



RADIO TEST REPORT

Test Report No.: 4786001954S-A

Applicant : PIONEER CORPORATION
Type of Equipment : NAVIGATION AV SYSTEM
Model No. : AVIC-Z150BH
FCC ID : AJDK060
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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3. This sample tested is in compliance with the limits of the above regulation.
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: December 17 to 24, 2012

Tested by:

H. Shirasawa

Hikaru Shirasawa
Engineer of WiSE Japan,
UL Verification Service

Approved by :

T. Imamura

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service



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☒ There is no testing item of "Non-accreditation".

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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

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 4786001954S-A

[illegible]

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SECTION 1: Customer information

Company Name : PIONEER CORPORATION
Brand name : Pioneer
Address : 25-1 Aza-Nishi-machi, 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 : NAVIGATION AV SYSTEM
Model No. : AVIC-Z150BH
Serial No. : See Section 4.
Rating : DC 14.4V
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 : December 22, 2012

2.2 Product description

Model: AVIC-Z150BH (referred to as the EUT in this report) is a NAVIGATION AV SYSTEM.

Derived models and the difference:

Model	AVIC-Z150BH	AVIC-X850BT	AVIC-X8510BT	AVIC-X950BH
Shape of Face panel	Type A	Type B	Type B	Type B
Screen size	6.95-inch	6.1-inch	6.1-inch	6.1-inch
Keyboard is detachable	No	Yes	Yes	Yes
Memory Card	SD	Micro SD	Micro SD	Micro SD
HDMI input	Yes	Yes	No	No
Unit box	Full color	Full color	Black and White	Full color

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Clock Frequency:

FM/AM TUNER: 36.480MHz,
SYSTEM MICRO COMPUTER: 16.000MHz,
GRAPHIC IC: 42.000MHz,
RGB ILM DRIVER: 3MHz/2.5MHz,
DVD MECHA: 36.864MHz/33.868MHz/27MHz,
DC/DC CONVERTER (1): 750kHz/681.818kHz,
DC/DC CONVERTER (3): 375kHz/405.405kHz,
DC/DC CONVERTER (5): 428.571kHz/500kHz,
DC/DC CONVERTER (7): 2.2MHz,

RDS-TMC TUNER: 4MHz,
HDMI RECEIVER: 27MHz,
ECHO CANCELLER: 12.288MHz,
CPU: 16.66MHz/48.000MHz/33.231MHz/27MHz,
GPS: 16.37MHz,
DC/DC CONVERTER (2): 3MHz,
DC/DC CONVERTER (4): 1001kHz/706kHz,
DC/DC CONVERTER (6): 1.93MHz,
DC/DC CONVERTER (8): 2.25MHz,

Radio specification:

Equipment type	: Transceiver
Frequency of operation	: 2402-2480MHz
Bandwidth & channel spacing	: 79MHz & 1MHz
Type of modulation	: GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna type	: PWB pattern
Antenna gain with cable loss	: -4.6dBi (max)
Antenna connector type	: None
Operation temperature range	: -10 to +60 deg.C.

FCC 15.31 (e)

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

FCC 15.203

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

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2012,
final revised on August 13, 2012 and effective September 12, 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.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	-	N/A
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	3.3dB Freq.: 182.763MHz&800MHz Polarization: Horizontal Detection: Quasi Peak Mode: Tx 2402MHz, DH5	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						
*1) The test is not applicable since the EUT has no AC mains.						

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3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

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

3.4 Uncertainty

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

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 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	4.6 dB	4.3 dB	4.4 dB

*1: SAC=Semi-Anechoic Chamber

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

Radiated emission

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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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
☐ 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 Semi-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 test & Test instruments

Refer to APPENDIX 1 to 3.

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

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Facsimile : +81 463 50 6401

SECTION 4: Operation of E.U.T. during testing

4.1 Operating mode

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

Software: Test Program ver.2.000000 (supplied by the customer)
(Power setting: fixed)

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

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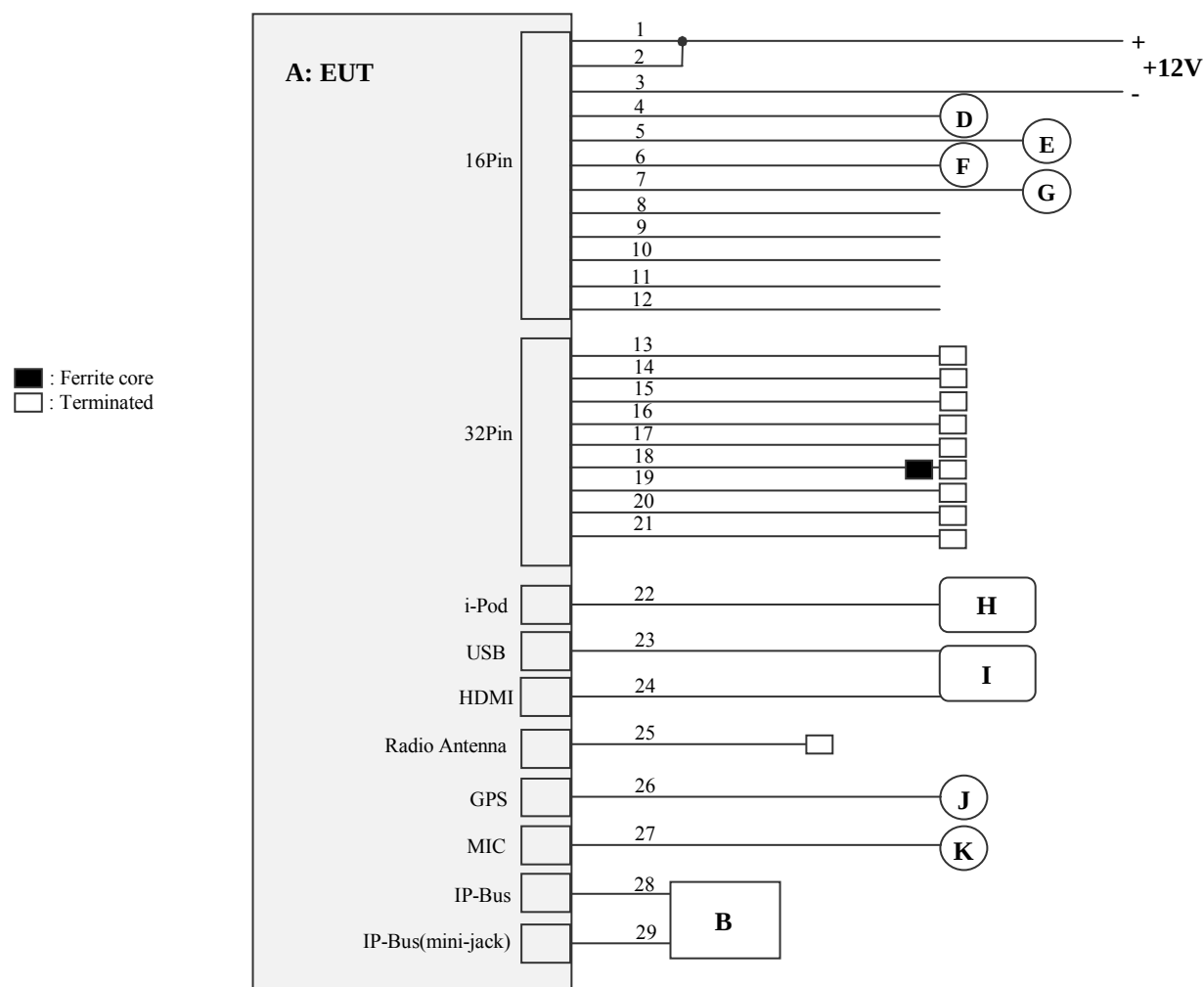
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4.2 Configuration of and peripherals



* Test data was taken under worse case conditions.

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

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	NAVIGATION AV SYSTEM	AVIC-Z150BH	*1)	PIONEER	EUT
B	IP-Bus	STK371	3710203010311	PIONEER	-
D	Speaker	LV-002	S11014200773	L&V	-
E	Speaker	LV-002	S11014200773	L&V	-
F	Speaker	LV-002	S11014200775	L&V	-
G	Speaker	LV-002	S11014200775	L&V	-
H	i-Pod touch	A1367	C3LDDBWFD7CP7	Apple	-
I	Cell-phone	1SW11F	SFJAL066073 03	FUJITSU	-
J	GPS Antenna	CZX5496-A	-	PIONEER	-
K	Microphone	-	-	PIONEER	-

*1) Antenna terminal conducted tests: LJTM000013UC, Radiated emission tests: LJTM000012UC

List of cables used

No.	Cable name	Length(m)	Shield		Remarks
			Cable	Connector	
1	ACC	0.3 +2.0	Unshielded	Unshielded	16Pin connector
2	+B	0.3 +2.0	Unshielded	Unshielded	
3	GND	0.3 +2.0	Unshielded	Unshielded	
4	FL	0.1 +3.0	Unshielded	Unshielded	
5	FR	0.1 +3.0	Unshielded	Unshielded	
6	RL	0.1 +3.0	Unshielded	Unshielded	
7	RR	0.1 +3.0	Unshielded	Unshielded	
8	Car Speed Signal Input	1.9	Unshielded	Unshielded	
9	Reverse-Gear Signal Input	7.8	Unshielded	Unshielded	
10	Antenna /System Control	2.0	Unshielded	Unshielded	
11	Illumination	1.6	Unshielded	Unshielded	
12	Parking Brake	1.9	Unshielded	Unshielded	32Pin Connector
13	Rear View Camera Input	1.8	Unshielded	Unshielded	
14	Rear Monitor Output(Audio)	1.2	Shield	Shield	
15	Rear Monitor Output(Video)	1.2	Shield	Shield	
16	Front Output	1.3	Shield	Shield	
17	Rear Output	1.3	Shield	Shield	
18	Subwoofer Output	1.3	Shield	Shield	
19	Audio Input	1.9	Shield	Shield	
20	Video Input	1.9	Shield	Shield	
21	Audio Output (Stereo Mini Jack)	1.7	Shield	Shield	
22	i-Pod	2.3	Shield	Shield	-
23	USB(Extension)	2.25	Shield	Shield	-
24	HDMI	2.2	Shield	Shield	-
25	Radio Antenna	0.3+3.0	Shield	Shield	-
26	GPS	3.5	Shield	Shield	-
27	Microphone	4.0	Shield	Shield	-
28	IP-Bus	0.45	Unshielded	Unshielded	-
29	IP-Bus(mini Jack)	0.35	Shield	Shield	-

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

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SECTION 5: Carrier frequency separation

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX

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

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX

SECTION 7: Number of hopping frequency

Test procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX

SECTION 8: Dwell time

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX

SECTION 9: Maximum peak output power

Test procedure

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX

SECTION 10: Spurious emissions (Antenna port conducted)

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX

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SECTION 11: Radiated emission

11.1 Operating environment

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

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, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. Photographs of the set up are shown in APPENDIX.

11.3 Test conditions

Frequency range : 30MHz to 25GHz
EUT position : Table top

11.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

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

Frequency	30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	: Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	: 120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz, VBW: 300kHz

* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold. Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

The carrier level and noise levels were confirmed at mounting 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.

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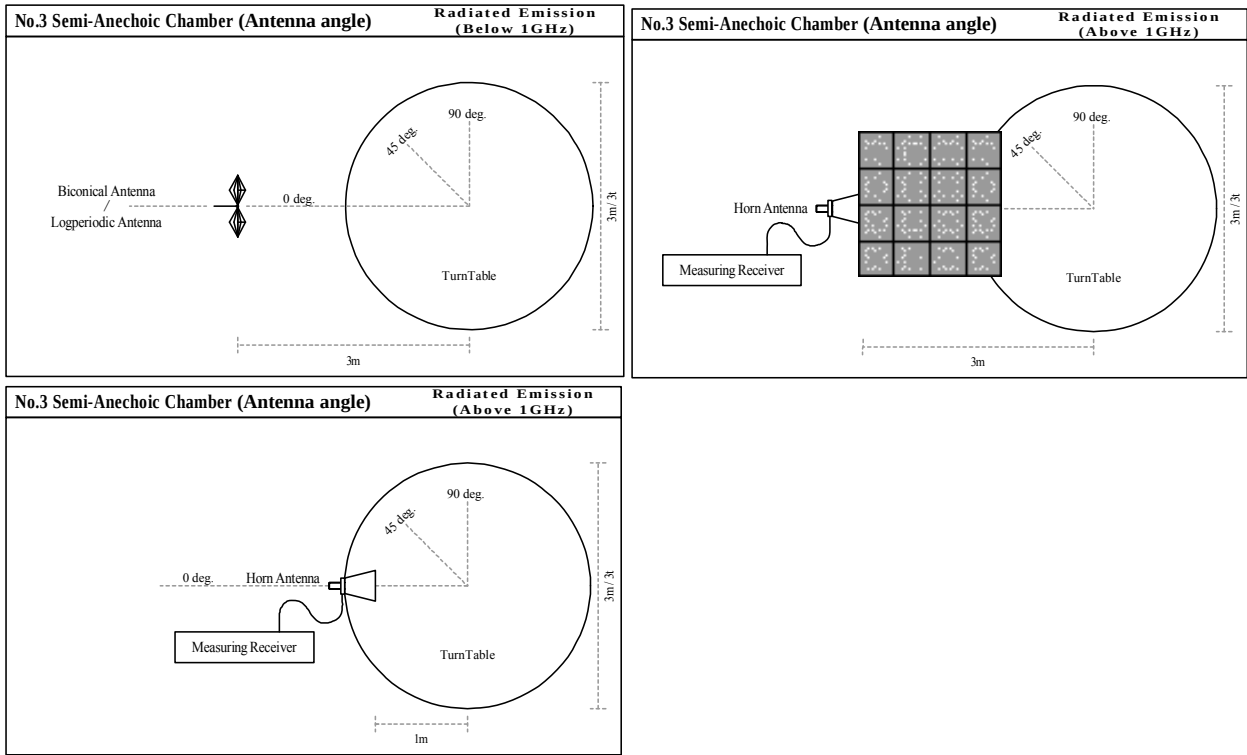
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Figure 1. Antenna angle



11.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

11.6 Results

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

Refer to APPENDIX

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20dB bandwidth and Carrier frequency separation
Number of hopping frequency
Dwell time
Maximum peak output power
Radiated emission
Spurious emission (Antenna port conducted)
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission

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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

APPENDIX 1: Data of Radio tests

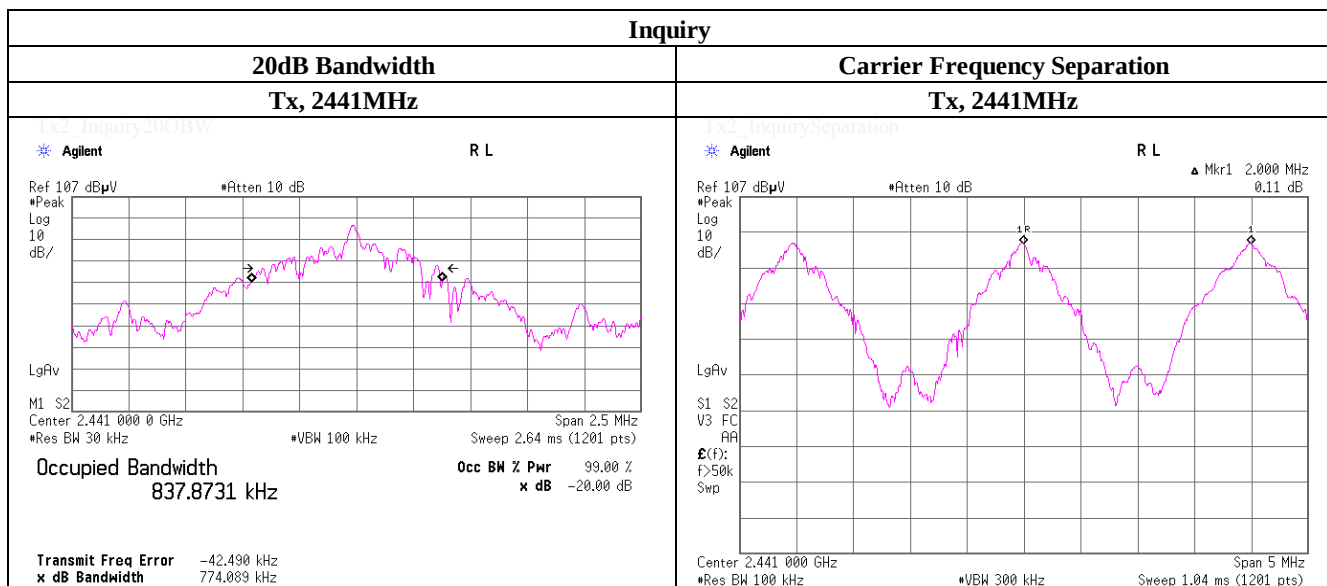
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	December 17, 2012	
Temperature / Humidity	23deg.C , 40%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	0.926	1.000	>= 0.618
DH5	2441.0	0.935	1.000	>= 0.623
DH5	2480.0	0.924	1.003	>= 0.616
Inquiry	2441.0	0.774	2.000	>= 0.516

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

No limit applies to 20dB Bandwidth.



