



RADIO TEST REPORT

Test Report No.: 33CE0266-SH-02-B

Applicant : Toshiba Corporation
Type of Equipment : Notebook Computer
Model No. : Satellite U930
FCC ID : CJ6UPSU7FPC2
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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Date of test: November 17 to December 4, 2012

Tested by:

Tatsuya Arai
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 33CE0266-SH-02-B

[illegible]

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SECTION 1: Customer information

Company Name : Toshiba Corporation
Address : 2-9, Suehiro-cho, Ome-shi, Tokyo, 198-8710 Japan
Telephone Number : +81 42 834 1050
Facsimile Number : +81 42 830 7331
Contact Person : Toshiyuki Echigo

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of Equipment : Notebook Computer
Model Number : Satellite U930
Serial Number : Refer to 4.2 in this report.
Rating : DC19V
Country of Mass-production : China
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : November 14, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: Satellite U930 (referred to as the EUT in this report) is a Notebook Computer.

Derived models of the EUT:

Model	Touch screen function
Satellite U930 (EUT)	-
Satellite U930t	Yes
Satellite U935	-
Satellite U935t	Yes

Model: Satellite U930/ Satellite U930t has a different sales channel with Satellite U935/Satellite U935t.

Clock frequency(ies) in the system : 40MHz (XTAL)

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Radio specification:

Bluetooth:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth : 79MHz
Channel spacing : 1MHz (BDR/EDR mode), 2MHz (Low Energy mode)
Type of modulation : FHSS, DSSS
Antenna type : PIFA
Antenna gain with cable loss : 3.24dBi
Antenna connector type : U.FL
ITU code : F1D, G1D

Refer to the test report: 33CE0266-SH-02-C for Bluetooth part (Low Energy mode).

When Bluetooth is used, IEEE 802.11 a/b/g/n is not transmitted.

Wireless LAN:

Equipment type : Transceiver
Frequency of operation : 2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)
2422-2452MHz (IEEE 802.11n-HT40)
W52: 5180-5240MHz (IEEE 802.11a, 11n-HT20)
5190-5230MHz (IEEE 802.11n-HT40)
W53: 5260-5320MHz (IEEE 802.11a, 11n-HT20)
5270-5310MHz (IEEE 802.11n-HT40)
W56: 5500-5700MHz (IEEE 802.11a, 11n-HT20)
5510-5670MHz (IEEE 802.11n-HT40)
W58: 5745-5825MHz (IEEE 802.11a, 11n-HT20)
5755-5795MHz (IEEE 802.11n-HT40)
Bandwidth : 20MHz (IEEE 802.11a/b/g/n), 40MHz (IEEE 802.11n)
Channel spacing : 5MHz (2.4GHz),
20MHz (11a, 11n (HT20, 5GHz)), 40MHz (11n (HT40, 5GHz))
Type of modulation : DSSS, OFDM
Antenna type : PIFA
Antenna gain with cable loss : 3.24dBi (2.4GHz),
3.64dBi (W52), 3.73dBi (W53), 4.77dBi (W56), 4.97dBi (W58)
Antenna connector type : U.FL
ITU code : D1D, G1D

Refer to the test report: 33CE0266-SH-02-A/D/E for Wireless LAN part.

Operation temperature range : 0 to +80 deg.C

FCC 15.31 (e)

The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203

The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2012, final revised on August 13, 2012 and effective September 12, 2012
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.207 Conducted limits
 Section 15.209 Radiated emission limits, general requirements
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 and 5725-5850MHz

The EUT will be 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	4.8dB Freq.: 27.64810MHz Detection: Average Phase: N Mode: Tx 2441MHz, 3-DH5	Complied
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	6.9dB Freq.: 2281.993MHz Polarization: Vertical Detection: Average Mode: Tx 2402MHz, DH5	Complied

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

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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 (±)
Conducted emission (AC Mains) LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
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

Conducted emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test

The data listed in this test report has enough margin, more than the 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

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JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☒ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☒ No.7 shielded room	-	-	2.76 x 3.76 x 2.4	2.76 x 3.76	-

3.6 Test setup, Test data & 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
Conducted emission	Transmitting (DH5/3-DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Carrier frequency separation	Transmitting Hopping ON (DH5/3-DH5) / Paging Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3-DH5) / Paging Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3-DH5) / Paging Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 -DH1, -DH3, -DH5 -3-DH1, -3-DH3, -3-DH5 -Paging	-
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	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

*EUT has the power settings by the software as follows;

Power settings: Power target: 8 (dBm)

Test software: DRTU version 1.5.7.0432 (Intel)

Antenna port used: AUX (Bluetooth is transmitted from this port only.)

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

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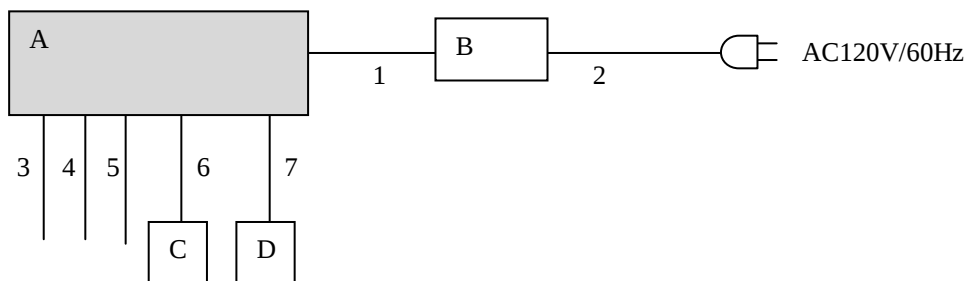
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Notebook Computer	Satellite U930	*1)	Toshiba	EUT *2)
B	AC Adaptor	PA5096U-1ACA	G71C000FF1100	Toshiba	-
C	Mouse	MO28UOL	453859	Lenovo	-
D	Headphones	HP-H500N	-	AudioComm	-

*1) XC134402H: Maximum peak output power test, XC125749H: Other test

*2) Intel® Centrino® Advanced -N 6235 (Model: 6235ANHMW, FCC ID: PD96235ANH) is installed in the EUT.

List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.7	Unshielded	Unshielded	-
2	AC	1.7	Unshielded	Unshielded	-
3	HDMI	3.0	Shielded	Shielded	-
4	USB	2.0	Shielded	Shielded	-
5	USB	1.8	Shielded	Shielded	-
6	Audio	1.2	Unshielded	Unshielded	-
7	Mouse	1.8	Unshielded	Unshielded	-

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SECTION 5: Conducted emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a Shielded room.

The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

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

Detection Type : Quasi-Peak/ Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

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SECTION 6: Radiated emission

6.1 Operating environment

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

6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. The rear of EUT was aligned and flushed with rear of tabletop.
Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

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

6.4 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 each tilt angle of LCD of EUT to see the angle of maximum noise, and the test was made at the tilt angle of 90 deg. (below 1GHz) / 135 deg. (above 1GHz) that has the maximum noise.

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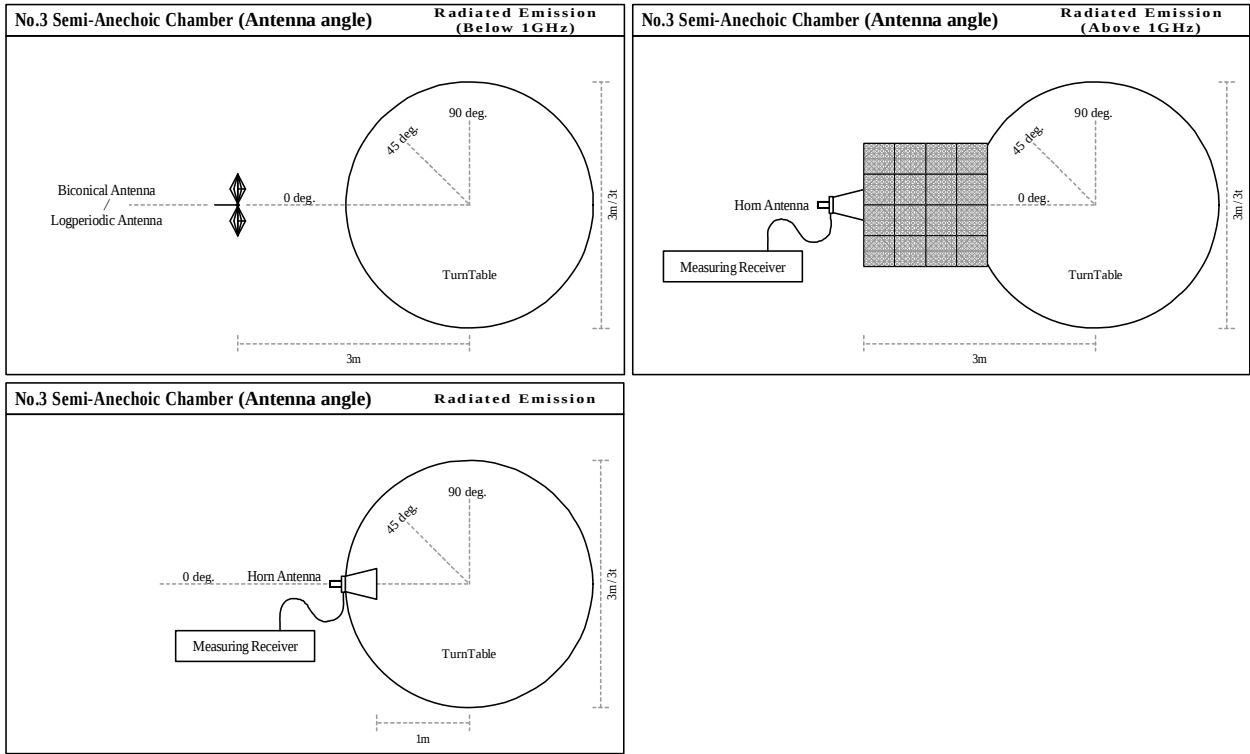
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Figure 1. Antenna angle



6.5 Band edge

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

6.6 Results

Summary of the test results : Pass *No noise was detected above the 3rd order harmonics.

Refer to APPENDIX

SECTION 7: 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 8: 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 9: 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 10: 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 11: 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 12: 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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Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

Conducted emission
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

Conducted emission
Radiated emission

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APPENDIX 1: Data of Radio tests

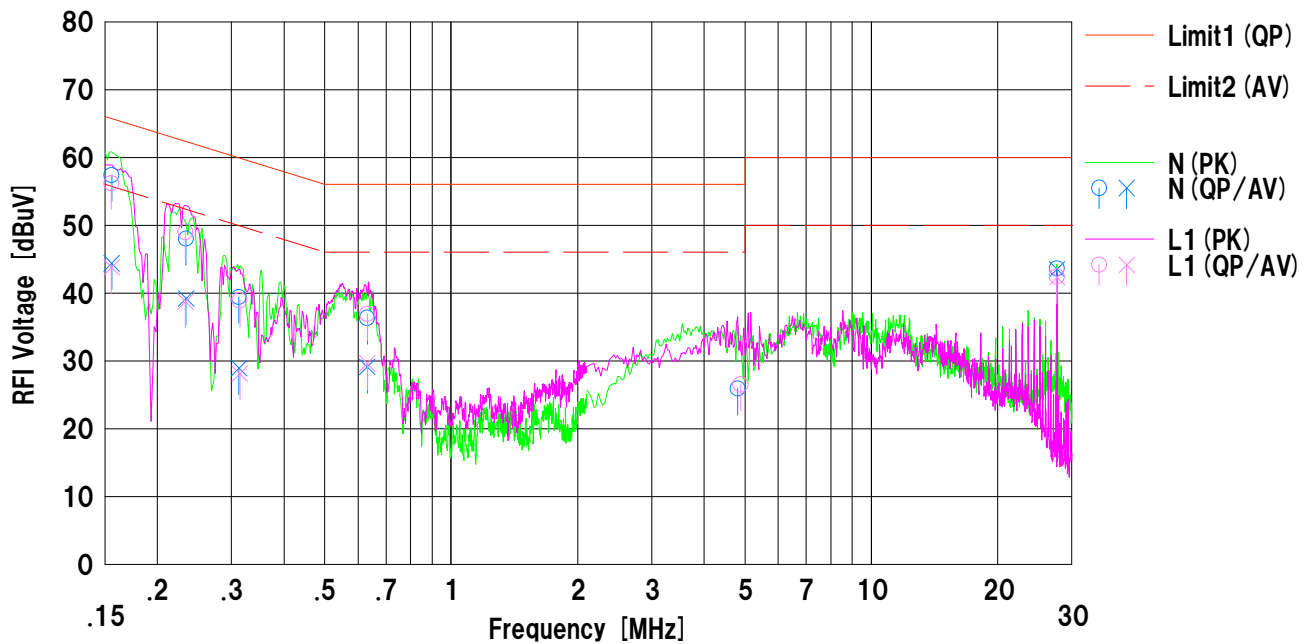
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, DH5, Tx 2441MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15570	44.7	31.7	12.7	57.4	44.4	65.6	55.6	8.2	11.2	N	
2	0.23400	35.3	26.5	12.7	48.0	39.2	62.3	52.3	14.3	13.1	N	
3	0.31250	26.7	16.2	12.7	39.4	28.9	59.9	49.9	20.5	21.0	N	
4	0.63150	23.6	16.4	12.7	36.3	29.1	56.0	46.0	19.7	16.9	N	
5	4.80700	13.0	---	12.9	25.9	---	56.0	46.0	30.1	---	N	
6	27.64840	29.8	29.7	13.8	43.6	43.5	60.0	50.0	16.4	6.5	N	
7	0.15540	43.5	31.1	12.7	56.2	43.8	65.7	55.7	9.5	11.9	L1	
8	0.23340	36.3	26.0	12.7	49.0	38.7	62.3	52.3	13.3	13.6	L1	
9	0.31400	26.2	15.4	12.7	38.9	28.1	59.8	49.8	20.9	21.7	L1	
10	0.63150	24.2	16.9	12.7	36.9	29.6	56.0	46.0	19.1	16.4	L1	
11	4.88700	13.6	---	12.9	26.5	---	56.0	46.0	29.5	---	L1	
12	27.64820	28.6	28.5	13.8	42.4	42.3	60.0	50.0	17.6	7.7	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

