



# RADIO TEST REPORT

**Test Report No.: 32HE0348-SH-02-A**

**Applicant** : PIONEER CORPORATION  
**Type of Equipment** : CD RDS RECEIVER  
**Model No.** : DEH-X6500BT  
**FCC ID** : AJDK054  
**Test regulation** : FCC Part15 Subpart C: 2012  
**Test result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.

**Date of test:** June 5 to 15, 2012

**Representative  
test engineer:**

Shinichi Takano  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**

Toyokazu Imamura  
Leader of WiSE Japan,  
UL Verification Service

**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429



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Facsimile : +81 463 50 6401

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## **SECTION 1: Customer information**

Company Name : PIONEER CORPORATION  
Brand Name : Pioneer  
Address : 25-1 Aza-Nishimachi, Yamada, Kawagoe-shi, Saitama 350-8555, Japan  
Telephone Number : +81-49-228-6415  
Facsimile Number : +81-49-228-6493  
Contact Person : Makoto Kaieda

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

### **2.1 Identification of E.U.T.**

Type of Equipment : CD RDS RECEIVER  
Model No. : DEH-X6500BT  
Serial No. : Refer to 4.2 of this report.  
Rating : DC14.4V  
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 : June 4, 2012

### **2.2 Product description**

Model: DEH-X6500BT (referred to as the EUT in this report) is a CD RDS RECEIVER.

Clock frequency(ies) in the system : SYSTEM MICRO: 16.93MHz, 12MHz  
GRILL MICRO: 4.97MHz  
CD mechanism: 16.93MHz  
Tuner: 36.48MHz (VCO: 2.5~3.3GHz)  
Bluetooth module: 26MHz  
DC-DC CONVERTER: 367.347/439.024kHz

Bluetooth specification:

Equipment type : Transceiver  
Frequency of operation : 2402-2480MHz  
Bandwidth & channel spacing : 79MHz & 1MHz  
Type of modulation : FHSS  
Antenna type : Pattern  
Antenna connector type : None  
Antenna gain : -2.2dBi  
ITU code : F1D, G1D  
Operation temperature range : -10 to +60 deg.C.

FCC 15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC 3.3V and 1.8V), therefore, the equipment complies with power supply regulation.

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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Facsimile : +81 463 50 6401

The EUT and its derived models:

The electrical characteristics among those models are identical to each other.

Model	DEH-X6500BT	DEH-X65BT	DEH-4500BT	FH-X700BT
Illumination	Multi-Color	Multi-Color	BLUE	Multi-Color
Face type *1	A	A	B	C
Sensormatic TAG	-	X	X	-
FM Frequency range & Step	87.9 to 107.9 MHz 200 kHz step	87.9 to 107.9 MHz 200 kHz step	87.9 to 107.9 MHz 200 kHz step	87.9 to 107.9 MHz 200 kHz step
AM Frequency range & Step	530 to 1710 kHz (10kHz) 10 kHz step	530 to 1710 kHz (10kHz) 10 kHz step	530 to 1710 kHz (10kHz) 10 kHz step	530 to 1710 kHz (10kHz) 10 kHz step
Size (W x H x D)	178 x 50 x 165	178 x 50 x 165	178 x 50 x 165	178 x 100 x 157

X: Application

\*1 FACE Type A: 1DIN Multi-Color Illumination type

B: 1DIN Single Illumination type

C: 2DIN Multi-Color Illumination type

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Facsimile : +81 463 50 6401

**SECTION 3: Test specification, procedures & results****3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2012,  
final revised on May 17, 2012 and effective June 18, 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 by the customer.

\*The revision on May 17, 2012 does not affect the test specification applied to the EUT.

**3.2 Procedures & Results**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 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 C63.4:2003 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 C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 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 C63.4:2003 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 C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A		2.7dB Freq.: 360.001MHz Detection: Quasi-Peak Polarization: Horizontal Mode: Tx 2402MHz, DH5

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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Facsimile : +81 463 50 6401

**3.3 Addition to standard**

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-

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

\* Other than above, no addition, exclusion nor deviation has been made from the standard.

**3.4 Uncertainty**

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

**3.4.1 Shonan EMC Lab.****Antenna port conducted test**

Power measurement uncertainty above 1GHz for this test was: ( $\pm$ ) 1.5dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: ( $\pm$ ) 1.7dB

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

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

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

Bandwidth measurement uncertainty for this test was: ( $\pm$ ) 5.4%

**3.4.2 Yamakita EMC Lab.**

Item	Frequency range	No.1 Site <sup>*1</sup> /SR <sup>*2</sup> ( $\pm$ )	No.2 Site/SR ( $\pm$ )	No.1 SAC/SR ( $\pm$ )
<b>Radiated emission (Measurement distance: 3m)</b>	9kHz-30MHz	3.6 dB	3.7 dB	3.7 dB
	30MHz-300MHz	5.0 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.1 dB	5.1 dB	5.1 dB
	1GHz-15GHz	4.9 dB	4.9 dB	5.4 dB
<b>Radiated emission (Measurement distance: 1m)</b>	15GHz-18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz-40GHz	4.9 dB	4.4 dB	4.5 dB

\*1: SAC=Semi-Anechoic Chamber

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

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

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

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

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input 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	-

UL Japan, Inc. Yamakita EMC Lab.

907 Kawanishi, Yamakita-machi, Ashigarakami-gun, Kanagawa-ken 258-0124 JAPAN

Telephone : +81 465 77 1011

Facsimile : +81 465 77 2112

	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 open area test site	95486	2973B-1	-	12.0 x 41.2	30m
<input type="checkbox"/> No.2 open area test site	466226	2973B-3	-	9.5 x 17.8	10m
<input checked="" type="checkbox"/> No.1 Semi-anechoic chamber	95967	2973B-2	10.0 x 7.5 x 5.7	10.0 x 7.5	3m
<input type="checkbox"/> No.2 Full-anechoic chamber	-	-	8.0 x 4.7 x 4.0	8.0 x 4.7	2.5m
<input type="checkbox"/> No.1 shielded room	-	-	8.0 x 5.0 x 2.5	8.0 x 5.0	-
<input type="checkbox"/> No.2 shielded room	-	-	5.0 x 4.0 x 2.5	5.0 x 4.0	-
<input type="checkbox"/> No.3 shielded room	-	-	4.0 x 5.0 x 2.7	4.0 x 5.0	-
<input type="checkbox"/> No.4 shielded room	-	-	5.0 x 4.0 x 2.7	5.0 x 4.0	-
<input type="checkbox"/> No.5 shielded room	-	-	4.5 x 4.3 x 2.7	4.5 x 4.3	-

### 3.6 Test setup, Data of radio test & Test instruments

Refer to Appendix 1 to 3.

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**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



## **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.

<b>Test item</b>	<b>Operating mode</b>	<b>Tested frequency</b>
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: 4

Software: BT module only Control software manufactured by Parrot ver: 1.22.11

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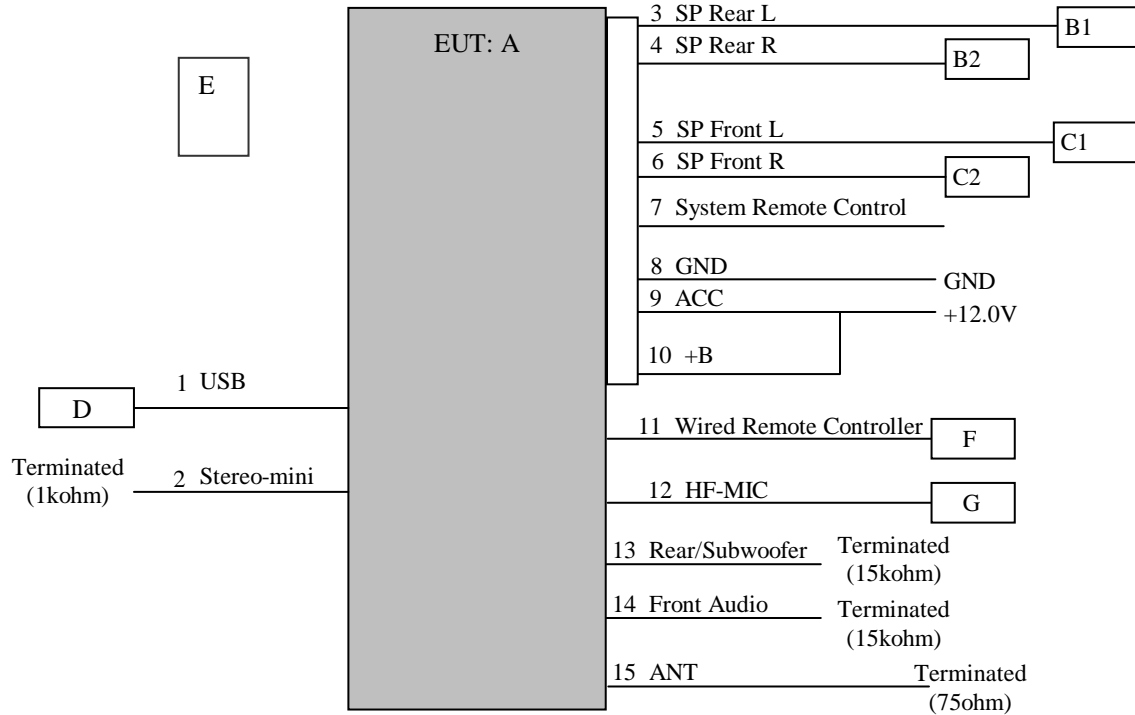
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## 4.2 Configuration and peripherals



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

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

### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	CD RDS Receiver	DEH-X6500BT	*2)	Pioneer	EUT
B1	4 ohm Dummy Load	-	-	CHIBA TECHNO	-
B2	4 ohm Dummy Load	-	-	CHIBA TECHNO	-
C1	Speaker	TS-X350	47	Pioneer	-
C2	Speaker	TS-X350	48	Pioneer	-
D	USB Memory	-	R7R1004783ZW	IO DATA	-
E	Remote Controller	QXE1044	-	Pioneer	-
F	Wired Remote Controller	RM-X2S	-	SONY	-
G	HF-MIC	-	-	-	-

\*2) LDTM000013EW: for Antenna terminal conducted tests, LDTM000012EW: for Radiated emission tests

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**List of cables used**

No.	Cable name	Length (m)	Shield		Remark
			Cable	Connector	
1	USB	2.0	Shielded	Shielded	-
2	AUX In (Stereo-mini)	1.4	Unshielded	Unshielded	-
3	SP Rear L	0.15+5.0	Unshielded	Unshielded	-
4	SP Rear R	0.15+6.2	Unshielded	Unshielded	-
5	SP Front L	0.15+6.4	Unshielded	Unshielded	-
6	SP Front R	0.15+6.4	Unshielded	Unshielded	-
7	System Remote Control	0.15+1.85	Unshielded	Unshielded	-
8	GND	0.4+1.6	Unshielded	Unshielded	-
9	ACC	0.15+1.85	Unshielded	Unshielded	-
10	+B	0.15+1.85	Unshielded	Unshielded	-
11	Wired Remote Controller	2.0	Unshielded	Unshielded	-
12	MIC	4.0	Unshielded	Unshielded	-
13	Rear/Subwoofer (RCA)	3.0	Unshielded	Unshielded	-
14	Front Audio (RCA)	1.5	Unshielded	Unshielded	-
15	ANT	0.3+1.5	Shielded	Shielded	-

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

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 5: Carrier frequency separation**

### **Test procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 1

## **SECTION 6: 20dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

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

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 7: Number of hopping frequency**

### **Test procedure**

The number of hopping frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 1

## **SECTION 8: Dwell time**

### **Test procedure**

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

Summary of the test results: Pass

Refer to APPENDIX 1

## **SECTION 9: Maximum peak output power**

### **Test procedure**

The maximum peak output power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass

Refer to APPENDIX 1

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**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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## **SECTION 10: Spurious emissions (Radiated)**

### **10.1 Operating environment**

The test was carried out in No.1 semi-anechoic chamber of Yamakita EMC lab.

Temperature : See test data (APPENDIX 2)

Humidity : See test data (APPENDIX 2)

### **10.2 Test configuration**

EUT was placed on a platform of nominal size, 0.9m by 1.8m, raised 0.8m above the conducting ground plane. 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. Photographs of the set up are shown in Appendix 1.

### **10.3 Test conditions**

Frequency range : 30MHz to 25GHz

Test distance : 3m (below 13GHz) / 1m (above 13GHz)

EUT position : Table top

### **10.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz). 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 60 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.

### **10.5 Band edge**

Band edge level is below the limits of FCC 15.209. Refer to the data.

### **10.6 Results**

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

Refer to APPENDIX 1

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### **Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## **SECTION 11: 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

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**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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

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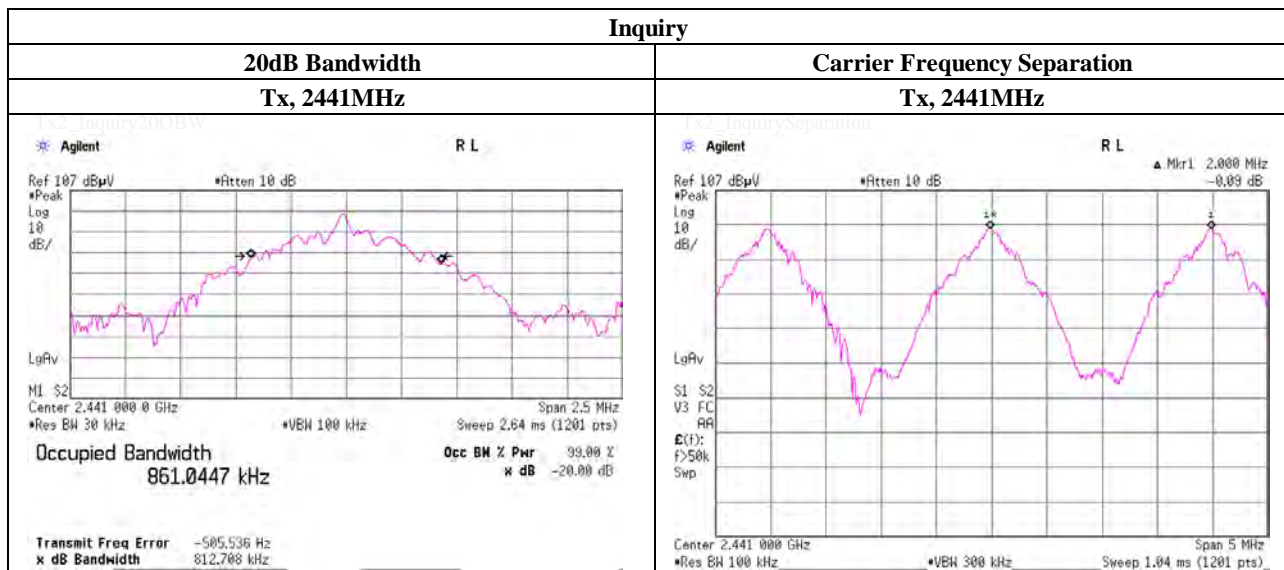
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## 20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 15, 2012	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.935	1.000	≥ 0.624
DH5	2441.0	0.923	1.000	≥ 0.616
DH5	2480.0	0.935	1.000	≥ 0.623
Inquiry	2441.0	0.813	2.000	≥ 0.542

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).  
 No limit applies to 20dB Bandwidth.



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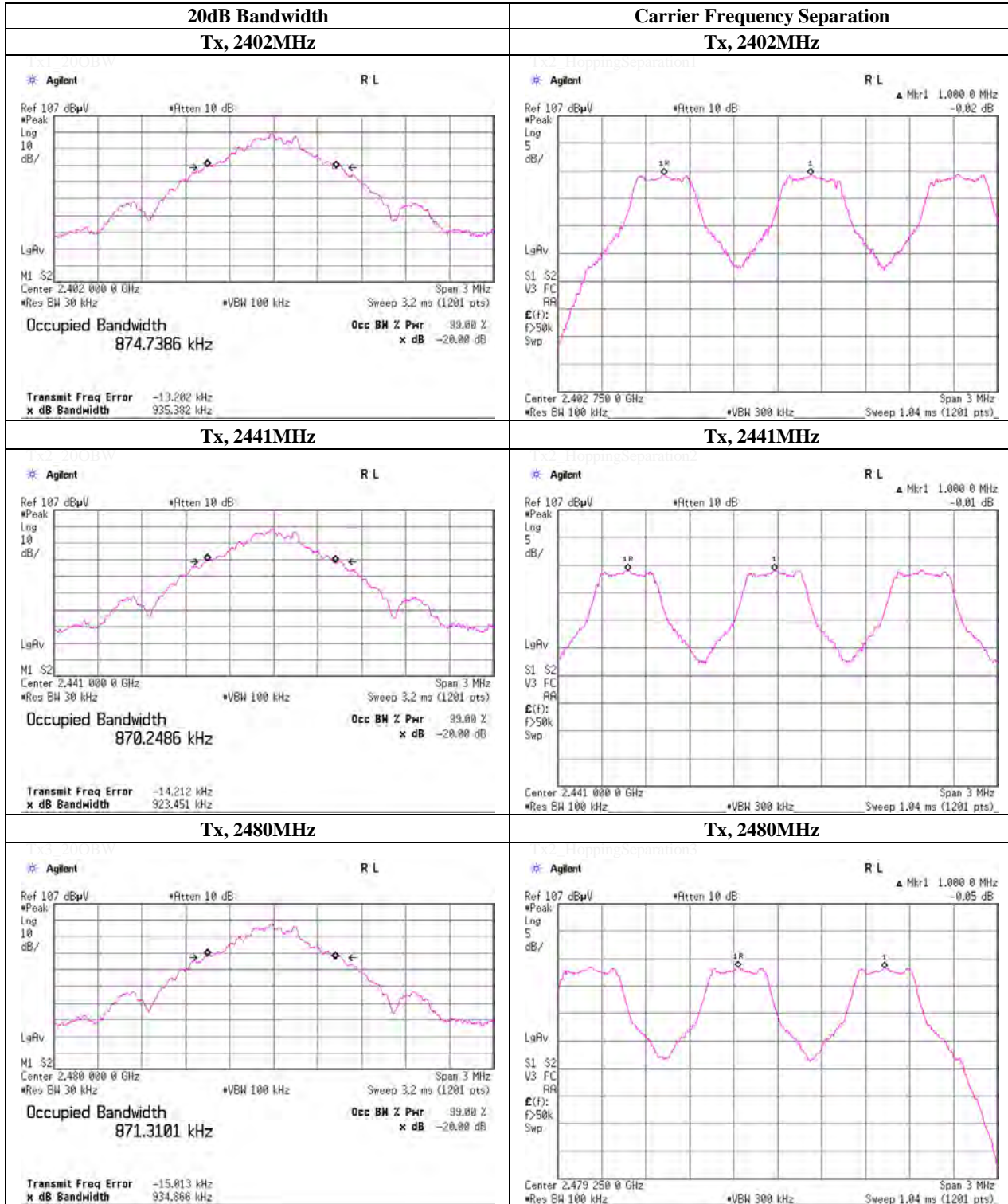
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## 20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**20dB Bandwidth and Carrier Frequency Separation**

Test place                   UL Japan, Inc. Shonan EMC Lab.           No.5 Shielded Room  
 Date                         June 15, 2012  
 Temperature / Humidity   24 deg.C     , 60 %RH  
 Engineer                  Shinichi Takano  
 Mode                        Tx, Bluetooth, EDR, PRBS9

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.285	1.000	≥ 0.857
3-DH5	2441.0	1.284	1.000	≥ 0.856
3-DH5	2480.0	1.313	1.000	≥ 0.875

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

No limit applies to 20dB Bandwidth.