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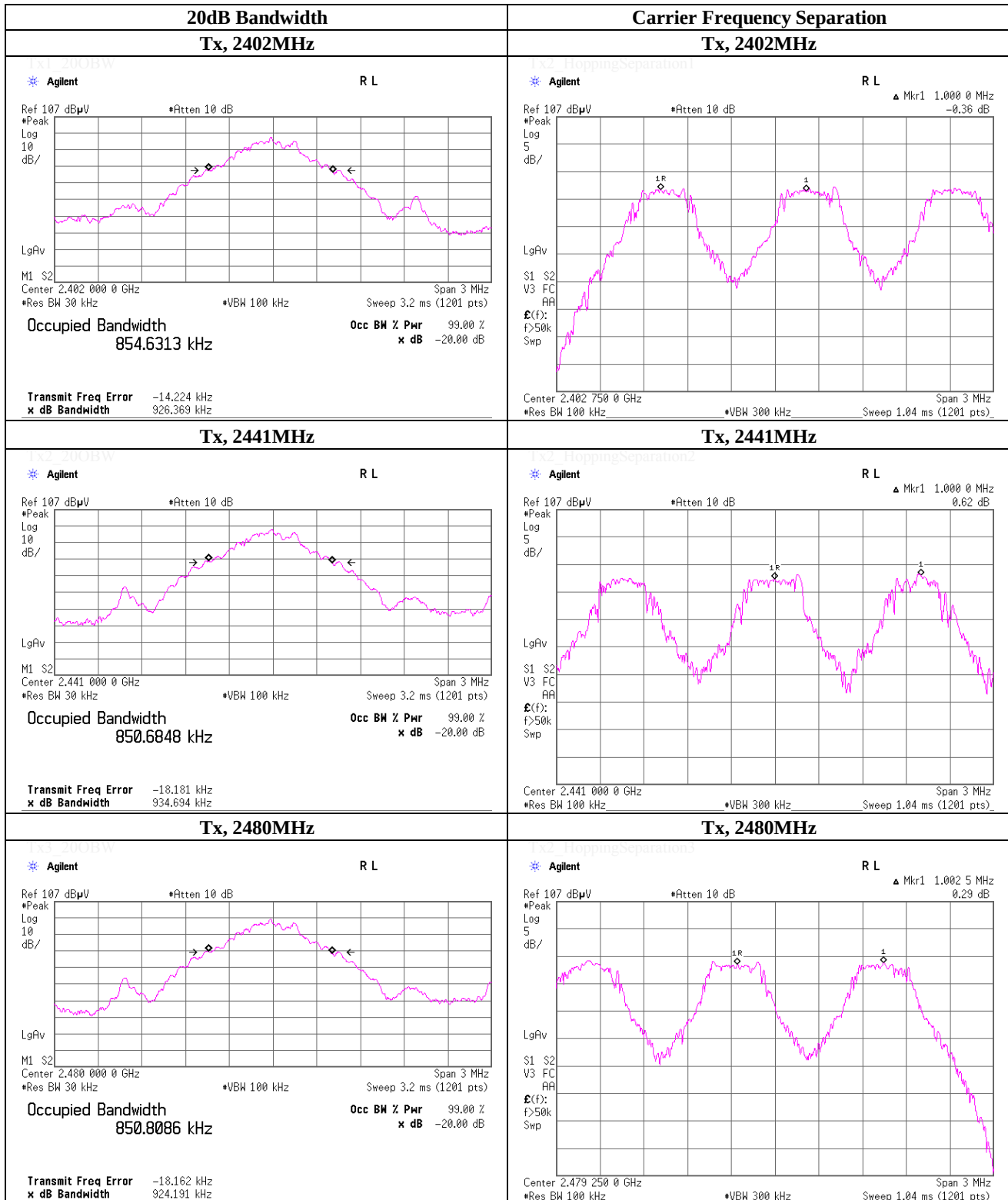
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



UL Japan, Inc.

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

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20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date December 17, 2012
Temperature / Humidity 23deg.C , 40%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	1.267	1.000	>= 0.845
3-DH5	2441.0	1.306	1.003	>= 0.871
3-DH5	2480.0	1.262	1.003	>= 0.841

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

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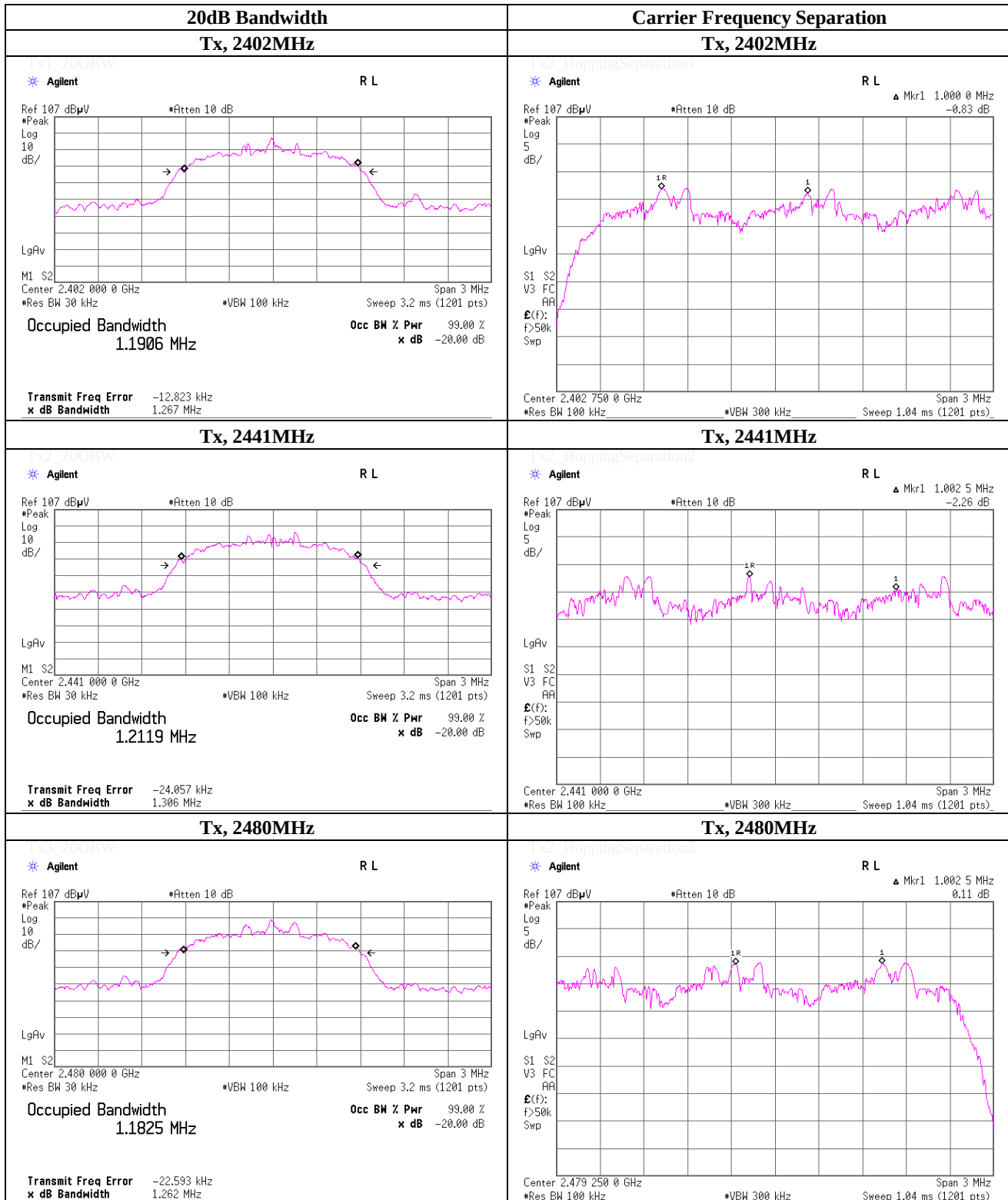
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

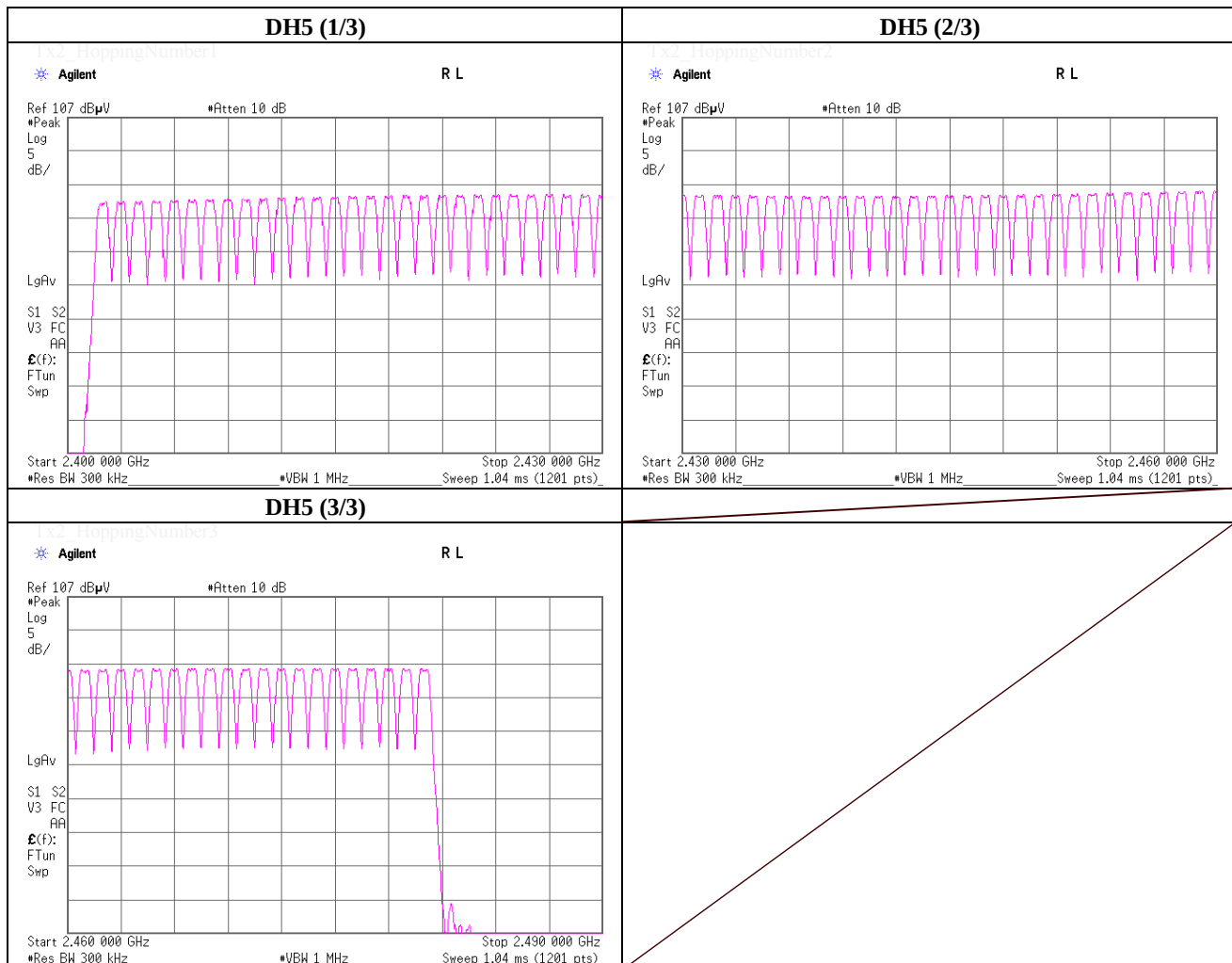
Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	December 17, 2012	
Temperature / Humidity	23deg.C , 40%RH	
Engineer	Kenichi Adachi	
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.



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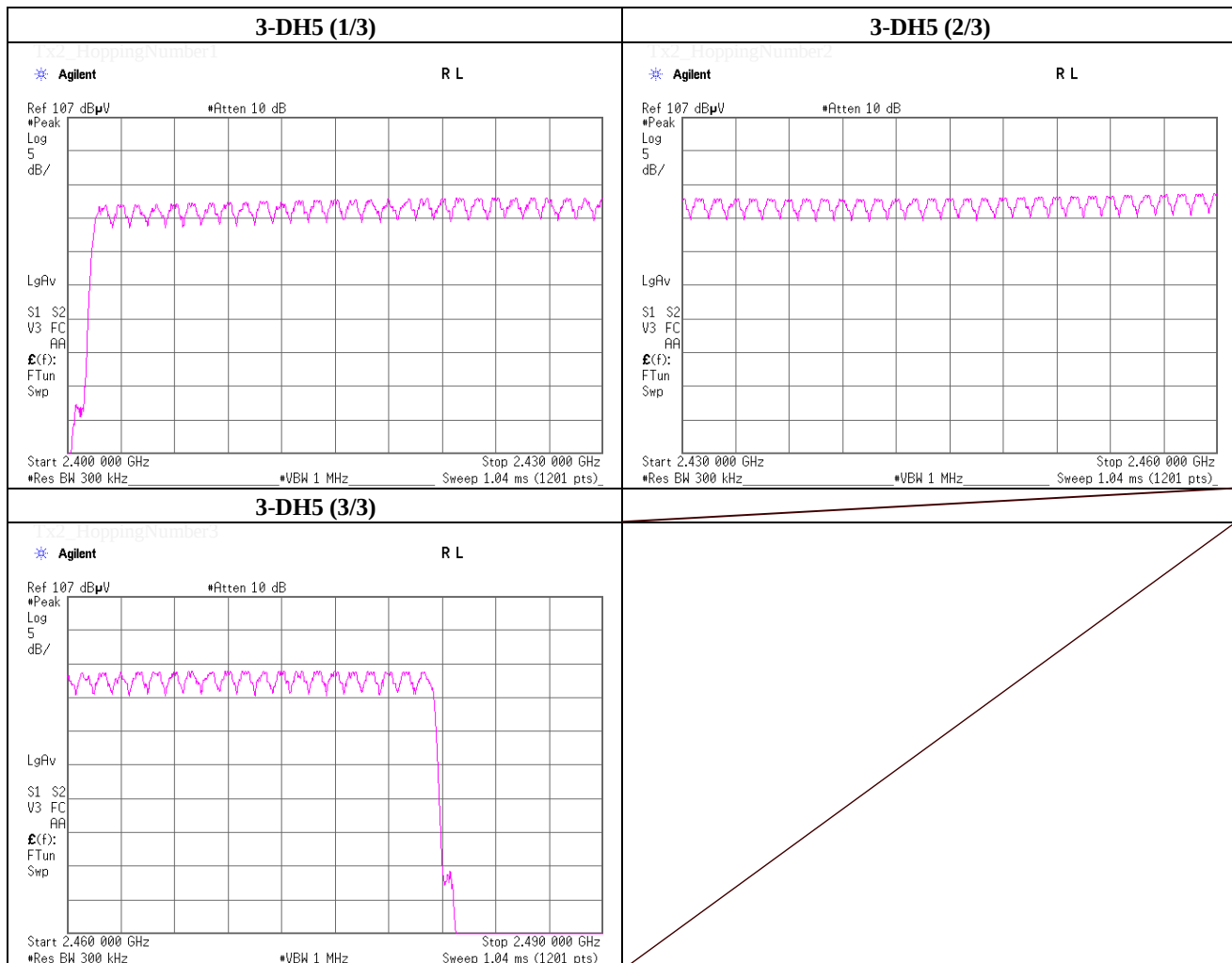
Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	December 17, 2012	
Temperature / Humidity	23deg.C , 40%RH	
Engineer	Kenichi Adachi	
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.



