



RADIO TEST REPORT

Test Report No.: 10008162S-A

Applicant : PIONEER CORPORATION
Type of Equipment : CD TUNER
Model No. : DEH-3238ZH
FCC ID : AJDK070
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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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: April 11 to May 14, 2013

Tested by:


Akio Hayashi

Engineer of WiSE Japan,
UL Verification Service

Approved by :



Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service



JAB
Testing
RTL02610

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

Telephone : +81 463 50 6400

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13-EM-F0429

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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 : CD TUNER
Model No. : DEH-3238ZH
Serial No. : See Section 4.
Rating : DC 13.2V
Country of Mass-production : China
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.
Receipt date of Sample : April 11 and May 13, 2013

2.2 Product description

Model: DEH-3238ZH (referred to as the EUT in this report) is a CD TUNER.

Similar model: DEH-3138ZH, DEH-3438ZH

<Differences Table>

	External accessory1	External accessory2
DEH-3138ZH	Not Applied	Applied
DEH-3238ZH (Tested Model)	Applied	Applied
DEH-3438ZH	Not Applied	Not Applied

Clock Frequency:

S-CD Mecha: 16.934MHz, Graphic CPU: 13.318MHz, 33.233MHz, 27MHz
Media CPU: 48MHz, LOUD EQ: 41.6MHz
System Micro: 10MHz, BT module: 26MHz

Radio specification:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 78MHz & 1MHz
Type of modulation : GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna type : Sheet metal inverted F antenna
Antenna gain with cable loss : -0.07dBi (max)
Antenna connector type : UFL (20279 Type (manufactured by I-PEX))
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 December 27, 2012 and effective January 28, 2013
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		8.6dB Freq.: 598.379MHz Polarization: Horizontal Detection: Quasi Peak Mode: Tx 2480MHz, 3-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 test report has enough margin, more than site margin.

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

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

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

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

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

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

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3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

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

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input checked="" 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 Semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5 -Inquiry	-
Maximum peak output power	Transmitting Hopping OFF , Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -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: system:ver99.22, module firmware:03.00.40
(Power setting: level 4)

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

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	CD Tuner	DEH-3238ZH	*1)	PIONEER	EUT
B	Speaker	KFC-RS160	-	KENWOOD	-
C	Speaker	KFC-RS160	-	KENWOOD	-
D	Speaker	KFC-RS160	-	KENWOOD	-
E	Speaker	KFC-RS160	-	KENWOOD	-
F	Display Assy 8inch TFT	39710-T2AA -A010-M1	14-07-110701-L163	PIONEER	-

*1) 01LE012: Antenna port conducted tests, UTP0004: Radiated emission

List of cables used

No.	Cable name	Length (m)	Shield (Cable)	Shield (Connector)	Remarks
1	Signal	0.5	Unshielded	Unshielded	-
2	Speaker	2.5	Unshielded	Unshielded	-
3	DC	1.5	Unshielded	Unshielded	-
4	Signal	0.4	Unshielded	Unshielded	-
5	DC	1.5	Unshielded	Unshielded	-
6	Signal	1.5	Unshielded	Unshielded	-
7	FM	0.3	Unshielded	Unshielded	-
8	AM	0.3	Unshielded	Unshielded	-
9	Signal	0.5	Unshielded	Unshielded	-
10	USB	1.0	Shielded	Shielded	-
11	Signal	0.5	Unshielded	Unshielded	-
12	Signal	0.5	Unshielded	Unshielded	-
13	Signal	0.5	Unshielded	Unshielded	-

*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 2.0m, 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	
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 10 to 45 deg. (Typ. 35deg.) based on the product specification to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization / Test item	Carrier	Spurious emission (Below 1GHz)	Spurious emission (Above 1GHz)
Horizontal	35 deg.	10 deg.	35 deg.
Vertical	35 deg.	10 deg.	35 deg.

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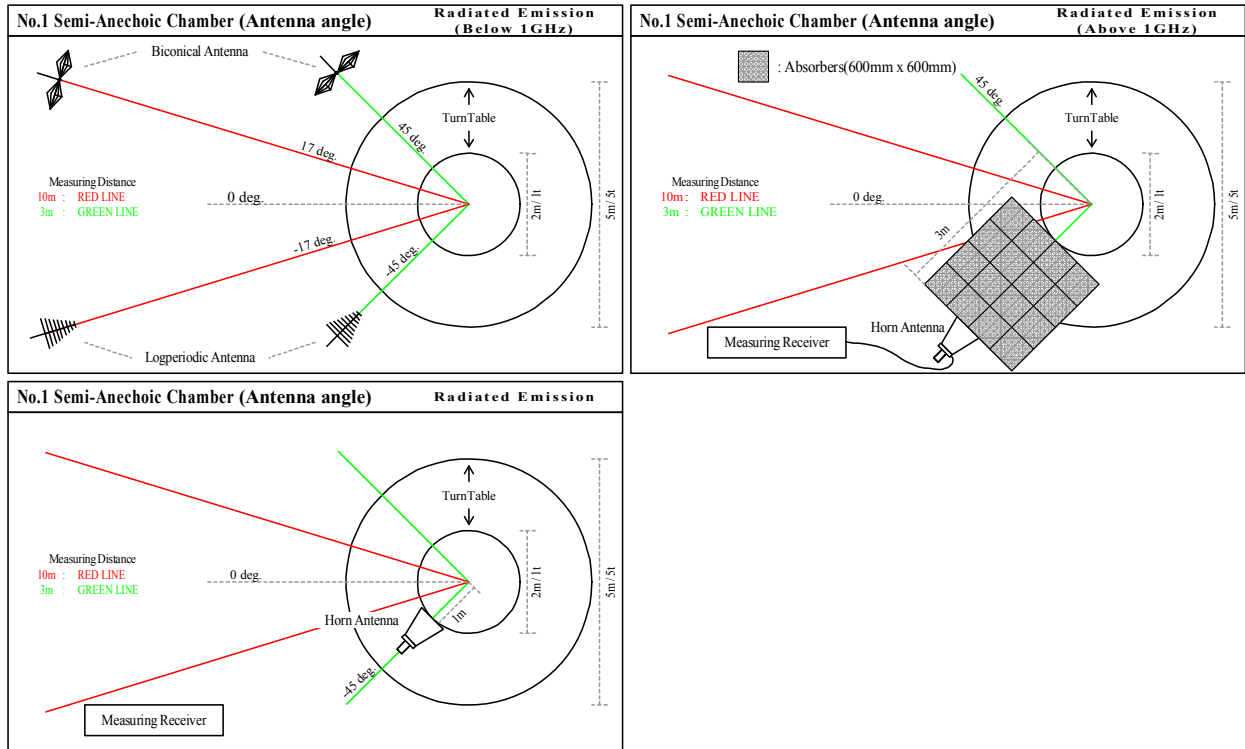
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Figure 1. Antenna angle



11.5 Band edge

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

11.6 Results

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

Refer to APPENDIX

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Facsimile : +81 463 50 6401

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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APPENDIX 1: Data of Radio tests

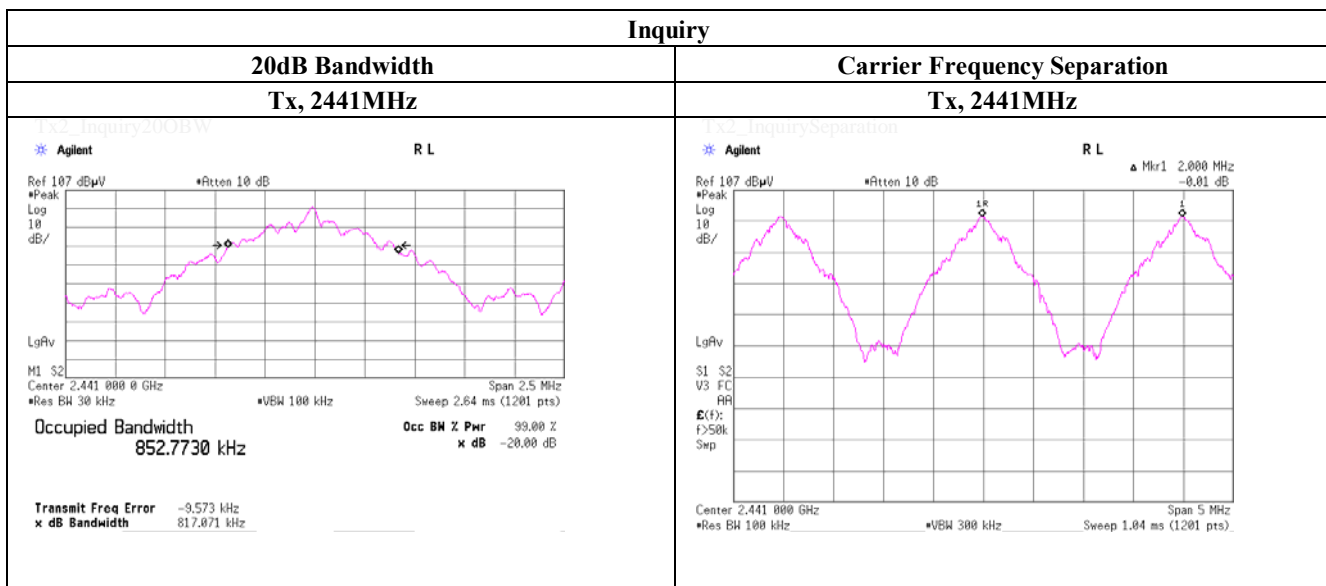
20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 11, 2013
 Temperature / Humidity 24 deg.C , 44 %RH
 Engineer Akio Hayashi
 Mode Tx, Bluetooth, BDR, PRBS9

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.937	1.000	>= 0.625
DH5	2441.0	0.936	1.000	>= 0.624
DH5	2480.0	0.931	1.000	>= 0.621
Inquiry	2441.0	0.817	2.000	>= 0.545

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

No limit applies to 20dB Bandwidth.



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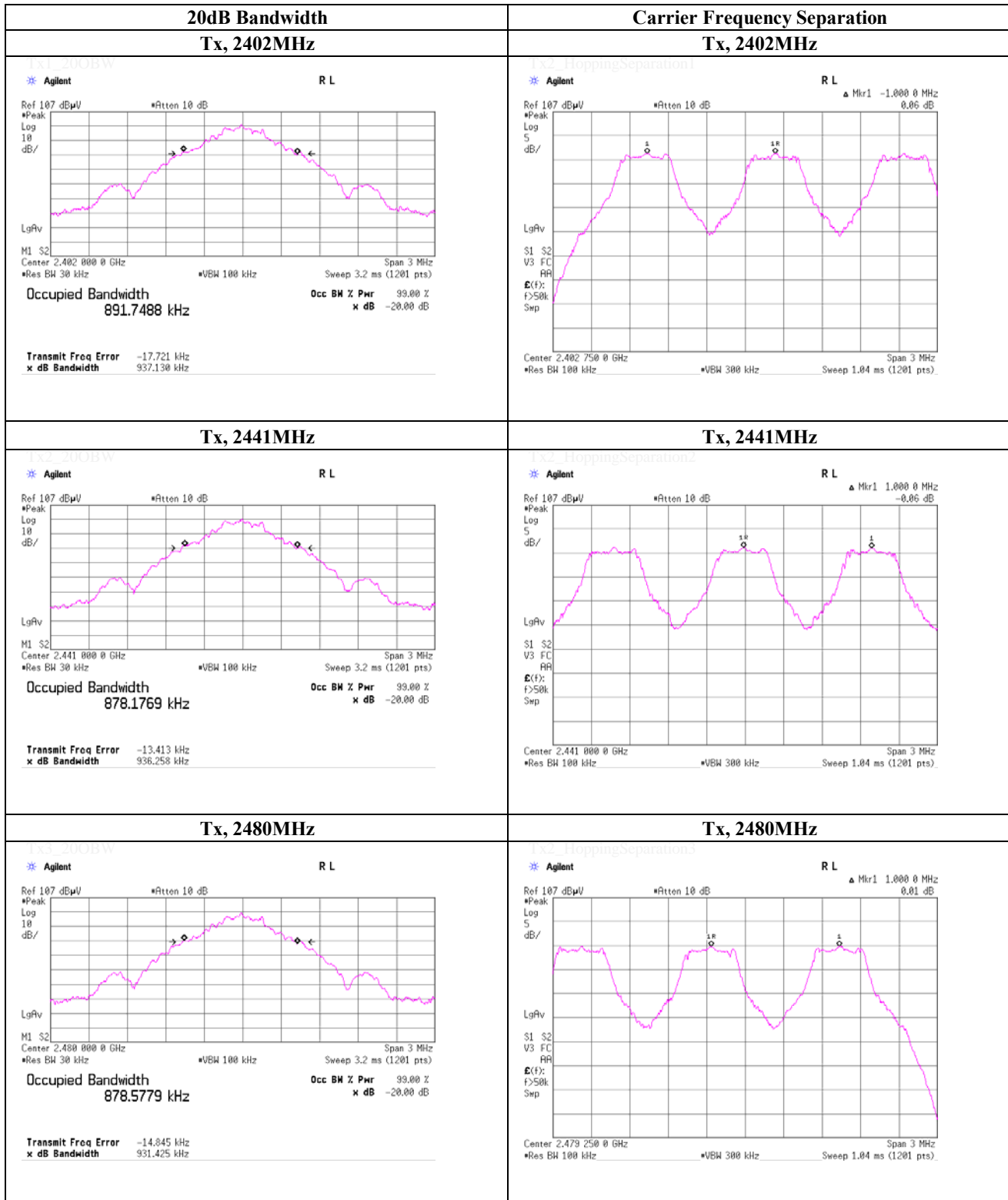
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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

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 April 11, 2013
 Temperature / Humidity 24 deg.C , 44 %RH
 Engineer Akio Hayashi
 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	1.283	1.000	>= 0.855
3-DH5	2441.0	1.292	1.000	>= 0.861
3-DH5	2480.0	1.295	1.000	>= 0.863

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

No limit applies to 20dB Bandwidth.

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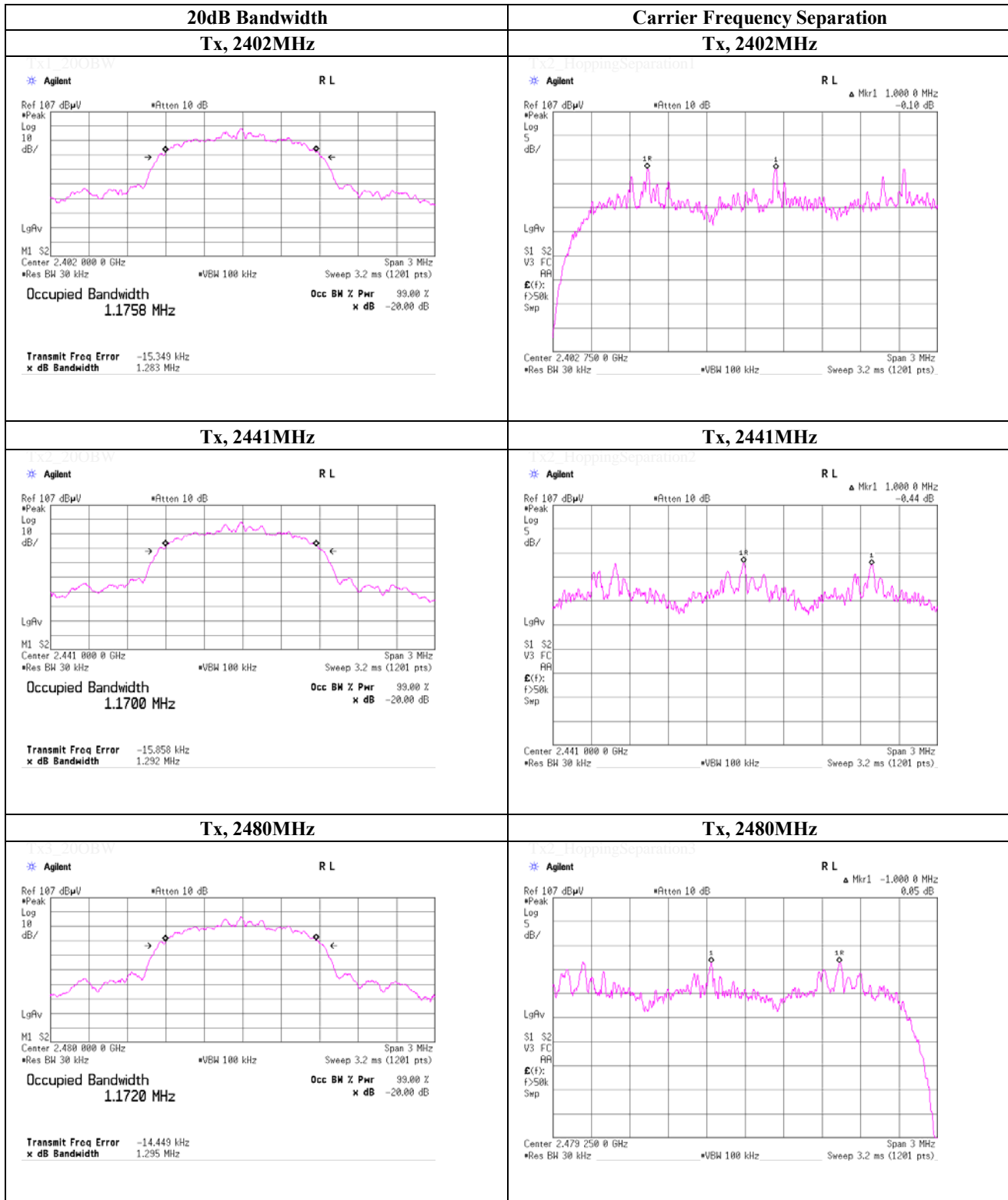
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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