**UL Japan, Inc.**

**Shonan EMC Lab.**

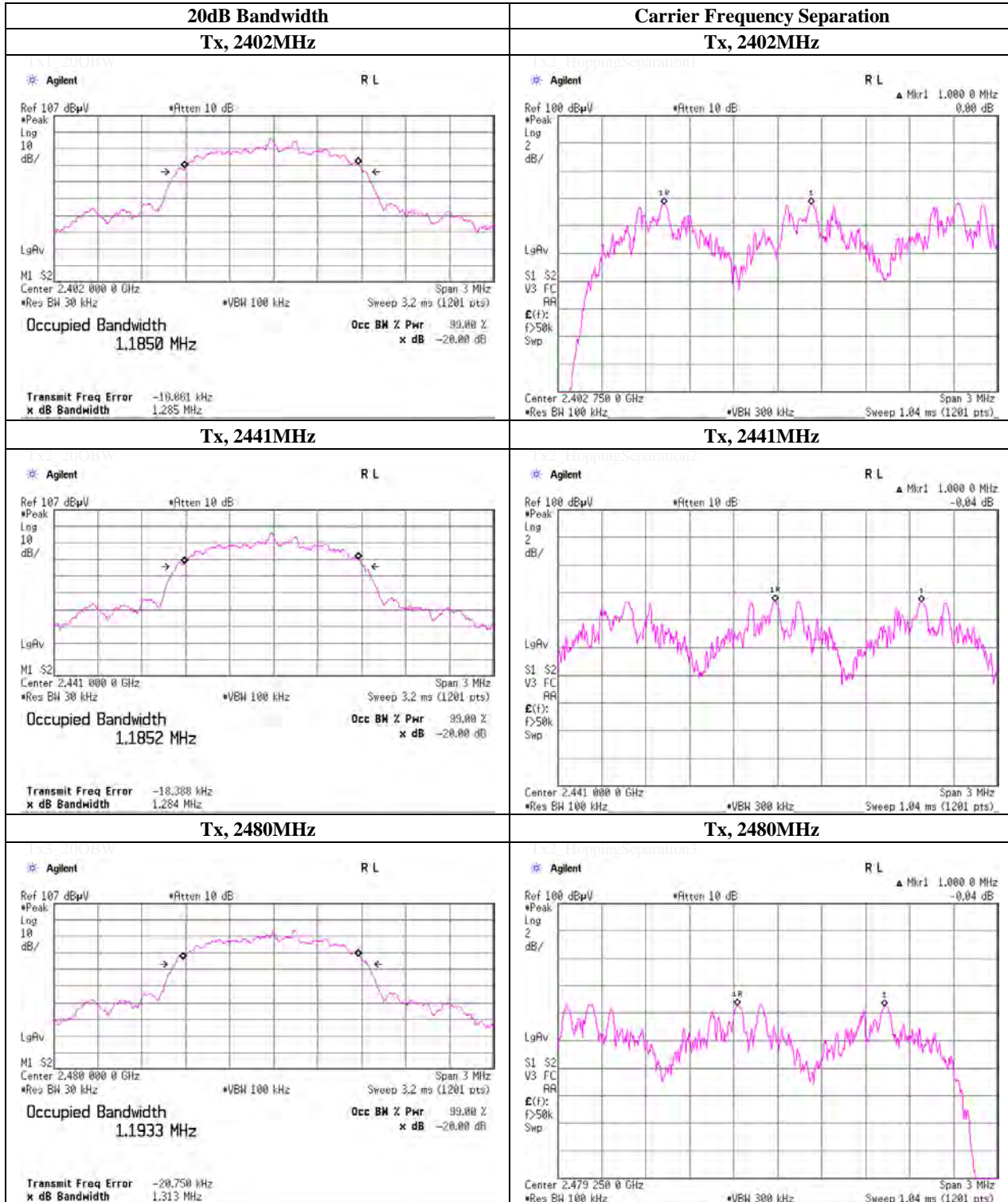
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## 20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

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Telephone : +81 463 50 6400

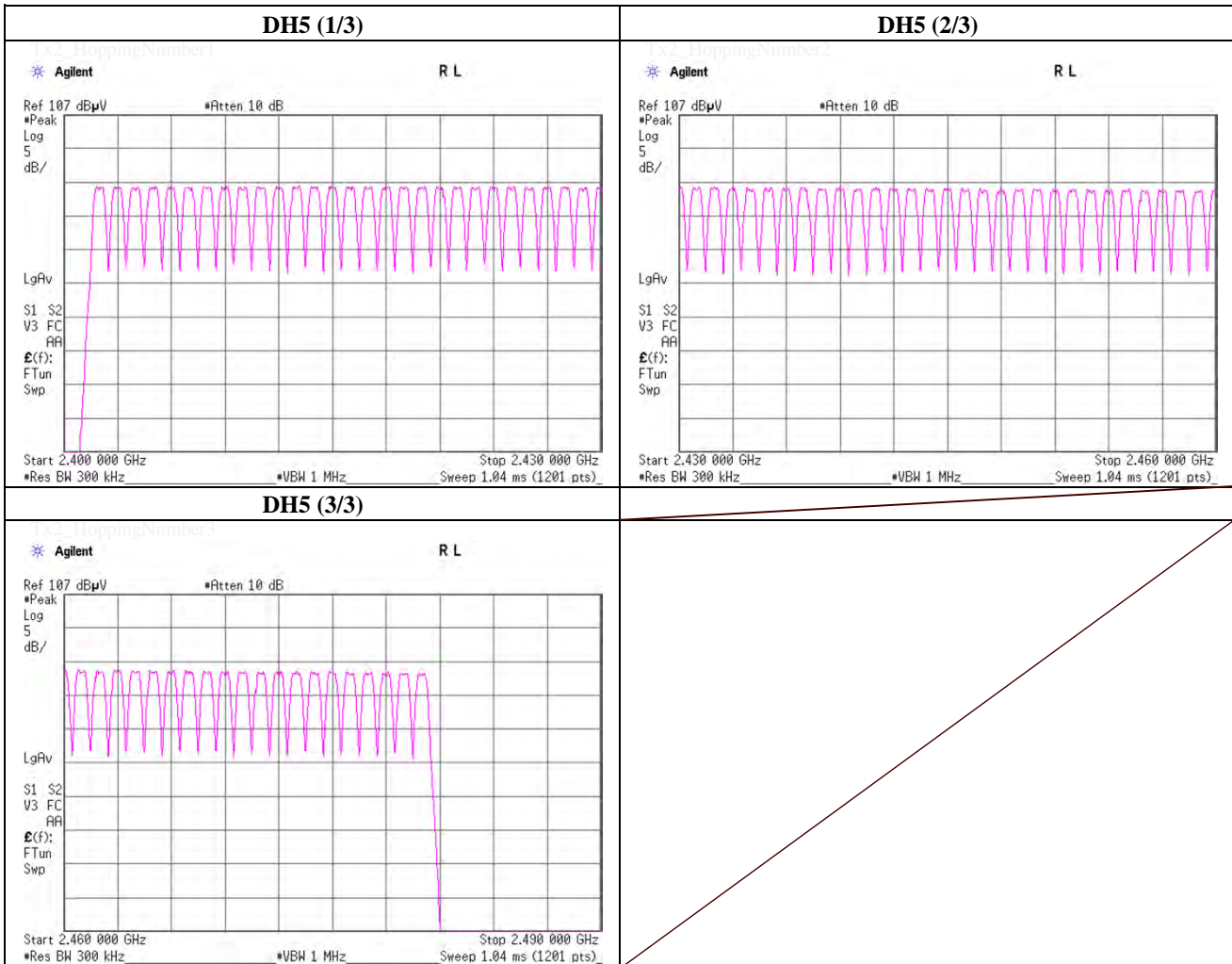
Facsimile : +81 463 50 6401

### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 15, 2012	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

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

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification 3.0.



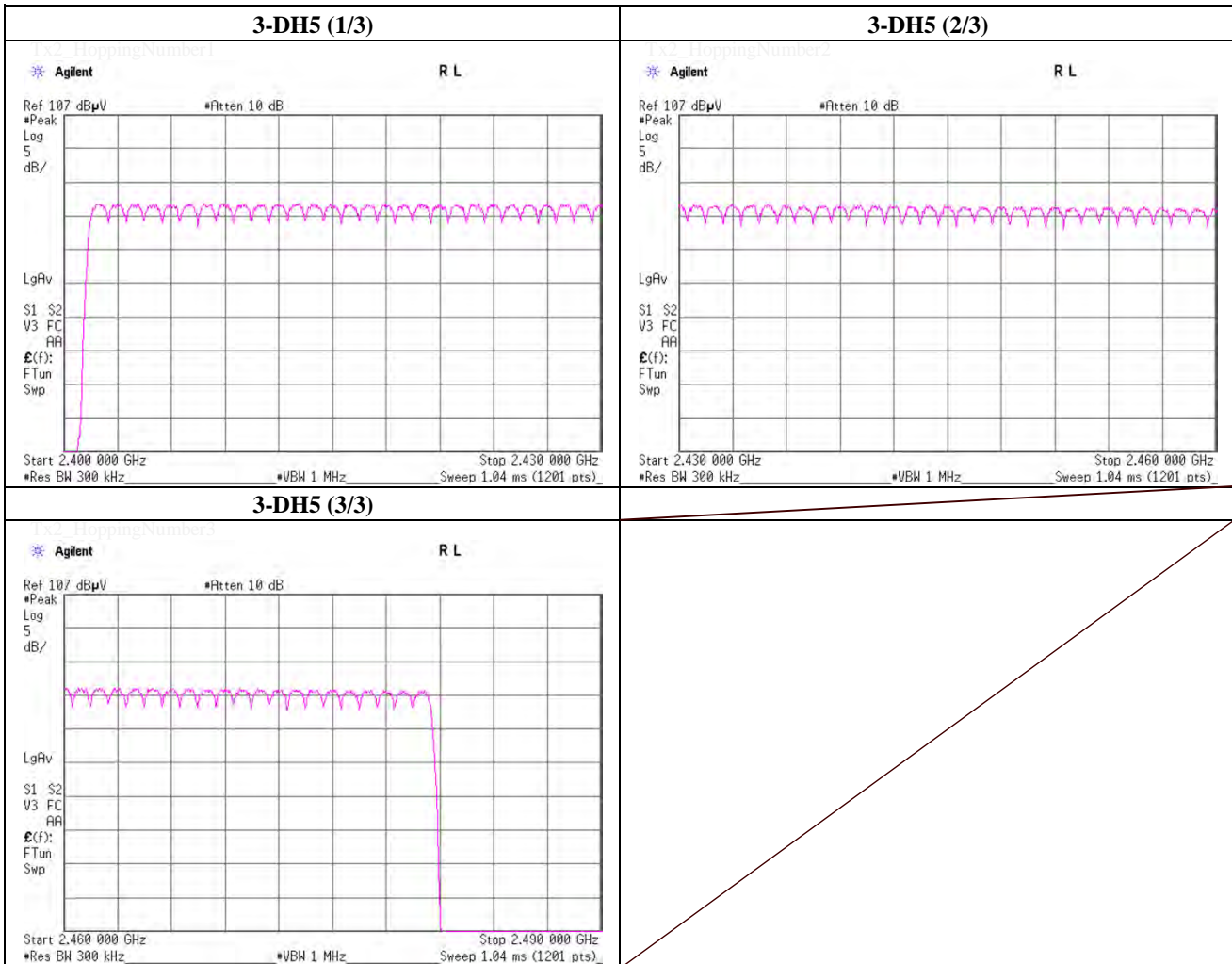
**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 15, 2012	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, EDR, PRBS9	

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

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification 3.0.

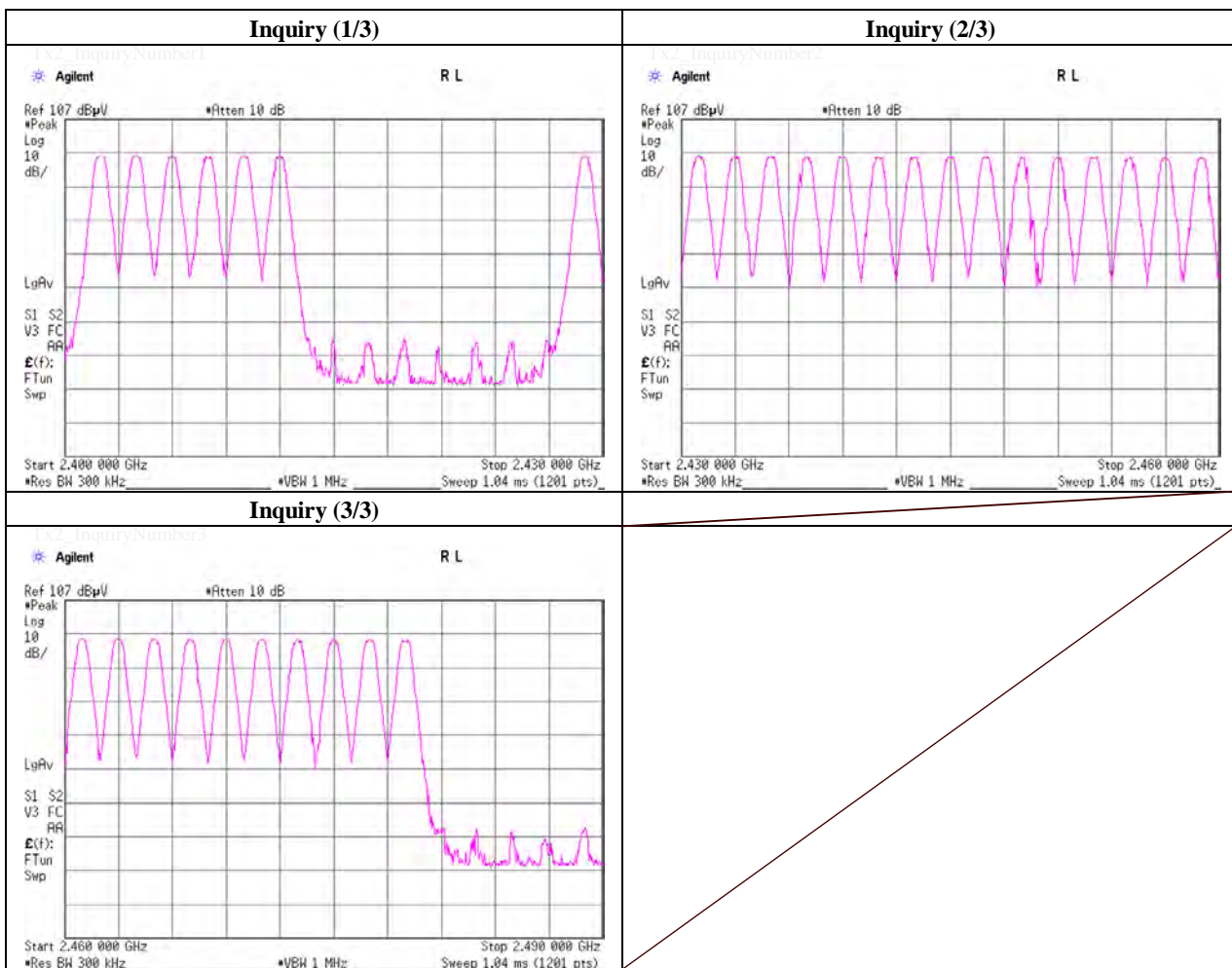


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### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 15, 2012	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Shinichi Takano	
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                         June 15, 2012  
 Temperature / Humidity   24 deg.C     , 60 %RH  
 Engineer                   Shinichi Takano  
 Mode                        Tx, Bluetooth, BDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	17.0 / 5.0 sec. x 31.6 sec. = 108 times	0.397	43	400
DH3	16.4 / 5.0 sec. x 31.6 sec. = 104 times	1.654	172	400
DH5	17.4 / 5.0 sec. x 31.6 sec. = 110 times	2.902	319	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.099	127	400

Sample Calculation

Result = Number of transmission x Length of transmission time

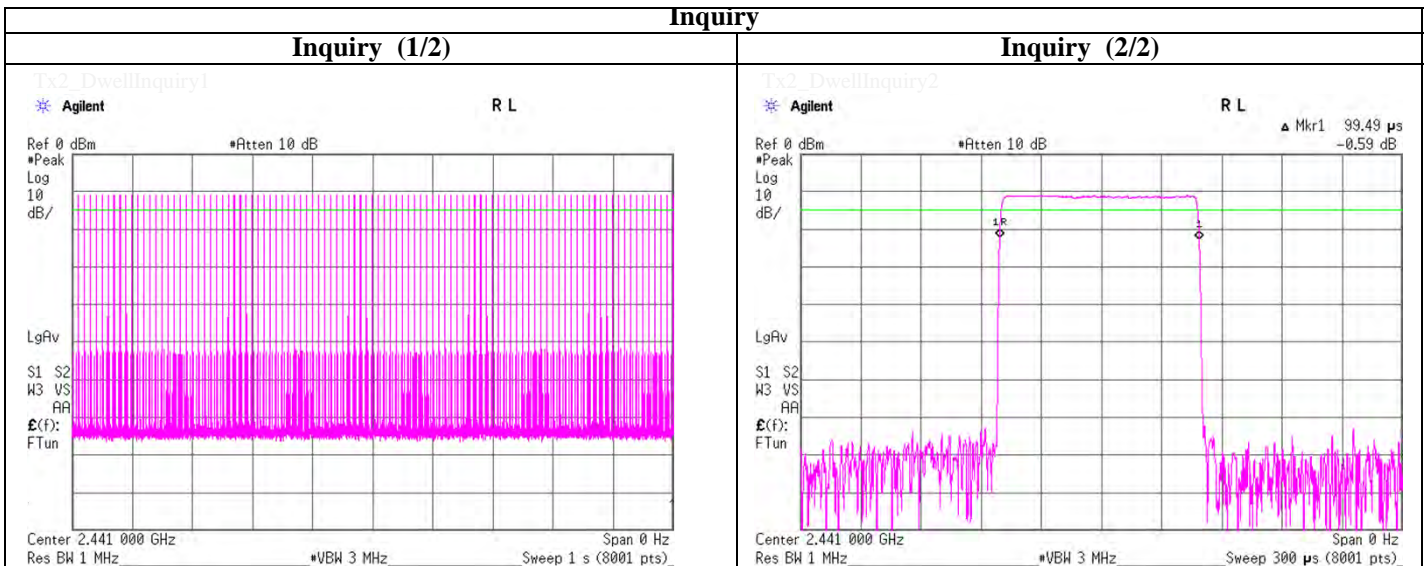
\*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	18	17	16	16	18	17.0
DH3	19	15	16	17	15	16.4
DH5	15	17	18	18	19	17.4
Inquiry	100	100	100	100	100	100.0

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for  $N=79$ .