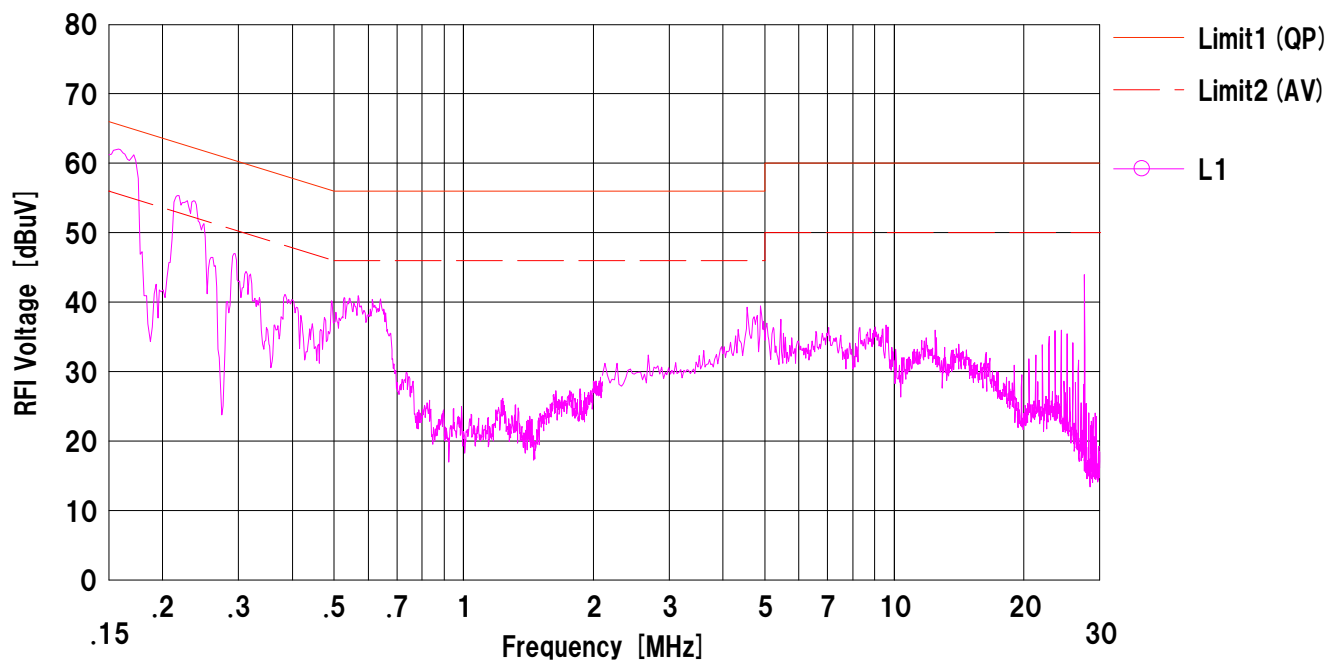
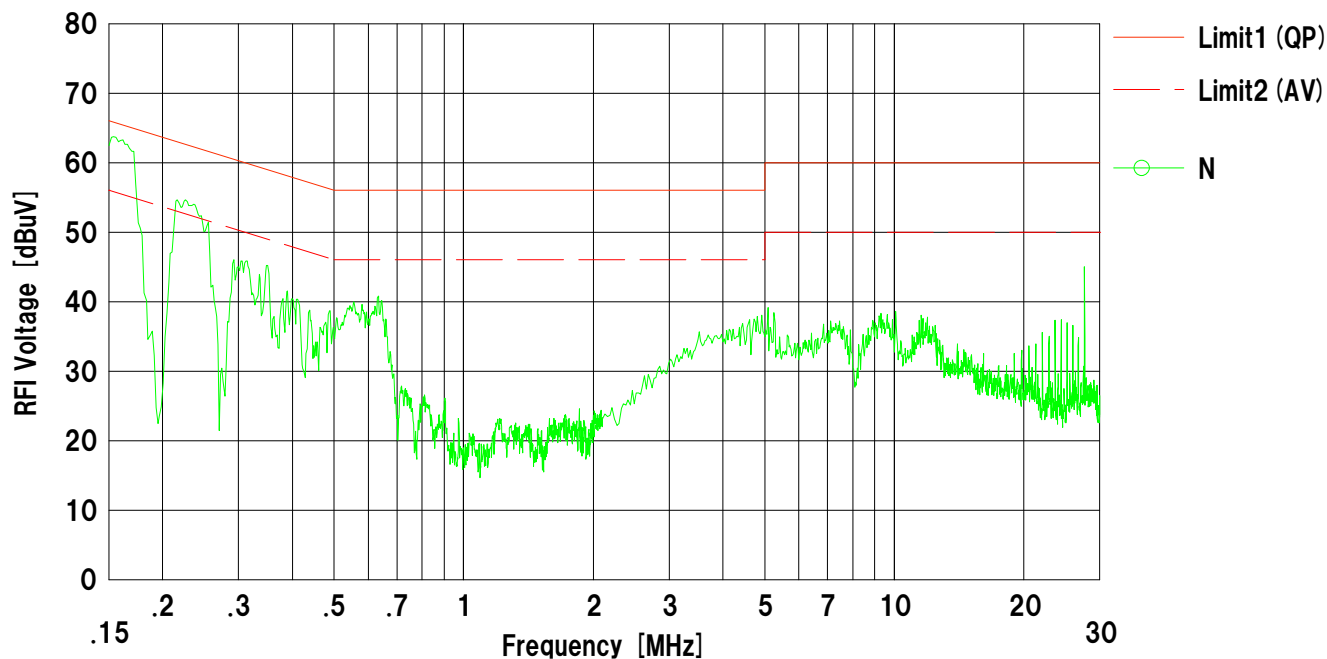
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, DH5, Tx 2402MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

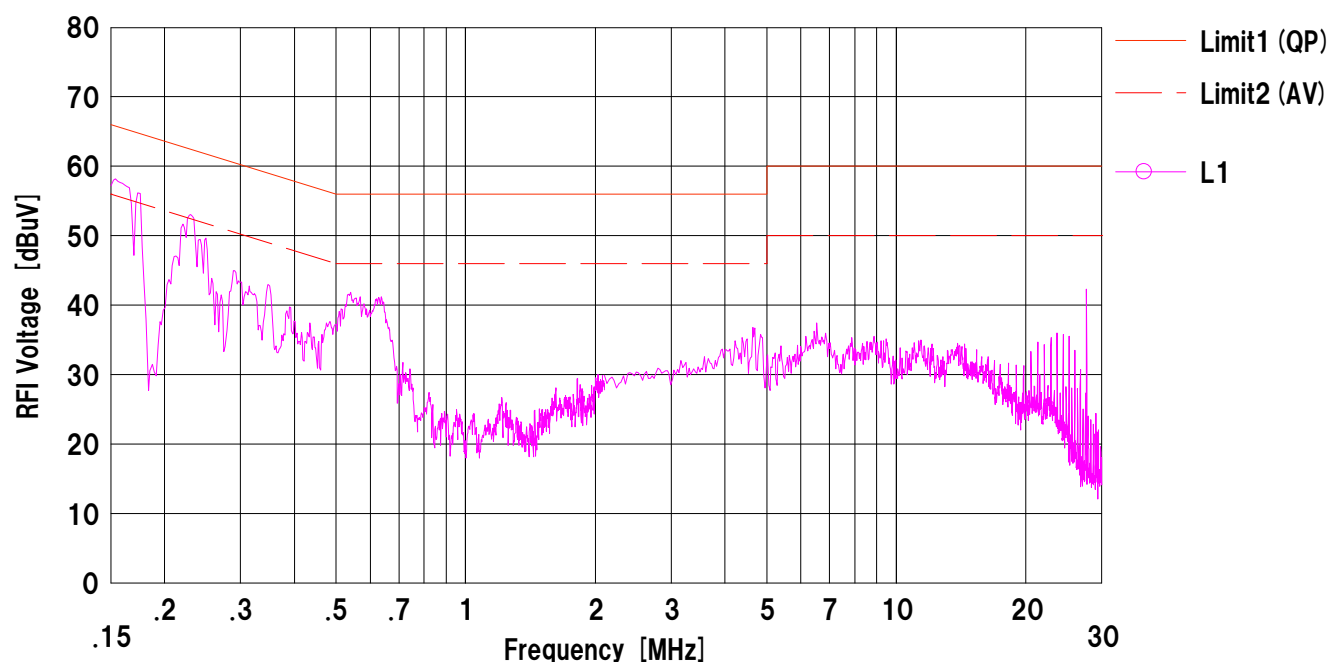
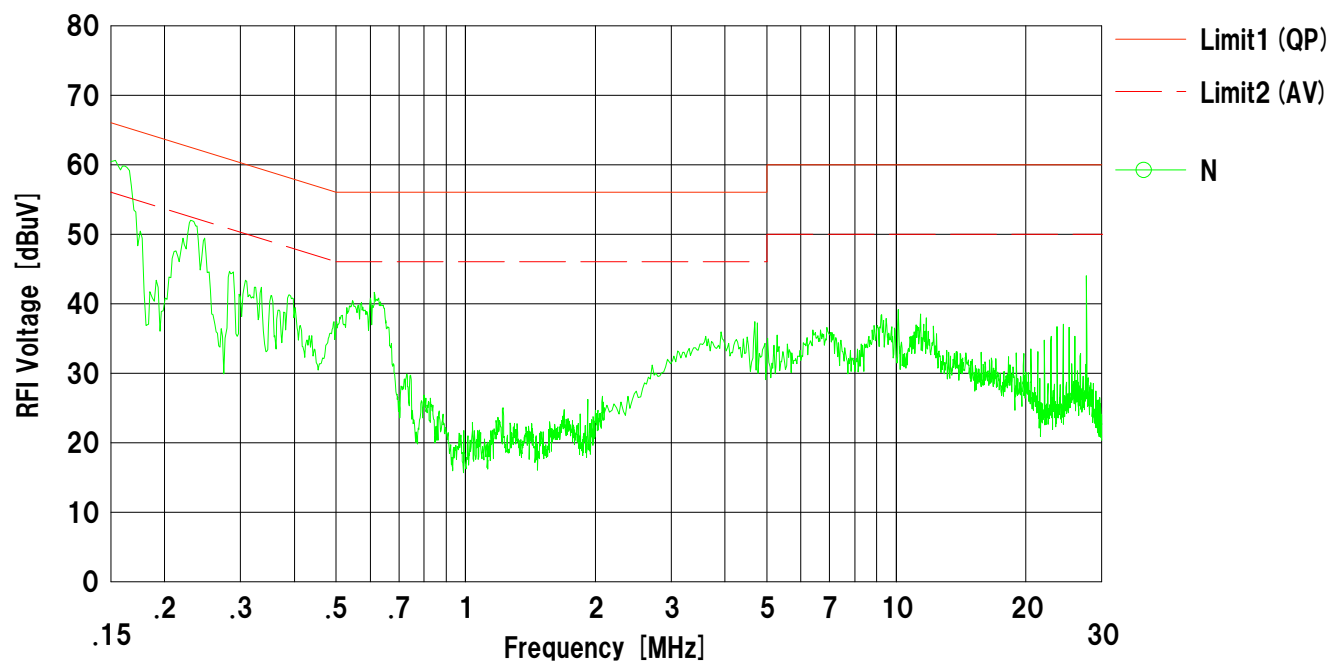
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, DH5, Tx 2480MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

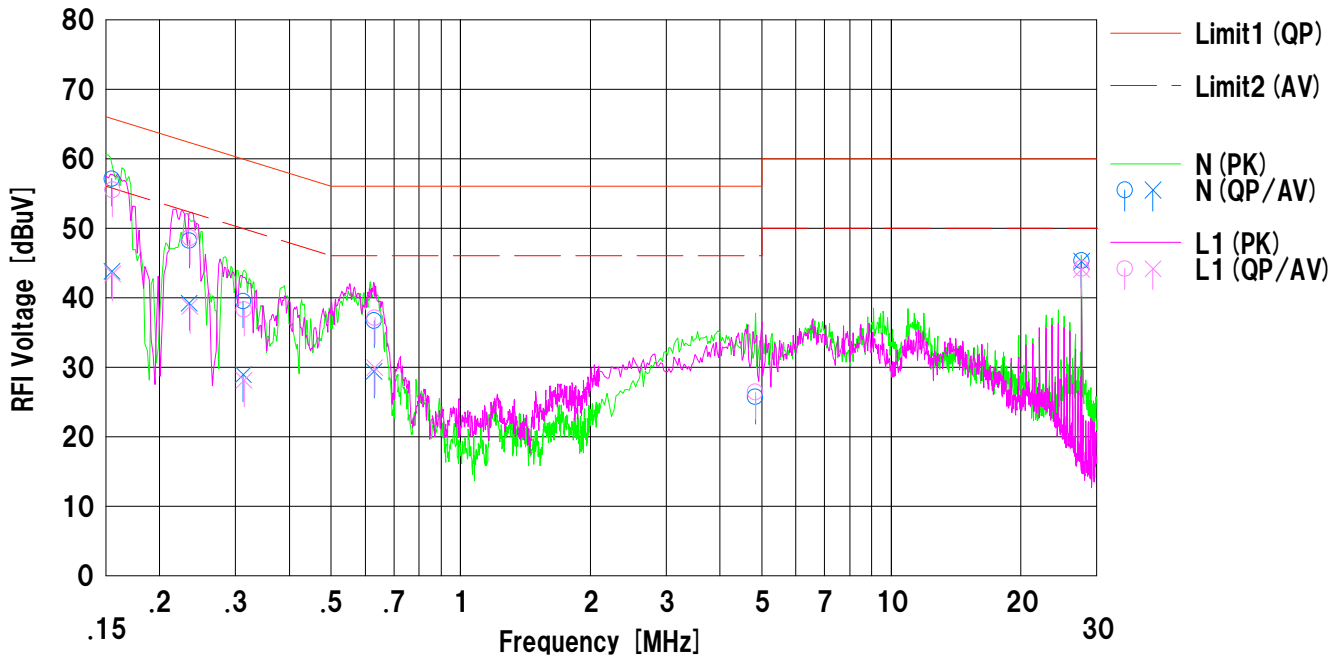
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, 3-DH5, Tx 2441MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15500	44.4	31.1	12.7	57.1	43.8	65.7	55.7	8.6	11.9	N	
2	0.23450	35.5	26.5	12.7	48.2	39.2	62.2	52.2	14.0	13.0	N	
3	0.31250	26.8	16.2	12.7	39.5	28.9	59.9	49.9	20.4	21.0	N	
4	0.63000	24.0	16.7	12.7	36.7	29.4	56.0	46.0	19.3	16.6	N	
5	4.83500	12.8	---	12.9	25.7	---	56.0	46.0	30.3	---	N	
6	27.64810	31.5	31.4	13.8	45.3	45.2	60.0	50.0	14.7	4.8	N	
7	0.15550	42.8	30.7	12.7	55.5	43.4	65.7	55.7	10.2	12.3	L1	
8	0.23500	35.9	26.0	12.7	48.6	38.7	62.2	52.2	13.6	13.5	L1	
9	0.31400	25.6	15.4	12.7	38.3	28.1	59.8	49.8	21.5	21.7	L1	
10	0.63200	24.4	17.2	12.7	37.1	29.9	56.0	46.0	18.9	16.1	L1	
11	4.83500	13.5	---	12.9	26.4	---	56.0	46.0	29.6	---	L1	
12	27.64810	30.4	30.3	13.8	44.2	44.1	60.0	50.0	15.8	5.9	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

