



Test report No. : 10085484S-A
Page : 1 of 51
Issued date : November 28, 2013
Revised date : December 4, 2013
FCC ID : AK8MEXN4000BT

RADIO TEST REPORT

Test Report No.: 10085484S-A

Applicant : Sony Corporation
Type of Equipment : Bluetooth Audio System
Model No. : MEX-N4000BT
FCC ID : AK8MEXN4000BT
Test regulation : FCC Part15 Subpart C: 2013
Test result : Complied

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Date of test: October 29 to November 19, 2013

Tested by: *S. Takano*
Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : *T. Imamura*
Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service



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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony Corporation
Address : Sony City Osaki, 2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan
Telephone Number : +81 50 3750 7634
Facsimile Number : +81 50 3750 6574
Contact Person : Toshihiro Maeda

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

2.1 Identification of E.U.T.

Type of Equipment : Bluetooth Audio System
Model Number : MEX-N4000BT
Serial Number : Refer to 4.2 of this report.
Rating : DC12V (car battery)
Country of Mass-production : Thailand
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : October 29, 2013
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: MEX-N4000BT (referred to as the EUT in this report) is a Bluetooth Audio System.

Clock frequency(ies) in the system : 48.000MHz, 36.480MHz, 26.000MHz, 16.9344MHz, 13.333MHz,
32.768kHz

Bluetooth specification:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS
Operation temperature range : -20 to +60 deg.C.
Antenna type : Meander Monopole
Antenna connector type : U-FL Type Interchangeability
Antenna gain : 0.929dBi (Peak)
ITU code : F1D, G1D

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 the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

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Comparison list of similar models:

		Item Model	MEX-N4000BT	MEX-N4050BT
1	Destination		UC	E
2	Color of Front Panel		RED/Blue	Red
3	Handling Country		USA	Venezuela
			Canada	Chile
				Nicaragua
				Costa Rica
				Uruguay
				Honduras
				Paraguay
				Korea
				Singapore
				Malaysia
				Taiwan
				Australia
				New Zealand
		Indonesia		
		Oman		
4	f cover	LW		
		MW	MW 530.000kHz~ 1710.000kHz	MW 531.000kHz~ 1602.000kHz
		MW	MW 530.000kHz~ 1710.000kHz	MW 531.000kHz~ 1602.000kHz
		SW	-	-
		SW	-	-
		FM	FM 87.500MHz~ 107.900MHz	FM 87.500MHz~ 108.000MHz
		FM	FM 87.500MHz~ 107.900MHz	FM 87.500MHz~ 108.000MHz
		FM	FM 87.500MHz~ 107.900MHz	FM 87.500MHz~ 108.000MHz
5	IF Band Change	9kHz/10kHz	-	X
6	Sirius (Satellite)		X	-

X: Applicable, -: None

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2013,
final revised on September 30, 2013 and effective October 30, 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 revision on September 30, 2013 does not affect the test specification applied to the EUT.

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 10085484S-C.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results	
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	-	-	
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		7.3dB Freq.: 95.992MHz 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	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides 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: (±) 1.6dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB

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

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3.5 Test location

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 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 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	-
<input checked="" type="checkbox"/> No.1 measurement room	-	-	2.55 x 4.1 x 2.5	-	-

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: Blue Suite ver.2.5.0, BlueTest3 ver.2.5.0.93
BtCli ver.2.5.0.93 (Inquiry mode only)

Power Settings: BDR: Ext PA: 23, Int PA: 39
EDR: Ext PA: 73, Int PA: 48

We removed 2-DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative.

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

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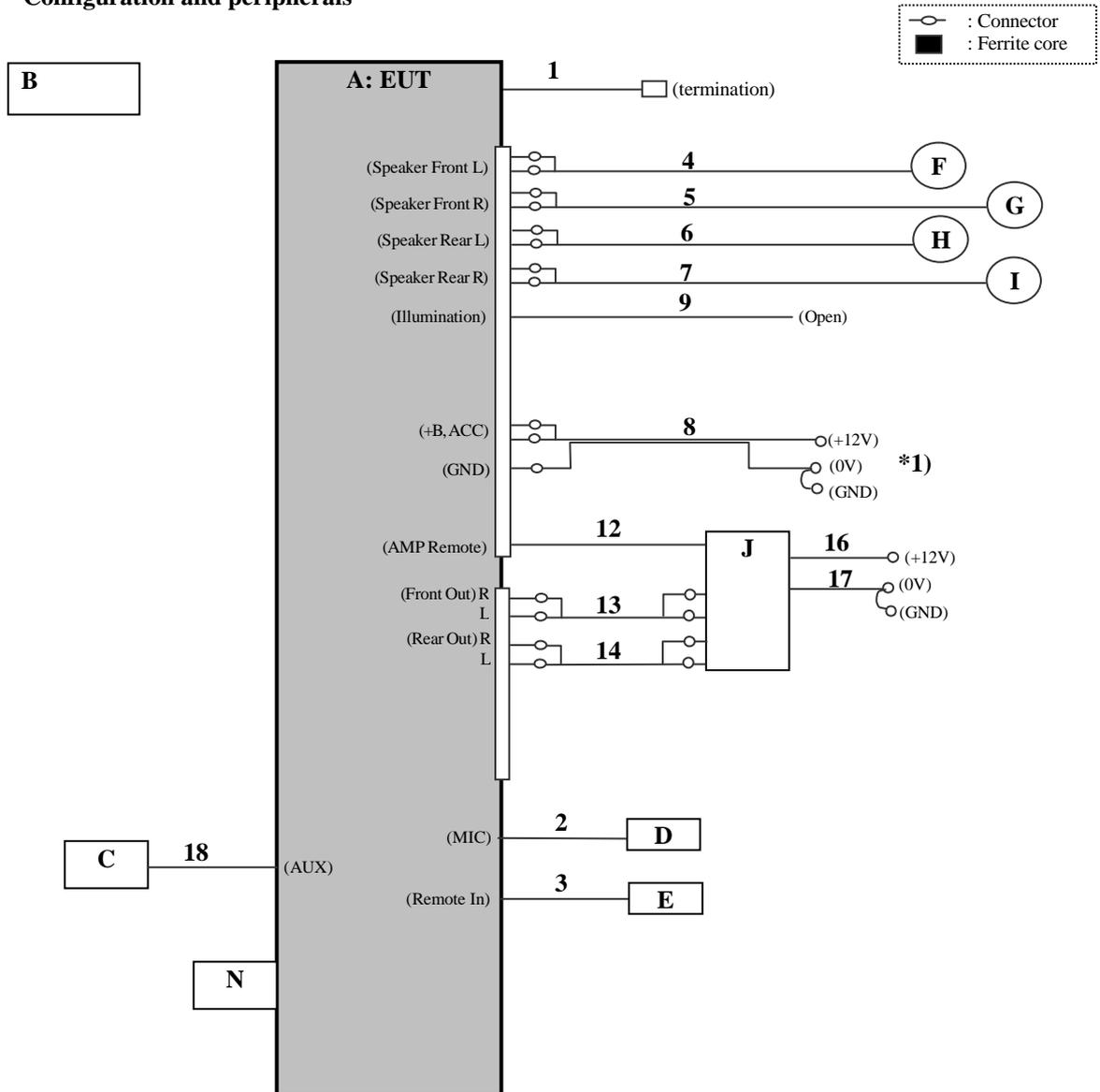
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4.2 Configuration and peripherals



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

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

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth Audio System	MEX-N4000BT	*2)	Sony	EUT
B	Remote Commander	RM-X231	-	Sony	-
C	Media Player	NWZ-A829	1000200	Sony	-
D	MIC	-	-	Sony	-
E	Wired Remote Controller	RM-X2S	-	Sony	-
F	Speaker 1	XS-GTF1338	-	Sony	-
G	Speaker 2	XS-GTF1338	-	Sony	-
H	Speaker 3	XS-GTF1338	-	Sony	-
I	Speaker 4	XS-GTF1338	-	Sony	-
J	Stereo Power Amplifier	XM-4S	-	Sony	-
N	USB Memory	USM4GL	-	Sony	-

*2) 49: Antenna terminal conducted tests, 20: Radiated emission tests

List of cables used

No.	Name	Length (m)	Shield- Cable	Shield- Connector	Remarks
1	FM antenna	2.0	Shielded	Shielded	-
2	MIC	4.0	Shielded	Shielded	-
3	REMOTE IN	1.9	Shielded	Shielded	-
4	Speaker (1)	0.15+2.1	Unshielded	Unshielded	-
5	Speaker (2)	0.15+2.1	Unshielded	Unshielded	-
6	Speaker (3)	0.15+2.1	Unshielded	Unshielded	-
7	Speaker (4)	0.15+2.1	Unshielded	Unshielded	-
8	DC Power	0.15+1.0	Unshielded	Unshielded	-
9	Illumination	0.15+1.9	Unshielded	Unshielded	-
12	AMP Remote	0.15+1.6	Unshielded	Unshielded	-
13	RCA (Front Audio Out)	0.1+5.0	Shielded	Shielded	-
14	RCA (Rear Audio Out)	0.1+5.0	Shielded	Shielded	-
16	DC Power (+)	1.0	Unshielded	Unshielded	-
17	DC Power (-)	1.0	Unshielded	Unshielded	-
18	Audio	1.5	Shielded	Shielded	-

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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 1.

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 1.

SECTION 7: Number of hopping frequency

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 8: Dwell time

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 9: Maximum peak output power

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX 1.

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 1.

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SECTION 11: Radiated emission

11.1 Operating environment

Test room : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

11.2 Test configuration

EUT was placed on a platform of nominal size, 1.0m 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 3.

11.3 Test conditions

Frequency range : 30MHz - 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.

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 mounting angle of 0 to +45 deg (lengthwise direction) and -45 to +45 deg (crosswise direction) 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.

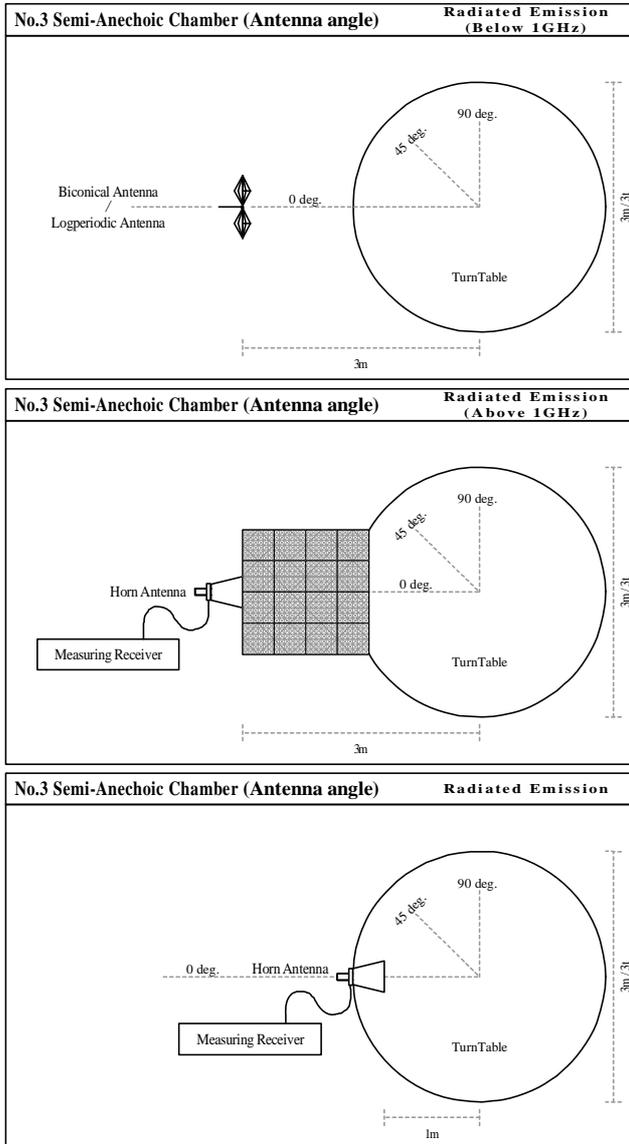
Antenna polarization \ Test item		Carrier	Spurious emission (Below 1GHz)	Spurious emission (1-15GHz)	Spurious emission (Above 15GHz)
Horizontal	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.

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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 1.

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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

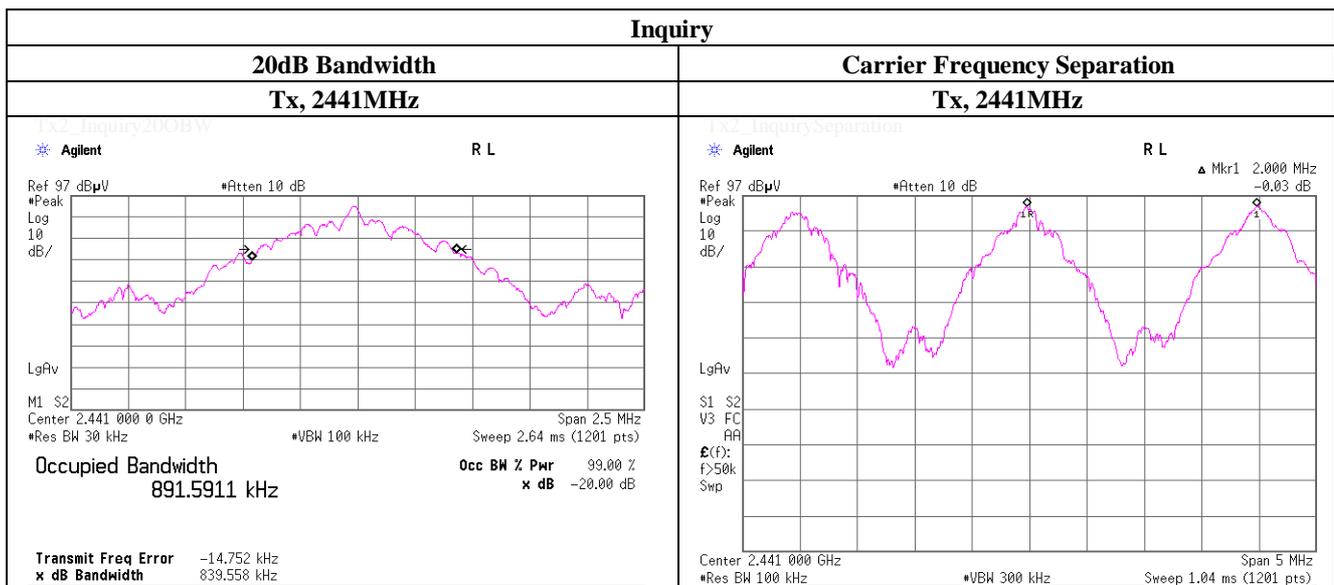
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	October 29, 2013	
Temperature / Humidity	27 deg.C , 46 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.961	1.000	>= 0.641
DH5	2441.0	1.015	1.000	>= 0.676
DH5	2480.0	1.022	1.000	>= 0.681
Inquiry	2441.0	0.840	2.000	>= 0.560

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

No limit applies to 20dB Bandwidth.