**UL Japan, Inc.**

**Shonan EMC Lab.**

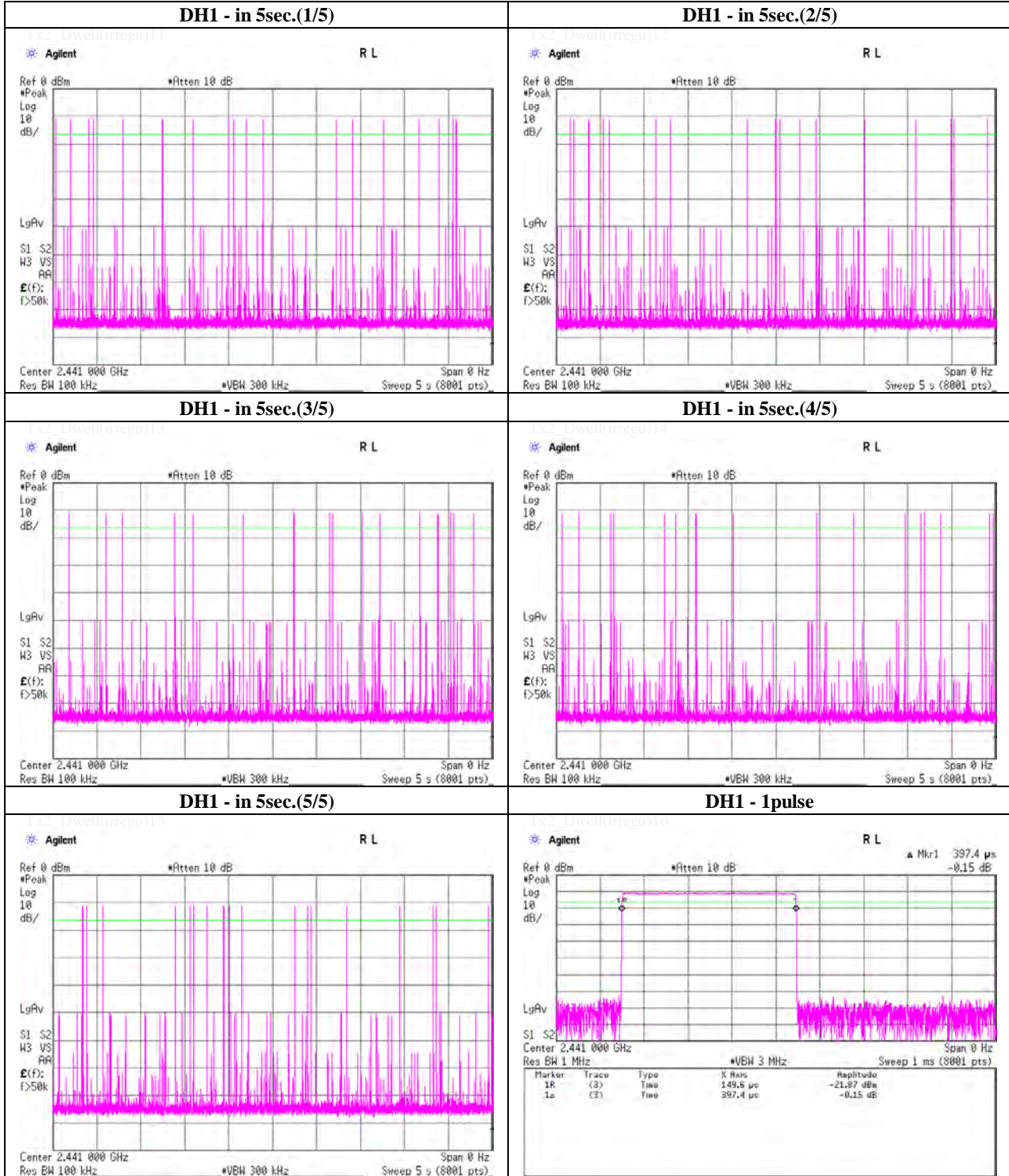
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## Dwell time

Tx, Bluetooth, BDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

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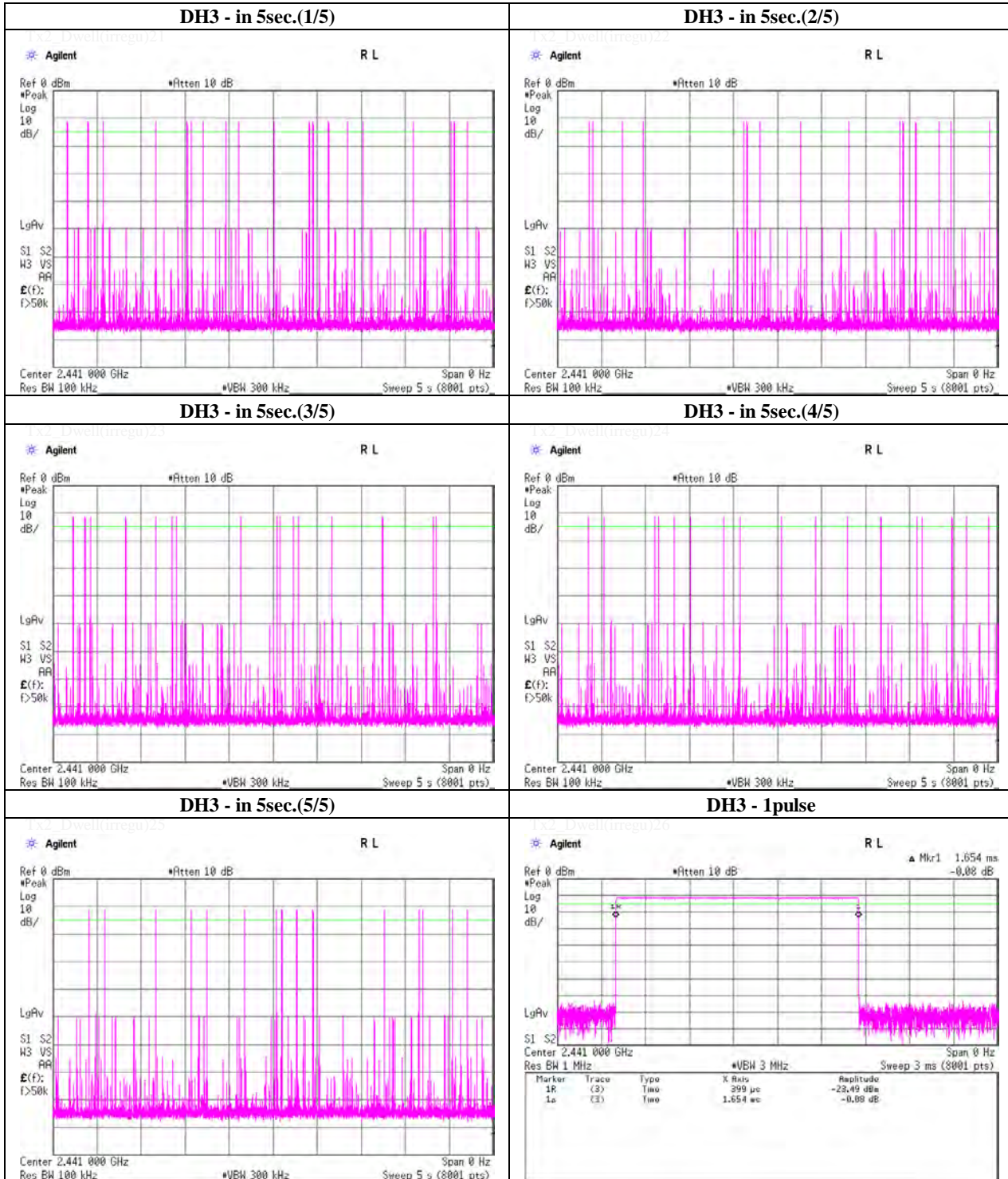
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Facsimile : +81 463 50 6401



## Dwell time

Tx, Bluetooth, BDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

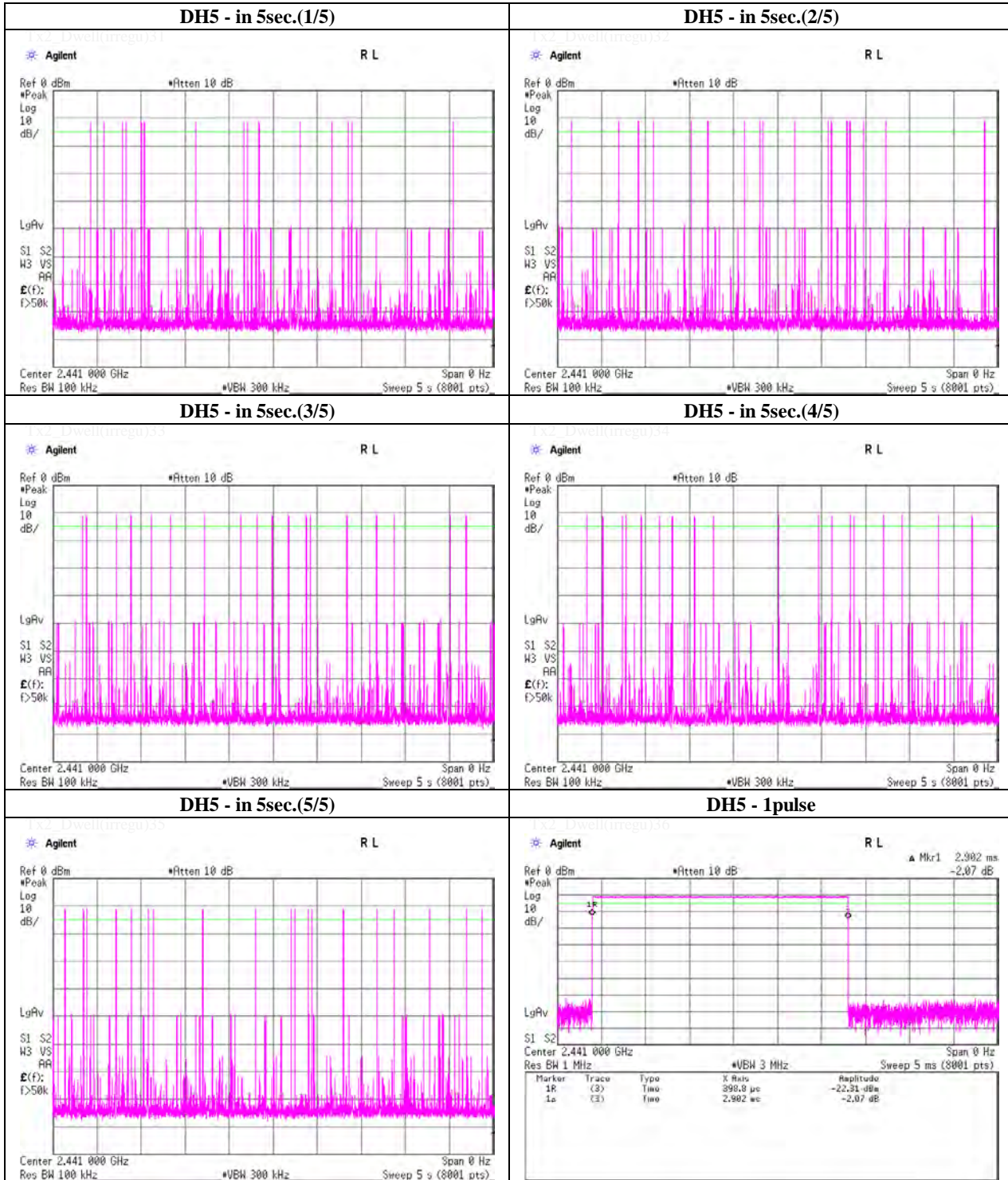
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## Dwell time

Tx, Bluetooth, BDR, PRBS9



**UL Japan, Inc.**

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## Dwell Time

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.5 Shielded Room  
 Date                         June 15, 2012  
 Temperature / Humidity   24 deg.C     , 60 %RH  
 Engineer                    Shinichi Takano  
 Mode                        Tx, Bluetooth, EDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4)	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	18.0 / 5.0 sec. x 31.6 sec. = 114 times	0.408	46	400
3-DH3	17.6 / 5.0 sec. x 31.6 sec. = 112 times	1.659	186	400
3-DH5	18.4 / 5.0 sec. x 31.6 sec. = 117 times	2.910	340	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	17	18	21	16	18	18.0
3-DH3	17	17	18	15	21	17.6
3-DH5	16	22	18	15	21	18.4

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in  $N \times 0.4s$ , where  $N$  is the number of channels being used in the hopping sequence ( $20 \leq N \leq 79$ ), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for  $N=79$ .

**UL Japan, Inc.**

**Shonan EMC Lab.**

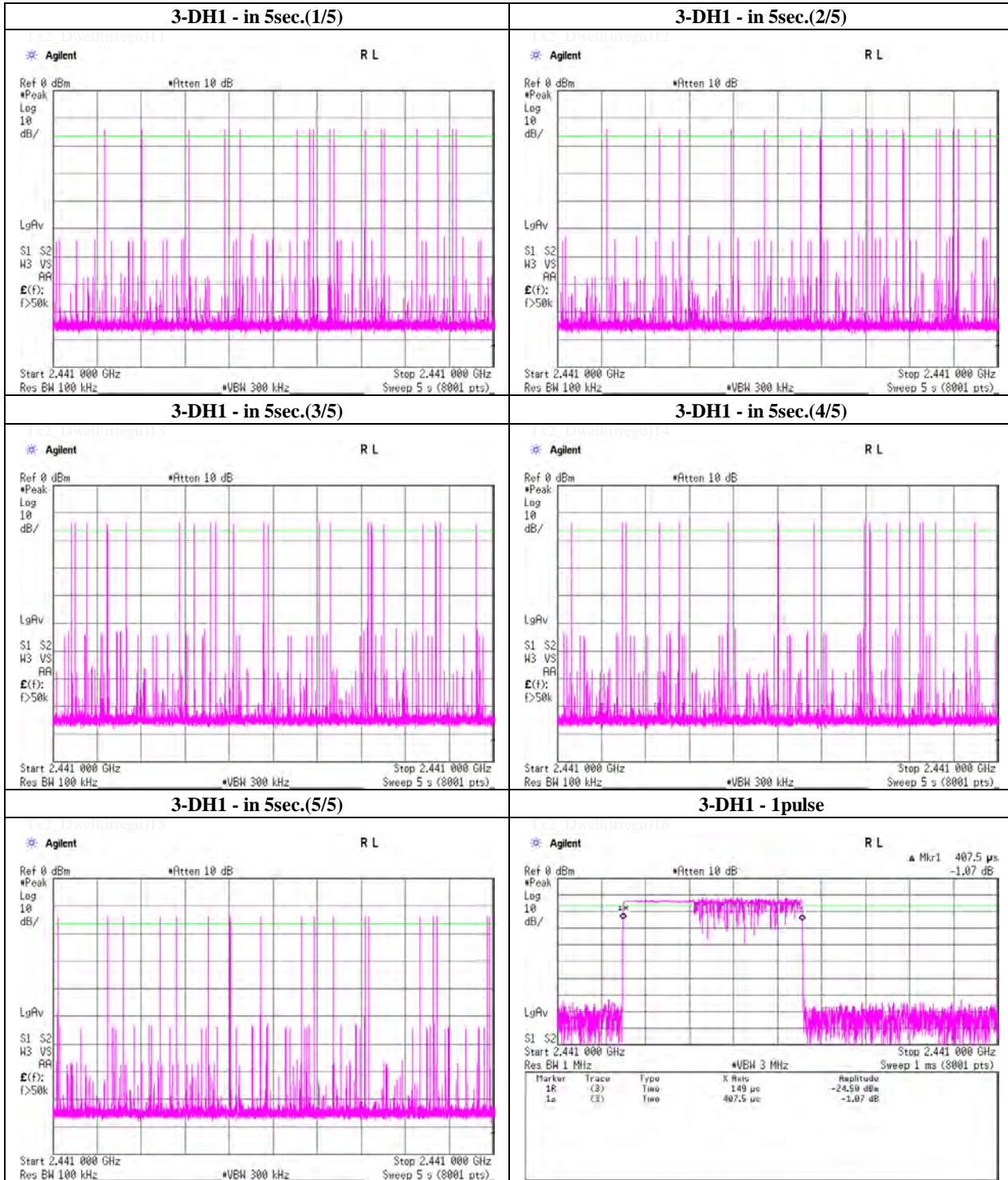
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## Dwell time