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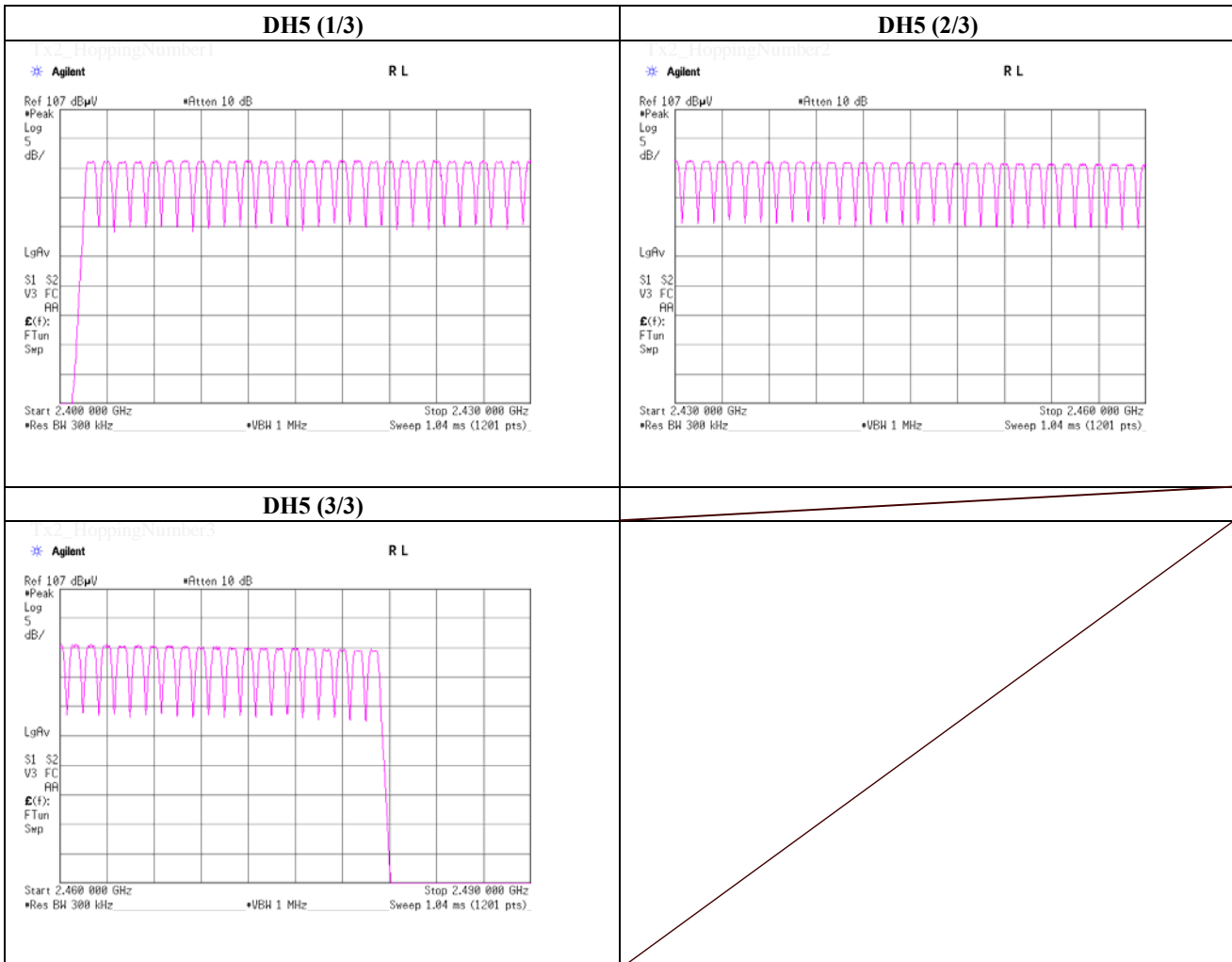
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	24 deg.C , 44 %RH	
Engineer	Akio Hayashi	
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.

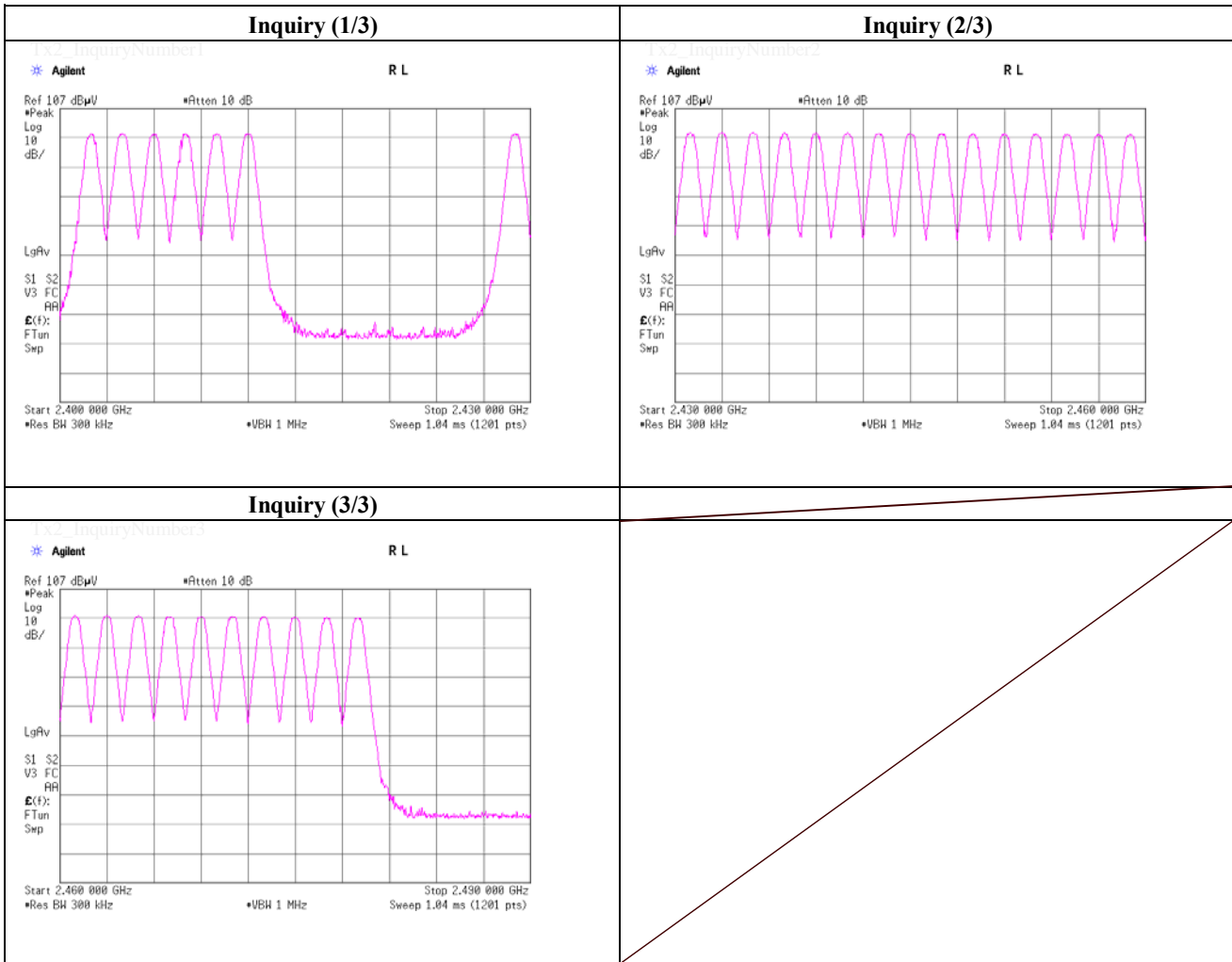


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Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	24 deg.C , 44 %RH	
Engineer	Akio Hayashi	
Mode	Tx, Bluetooth, Inquiry	

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



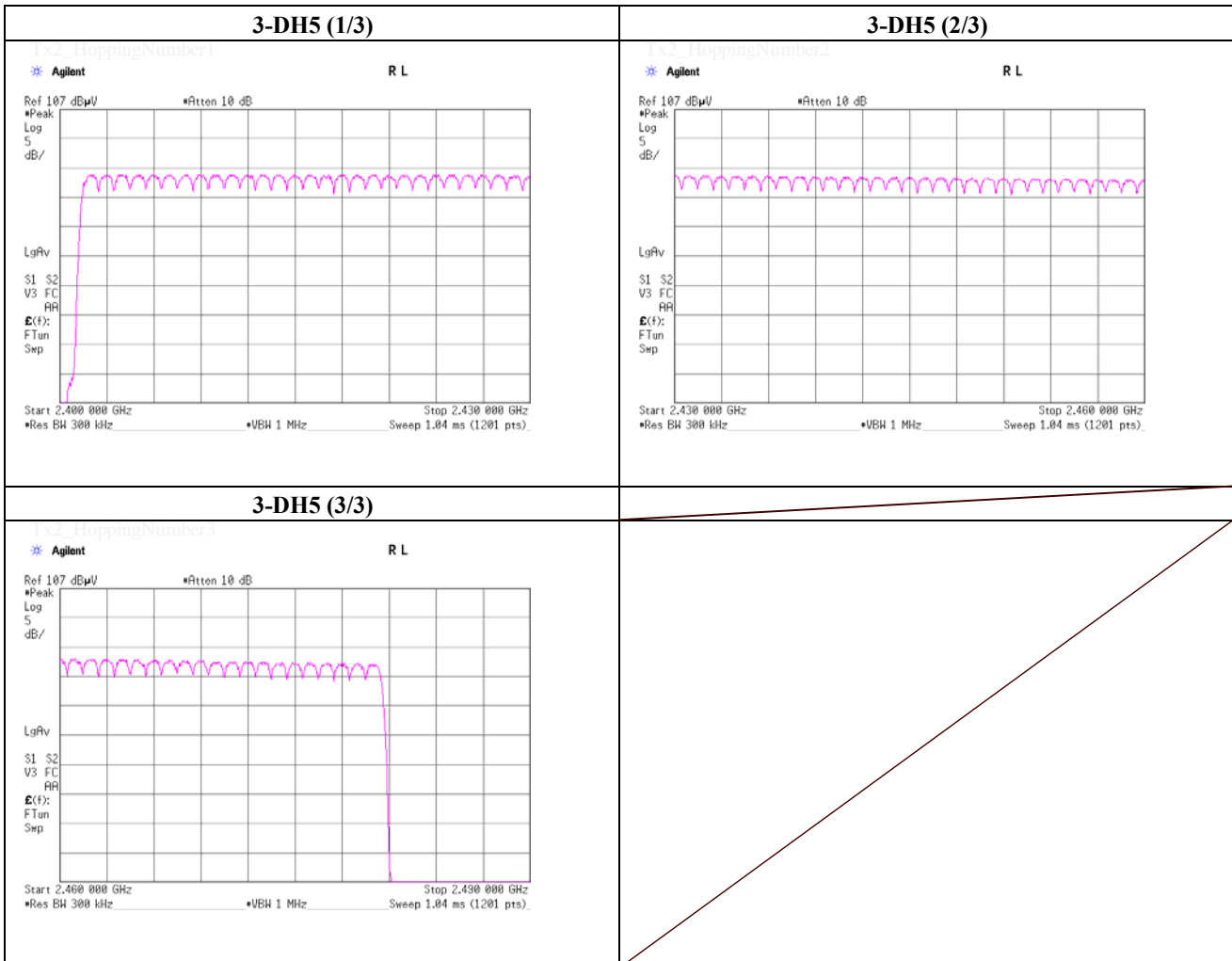
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 Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 11, 2013	
Temperature / Humidity	24 deg.C , 44 %RH	
Engineer	Akio Hayashi	
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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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 15, 2013
 Temperature / Humidity 24 deg.C , 39 %RH
 Engineer Akio Hayashi
 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	19.4 / 5.0 sec. x 31.6 sec. = 123 times	0.399	49	400
DH3	21.0 / 5.0 sec. x 31.6 sec. = 133 times	1.655	220	400
DH5	19.6 / 5.0 sec. x 31.6 sec. = 124 times	2.904	360	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.101	129	400

Sample Calculation

Result = Number of transmission x Length of transmission time

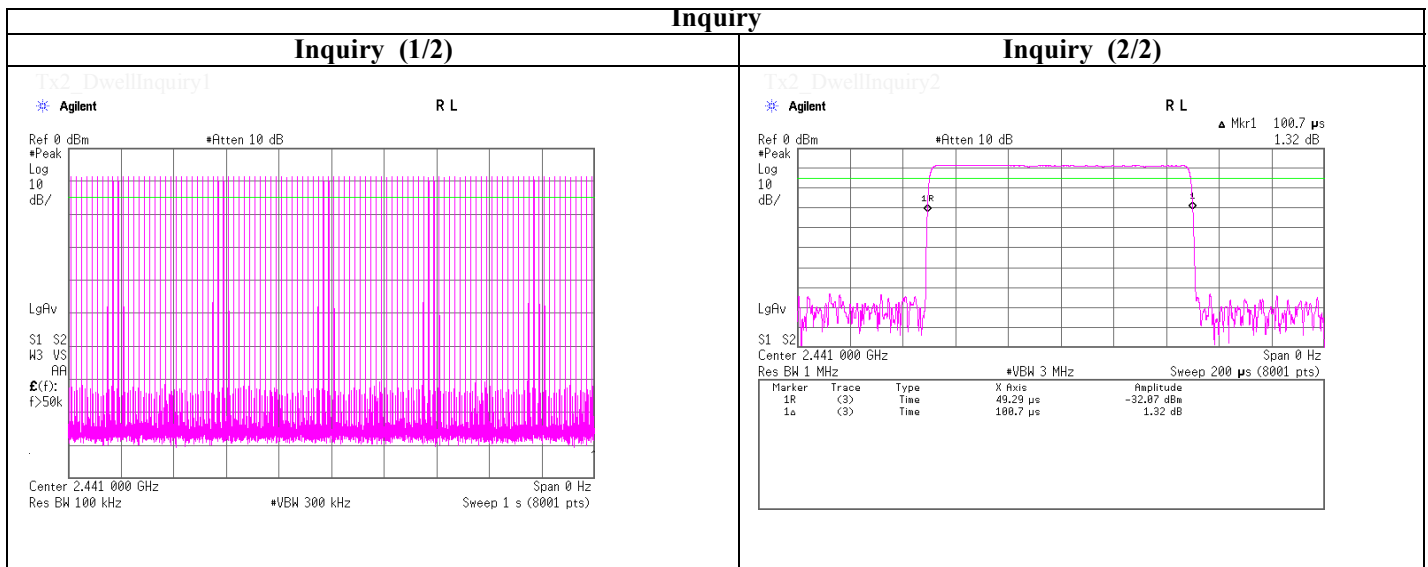
*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	19	19	21	18	20	19.4
DH3	23	21	20	18	23	21.0
DH5	19	17	21	21	20	19.6
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 $N=79$.