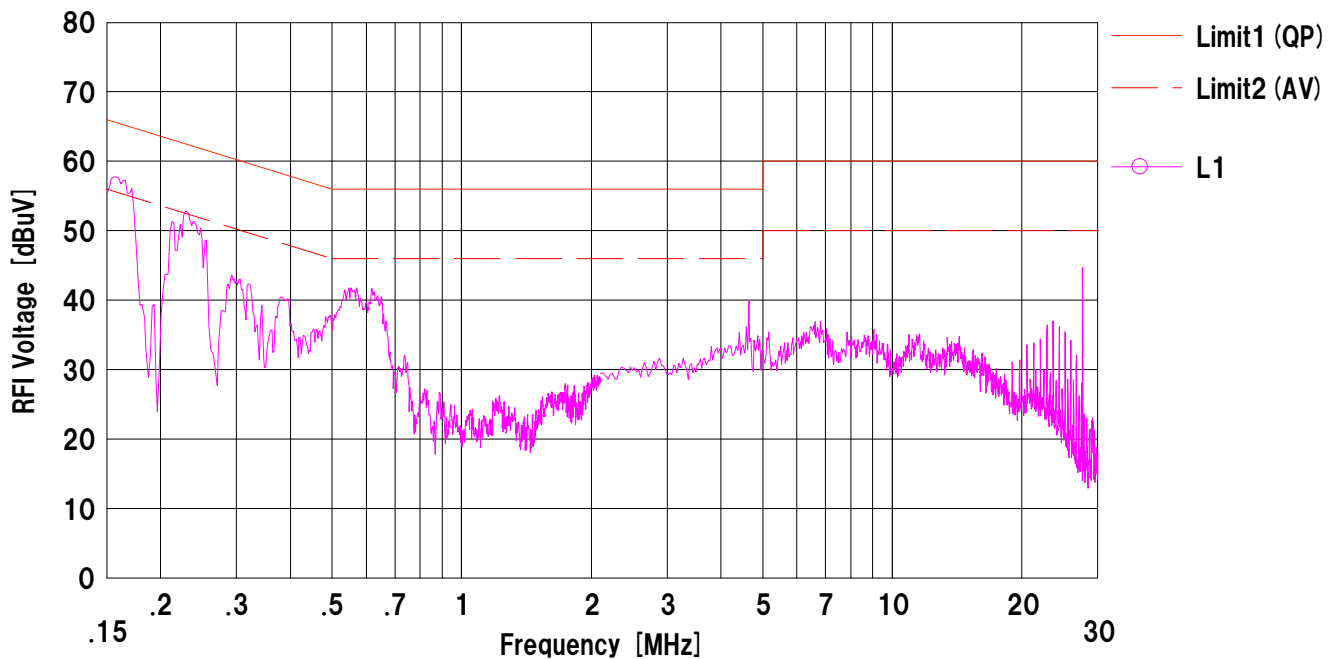
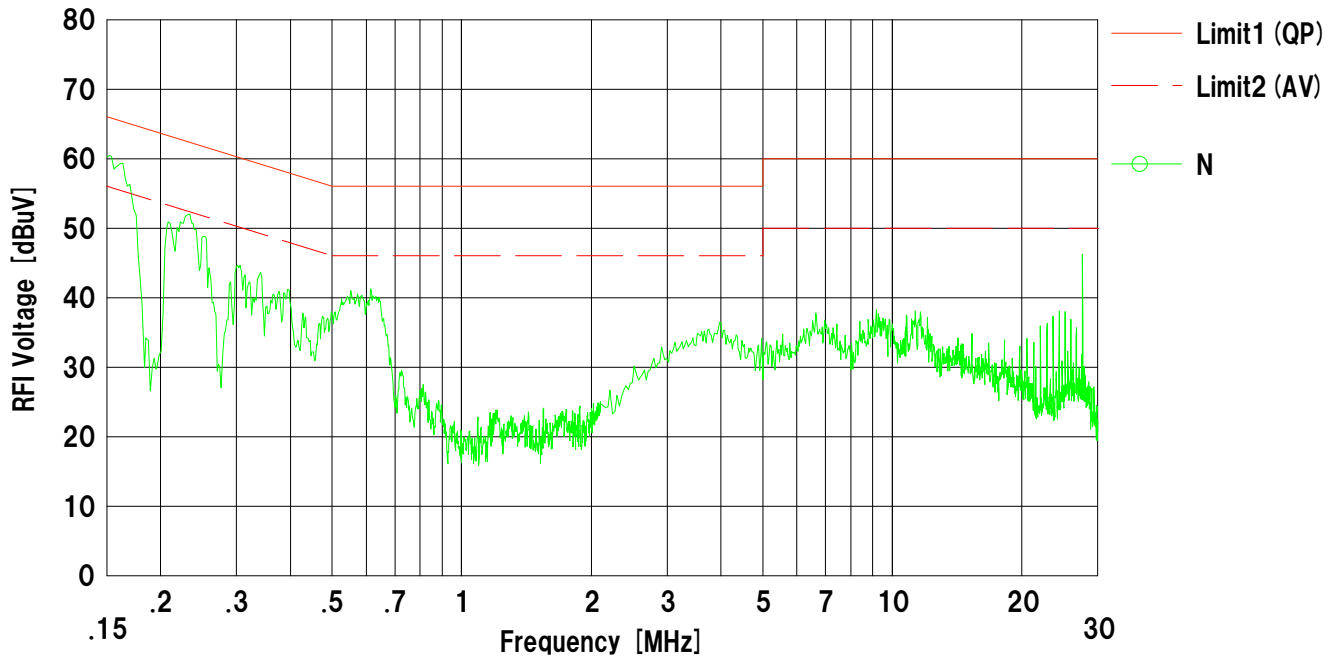
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, 3-DH5, Tx 2402MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

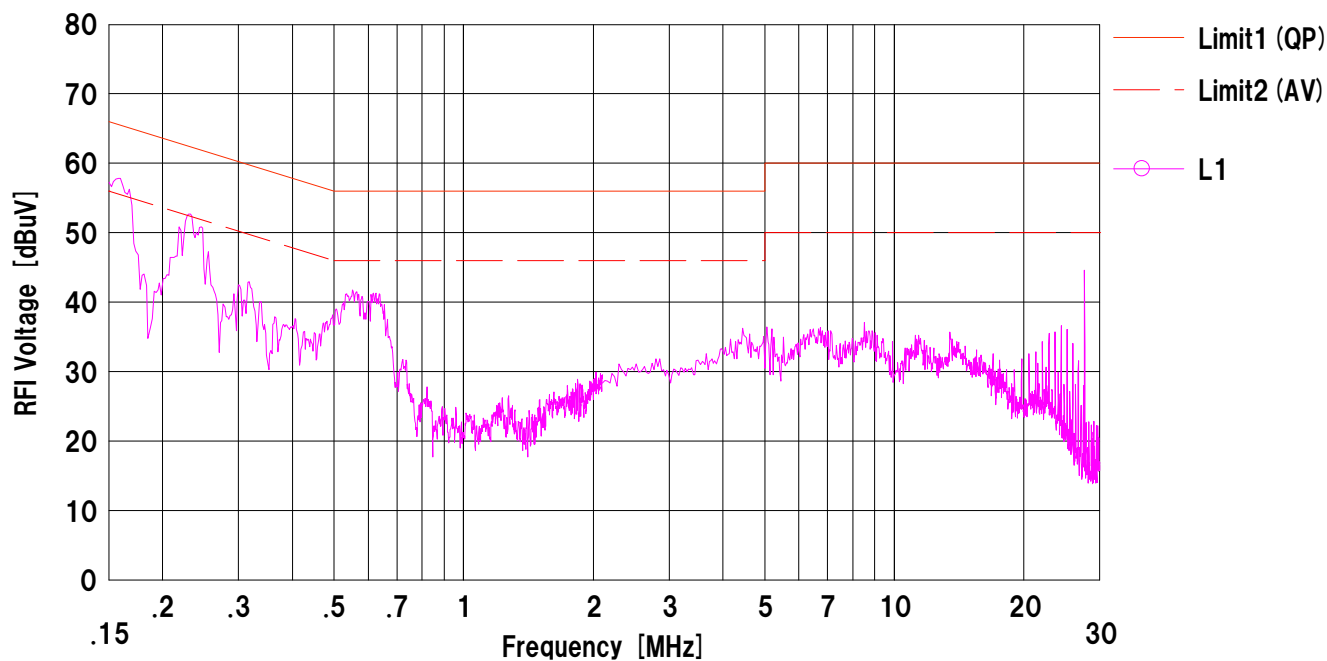
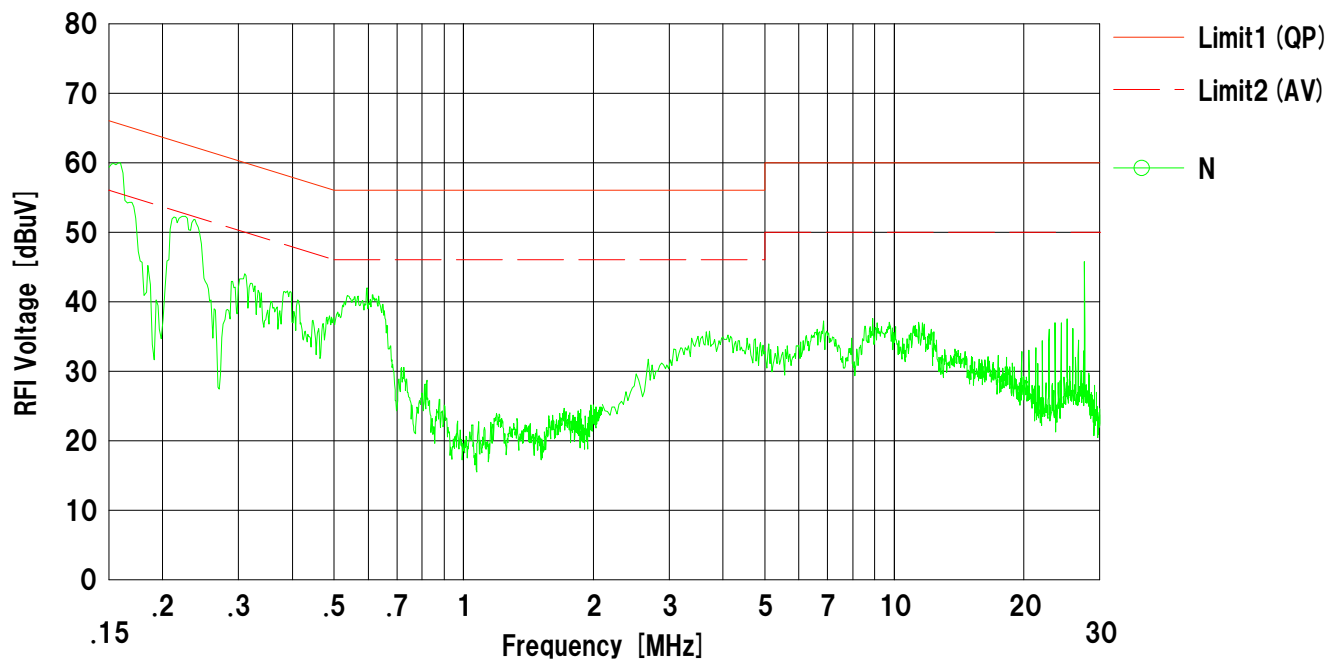
DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2012/12/04

Mode : Bluetooth, 3-DH5, Tx 2480MHz
Report No. : 33CE0266-SH-02-B
Power : AC 120V / 60Hz
Temp./Humi. : 25deg.C / 39%RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-05

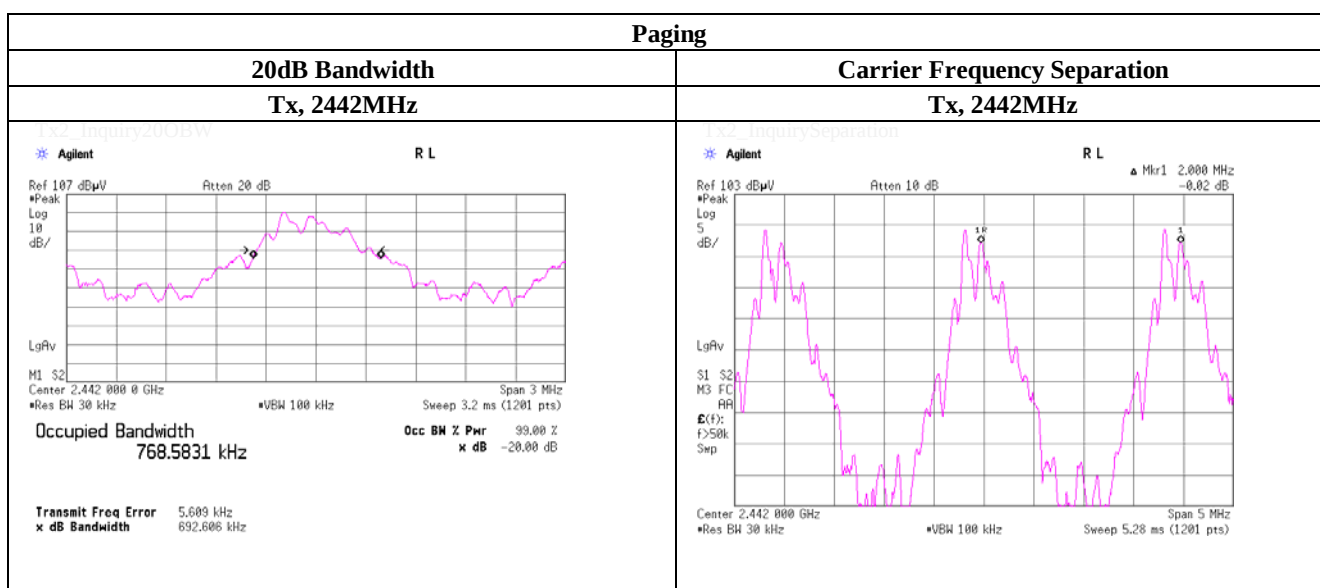
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 28, 2012	
Temperature / Humidity	22 deg.C , 50 %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	0.961	1.000	>= 0.641
DH5	2441.0	0.957	1.000	>= 0.638
DH5	2480.0	0.966	1.000	>= 0.644
Paging	2442.0	0.693	2.000	>= 0.462

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

No limit applies to 20dB Bandwidth.