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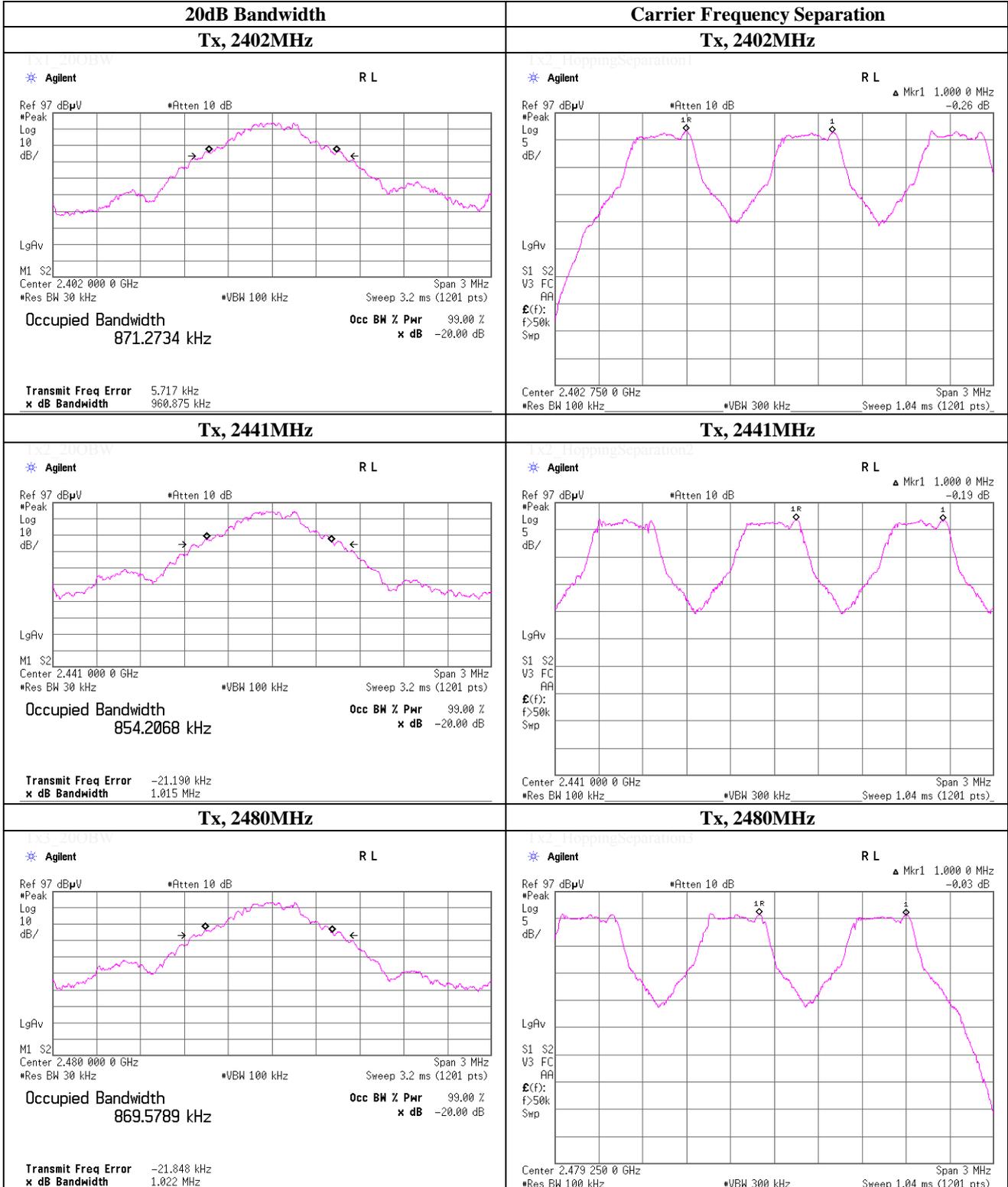
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9



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20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Measurement Room
 Date October 29, 2013
 Temperature / Humidity 27 deg.C , 46 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth, EDR, PRBS9

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.287	1.000	>= 0.858
3-DH5	2441.0	1.288	1.000	>= 0.858
3-DH5	2480.0	1.282	1.000	>= 0.855

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

No limit applies to 20dB Bandwidth.

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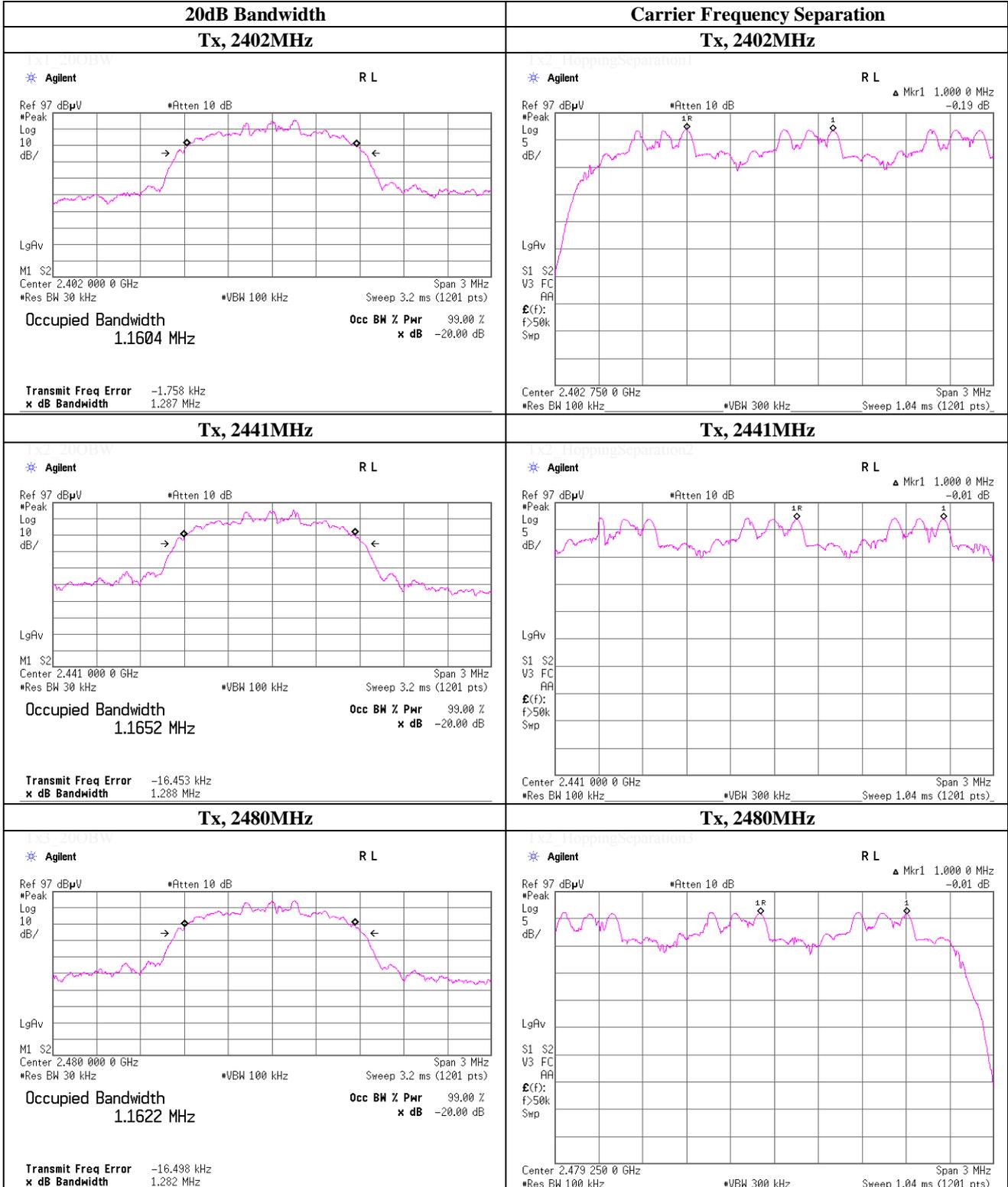
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9



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Shonan EMC Lab.

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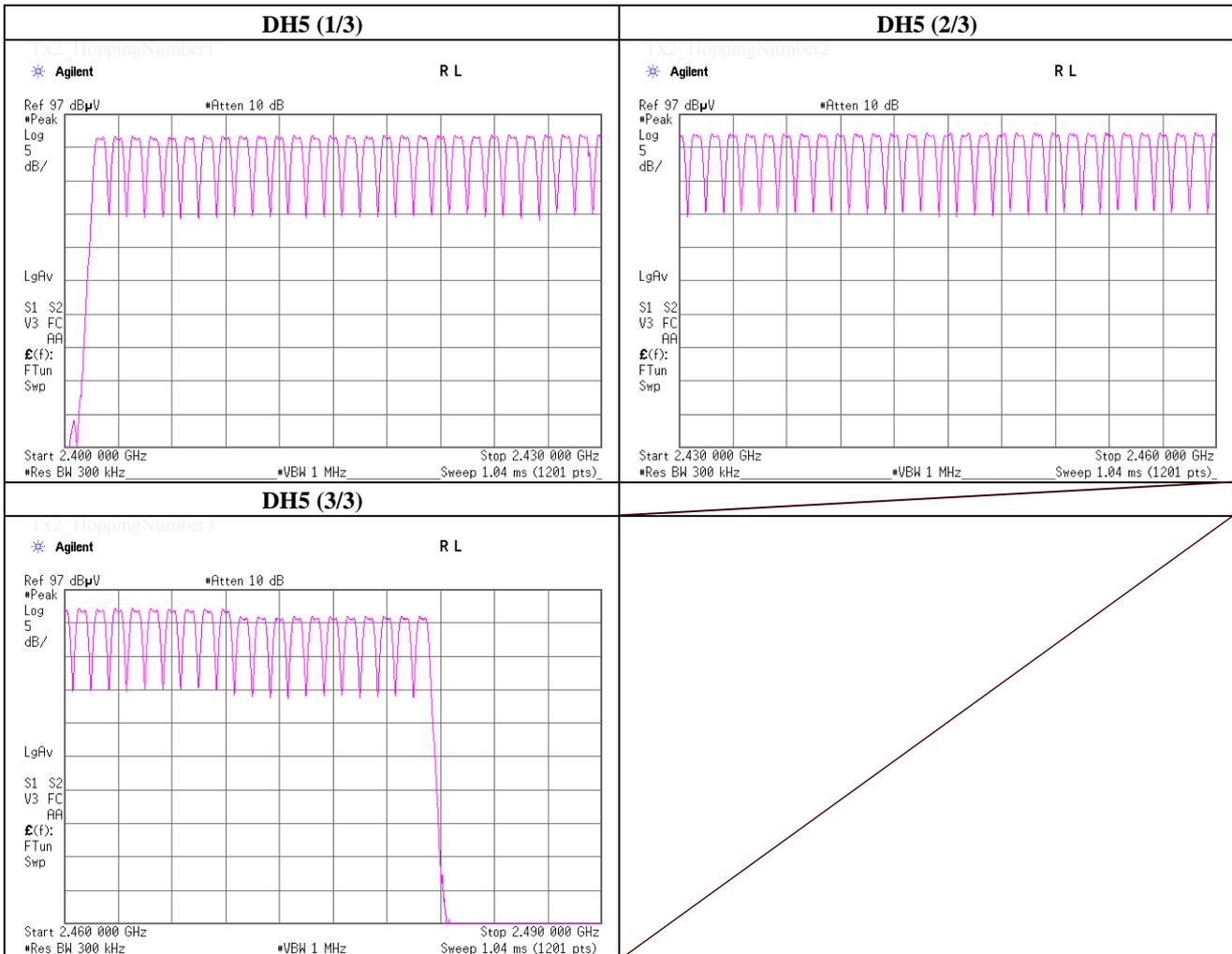
Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	October 29, 2013	
Temperature / Humidity	27 deg.C , 46 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

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

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



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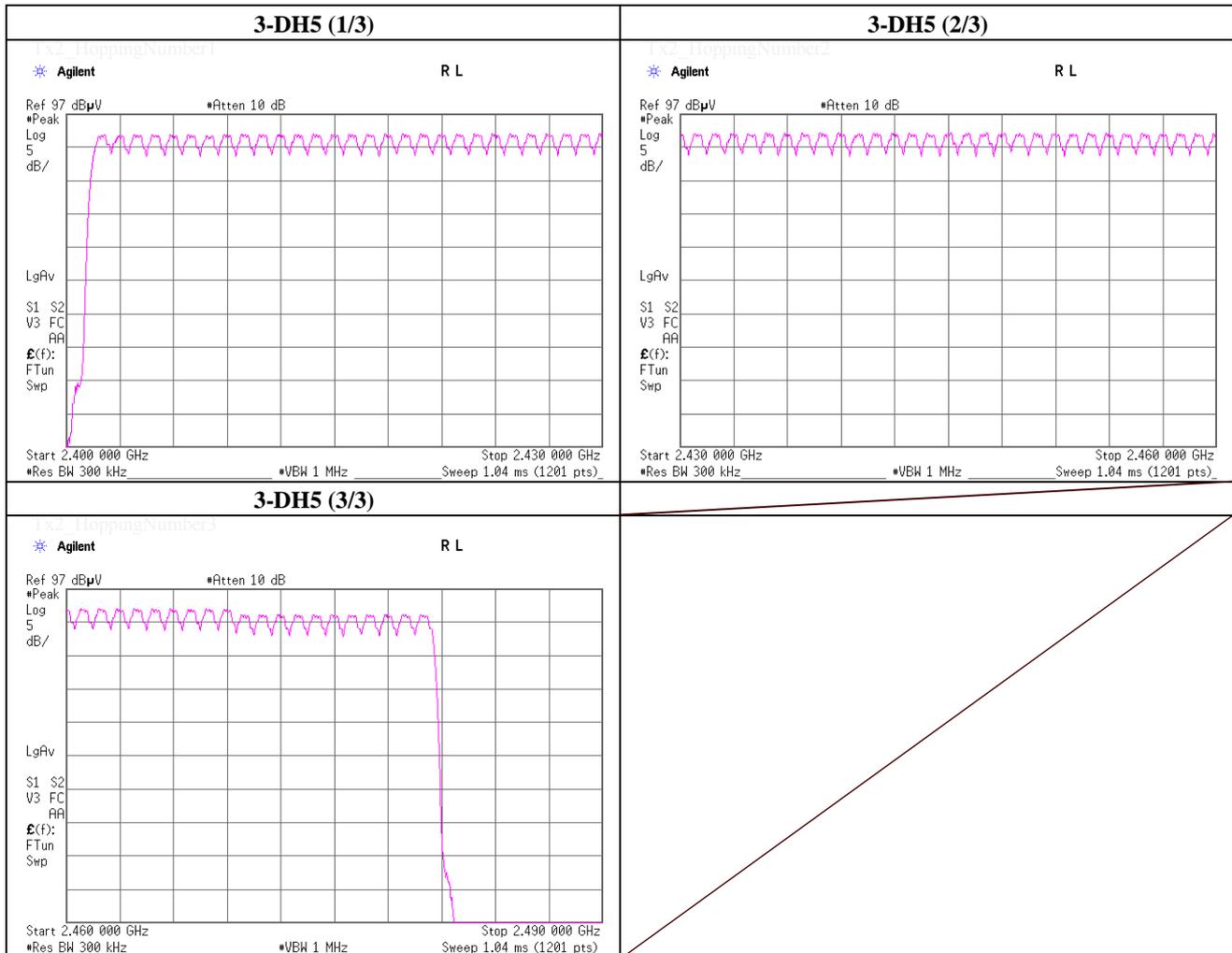
Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	October 29, 2013	
Temperature / Humidity	27 deg.C , 46 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, EDR, PRBS9	

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

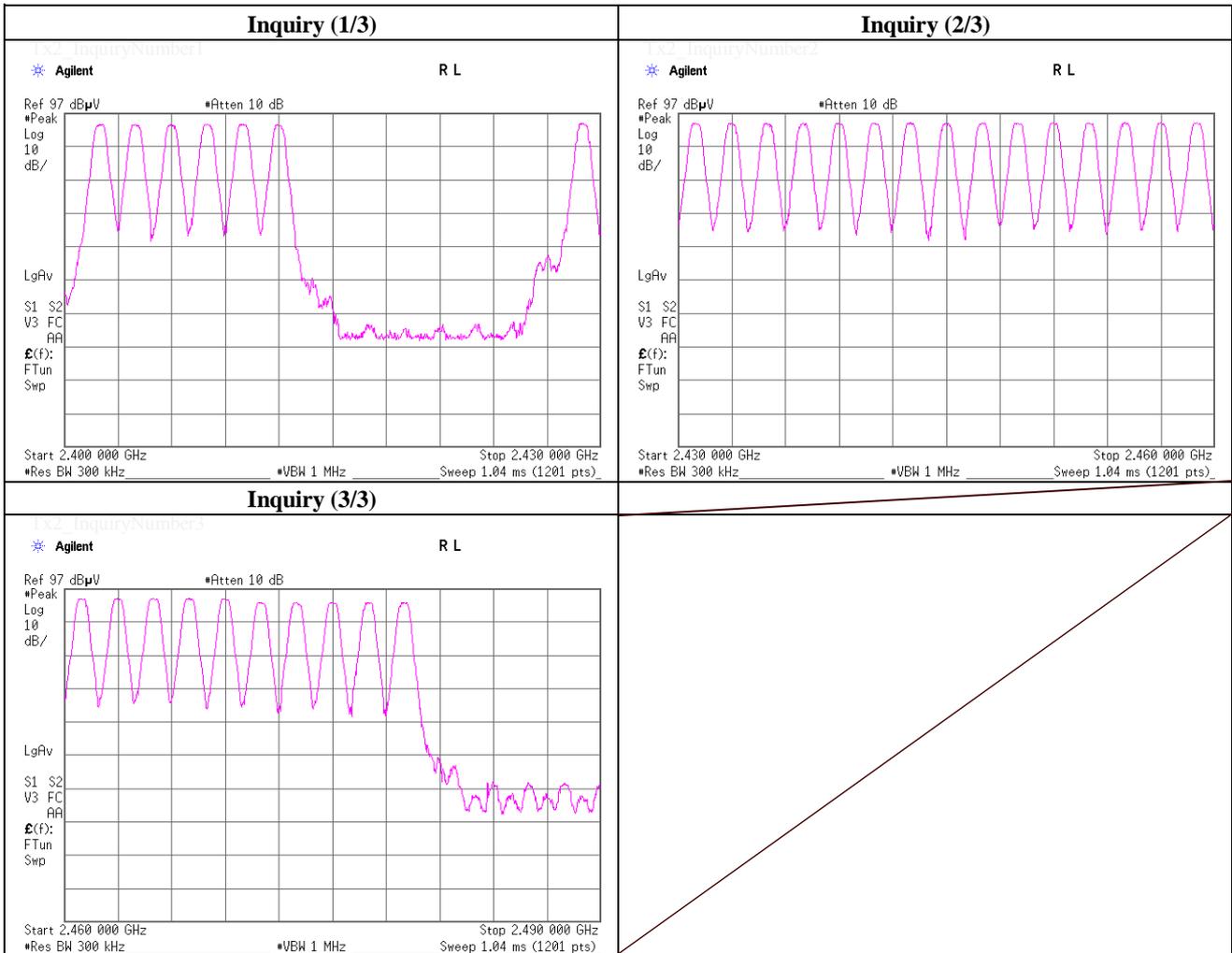
* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.



Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	October 29, 2013	
Temperature / Humidity	27 deg.C , 46 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, Inquiry	

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



Dwell Time

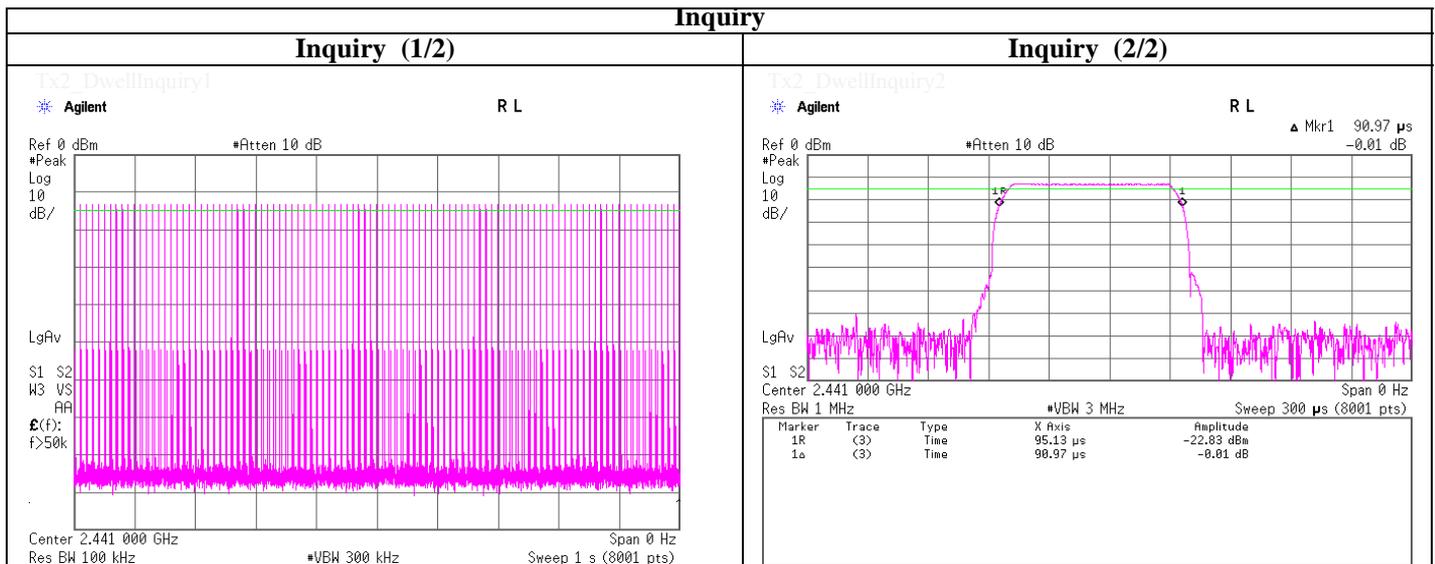
Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	October 29, 2013	
Temperature / Humidity	27 deg.C , 46 %RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.389	126	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.645	271	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.893	312	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.091	116	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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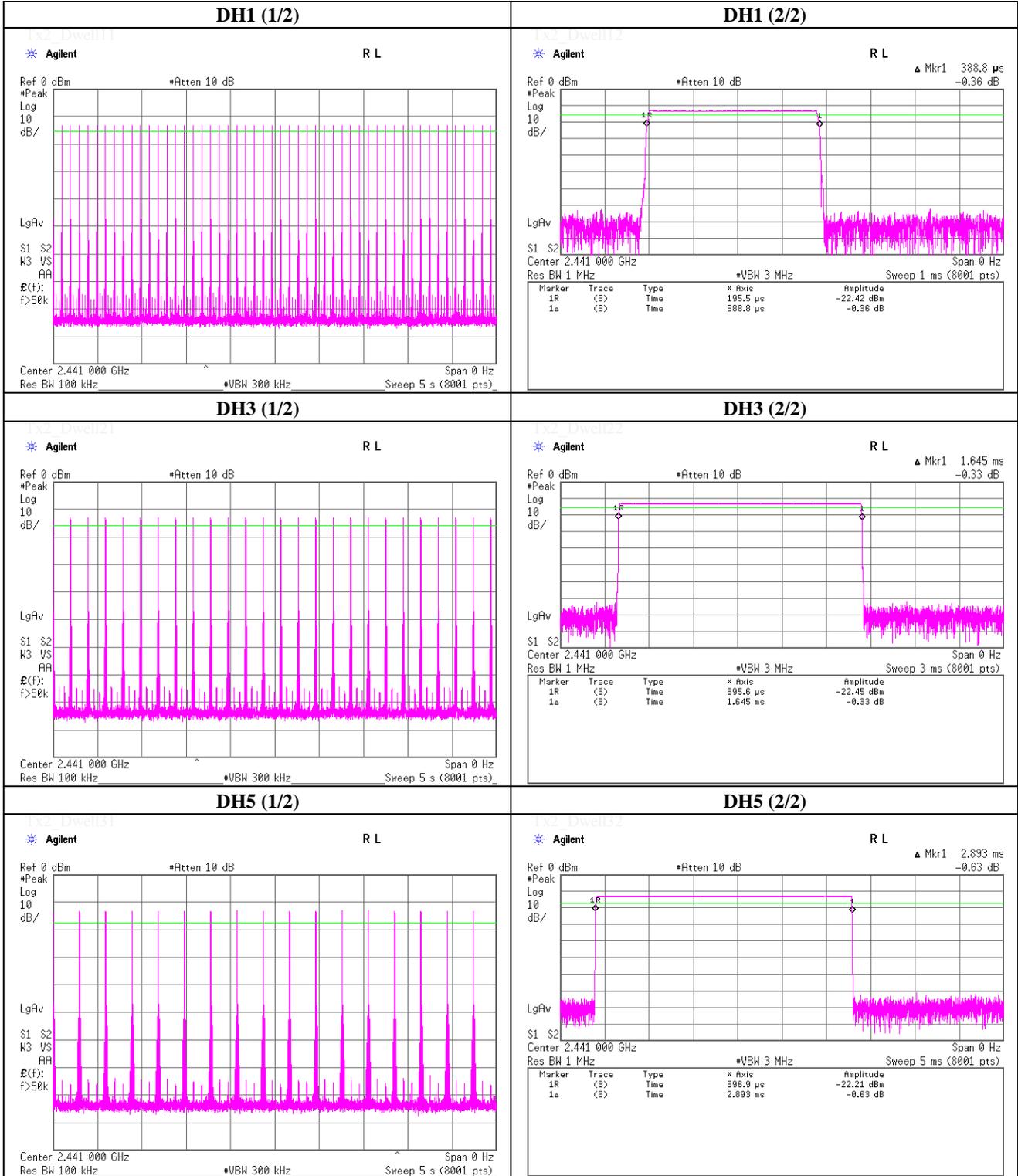
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Measurement Room
 Date October 29, 2013
 Temperature / Humidity 27 deg.C , 46 %RH
 Engineer Shinichi Takano
 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	0.403	130	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.653	273	400
3-DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.905	314	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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for $N=79$.

UL Japan, Inc.

Shonan EMC Lab.

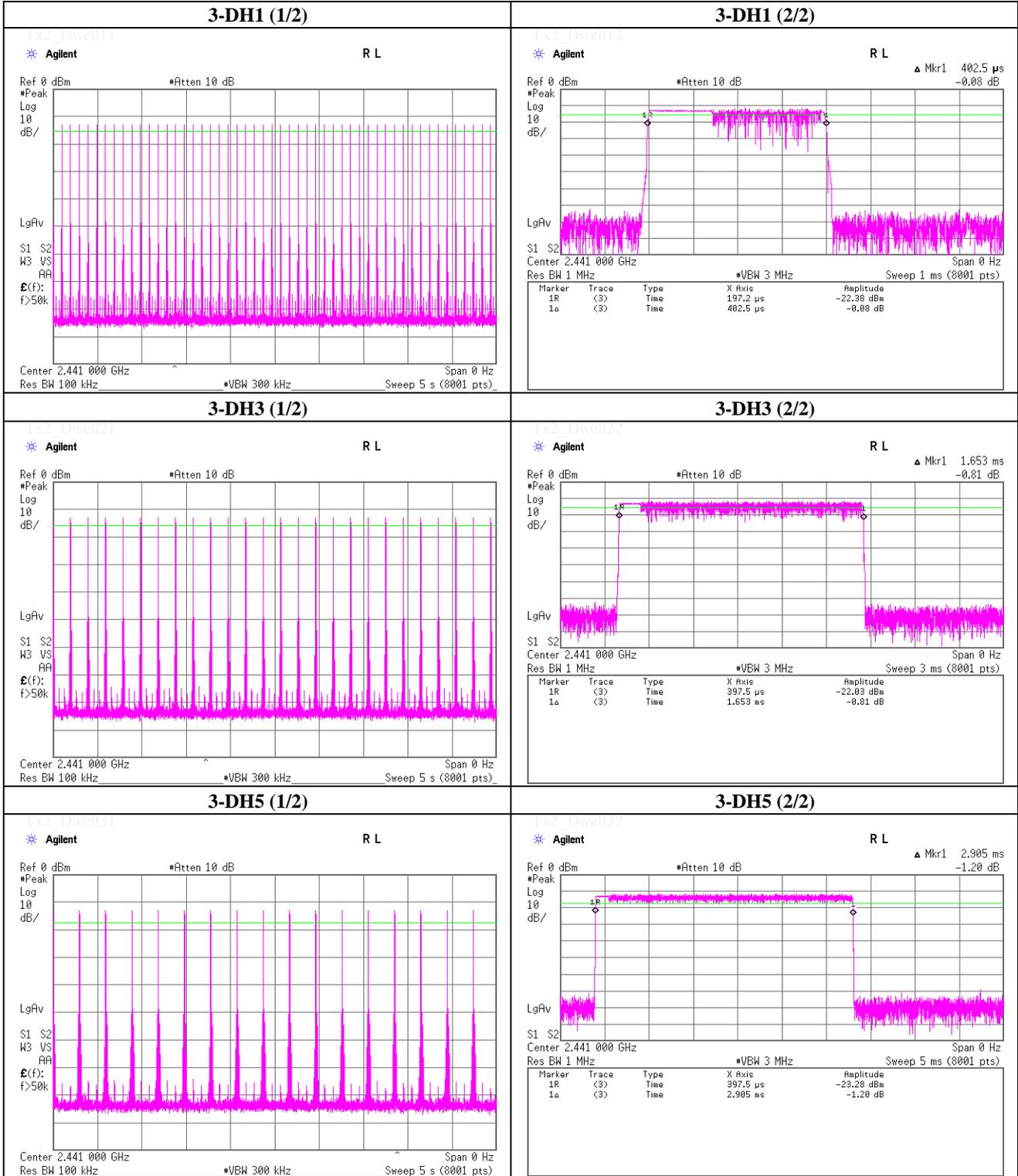
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Maximum Peak Conducted Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Measurement Room
 Date October 29, 2013
 Temperature / Humidity 27 deg.C , 46 %RH
 Engineer Shinichi Takano
 Mode Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-12.91	1.18	10.04	-1.69	0.68	20.97	125	22.66
DH5	2441.0	-12.43	1.19	10.04	-1.20	0.76	20.97	125	22.17
DH5	2480.0	-13.39	1.21	10.04	-2.14	0.61	20.97	125	23.11
2-DH5	2402.0	-11.41	1.18	10.04	-0.19	0.96	20.97	125	21.16
2-DH5	2441.0	-11.21	1.19	10.04	0.02	1.00	20.97	125	20.95
2-DH5	2480.0	-12.21	1.21	10.04	-0.96	0.80	20.97	125	21.93
3-DH5	2402.0	-11.10	1.18	10.04	0.12	1.03	20.97	125	20.85
3-DH5	2441.0	-10.84	1.19	10.04	0.39	1.09	20.97	125	20.58
3-DH5	2480.0	-11.81	1.21	10.04	-0.56	0.88	20.97	125	21.53

Sample Calculation:

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
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.	95.992	QP	51.6	9.3	7.4	32.1	36.2	43.5	7.3	200	95	
Hori.	122.769	QP	35.9	13.2	7.2	32.1	24.2	43.5	19.3	271	80	
Hori.	788.612	QP	28.3	20.5	10.5	31.6	27.7	46.0	18.3	140	144	
Hori.	960.000	QP	29.3	22.1	11.0	30.5	31.9	46.0	14.1	114	28	
Hori.	960.045	QP	32.0	22.1	11.0	30.5	34.6	53.9	19.3	114	28	
Hori.	1920.089	PK	55.4	26.5	4.2	41.2	44.9	73.9	29.0	130	309	
Hori.	2273.000	PK	47.4	26.7	4.6	41.2	37.5	73.9	36.4	100	214	
Hori.	2390.000	PK	46.0	26.8	4.7	41.1	36.4	73.9	37.5	100	155	
Hori.	2400.000	PK	49.7	26.8	4.7	41.1	40.1	73.9	33.8	100	155	
Hori.	2507.000	PK	52.0	26.9	4.9	41.0	42.8	73.9	31.1	100	156	
Hori.	2533.000	PK	50.3	27.0	4.9	41.1	41.1	73.9	32.8	100	156	
Hori.	4804.000	PK	47.5	30.9	7.5	41.2	44.7	73.9	29.2	100	0	
Hori.	7206.000	PK	47.1	37.1	9.1	41.0	52.3	73.9	21.6	100	0	
Hori.	1920.089	AV	50.5	26.5	4.2	41.2	40.0	53.9	13.9	130	309	
Hori.	2273.000	AV	37.3	26.7	4.6	41.2	27.4	53.9	26.5	100	214	
Hori.	2390.000	AV	37.3	26.8	4.7	41.1	27.7	53.9	26.2	100	155	
Hori.	2400.000	AV	39.0	26.8	4.7	41.1	29.4	53.9	24.5	100	155	
Hori.	2507.000	AV	45.1	26.9	4.9	41.0	35.9	53.9	18.0	100	156	
Hori.	2533.000	AV	44.0	27.0	4.9	41.1	34.8	53.9	19.1	100	156	
Hori.	4804.000	AV	35.3	30.9	7.5	41.2	32.5	53.9	21.4	100	0	
Hori.	7206.000	AV	35.6	37.1	9.1	41.0	40.8	53.9	13.1	100	0	
Vert.	95.874	QP	46.4	9.2	7.4	32.1	31.0	43.5	12.5	100	91	
Vert.	960.000	QP	27.5	22.1	11.0	30.5	30.1	46.0	15.9	113	101	
Vert.	960.045	QP	30.7	22.1	11.0	30.5	33.3	53.9	20.6	113	101	
Vert.	1920.089	PK	51.1	26.5	4.2	41.2	40.6	73.9	33.3	100	183	
Vert.	2273.000	PK	49.6	26.7	4.6	41.2	39.7	73.9	34.2	100	311	
Vert.	2390.000	PK	46.0	26.8	4.7	41.1	36.4	73.9	37.5	100	309	
Vert.	2400.000	PK	52.0	26.8	4.7	41.1	42.4	73.9	31.5	100	309	
Vert.	2507.000	PK	53.8	26.9	4.9	41.0	44.6	73.9	29.3	100	337	
Vert.	2533.000	PK	53.0	27.0	4.9	41.1	43.8	73.9	30.1	100	337	
Vert.	4804.000	PK	48.4	30.9	7.5	41.2	45.6	73.9	28.3	100	321	
Vert.	7206.000	PK	47.2	37.1	9.1	41.0	52.4	73.9	21.5	100	0	
Vert.	1920.089	AV	43.4	26.5	4.2	41.2	32.9	53.9	21.0	100	183	
Vert.	2273.000	AV	40.0	26.7	4.6	41.2	30.1	53.9	23.8	100	311	
Vert.	2390.000	AV	34.8	26.8	4.7	41.1	25.2	53.9	28.7	100	309	
Vert.	2400.000	AV	41.6	26.8	4.7	41.1	32.0	53.9	21.9	100	309	
Vert.	2507.000	AV	47.6	26.9	4.9	41.0	38.4	53.9	15.5	100	337	
Vert.	2533.000	AV	46.7	27.0	4.9	41.1	37.5	53.9	16.4	100	337	
Vert.	4804.000	AV	38.0	30.9	7.5	41.2	35.2	53.9	18.7	100	321	
Vert.	7206.000	AV	35.6	37.1	9.1	41.0	40.8	53.9	13.1	100	0	