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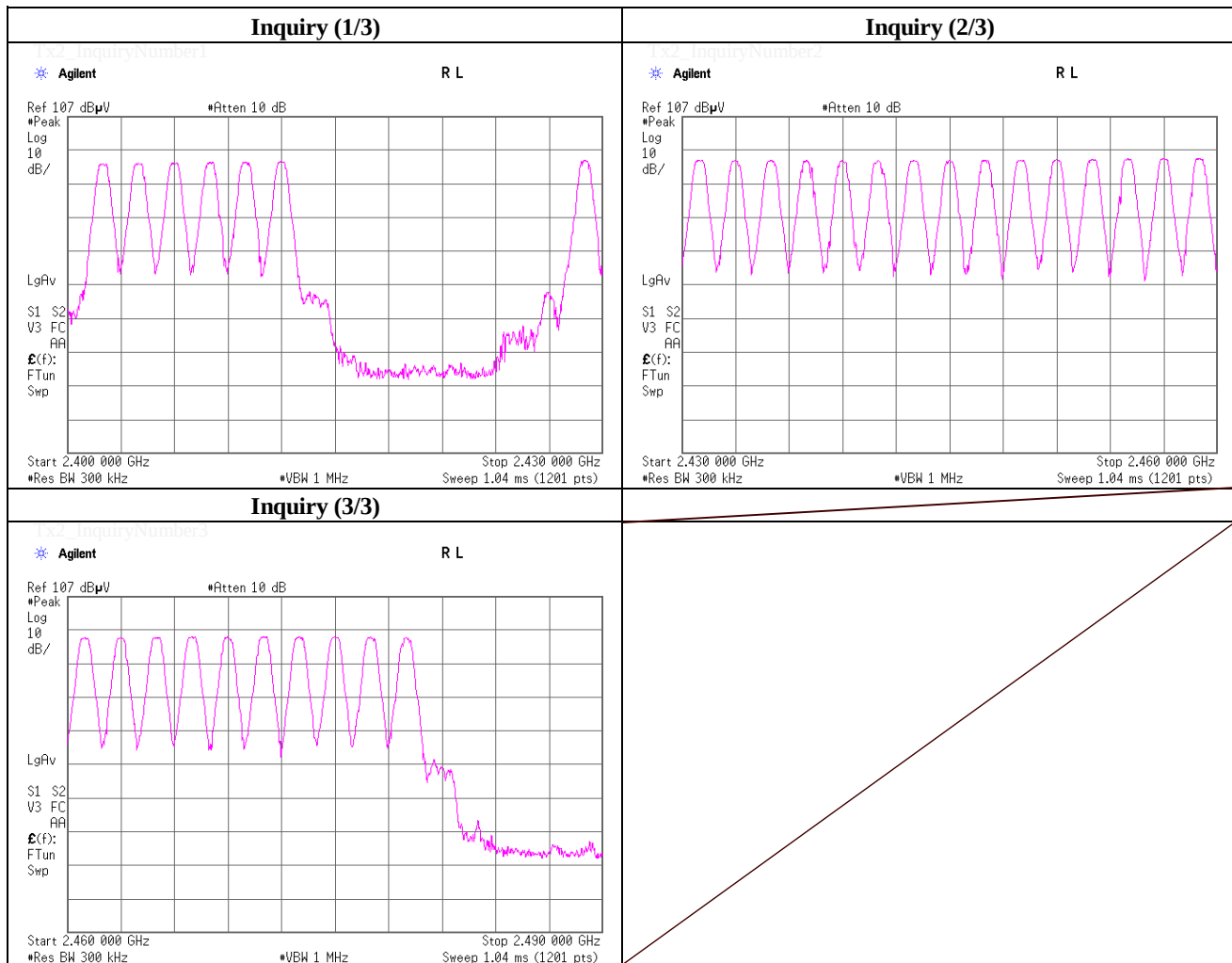
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	December 17, 2012	
Temperature / Humidity	23deg.C , 40%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, Inquiry	

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



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Dwell Time

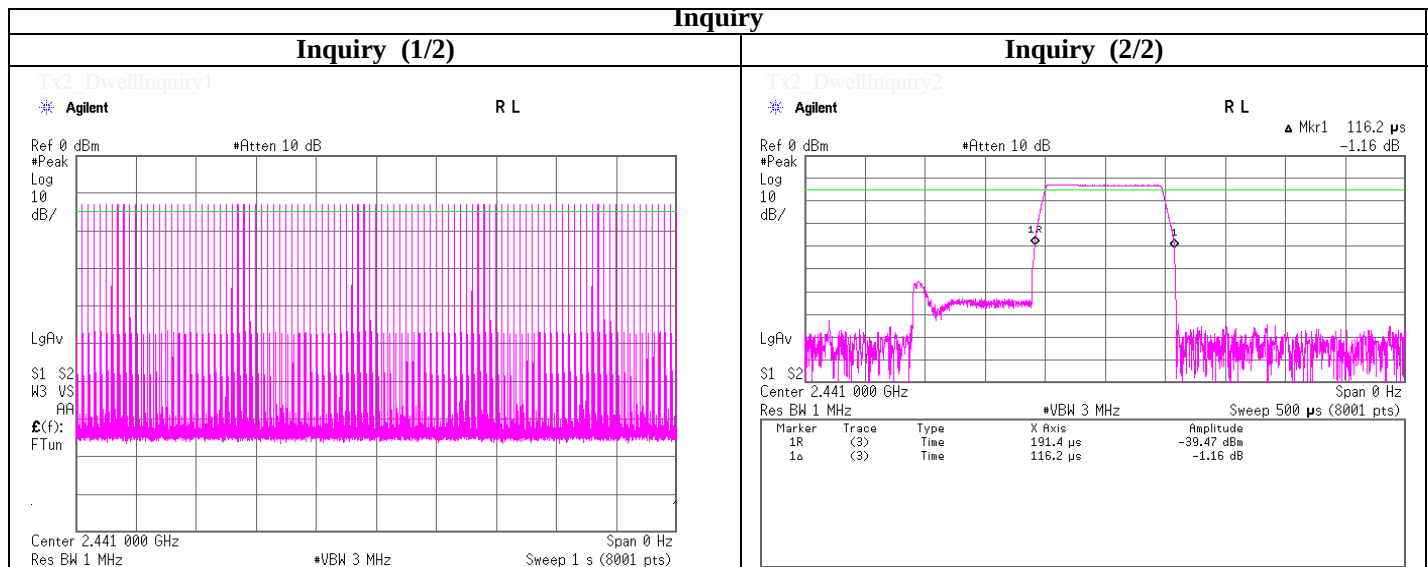
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	December 17, 2012	
Temperature / Humidity	23deg.C , 40%RH	
Engineer	Kenichi Adachi	
Mode	Tx, Bluetooth, BDR, PRBS9	

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	0.410	133	400
DH3	26.0	/ 5.0 sec.	x 31.6 sec. = 165 times	1.670	275	400
DH5	17.0	/ 5.0 sec.	x 31.6 sec. = 108 times	2.916	315	400
Inquiry	100.0	/ 1.0 sec.	x 12.8 sec. = 1280 times	0.116	149	400

Sample Calculation

Result = Number of transmission x Length of transmission time

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



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Shonan EMC Lab.

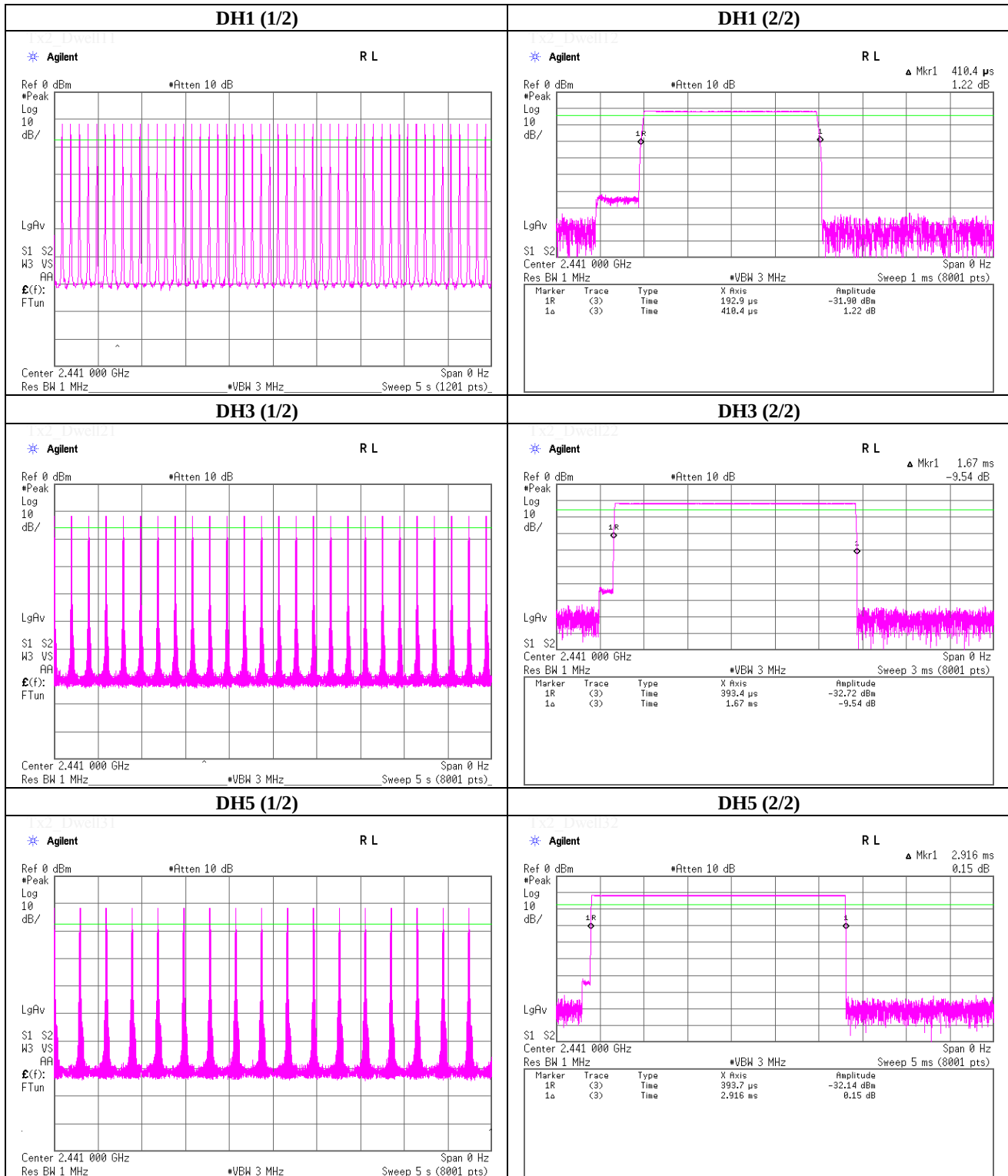
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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Dwell time

Tx, Bluetooth, BDR, PRBS9



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Facsimile : +81 463 50 6401

Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date December 17, 2012
Temperature / Humidity 23deg.C , 40%RH
Engineer Kenichi Adachi
Mode Tx, Bluetooth, EDR, PRBS9

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second			Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	51.0	/ 5.0 sec.	x 31.6 sec. = 323 times	0.425	137	400
3-DH3	26.0	/ 5.0 sec.	x 31.6 sec. = 165 times	1.677	277	400
3-DH5	17.0	/ 5.0 sec.	x 31.6 sec. = 108 times	2.928	316	400

Sample Calculation

Result = Number of transmission x Length of transmtion time

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

UL Japan, Inc.

Shonan EMC Lab.

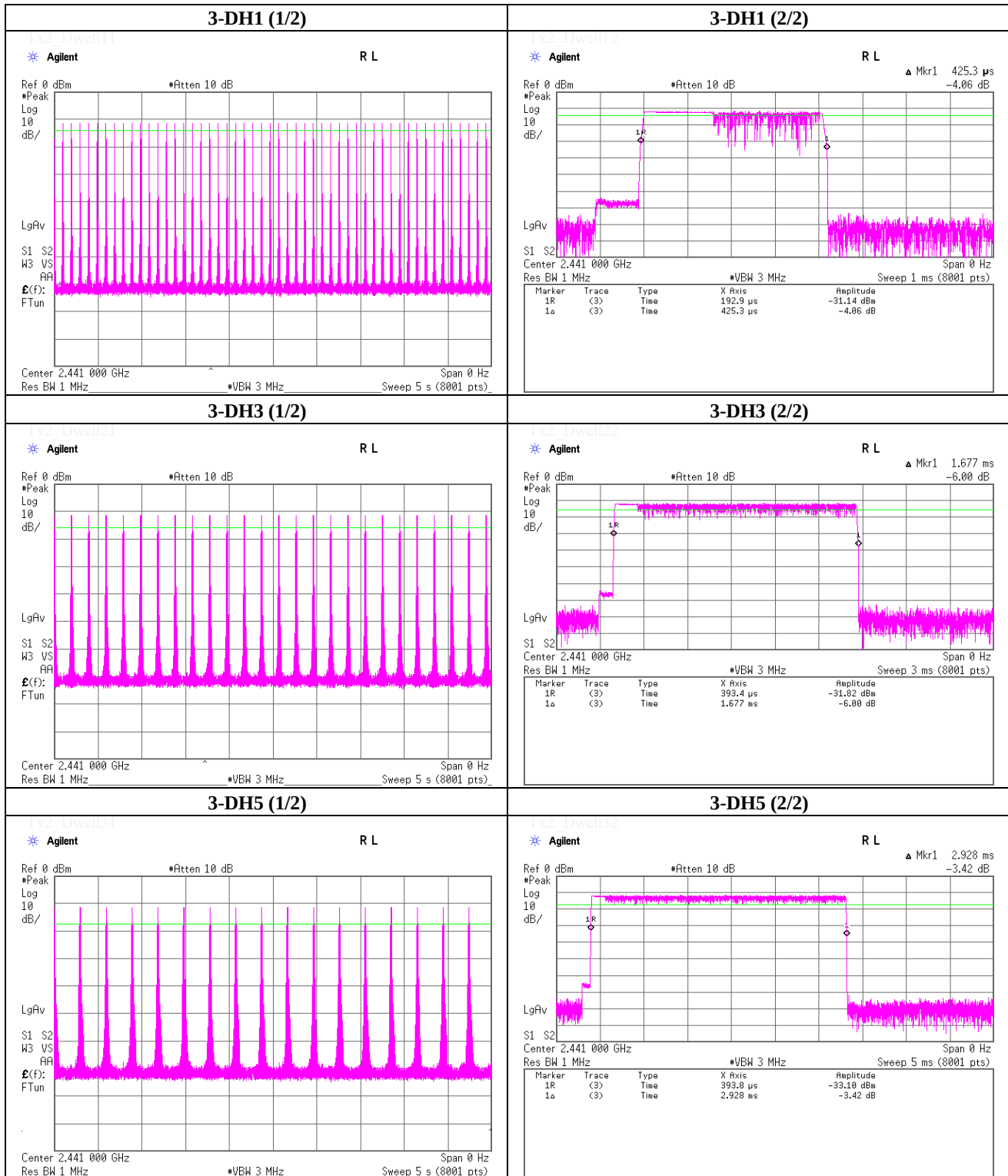
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Maximum Peak Conducted Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date December 17, 2012
Temperature / Humidity 23deg.C , 40%RH
Engineer Kenichi Adachi
Mode Tx, Bluetooth

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

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-11.92	1.35	9.97	-0.60	0.87	20.97	125	21.57
DH5	2441.0	-11.16	1.36	9.97	0.17	1.04	20.97	125	20.80
DH5	2480.0	-9.94	1.37	9.97	1.40	1.38	20.97	125	19.57
2-DH5	2402.0	-11.71	1.35	9.97	-0.39	0.91	20.97	125	21.36
2-DH5	2441.0	-10.86	1.36	9.97	0.47	1.11	20.97	125	20.50
2-DH5	2480.0	-10.06	1.37	9.97	1.28	1.34	20.97	125	19.69
3-DH5	2402.0	-11.64	1.35	9.97	-0.32	0.93	20.97	125	21.29
3-DH5	2441.0	-10.83	1.36	9.97	0.50	1.12	20.97	125	20.47
3-DH5	2480.0	-9.98	1.37	9.97	1.36	1.37	20.97	125	19.61

Sample Calculation:

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

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Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, DH5, 2402MHz