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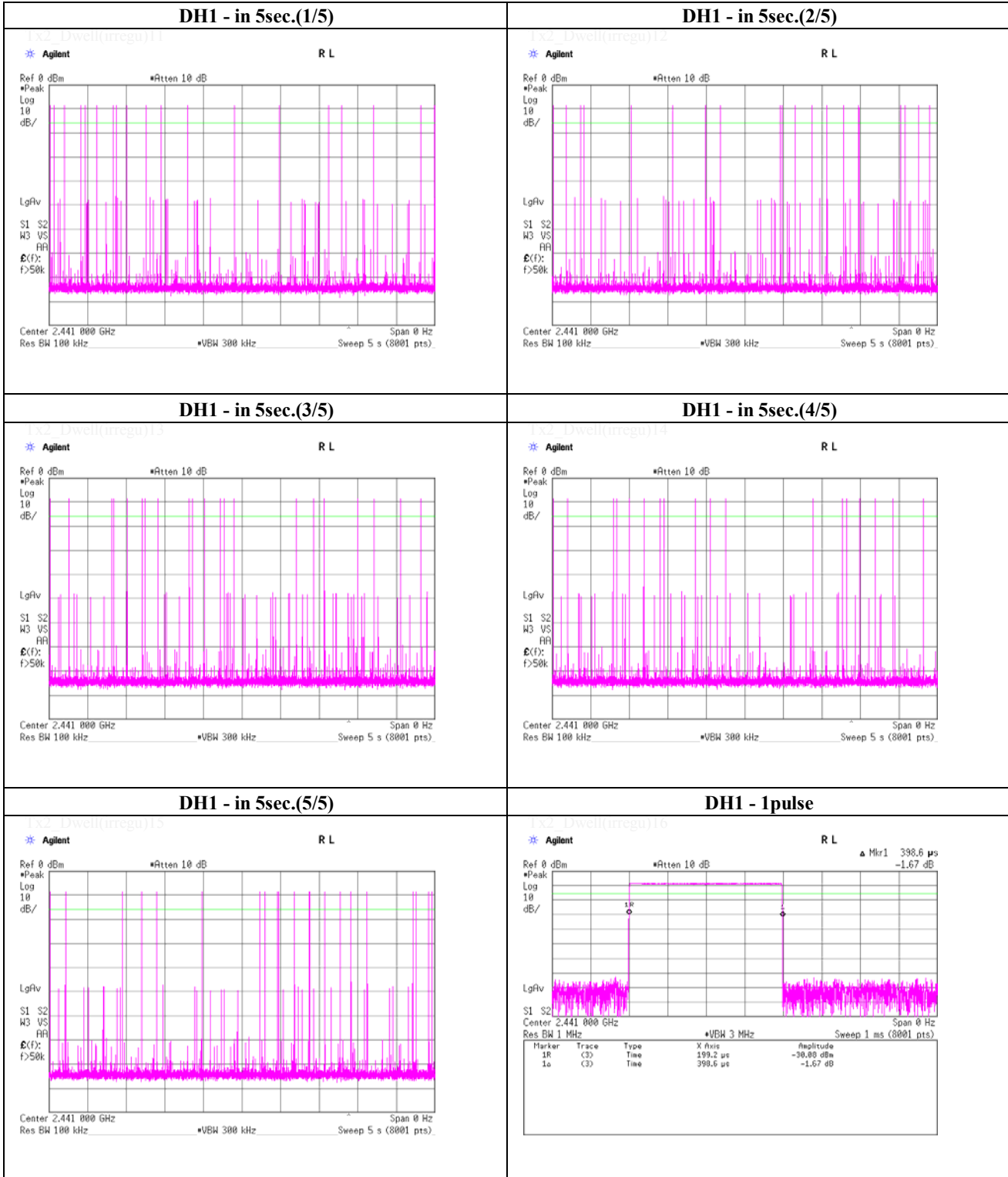
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Dwell time

Tx, Bluetooth, BDR, PRBS9



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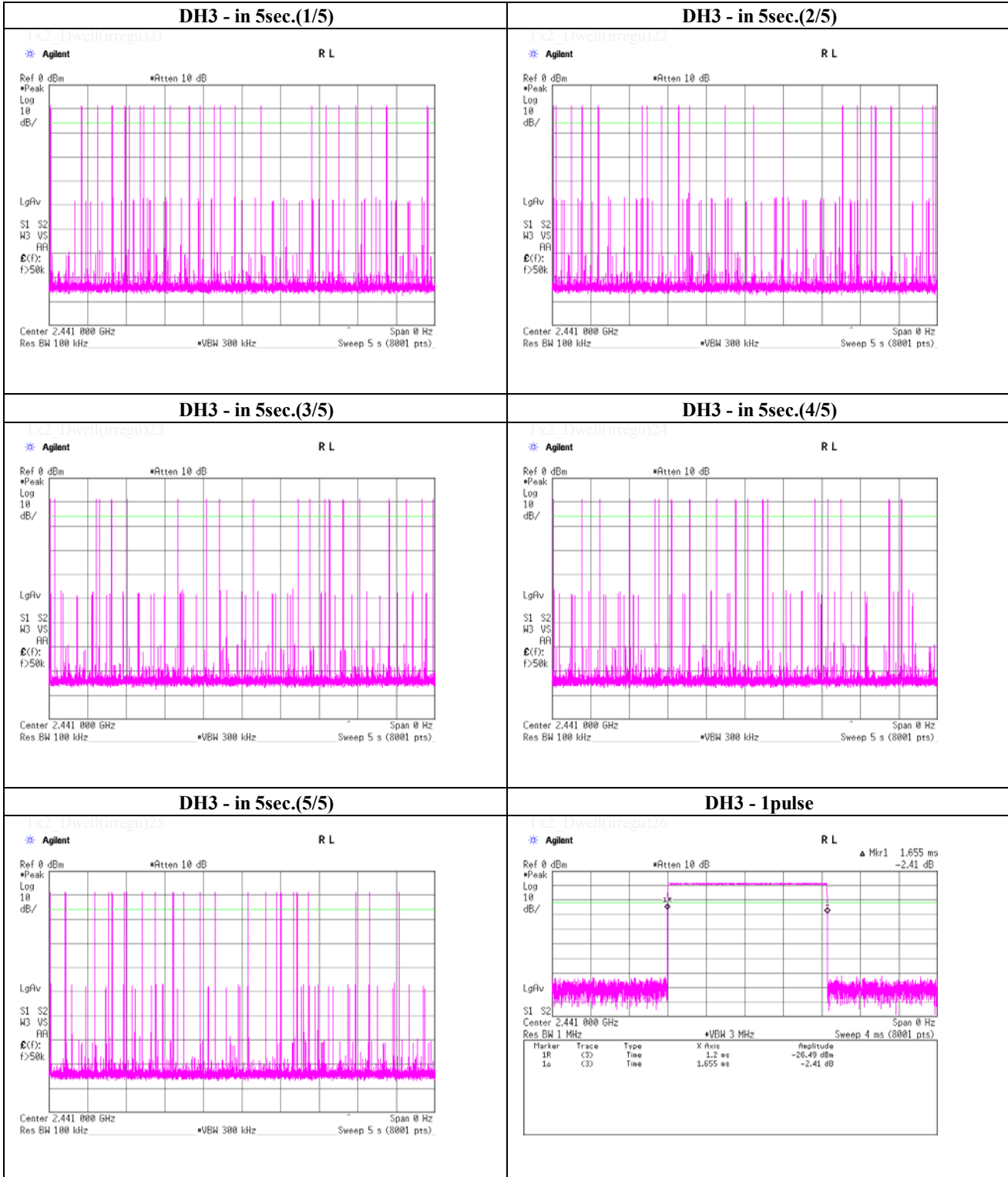
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Dwell time

Tx, Bluetooth, BDR, PRBS9



UL Japan, Inc.

Shonan EMC Lab.

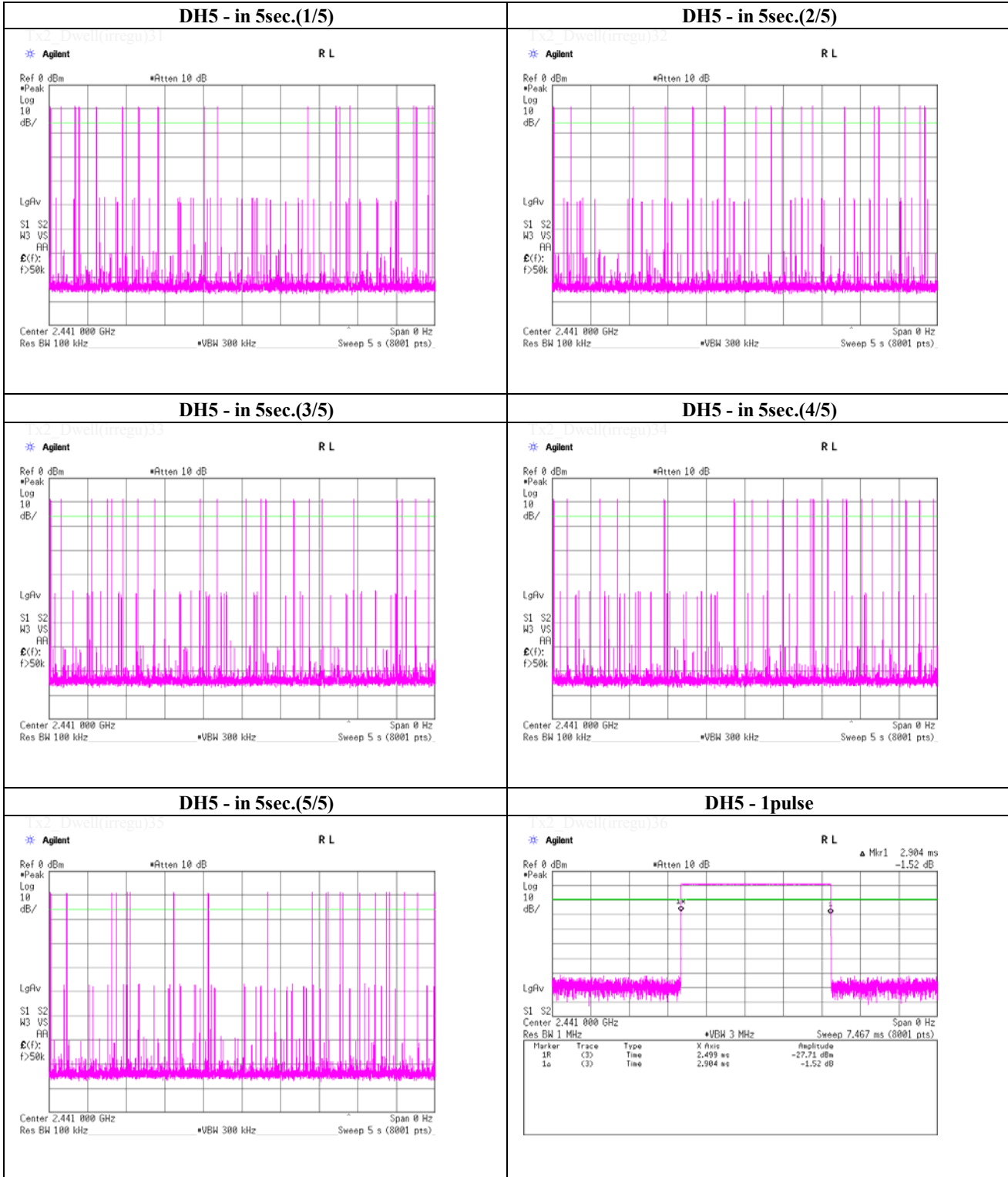
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 15, 2013
 Temperature / Humidity 24 deg.C , 39 %RH
 Engineer Akio Hayashi
 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	19.8 / 5.0 sec. x 31.6 sec. = 126 times	0.409	52	400
3-DH3	20.4 / 5.0 sec. x 31.6 sec. = 129 times	1.661	214	400
3-DH5	19.0 / 5.0 sec. x 31.6 sec. = 121 times	2.912	352	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	18	21	22	18	20	19.8
3-DH3	20	21	21	21	19	20.4
3-DH5	19	17	17	21	21	19.0

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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for $N=79$.

UL Japan, Inc.

Shonan EMC Lab.

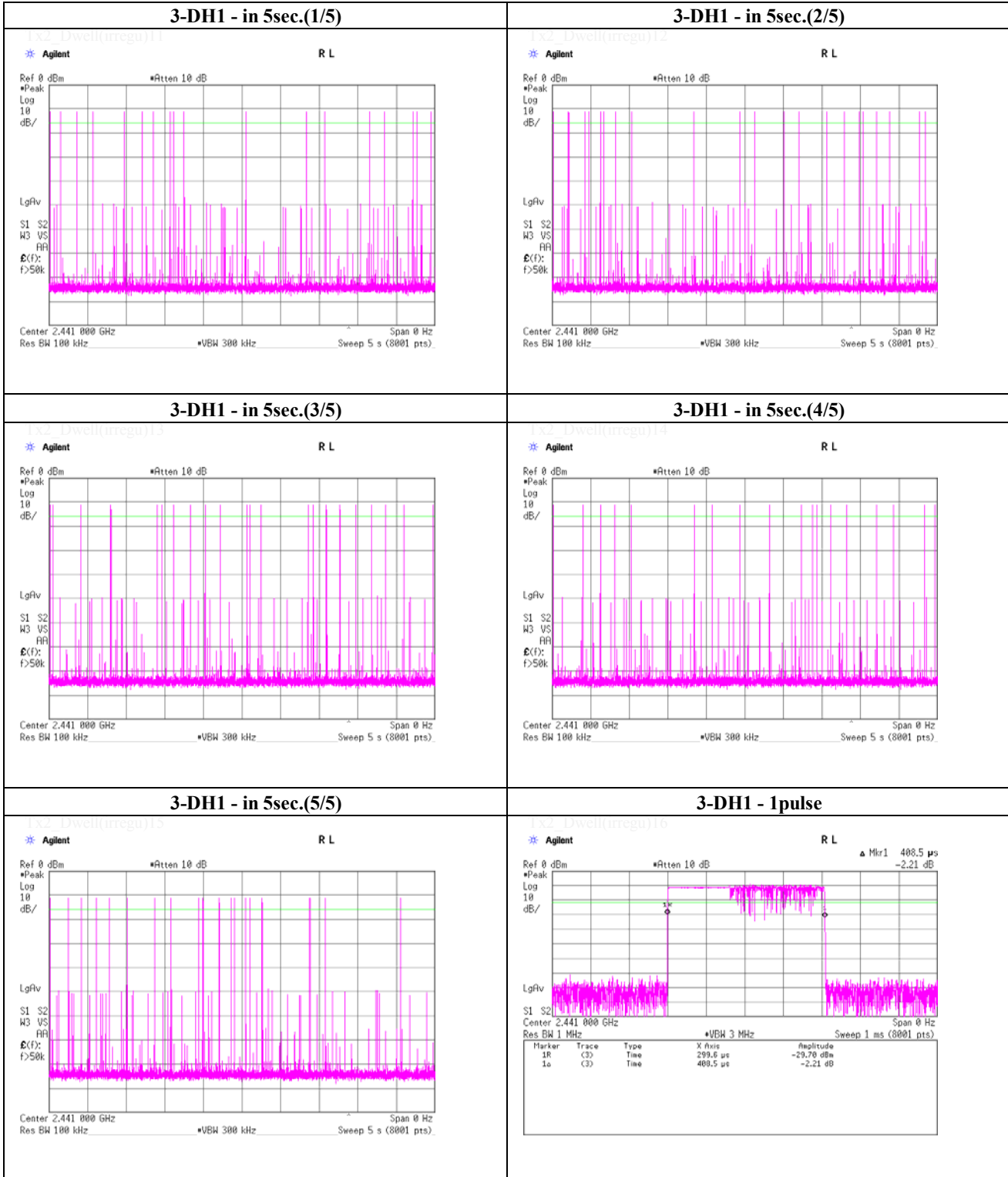
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Dwell time

Tx, Bluetooth, EDR, PRBS9



UL Japan, Inc.

Shonan EMC Lab.

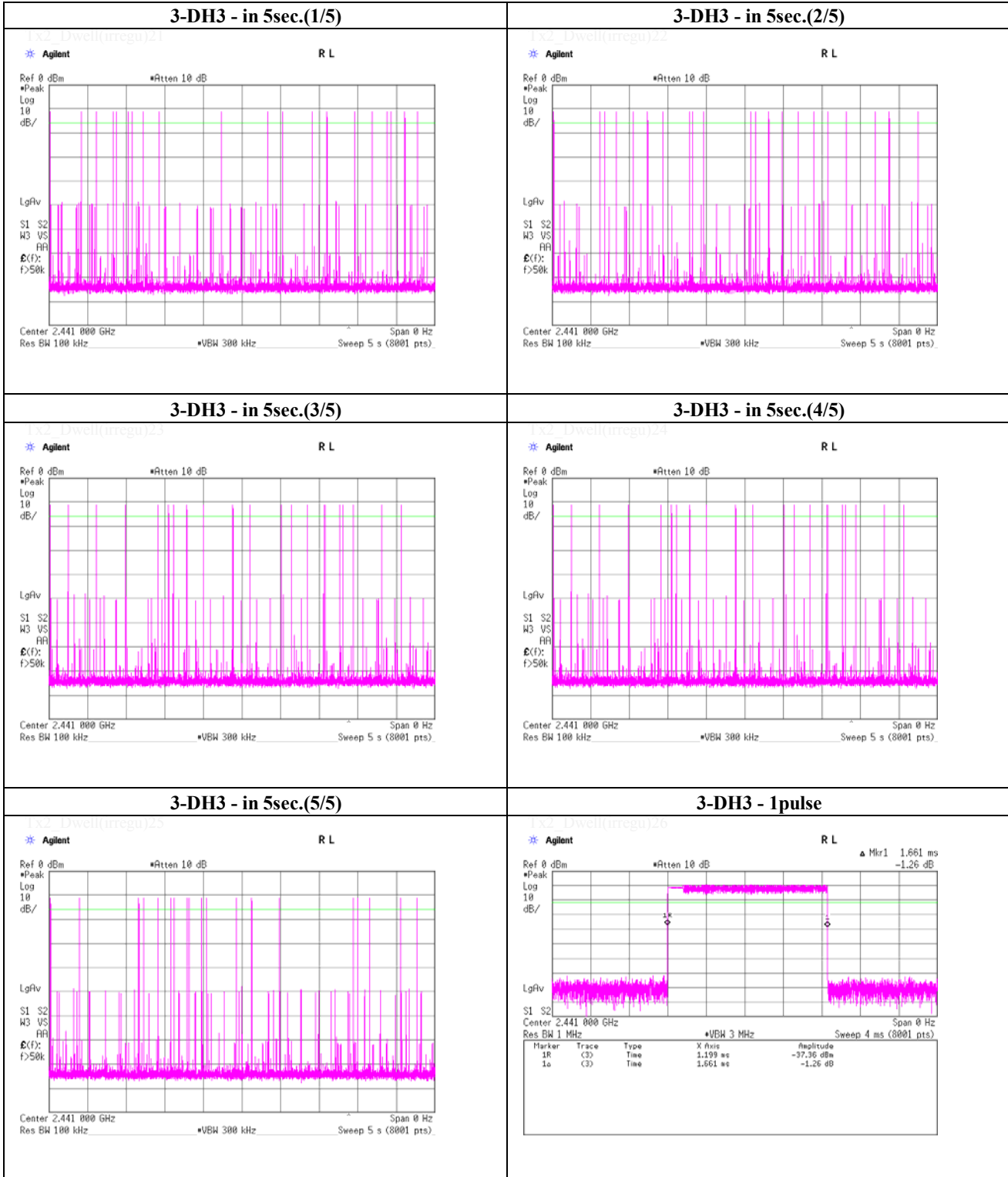
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Shonan EMC Lab.