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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz Agilent R L Ref 97 dBμV #Peak Log 10 dB/ LgAv MI S2 Center 2.402 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 874.6236 kHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -20.053 kHz x dB Bandwidth 961.083 kHz	Tx, 2402MHz Agilent R L Ref 108 dBμV #Peak Log 5 dB/ LgAv MI S2 Center 2.402 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Carrier Frequency Separation 0.11 dB
Tx, 2441MHz Agilent R L Ref 97 dBμV #Peak Log 10 dB/ LgAv MI S2 Center 2.441 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 877.4318 kHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -22.797 kHz x dB Bandwidth 956.962 kHz	Tx, 2441MHz Agilent R L Ref 108 dBμV #Peak Log 5 dB/ LgAv MI S2 Center 2.441 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Carrier Frequency Separation -0.04 dB
Tx, 2480MHz Agilent R L Ref 97 dBμV #Peak Log 10 dB/ LgAv MI S2 Center 2.480 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 874.2831 kHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -22.582 kHz x dB Bandwidth 966.164 kHz	Tx, 2480MHz Agilent R L Ref 108 dBμV #Peak Log 5 dB/ LgAv MI S2 Center 2.479 000 0 GHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms (1201 pts) Carrier Frequency Separation 0.10 dB

20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date November 28, 2012
Temperature / Humidity 22 deg.C , 50 %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	1.295	1.000	>= 0.864
3-DH5	2441.0	1.297	1.000	>= 0.864
3-DH5	2480.0	1.296	1.000	>= 0.864

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

No limit applies to 20dB Bandwidth.

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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz Agilent Ref 97 dBμV Atten 10 dB Peak Log 10 dB/ LgAv M1 S2 Center 2.402 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1656 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -18.927 kHz x dB Bandwidth 1.295 MHz	Tx, 2402MHz Agilent Ref 101 dBμV Atten 10 dB Peak Log 2 dB/ LgAv M1 S2 Center 2.403 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Mkr1 1.000 0 MHz 0.02 dB
Tx, 2441MHz Agilent Ref 97 dBμV Atten 10 dB Peak Log 10 dB/ LgAv M1 S2 Center 2.441 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1669 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -20.187 kHz x dB Bandwidth 1.297 MHz	Tx, 2441MHz Agilent Ref 101 dBμV Atten 10 dB Peak Log 2 dB/ LgAv M1 S2 Center 2.441 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Mkr1 1.000 0 MHz 0.03 dB
Tx, 2480MHz Agilent Ref 97 dBμV Atten 10 dB Peak Log 10 dB/ LgAv M1 S2 Center 2.480 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Occupied Bandwidth 1.1703 MHz Occ BW % Pwr 99.00 % x dB -20.00 dB Transmit Freq Error -18.984 kHz x dB Bandwidth 1.296 MHz	Tx, 2480MHz Agilent Ref 101 dBμV Atten 10 dB Peak Log 2 dB/ LgAv M1 S2 Center 2.479 000 0 GHz Res BW 30 kHz VBW 100 kHz Span 3 MHz Sweep 3.2 ms (1201 pts) Mkr1 1.000 0 MHz 0.01 dB

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Number of Hopping Frequency

Test place

UL Japan, Inc. Shonan EMC Lab.

No.5 Shielded Room

Date

November 28, 2012

Temperature / Humidity

22 deg.C , 50 %RH

Engineer

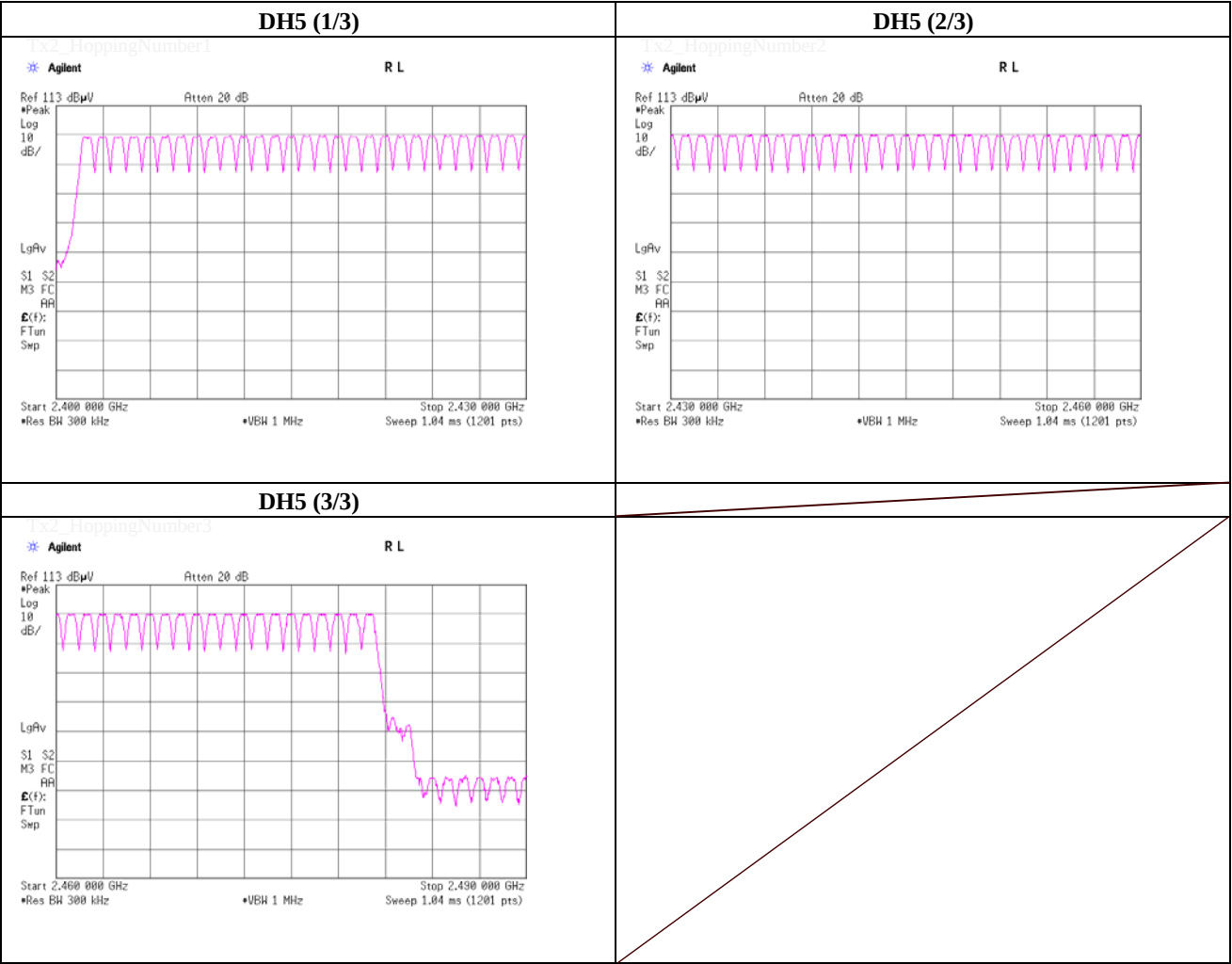
Akio Hayashi

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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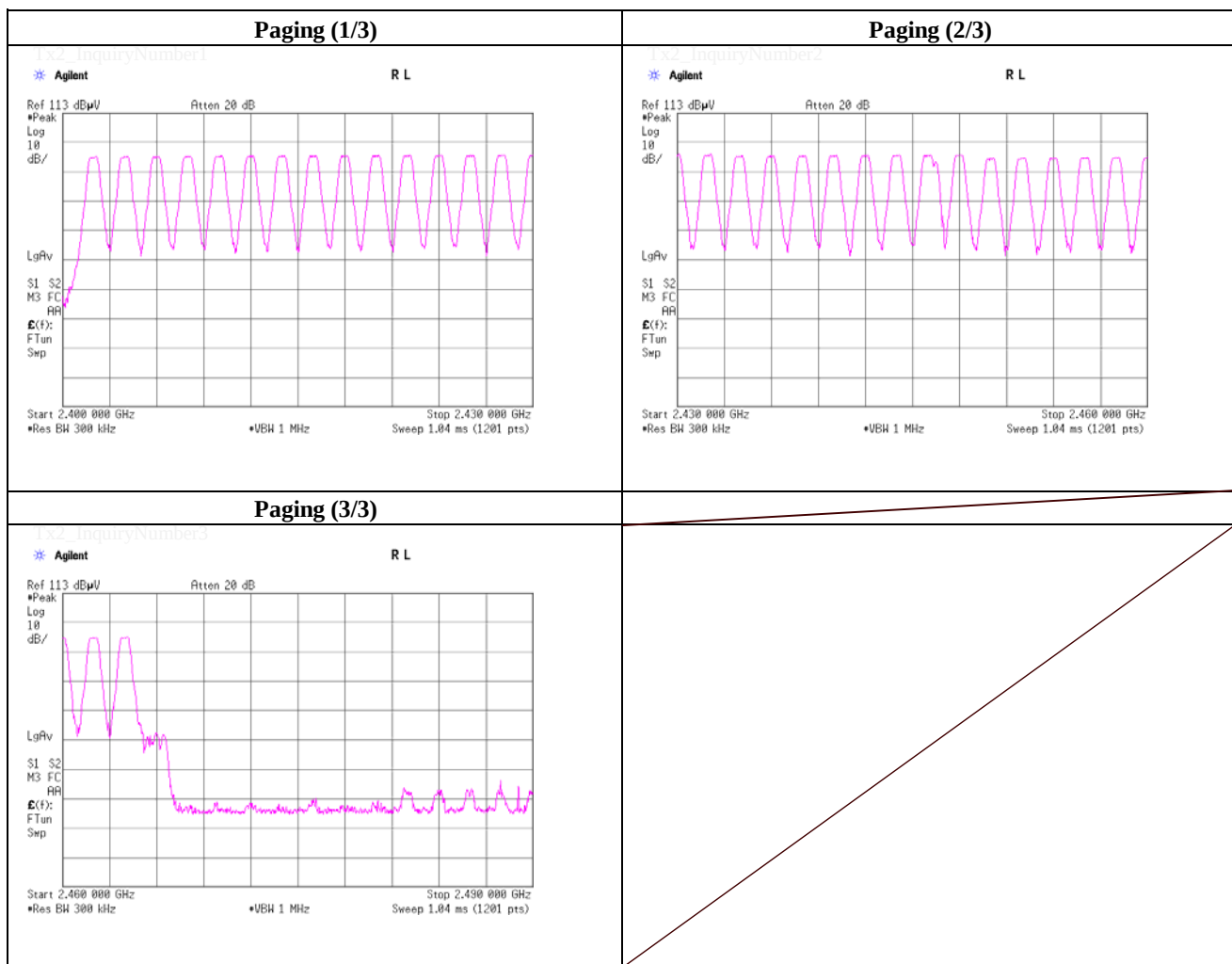
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 28, 2012	
Temperature / Humidity	22 deg.C , 50 %RH	
Engineer	Akio Hayashi	
Mode	Tx, Bluetooth, Paging	

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



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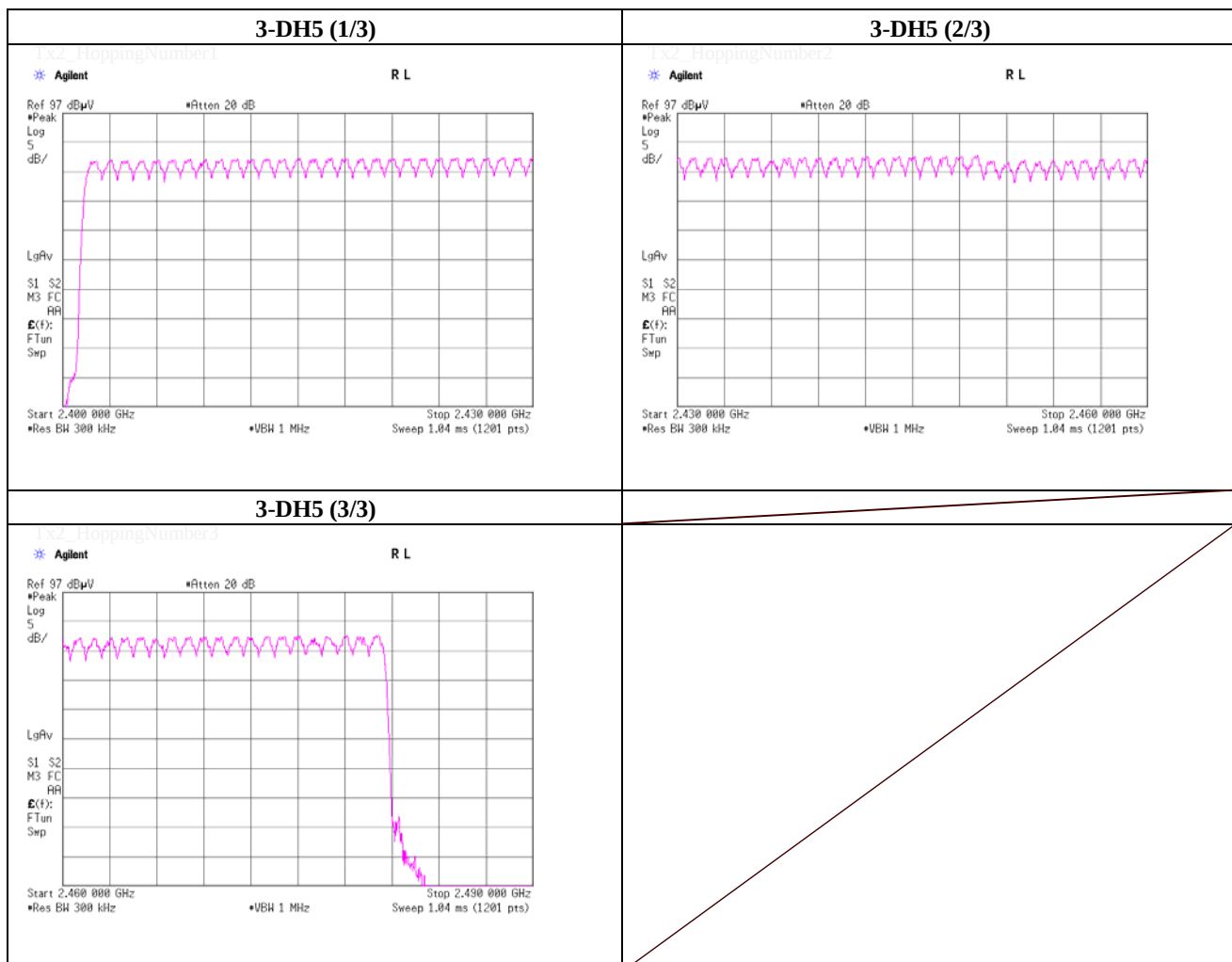
Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 28, 2012	
Temperature / Humidity	22 deg.C , 50 %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	November 28, 2012	
Temperature / Humidity	22 deg.C , 50 %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	103.0 / 5.0 sec. x 31.6 sec. = 651 times	0.393	256	400
DH3	34.0 / 5.0 sec. x 31.6 sec. = 215 times	1.650	355	400
DH5	21.0 / 5.0 sec. x 31.6 sec. = 133 times	2.898	385	400
Paging	50.0 / 1.0 sec. x 12.8 sec. = 640 times	0.096	62	400