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

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
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.	95.993	QP	51.5	9.3	7.4	32.1	36.1	43.5	7.4	210	84	
Hori.	278.008	QP	29.3	18.1	8.4	32.0	23.8	46.0	22.2	123	268	
Hori.	720.037	QP	39.0	19.9	10.2	31.8	37.3	46.0	8.7	168	142	
Hori.	788.610	QP	29.6	20.5	10.5	31.6	29.0	46.0	17.0	156	158	
Hori.	1920.089	PK	54.1	26.5	4.2	41.2	43.6	73.9	30.3	131	305	
Hori.	2283.000	PK	49.0	26.8	4.6	41.2	39.2	73.9	34.7	111	175	
Hori.	2543.000	PK	51.7	27.0	5.0	41.1	42.6	73.9	31.3	100	156	
Hori.	2570.000	PK	50.2	27.1	5.0	41.1	41.2	73.9	32.7	100	155	
Hori.	4882.000	PK	47.8	31.4	7.5	41.1	45.6	73.9	28.3	100	0	
Hori.	7323.000	PK	47.1	37.2	9.0	41.1	52.2	73.9	21.7	100	0	
Hori.	1920.089	AV	50.8	26.5	4.2	41.2	40.3	53.9	13.6	131	305	
Hori.	2283.000	AV	39.3	26.8	4.6	41.2	29.5	53.9	24.4	111	175	
Hori.	2543.000	AV	44.7	27.0	5.0	41.1	35.6	53.9	18.3	100	156	
Hori.	2570.000	AV	42.8	27.1	5.0	41.1	33.8	53.9	20.1	100	155	
Hori.	4882.000	AV	35.8	31.4	7.5	41.1	33.6	53.9	20.3	100	0	
Hori.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	
Vert.	95.993	QP	46.5	9.3	7.4	32.1	31.1	43.5	12.4	100	98	
Vert.	1920.089	PK	51.6	26.5	4.2	41.2	41.1	73.9	32.8	100	185	
Vert.	2283.000	PK	50.6	26.8	4.6	41.2	40.8	73.9	33.1	100	298	
Vert.	2543.000	PK	53.9	27.0	5.0	41.1	44.8	73.9	29.1	100	335	
Vert.	2570.000	PK	53.1	27.1	5.0	41.1	44.1	73.9	29.8	100	335	
Vert.	4882.000	PK	48.0	31.4	7.5	41.1	45.8	73.9	28.1	100	144	
Vert.	7323.000	PK	47.0	37.2	9.0	41.1	52.1	73.9	21.8	100	0	
Vert.	1920.089	AV	43.3	26.5	4.2	41.2	32.8	53.9	21.1	100	185	
Vert.	2283.000	AV	42.3	26.8	4.6	41.2	32.5	53.9	21.4	100	298	
Vert.	2543.000	AV	49.0	27.0	5.0	41.1	39.9	53.9	14.0	100	335	
Vert.	2570.000	AV	48.3	27.1	5.0	41.1	39.3	53.9	14.6	100	335	
Vert.	4882.000	AV	37.7	31.4	7.5	41.1	35.5	53.9	18.4	100	144	
Vert.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
Mode Tx, 2480 MHz
 Tx, Bluetooth, BDR, PRBS9

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	95.994	QP	51.3	9.3	7.4	32.1		35.9	43.5	7.6	220	84	
Hori.	269.996	QP	37.9	17.8	8.4	32.0		32.1	46.0	13.9	144	359	
Hori.	720.035	QP	38.9	19.9	10.2	31.8		37.2	46.0	8.8	175	138	
Hori.	788.625	QP	32.5	20.5	10.5	31.6		31.9	46.0	14.1	140	236	
Hori.	1920.089	PK	54.8	26.5	4.2	41.2		44.3	73.9	29.6	131	303	
Hori.	2350.000	PK	51.7	26.8	4.7	41.1		42.1	73.9	31.8	100	185	
Hori.	2483.500	PK	46.7	26.9	4.8	41.0		37.4	73.9	36.5	100	162	
Hori.	2583.000	PK	54.0	27.1	5.0	41.1		45.0	73.9	28.9	100	170	
Hori.	2610.000	PK	53.6	27.2	5.0	41.2		44.6	73.9	29.3	100	170	
Hori.	4960.000	PK	47.6	31.8	7.5	41.1		45.8	73.9	28.1	100	0	
Hori.	7440.000	PK	46.7	37.4	9.0	41.1		52.0	73.9	21.9	100	0	
Hori.	1920.089	AV	50.4	26.5	4.2	41.2		39.9	53.9	14.0	131	303	
Hori.	2350.000	AV	43.9	26.8	4.7	41.1		34.3	53.9	19.6	100	185	
Hori.	2483.500	AV	36.7	26.9	4.8	41.0		27.4	53.9	26.5	100	162	
Hori.	2583.000	AV	48.1	27.1	5.0	41.1		39.1	53.9	14.8	100	170	
Hori.	2610.000	AV	47.0	27.2	5.0	41.2		38.0	53.9	15.9	100	170	
Hori.	4960.000	AV	35.6	31.8	7.5	41.1		33.8	53.9	20.1	100	0	
Hori.	7440.000	AV	35.4	37.4	9.0	41.1		40.7	53.9	13.2	100	0	
Vert.	95.994	QP	46.4	9.3	7.4	32.1		31.0	43.5	12.5	100	88	
Vert.	1920.089	PK	51.3	26.5	4.2	41.2		40.8	73.9	33.1	100	185	
Vert.	2350.000	PK	50.8	26.8	4.7	41.1		41.2	73.9	32.7	100	333	
Vert.	2483.500	PK	48.4	26.9	4.8	41.0		39.1	73.9	34.8	100	355	
Vert.	2583.000	PK	55.0	27.1	5.0	41.1		46.0	73.9	27.9	100	333	
Vert.	2610.000	PK	54.4	27.2	5.0	41.2		45.4	73.9	28.5	100	333	
Vert.	4960.000	PK	48.1	31.8	7.5	41.1		46.3	73.9	27.6	100	150	
Vert.	7440.000	PK	47.0	37.4	9.0	41.1		52.3	73.9	21.6	100	0	
Vert.	1920.089	AV	43.4	26.5	4.2	41.2		32.9	53.9	21.0	100	185	
Vert.	2350.000	AV	43.6	26.8	4.7	41.1		34.0	53.9	19.9	100	333	
Vert.	2483.500	AV	38.5	26.9	4.8	41.0		29.2	53.9	24.7	100	355	
Vert.	2583.000	AV	49.7	27.1	5.0	41.1		40.7	53.9	13.2	100	333	
Vert.	2610.000	AV	48.7	27.2	5.0	41.2		39.7	53.9	14.2	100	333	
Vert.	4960.000	AV	39.3	31.8	7.5	41.1		37.5	53.9	16.4	100	150	
Vert.	7440.000	AV	35.6	37.4	9.0	41.1		40.9	53.9	13.0	100	0	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
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.	95.994	QP	51.2	9.3	7.4	32.1	35.8	43.5	7.7	216	81	
Hori.	239.984	QP	39.1	16.9	8.2	32.0	32.2	46.0	13.8	141	59	
Hori.	720.039	QP	38.1	19.9	10.2	31.8	36.4	46.0	9.6	181	137	
Hori.	857.195	QP	34.1	21.2	10.7	31.3	34.7	46.0	11.3	139	348	
Hori.	1920.089	PK	55.3	26.5	4.2	41.2	44.8	73.9	29.1	130	307	
Hori.	2273.000	PK	47.0	26.7	4.6	41.2	37.1	73.9	36.8	100	5	
Hori.	2390.000	PK	45.7	26.8	4.7	41.1	36.1	73.9	37.8	100	187	
Hori.	2400.000	PK	54.4	26.8	4.7	41.1	44.8	73.9	29.1	100	187	
Hori.	2507.000	PK	50.3	26.9	4.9	41.0	41.1	73.9	32.8	100	165	
Hori.	2557.000	PK	50.5	27.0	5.0	41.1	41.4	73.9	32.5	100	165	
Hori.	4804.000	PK	46.9	30.9	7.5	41.2	44.1	73.9	29.8	100	0	
Hori.	7206.000	PK	46.6	37.1	9.1	41.0	51.8	73.9	22.1	100	0	
Hori.	1920.089	AV	50.9	26.5	4.2	41.2	40.4	53.9	13.5	130	307	
Hori.	2273.000	AV	37.2	26.7	4.6	41.2	27.3	53.9	26.6	100	5	
Hori.	2390.000	AV	35.0	26.8	4.7	41.1	25.4	53.9	28.5	100	187	
Hori.	2400.000	AV	41.1	26.8	4.7	41.1	31.5	53.9	22.4	100	187	
Hori.	2507.000	AV	42.4	26.9	4.9	41.0	33.2	53.9	20.7	100	165	
Hori.	2557.000	AV	41.3	27.0	5.0	41.1	32.2	53.9	21.7	100	165	
Hori.	4804.000	AV	35.6	30.9	7.5	41.2	32.8	53.9	21.1	100	0	
Hori.	7206.000	AV	35.5	37.1	9.1	41.0	40.7	53.9	13.2	100	0	
Vert.	95.994	QP	46.2	9.3	7.4	32.1	30.8	43.5	12.7	100	88	
Vert.	1920.089	PK	51.0	26.5	4.2	41.2	40.5	73.9	33.4	100	185	
Vert.	2273.000	PK	49.2	26.7	4.6	41.2	39.3	73.9	34.6	100	4	
Vert.	2390.000	PK	45.1	26.8	4.7	41.1	35.5	73.9	38.4	100	309	
Vert.	2400.000	PK	60.0	26.8	4.7	41.1	50.4	73.9	23.5	100	309	
Vert.	2507.000	PK	53.5	26.9	4.9	41.0	44.3	73.9	29.6	100	332	
Vert.	2557.000	PK	54.3	27.0	5.0	41.1	45.2	73.9	28.7	100	332	
Vert.	4804.000	PK	48.0	30.9	7.5	41.2	45.2	73.9	28.7	100	0	
Vert.	7206.000	PK	47.6	37.1	9.1	41.0	52.8	73.9	21.1	100	0	
Vert.	1920.089	AV	43.3	26.5	4.2	41.2	32.8	53.9	21.1	100	185	
Vert.	2273.000	AV	38.9	26.7	4.6	41.2	29.0	53.9	24.9	100	4	
Vert.	2390.000	AV	35.0	26.8	4.7	41.1	25.4	53.9	28.5	100	309	
Vert.	2400.000	AV	45.0	26.8	4.7	41.1	35.4	53.9	18.5	100	309	
Vert.	2507.000	AV	47.4	26.9	4.9	41.0	38.2	53.9	15.7	100	332	
Vert.	2557.000	AV	47.1	27.0	5.0	41.1	38.0	53.9	15.9	100	332	
Vert.	4804.000	AV	37.7	30.9	7.5	41.2	34.9	53.9	19.0	100	0	
Vert.	7206.000	AV	35.6	37.1	9.1	41.0	40.8	53.9	13.1	100	0	

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
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.	95.994	QP	51.2	9.3	7.4	32.1	35.8	43.5	7.7	212	84	
Hori.	239.984	QP	38.8	16.9	8.2	32.0	31.9	46.0	14.1	150	45	
Hori.	514.171	QP	34.3	17.5	9.5	32.0	29.3	46.0	16.7	100	303	
Hori.	720.037	QP	39.0	19.9	10.2	31.8	37.3	46.0	8.7	177	143	
Hori.	1920.089	PK	54.4	26.5	4.2	41.2	43.9	73.9	30.0	129	303	
Hori.	2310.000	PK	48.8	26.8	4.6	41.1	39.1	73.9	34.8	100	85	
Hori.	2547.000	PK	52.0	27.0	5.0	41.1	42.9	73.9	31.0	100	184	
Hori.	2597.000	PK	52.0	27.1	5.0	41.1	43.0	73.9	30.9	100	177	
Hori.	4882.000	PK	47.0	31.4	7.5	41.1	44.8	73.9	29.1	100	0	
Hori.	7323.000	PK	46.4	37.2	9.0	41.1	51.5	73.9	22.4	100	0	
Hori.	1920.089	AV	50.2	26.5	4.2	41.2	39.7	53.9	14.2	129	303	
Hori.	2310.000	AV	39.0	26.8	4.6	41.1	29.3	53.9	24.6	100	85	
Hori.	2547.000	AV	43.0	27.0	5.0	41.1	33.9	53.9	20.0	100	184	
Hori.	2597.000	AV	42.7	27.1	5.0	41.1	33.7	53.9	20.2	100	177	
Hori.	4882.000	AV	35.9	31.4	7.5	41.1	33.7	53.9	20.2	100	0	
Hori.	7323.000	AV	35.1	37.2	9.0	41.1	40.2	53.9	13.7	100	0	
Vert.	95.994	QP	46.5	9.3	7.4	32.1	31.1	43.5	12.4	100	66	
Vert.	1920.089	PK	52.0	26.5	4.2	41.2	41.5	73.9	32.4	100	188	
Vert.	2310.000	PK	50.5	26.8	4.6	41.1	40.8	73.9	33.1	100	295	
Vert.	2547.000	PK	54.6	27.0	5.0	41.1	45.5	73.9	28.4	100	331	
Vert.	2597.000	PK	54.6	27.1	5.0	41.1	45.6	73.9	28.3	100	331	
Vert.	4882.000	PK	48.2	31.4	7.5	41.1	46.0	73.9	27.9	100	0	
Vert.	7323.000	PK	47.0	37.2	9.0	41.1	52.1	73.9	21.8	100	0	
Vert.	1920.089	AV	43.0	26.5	4.2	41.2	32.5	53.9	21.4	100	188	
Vert.	2310.000	AV	41.4	26.8	4.6	41.1	31.7	53.9	22.2	100	295	
Vert.	2547.000	AV	47.2	27.0	5.0	41.1	38.1	53.9	15.8	100	331	
Vert.	2597.000	AV	47.0	27.1	5.0	41.1	38.0	53.9	15.9	100	331	
Vert.	4882.000	AV	37.4	31.4	7.5	41.1	35.2	53.9	18.7	100	0	
Vert.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	

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

UL Japan, Inc.

