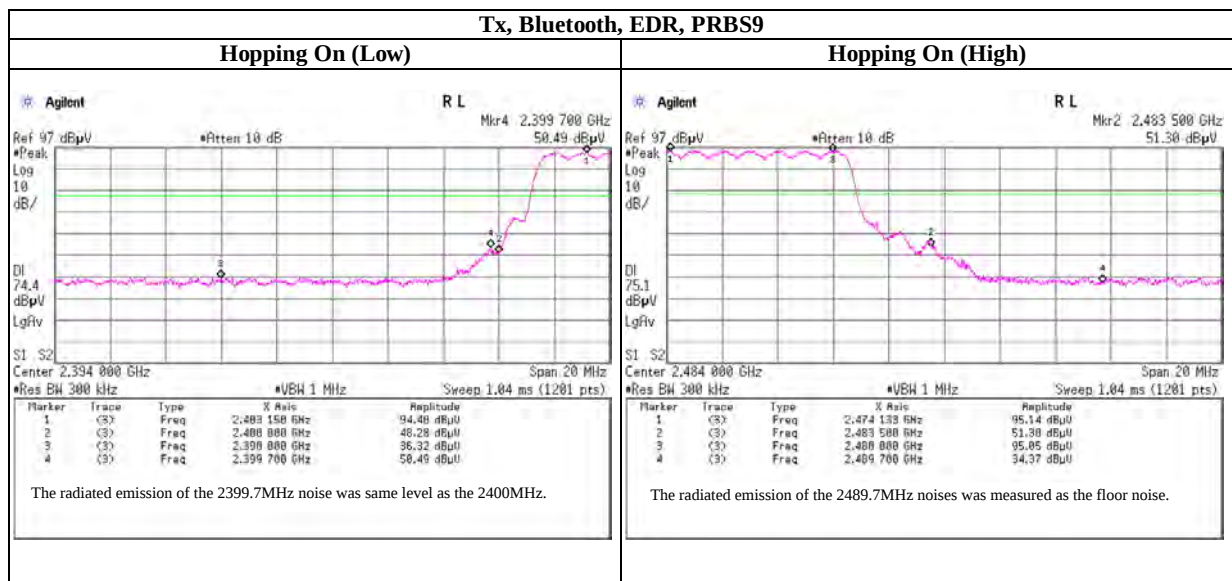
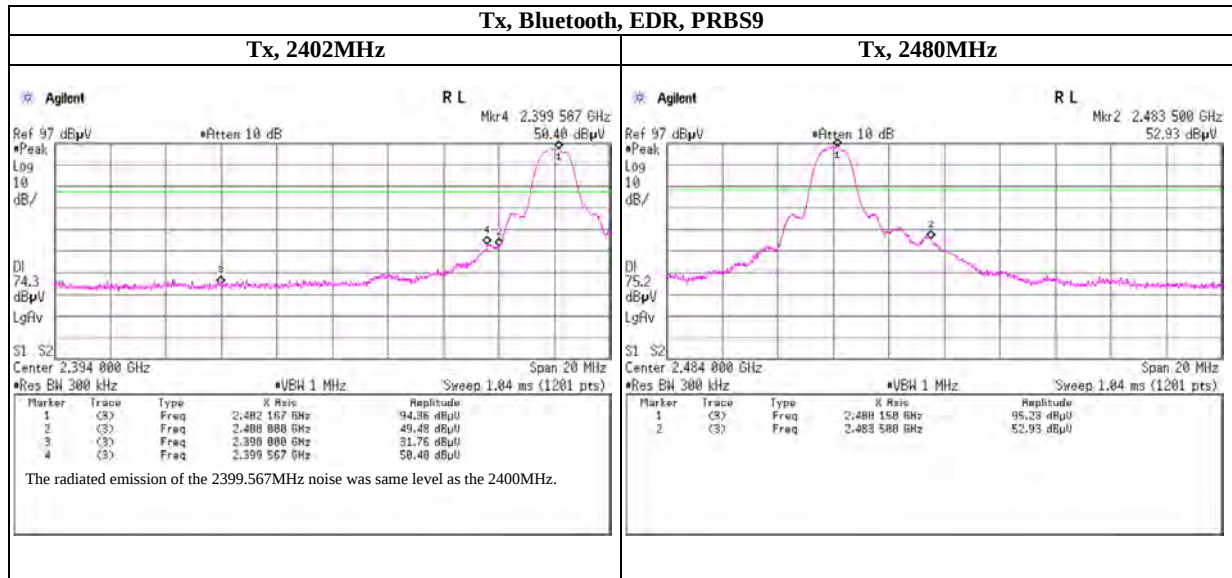
Spurious emission (Conducted)