Tx, Bluetooth, EDR, PRBS9



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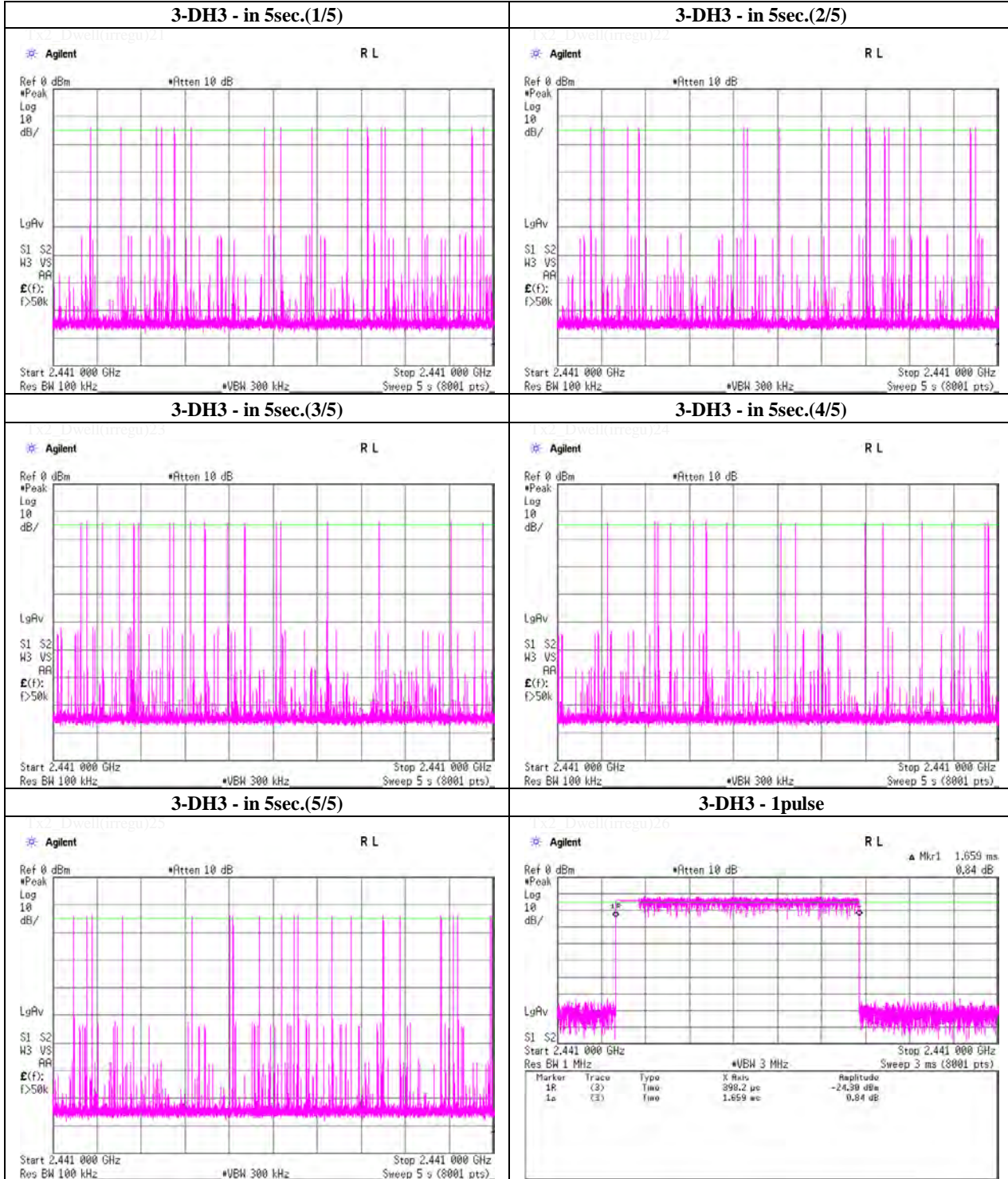
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## Dwell time

Tx, Bluetooth, EDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

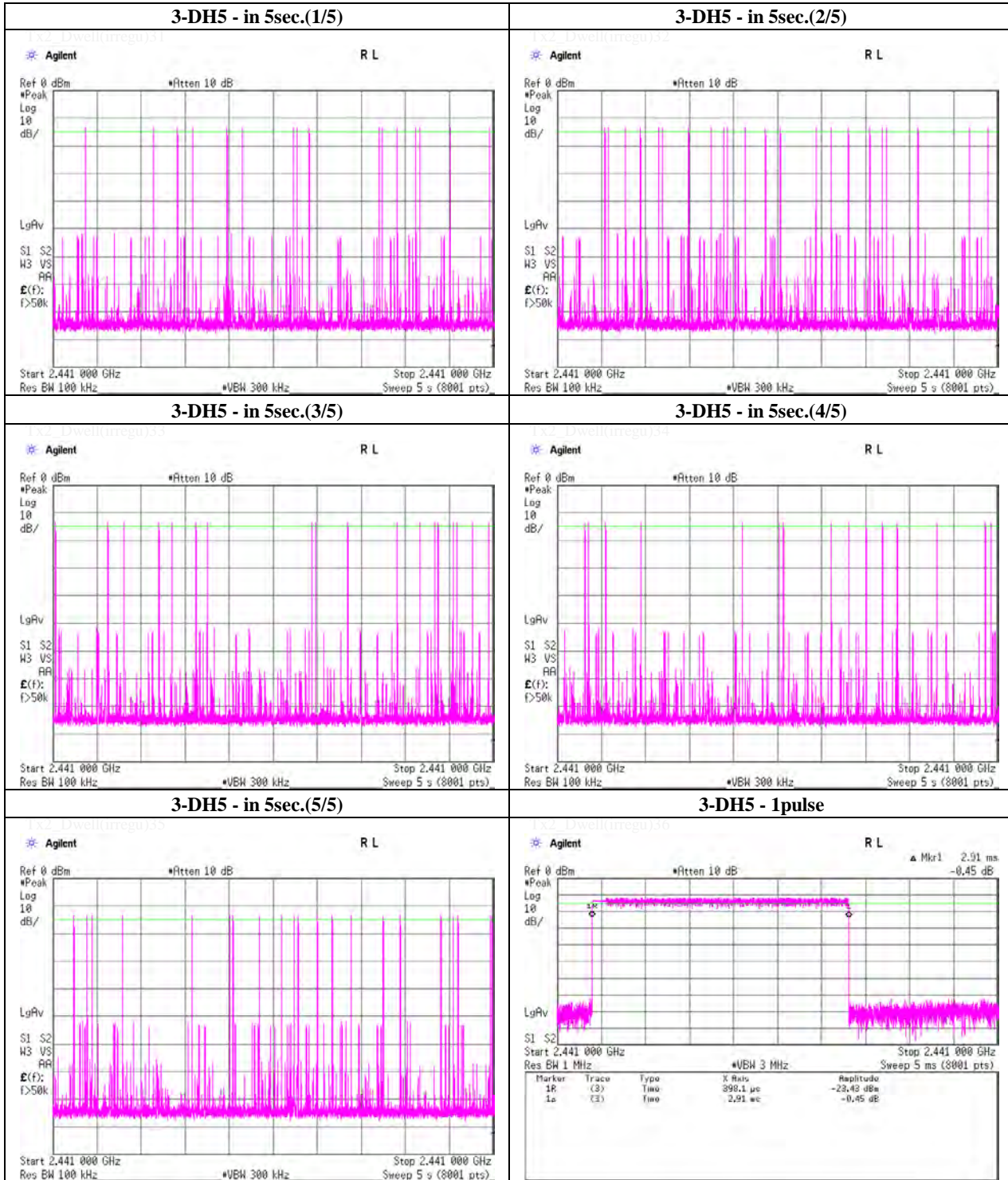
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## Dwell time

Tx, Bluetooth, EDR, PRBS9



**UL Japan, Inc.**

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## Peak Output Power (Conducted)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.5 Shielded Room  
 Date                         June 15, 2012  
 Temperature / Humidity   24 deg.C   , 60 %RH  
 Engineer                  Shinichi Takano  
 Mode                        Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-10.72	1.12	9.97	0.37	1.09	20.97	125	20.60
DH5	2441.0	-10.98	1.15	9.97	0.14	1.03	20.97	125	20.83
DH5	2480.0	-11.22	1.20	9.97	-0.05	0.99	20.97	125	21.02
2-DH5	2402.0	-10.89	1.12	9.97	0.20	1.05	20.97	125	20.77
2-DH5	2441.0	-11.13	1.15	9.97	-0.01	1.00	20.97	125	20.98
2-DH5	2480.0	-11.53	1.20	9.97	-0.36	0.92	20.97	125	21.33
3-DH5	2402.0	-10.84	1.12	9.97	0.25	1.06	20.97	125	20.72
3-DH5	2441.0	-11.06	1.15	9.97	0.06	1.01	20.97	125	20.91
3-DH5	2480.0	-11.42	1.20	9.97	-0.25	0.94	20.97	125	21.22

Sample Calculation:

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

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

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

**Radiated Emission**

Test place                   UL Japan, Inc. Yamakita EMC Lab.                   No.1 Semi Anechoic Chamber  
Date                         June 5, 2012   June 6, 2012  
Temperature / Humidity    20 deg.C , 65 %RH                                 21 deg.C , 65 %RH  
Engineer                   Akira Sato   Akira Sato  
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.	321.755	QP	44.5	15.1	9.0	27.1	41.5	46.0	4.5	100	190	PK:VBW 3MHz
Hori.	355.619	QP	42.8	16.1	9.2	27.3	40.8	46.0	5.2	100	192	AV:VBW 10Hz
Hori.	360.001	QP	45.3	16.2	9.2	27.4	43.3	46.0	2.7	100	216	
Hori.	504.001	QP	37.8	18.3	9.9	28.3	37.7	46.0	8.3	100	343	
Hori.	791.998	QP	30.8	22.0	11.1	28.3	35.6	46.0	10.4	121	231	
Hori.	2390.000	PK	43.1	27.4	14.4	36.3	48.6	73.9	25.3	100	143	
Hori.	2400.000	PK	44.2	27.4	14.4	36.3	49.7	73.9	24.2	100	143	
Hori.	4804.000	PK	45.1	30.9	6.7	36.0	46.7	73.9	27.2	100	53	
Hori.	7206.000	PK	44.6	35.9	8.0	36.1	52.4	73.9	21.5	100	2	
Hori.	9608.000	PK	42.4	38.8	10.1	37.0	54.3	73.9	19.6	100	1	
Hori.	12010.000	PK	44.4	38.9	10.7	35.8	58.2	73.9	15.7	100	0	
Hori.	2390.000	AV	33.4	27.4	14.4	36.3	38.9	53.9	15.0	100	143	
Hori.	2400.000	AV	34.1	27.4	14.4	36.3	39.6	53.9	14.3	100	143	
Hori.	4804.000	AV	33.3	30.9	6.7	36.0	34.9	53.9	19.0	100	53	
Hori.	7206.000	AV	32.5	35.9	8.0	36.1	40.3	53.9	13.6	100	2	
Hori.	9608.000	AV	31.9	38.8	10.1	37.0	43.8	53.9	10.1	100	1	
Hori.	12010.000	AV	32.6	38.9	10.7	35.8	46.4	53.9	7.5	100	0	
Vert.	67.740	QP	41.4	7.1	7.1	27.6	28.0	40.0	12.0	100	16	
Vert.	287.884	QP	36.2	18.8	8.8	27.0	36.8	46.0	9.2	100	160	
Vert.	647.999	QP	33.8	20.0	10.6	28.5	35.9	46.0	10.1	100	144	
Vert.	2390.000	PK	43.5	27.4	14.4	36.3	49.0	73.9	24.9	100	223	
Vert.	2400.000	PK	44.5	27.4	14.4	36.3	50.0	73.9	23.9	100	223	
Vert.	4804.000	PK	46.8	30.9	6.7	36.0	48.4	73.9	25.5	100	135	
Vert.	7206.000	PK	44.6	35.9	8.0	36.1	52.4	73.9	21.5	100	176	
Vert.	9608.000	PK	43.8	38.8	10.1	37.0	55.7	73.9	18.2	100	12	
Vert.	12010.000	PK	45.3	38.9	10.7	35.8	59.1	73.9	14.8	100	1	
Vert.	2390.000	AV	33.4	27.4	14.4	36.3	38.9	53.9	15.0	100	223	
Vert.	2400.000	AV	34.3	27.4	14.4	36.3	39.8	53.9	14.1	100	223	
Vert.	4804.000	AV	36.9	30.9	6.7	36.0	38.5	53.9	15.4	100	135	
Vert.	7206.000	AV	32.7	35.9	8.0	36.1	40.5	53.9	13.4	100	176	
Vert.	9608.000	AV	32.1	38.8	10.1	37.0	44.0	53.9	9.9	100	12	
Vert.	12010.000	AV	32.1	38.9	10.7	35.8	45.9	53.9	8.0	100	1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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



## Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	June 5, 2012	June 6, 2012
Temperature / Humidity	20 deg.C , 65 %RH	21 deg.C , 65 %RH
Engineer	Akira Sato	Akira Sato
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.	215.992	QP	34.0	16.6	8.4	27.1	31.9	43.5	11.6	161	93	PK:VBW 3MHz
Hori.	287.884	QP	36.4	18.8	8.8	27.0	37.0	46.0	9.0	133	295	AV:VBW 10Hz
Hori.	321.754	QP	41.3	15.1	9.0	27.1	38.3	46.0	7.7	113	180	
Hori.	355.621	QP	42.8	16.1	9.2	27.3	40.8	46.0	5.2	100	204	
Hori.	360.004	QP	45.0	16.2	9.2	27.4	43.0	46.0	3.0	100	229	
Hori.	648.001	QP	35.9	20.0	10.6	28.5	38.0	46.0	8.0	156	177	
Hori.	4882.000	PK	43.7	31.2	6.8	36.0	45.7	73.9	28.2	100	21	
Hori.	7323.000	PK	44.6	36.1	8.1	36.0	52.8	73.9	21.1	100	53	
Hori.	9764.000	PK	44.2	38.8	10.2	37.0	56.2	73.9	17.7	100	100	
Hori.	12205.000	PK	44.1	39.1	10.6	36.2	57.6	73.9	16.3	100	359	
Hori.	4882.000	AV	31.9	31.2	6.8	36.0	33.9	53.9	20.0	100	21	
Hori.	7323.000	AV	32.8	36.1	8.1	36.0	41.0	53.9	12.9	100	53	
Hori.	9764.000	AV	32.2	38.8	10.2	37.0	44.2	53.9	9.7	100	100	
Hori.	12205.000	AV	32.3	39.1	10.6	36.2	45.8	53.9	8.1	100	359	
Vert.	67.736	QP	42.8	7.1	7.1	27.6	29.4	40.0	10.6	100	218	
Vert.	503.999	QP	37.4	18.3	9.9	28.3	37.3	46.0	8.7	130	141	
Vert.	4882.000	PK	43.5	31.2	6.8	36.0	45.5	73.9	28.4	100	340	
Vert.	7323.000	PK	43.4	36.1	8.1	36.0	51.6	73.9	22.3	100	2	
Vert.	9764.000	PK	45.0	38.8	10.2	37.0	57.0	73.9	16.9	100	357	
Vert.	12205.000	PK	43.9	39.1	10.6	36.2	57.4	73.9	16.5	100	11	
Vert.	4882.000	AV	32.1	31.2	6.8	36.0	34.1	53.9	19.8	100	340	
Vert.	7323.000	AV	33.0	36.1	8.1	36.0	41.2	53.9	12.7	100	2	
Vert.	9764.000	AV	33.0	38.8	10.2	37.0	45.0	53.9	8.9	100	357	
Vert.	12205.000	AV	32.6	39.1	10.6	36.2	46.1	53.9	7.8	100	11	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

**Radiated Emission**

Test place                   UL Japan, Inc. Yamakita EMC Lab.                   No.1 Semi Anechoic Chamber  
Date                           June 5, 2012   June 6, 2012  
Temperature / Humidity    20 deg.C , 65 %RH                                   21 deg.C , 65 %RH  
Engineer                    Akira Sato   Akira Sato  
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.	321.757	QP	41.1	15.1	9.0	27.1	38.1	46.0	7.9	114	193	PK:VBW 3MHz
Hori.	355.620	QP	42.9	16.1	9.2	27.3	40.9	46.0	5.1	100	211	AV:VBW 10Hz
Hori.	359.994	QP	44.7	16.2	9.2	27.4	42.7	46.0	3.3	100	180	
Hori.	2483.500	PK	42.8	27.3	14.5	36.3	48.3	73.9	25.6	100	142	
Hori.	4960.000	PK	44.3	31.4	6.7	36.0	46.4	73.9	27.5	100	12	
Hori.	7440.000	PK	44.5	36.3	8.1	36.0	52.9	73.9	21.0	100	2	
Hori.	9880.000	PK	43.9	38.9	10.3	37.1	56.0	73.9	17.9	100	36	
Hori.	12360.000	PK	43.4	39.2	10.7	36.6	56.7	73.9	17.2	100	356	
Hori.	2483.500	AV	33.4	27.3	14.5	36.3	38.9	53.9	15.0	100	142	
Hori.	4960.000	AV	32.1	31.4	6.7	36.0	34.2	53.9	19.7	100	12	
Hori.	7440.000	AV	32.8	36.3	8.1	36.0	41.2	53.9	12.7	100	2	
Hori.	9880.000	AV	32.8	38.9	10.3	37.1	44.9	53.9	9.0	100	36	
Hori.	12360.000	AV	32.5	39.2	10.7	36.6	45.8	53.9	8.1	100	356	
Vert.	67.736	QP	43.0	7.1	7.1	27.6	29.6	40.0	10.4	100	224	
Vert.	287.882	QP	35.5	18.8	8.8	27.0	36.1	46.0	9.9	100	163	
Vert.	503.999	QP	37.3	18.3	9.9	28.3	37.2	46.0	8.8	126	137	
Vert.	648.000	QP	36.8	20.0	10.6	28.5	38.9	46.0	7.1	106	148	
Vert.	2483.500	PK	43.6	27.3	14.5	36.3	49.1	73.9	24.8	100	139	
Vert.	4960.000	PK	44.1	31.4	6.7	36.0	46.2	73.9	27.7	100	3	
Vert.	7440.000	PK	44.5	36.3	8.1	36.0	52.9	73.9	21.0	100	358	
Vert.	9880.000	PK	43.5	38.9	10.3	37.1	55.6	73.9	18.3	100	0	
Vert.	12360.000	PK	44.4	39.2	10.7	36.6	57.7	73.9	16.2	100	359	
Vert.	2483.500	AV	33.4	27.3	14.5	36.3	38.9	53.9	15.0	100	139	
Vert.	4960.000	AV	32.7	31.4	6.7	36.0	34.8	53.9	19.1	100	3	
Vert.	7440.000	AV	32.8	36.3	8.1	36.0	41.2	53.9	12.7	100	358	
Vert.	9880.000	AV	32.8	38.9	10.3	37.1	44.9	53.9	9.0	100	0	
Vert.	12360.000	AV	32.4	39.2	10.7	36.6	45.7	53.9	8.2	100	359	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

## Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	June 5, 2012	June 6, 2012
Temperature / Humidity	20 deg.C , 65 %RH	21 deg.C , 65 %RH
Engineer	Akira Sato	Akira Sato
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.	321.755	QP	41.0	15.1	9.0	27.1	38.0	46.0	8.0	110	186	PK:VBW 3MHz
Hori.	355.622	QP	42.8	16.1	9.2	27.3	40.8	46.0	5.2	100	208	AV:VBW 10Hz
Hori.	360.000	QP	44.5	16.2	9.2	27.4	42.5	46.0	3.5	100	172	
Hori.	504.004	QP	37.3	18.3	9.9	28.3	37.2	46.0	8.8	100	348	
Hori.	647.999	QP	31.8	20.0	10.6	28.5	33.9	46.0	12.1	100	345	
Hori.	791.993	QP	31.7	22.0	11.1	28.3	36.5	46.0	9.5	121	215	
Hori.	2390.000	PK	46.5	27.4	14.4	36.3	52.0	73.9	21.9	100	137	
Hori.	2400.000	PK	47.1	27.4	14.4	36.3	52.6	73.9	21.3	100	137	
Hori.	4804.000	PK	43.1	30.9	6.7	36.0	44.7	73.9	29.2	100	0	
Hori.	7206.000	PK	44.7	35.9	8.0	36.1	52.5	73.9	21.4	100	0	
Hori.	9608.000	PK	43.5	38.8	10.1	37.0	55.4	73.9	18.5	100	0	
Hori.	12010.000	PK	44.6	38.9	10.7	35.8	58.4	73.9	15.5	100	0	
Hori.	2390.000	AV	32.9	27.4	14.4	36.3	38.4	53.9	15.5	100	137	
Hori.	2400.000	AV	34.5	27.4	14.4	36.3	40.0	53.9	13.9	100	137	
Hori.	4804.000	AV	33.0	30.9	6.7	36.0	34.6	53.9	19.3	100	0	
Hori.	7206.000	AV	32.6	35.9	8.0	36.1	40.4	53.9	13.5	100	0	
Hori.	9608.000	AV	32.0	38.8	10.1	37.0	43.9	53.9	10.0	100	0	
Hori.	12010.000	AV	32.6	38.9	10.7	35.8	46.4	53.9	7.5	100	0	
Vert.	67.736	QP	42.9	7.1	7.1	27.6	29.5	40.0	10.5	100	228	
Vert.	287.885	QP	35.6	18.8	8.8	27.0	36.2	46.0	9.8	100	169	
Vert.	2390.000	PK	43.5	27.4	14.4	36.3	49.0	73.9	24.9	100	142	
Vert.	2400.000	PK	50.2	27.4	14.4	36.3	55.7	73.9	18.2	100	142	
Vert.	4804.000	PK	44.5	30.9	6.7	36.0	46.1	73.9	27.8	100	53	
Vert.	7206.000	PK	44.1	35.9	8.0	36.1	51.9	73.9	22.0	100	2	
Vert.	9608.000	PK	43.7	38.8	10.1	37.0	55.6	73.9	18.3	100	3	
Vert.	12010.000	PK	43.0	38.9	10.7	35.8	56.8	73.9	17.1	100	1	
Vert.	2390.000	AV	33.4	27.4	14.4	36.3	38.9	53.9	15.0	100	142	
Vert.	2400.000	AV	37.1	27.4	14.4	36.3	42.6	53.9	11.3	100	142	
Vert.	4804.000	AV	34.2	30.9	6.7	36.0	35.8	53.9	18.1	100	53	
Vert.	7206.000	AV	32.7	35.9	8.0	36.1	40.5	53.9	13.4	100	2	
Vert.	9608.000	AV	32.1	38.8	10.1	37.0	44.0	53.9	9.9	100	3	
Vert.	12010.000	AV	32.6	38.9	10.7	35.8	46.4	53.9	7.5	100	1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

## Radiated Emission

Test place	UL Japan, Inc. Yamakita EMC Lab.	No.1 Semi Anechoic Chamber
Date	June 5, 2012	June 6, 2012
Temperature / Humidity	20 deg.C , 65 %RH	21 deg.C , 65 %RH
Engineer	Akira Sato	Akira Sato
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.	287.888	QP	36.8	18.8	8.8	27.0	37.4	46.0	8.6	134	289	PK:VBW 3MHz
Hori.	321.754	QP	40.6	15.1	9.0	27.1	37.6	46.0	8.4	109	186	AV:VBW 10Hz
Hori.	355.620	QP	43.2	16.1	9.2	27.3	41.2	46.0	4.8	100	216	
Hori.	359.998	QP	44.7	16.2	9.2	27.4	42.7	46.0	<b>3.3</b>	100	225	
Hori.	791.997	QP	32.0	22.0	11.1	28.3	36.8	46.0	9.2	150	325	
Hori.	959.986	QP	29.4	23.1	11.8	27.9	36.4	46.0	9.6	100	245	
Hori.	4882.000	PK	44.2	31.2	6.8	36.0	46.2	73.9	27.7	100	56	
Hori.	7323.000	PK	44.6	36.1	8.1	36.0	52.8	73.9	21.1	100	7	
Hori.	9764.000	PK	44.2	38.8	10.2	37.0	56.2	73.9	17.7	100	4	
Hori.	12205.000	PK	44.9	39.1	10.6	36.2	58.4	73.9	15.5	100	357	
Hori.	4882.000	AV	32.5	31.2	6.8	36.0	34.5	53.9	19.4	100	56	
Hori.	7323.000	AV	32.8	36.1	8.1	36.0	41.0	53.9	12.9	100	7	
Hori.	9764.000	AV	32.4	38.8	10.2	37.0	44.4	53.9	9.5	100	4	
Hori.	12205.000	AV	32.5	39.1	10.6	36.2	46.0	53.9	7.9	100	357	
Vert.	67.736	QP	43.1	7.1	7.1	27.6	29.7	40.0	10.3	100	242	
Vert.	647.999	QP	37.1	20.0	10.6	28.5	39.2	46.0	6.8	100	150	
Vert.	4882.000	PK	44.4	31.2	6.8	36.0	46.4	73.9	27.5	100	132	
Vert.	7323.000	PK	44.8	36.1	8.1	36.0	53.0	73.9	20.9	100	1	
Vert.	9764.000	PK	44.7	38.8	10.2	37.0	56.7	73.9	17.2	100	6	
Vert.	12205.000	PK	44.6	39.1	10.6	36.2	58.1	73.9	15.8	100	11	
Vert.	4882.000	AV	32.9	31.2	6.8	36.0	34.9	53.9	19.0	100	132	
Vert.	7323.000	AV	33.0	36.1	8.1	36.0	41.2	53.9	12.7	100	1	
Vert.	9764.000	AV	32.6	38.8	10.2	37.0	44.6	53.9	9.3	100	6	
Vert.	12205.000	AV	32.5	39.1	10.6	36.2	46.0	53.9	7.9	100	11	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

**Radiated Emission**

Test place                   UL Japan, Inc. Yamakita EMC Lab.                   No.1 Semi Anechoic Chamber  
Date                           June 5, 2012   June 6, 2012  
Temperature / Humidity    20 deg.C , 65 %RH                                   21 deg.C , 65 %RH  
Engineer                    Akira Sato   Akira Sato  
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.	287.886	QP	36.7	18.8	8.8	27.0	37.3	46.0	8.7	135	296	PK:VBW 3MHz
Hori.	321.755	QP	40.6	15.1	9.0	27.1	37.6	46.0	8.4	110	185	AV:VBW 10Hz
Hori.	355.622	QP	42.9	16.1	9.2	27.3	40.9	46.0	5.1	100	208	
Hori.	360.000	QP	44.4	16.2	9.2	27.4	42.4	46.0	3.6	100	177	
Hori.	504.000	QP	37.5	18.3	9.9	28.3	37.4	46.0	8.6	100	349	
Hori.	647.998	QP	36.1	20.0	10.6	28.5	38.2	46.0	7.8	148	174	
Hori.	792.000	QP	32.0	22.0	11.1	28.3	36.8	46.0	9.2	114	208	
Hori.	2483.500	PK	43.7	27.3	14.5	36.3	49.2	73.9	24.7	100	0	
Hori.	4960.000	PK	42.9	31.4	6.7	36.0	45.0	73.9	28.9	100	345	
Hori.	7440.000	PK	43.6	36.3	8.1	36.0	52.0	73.9	21.9	100	1	
Hori.	9880.000	PK	43.5	38.9	10.3	37.1	55.6	73.9	18.3	100	358	
Hori.	12360.000	PK	44.0	39.2	10.7	36.6	57.3	73.9	16.6	100	357	
Hori.	2483.500	AV	33.5	27.3	14.5	36.3	39.0	53.9	14.9	100	0	
Hori.	4960.000	AV	32.3	31.4	6.7	36.0	34.4	53.9	19.5	100	345	
Hori.	7440.000	AV	32.8	36.3	8.1	36.0	41.2	53.9	12.7	100	1	
Hori.	9880.000	AV	32.8	38.9	10.3	37.1	44.9	53.9	9.0	100	358	
Hori.	12360.000	AV	32.4	39.2	10.7	36.6	45.7	53.9	8.2	100	357	
Vert.	32.638	QP	26.2	17.0	6.7	27.6	22.3	40.0	17.7	100	49	
Vert.	67.735	QP	42.7	7.1	7.1	27.6	29.3	40.0	10.7	108	225	
Vert.	2483.500	PK	42.8	27.3	14.5	36.3	48.3	73.9	25.6	100	0	
Vert.	4960.000	PK	44.5	31.4	6.7	36.0	46.6	73.9	27.3	100	343	
Vert.	7440.000	PK	44.0	36.3	8.1	36.0	52.4	73.9	21.5	100	357	
Vert.	9880.000	PK	44.3	38.9	10.3	37.1	56.4	73.9	17.5	100	357	
Vert.	12360.000	PK	43.2	39.2	10.7	36.6	56.5	73.9	17.4	100	356	
Vert.	2483.500	AV	33.4	27.3	14.5	36.3	38.9	53.9	15.0	100	0	
Vert.	4960.000	AV	32.4	31.4	6.7	36.0	34.5	53.9	19.4	100	343	
Vert.	7440.000	AV	32.7	36.3	8.1	36.0	41.1	53.9	12.8	100	357	
Vert.	9880.000	AV	32.8	38.9	10.3	37.1	44.9	53.9	9.0	100	357	
Vert.	12360.000	AV	32.4	39.2	10.7	36.6	45.7	53.9	8.2	100	356	

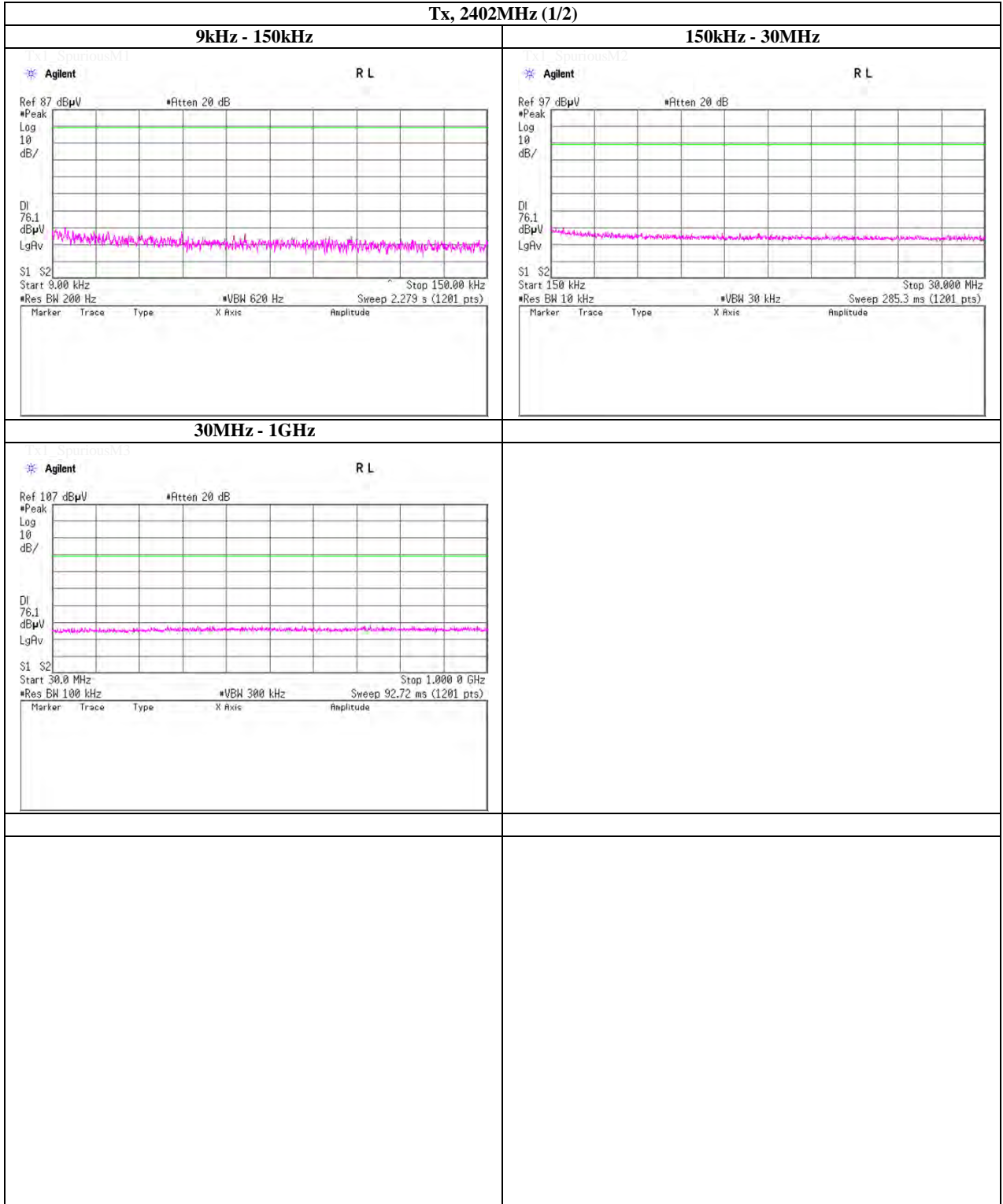
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)

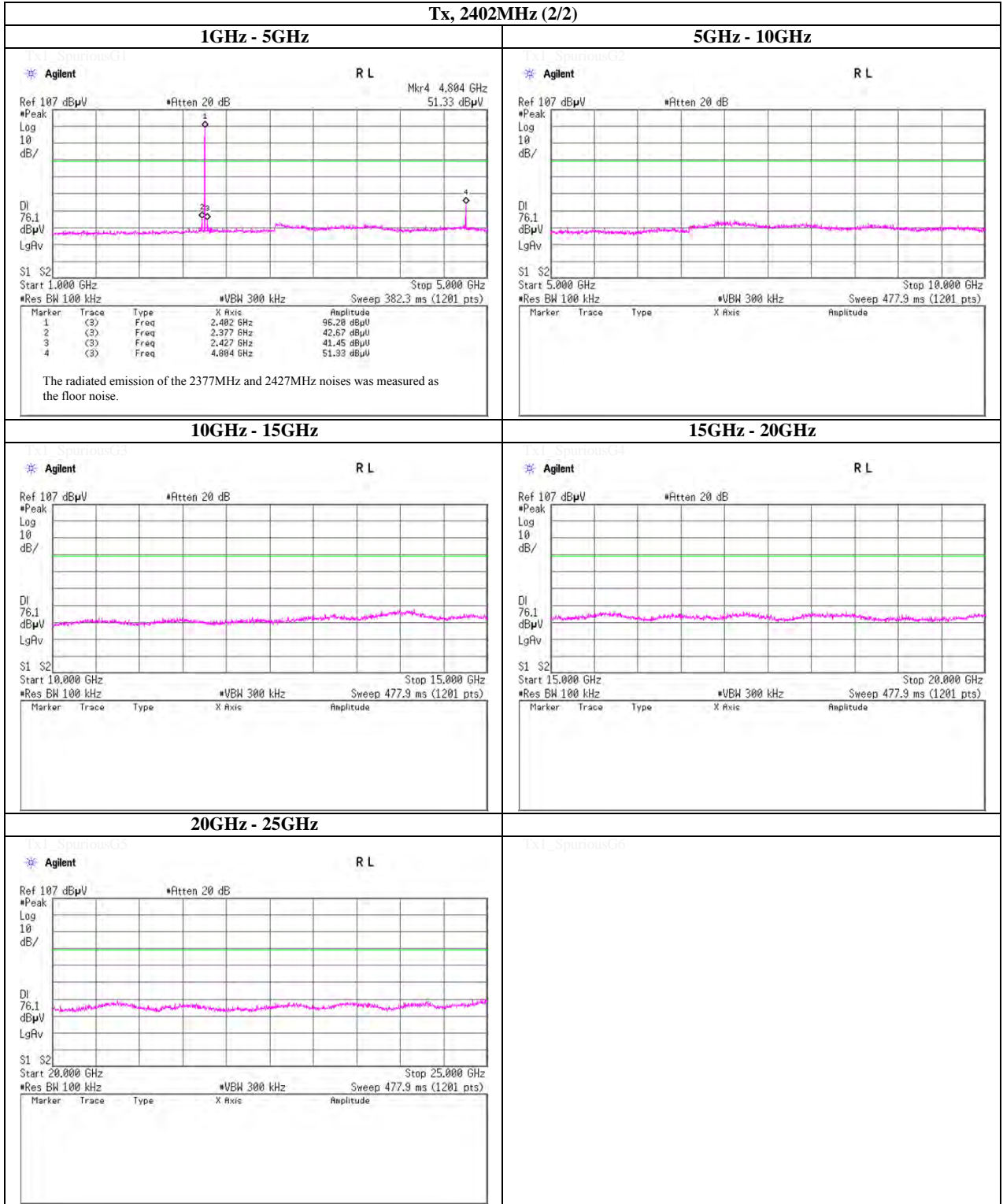


**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (2/2)



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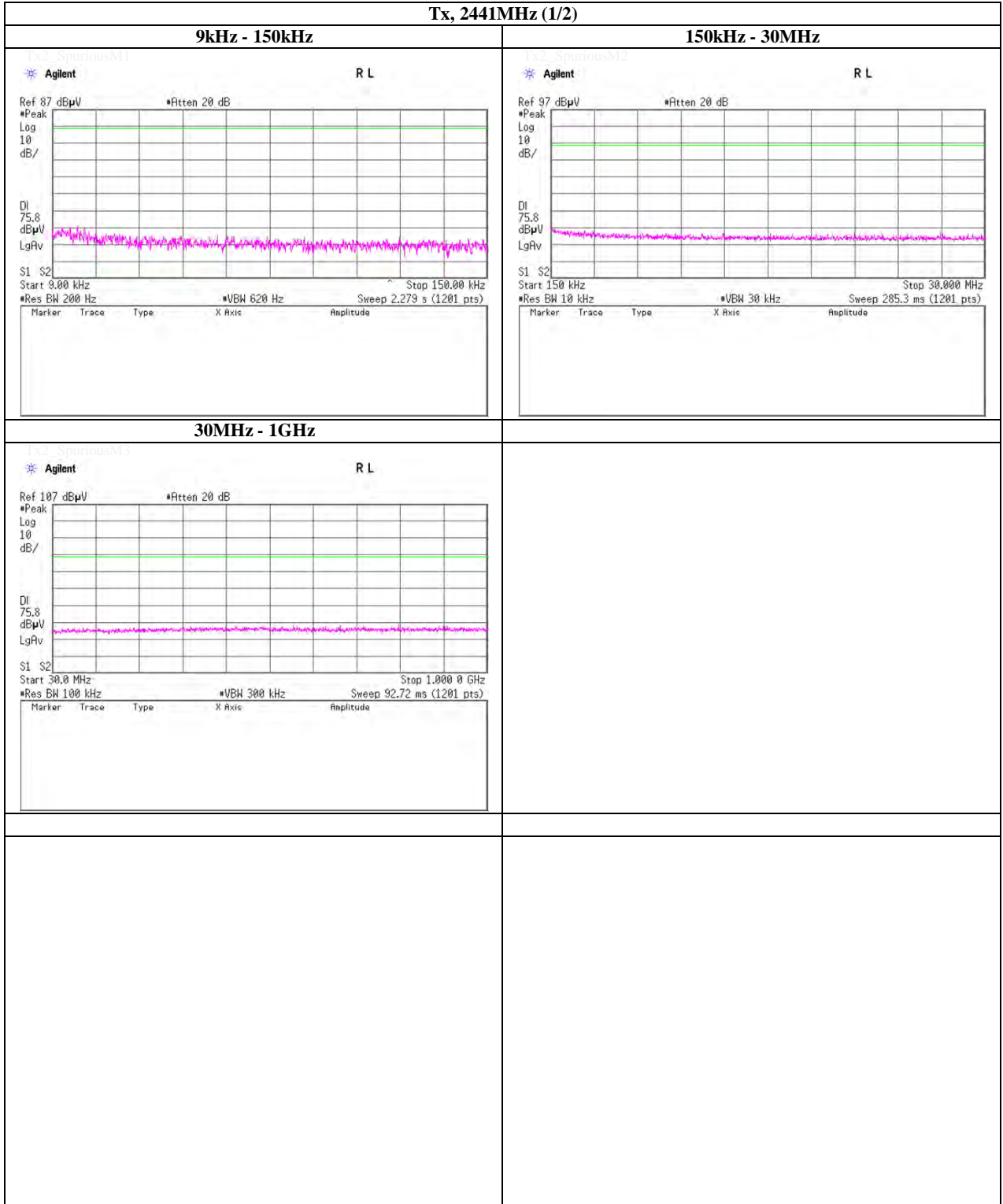
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**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2441MHz (1/2)**