~~Shonan EMC Lab.~~

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 8, 2013 November 19, 2013
Temperature / Humidity 23 deg.C , 40 %RH 23 deg.C , 34 %RH
Engineer Shinichi Takano Wataru Kojima
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.	95.994	QP	51.1	9.3	7.4	32.1	35.7	43.5	7.8	223	86	
Hori.	239.983	QP	37.8	16.9	8.2	32.0	30.9	46.0	15.1	197	49	
Hori.	720.034	QP	39.6	19.9	10.2	31.8	37.9	46.0	8.1	150	144	
Hori.	857.190	QP	32.0	21.2	10.7	31.3	32.6	46.0	13.4	138	323	
Hori.	1920.089	PK	54.4	26.5	4.2	41.2	43.9	73.9	30.0	127	300	
Hori.	2350.000	PK	50.1	26.8	4.7	41.1	40.5	73.9	33.4	100	180	
Hori.	2483.500	PK	46.2	26.9	4.8	41.0	36.9	73.9	37.0	100	165	
Hori.	2583.000	PK	52.7	27.1	5.0	41.1	43.7	73.9	30.2	100	173	
Hori.	2637.000	PK	52.5	27.2	5.0	41.2	43.5	73.9	30.4	100	173	
Hori.	4960.000	PK	47.3	31.8	7.5	41.1	45.5	73.9	28.4	100	0	
Hori.	7440.000	PK	46.6	37.4	9.0	41.1	51.9	73.9	22.0	100	0	
Hori.	1920.089	AV	50.4	26.5	4.2	41.2	39.9	53.9	14.0	127	300	
Hori.	2350.000	AV	39.7	26.8	4.7	41.1	30.1	53.9	23.8	100	180	
Hori.	2483.500	AV	36.0	26.9	4.8	41.0	26.7	53.9	27.2	100	165	
Hori.	2583.000	AV	44.6	27.1	5.0	41.1	35.6	53.9	18.3	100	173	
Hori.	2637.000	AV	43.2	27.2	5.0	41.2	34.2	53.9	19.7	100	173	
Hori.	4960.000	AV	35.5	31.8	7.5	41.1	33.7	53.9	20.2	100	0	
Hori.	7440.000	AV	35.7	37.4	9.0	41.1	41.0	53.9	12.9	100	0	
Vert.	95.994	QP	46.2	9.3	7.4	32.1	30.8	43.5	12.7	100	88	
Vert.	1920.089	PK	52.0	26.5	4.2	41.2	41.5	73.9	32.4	100	185	
Vert.	2350.000	PK	50.9	26.8	4.7	41.1	41.3	73.9	32.6	100	331	
Vert.	2483.500	PK	45.6	26.9	4.8	41.0	36.3	73.9	37.6	100	351	
Vert.	2583.000	PK	55.5	27.1	5.0	41.1	46.5	73.9	27.4	100	330	
Vert.	2637.000	PK	55.3	27.2	5.0	41.2	46.3	73.9	27.6	100	330	
Vert.	4960.000	PK	48.0	31.8	7.5	41.1	46.2	73.9	27.7	100	0	
Vert.	7440.000	PK	47.2	37.4	9.0	41.1	52.5	73.9	21.4	100	0	
Vert.	1920.089	AV	43.3	26.5	4.2	41.2	32.8	53.9	21.1	100	185	
Vert.	2350.000	AV	41.8	26.8	4.7	41.1	32.2	53.9	21.7	100	331	
Vert.	2483.500	AV	36.2	26.9	4.8	41.0	26.9	53.9	27.0	100	351	
Vert.	2583.000	AV	48.4	27.1	5.0	41.1	39.4	53.9	14.5	100	330	
Vert.	2637.000	AV	47.8	27.2	5.0	41.2	38.8	53.9	15.1	100	330	
Vert.	4960.000	AV	39.0	31.8	7.5	41.1	37.2	53.9	16.7	100	0	
Vert.	7440.000	AV	36.0	37.4	9.0	41.1	41.3	53.9	12.6	100	0	

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

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

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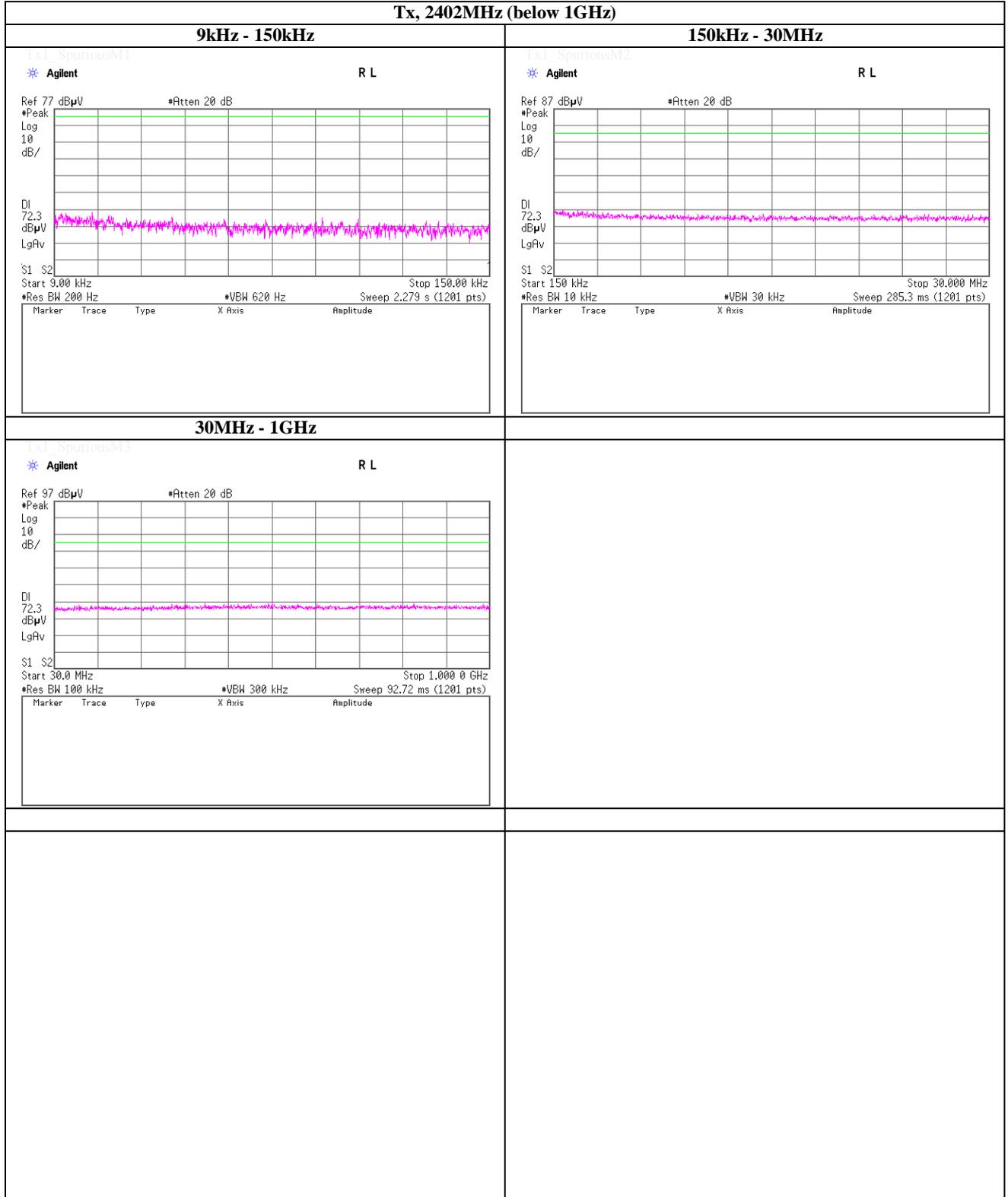
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)



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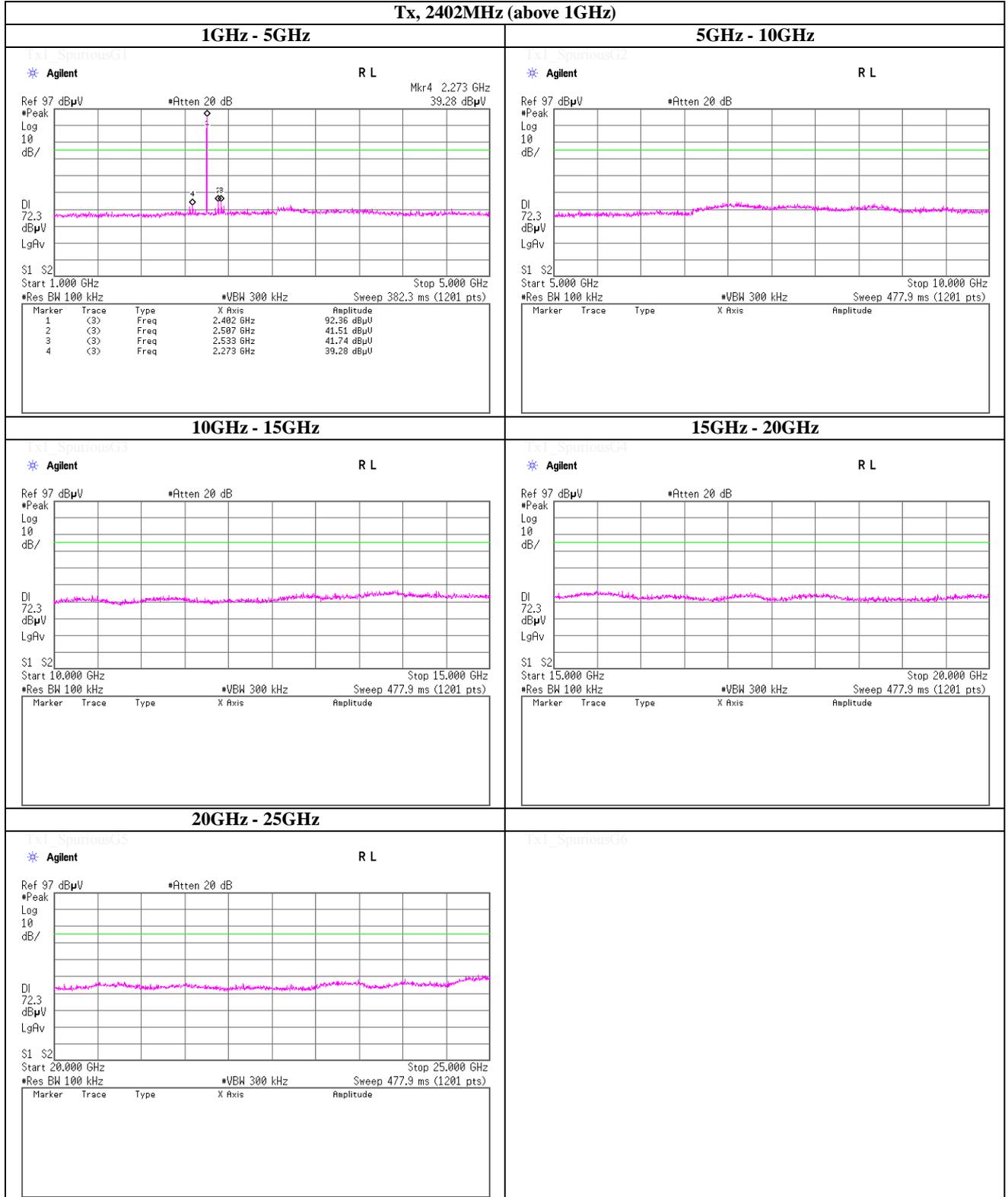
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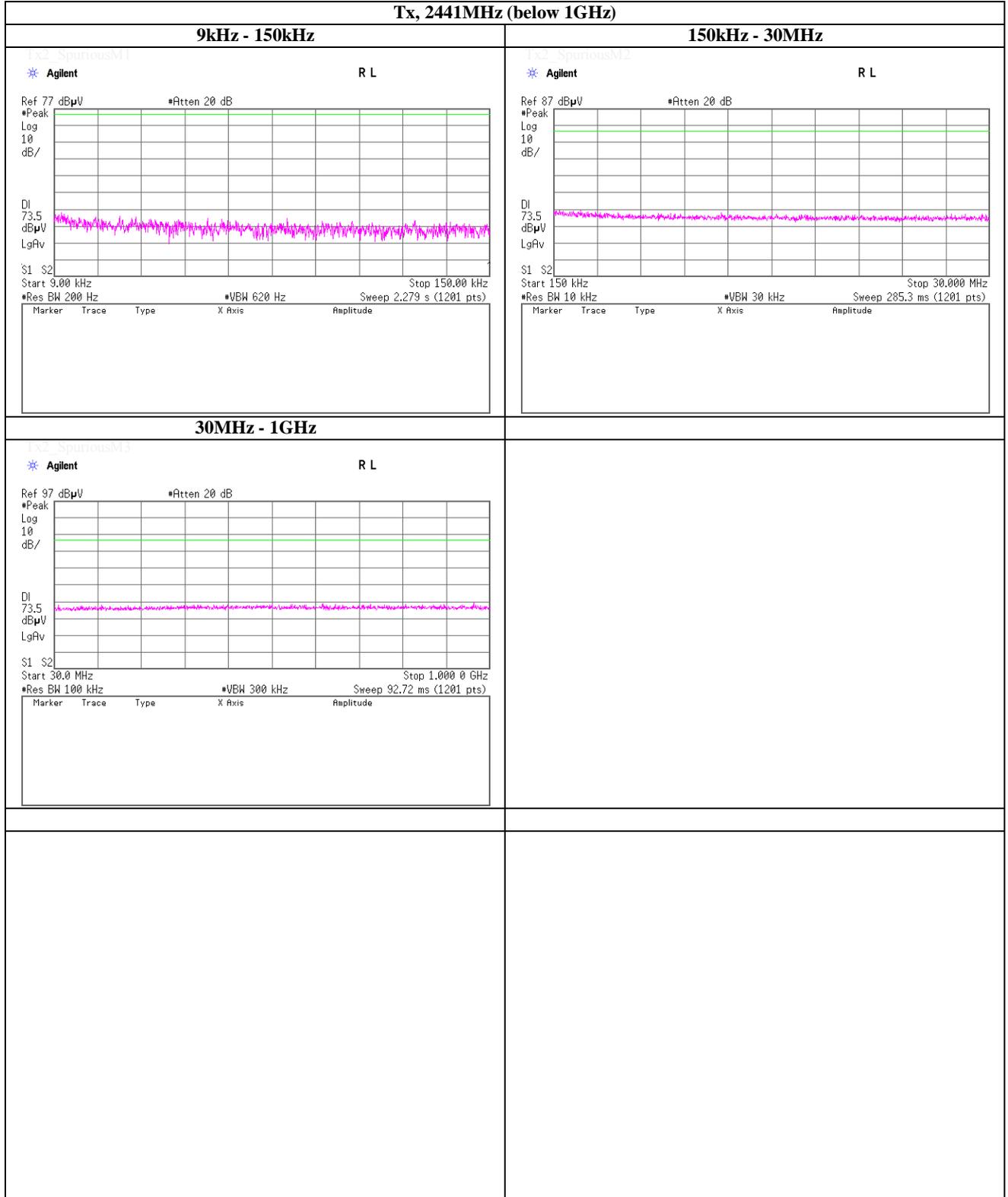
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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)