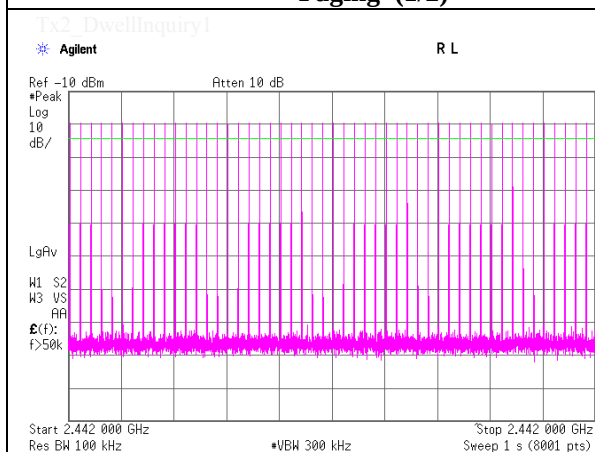
Sample Calculation

Result = Number of transmission x Length of transmission time

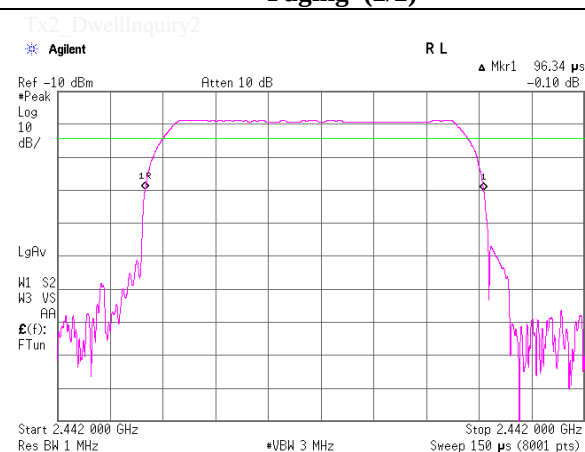
* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s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

Paging

Paging (1/2)



Paging (2/2)



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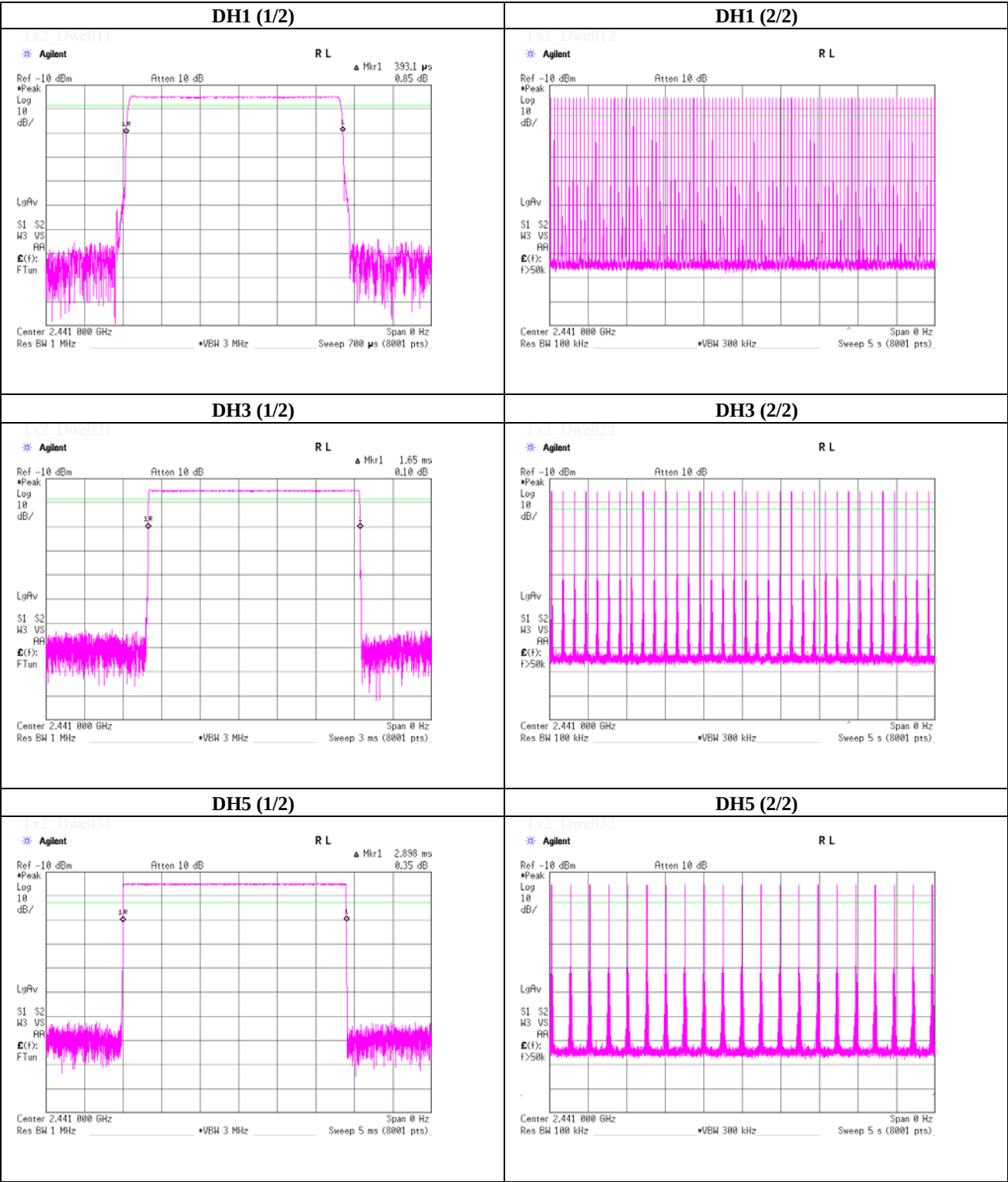
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Dwell time

Tx, Bluetooth, BDR, PRBS9



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 28, 2012	
Temperature / Humidity	22 deg.C , 50 %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	101.0 / 5.0 sec. x 31.6 sec. = 639 times	0.406	260	400
3-DH3	34.0 / 5.0 sec. x 31.6 sec. = 215 times	1.656	356	400
3-DH5	21.0 / 5.0 sec. x 31.6 sec. = 133 times	2.908	387	400

Sample Calculation

Result = Number of transmission x Length of transmittion 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 $N=79$.

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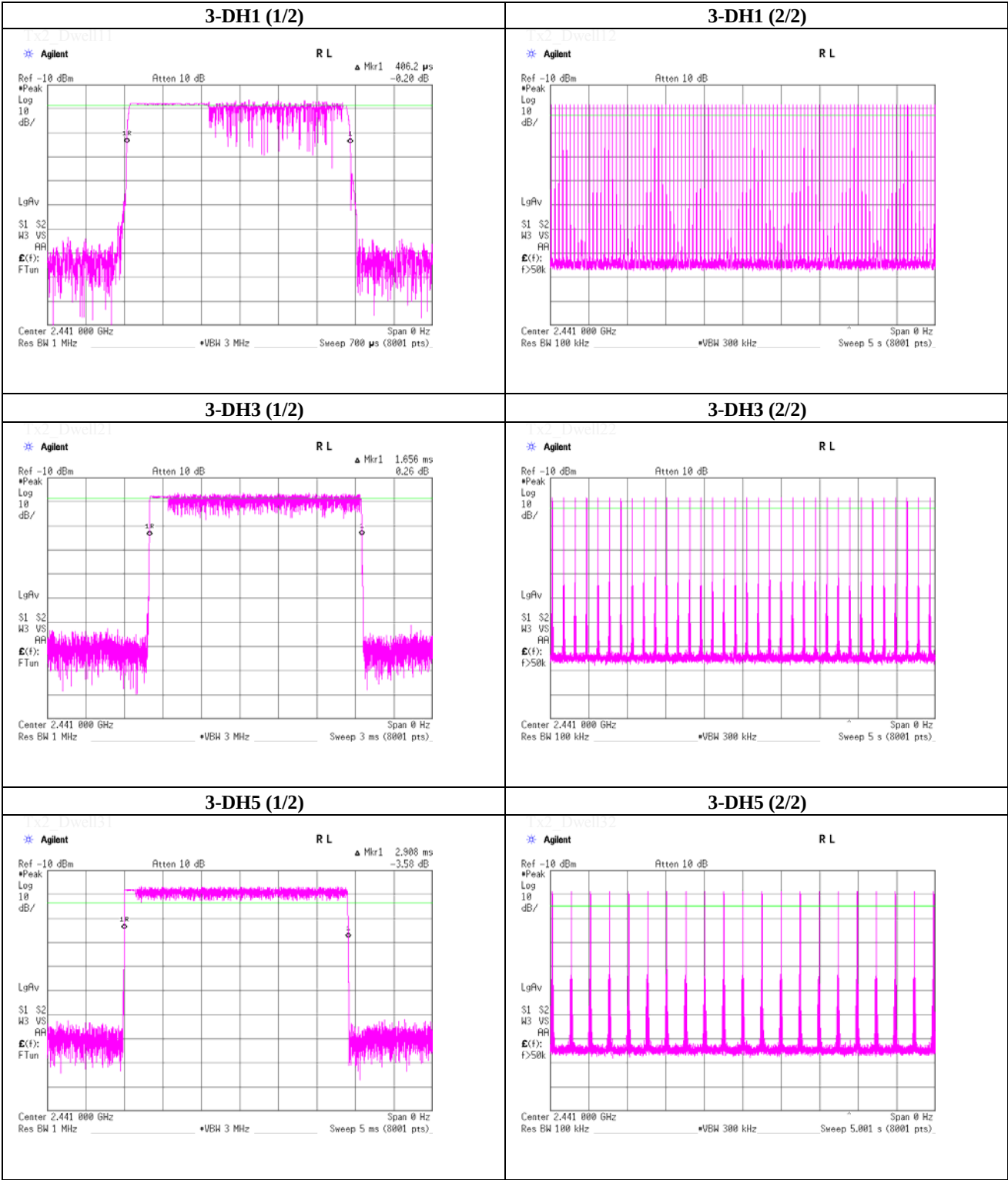
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Dwell time

Tx, Bluetooth, EDR, PRBS9



Maximum Peak Conducted Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.7 Shielded Room
 Date November 17, 2012
 Temperature / Humidity 24deg.C , 34%RH
 Engineer Kenichi Adachi
 Mode Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-4.21	0.74	10.00	6.53	4.50	20.97	125	14.44
DH5	2441.0	-3.39	0.75	10.00	7.36	5.45	20.97	125	13.61
DH5	2480.0	-3.36	0.75	10.00	7.39	5.48	20.97	125	13.58
2-DH5	2402.0	-5.69	0.74	10.00	5.05	3.20	20.97	125	15.92
2-DH5	2441.0	-5.60	0.75	10.00	5.15	3.27	20.97	125	15.82
2-DH5	2480.0	-5.66	0.75	10.00	5.09	3.23	20.97	125	15.88
3-DH5	2402.0	-5.64	0.74	10.00	5.10	3.24	20.97	125	15.87
3-DH5	2441.0	-4.59	0.75	10.00	6.16	4.13	20.97	125	14.81
3-DH5	2480.0	-4.25	0.75	10.00	6.50	4.47	20.97	125	14.47

Sample Calculation:

Result = Reading + Cable Loss + Atten. Loss

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 27, 2012 December 2, 2012
Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
Engineer Shinichi Takano Kenichi Adachi
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.	82.121	QP	43.5	6.8	7.5	32.2	25.6	40.0	14.4	230	216	
Hori.	149.255	QP	43.3	14.8	7.7	32.1	33.7	43.5	9.8	203	318	
Hori.	179.257	QP	41.4	15.8	7.8	32.1	32.9	43.5	10.6	192	178	
Hori.	313.422	QP	32.5	14.3	8.6	32.0	23.4	46.0	22.6	100	279	
Hori.	2241.970	PK	48.5	27.2	14.0	41.3	48.4	73.9	25.5	132	146	
Hori.	2281.995	PK	51.4	27.3	14.1	41.3	51.5	73.9	22.4	132	146	
Hori.	2390.000	PK	46.0	27.4	14.2	41.4	46.2	73.9	27.7	133	150	
Hori.	2521.989	PK	51.2	27.6	14.3	41.4	51.7	73.9	22.2	100	151	
Hori.	2561.985	PK	50.0	27.7	14.3	41.4	50.6	73.9	23.3	100	151	
Hori.	4804.000	PK	48.5	31.1	6.8	41.2	45.2	73.9	28.7	100	122	
Hori.	7206.000	PK	46.8	36.6	8.3	41.4	50.3	73.9	23.6	100	0	
Hori.	2241.970	AV	40.8	27.2	14.0	41.3	40.7	53.9	13.2	132	146	
Hori.	2281.995	AV	45.3	27.3	14.1	41.3	45.4	53.9	8.5	132	146	
Hori.	2390.000	AV	34.1	27.4	14.2	41.4	34.3	53.9	19.6	133	150	
Hori.	2521.989	AV	46.0	27.6	14.3	41.4	46.5	53.9	7.4	100	151	
Hori.	2561.985	AV	43.5	27.7	14.3	41.4	44.1	53.9	9.8	100	151	
Hori.	4804.000	AV	38.2	31.1	6.8	41.2	34.9	53.9	19.0	100	122	
Hori.	7206.000	AV	35.9	36.6	8.3	41.4	39.4	53.9	14.5	100	0	
Vert.	32.151	QP	34.3	17.2	6.5	32.2	25.8	40.0	14.2	100	74	
Vert.	82.121	QP	50.3	6.8	7.5	32.2	32.4	40.0	7.6	100	281	
Vert.	149.255	QP	42.7	14.8	7.7	32.1	33.1	43.5	10.4	100	71	
Vert.	179.257	QP	39.6	15.8	7.8	32.1	31.1	43.5	12.4	100	339	
Vert.	313.422	QP	31.5	14.3	8.6	32.0	22.4	46.0	23.6	100	294	
Vert.	2242.100	PK	49.4	27.2	14.0	41.3	49.3	73.9	24.6	100	172	
Vert.	2281.993	PK	51.8	27.3	14.1	41.3	51.9	73.9	22.0	100	172	
Vert.	2390.000	PK	45.9	27.4	14.2	41.4	46.1	73.9	27.8	100	219	
Vert.	2521.987	PK	49.9	27.6	14.3	41.4	50.4	73.9	23.5	114	214	
Vert.	2561.979	PK	50.2	27.7	14.3	41.4	50.8	73.9	23.1	114	214	
Vert.	4804.000	PK	48.3	31.1	6.8	41.2	45.0	73.9	28.9	100	213	
Vert.	7206.000	PK	46.8	36.6	8.3	41.4	50.3	73.9	23.6	100	0	
Vert.	2242.100	AV	42.1	27.2	14.0	41.3	42.0	53.9	11.9	100	172	
Vert.	2281.993	AV	46.9	27.3	14.1	41.3	47.0	53.9	6.9	100	172	
Vert.	2390.000	AV	34.1	27.4	14.2	41.4	34.3	53.9	19.6	100	219	
Vert.	2521.987	AV	43.8	27.6	14.3	41.4	44.3	53.9	9.6	114	214	
Vert.	2561.979	AV	42.5	27.7	14.3	41.4	43.1	53.9	10.8	114	214	
Vert.	4804.000	AV	38.3	31.1	6.8	41.2	35.0	53.9	18.9	100	213	
Vert.	7206.000	AV	35.8	36.6	8.3	41.4	39.3	53.9	14.6	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).