Band Edge compliance



Spurious emission (Conducted)

Band Edge compliance



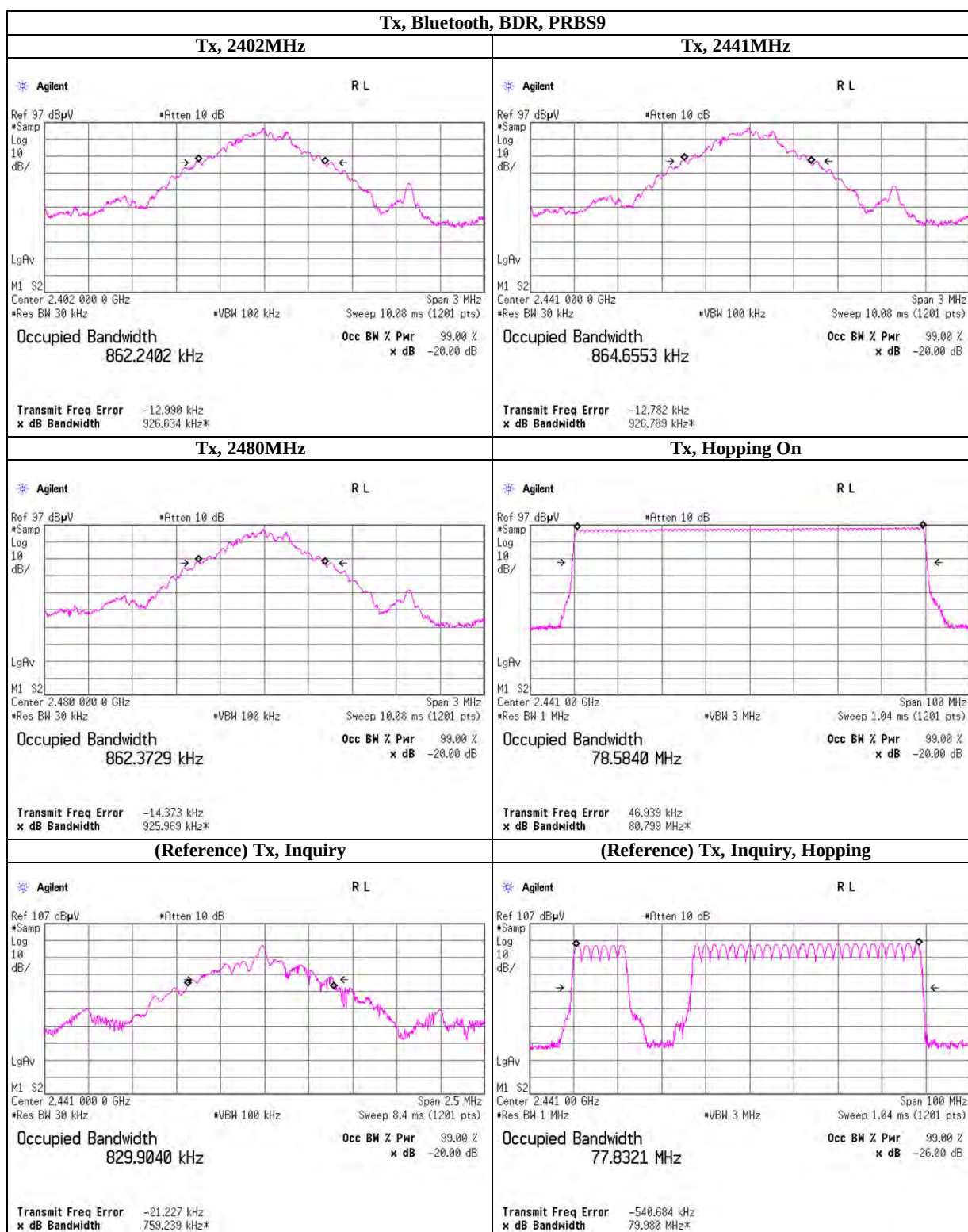
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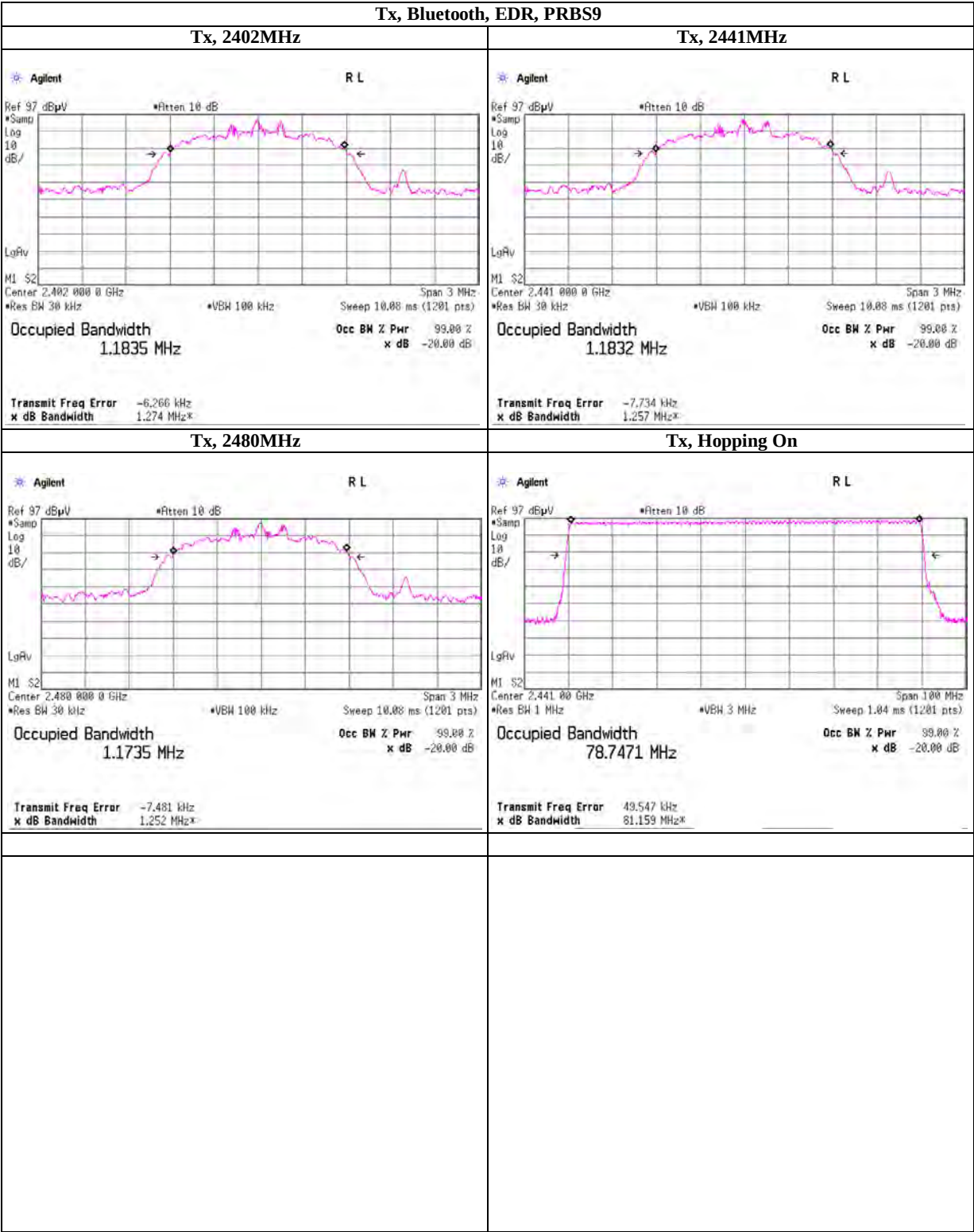
99% Occupied Bandwidth**UL Japan, Inc.****Shonan EMC Lab.**

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99% Occupied Bandwidth



APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2011/03/07 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2011/03/23 * 12
SAT10-08	Attenuator	Weinschel	W54-10	-	AT	2011/03/23 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	AT	2011/03/02 * 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
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
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
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	RE	2011/03/02 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	RE	2011/07/28 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,IMF)	-	RE	-
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2011/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2011/03/16 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2011/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2011/02/17 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 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/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
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2011/10/22 * 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
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2011/03/02 * 12

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

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

Test Item :

RE: Radiated emission ,

AT: Antenna terminal disturbance voltage