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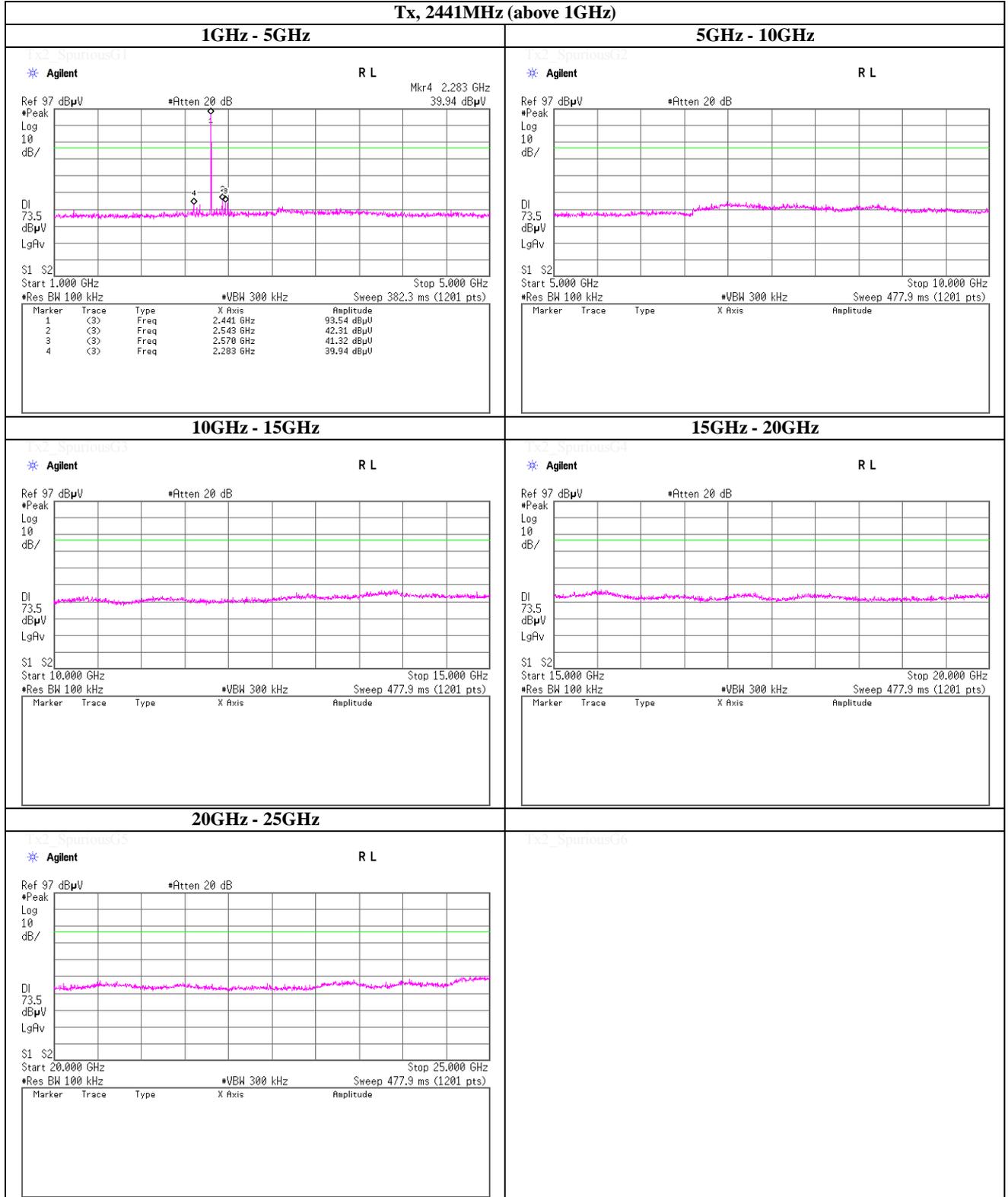
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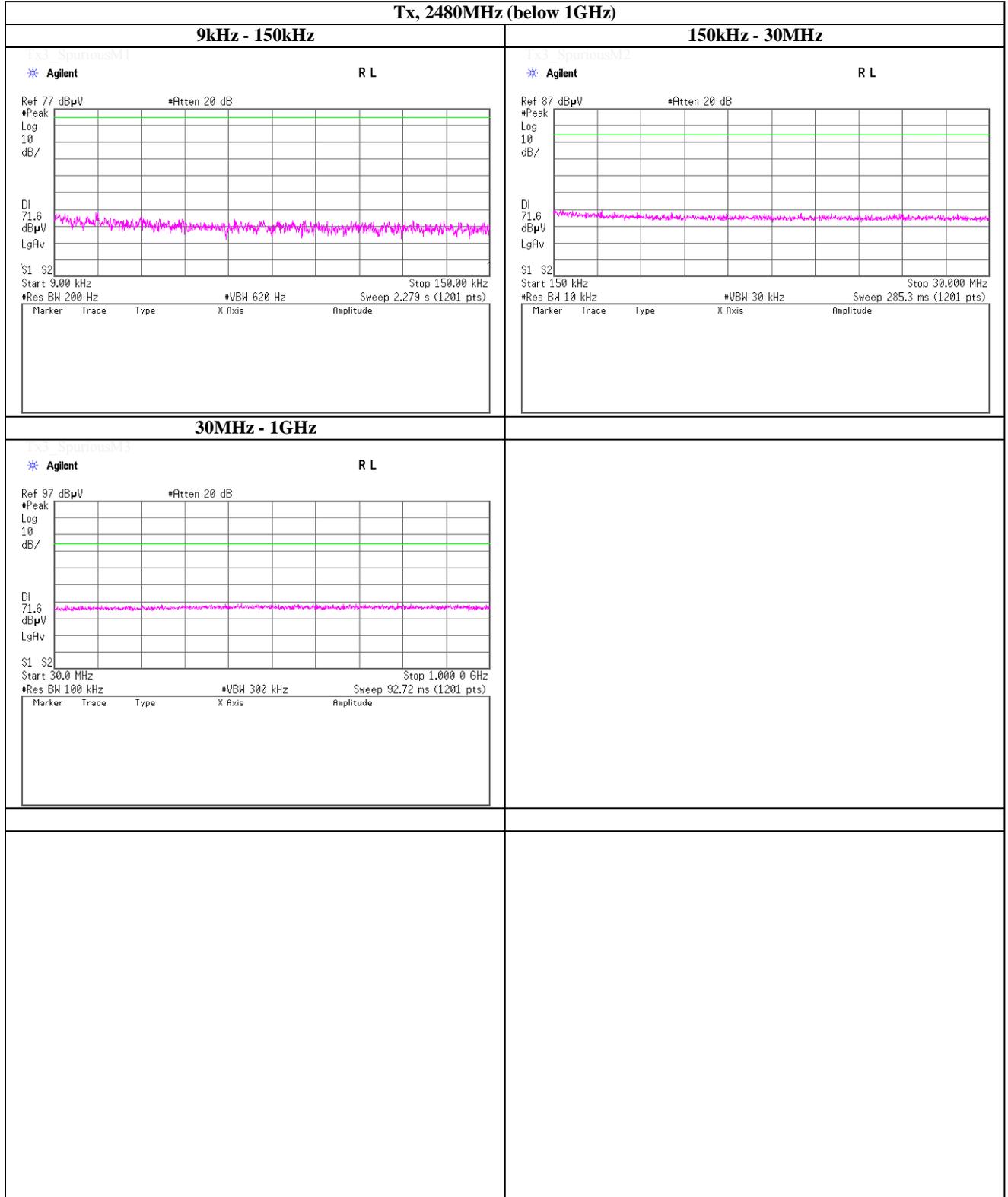
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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)



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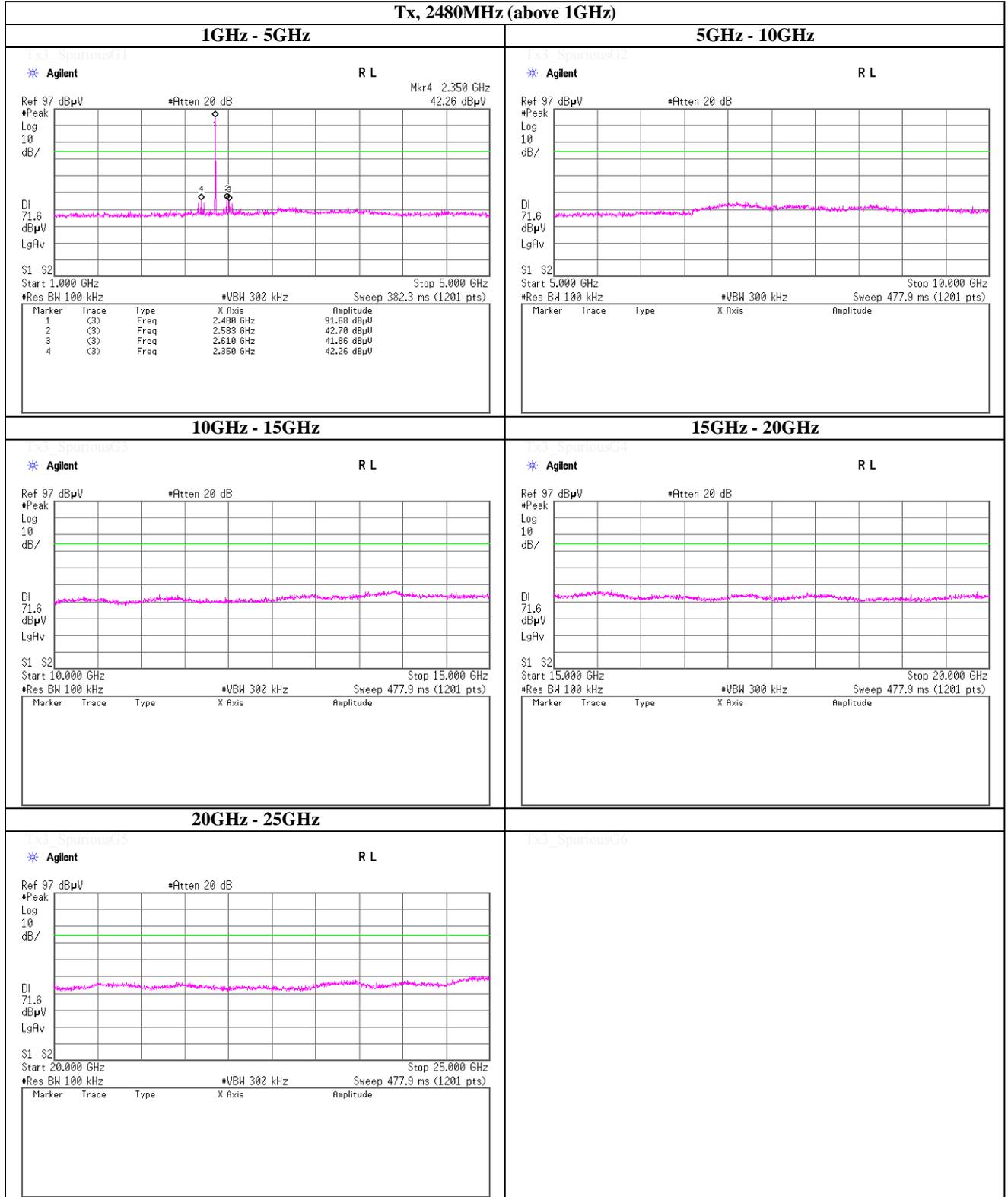
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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)



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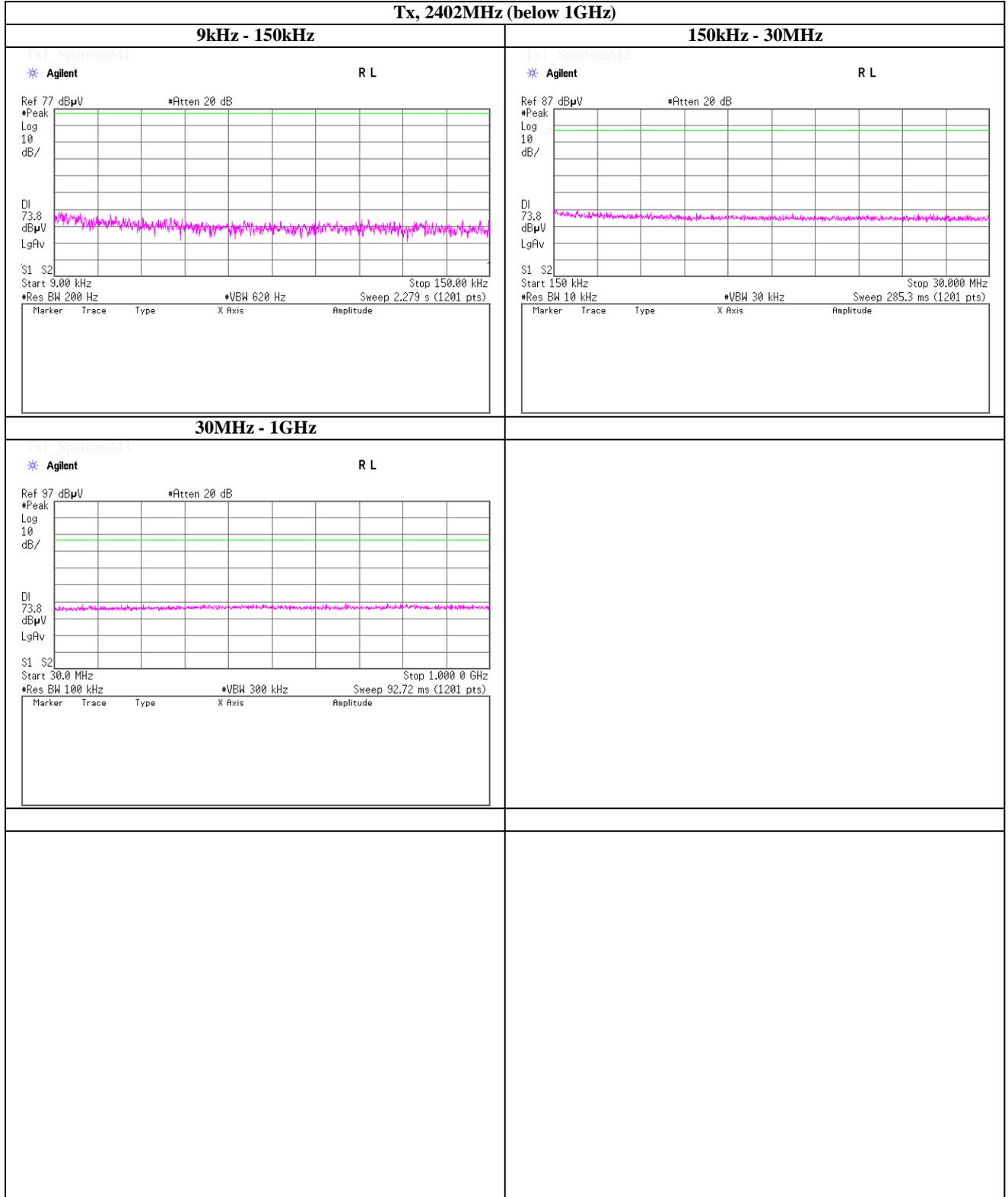
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)



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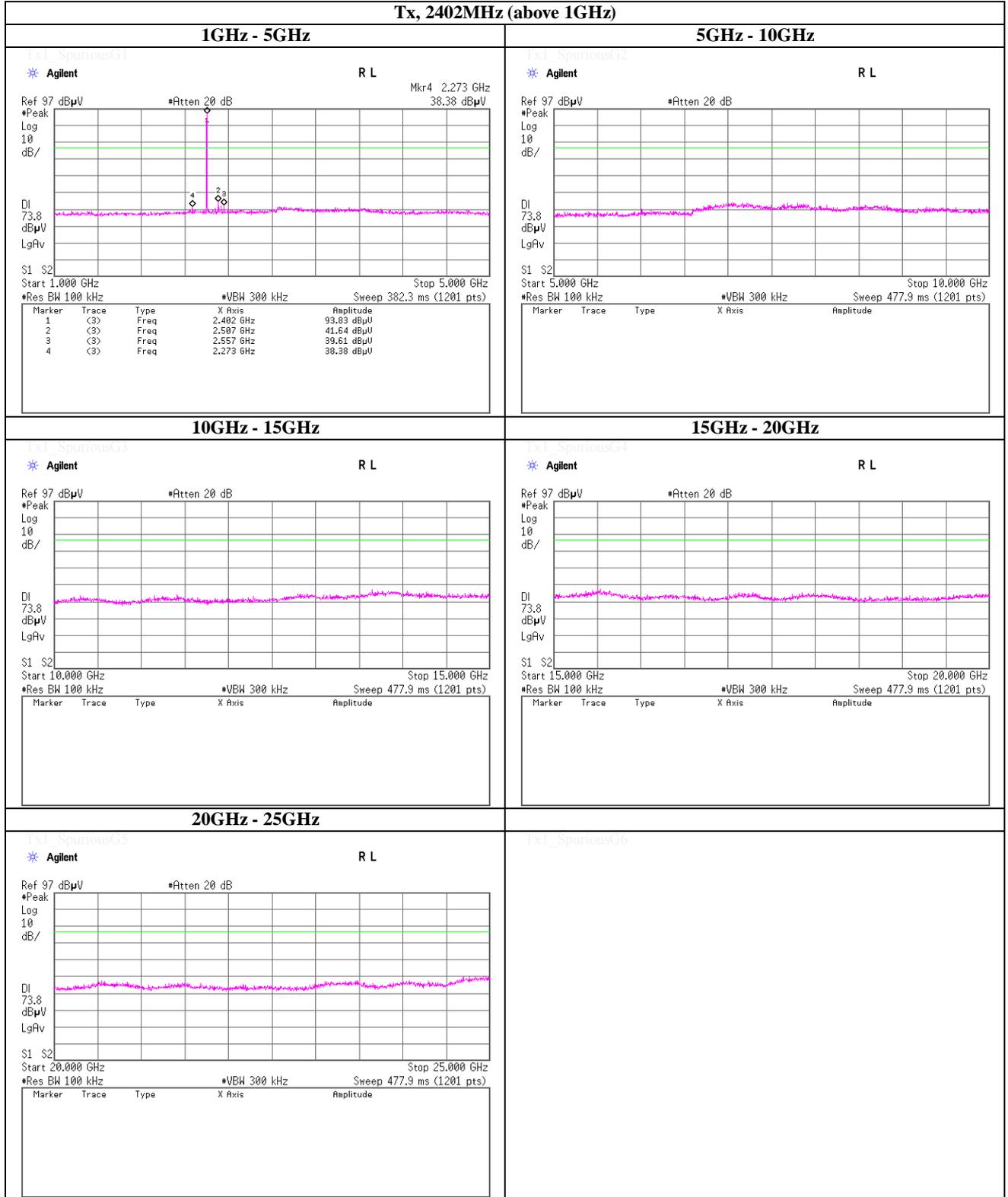
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Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)