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.	163.746	QP	43.6	15.3	7.7	32.1	34.5	43.5	9.0	201	64	
Hori.	182.763	QP	48.6	15.9	7.8	32.1	40.2	43.5	3.3	183	54	
Hori.	332.308	QP	47.8	14.7	8.7	32.0	39.2	46.0	6.8	100	105	
Hori.	599.765	QP	41.0	18.9	9.8	32.0	37.7	46.0	8.3	200	18	
Hori.	800.000	QP	43.1	20.9	10.4	31.7	42.7	46.0	3.3	149	83	
Hori.	2390.000	PK	45.7	27.4	14.2	41.4	45.9	73.9	28.0	100	0	
Hori.	4804.000	PK	51.6	31.1	6.8	41.2	48.3	73.9	25.6	100	241	
Hori.	7206.000	PK	48.2	36.6	8.3	41.4	51.7	73.9	22.2	100	0	
Hori.	9608.000	PK	45.6	38.5	9.4	38.9	54.6	73.9	19.3	100	0	
Hori.	12010.000	PK	45.6	39.4	10.7	39.4	56.3	73.9	17.6	100	0	
Hori.	2390.000	AV	34.6	27.4	14.2	41.4	34.8	53.9	19.1	100	0	
Hori.	4804.000	AV	46.0	31.1	6.8	41.2	42.7	53.9	11.2	100	241	
Hori.	7206.000	AV	36.0	36.6	8.3	41.4	39.5	53.9	14.4	100	0	
Hori.	9608.000	AV	33.3	38.5	9.4	38.9	42.3	53.9	11.6	100	0	
Hori.	12010.000	AV	34.6	39.4	10.7	39.4	45.3	53.9	8.6	100	0	
Vert.	182.763	QP	45.6	15.9	7.8	32.1	37.2	43.5	6.3	100	348	
Vert.	533.333	QP	41.6	18.0	9.5	32.0	37.1	46.0	8.9	115	174	
Vert.	2390.000	PK	44.6	27.4	14.2	41.4	44.8	73.9	29.1	100	0	
Vert.	4804.000	PK	54.9	31.1	6.8	41.2	51.6	73.9	22.3	124	197	
Vert.	7206.000	PK	47.4	36.6	8.3	41.4	50.9	73.9	23.0	100	0	
Vert.	9608.000	PK	45.3	38.5	9.4	38.9	54.3	73.9	19.6	100	0	
Vert.	12010.000	PK	45.6	39.4	10.7	39.4	56.3	73.9	17.6	100	0	
Vert.	2390.000	AV	34.6	27.4	14.2	41.4	34.8	53.9	19.1	100	0	
Vert.	4804.000	AV	50.1	31.1	6.8	41.2	46.8	53.9	7.1	124	197	
Vert.	7206.000	AV	36.0	36.6	8.3	41.4	39.5	53.9	14.4	100	0	
Vert.	9608.000	AV	33.4	38.5	9.4	38.9	42.4	53.9	11.5	100	0	
Vert.	12010.000	AV	34.4	39.4	10.7	39.4	45.1	53.9	8.8	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2402.000	PK	86.7	27.4	14.2	41.4	86.9	-	-	100	44	carrier
Hori.	533.333	PK	48.3	18.0	9.5	32.0	43.8	66.9	23.1	100	194	
Hori.	2399.481	PK	43.1	27.4	14.2	41.4	43.3	66.9	23.6	100	205	
Hori.	2400.000	PK	42.5	27.4	14.2	41.4	42.7	66.9	24.2	100	207	
Vert.	2402.000	PK	87.3	27.4	14.2	41.4	87.5	-	-	100	196	carrier
Vert.	800.000	PK	47.3	20.9	10.4	31.7	46.9	67.5	20.6	100	1	
Vert.	2399.481	PK	44.1	27.4	14.2	41.4	44.3	67.5	23.2	100	197	
Vert.	2400.000	PK	42.7	27.4	14.2	41.4	42.9	67.5	24.6	100	145	

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, DH5, 2441MHz

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.	182.756	QP	42.9	15.9	7.8	32.1	34.5	43.5	9.0	182	212	
Hori.	332.308	QP	43.8	14.7	8.7	32.0	35.2	46.0	10.8	100	108	
Hori.	599.765	QP	42.2	18.9	9.8	32.0	38.9	46.0	7.1	100	239	
Hori.	800.000	QP	42.2	20.9	10.4	31.7	41.8	46.0	4.2	152	82	
Hori.	1066.410	PK	49.1	25.0	12.7	40.7	46.1	73.9	27.8	102	132	
Hori.	4882.000	PK	48.8	31.3	6.9	41.1	45.9	73.9	28.0	103	287	
Hori.	7323.000	PK	47.8	36.6	8.6	41.4	51.6	73.9	22.3	100	0	
Hori.	9764.000	PK	44.3	38.7	9.5	38.9	53.6	73.9	20.3	100	0	
Hori.	12205.000	PK	45.3	39.5	10.8	39.3	56.3	73.9	17.6	100	0	
Hori.	1066.410	AV	39.8	25.0	12.7	40.7	36.8	53.9	17.1	102	132	
Hori.	4882.000	AV	40.9	31.3	6.9	41.1	38.0	53.9	15.9	103	287	
Hori.	7323.000	AV	35.8	36.6	8.6	41.4	39.6	53.9	14.3	100	0	
Hori.	9764.000	AV	33.0	38.7	9.5	38.9	42.3	53.9	11.6	100	0	
Hori.	12205.000	AV	33.9	39.5	10.8	39.3	44.9	53.9	9.0	100	0	
Vert.	207.708	QP	40.8	16.4	8.0	32.1	33.1	43.5	10.4	100	356	
Vert.	533.333	QP	41.6	18.0	9.5	32.0	37.1	46.0	8.9	124	168	
Vert.	1066.410	PK	44.1	25.0	12.7	40.7	41.1	73.9	32.8	107	94	
Vert.	4882.000	PK	49.3	31.3	6.9	41.1	46.4	73.9	27.5	100	9	
Vert.	7323.000	PK	47.3	36.6	8.6	41.4	51.1	73.9	22.8	100	0	
Vert.	9764.000	PK	44.4	38.7	9.5	38.9	53.7	73.9	20.2	100	0	
Vert.	12205.000	PK	45.4	39.5	10.8	39.3	56.4	73.9	17.5	100	0	
Vert.	1066.410	AV	36.7	25.0	12.7	40.7	33.7	53.9	20.2	107	94	
Vert.	4882.000	AV	42.3	31.3	6.9	41.1	39.4	53.9	14.5	100	9	
Vert.	7323.000	AV	36.1	36.6	8.6	41.4	39.9	53.9	14.0	100	0	
Vert.	9764.000	AV	33.0	38.7	9.5	38.9	42.3	53.9	11.6	100	0	
Vert.	12205.000	AV	33.8	39.5	10.8	39.3	44.8	53.9	9.1	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2441.000	PK	88.1	27.5	14.2	41.4	88.4	-	-	117	125	carrier
Hori.	533.333	PK	48.2	18.0	9.5	32.0	43.7	68.4	24.7	100	195	
Vert.	2441.000	PK	85.5	27.5	14.2	41.4	85.8	-	-	100	143	carrier
Vert.	800.000	PK	47.6	20.9	10.4	31.7	47.2	65.8	18.6	100	0	

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, DH5, 2480MHz

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.	182.765	QP	44.3	15.9	7.8	32.1	35.9	43.5	7.6	186	208	
Hori.	332.308	QP	45.3	14.7	8.7	32.0	36.7	46.0	9.3	100	104	
Hori.	599.765	QP	42.5	18.9	9.8	32.0	39.2	46.0	6.8	100	240	
Hori.	800.000	QP	42.3	20.9	10.4	31.7	41.9	46.0	4.1	151	81	
Hori.	2483.500	PK	45.4	27.5	14.3	41.4	45.8	73.9	28.1	100	150	
Hori.	4960.000	PK	53.6	31.6	6.9	41.0	51.1	73.9	22.8	100	202	
Hori.	7440.000	PK	46.9	36.7	8.8	41.5	50.9	73.9	23.0	100	0	
Hori.	9920.000	PK	43.4	39.0	9.7	38.9	53.2	73.9	20.7	100	0	
Hori.	12400.000	PK	44.4	39.5	10.8	39.3	55.4	73.9	18.5	100	0	
Hori.	2483.500	AV	35.4	27.5	14.3	41.4	35.8	53.9	18.1	100	150	
Hori.	4960.000	AV	46.7	31.6	6.9	41.0	44.2	53.9	9.7	100	202	
Hori.	7440.000	AV	35.6	36.7	8.8	41.5	39.6	53.9	14.3	100	0	
Hori.	9920.000	AV	32.0	39.0	9.7	38.9	41.8	53.9	12.1	100	0	
Hori.	12400.000	AV	32.6	39.5	10.8	39.3	43.6	53.9	10.3	100	0	
Vert.	182.765	QP	41.3	15.9	7.8	32.1	32.9	43.5	10.6	100	353	
Vert.	207.707	QP	39.1	16.4	8.0	32.1	31.4	43.5	12.1	100	359	
Vert.	533.333	QP	41.9	18.0	9.5	32.0	37.4	46.0	8.6	115	171	
Vert.	2483.500	PK	44.4	27.5	14.3	41.4	44.8	73.9	29.1	100	239	
Vert.	4960.000	PK	53.0	31.6	6.9	41.0	50.5	73.9	23.4	100	155	
Vert.	7440.000	PK	48.2	36.7	8.8	41.5	52.2	73.9	21.7	100	0	
Vert.	9920.000	PK	43.5	39.0	9.7	38.9	53.3	73.9	20.6	100	0	
Vert.	12400.000	PK	43.7	39.5	10.8	39.3	54.7	73.9	19.2	100	0	
Vert.	2483.500	AV	34.8	27.5	14.3	41.4	35.2	53.9	18.7	100	239	
Vert.	4960.000	AV	47.7	31.6	6.9	41.0	45.2	53.9	8.7	100	155	
Vert.	7440.000	AV	36.0	36.7	8.8	41.5	40.0	53.9	13.9	100	0	
Vert.	9920.000	AV	32.1	39.0	9.7	38.9	41.9	53.9	12.0	100	0	
Vert.	12400.000	AV	32.7	39.5	10.8	39.3	43.7	53.9	10.2	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2480.000	PK	92.3	27.5	14.3	41.4	92.7	-	-	102	129	carrier
Hori.	533.333	PK	48.5	18.0	9.5	32.0	44.0	72.7	28.7	100	193	
Vert.	2480.000	PK	84.3	27.5	14.3	41.4	84.7	-	-	100	236	carrier
Vert.	800.000	PK	48.2	20.9	10.4	31.7	47.8	64.7	16.9	100	6	

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, 3-DH5, 2402MHz

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.	182.767	QP	44.4	15.9	7.8	32.1	36.0	43.5	7.5	183	208	
Hori.	207.713	QP	40.4	16.4	8.0	32.1	32.7	43.5	10.8	156	40	
Hori.	332.308	QP	45.3	14.7	8.7	32.0	36.7	46.0	9.3	100	108	
Hori.	599.765	QP	42.6	18.9	9.8	32.0	39.3	46.0	6.7	100	241	
Hori.	800.000	QP	42.2	20.9	10.4	31.7	41.8	46.0	4.2	155	83	
Hori.	2390.000	PK	47.3	27.4	14.2	41.4	47.5	73.9	26.4	100	0	
Hori.	4804.000	PK	46.6	31.1	6.8	41.2	43.3	73.9	30.6	100	189	
Hori.	7206.000	PK	48.1	36.6	8.3	41.4	51.6	73.9	22.3	100	0	
Hori.	9608.000	PK	45.5	38.5	9.4	38.9	54.5	73.9	19.4	100	0	
Hori.	12010.000	PK	45.7	39.4	10.7	39.4	56.4	73.9	17.5	100	0	
Hori.	2390.000	AV	34.6	27.4	14.2	41.4	34.8	53.9	19.1	100	0	
Hori.	4804.000	AV	34.9	31.1	6.8	41.2	31.6	53.9	22.3	100	189	
Hori.	7206.000	AV	36.0	36.6	8.3	41.4	39.5	53.9	14.4	100	0	
Hori.	9608.000	AV	33.2	38.5	9.4	38.9	42.2	53.9	11.7	100	0	
Hori.	12010.000	AV	34.6	39.4	10.7	39.4	45.3	53.9	8.6	100	0	
Vert.	182.767	QP	41.5	15.9	7.8	32.1	33.1	43.5	10.4	100	355	
Vert.	533.333	QP	41.7	18.0	9.5	32.0	37.2	46.0	8.8	117	168	
Vert.	2390.000	PK	46.7	27.4	14.2	41.4	46.9	73.9	27.0	100	0	
Vert.	4804.000	PK	48.3	31.1	6.8	41.2	45.0	73.9	28.9	102	168	
Vert.	7206.000	PK	47.5	36.6	8.3	41.4	51.0	73.9	22.9	100	0	
Vert.	9608.000	PK	45.2	38.5	9.4	38.9	54.2	73.9	19.7	100	0	
Vert.	12010.000	PK	45.6	39.4	10.7	39.4	56.3	73.9	17.6	100	0	
Vert.	2390.000	AV	34.7	27.4	14.2	41.4	34.9	53.9	19.0	100	0	
Vert.	4804.000	AV	37.3	31.1	6.8	41.2	34.0	53.9	19.9	102	168	
Vert.	7206.000	AV	36.1	36.6	8.3	41.4	39.6	53.9	14.3	100	0	
Vert.	9608.000	AV	33.3	38.5	9.4	38.9	42.3	53.9	11.6	100	0	
Vert.	12010.000	AV	34.3	39.4	10.7	39.4	45.0	53.9	8.9	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2402.000	PK	86.3	27.4	14.2	41.4	86.5	-	-	140	121	carrier
Hori.	533.333	PK	48.3	18.0	9.5	32.0	43.8	66.5	22.7	100	194	
Hori.	2399.613	PK	40.3	27.4	14.2	41.4	40.5	66.5	26.0	100	115	
Hori.	2400.000	PK	40.0	27.4	14.2	41.4	40.2	66.5	26.3	140	120	
Vert.	2402.000	PK	85.3	27.4	14.2	41.4	85.5	-	-	100	145	carrier
Vert.	800.000	PK	48.1	20.9	10.4	31.7	47.7	65.5	17.8	100	358	
Vert.	2399.567	PK	41.3	27.4	14.2	41.4	41.5	65.5	24.0	100	148	
Vert.	2400.000	PK	38.7	27.4	14.2	41.4	38.9	65.5	26.6	100	146	

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

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, 3-DH5, 2441MHz

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.	182.761	QP	44.1	15.9	7.8	32.1	35.7	43.5	7.8	182	214	
Hori.	207.717	QP	40.5	16.4	8.0	32.1	32.8	43.5	10.7	159	40	
Hori.	332.308	QP	45.2	14.7	8.7	32.0	36.6	46.0	9.4	100	109	
Hori.	599.765	QP	42.7	18.9	9.8	32.0	39.4	46.0	6.6	100	239	
Hori.	800.000	QP	42.2	20.9	10.4	31.7	41.8	46.0	4.2	157	83	
Hori.	1066.680	PK	48.1	25.0	12.7	40.7	45.1	73.9	28.8	100	22	
Hori.	4882.000	PK	47.6	31.3	6.9	41.1	44.7	73.9	29.2	100	218	
Hori.	7323.000	PK	47.8	36.6	8.6	41.4	51.6	73.9	22.3	100	0	
Hori.	9764.000	PK	44.4	38.7	9.5	38.9	53.7	73.9	20.2	100	0	
Hori.	12205.000	PK	45.3	39.5	10.8	39.3	56.3	73.9	17.6	100	0	
Hori.	1066.680	AV	42.5	25.0	12.7	40.7	39.5	53.9	14.4	100	22	
Hori.	4882.000	AV	37.1	31.3	6.9	41.1	34.2	53.9	19.7	100	218	
Hori.	7323.000	AV	35.7	36.6	8.6	41.4	39.5	53.9	14.4	100	0	
Hori.	9764.000	AV	33.1	38.7	9.5	38.9	42.4	53.9	11.5	100	0	
Hori.	12205.000	AV	33.8	39.5	10.8	39.3	44.8	53.9	9.1	100	0	
Vert.	207.708	QP	39.6	16.4	8.0	32.1	31.9	43.5	11.6	100	359	
Vert.	533.333	QP	41.7	18.0	9.5	32.0	37.2	46.0	8.8	115	170	
Vert.	1066.695	PK	47.7	25.0	12.7	40.7	44.7	73.9	29.2	100	0	
Vert.	4882.000	PK	47.8	31.3	6.9	41.1	44.9	73.9	29.0	100	192	
Vert.	7323.000	PK	47.3	36.6	8.6	41.4	51.1	73.9	22.8	100	0	
Vert.	9764.000	PK	44.5	38.7	9.5	38.9	53.8	73.9	20.1	100	0	
Vert.	12205.000	PK	45.5	39.5	10.8	39.3	56.5	73.9	17.4	100	0	
Vert.	1066.695	AV	38.6	25.0	12.7	40.7	35.6	53.9	18.3	100	0	
Vert.	4882.000	AV	37.2	31.3	6.9	41.1	34.3	53.9	19.6	100	192	
Vert.	7323.000	AV	36.1	36.6	8.6	41.4	39.9	53.9	14.0	100	0	
Vert.	9764.000	AV	33.0	38.7	9.5	38.9	42.3	53.9	11.6	100	0	
Vert.	12205.000	AV	33.9	39.5	10.8	39.3	44.9	53.9	9.0	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	2441.000	PK	86.9	27.5	14.2	41.4	87.2	-	-	103	123	carrier
Hori.	533.333	PK	48.1	18.0	9.5	32.0	43.6	67.2	23.6	100	195	
Vert.	2441.000	PK	85.1	27.5	14.2	41.4	85.4	-	-	100	147	carrier
Vert.	800.000	PK	48.3	20.9	10.4	31.7	47.9	65.4	17.5	100	0	