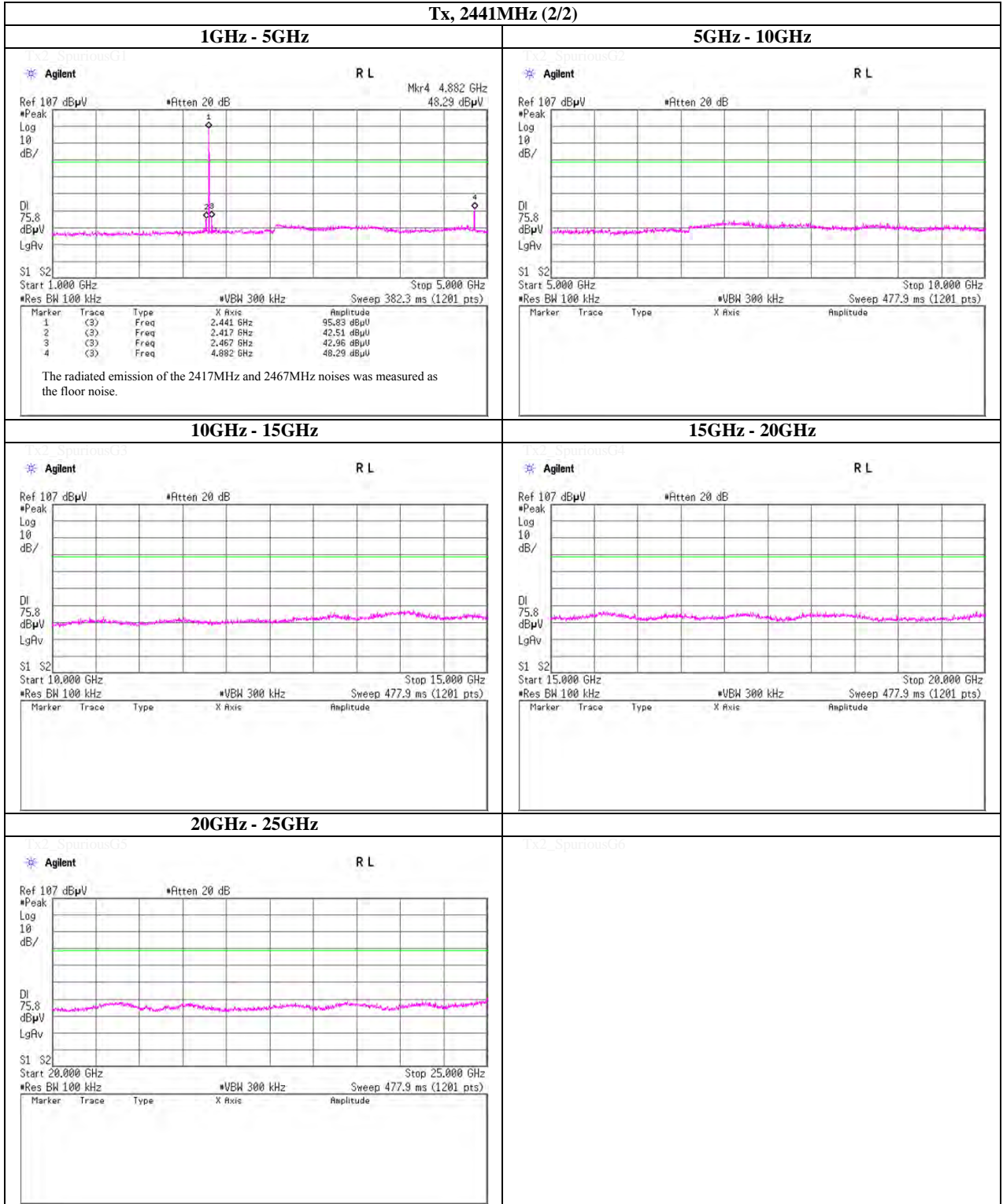
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**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
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### Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2441MHz (2/2)**



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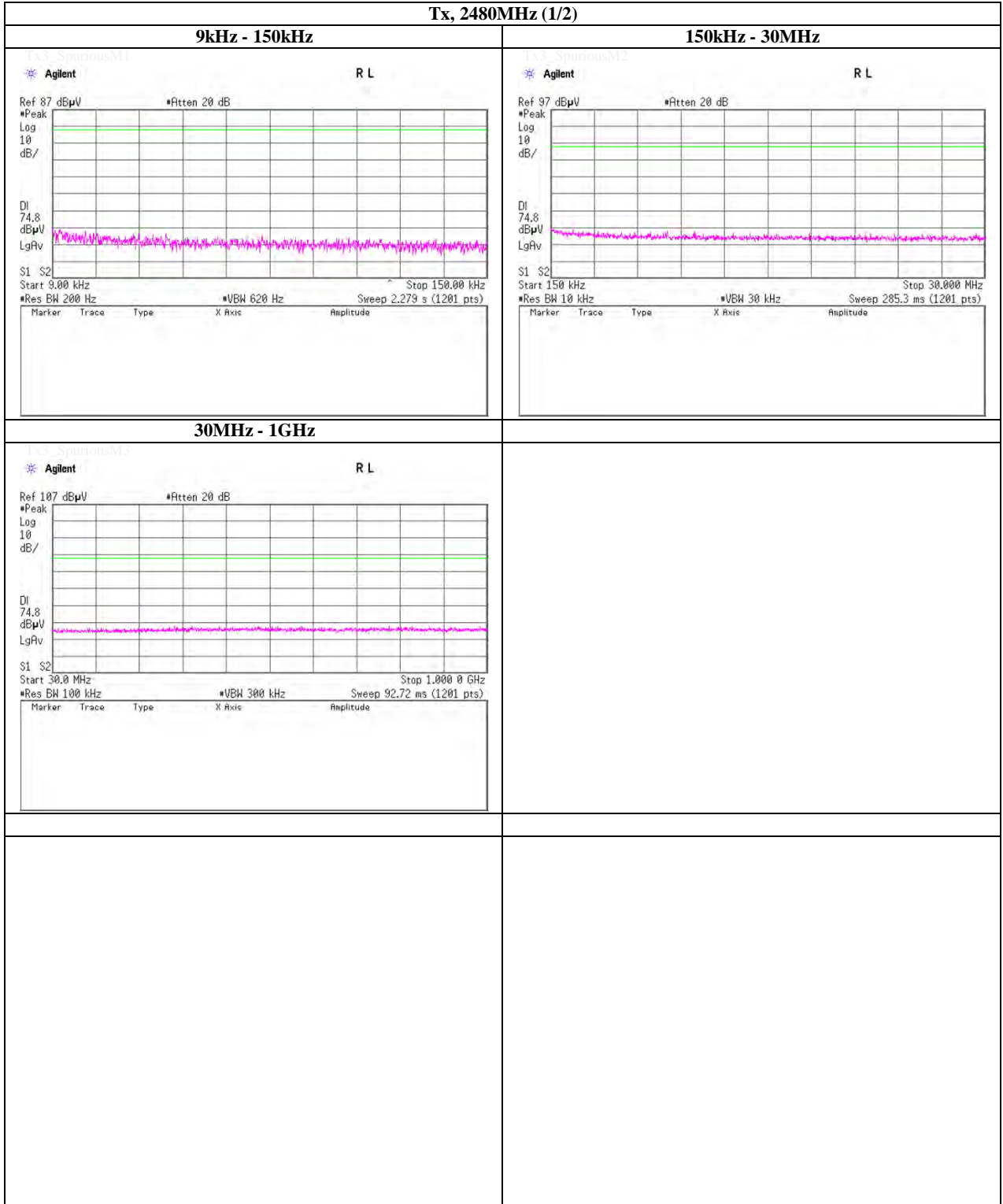
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**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2480MHz (1/2)**

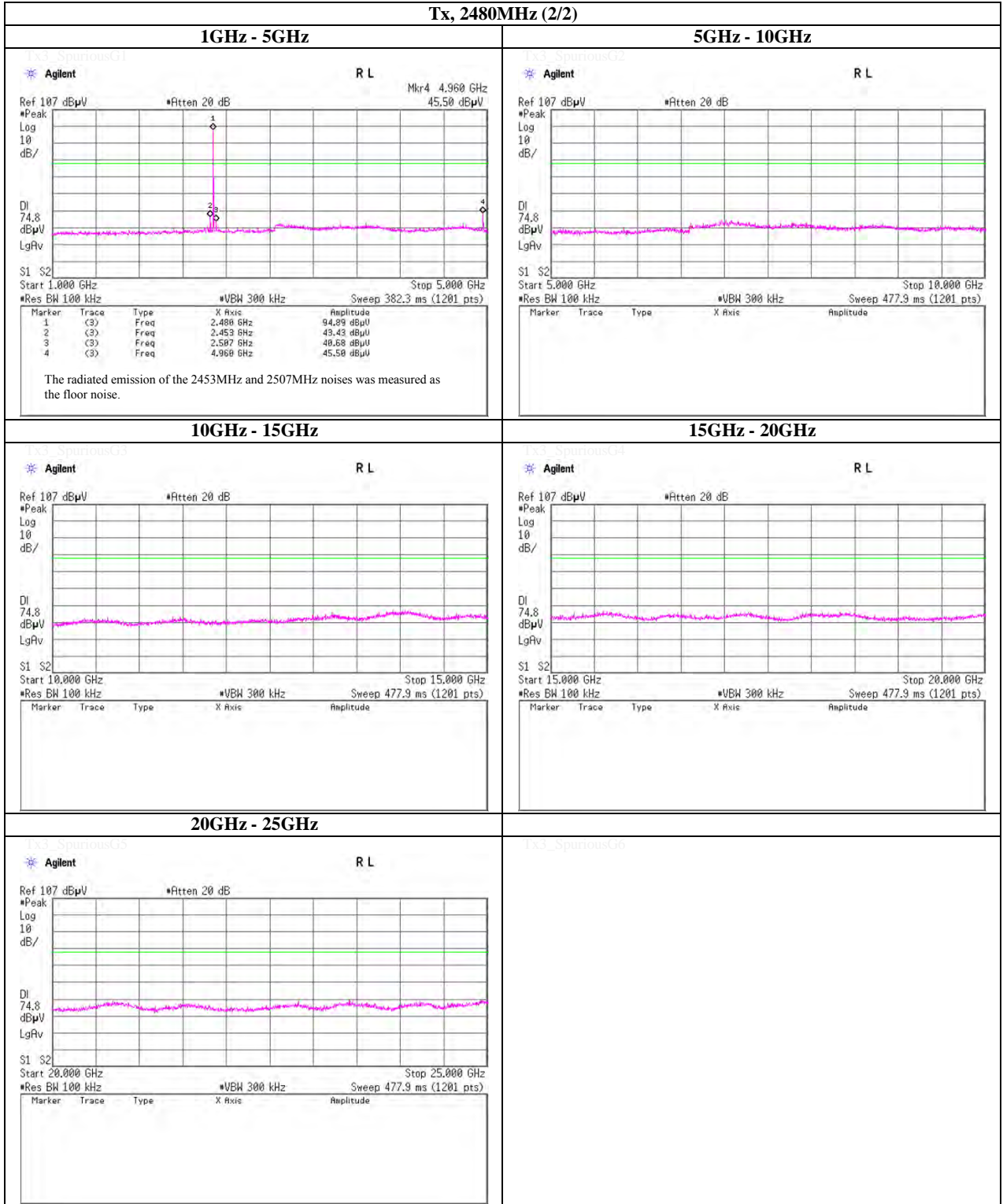


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**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
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 Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2480MHz (2/2)**



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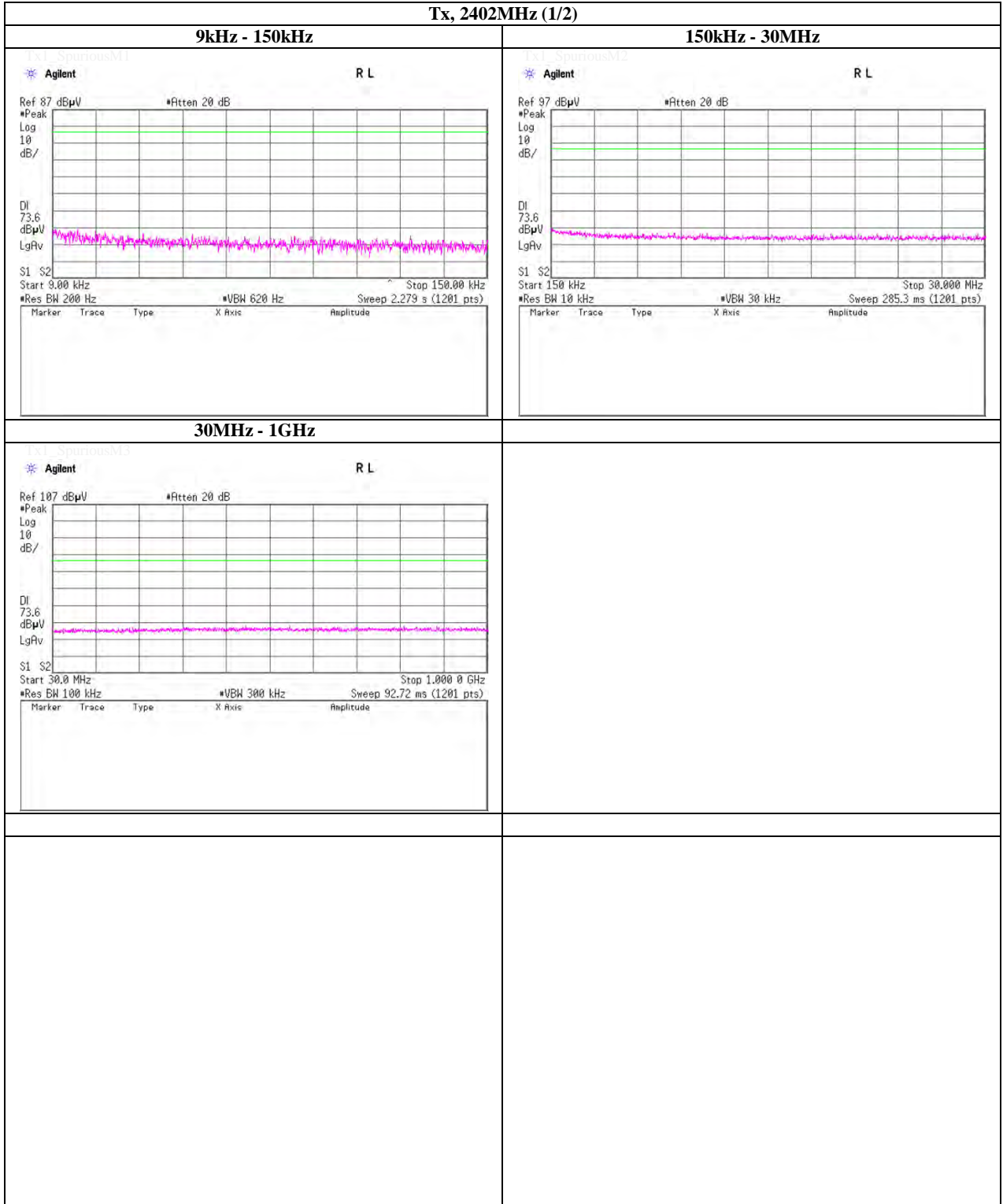
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)