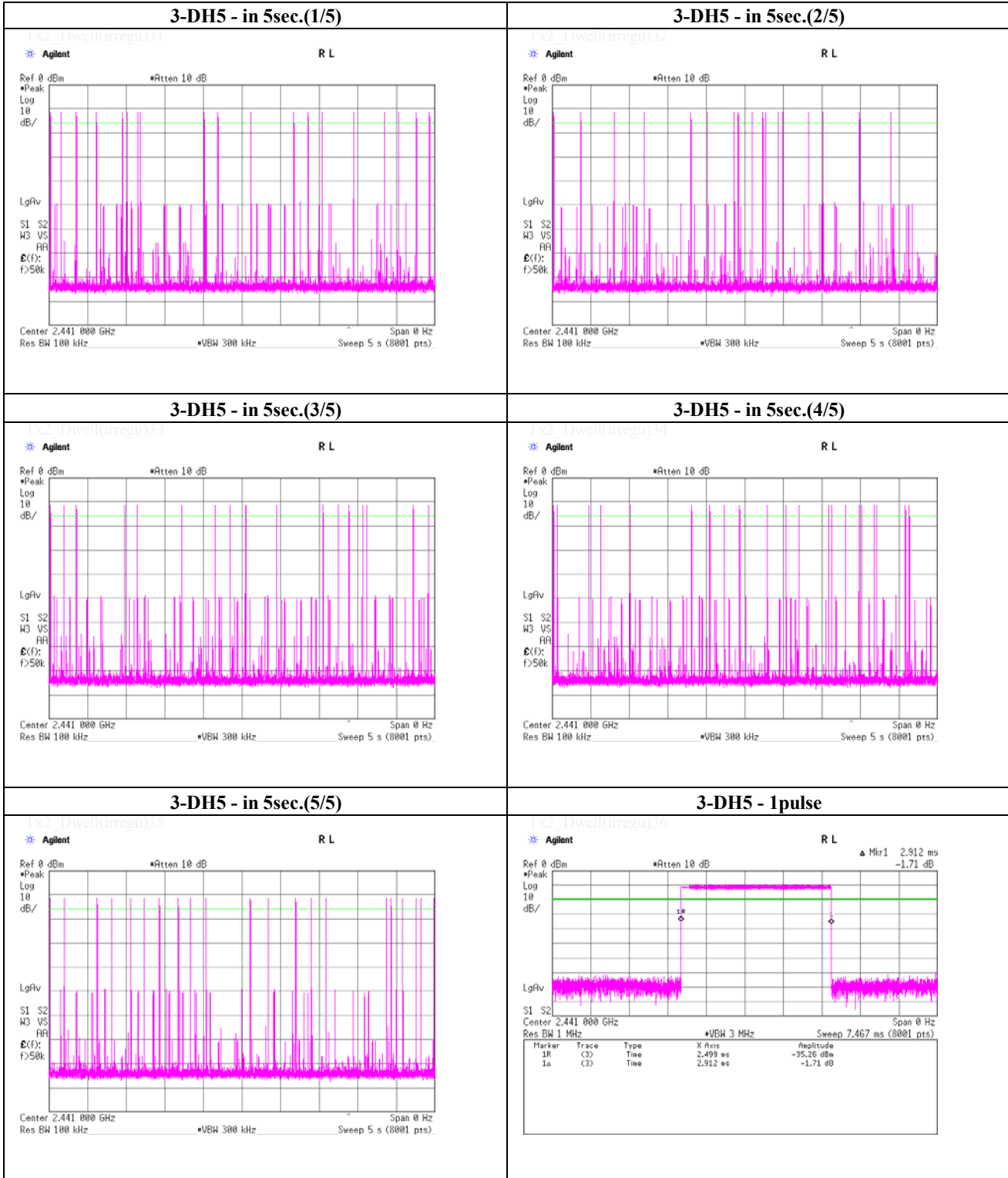
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum Peak Conducted Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 11, 2013
 Temperature / Humidity 24 deg.C , 44 %RH
 Engineer Akio Hayashi
 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	-8.38	1.72	9.62	2.96	1.98	20.97	125	18.01
DH5	2441.0	-8.67	1.73	9.63	2.69	1.86	20.97	125	18.28
DH5	2480.0	-9.91	1.74	9.63	1.46	1.40	20.97	125	19.51
2-DH5	2402.0	-8.88	1.72	9.62	2.46	1.76	20.97	125	18.51
2-DH5	2441.0	-9.27	1.73	9.63	2.09	1.62	20.97	125	18.88
2-DH5	2480.0	-11.06	1.74	9.63	0.31	1.07	20.97	125	20.66
3-DH5	2402.0	-8.52	1.72	9.62	2.82	1.91	20.97	125	18.15
3-DH5	2441.0	-8.77	1.73	9.63	2.59	1.82	20.97	125	18.38
3-DH5	2480.0	-10.03	1.74	9.63	1.34	1.36	20.97	125	19.63

Sample Calculation:

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber
Date	2013/5/13	2013/5/14
Temperature / Humidity	25 deg.C , 55 %RH	20 deg.C , 50 %RH
Engineer	Akio Hayashi	Akio Hayashi
	(below 1GHz / above 18GHz)	(1GHz-18GHz)
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.	299.107	QP	29.7	19.6	10.3	31.8		27.8	46.0	18.2	250	111	
Hori.	398.805	QP	39.6	16.1	7.8	31.9		31.6	46.0	14.4	111	245	
Hori.	598.200	QP	41.2	19.3	8.8	32.0		37.3	46.0	8.7	100	108	
Hori.	1592.000	PK	50.9	25.4	13.4	40.9		48.8	73.9	25.1	100	100	
Hori.	2390.000	PK	44.4	27.6	14.2	40.9		45.3	73.9	28.6	100	103	
Hori.	2400.000	PK	45.8	27.6	14.2	40.9		46.7	73.9	27.2	100	103	
Hori.	4804.000	PK	49.7	31.2	6.8	41.8		45.9	73.9	28.0	100	0	
Hori.	7206.000	PK	49.9	36.0	7.9	41.4		52.4	73.9	21.5	100	0	
Hori.	9608.000	PK	49.1	38.1	9.3	40.6		55.9	73.9	18.0	100	0	
Hori.	12010.000	PK	47.8	39.0	10.0	39.9		56.9	73.9	17.0	100	0	
Hori.	1592.000	AV	41.1	25.4	13.4	40.9		39.0	53.9	14.9	100	100	
Hori.	2390.000	AV	34.6	27.6	14.2	40.9		35.5	53.9	18.4	100	103	
Hori.	2400.000	AV	34.2	27.6	14.2	40.9		35.1	53.9	18.8	100	103	
Hori.	4804.000	AV	37.2	31.2	6.8	41.8		33.4	53.9	20.5	100	0	
Hori.	7206.000	AV	35.9	36.0	7.9	41.4		38.4	53.9	15.5	100	0	
Hori.	9608.000	AV	35.5	38.1	9.3	40.6		42.3	53.9	11.6	100	0	
Hori.	12010.000	AV	34.0	39.0	10.0	39.9		43.1	53.9	10.8	100	0	
Vert.	299.098	QP	32.6	19.6	10.3	31.8		30.7	46.0	15.3	100	172	
Vert.	398.802	QP	38.4	16.1	7.8	31.9		30.4	46.0	15.6	100	12	
Vert.	598.204	QP	38.4	19.3	8.8	32.0		34.5	46.0	11.5	120	138	
Vert.	1592.000	PK	50.0	25.4	13.4	40.9		47.9	73.9	26.0	100	166	
Vert.	2390.000	PK	45.0	27.6	14.2	40.9		45.9	73.9	28.0	100	140	
Vert.	2400.000	PK	38.1	27.6	14.2	40.9		39.0	73.9	34.9	100	140	
Vert.	2400.000	PK	55.3	27.6	14.2	40.9		56.2	73.9	17.7	100	140	
Vert.	4804.000	PK	50.1	31.2	6.8	41.8		46.3	73.9	27.6	100	0	
Vert.	7206.000	PK	50.0	36.0	7.9	41.4		52.5	73.9	21.4	100	0	
Vert.	9608.000	PK	49.5	38.1	9.3	40.6		56.3	73.9	17.6	100	0	
Vert.	12010.000	PK	45.5	39.0	10.0	39.9		54.6	73.9	19.3	100	0	
Vert.	1592.000	AV	40.0	25.4	13.4	40.9		37.9	53.9	16.0	100	166	
Vert.	2390.000	AV	34.6	27.6	14.2	40.9		35.5	53.9	18.4	100	140	
Vert.	4804.000	AV	37.2	31.2	6.8	41.8		33.4	53.9	20.5	100	0	
Vert.	7206.000	AV	36.3	36.0	7.9	41.4		38.8	53.9	15.1	100	0	
Vert.	9608.000	AV	35.8	38.1	9.3	40.6		42.6	53.9	11.3	100	0	
Vert.	12010.000	AV	33.0	39.0	10.0	39.9		42.1	53.9	11.8	100	0	

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber
Date	2013/5/13	2013/5/14
Temperature / Humidity	25 deg.C , 55 %RH	20 deg.C , 50 %RH
Engineer	Akio Hayashi	Akio Hayashi
	(below 1GHz / above 18GHz)	(1GHz-18GHz)
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.	299.111	QP	30.2	19.6	10.3	31.8		28.3	46.0	17.7	173	232	
Hori.	398.801	QP	39.1	16.1	7.8	31.9		31.1	46.0	14.9	111	248	
Hori.	598.200	QP	38.6	19.3	8.8	32.0		34.7	46.0	11.3	170	71	
Hori.	1591.978	PK	52.0	25.4	13.4	40.9		49.9	73.9	24.0	100	98	
Hori.	4882.000	PK	49.5	31.3	6.8	41.7		45.9	73.9	28.0	100	99	
Hori.	7323.000	PK	49.5	36.2	7.9	41.4		52.2	73.9	21.7	100	0	
Hori.	9764.000	PK	49.0	38.1	9.5	40.6		56.0	73.9	17.9	100	0	
Hori.	12205.000	PK	47.6	38.9	9.9	39.9		56.5	73.9	17.4	100	0	
Hori.	1591.978	AV	41.6	25.4	13.4	40.9		39.5	53.9	14.4	100	98	
Hori.	4882.000	AV	37.2	31.3	6.8	41.7		33.6	53.9	20.3	100	99	
Hori.	7323.000	AV	36.0	36.2	7.9	41.4		38.7	53.9	15.2	100	0	
Hori.	9764.000	AV	35.8	38.1	9.5	40.6		42.8	53.9	11.1	100	0	
Hori.	12205.000	AV	34.8	38.9	9.9	39.9		43.7	53.9	10.2	100	0	
Vert.	37.643	QP	31.0	15.7	6.9	31.8		21.8	40.0	18.2	100	298	
Vert.	398.797	QP	38.2	16.1	7.8	31.9		30.2	46.0	15.8	100	19	
Vert.	598.205	QP	38.3	19.3	8.8	32.0		34.4	46.0	11.6	115	138	
Vert.	1591.978	PK	49.8	25.4	13.4	40.9		47.7	73.9	26.2	100	165	
Vert.	4882.000	PK	51.1	31.3	6.8	41.7		47.5	73.9	26.4	100	137	
Vert.	7323.000	PK	50.0	36.2	7.9	41.4		52.7	73.9	21.2	100	0	
Vert.	9764.000	PK	48.0	38.1	9.5	40.6		55.0	73.9	18.9	100	0	
Vert.	12205.000	PK	46.5	38.9	9.9	39.9		55.4	73.9	18.5	100	0	
Vert.	1591.978	AV	39.9	25.4	13.4	40.9		37.8	53.9	16.1	100	165	
Vert.	4882.000	AV	39.6	31.3	6.8	41.7		36.0	53.9	17.9	100	137	
Vert.	7323.000	AV	36.7	36.2	7.9	41.4		39.4	53.9	14.5	100	0	
Vert.	9764.000	AV	35.3	38.1	9.5	40.6		42.3	53.9	11.6	100	0	
Vert.	12205.000	AV	32.7	38.9	9.9	39.9		41.6	53.9	12.3	100	0	

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

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

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Facsimile : +81 463 50 6401

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber
Date	2013/5/13	2013/5/14
Temperature / Humidity	25 deg.C , 55 %RH	20 deg.C , 50 %RH
Engineer	Akio Hayashi	Akio Hayashi
	(below 1GHz / above 18GHz)	(1GHz-18GHz)
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.	299.532	QP	29.9	19.6	10.3	31.8		28.0	46.0	18.0	170	345	
Hori.	598.198	QP	41.1	19.3	8.8	32.0		37.2	46.0	8.8	100	95	
Hori.	697.896	QP	34.2	20.7	9.3	32.0		32.2	46.0	13.8	119	150	
Hori.	1592.000	PK	51.5	25.4	13.4	40.9		49.4	73.9	24.5	100	100	
Hori.	2390.000	PK	44.0	27.6	14.2	40.9		44.9	73.9	29.0	100	105	
Hori.	2400.000	PK	47.2	27.6	14.2	40.9		48.1	73.9	25.8	100	105	
Hori.	4804.000	PK	50.8	31.2	6.8	41.8		47.0	73.9	26.9	100	0	
Hori.	7206.000	PK	49.5	36.0	7.9	41.4		52.0	73.9	21.9	100	0	
Hori.	9608.000	PK	49.0	38.1	9.3	40.6		55.8	73.9	18.1	100	0	
Hori.	12010.000	PK	47.1	39.0	10.0	39.9		56.2	73.9	17.7	100	0	
Hori.	1592.000	AV	41.1	25.4	13.4	40.9		39.0	53.9	14.9	100	100	
Hori.	2390.000	AV	34.8	27.6	14.2	40.9		35.7	53.9	18.2	100	105	
Hori.	2400.000	AV	33.4	27.6	14.2	40.9		34.3	53.9	19.6	100	105	
Hori.	4804.000	AV	37.3	31.2	6.8	41.8		33.5	53.9	20.4	100	0	
Hori.	7206.000	AV	36.0	36.0	7.9	41.4		38.5	53.9	15.4	100	0	
Hori.	9608.000	AV	35.6	38.1	9.3	40.6		42.4	53.9	11.5	100	0	
Hori.	12010.000	AV	34.2	39.0	10.0	39.9		43.3	53.9	10.6	100	0	
Vert.	299.098	QP	31.0	19.6	10.3	31.8		29.1	46.0	16.9	100	180	
Vert.	598.198	QP	38.6	19.3	8.8	32.0		34.7	46.0	11.3	114	135	
Vert.	697.898	QP	35.4	20.7	9.3	32.0		33.4	46.0	12.6	100	239	
Vert.	1592.000	PK	49.5	25.4	13.4	40.9		47.4	73.9	26.5	100	160	
Vert.	2390.000	PK	46.0	27.6	14.2	40.9		46.9	73.9	27.0	100	139	
Vert.	2400.000	PK	58.2	27.6	14.2	40.9		59.1	73.9	14.8	100	139	
Vert.	4804.000	PK	50.8	31.2	6.8	41.8		47.0	73.9	26.9	100	0	
Vert.	7206.000	PK	49.8	36.0	7.9	41.4		52.3	73.9	21.6	100	0	
Vert.	9608.000	PK	49.4	38.1	9.3	40.6		56.2	73.9	17.7	100	0	
Vert.	12010.000	PK	46.1	39.0	10.0	39.9		55.2	73.9	18.7	100	0	
Vert.	1592.000	AV	39.9	25.4	13.4	40.9		37.8	53.9	16.1	100	160	
Vert.	2390.000	AV	34.7	27.6	14.2	40.9		35.6	53.9	18.3	100	139	
Vert.	2400.000	AV	42.0	27.6	14.2	40.9		42.9	53.9	11.0	100	139	
Vert.	4804.000	AV	37.3	31.2	6.8	41.8		33.5	53.9	20.4	100	0	
Vert.	7206.000	AV	36.6	36.0	7.9	41.4		39.1	53.9	14.8	100	0	
Vert.	9608.000	AV	35.8	38.1	9.3	40.6		42.6	53.9	11.3	100	0	
Vert.	12010.000	AV	32.7	39.0	10.0	39.9		41.8	53.9	12.1	100	0	