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	97.7	27.4	14.2	41.4	97.9	-	-	Carrier
Hori.	2399.153	PK	54.3	27.4	14.2	41.4	54.5	77.9	23.4	
Hori.	2400.000	PK	55.3	27.4	14.2	41.4	55.5	77.9	22.4	
Vert.	2402.000	PK	99.1	27.4	14.2	41.4	99.3	-	-	Carrier
Vert.	2399.152	PK	55.8	27.4	14.2	41.4	56.0	79.3	23.3	
Vert.	2400.000	PK	57.2	27.4	14.2	41.4	57.4	79.3	21.9	

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 27, 2012 December 2, 2012
 Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
 Engineer Shinichi Takano Kenichi Adachi
 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.	82.108	QP	43.3	6.8	7.5	32.2	25.4	40.0	14.6	231	218	
Hori.	149.260	QP	43.1	14.8	7.7	32.1	33.5	43.5	10.0	197	313	
Hori.	179.259	QP	41.1	15.8	7.8	32.1	32.6	43.5	10.9	201	183	
Hori.	313.483	QP	32.4	14.3	8.6	32.0	23.3	46.0	22.7	100	293	
Hori.	2280.984	PK	50.5	27.3	14.1	41.3	50.6	73.9	23.3	161	144	
Hori.	2320.997	PK	51.2	27.3	14.1	41.4	51.2	73.9	22.7	161	144	
Hori.	2560.985	PK	50.8	27.7	14.3	41.4	51.4	73.9	22.5	124	152	
Hori.	2600.978	PK	49.7	27.7	14.4	41.4	50.4	73.9	23.5	124	152	
Hori.	4882.000	PK	47.2	31.3	6.9	41.1	44.3	73.9	29.6	100	131	
Hori.	7323.000	PK	46.5	36.6	8.6	41.4	50.3	73.9	23.6	100	0	
Hori.	2280.984	AV	44.6	27.3	14.1	41.3	44.7	53.9	9.2	161	144	
Hori.	2320.997	AV	45.7	27.3	14.1	41.4	45.7	53.9	8.2	161	144	
Hori.	2560.985	AV	45.6	27.7	14.3	41.4	46.2	53.9	7.7	124	152	
Hori.	2600.978	AV	42.5	27.7	14.4	41.4	43.2	53.9	10.7	124	152	
Hori.	4882.000	AV	36.9	31.3	6.9	41.1	34.0	53.9	19.9	100	131	
Hori.	7323.000	AV	35.4	36.6	8.6	41.4	39.2	53.9	14.7	100	0	
Vert.	32.122	QP	34.0	17.2	6.5	32.2	25.5	40.0	14.5	100	75	
Vert.	82.108	QP	50.2	6.8	7.5	32.2	32.3	40.0	7.7	100	258	
Vert.	149.260	QP	42.9	14.8	7.7	32.1	33.3	43.5	10.2	100	88	
Vert.	179.259	QP	40.1	15.8	7.8	32.1	31.6	43.5	11.9	100	338	
Vert.	313.483	QP	31.3	14.3	8.6	32.0	22.2	46.0	23.8	100	292	
Vert.	2280.985	PK	51.8	27.3	14.1	41.3	51.9	73.9	22.0	100	171	
Vert.	2320.980	PK	51.7	27.3	14.1	41.4	51.7	73.9	22.2	100	171	
Vert.	2560.975	PK	51.5	27.7	14.3	41.4	52.1	73.9	21.8	111	216	
Vert.	2600.990	PK	49.2	27.7	14.4	41.4	49.9	73.9	24.0	111	216	
Vert.	4882.000	PK	47.9	31.3	6.9	41.1	45.0	73.9	28.9	100	215	
Vert.	7323.000	PK	47.2	36.6	8.6	41.4	51.0	73.9	22.9	100	0	
Vert.	2280.985	AV	45.8	27.3	14.1	41.3	45.9	53.9	8.0	100	171	
Vert.	2320.980	AV	46.2	27.3	14.1	41.4	46.2	53.9	7.7	100	171	
Vert.	2560.975	AV	44.4	27.7	14.3	41.4	45.0	53.9	8.9	111	216	
Vert.	2600.990	AV	41.8	27.7	14.4	41.4	42.5	53.9	11.4	111	216	
Vert.	4882.000	AV	37.9	31.3	6.9	41.1	35.0	53.9	18.9	100	215	
Vert.	7323.000	AV	35.4	36.6	8.6	41.4	39.2	53.9	14.7	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).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date November 27, 2012 December 2, 2012
 Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
 Engineer Shinichi Takano Kenichi Adachi
 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.	82.110	QP	43.4	6.8	7.5	32.2	25.5	40.0	14.5	224	214	
Hori.	149.263	QP	43.1	14.8	7.7	32.1	33.5	43.5	10.0	195	320	
Hori.	179.274	QP	41.7	15.8	7.8	32.1	33.2	43.5	10.3	192	179	
Hori.	313.442	QP	32.3	14.3	8.6	32.0	23.2	46.0	22.8	100	282	
Hori.	2319.997	PK	51.5	27.3	14.1	41.4	51.5	73.9	22.4	130	146	
Hori.	2359.980	PK	51.5	27.4	14.1	41.4	51.6	73.9	22.3	130	146	
Hori.	2483.500	PK	50.8	27.5	14.3	41.4	51.2	73.9	22.7	100	149	
Hori.	2599.993	PK	51.6	27.7	14.4	41.4	52.3	73.9	21.6	120	152	
Hori.	2639.984	PK	49.5	27.8	14.4	41.4	50.3	73.9	23.6	120	152	
Hori.	4960.000	PK	47.6	31.6	6.9	41.0	45.1	73.9	28.8	100	125	
Hori.	7440.000	PK	47.1	36.7	8.8	41.5	51.1	73.9	22.8	100	0	
Hori.	2319.997	AV	45.6	27.3	14.1	41.4	45.6	53.9	8.3	130	146	
Hori.	2359.980	AV	46.1	27.4	14.1	41.4	46.2	53.9	7.7	130	146	
Hori.	2483.500	AV	38.6	27.5	14.3	41.4	39.0	53.9	14.9	100	149	
Hori.	2599.993	AV	45.6	27.7	14.4	41.4	46.3	53.9	7.6	120	152	
Hori.	2639.984	AV	41.9	27.8	14.4	41.4	42.7	53.9	11.2	120	152	
Hori.	4960.000	AV	38.3	31.6	6.9	41.0	35.8	53.9	18.1	100	125	
Hori.	7440.000	AV	35.4	36.7	8.8	41.5	39.4	53.9	14.5	100	0	
Vert.	31.636	QP	34.4	17.4	6.5	32.2	26.1	40.0	13.9	100	78	
Vert.	82.110	QP	50.4	6.8	7.5	32.2	32.5	40.0	7.5	100	273	
Vert.	149.263	QP	42.5	14.8	7.7	32.1	32.9	43.5	10.6	100	70	
Vert.	179.274	QP	39.9	15.8	7.8	32.1	31.4	43.5	12.1	100	342	
Vert.	313.442	QP	31.6	14.3	8.6	32.0	22.5	46.0	23.5	100	288	
Vert.	2319.982	PK	51.0	27.3	14.1	41.4	51.0	73.9	22.9	100	170	
Vert.	2359.979	PK	51.8	27.4	14.1	41.4	51.9	73.9	22.0	100	170	
Vert.	2483.500	PK	50.4	27.5	14.3	41.4	50.8	73.9	23.1	100	218	
Vert.	2599.986	PK	50.8	27.7	14.4	41.4	51.5	73.9	22.4	110	216	
Vert.	2639.991	PK	49.4	27.8	14.4	41.4	50.2	73.9	23.7	110	216	
Vert.	4960.000	PK	49.6	31.6	6.9	41.0	47.1	73.9	26.8	100	216	
Vert.	7440.000	PK	46.2	36.7	8.8	41.5	50.2	73.9	23.7	100	0	
Vert.	2319.982	AV	45.2	27.3	14.1	41.4	45.2	53.9	8.7	100	170	
Vert.	2359.979	AV	46.3	27.4	14.1	41.4	46.4	53.9	7.5	100	170	
Vert.	2483.500	AV	38.1	27.5	14.3	41.4	38.5	53.9	15.4	100	218	
Vert.	2599.986	AV	45.2	27.7	14.4	41.4	45.9	53.9	8.0	110	216	
Vert.	2639.991	AV	42.1	27.8	14.4	41.4	42.9	53.9	11.0	110	216	
Vert.	4960.000	AV	38.9	31.6	6.9	41.0	36.4	53.9	17.5	100	216	
Vert.	7440.000	AV	35.2	36.7	8.8	41.5	39.2	53.9	14.7	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).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
 Date November 27, 2012 December 2, 2012
 Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
 Engineer Shinichi Takano Kenichi Adachi
 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.	82.116	QP	43.4	6.8	7.5	32.2	25.5	40.0	14.5	224	222	
Hori.	149.232	QP	42.9	14.8	7.7	32.1	33.3	43.5	10.2	197	322	
Hori.	179.236	QP	41.3	15.8	7.8	32.1	32.8	43.5	10.7	189	179	
Hori.	313.448	QP	32.4	14.3	8.6	32.0	23.3	46.0	22.7	100	283	
Hori.	2281.484	PK	49.8	27.3	14.1	41.3	49.9	73.9	24.0	162	144	
Hori.	2390.000	PK	46.0	27.4	14.2	41.4	46.2	73.9	27.7	100	147	
Hori.	2521.998	PK	50.2	27.6	14.3	41.4	50.7	73.9	23.2	100	152	
Hori.	4804.000	PK	46.9	31.1	6.8	41.2	43.6	73.9	30.3	100	122	
Hori.	7206.000	PK	46.9	36.6	8.3	41.4	50.4	73.9	23.5	100	0	
Hori.	2281.484	AV	41.7	27.3	14.1	41.3	41.8	53.9	12.1	162	144	
Hori.	2390.000	AV	34.1	27.4	14.2	41.4	34.3	53.9	19.6	100	147	
Hori.	2521.998	AV	41.5	27.6	14.3	41.4	42.0	53.9	11.9	100	152	
Hori.	4804.000	AV	36.4	31.1	6.8	41.2	33.1	53.9	20.8	100	122	
Hori.	7206.000	AV	35.8	36.6	8.3	41.4	39.3	53.9	14.6	100	0	
Vert.	32.250	QP	34.1	17.1	6.5	32.2	25.5	40.0	14.5	100	78	
Vert.	82.116	QP	50.4	6.8	7.5	32.2	32.5	40.0	7.5	100	283	
Vert.	149.232	QP	42.2	14.8	7.7	32.1	32.6	43.5	10.9	100	72	
Vert.	179.236	QP	39.7	15.8	7.8	32.1	31.2	43.5	12.3	100	298	
Vert.	313.448	QP	31.3	14.3	8.6	32.0	22.2	46.0	23.8	100	301	
Vert.	2282.002	PK	50.8	27.3	14.1	41.3	50.9	73.9	23.0	100	171	
Vert.	2390.000	PK	45.8	27.4	14.2	41.4	46.0	73.9	27.9	100	220	
Vert.	2521.977	PK	48.1	27.6	14.3	41.4	48.6	73.9	25.3	115	213	
Vert.	4804.000	PK	47.9	31.1	6.8	41.2	44.6	73.9	29.3	100	213	
Vert.	7206.000	PK	48.0	36.6	8.3	41.4	51.5	73.9	22.4	100	0	
Vert.	2282.002	AV	42.8	27.3	14.1	41.3	42.9	53.9	11.0	100	171	
Vert.	2390.000	AV	34.2	27.4	14.2	41.4	34.4	53.9	19.5	100	220	
Vert.	2521.977	AV	39.9	27.6	14.3	41.4	40.4	53.9	13.5	115	213	
Vert.	4804.000	AV	36.8	31.1	6.8	41.2	33.5	53.9	20.4	100	213	
Vert.	7206.000	AV	35.9	36.6	8.3	41.4	39.4	53.9	14.5	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).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.6	27.4	14.2	41.4	94.8	-	-	Carrier
Hori.	2400.000	PK	45.6	27.4	14.2	41.4	45.8	74.8	29.0	
Vert.	2402.000	PK	96.5	27.4	14.2	41.4	96.7	-	-	Carrier
Vert.	2400.000	PK	48.0	27.4	14.2	41.4	48.2	76.7	28.5	