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date December 17, 2012 December 24, 2012
Temperature / Humidity 23deg.C / 40%RH 23deg.C / 40%RH
Engineer Hikaru Shirasawa Hikaru Shirasawa
Mode Bluetooth, Transmitting, 3-DH5, 2480MHz

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.	182.762	QP	44.8	15.9	7.8	32.1	36.4	43.5	7.1	183	212	
Hori.	332.308	QP	45.2	14.7	8.7	32.0	36.6	46.0	9.4	100	106	
Hori.	599.765	QP	42.6	18.9	9.8	32.0	39.3	46.0	6.7	100	242	
Hori.	800.000	QP	42.4	20.9	10.4	31.7	42.0	46.0	4.0	154	83	
Hori.	2483.500	PK	45.6	27.5	14.3	41.4	46.0	73.9	27.9	100	128	
Hori.	4960.000	PK	48.2	31.6	6.9	41.0	45.7	73.9	28.2	100	178	
Hori.	7440.000	PK	47.0	36.7	8.8	41.5	51.0	73.9	22.9	100	0	
Hori.	9920.000	PK	43.3	39.0	9.7	38.9	53.1	73.9	20.8	100	0	
Hori.	12400.000	PK	44.5	39.5	10.8	39.3	55.5	73.9	18.4	100	0	
Hori.	2483.500	AV	34.3	27.5	14.3	41.4	34.7	53.9	19.2	100	128	
Hori.	4960.000	AV	37.0	31.6	6.9	41.0	34.5	53.9	19.4	100	178	
Hori.	7440.000	AV	35.7	36.7	8.8	41.5	39.7	53.9	14.2	100	0	
Hori.	9920.000	AV	32.0	39.0	9.7	38.9	41.8	53.9	12.1	100	0	
Hori.	12400.000	AV	32.6	39.5	10.8	39.3	43.6	53.9	10.3	100	0	
Vert.	207.700	QP	39.2	16.4	8.0	32.1	31.5	43.5	12.0	100	357	
Vert.	533.333	QP	41.5	18.0	9.5	32.0	37.0	46.0	9.0	118	172	
Vert.	2483.500	PK	44.5	27.5	14.3	41.4	44.9	73.9	29.0	100	298	
Vert.	4960.000	PK	48.3	31.6	6.9	41.0	45.8	73.9	28.1	103	157	
Vert.	7440.000	PK	48.3	36.7	8.8	41.5	52.3	73.9	21.6	100	0	
Vert.	9920.000	PK	43.5	39.0	9.7	38.9	53.3	73.9	20.6	100	0	
Vert.	12400.000	PK	43.8	39.5	10.8	39.3	54.8	73.9	19.1	100	0	
Vert.	2483.500	AV	34.2	27.5	14.3	41.4	34.6	53.9	19.3	100	298	
Vert.	4960.000	AV	37.8	31.6	6.9	41.0	35.3	53.9	18.6	103	157	
Vert.	7440.000	AV	36.1	36.7	8.8	41.5	40.1	53.9	13.8	100	0	
Vert.	9920.000	AV	32.0	39.0	9.7	38.9	41.8	53.9	12.1	100	0	
Vert.	12400.000	AV	32.8	39.5	10.8	39.3	43.8	53.9	10.1	100	0	

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

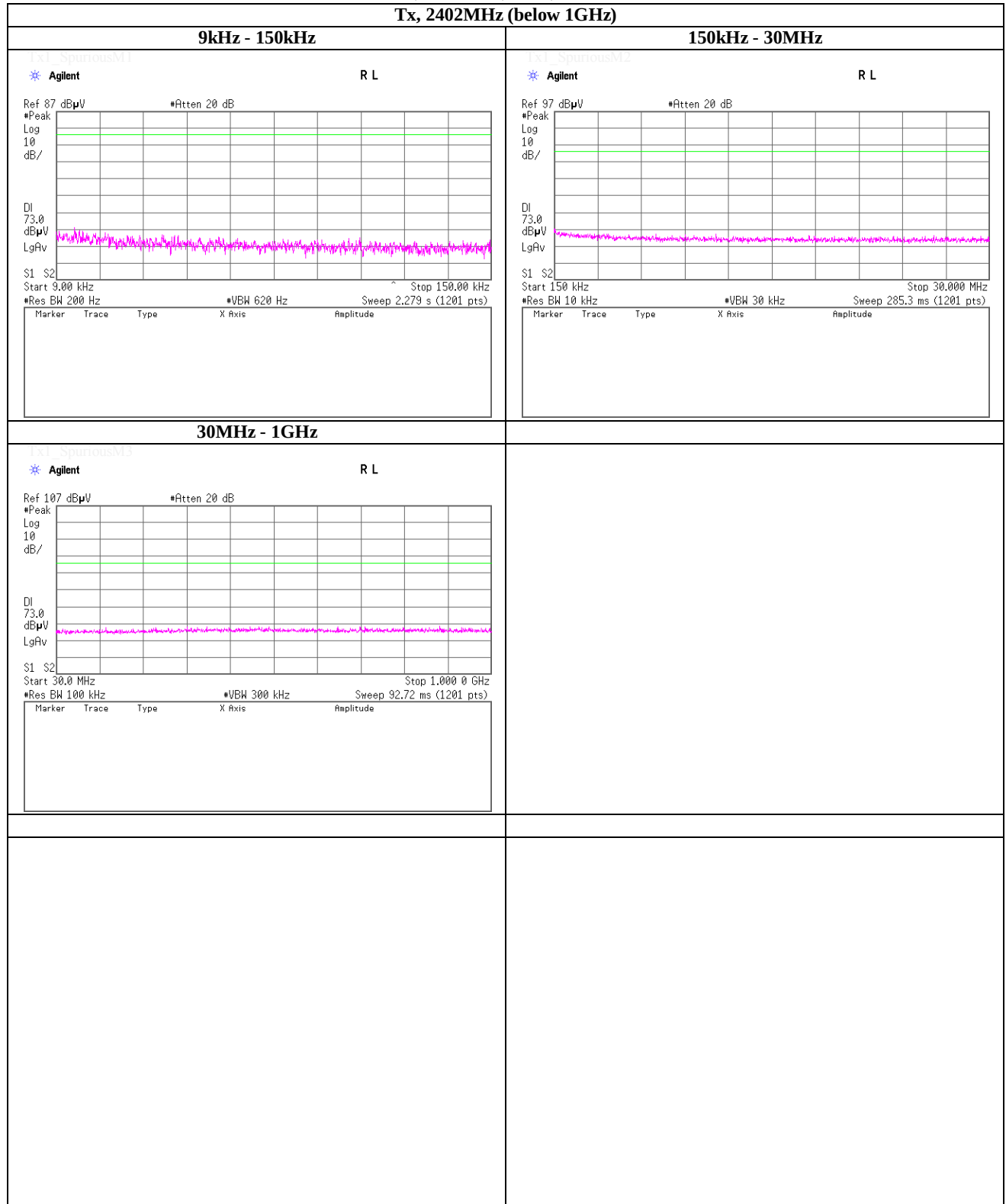
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Hori.	2480.000	PK	88.7	27.5	14.3	41.4	89.1	-	-	100	128	carrier
Hori.	533.333	PK	48.1	18.0	9.5	32.0	43.6	69.1	25.5	100	193	
Vert.	2480.000	PK	82.8	27.5	14.3	41.4	83.2	-	-	102	241	carrier
Vert.	800.000	PK	48.5	20.9	10.4	31.7	48.1	63.2	15.1	100	0	

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

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)



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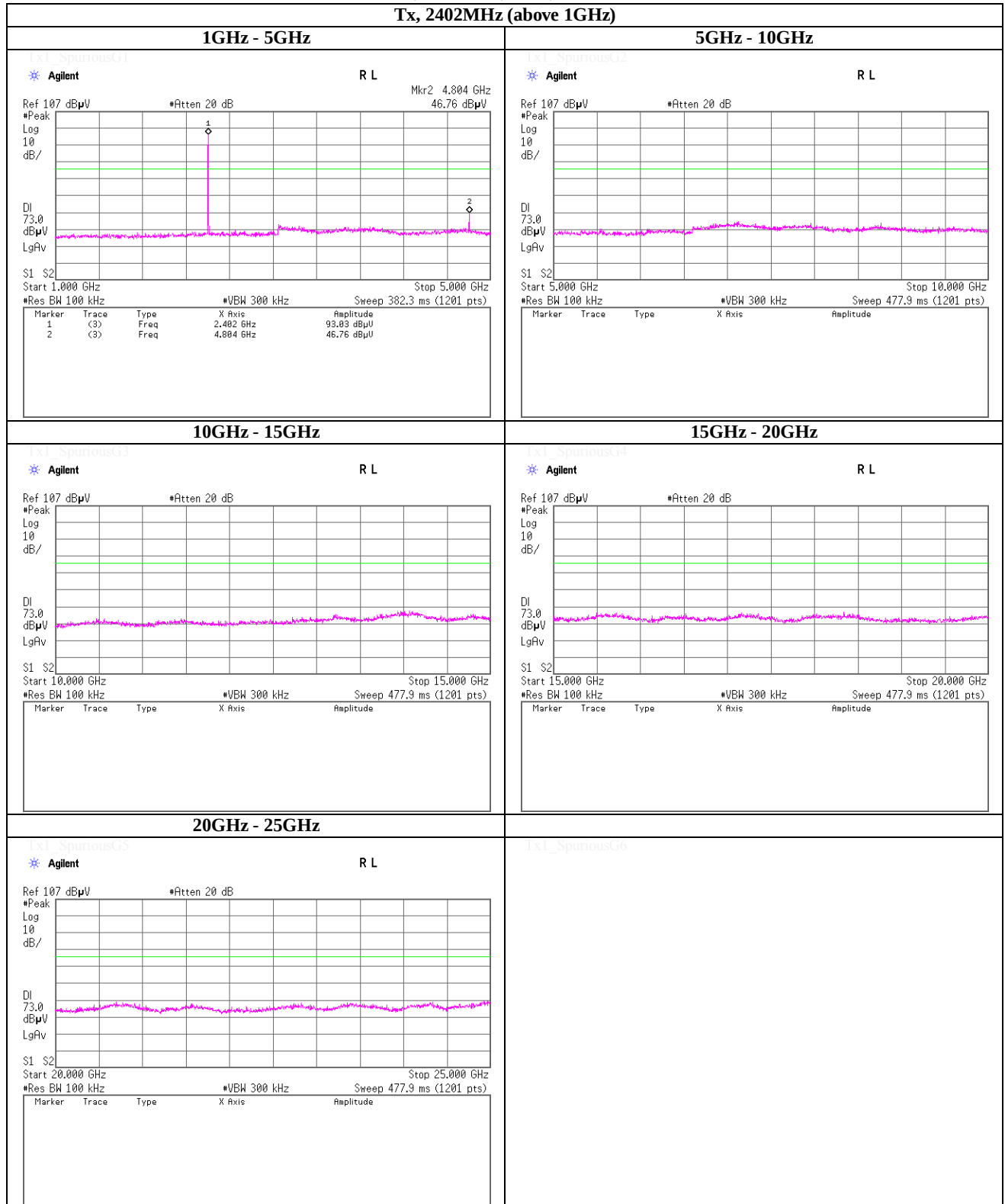
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (above 1GHz)



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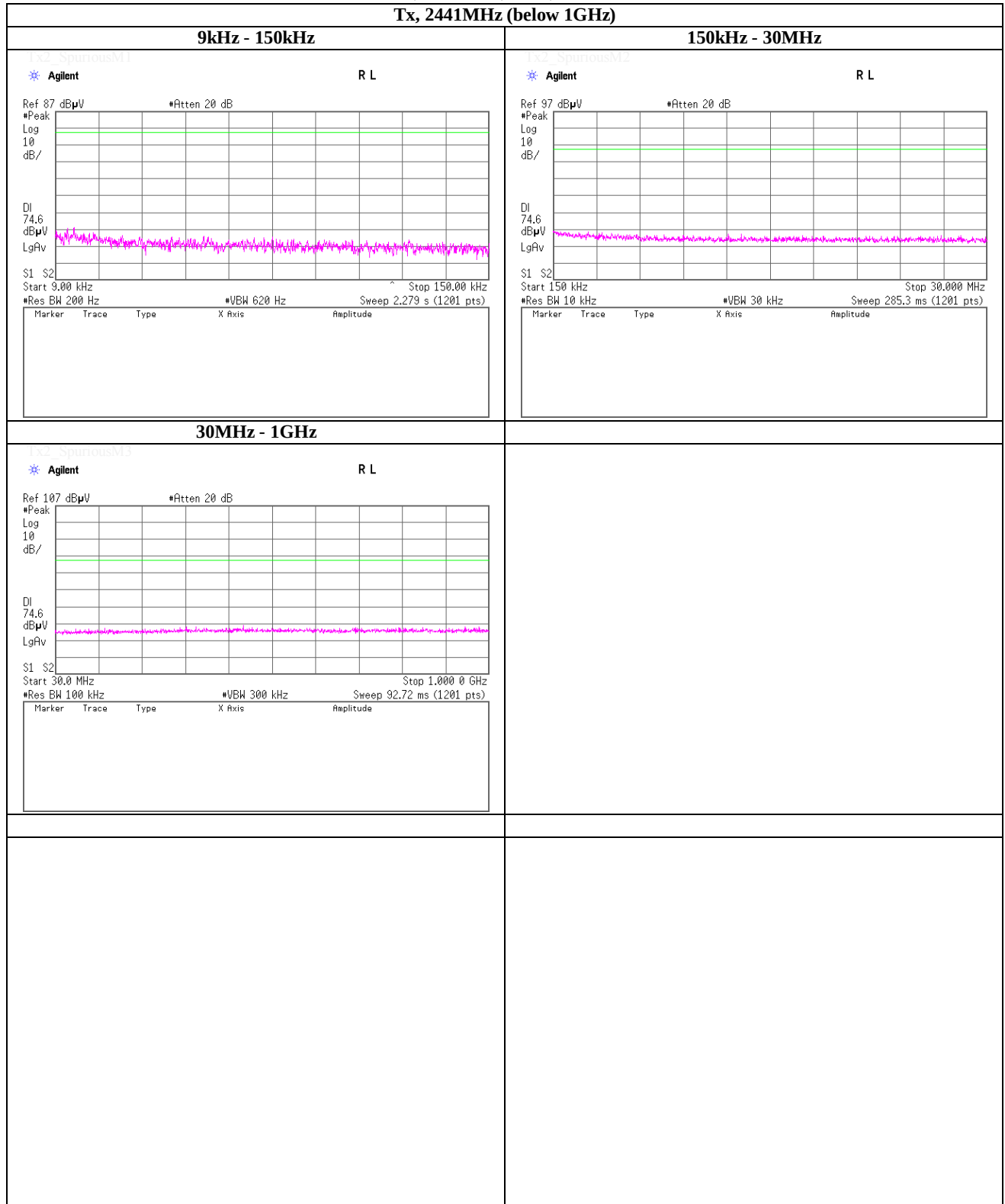
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)



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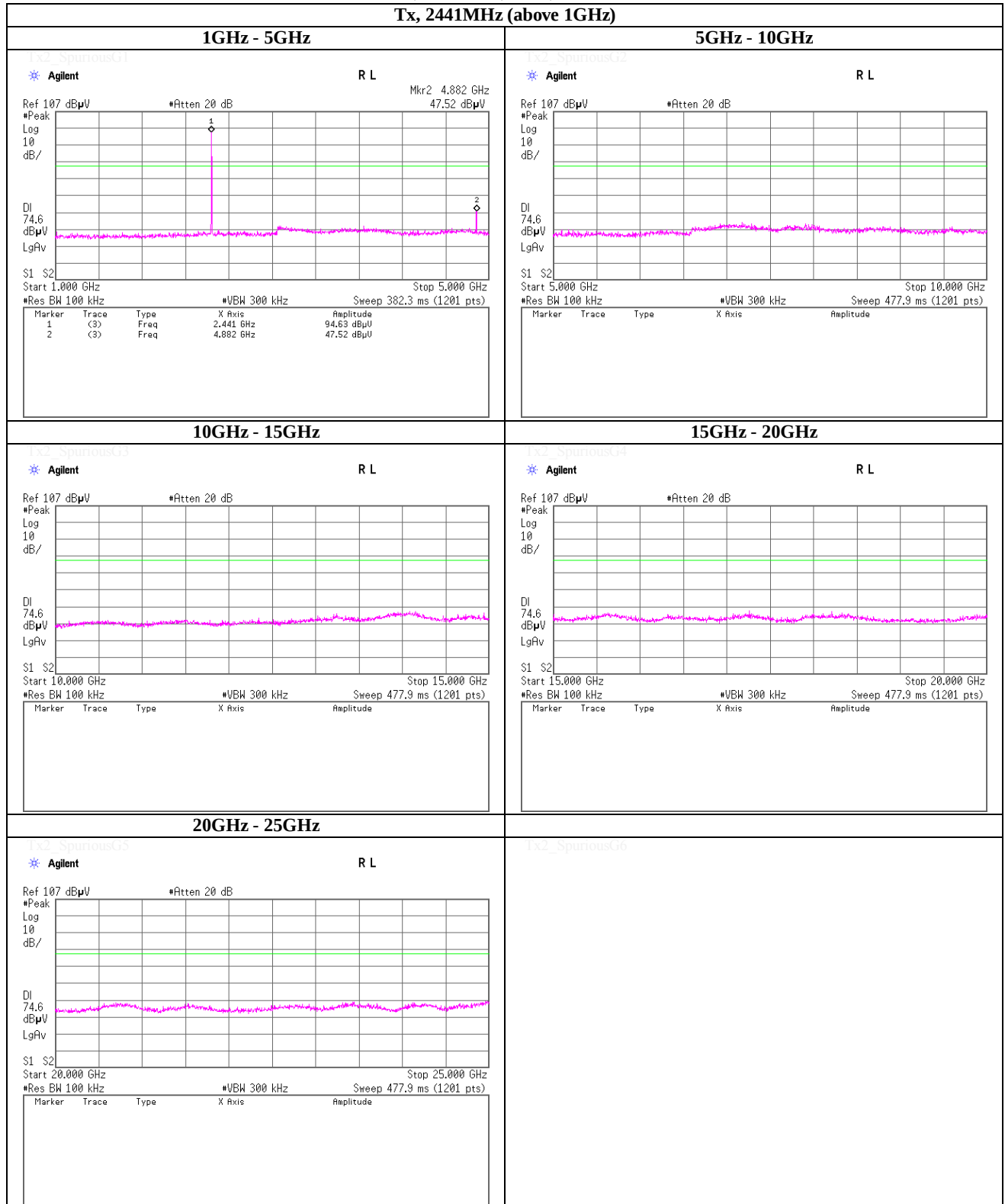
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)