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

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber
Date	2013/5/13	2013/5/14
Temperature / Humidity	25 deg.C , 55 %RH	20 deg.C , 50 %RH
Engineer	Akio Hayashi	Akio Hayashi
	(below 1GHz / above 18GHz)	(1GHz-18GHz)
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.	299.111	QP	30.2	19.6	10.3	31.8		28.3	46.0	17.7	171	232	
Hori.	398.801	QP	39.8	16.1	7.8	31.9		31.8	46.0	14.2	100	357	
Hori.	598.199	QP	41.0	19.3	8.8	32.0		37.1	46.0	8.9	100	72	
Hori.	1595.192	PK	50.5	25.5	13.4	40.9		48.5	73.9	25.4	100	140	
Hori.	4882.000	PK	50.9	31.3	6.8	41.7		47.3	73.9	26.6	100	130	
Hori.	7323.000	PK	49.2	36.2	7.9	41.4		51.9	73.9	22.0	100	0	
Hori.	9764.000	PK	48.9	38.1	9.5	40.6		55.9	73.9	18.0	100	0	
Hori.	12205.000	PK	47.0	38.9	9.9	39.9		55.9	73.9	18.0	100	0	
Hori.	1595.192	AV	41.0	25.5	13.4	40.9		39.0	53.9	14.9	100	140	
Hori.	4882.000	AV	37.9	31.3	6.8	41.7		34.3	53.9	19.6	100	130	
Hori.	7323.000	AV	36.0	36.2	7.9	41.4		38.7	53.9	15.2	100	0	
Hori.	9764.000	AV	35.6	38.1	9.5	40.6		42.6	53.9	11.3	100	0	
Hori.	12205.000	AV	34.4	38.9	9.9	39.9		43.3	53.9	10.6	100	0	
Vert.	199.623	QP	30.6	16.6	9.0	31.8		24.4	43.5	19.1	100	182	
Vert.	398.801	QP	39.3	16.1	7.8	31.9		31.3	46.0	14.7	100	15	
Vert.	598.205	QP	37.8	19.3	8.8	32.0		33.9	46.0	12.1	110	128	
Vert.	1595.192	PK	50.4	25.5	13.4	40.9		48.4	73.9	25.5	100	166	
Vert.	4882.000	PK	51.7	31.3	6.8	41.7		48.1	73.9	25.8	100	133	
Vert.	7323.000	PK	50.5	36.2	7.9	41.4		53.2	73.9	20.7	100	0	
Vert.	9764.000	PK	48.2	38.1	9.5	40.6		55.2	73.9	18.7	100	0	
Vert.	12205.000	PK	45.9	38.9	9.9	39.9		54.8	73.9	19.1	100	0	
Vert.	1595.192	AV	39.8	25.5	13.4	40.9		37.8	53.9	16.1	100	166	
Vert.	4882.000	AV	39.3	31.3	6.8	41.7		35.7	53.9	18.2	100	133	
Vert.	7323.000	AV	36.6	36.2	7.9	41.4		39.3	53.9	14.6	100	0	
Vert.	9764.000	AV	35.5	38.1	9.5	40.6		42.5	53.9	11.4	100	0	
Vert.	12205.000	AV	32.8	38.9	9.9	39.9		41.7	53.9	12.2	100	0	

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

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

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Telephone : +81 463 50 6400

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber
Date	2013/5/13	2013/5/14
Temperature / Humidity	25 deg.C , 55 %RH	20 deg.C , 50 %RH
Engineer	Akio Hayashi	Akio Hayashi
	(below 1GHz / above 18GHz)	(1GHz-18GHz)
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.	299.098	QP	30.0	19.6	10.3	31.8		28.1	46.0	17.9	170	233	
Hori.	598.379	QP	41.3	19.3	8.8	32.0		37.4	46.0	8.6	100	104	
Hori.	697.902	QP	34.1	20.7	9.3	32.0		32.1	46.0	13.9	115	148	
Hori.	1595.149	PK	51.7	25.5	13.4	40.9		49.7	73.9	24.2	100	101	
Hori.	2483.500	PK	47.0	27.6	14.3	40.9		48.0	73.9	25.9	100	100	
Hori.	4960.000	PK	48.9	31.5	6.9	41.5		45.8	73.9	28.1	100	96	
Hori.	7440.000	PK	50.0	36.3	8.0	41.4		52.9	73.9	21.0	100	0	
Hori.	9920.000	PK	48.8	38.1	9.5	40.7		55.7	73.9	18.2	100	0	
Hori.	12400.000	PK	47.1	38.9	9.8	39.8		56.0	73.9	17.9	100	0	
Hori.	1595.149	AV	42.0	25.5	13.4	40.9		40.0	53.9	13.9	100	101	
Hori.	2483.500	AV	30.0	27.6	14.3	40.9		31.0	53.9	22.9	100	100	
Hori.	4960.000	AV	36.6	31.5	6.9	41.5		33.5	53.9	20.4	100	96	
Hori.	7440.000	AV	36.3	36.3	8.0	41.4		39.2	53.9	14.7	100	0	
Hori.	9920.000	AV	35.7	38.1	9.5	40.7		42.6	53.9	11.3	100	0	
Hori.	12400.000	AV	34.6	38.9	9.8	39.8		43.5	53.9	10.4	100	0	
Vert.	199.398	QP	30.5	16.6	9.0	31.8		24.3	43.5	19.2	100	185	
Vert.	598.196	QP	38.3	19.3	8.8	32.0		34.4	46.0	11.6	110	141	
Vert.	697.898	QP	35.6	20.7	9.3	32.0		33.6	46.0	12.4	100	235	
Vert.	1595.149	PK	52.0	25.5	13.4	40.9		50.0	73.9	23.9	100	166	
Vert.	2483.500	PK	47.9	27.6	14.3	40.9		48.9	73.9	25.0	100	139	
Vert.	4960.000	PK	49.0	31.5	6.9	41.5		45.9	73.9	28.0	100	141	
Vert.	7440.000	PK	49.3	36.3	8.0	41.4		52.2	73.9	21.7	100	0	
Vert.	9920.000	PK	49.4	38.1	9.5	40.7		56.3	73.9	17.6	100	0	
Vert.	12400.000	PK	48.6	38.9	9.8	39.8		57.5	73.9	16.4	100	0	
Vert.	1595.149	AV	41.0	25.5	13.4	40.9		39.0	53.9	14.9	100	166	
Vert.	2483.500	AV	31.0	27.6	14.3	40.9		32.0	53.9	21.9	100	139	
Vert.	4960.000	AV	37.0	31.5	6.9	41.5		33.9	53.9	20.0	100	141	
Vert.	7440.000	AV	36.5	36.3	8.0	41.4		39.4	53.9	14.5	100	0	
Vert.	9920.000	AV	35.8	38.1	9.5	40.7		42.7	53.9	11.2	100	0	
Vert.	12400.000	AV	34.8	38.9	9.8	39.8		43.7	53.9	10.2	100	0	

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

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

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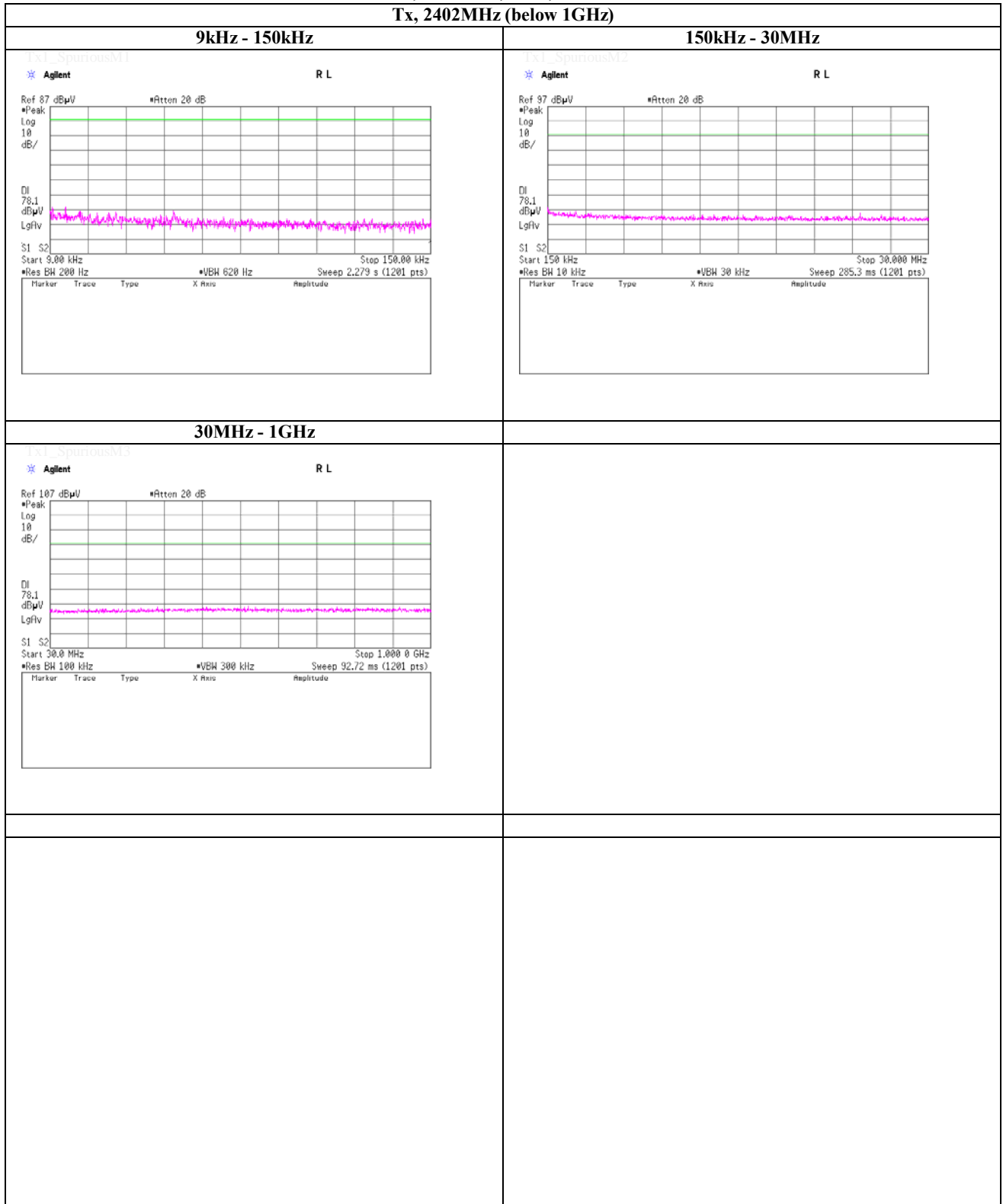
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)



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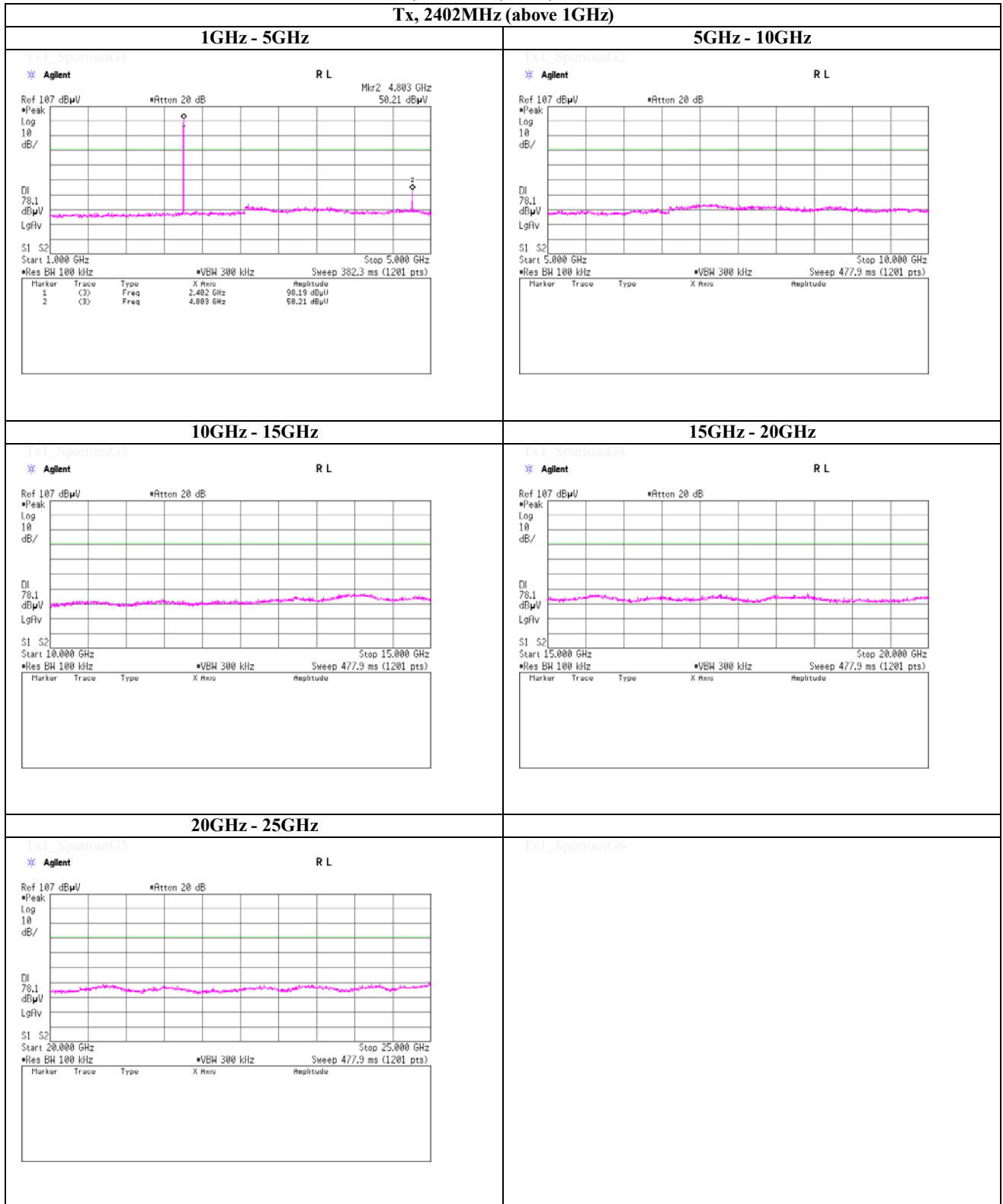
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (above 1GHz)