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 27, 2012 December 2, 2012
 Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
 Engineer Shinichi Takano Kenichi Adachi
 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.	82.111	QP	43.3	6.8	7.5	32.2	25.4	40.0	14.6	218	210	
Hori.	149.258	QP	43.1	14.8	7.7	32.1	33.5	43.5	10.0	195	321	
Hori.	179.275	QP	41.4	15.8	7.8	32.1	32.9	43.5	10.6	188	183	
Hori.	313.489	QP	32.5	14.3	8.6	32.0	23.4	46.0	22.6	100	278	
Hori.	2320.989	PK	50.6	27.3	14.1	41.4	50.6	73.9	23.3	130	145	
Hori.	2560.995	PK	49.8	27.7	14.3	41.4	50.4	73.9	23.5	100	153	
Hori.	4882.000	PK	48.0	31.3	6.9	41.1	45.1	73.9	28.8	100	133	
Hori.	7323.000	PK	46.8	36.6	8.6	41.4	50.6	73.9	23.3	100	0	
Hori.	2320.989	AV	41.7	27.3	14.1	41.4	41.7	53.9	12.2	130	145	
Hori.	2560.995	AV	41.5	27.7	14.3	41.4	42.1	53.9	11.8	100	153	
Hori.	4882.000	AV	36.1	31.3	6.9	41.1	33.2	53.9	20.7	100	133	
Hori.	7323.000	AV	35.4	36.6	8.6	41.4	39.2	53.9	14.7	100	0	
Vert.	32.246	QP	34.1	17.1	6.5	32.2	25.5	40.0	14.5	100	79	
Vert.	82.111	QP	50.3	6.8	7.5	32.2	32.4	40.0	7.6	100	278	
Vert.	149.258	QP	42.9	14.8	7.7	32.1	33.3	43.5	10.2	100	67	
Vert.	179.275	QP	39.5	15.8	7.8	32.1	31.0	43.5	12.5	100	303	
Vert.	313.489	QP	31.2	14.3	8.6	32.0	22.1	46.0	23.9	100	299	
Vert.	2321.004	PK	49.7	27.3	14.1	41.4	49.7	73.9	24.2	100	171	
Vert.	2560.975	PK	49.4	27.7	14.3	41.4	50.0	73.9	23.9	113	214	
Vert.	4882.000	PK	47.1	31.3	6.9	41.1	44.2	73.9	29.7	100	215	
Vert.	7323.000	PK	45.7	36.6	8.6	41.4	49.5	73.9	24.4	100	0	
Vert.	2321.004	AV	41.2	27.3	14.1	41.4	41.2	53.9	12.7	100	171	
Vert.	2560.975	AV	40.5	27.7	14.3	41.4	41.1	53.9	12.8	113	214	
Vert.	4882.000	AV	37.1	31.3	6.9	41.1	34.2	53.9	19.7	100	215	
Vert.	7323.000	AV	35.3	36.6	8.6	41.4	39.1	53.9	14.8	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).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber
Date November 27, 2012 December 2, 2012
Temperature / Humidity 25deg.C , 39 %RH 23deg.C , 30 %RH
Engineer Shinichi Takano Kenichi Adachi
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.	82.116	QP	43.5	6.8	7.5	32.2	25.6	40.0	14.4	223	213	
Hori.	149.286	QP	43.2	14.8	7.7	32.1	33.6	43.5	9.9	197	315	
Hori.	179.271	QP	41.6	15.8	7.8	32.1	33.1	43.5	10.4	185	177	
Hori.	313.469	QP	32.4	14.3	8.6	32.0	23.3	46.0	22.7	100	281	
Hori.	2359.991	PK	49.3	27.4	14.1	41.4	49.4	73.9	24.5	132	147	
Hori.	2483.500	PK	55.4	27.5	14.3	41.4	55.8	73.9	18.1	100	148	
Hori.	2600.264	PK	49.6	27.7	14.4	41.4	50.3	73.9	23.6	100	154	
Hori.	4960.000	PK	46.6	31.6	6.9	41.0	44.1	73.9	29.8	100	132	
Hori.	7440.000	PK	46.7	36.7	8.8	41.5	50.7	73.9	23.2	100	0	
Hori.	2359.991	AV	40.6	27.4	14.1	41.4	40.7	53.9	13.2	132	147	
Hori.	2483.500	AV	41.7	27.5	14.3	41.4	42.1	53.9	11.8	100	148	
Hori.	2600.264	AV	41.4	27.7	14.4	41.4	42.1	53.9	11.8	100	154	
Hori.	4960.000	AV	36.2	31.6	6.9	41.0	33.7	53.9	20.2	100	132	
Hori.	7440.000	AV	35.4	36.7	8.8	41.5	39.4	53.9	14.5	100	0	
Vert.	32.254	QP	34.2	17.1	6.5	32.2	25.6	40.0	14.4	100	82	
Vert.	82.116	QP	50.2	6.8	7.5	32.2	32.3	40.0	7.7	100	271	
Vert.	149.286	QP	43.3	14.8	7.7	32.1	33.7	43.5	9.8	100	67	
Vert.	179.271	QP	39.4	15.8	7.8	32.1	30.9	43.5	12.6	100	299	
Vert.	313.469	QP	31.3	14.3	8.6	32.0	22.2	46.0	23.8	100	302	
Vert.	2359.974	PK	49.0	27.4	14.1	41.4	49.1	73.9	24.8	100	172	
Vert.	2483.500	PK	54.4	27.5	14.3	41.4	54.8	73.9	19.1	100	220	
Vert.	2599.959	PK	49.6	27.7	14.4	41.4	50.3	73.9	23.6	111	215	
Vert.	4960.000	PK	47.8	31.6	6.9	41.0	45.3	73.9	28.6	112	215	
Vert.	7440.000	PK	45.9	36.7	8.8	41.5	49.9	73.9	24.0	100	0	
Vert.	2359.974	AV	40.6	27.4	14.1	41.4	40.7	53.9	13.2	100	172	
Vert.	2483.500	AV	41.0	27.5	14.3	41.4	41.4	53.9	12.5	100	220	
Vert.	2599.959	AV	41.0	27.7	14.4	41.4	41.7	53.9	12.2	111	215	
Vert.	4960.000	AV	37.6	31.6	6.9	41.0	35.1	53.9	18.8	112	215	
Vert.	7440.000	AV	35.3	36.7	8.8	41.5	39.3	53.9	14.6	100	0	

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

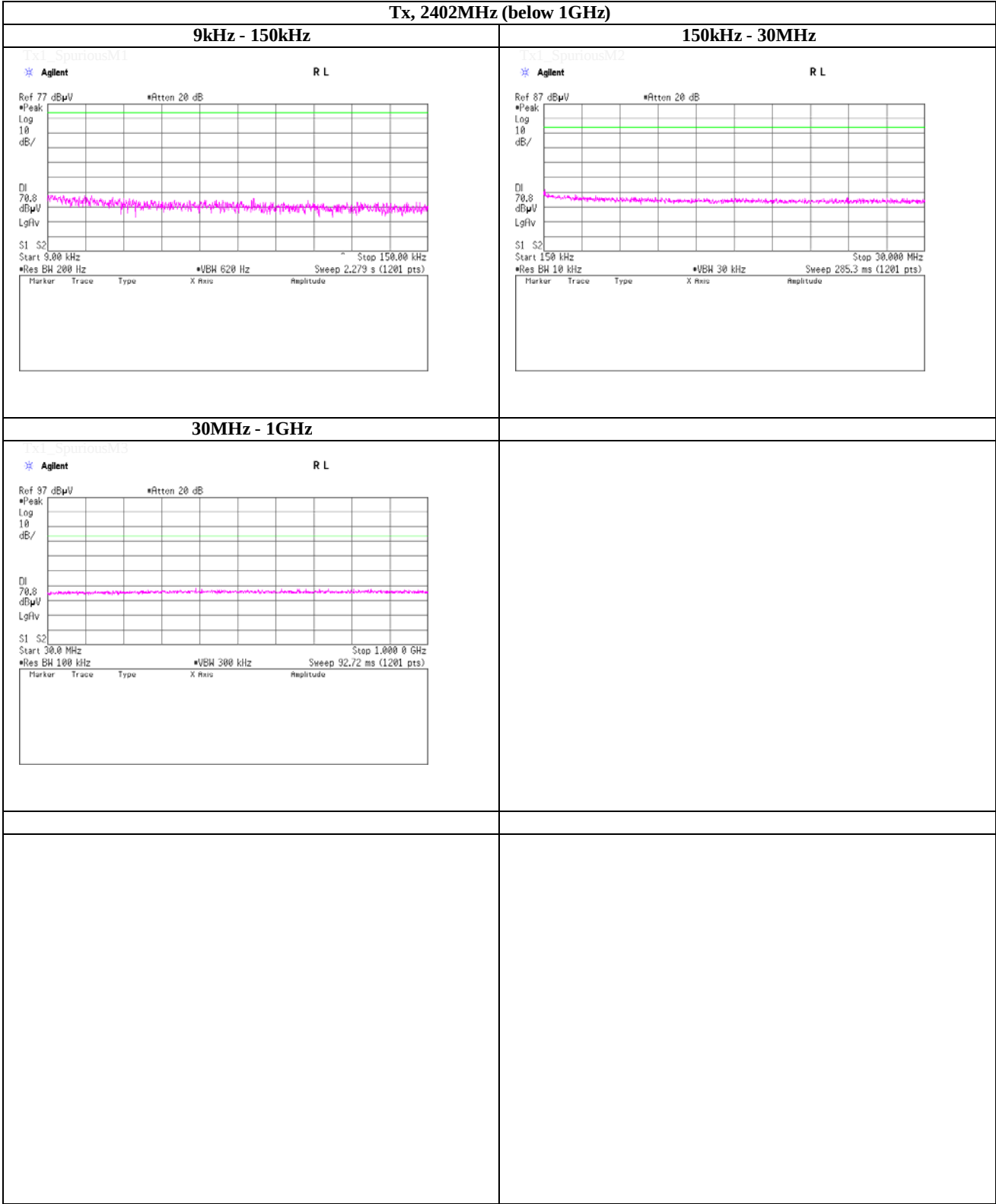
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Distance factor : 15GHz -40GHz : $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)

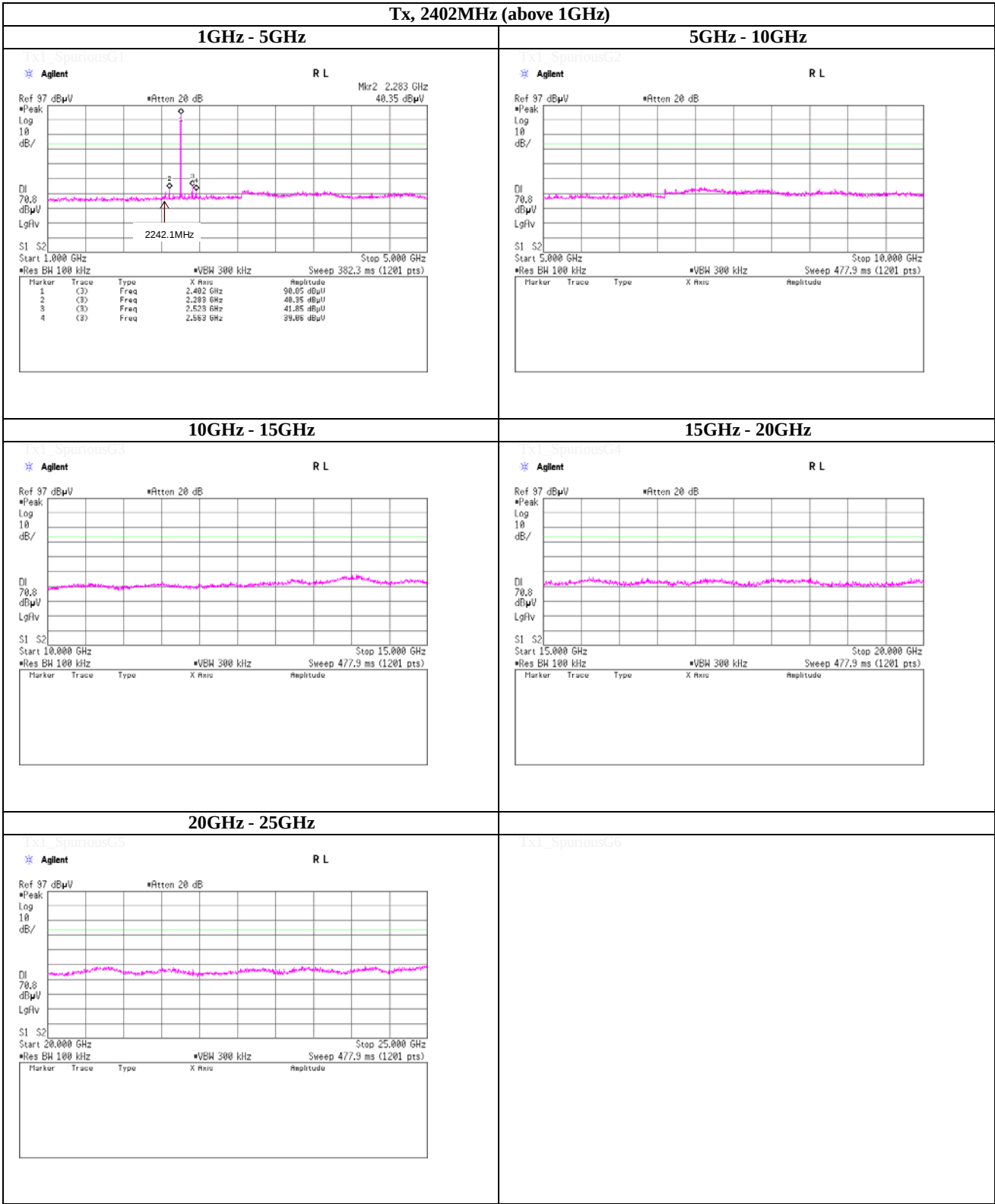


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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (above 1GHz)