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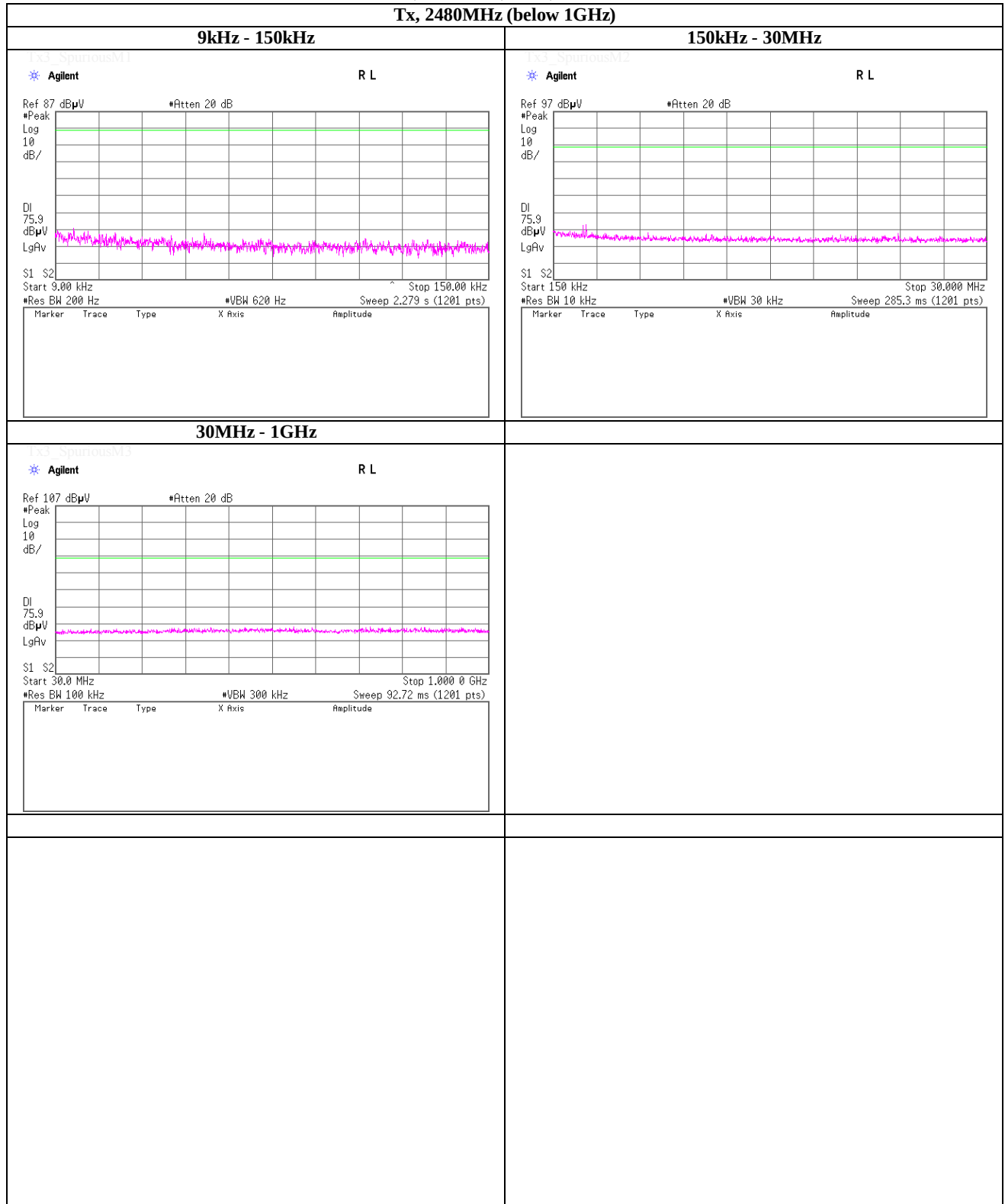
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)



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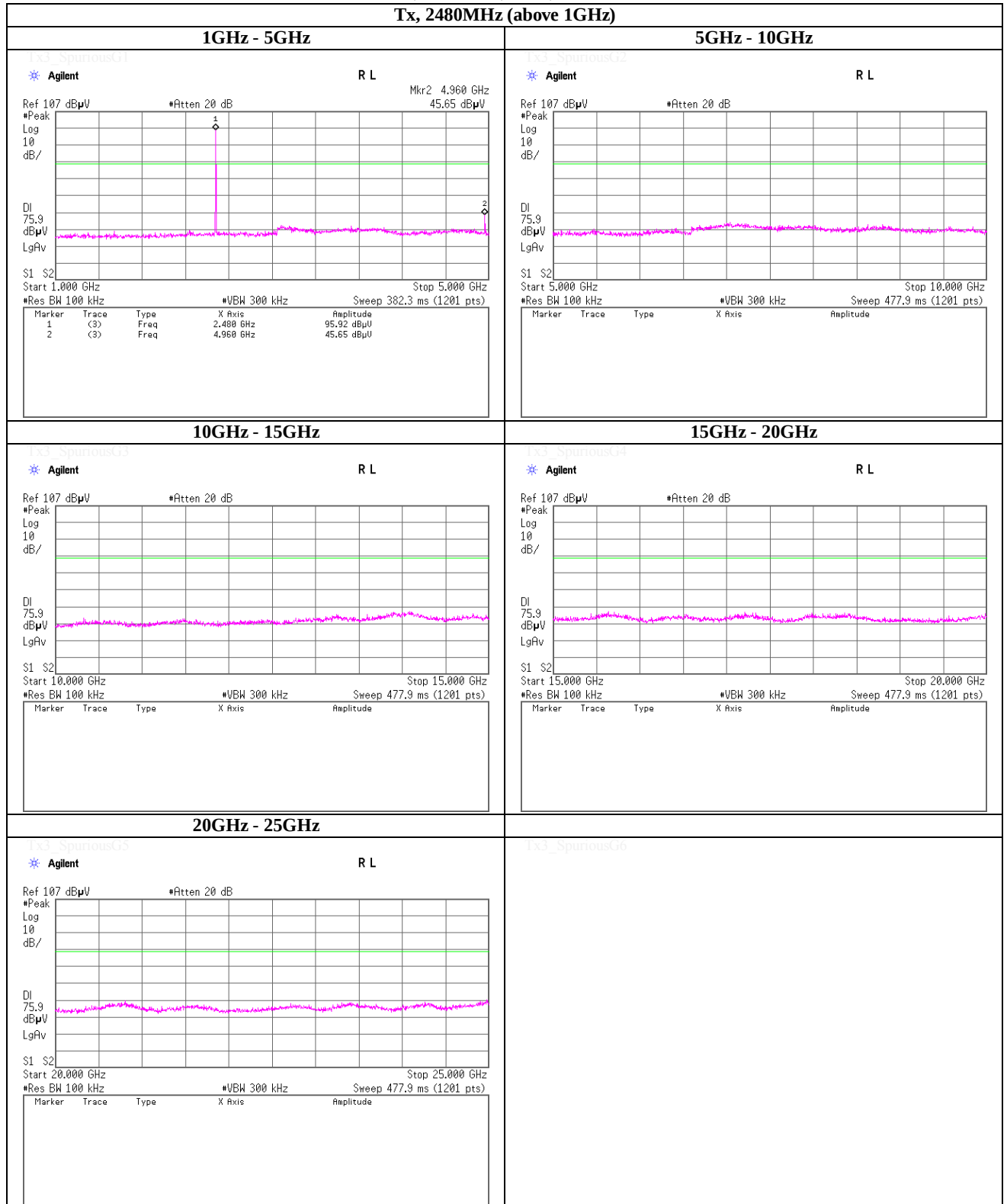
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)



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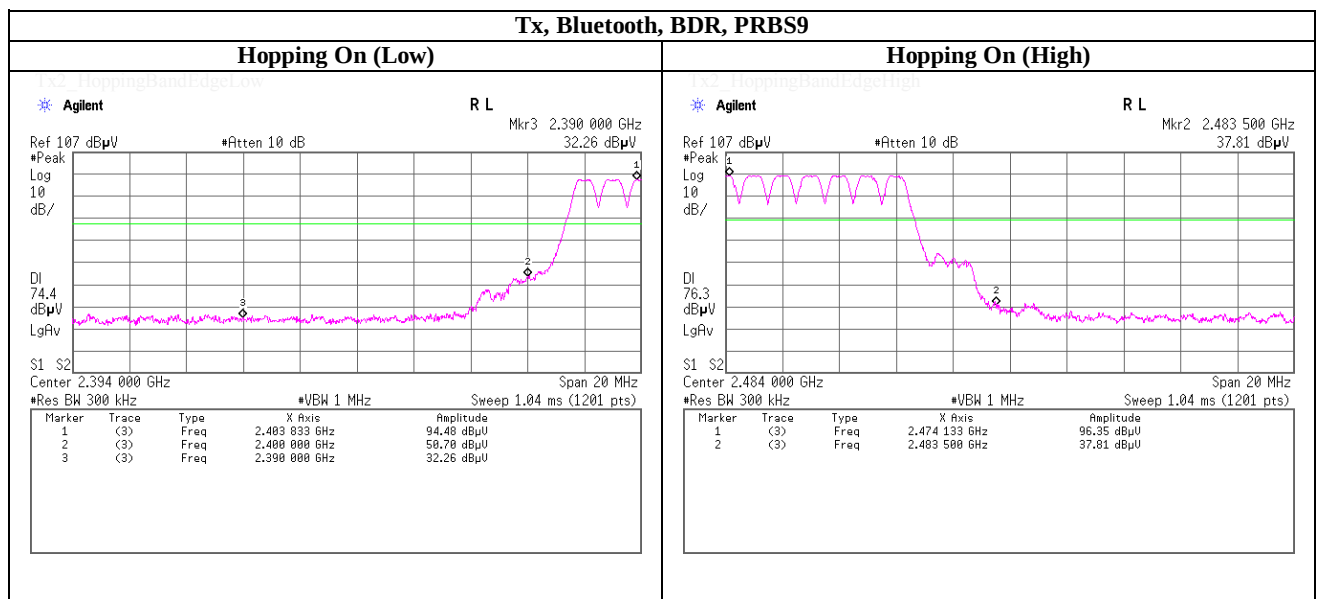
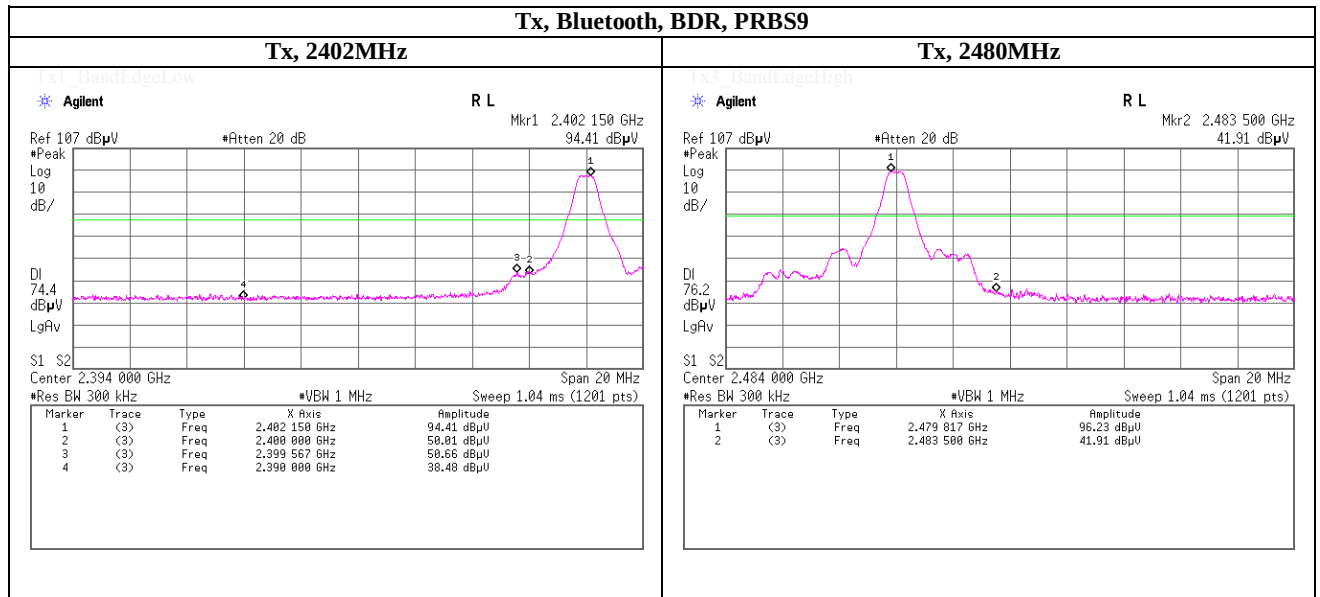
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Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

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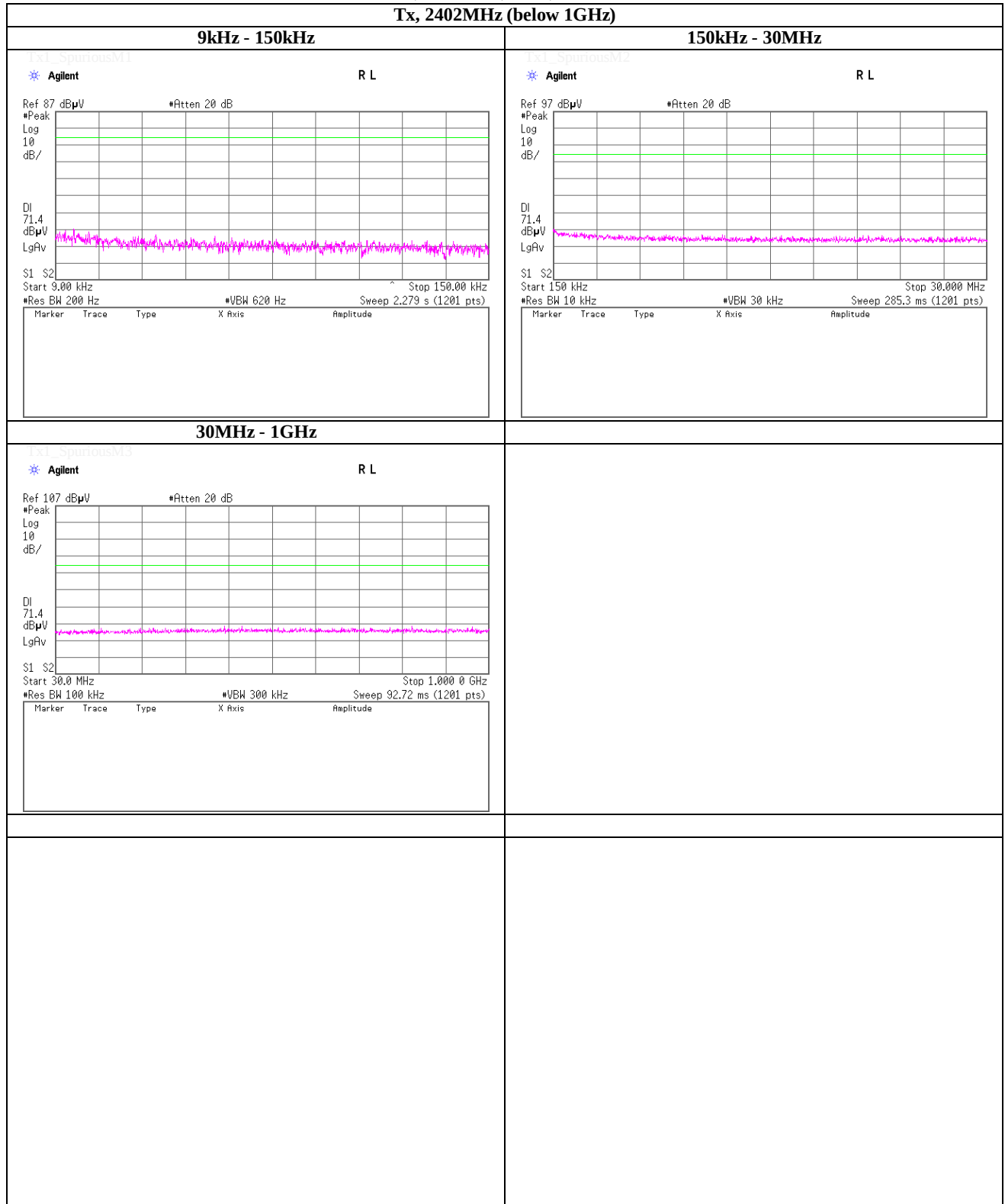
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)