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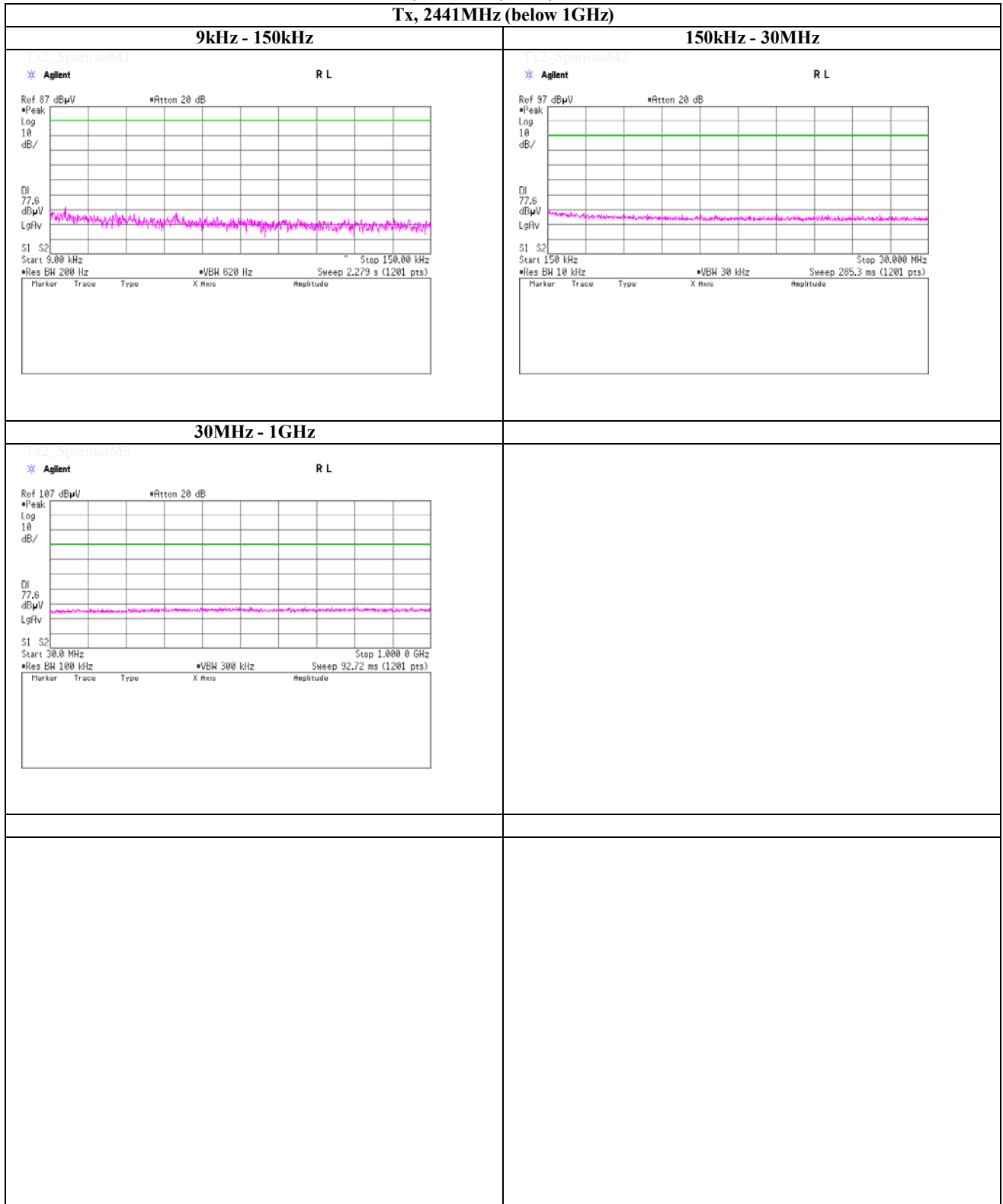
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)



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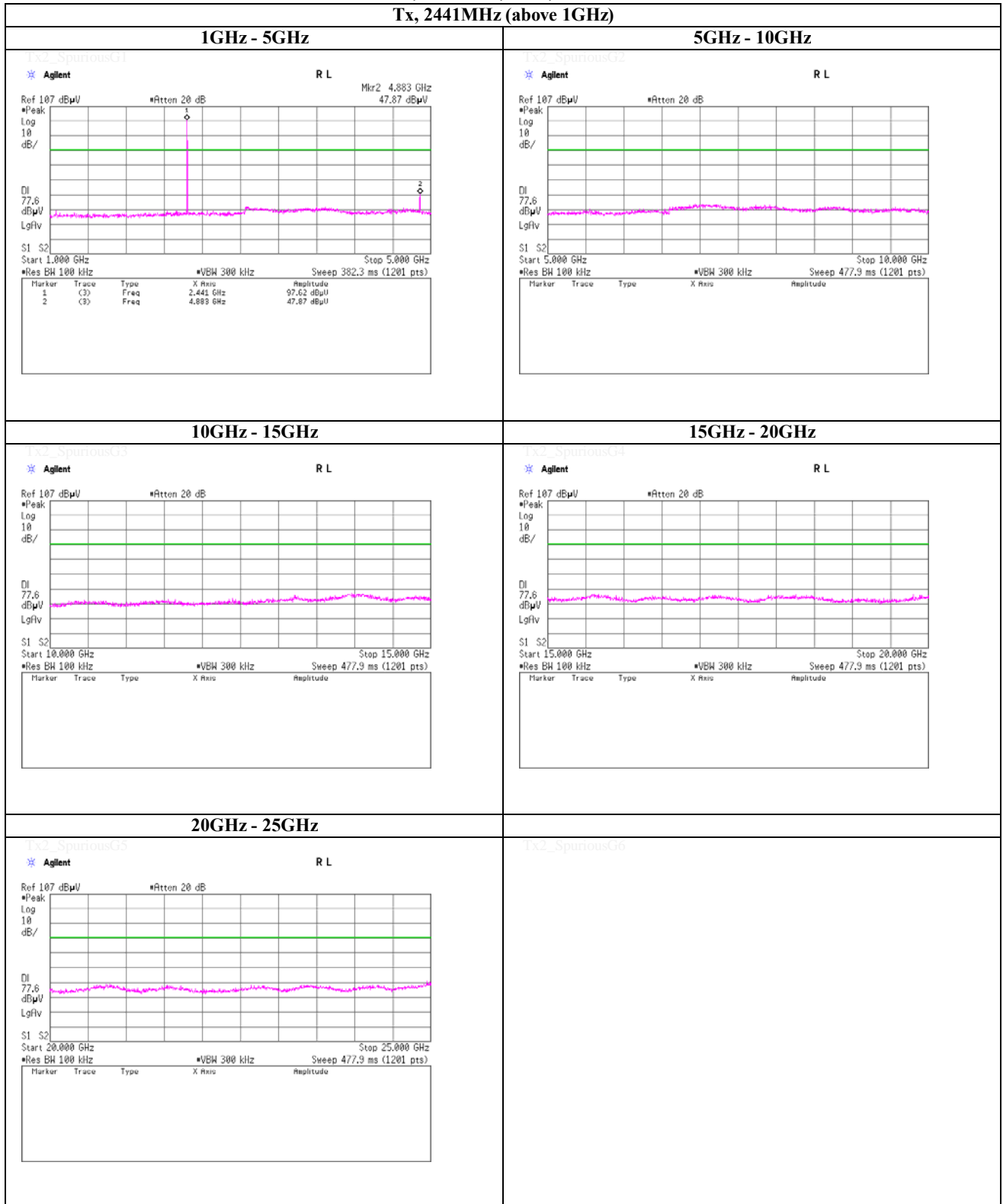
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)



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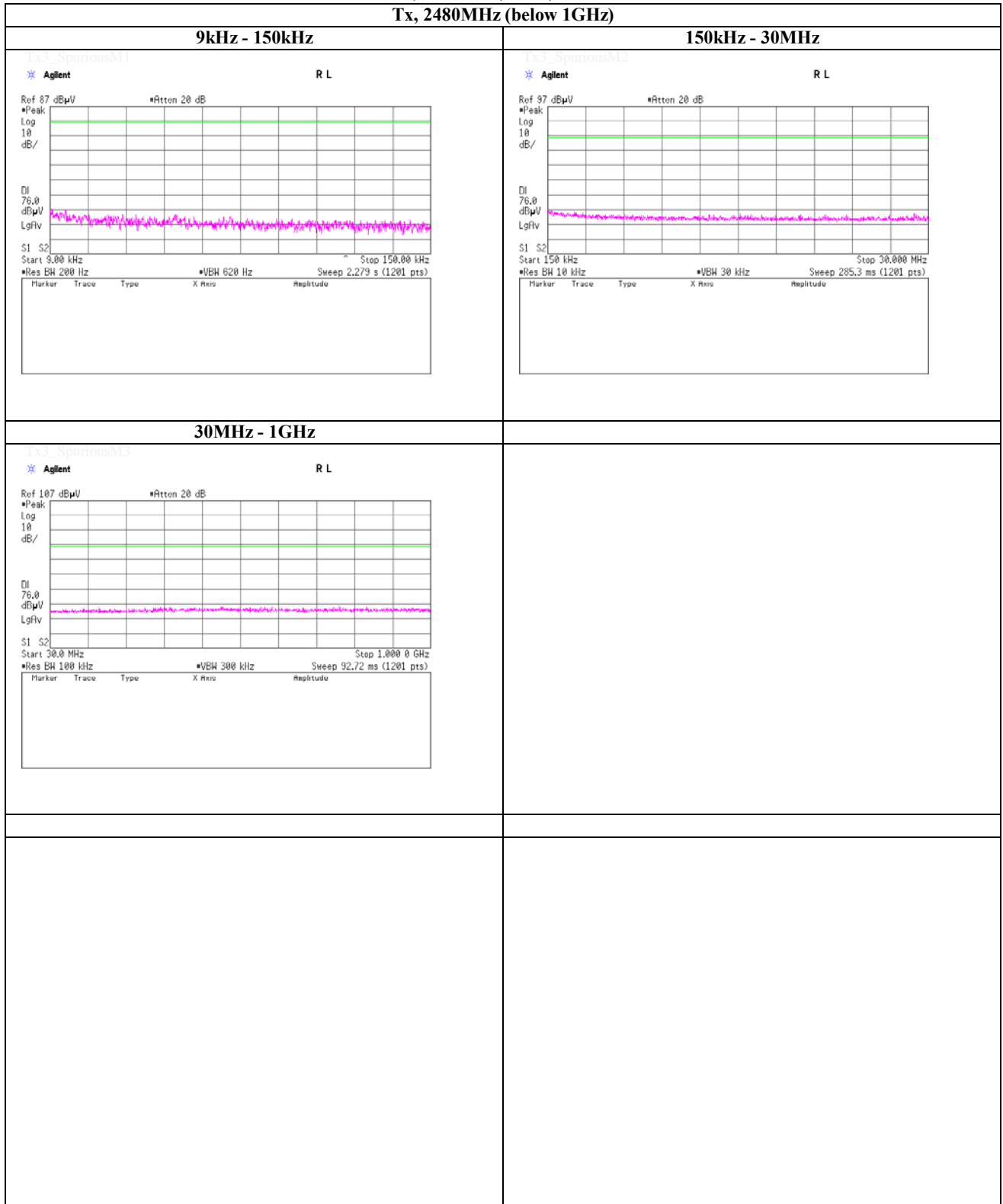
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)



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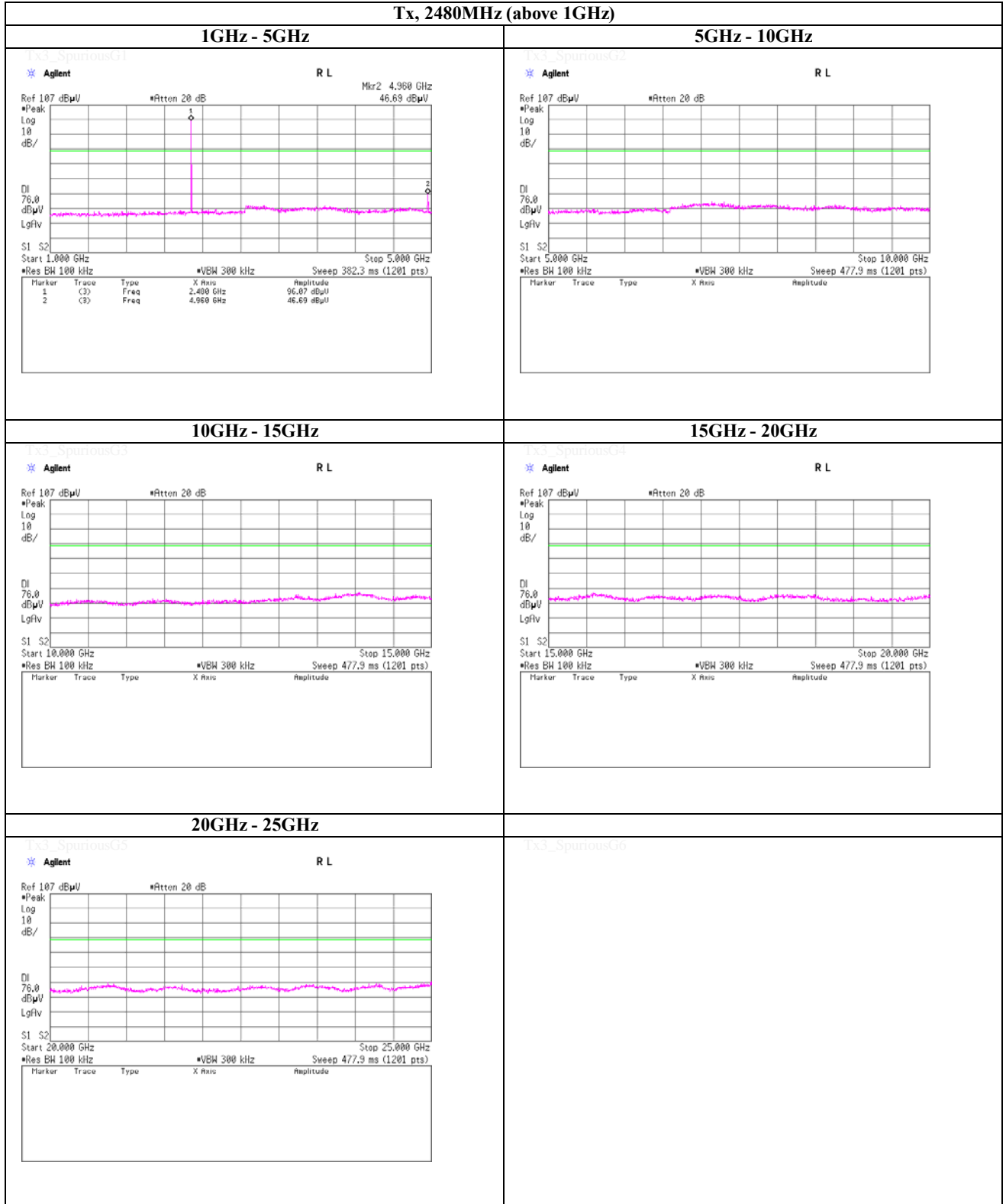
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)



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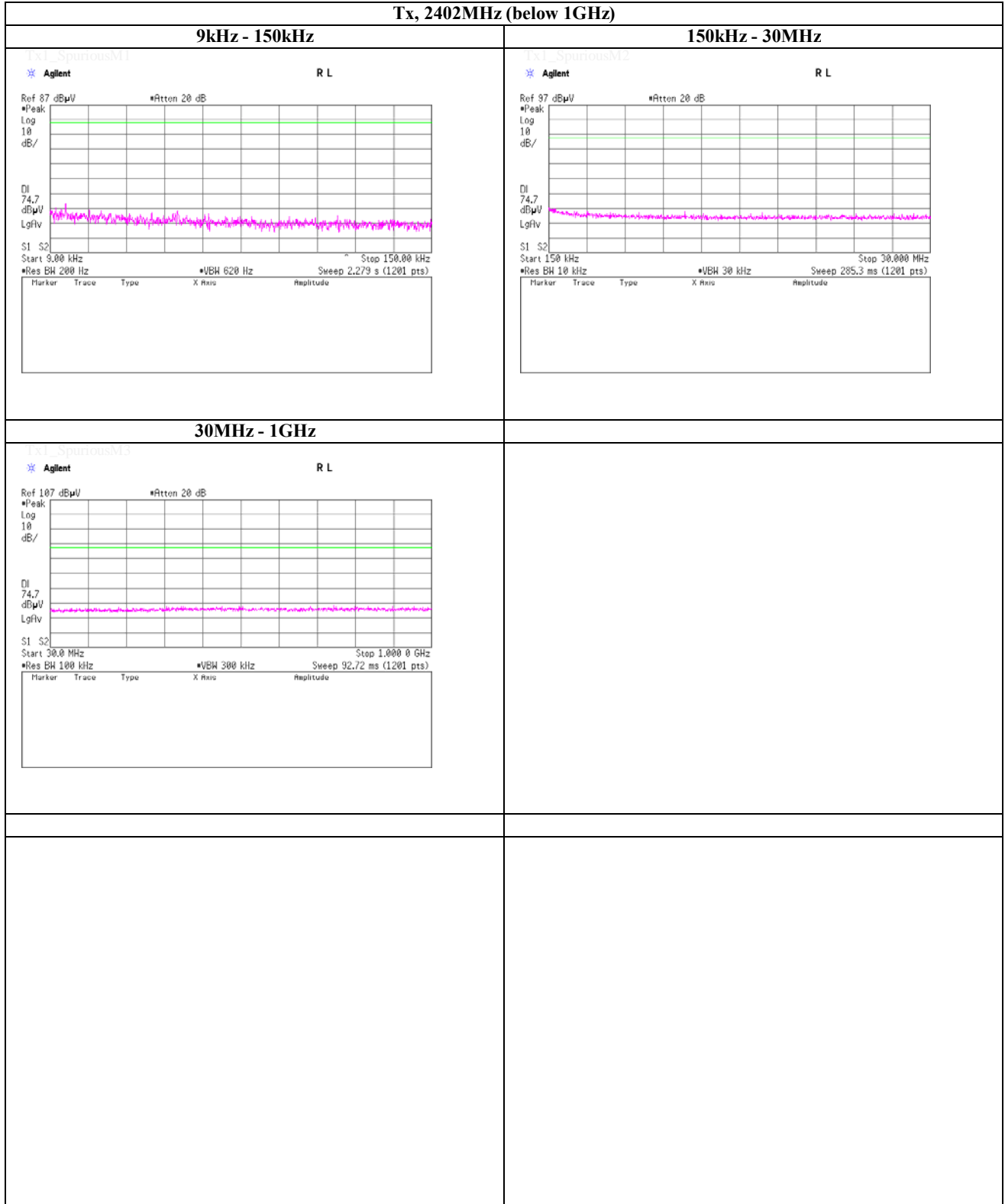
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)