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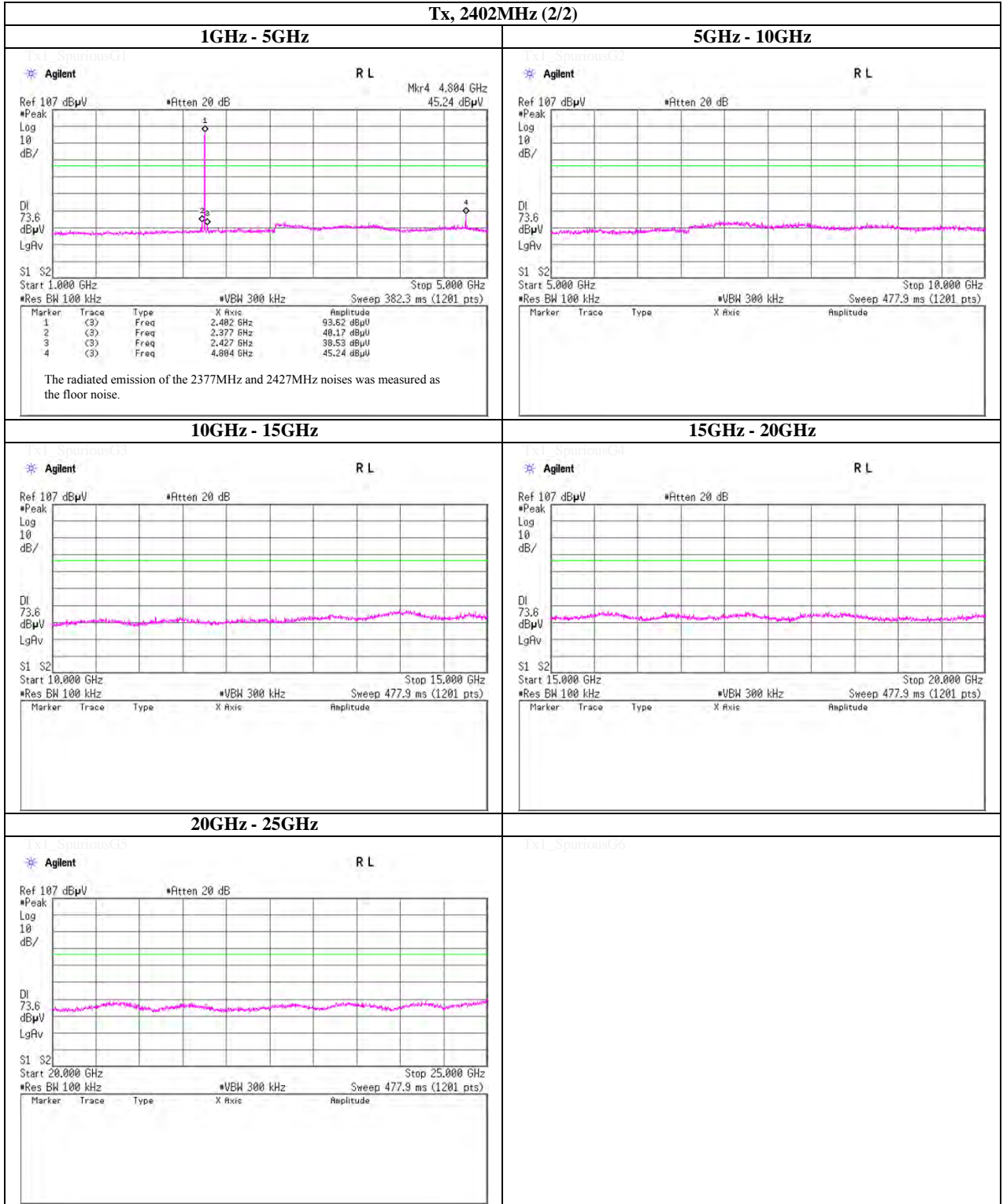
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### Spurious emission (Conducted)

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2402MHz (2/2)**



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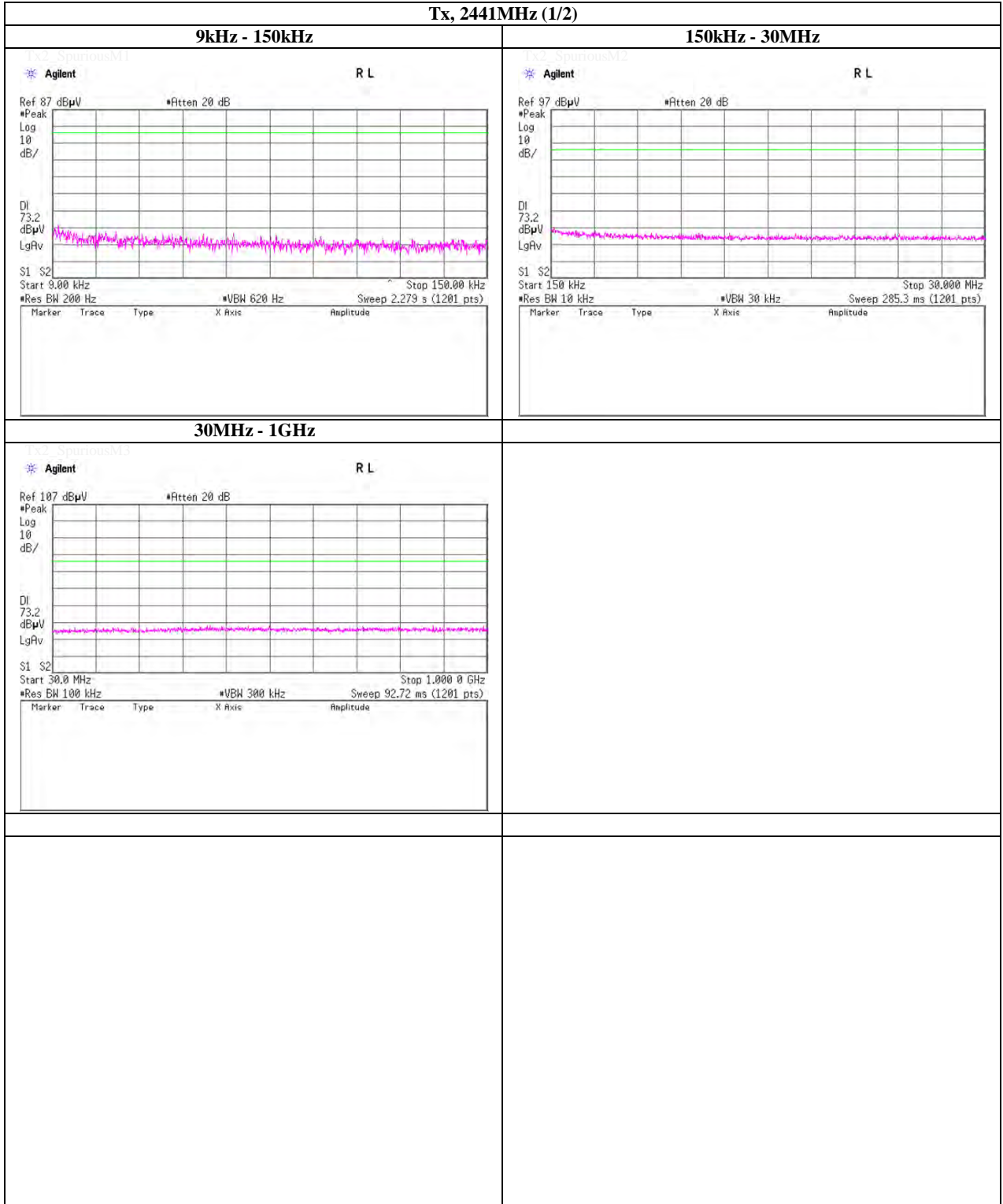
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Facsimile : +81 463 50 6401

**Spurious emission (Conducted)**

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2441MHz (1/2)**

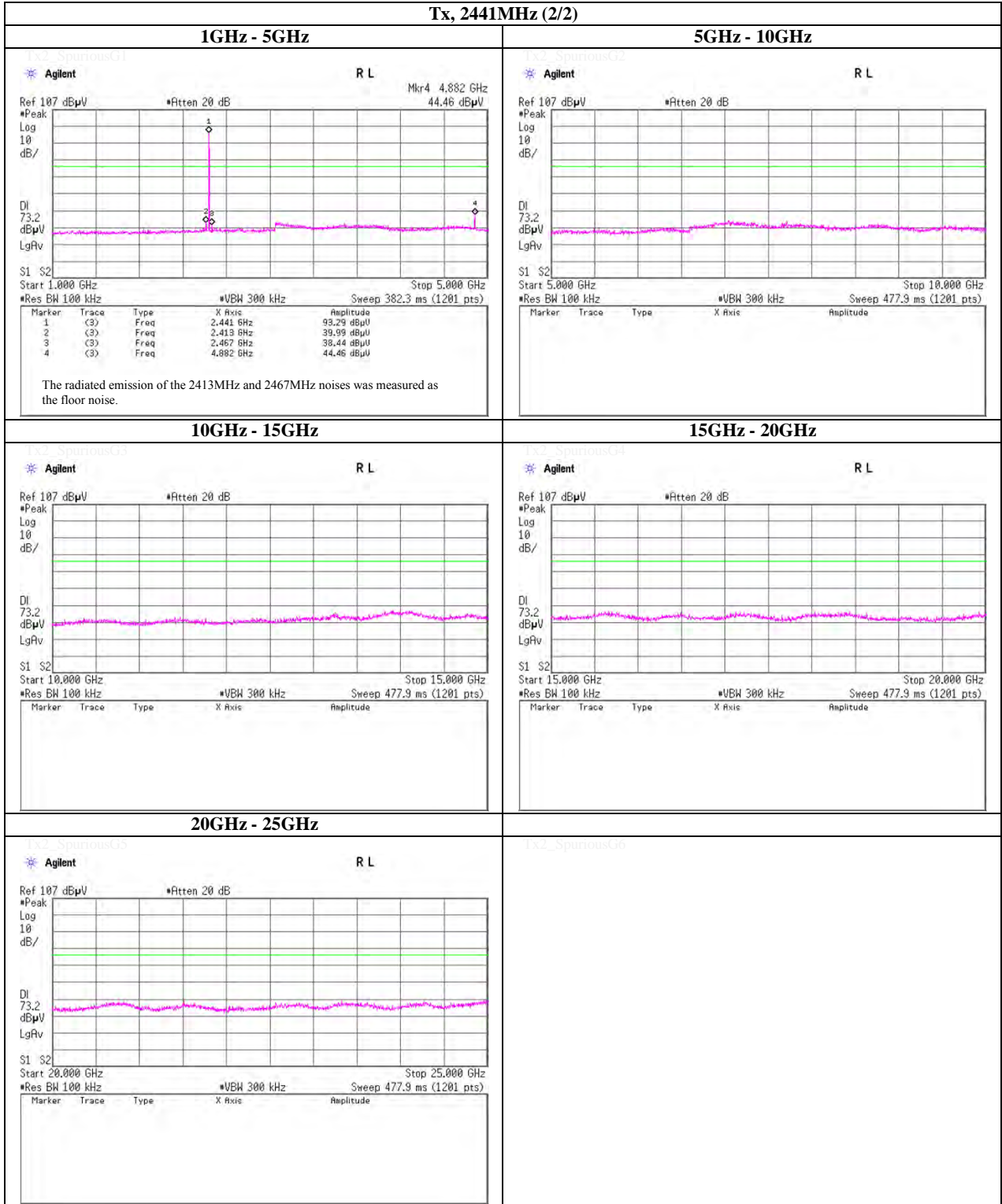


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**Shonan EMC Lab.**  
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 Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (2/2)



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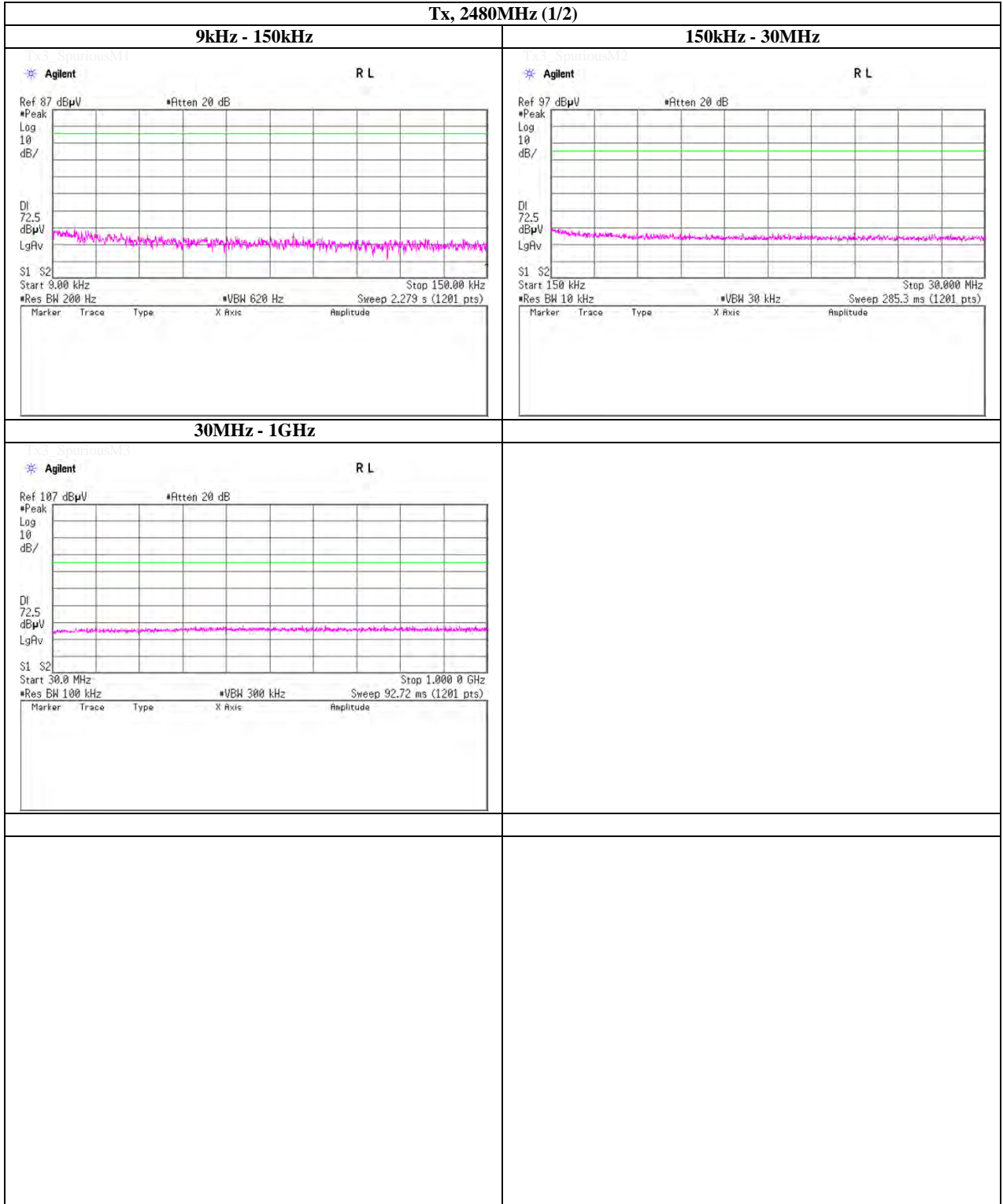
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**Spurious emission (Conducted)**

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2480MHz (1/2)**



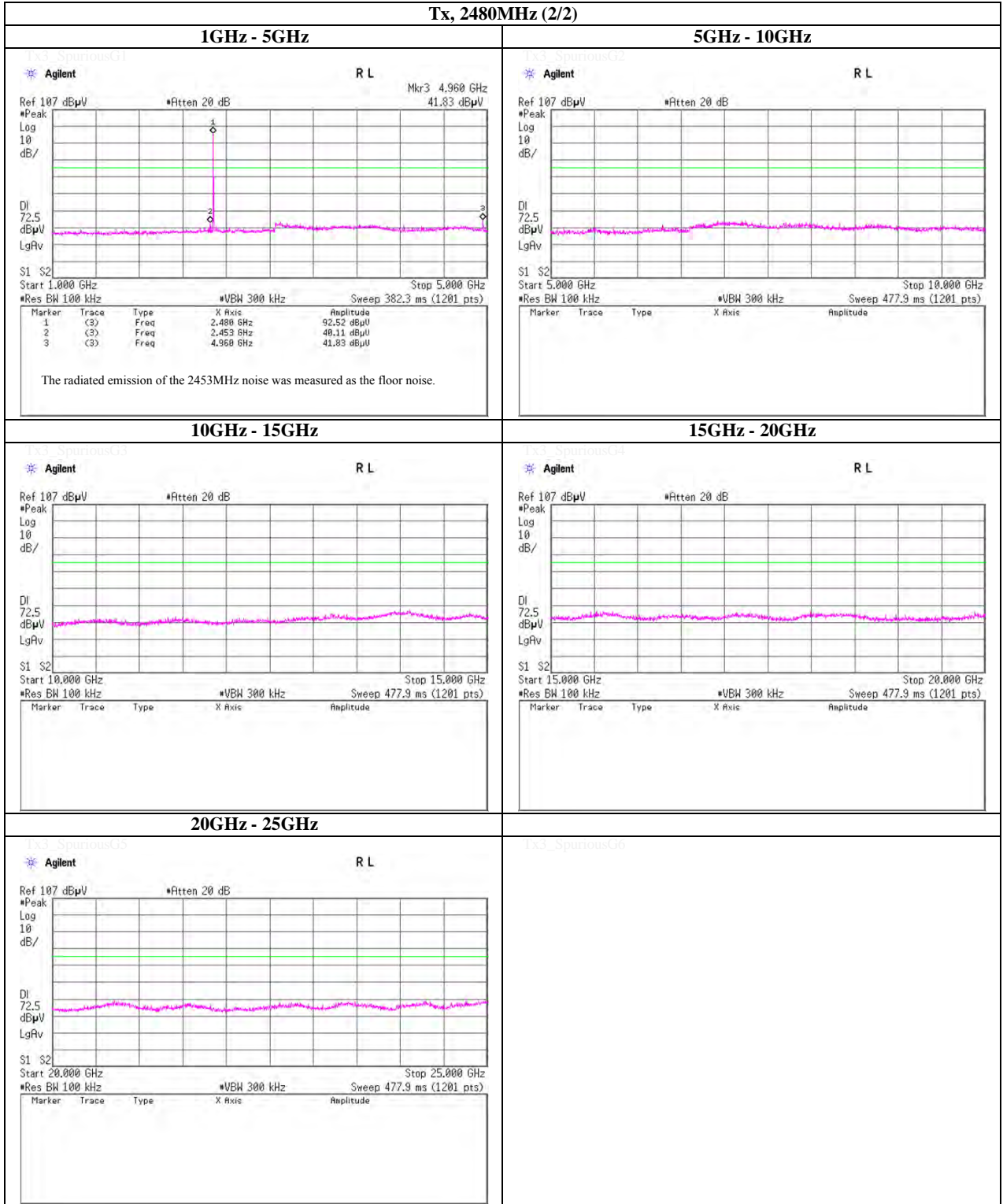
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 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401



### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)