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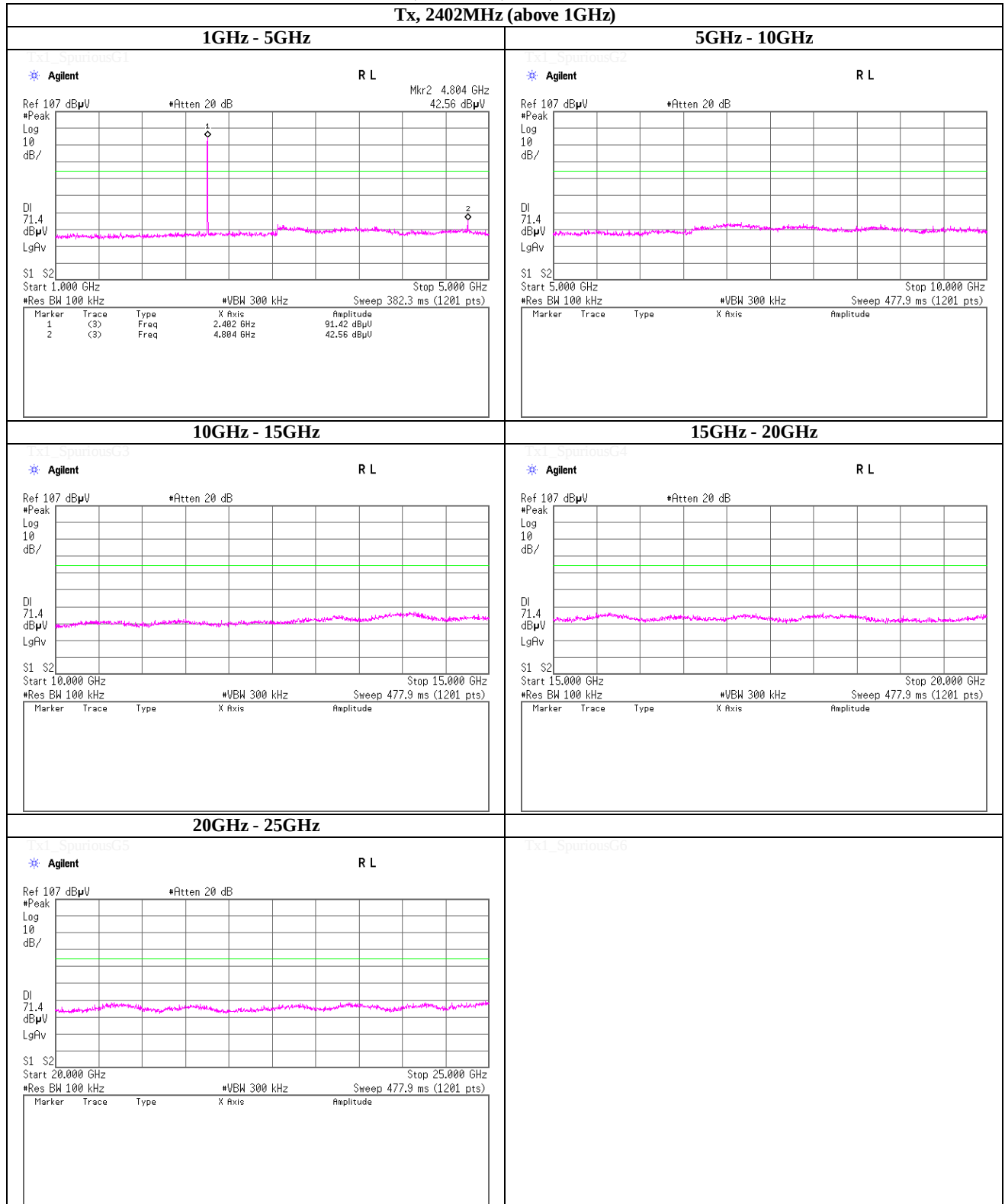
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)



UL Japan, Inc.

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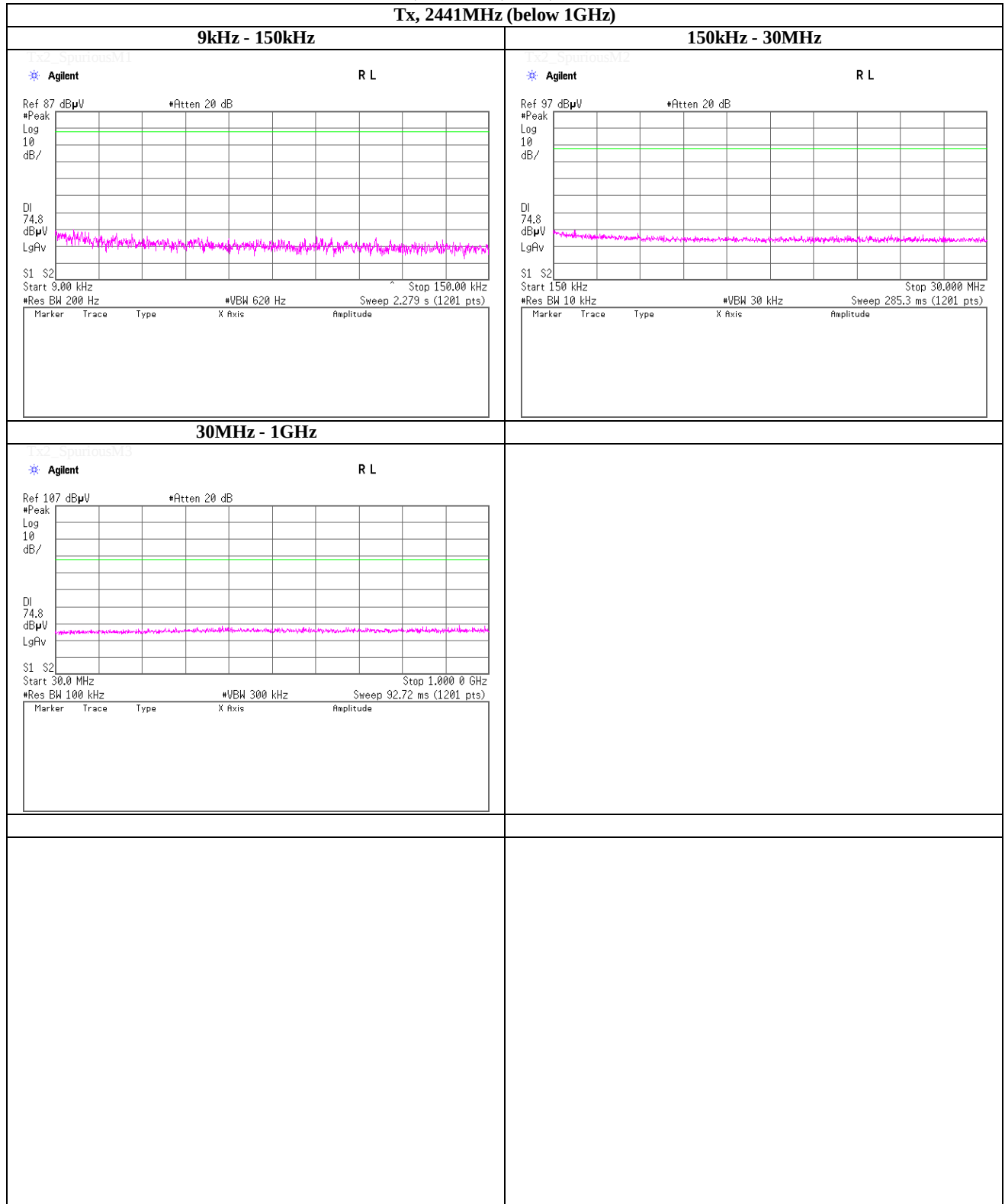
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)



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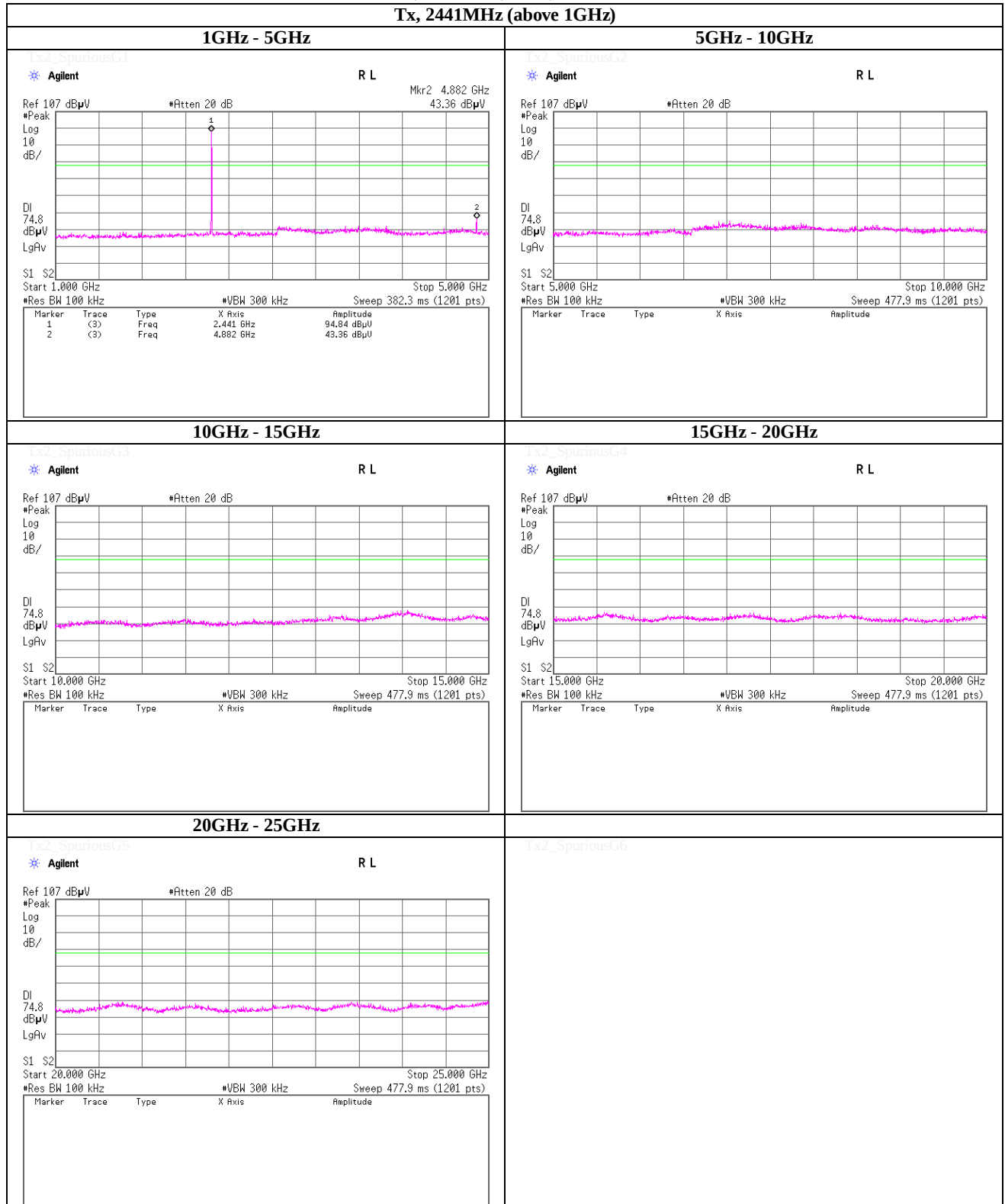
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)



UL Japan, Inc.

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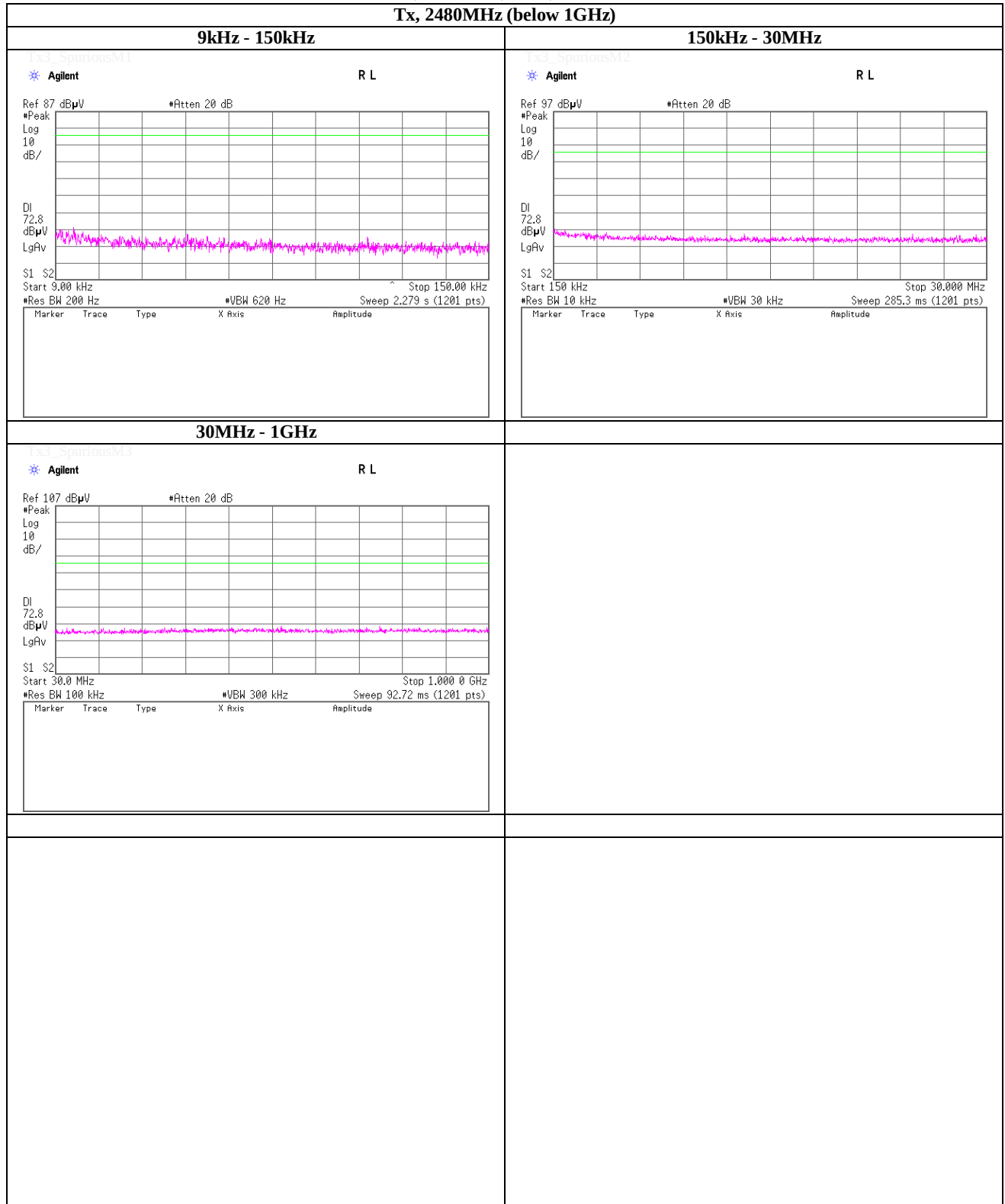
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)



UL Japan, Inc.

Shonan EMC Lab.