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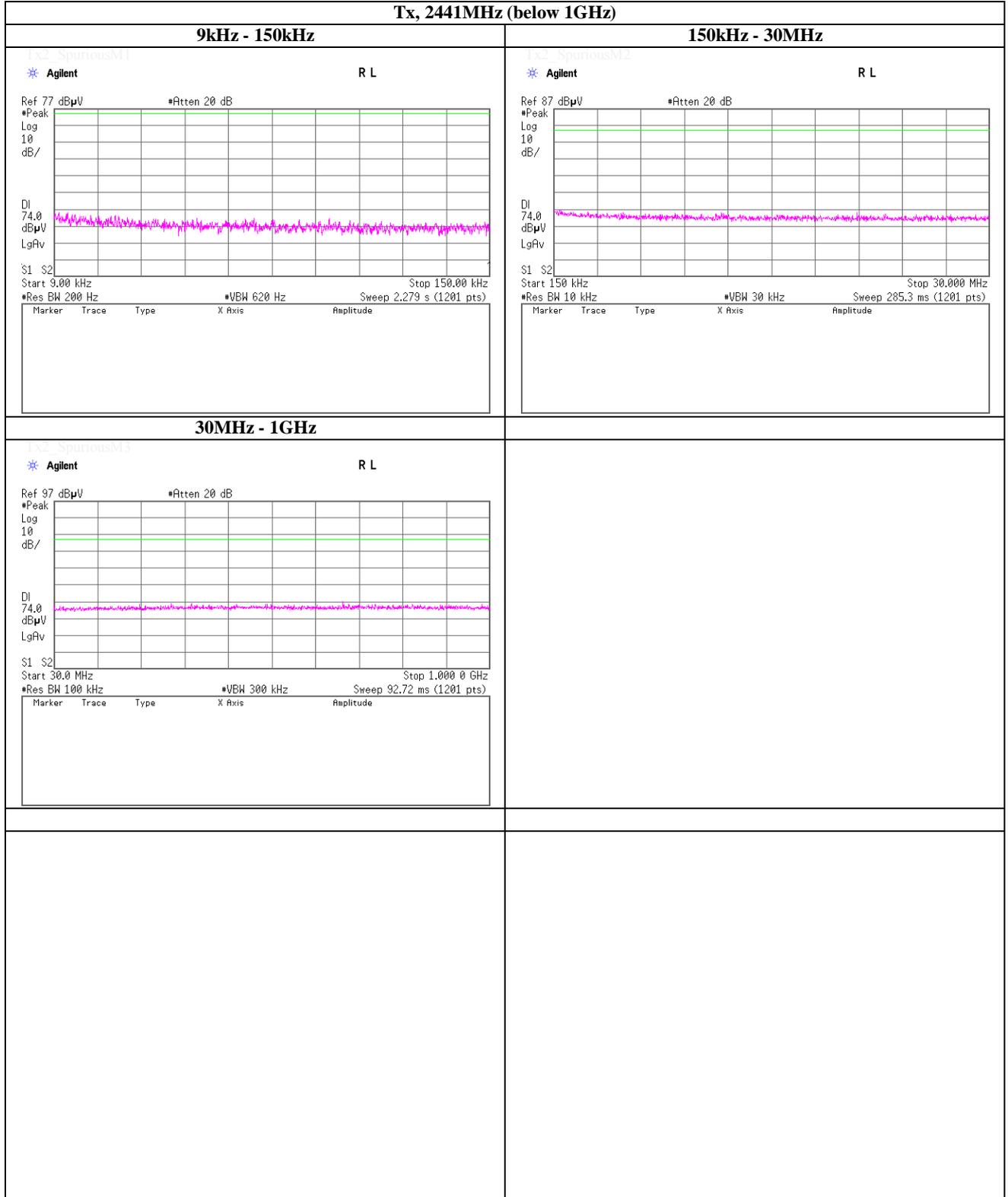
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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)



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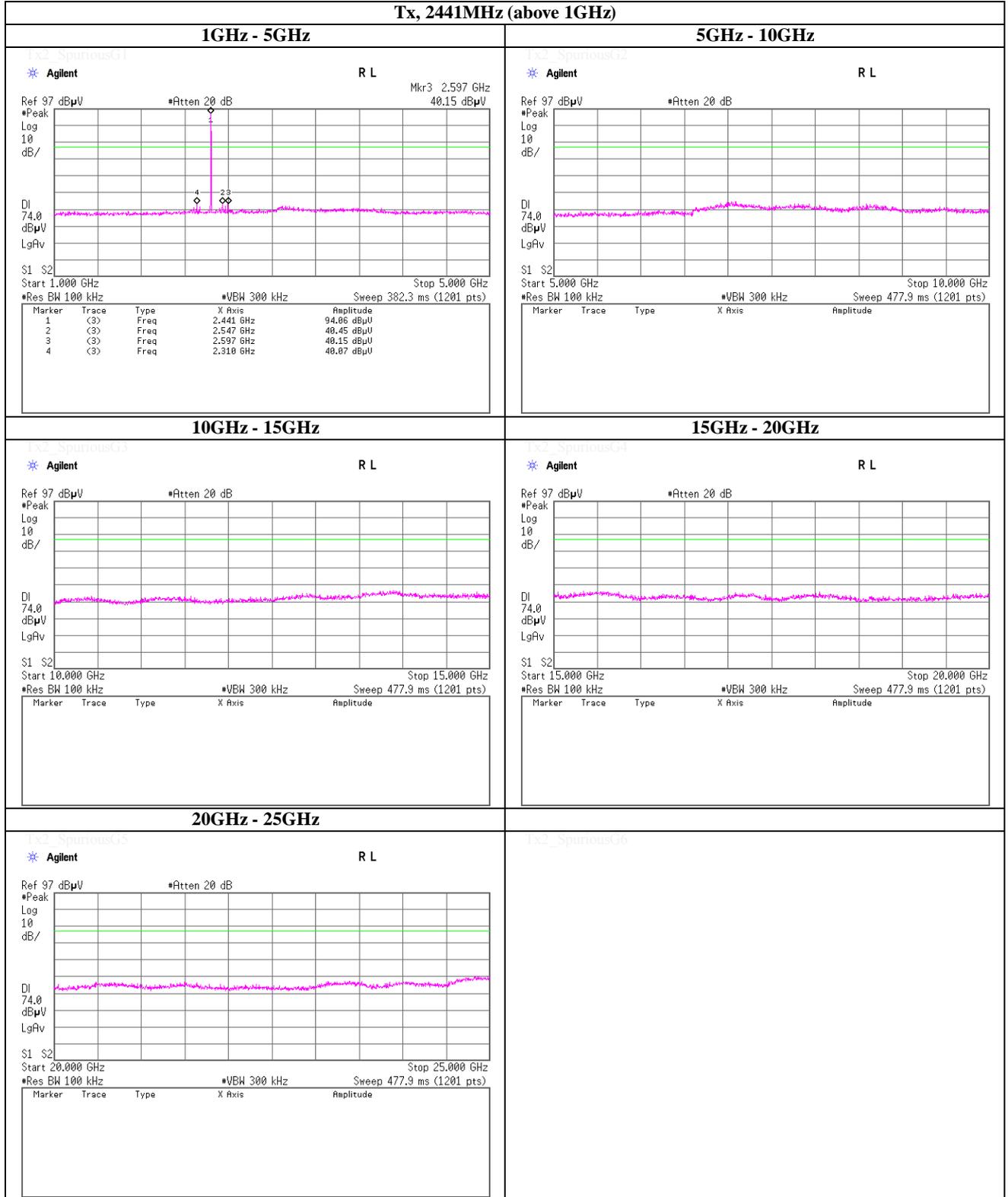
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Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)



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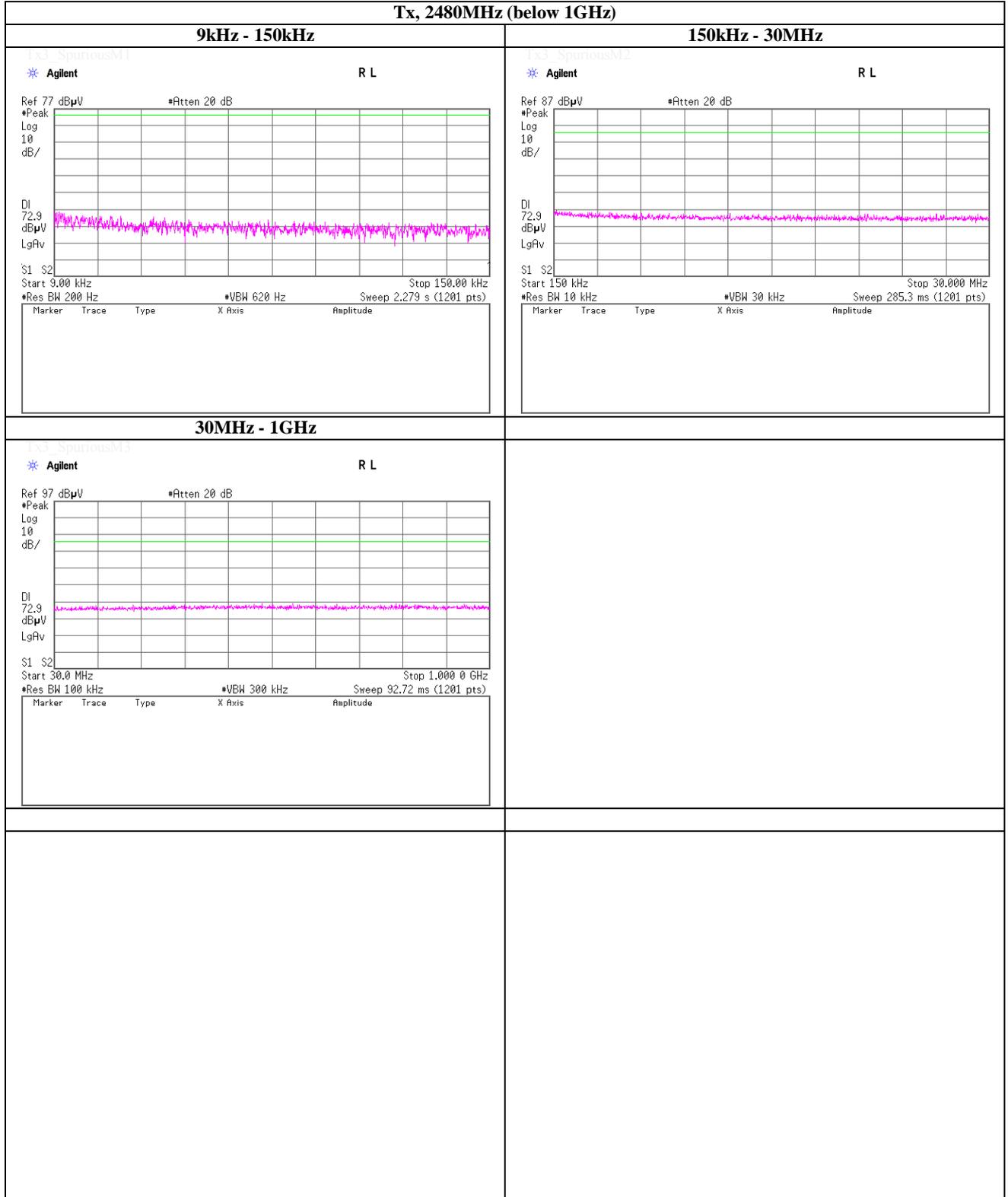
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)



UL Japan, Inc.

Shonan EMC Lab.

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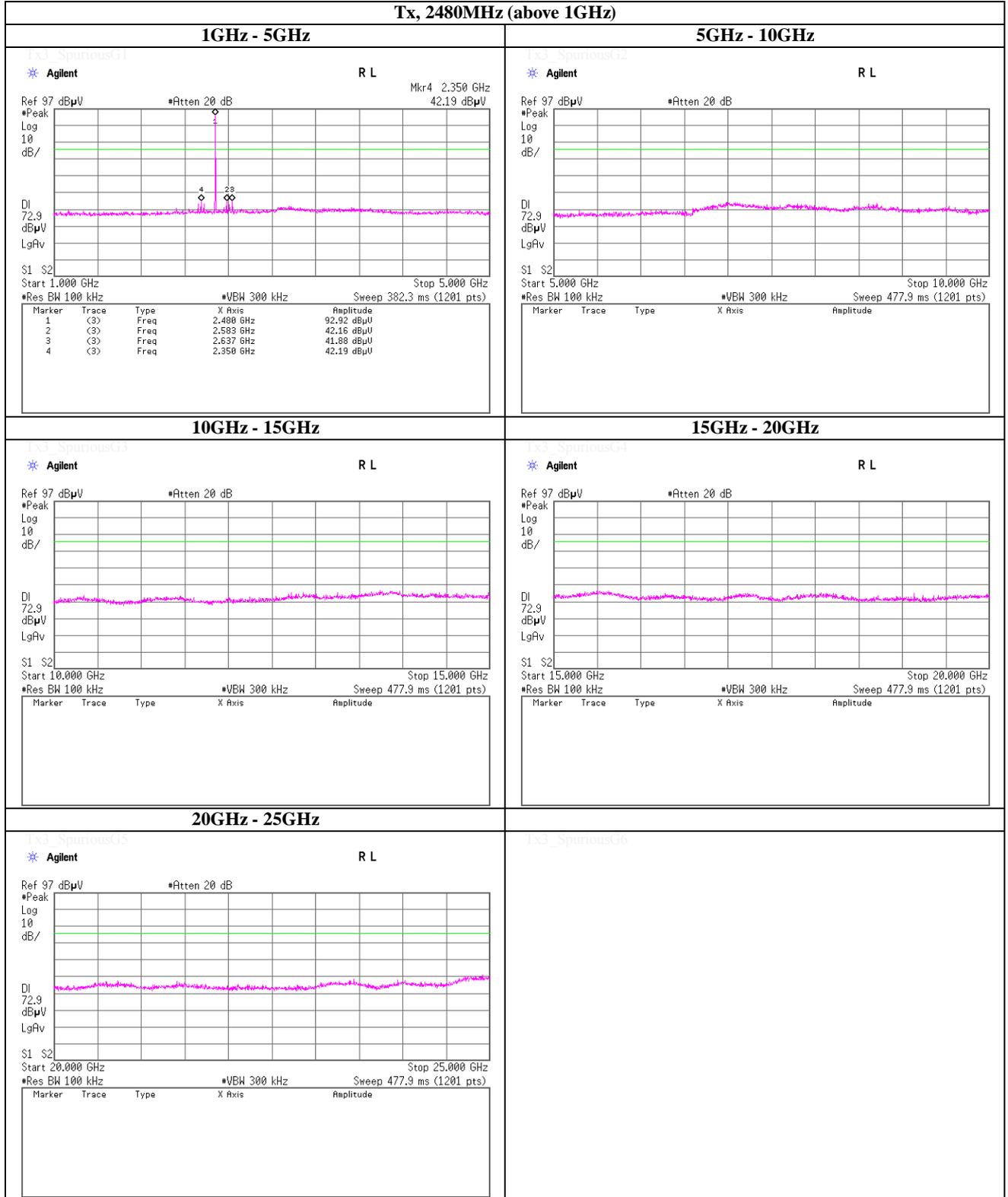
Telephone : +81 463 50 6400

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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (above 1GHz)



UL Japan, Inc.

Shonan EMC Lab.