**UL Japan, Inc.**

**Shonan EMC Lab.**

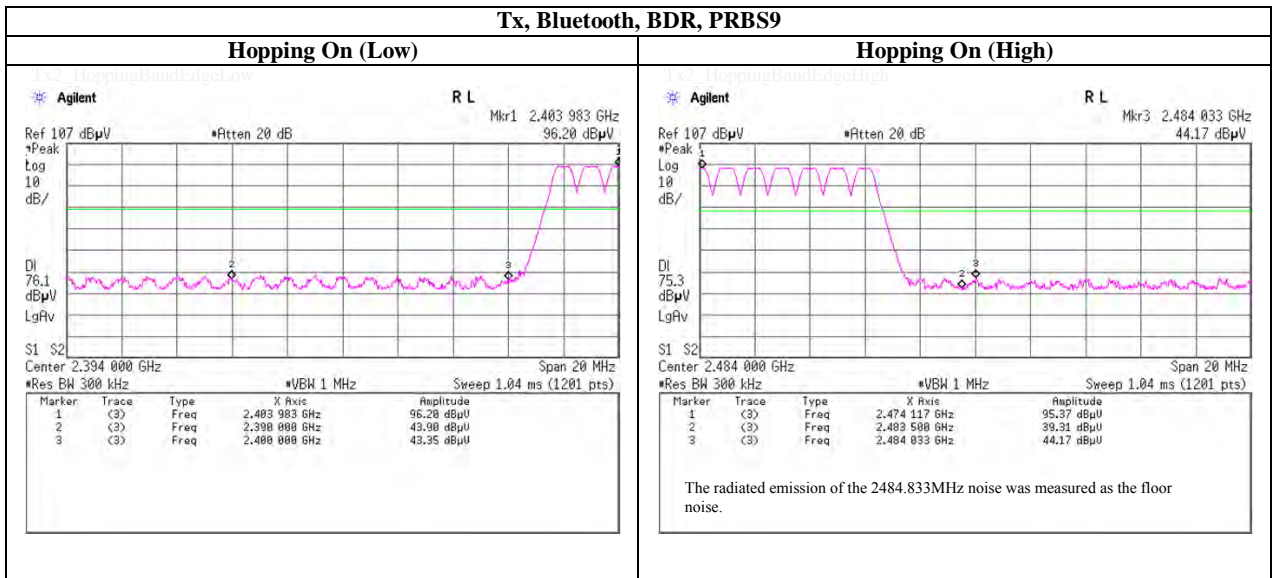
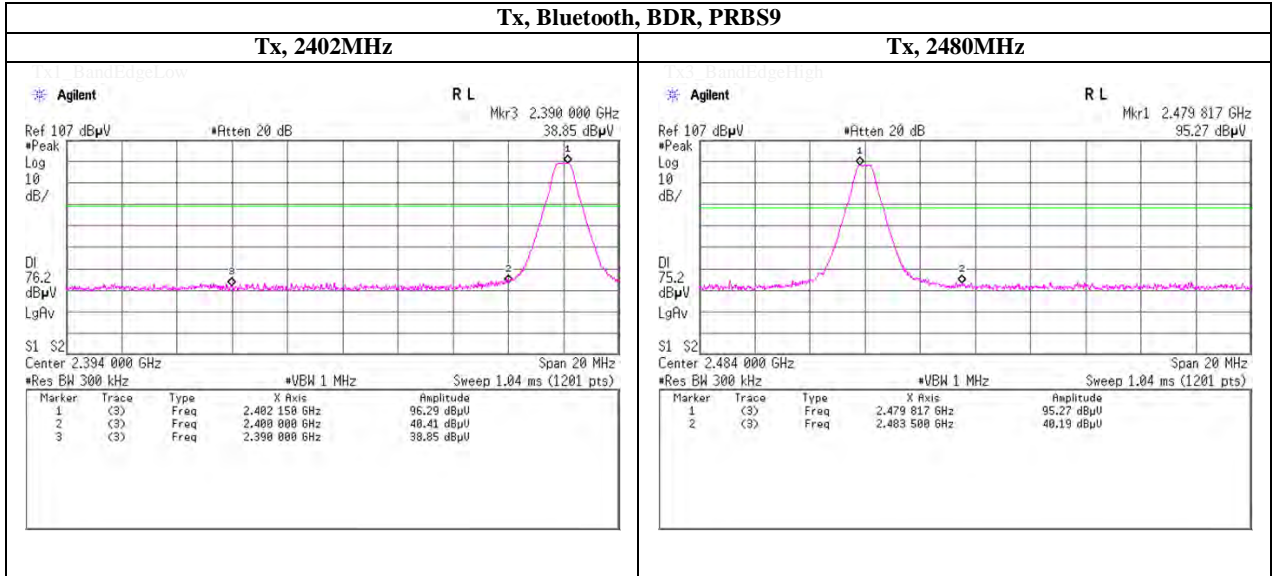
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## Spurious emission (Conducted)

### Band Edge compliance



**UL Japan, Inc.**

**Shonan EMC Lab.**

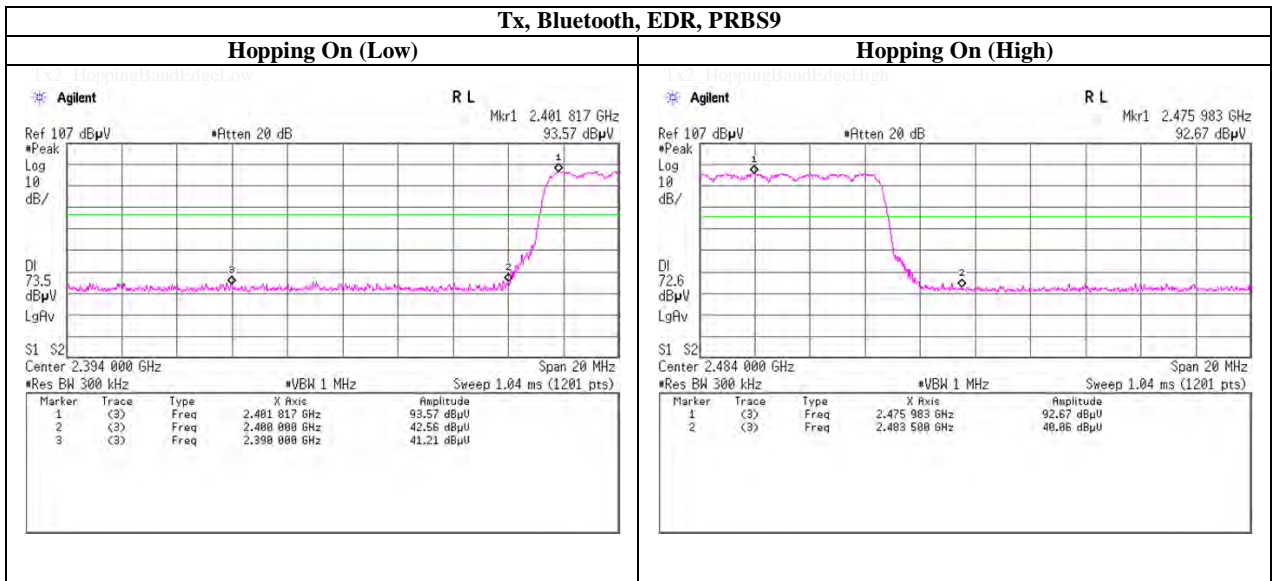
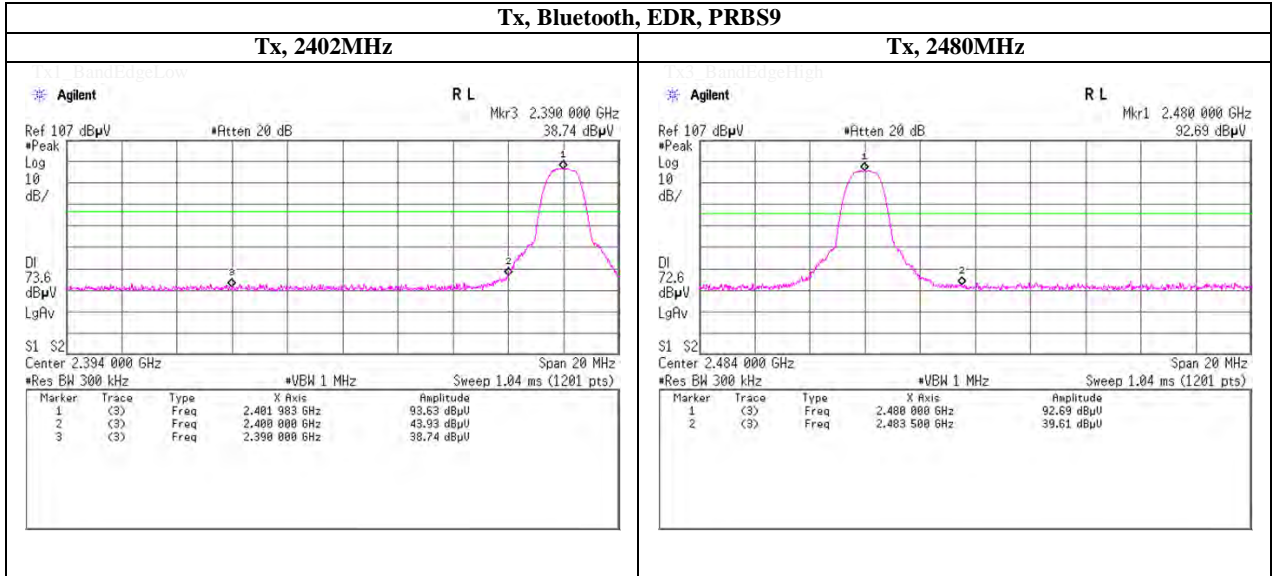
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Spurious emission (Conducted)

### Band Edge compliance



**UL Japan, Inc.**

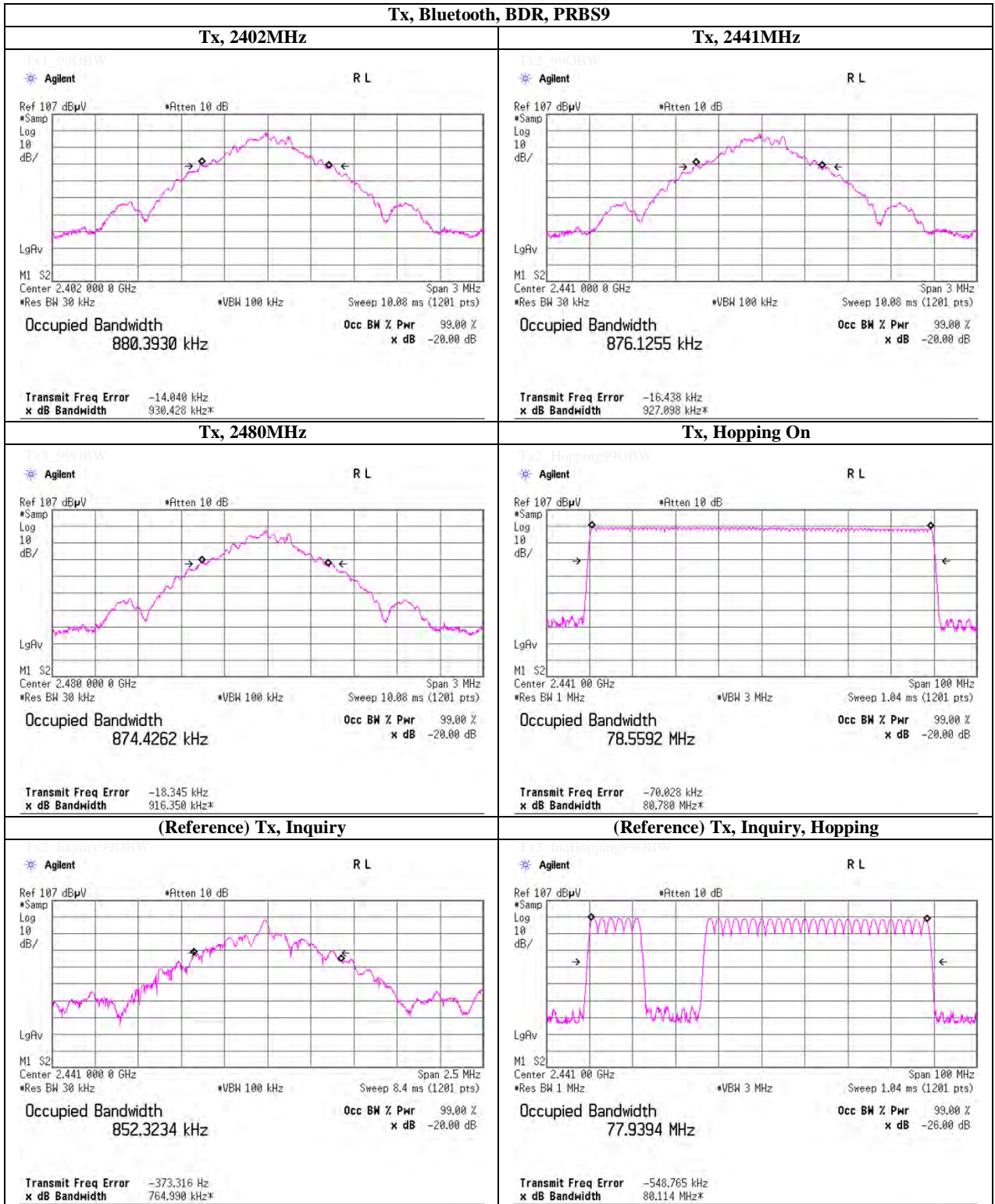
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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### 99% Occupied Bandwidth



**UL Japan, Inc.**

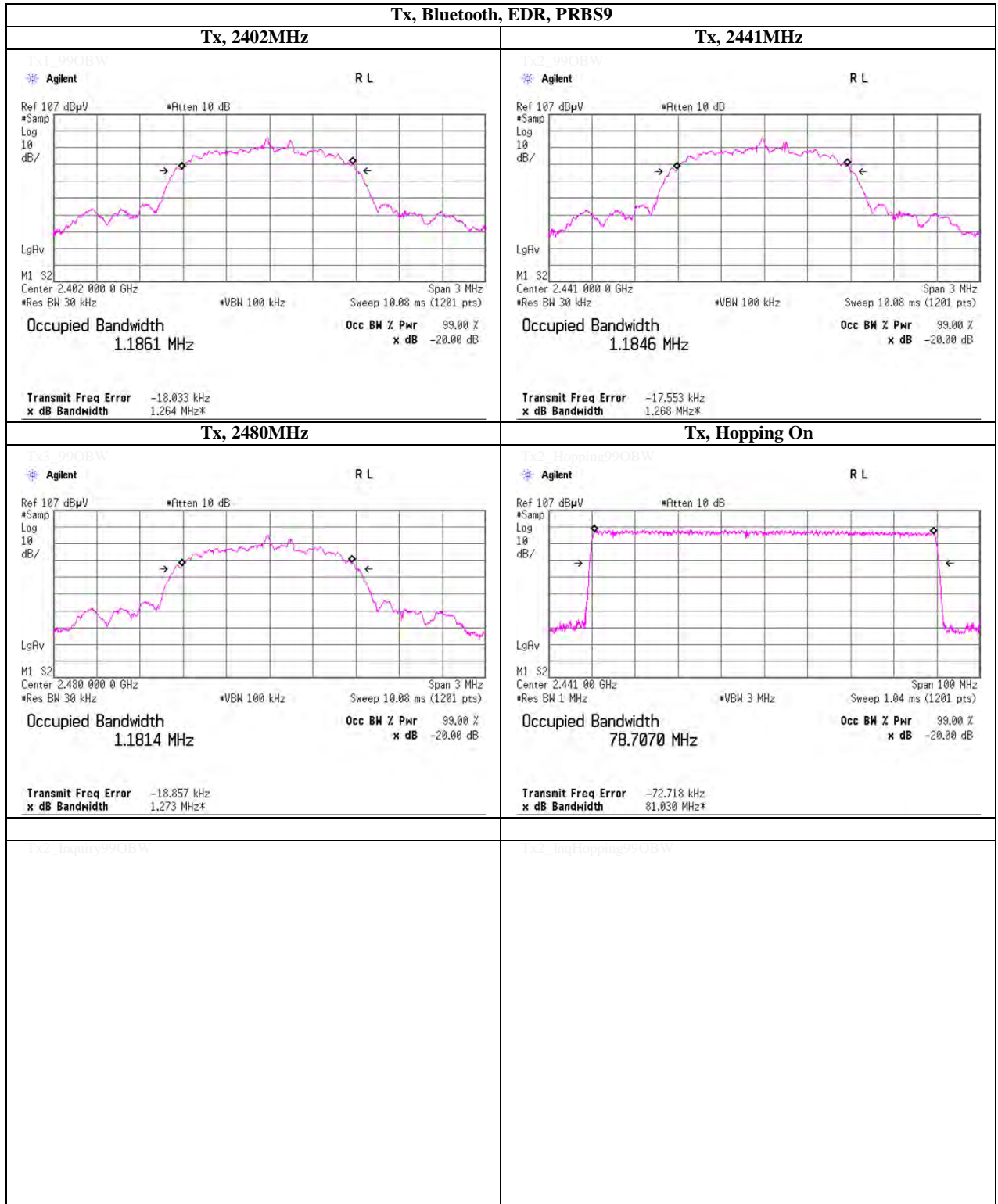
**Shonan EMC Lab.**

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### 99% Occupied Bandwidth



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**APPENDIX 2**  
**Test Instruments**

**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	1	RE	2011/08/08 * 12
KAF-02	Pre Amplifier	Hewlett Packard	8449B	3008A01268	RE	2012/04/06 * 12
KAF-06	Pre Amplifier	TSJ	MLA-1840B02-35	-	RE	2012/03/12 * 12
KHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	230	RE	2012/05/21 * 12
KHA-06	Horn Antenna	ETS LINDGREN	3116	00046543	RE	2012/03/30 * 12
KCC-D24/D25	Coaxial Cable	Suhner	SUCOFLEX 102	32718/2 / 32709/2	RE	2012/04/06 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2012/02/16 * 12
KJM-07	Measure	KOMELON	KMC-36	-	RE	-
KOS-02	Humidity Indicator	Custom	CTH-190	K-02	RE	2011/08/22 * 12
KAT10-S2	Attenuator	Agilent	8490D 010	06036	RE	2011/12/27 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	004	RE	2012/04/06 * 12
CUST-YA-RE	Radiated emission(software)	UL Japan	RE(Ver.2.0)	-	RE	-
KAF-03	Pre Amplifier	Hewlett Packard	8447D	2944A09947	RE	2011/11/04 * 12
KAT6-03	Attenuator	INMET	18N-6dB	-	RE	2011/12/28 * 12
KBA-01	Biconical Antenna	Schwarzbeck	BBA9106	1748	RE	2011/10/23 * 12
KLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	170	RE	2011/10/23 * 12
KCC-42/31/32 /34/37/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/8D-2W/S0 4272B/RFM-E421	-/01055	RE	2011/10/31 * 12
TR-09	Test Receiver	Rohde & Schwarz	ESCI	100769	RE	2011/09/16 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2012/03/16 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	AT	2012/03/12 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2012/04/06 * 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

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

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

Test Item :

RE: Radiated emission ,

AT: Antenna terminal conducted tests