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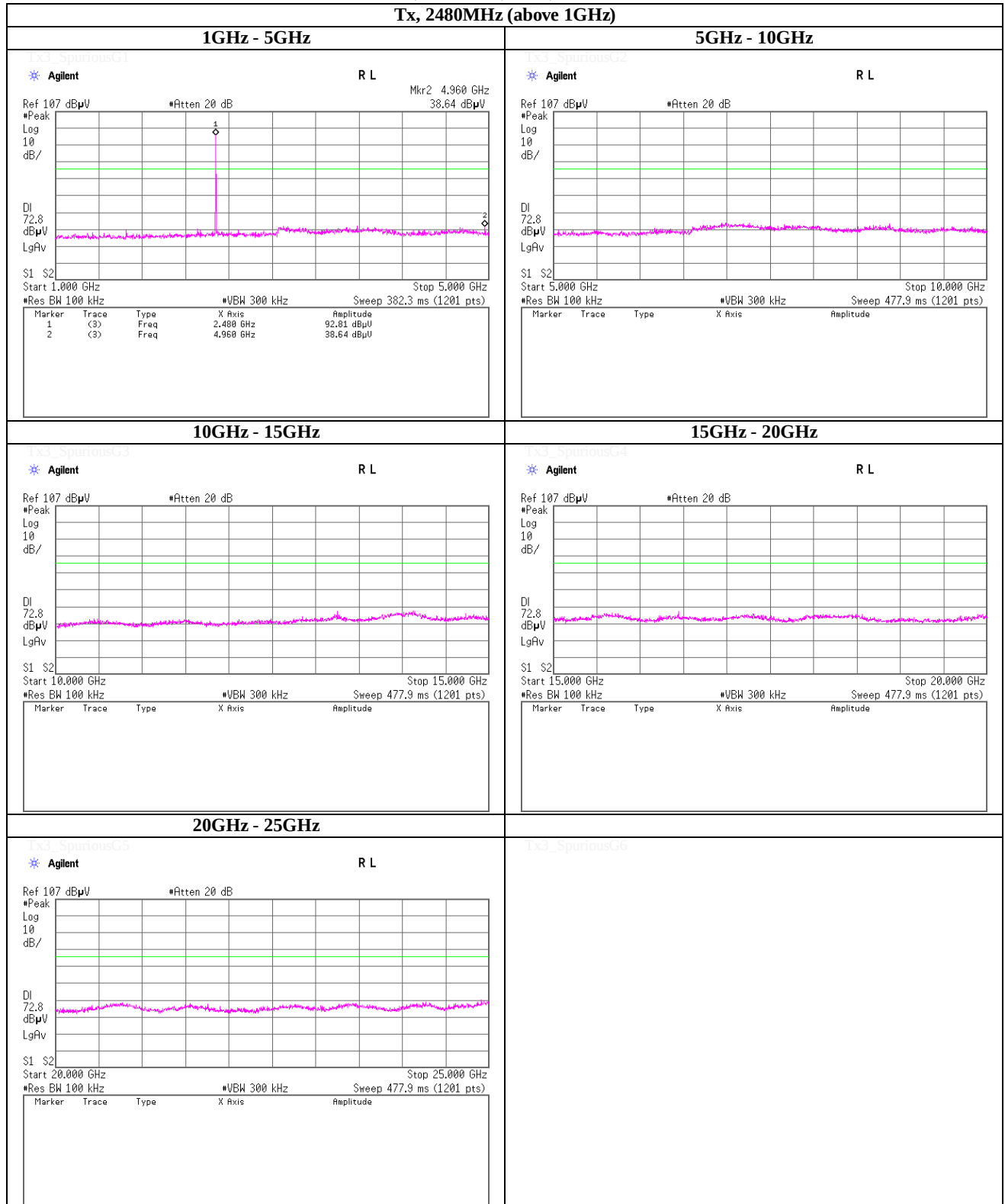
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (above 1GHz)



UL Japan, Inc.

Shonan EMC Lab.

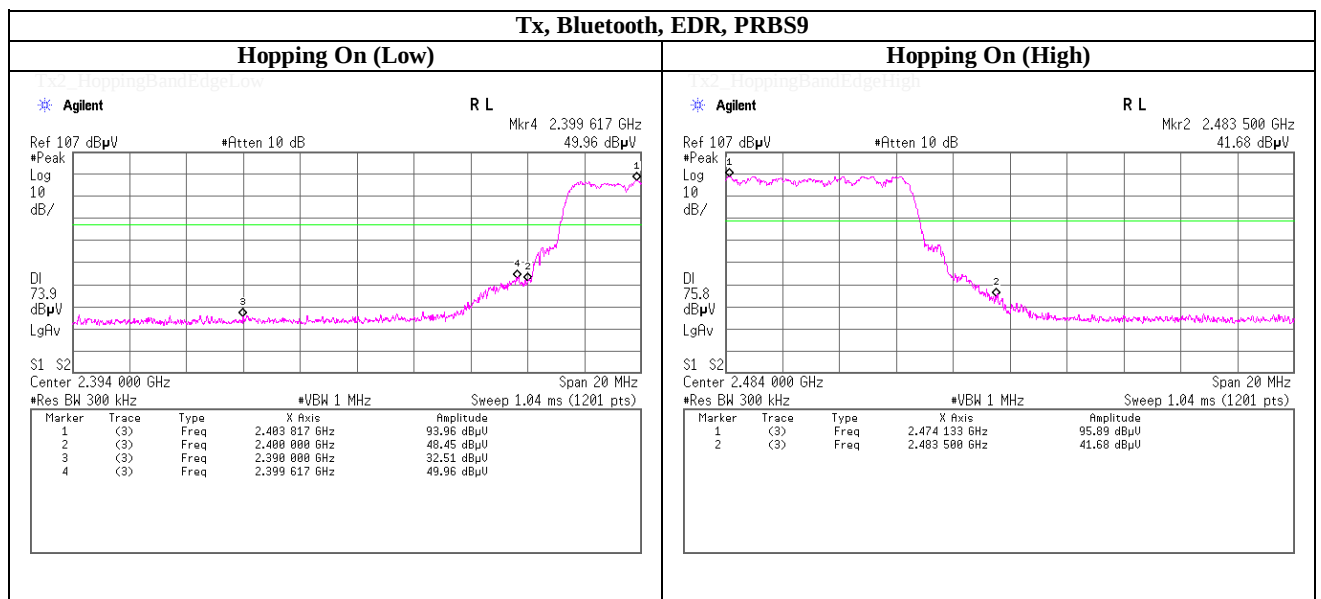
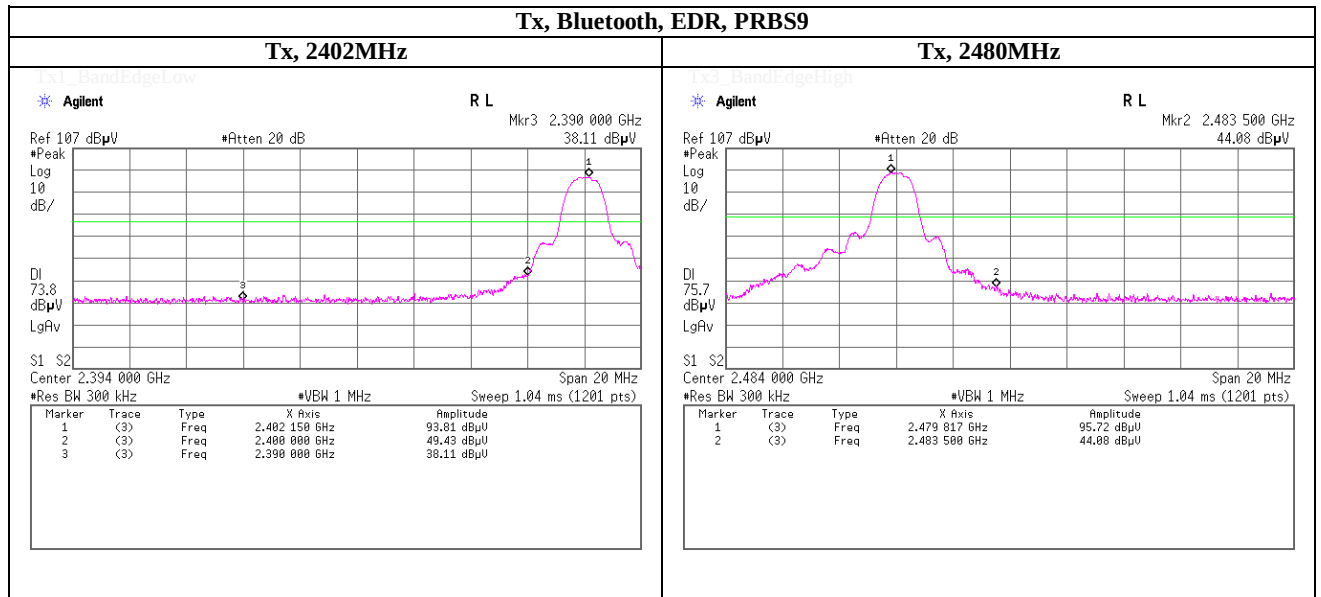
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

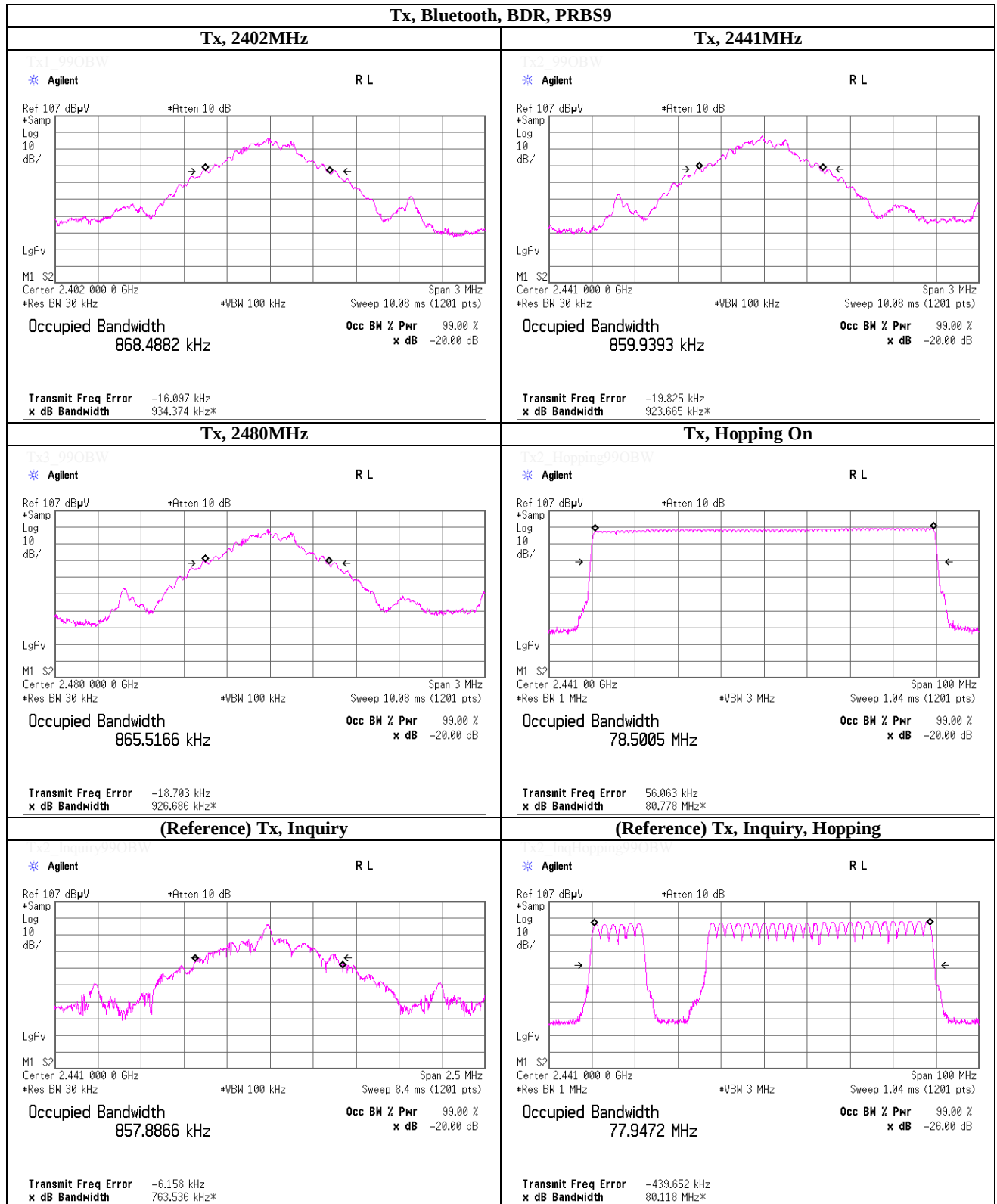
Shonan EMC Lab.

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99% Occupied Bandwidth



UL Japan, Inc.

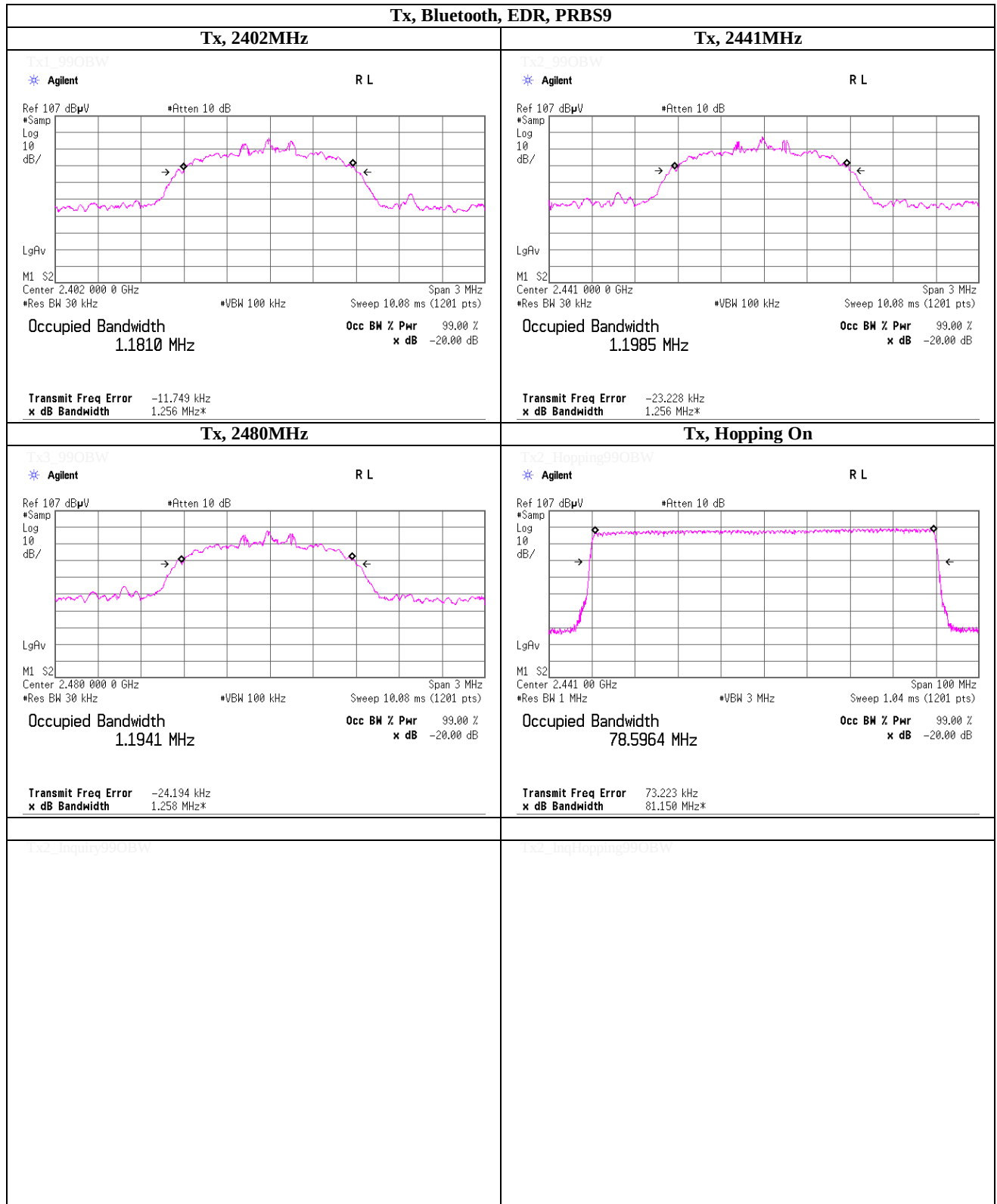
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99% Occupied Bandwidth



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Test Report No : 4786001954S-A

APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2012/04/06 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2012/03/12 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271 (RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2012/02/07 * 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 ,