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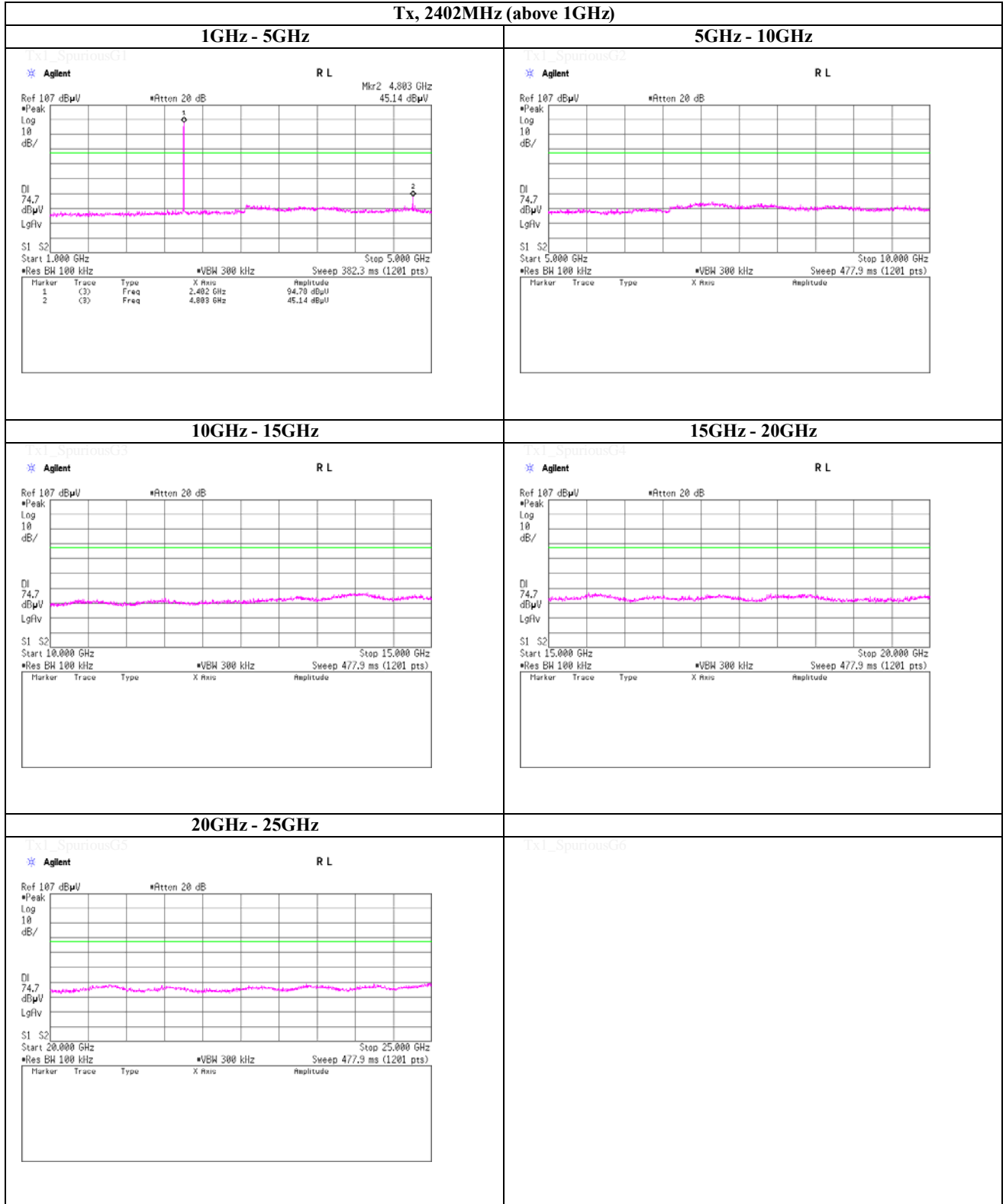
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)



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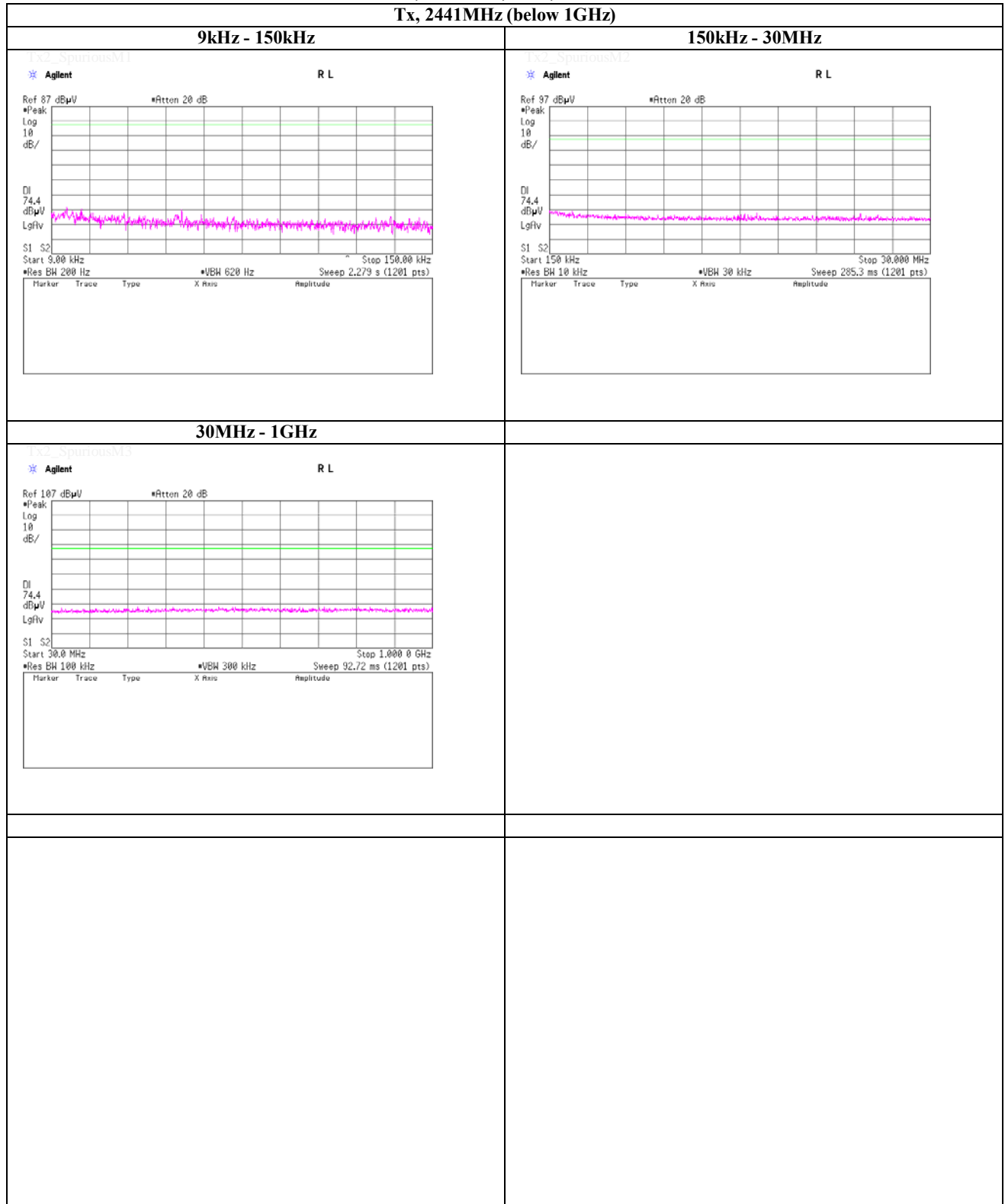
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)



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Shonan EMC Lab.

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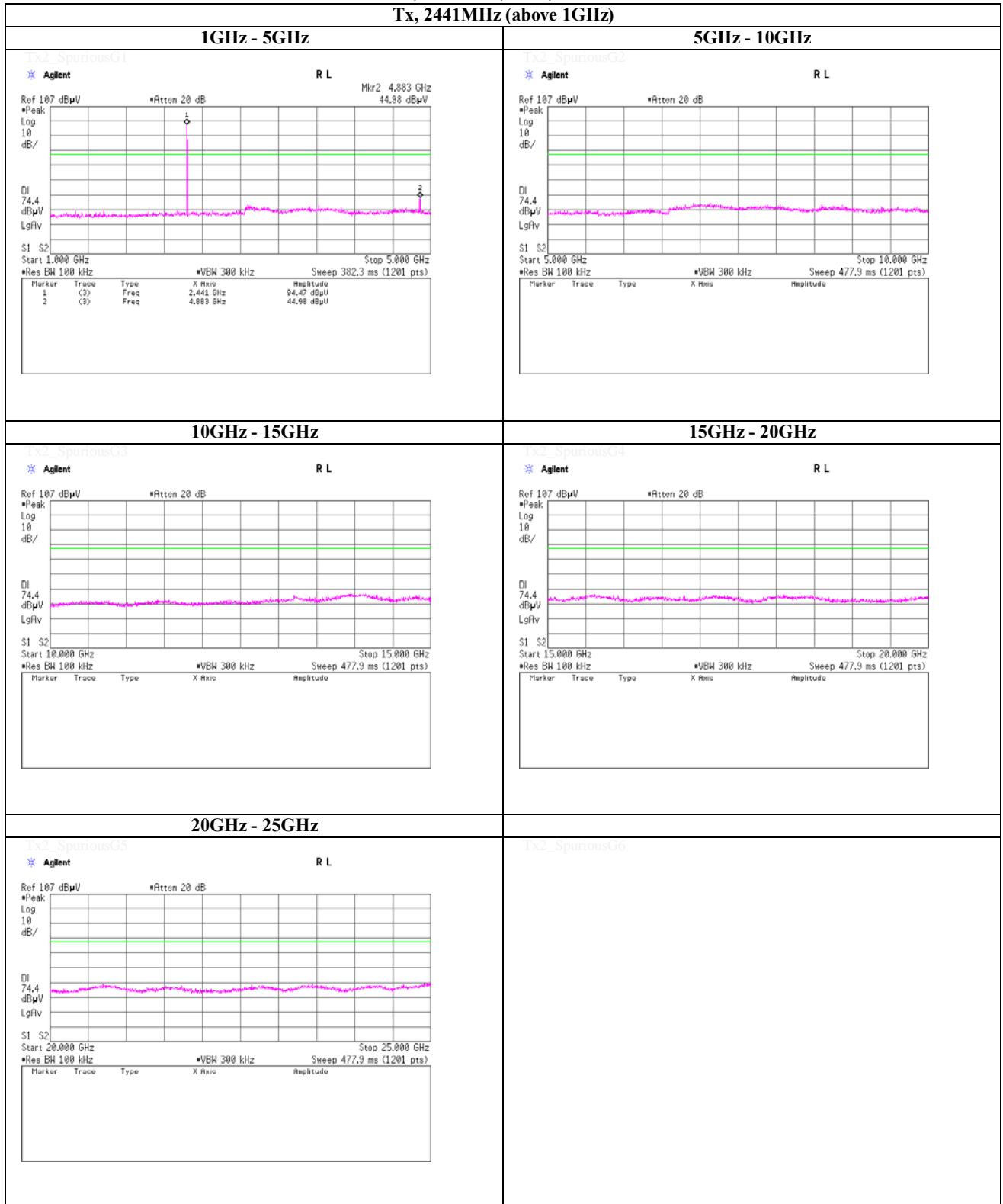
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)



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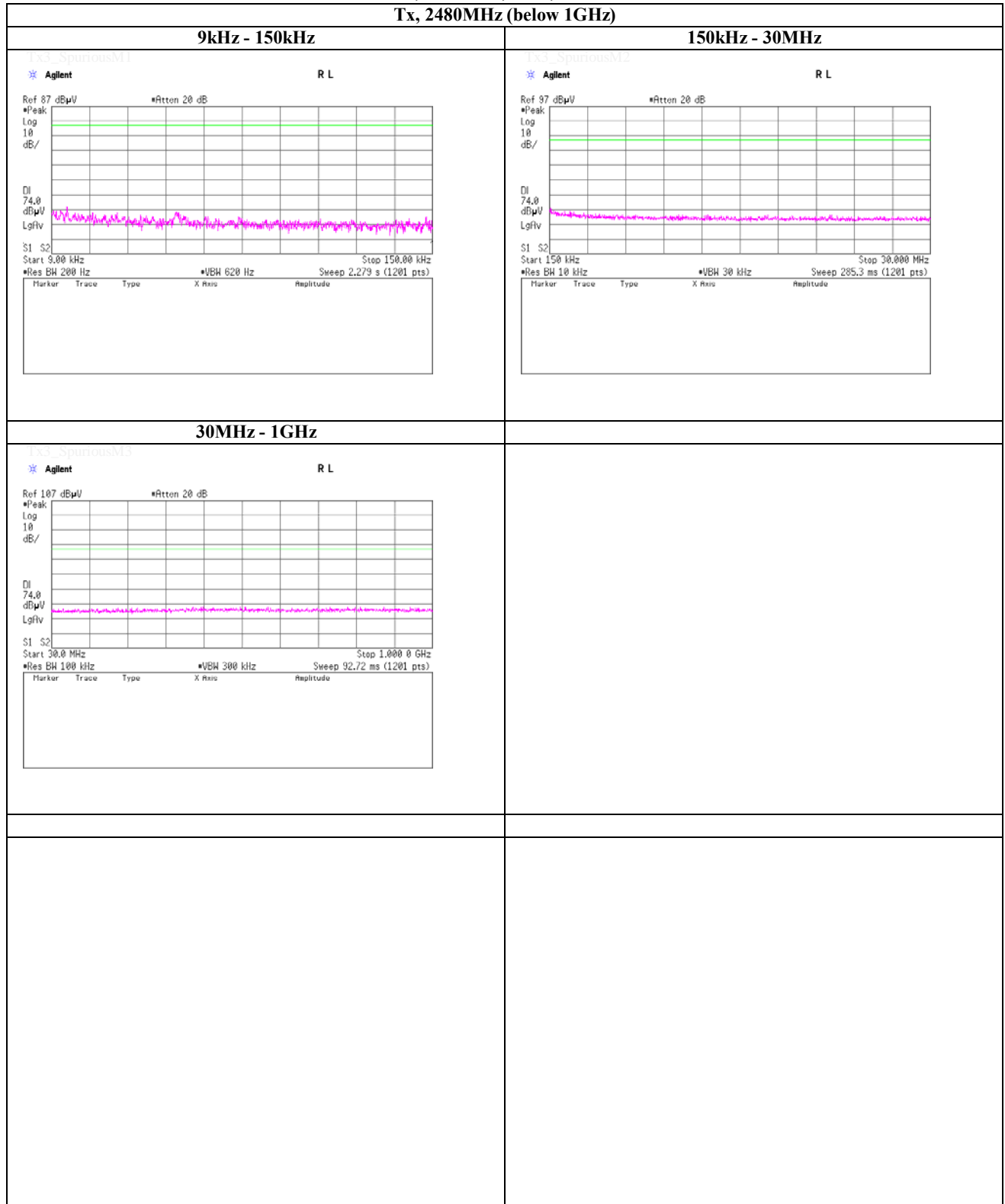
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)