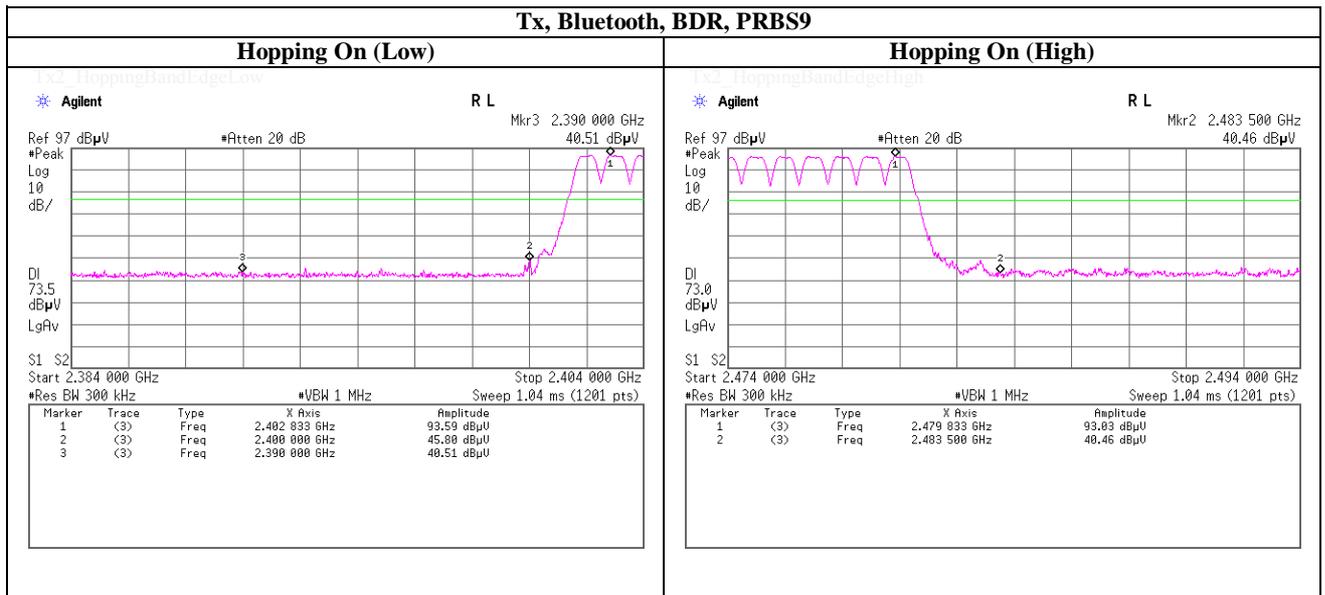
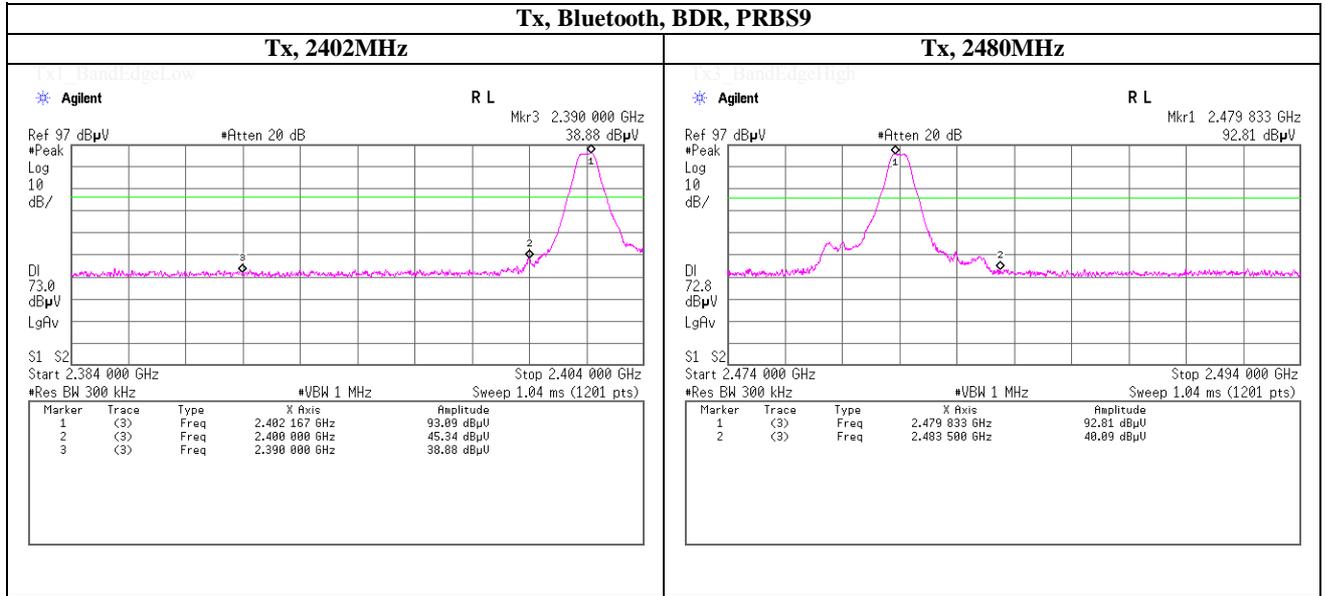
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Spurious emission (Conducted)

Band Edge compliance



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Shonan EMC Lab.

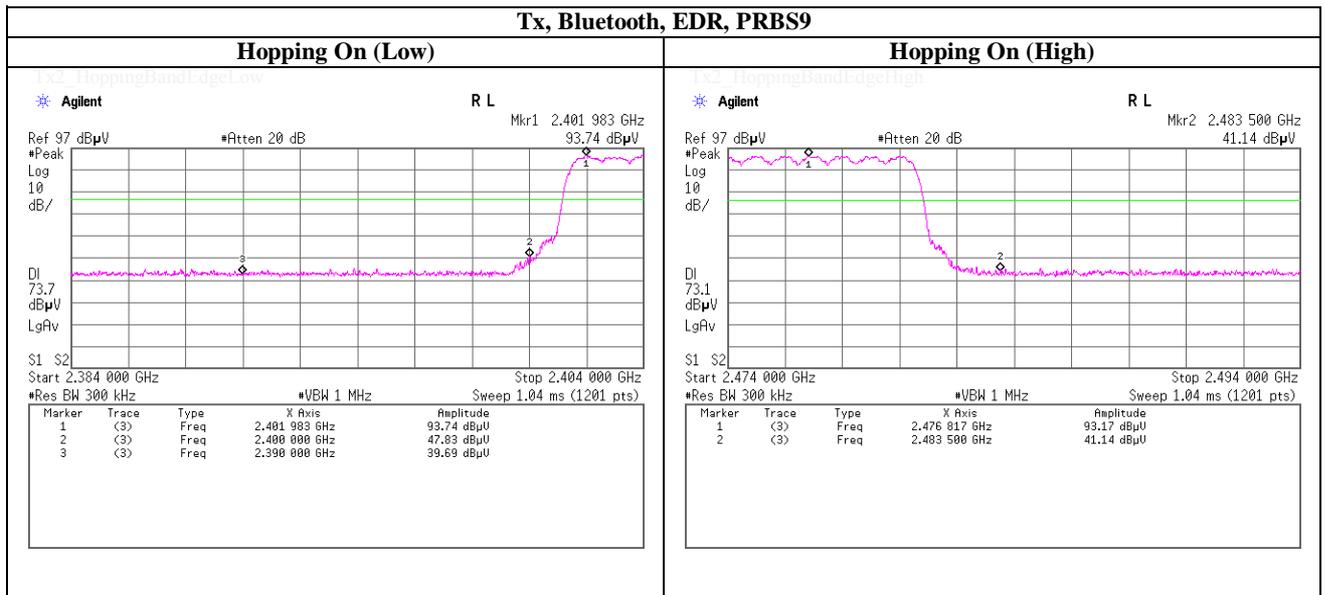
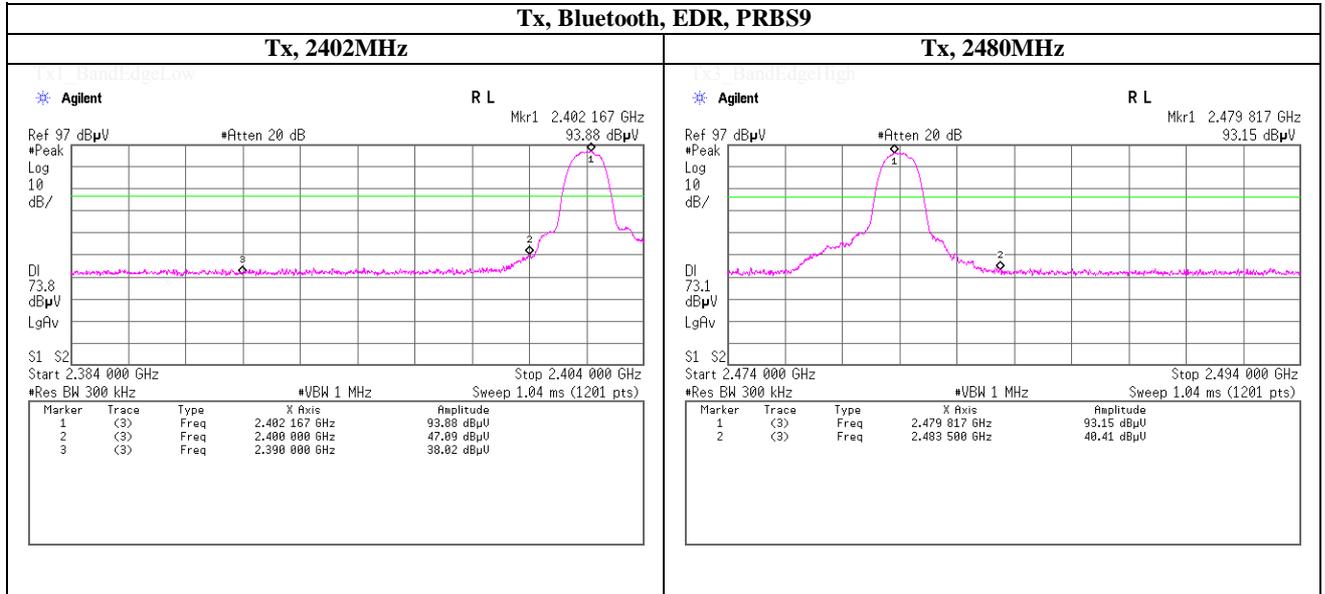
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Spurious emission (Conducted)

Band Edge compliace



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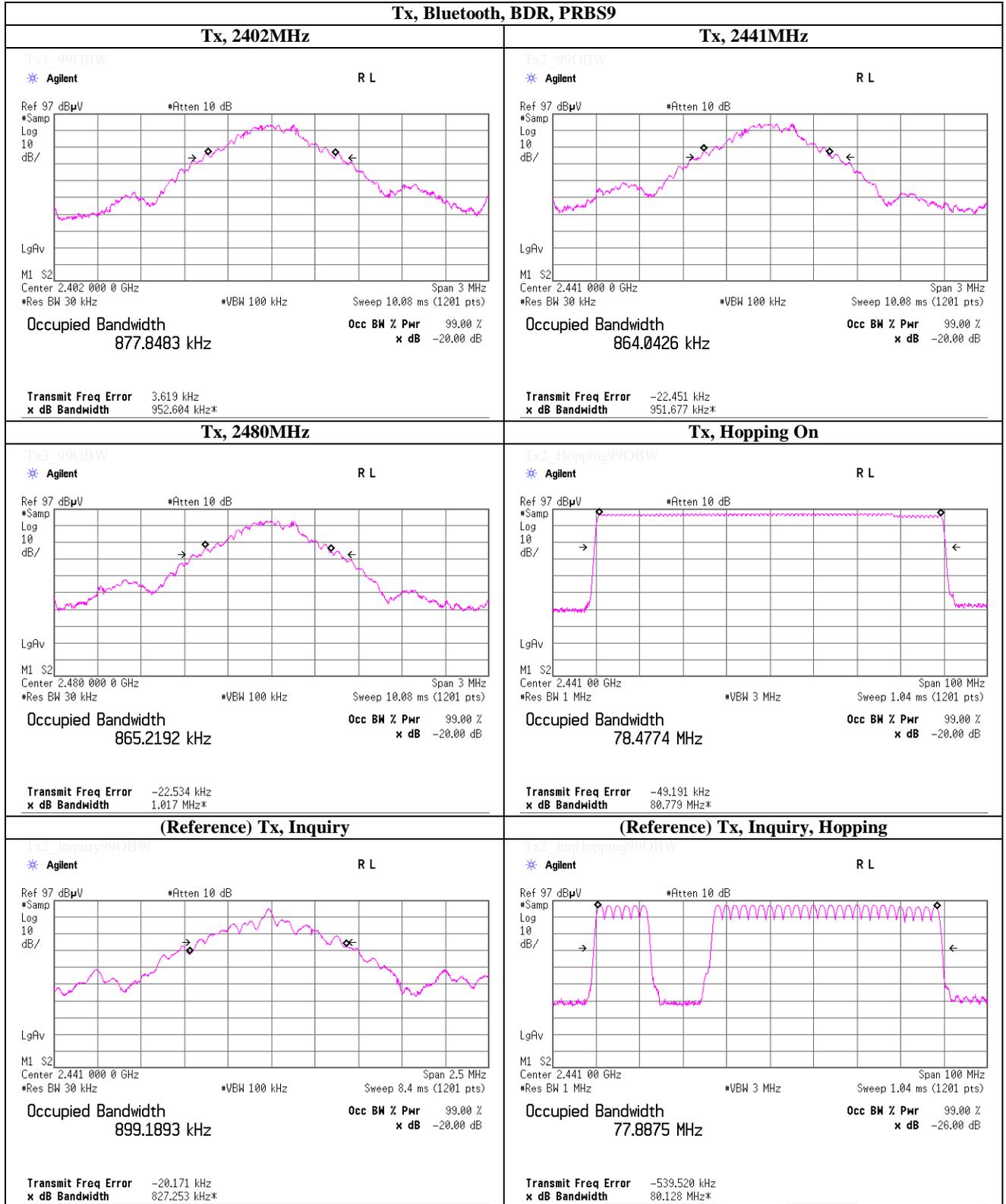
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99% Occupied Bandwidth



UL Japan, Inc.

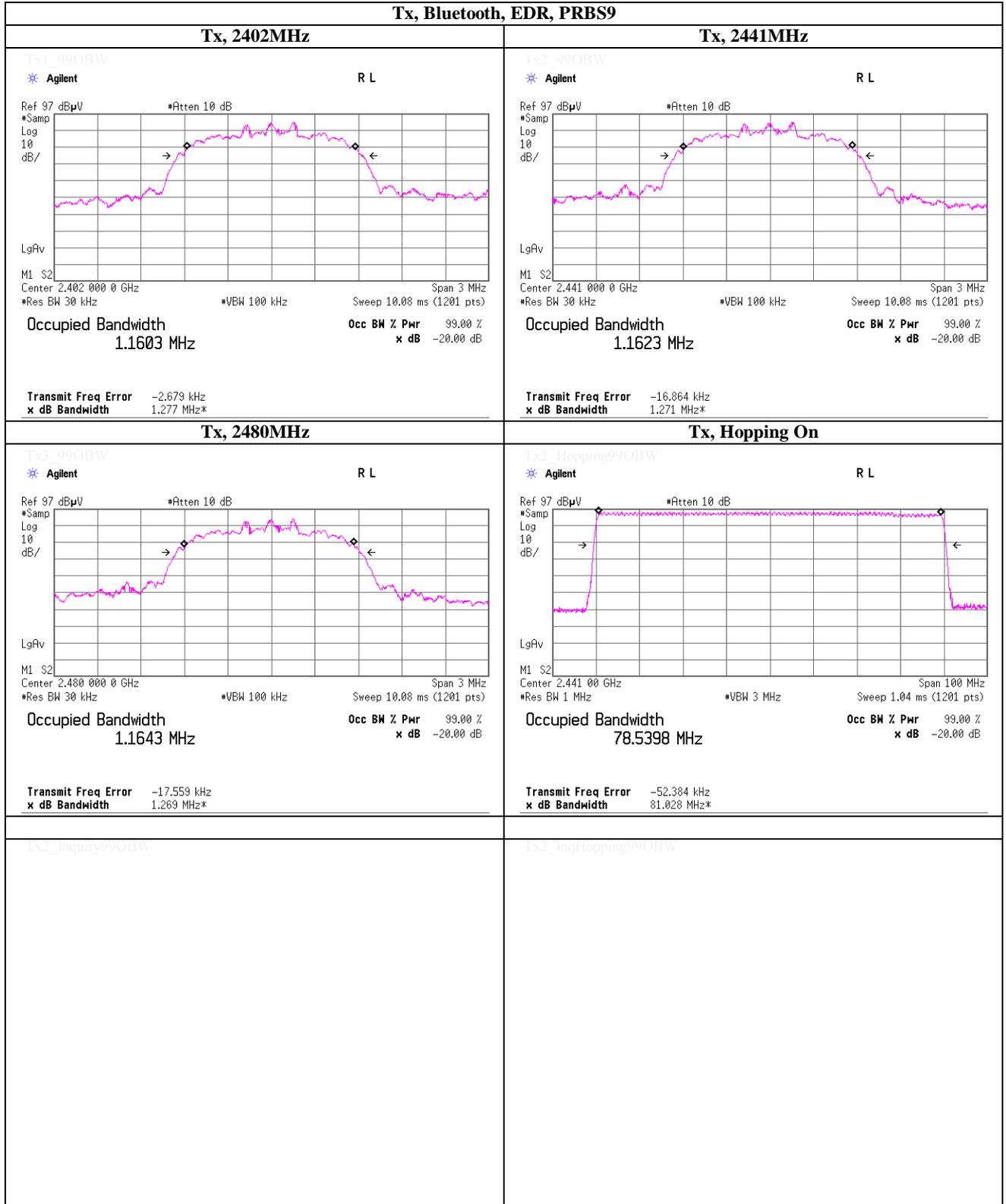
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APPENDIX 2 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2013/03/04 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2013/03/16 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2013/04/09 * 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
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2013/04/25 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2013/08/19 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2013/04/09 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2013/10/26 * 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	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2013/10/26 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2013/02/27 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2013/04/09 * 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	RE	2013/03/16 * 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