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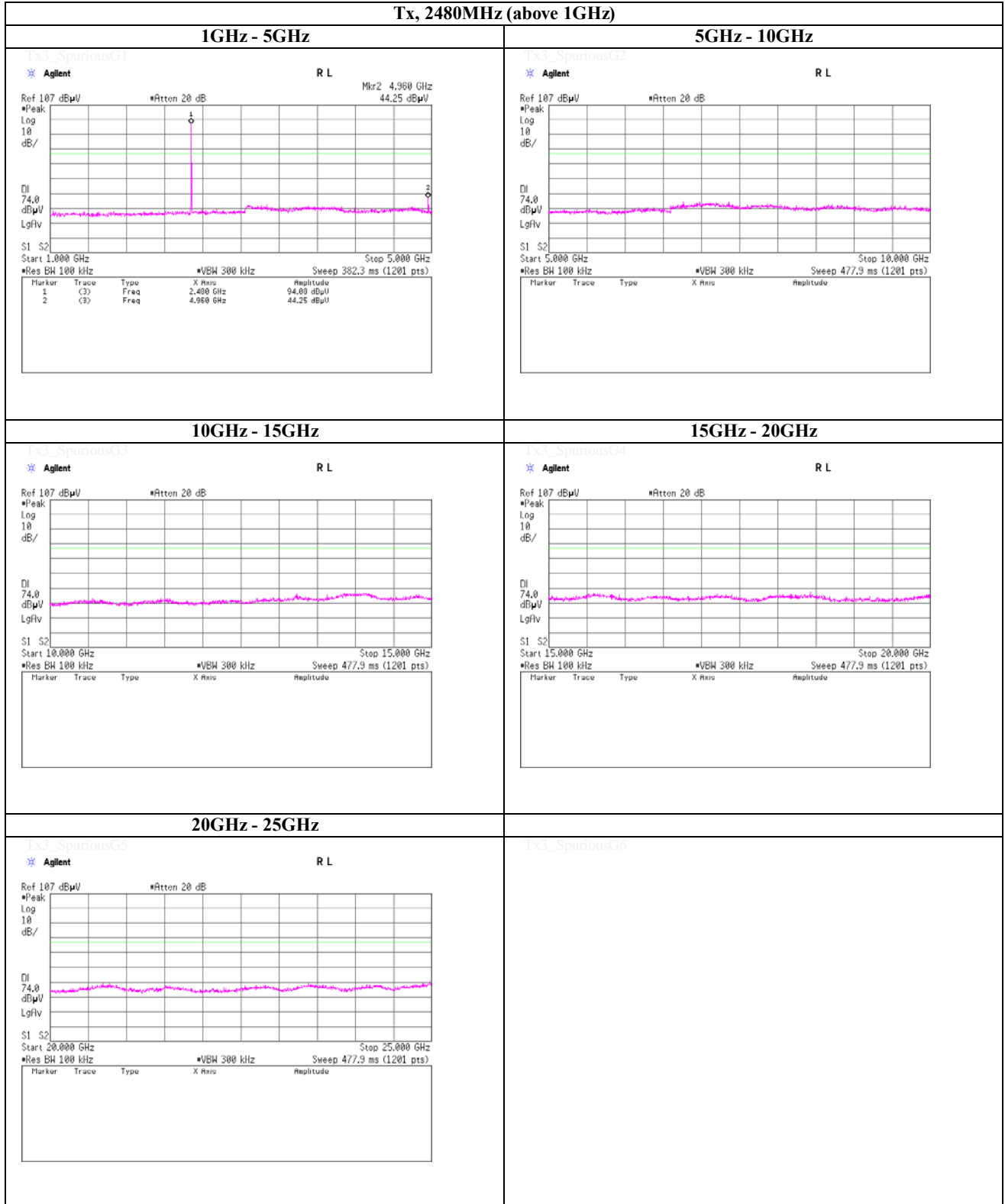
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (above 1GHz)



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Shonan EMC Lab.

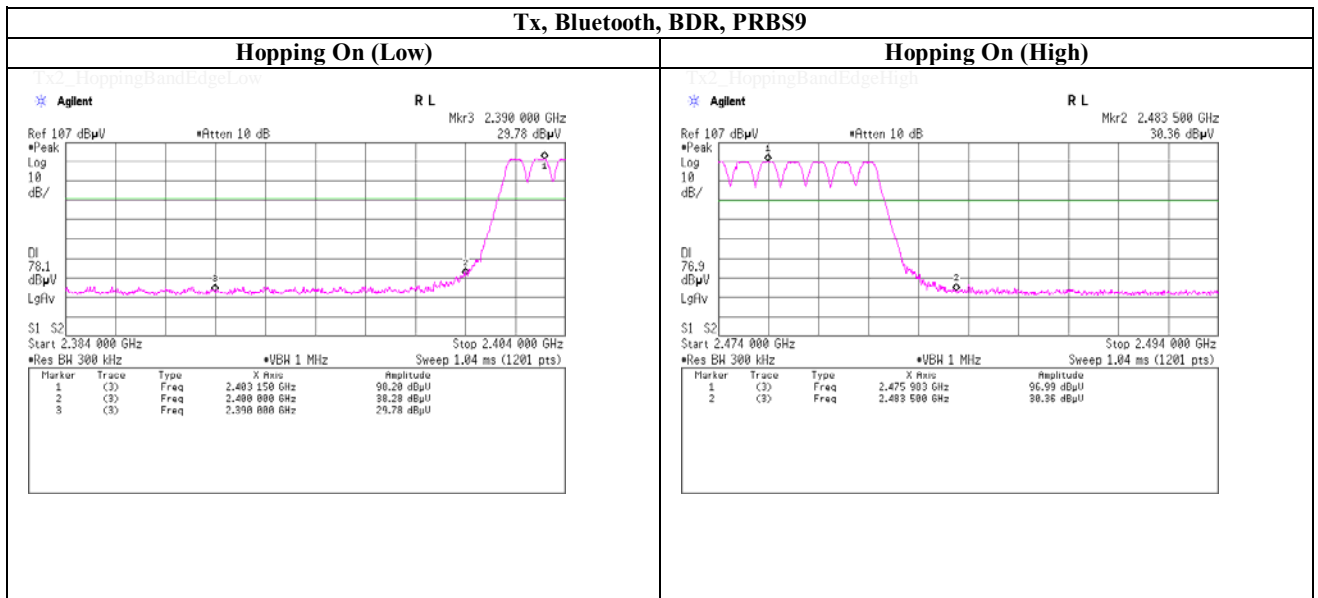
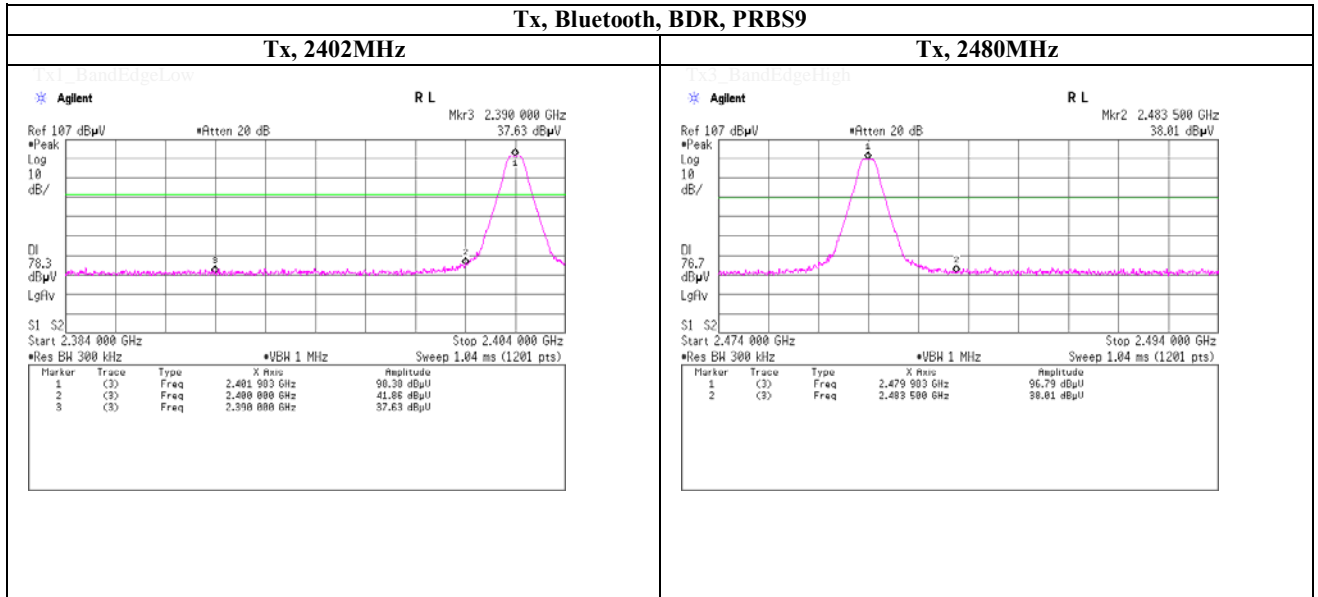
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Spurious emission (Conducted)

Band Edge compliance



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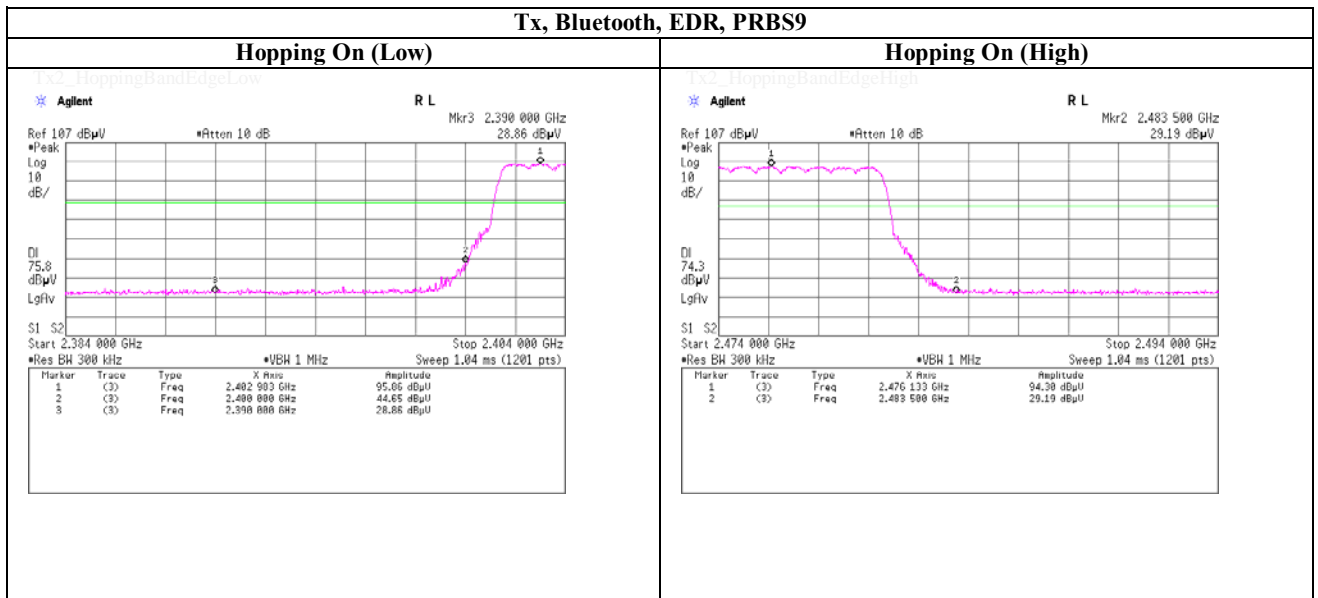
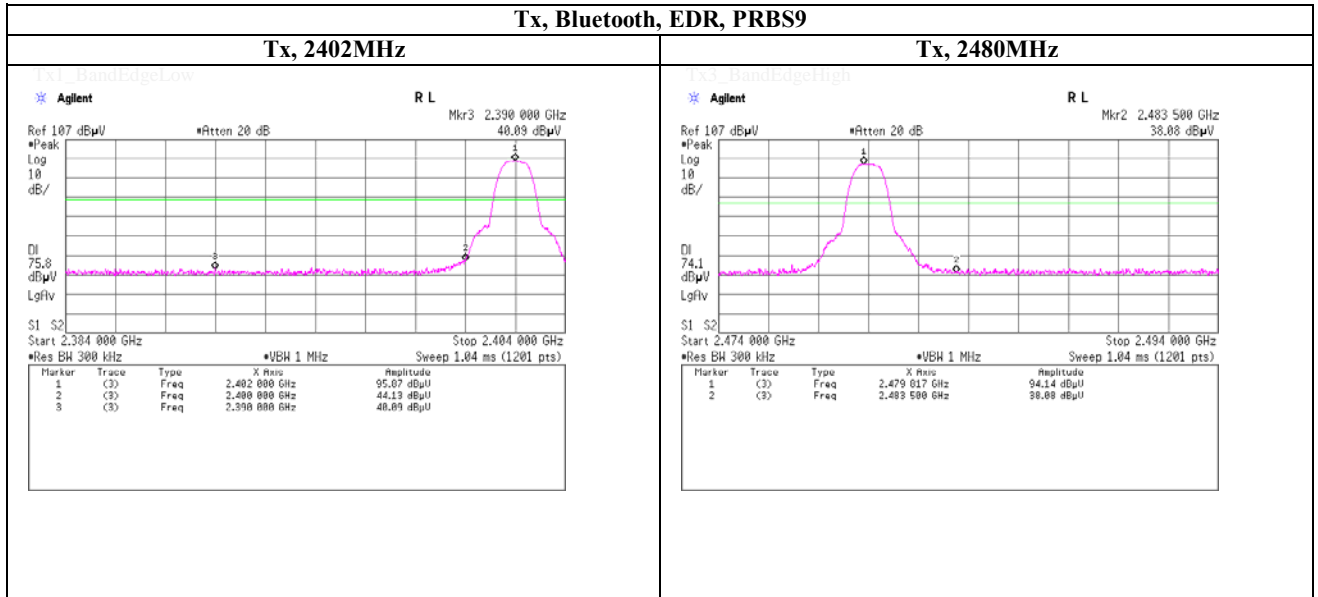
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Spurious emission (Conducted)

Band Edge compliance



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99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9	
Tx, 2402MHz	Tx, 2441MHz
<p>TX1_99OBW</p> <p style="text-align: right;">R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.402 000 0 GHz *Res BW 30 kHz Span 3 MHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 886.8046 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -15.215 kHz x dB Bandwidth 936.620 kHz*</p>	<p>TX2_99OBW</p> <p style="text-align: right;">R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 000 0 GHz *Res BW 30 kHz Span 3 MHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 877.1687 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -17.859 kHz x dB Bandwidth 932.210 kHz*</p>
<p>TX3_99OBW</p> <p style="text-align: right;">R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.480 000 0 GHz *Res BW 30 kHz Span 3 MHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 869.3456 kHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -18.098 kHz x dB Bandwidth 922.567 kHz*</p>	<p>TX2_Hopping99OBW</p> <p style="text-align: right;">R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Log 10 dB/</p> <p>LgAv</p> <p>M1 S2 Center 2.441 00 GHz *Res BW 1 MHz Span 100 MHz *VBW 3 MHz Sweep 1.04 ms (1201 pts)</p> <p>Occupied Bandwidth 78.5103 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -20.00 dB</p> <p>Transmit Freq Error -99.327 kHz x dB Bandwidth 80.758 MHz*</p>
<p>TX2_Inquiry99OBW</p>	<p>TX2_InqHopping99OBW</p>

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99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	Tx, 2441MHz
<p>TX1_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Center 2.402 000 0 GHz Span 3 MHz</p> <p>Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1718 MHz</p> <p>Occ BW % Pwr 99.00 %</p> <p>x dB -20.00 dB</p> <p>Transmit Freq Error -15.398 kHz</p> <p>x dB Bandwidth 1.265 MHz*</p>	<p>TX2_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Center 2.441 000 0 GHz Span 3 MHz</p> <p>Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1686 MHz</p> <p>Occ BW % Pwr 99.00 %</p> <p>x dB -20.00 dB</p> <p>Transmit Freq Error -16.798 kHz</p> <p>x dB Bandwidth 1.273 MHz*</p>
<p>TX3_99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Center 2.480 000 0 GHz Span 3 MHz</p> <p>Res BW 30 kHz *VBW 100 kHz Sweep 10.08 ms (1201 pts)</p> <p>Occupied Bandwidth 1.1698 MHz</p> <p>Occ BW % Pwr 99.00 %</p> <p>x dB -20.00 dB</p> <p>Transmit Freq Error -15.587 kHz</p> <p>x dB Bandwidth 1.286 MHz*</p>	<p>TX2_Hopping*99OBW</p> <p>Agilent R L</p> <p>Ref 107 dBμV *Atten 10 dB</p> <p>Center 2.441 00 GHz Span 100 MHz</p> <p>Res BW 1 MHz *VBW 3 MHz Sweep 1.04 ms (1201 pts)</p> <p>Occupied Bandwidth 78.6173 MHz</p> <p>Occ BW % Pwr 99.00 %</p> <p>x dB -20.00 dB</p> <p>Transmit Freq Error -135.358 kHz</p> <p>x dB Bandwidth 81.009 MHz*</p>
<p>TX2_Inquiry*99OBW</p>	<p>TX2_InqHopping*99OBW</p>

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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)
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2013/01/08 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2012/11/15 * 12
SCC-G30	Coaxial Cable	Junkosha	MWX241-02000KM SKMS	SEP-20-12-00 4	AT	2012/09/26 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2013/03/04 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2013/02/12 * 12
SAT6-05	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2013/02/12 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2012/10/08 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2013/04/04 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2013/04/04 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2012/11/18 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2013/02/27 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2012/10/04 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2012/09/11 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,LMF)	-	RE	-
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2013/03/19 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2013/04/09 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2012/05/22 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2012/08/20 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2		2013/03/16 * 12
KAT10-S2	Attenuator	Agilent	8490D 010	06036	RE/RFI	2012/12/18 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	004	RE	2013/04/03 * 12

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

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

Test Item :

RE: Radiated emission ,
AT: Antenna terminal disturbance voltage