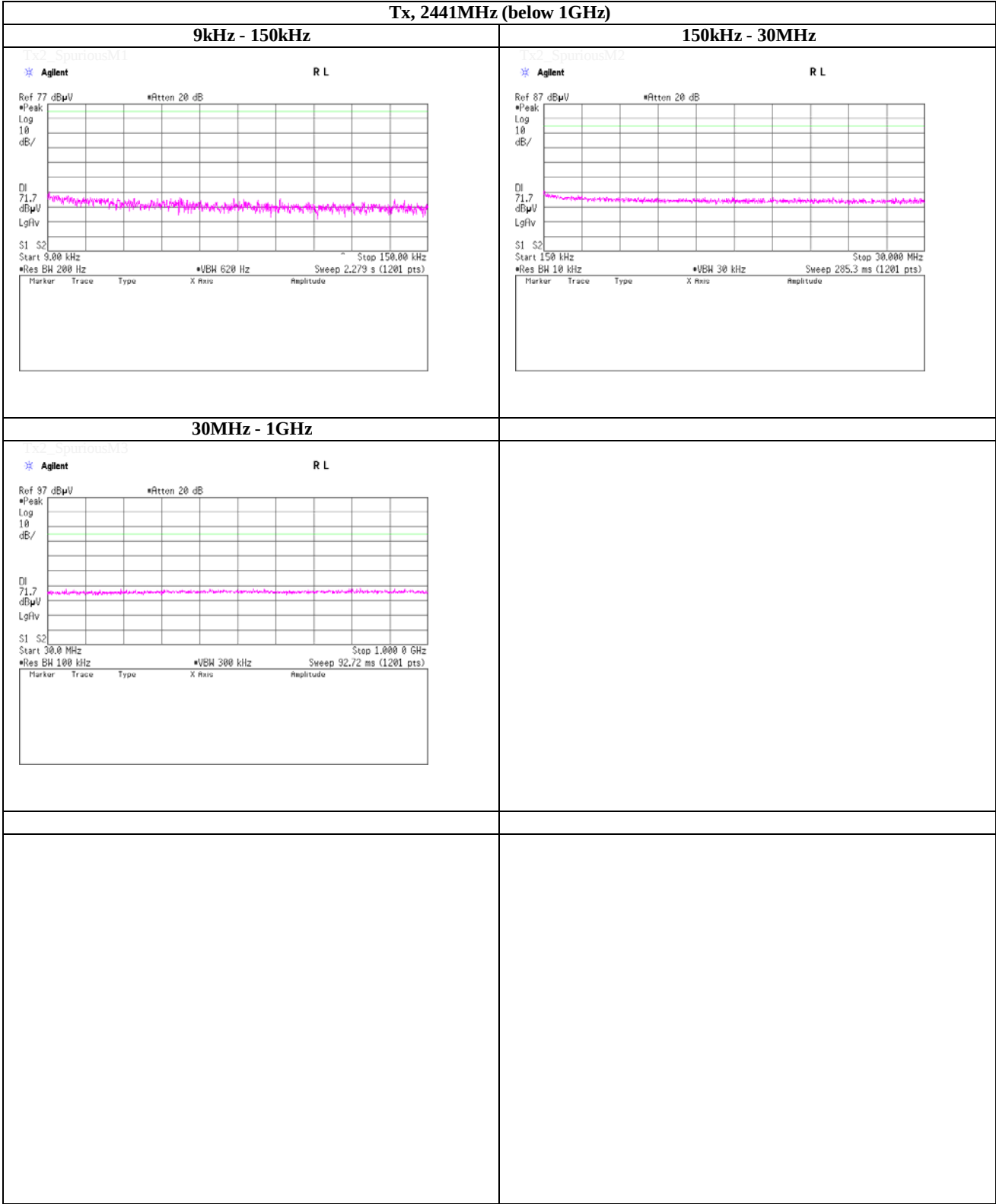


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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)

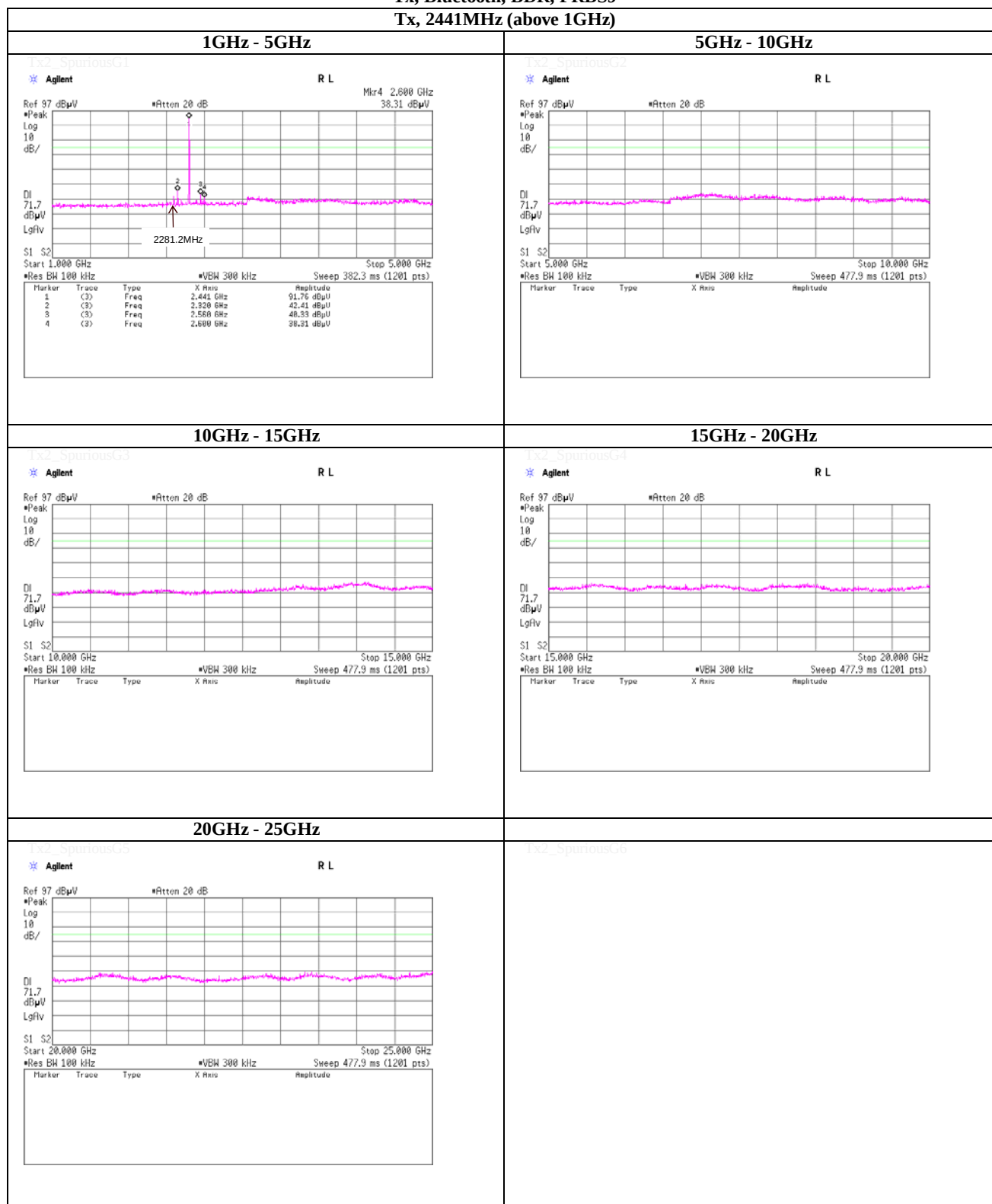


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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)



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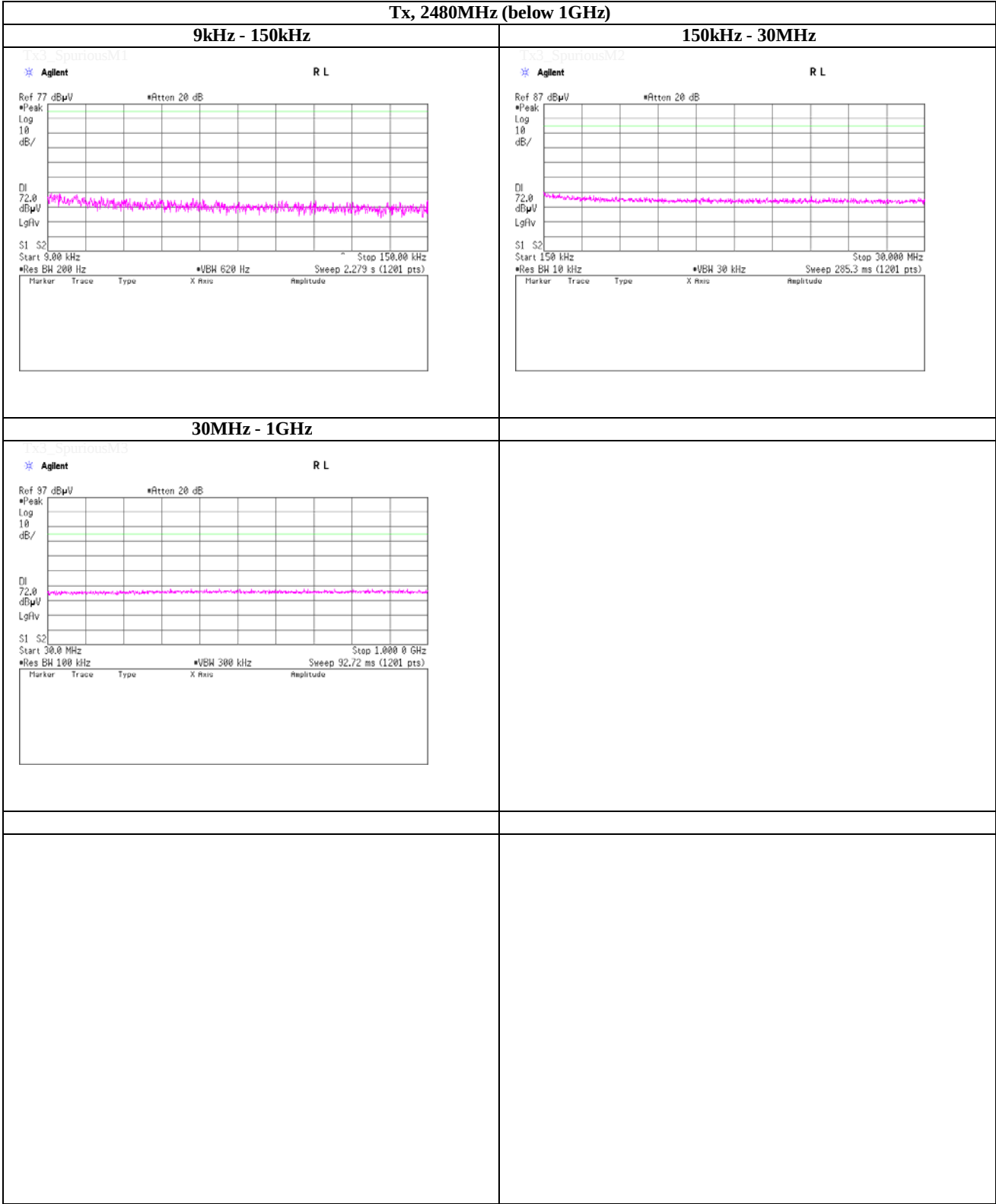
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)

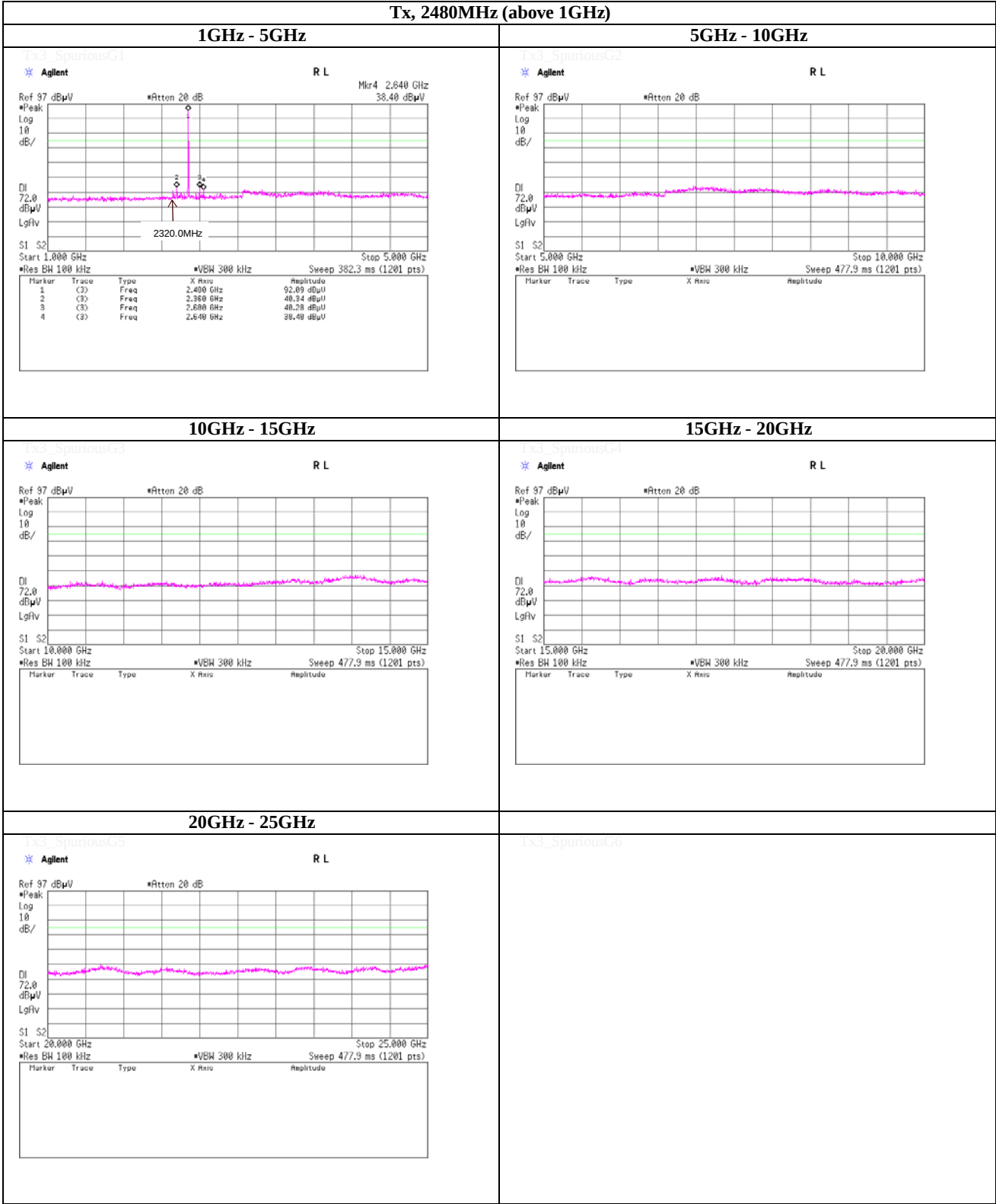


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Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)



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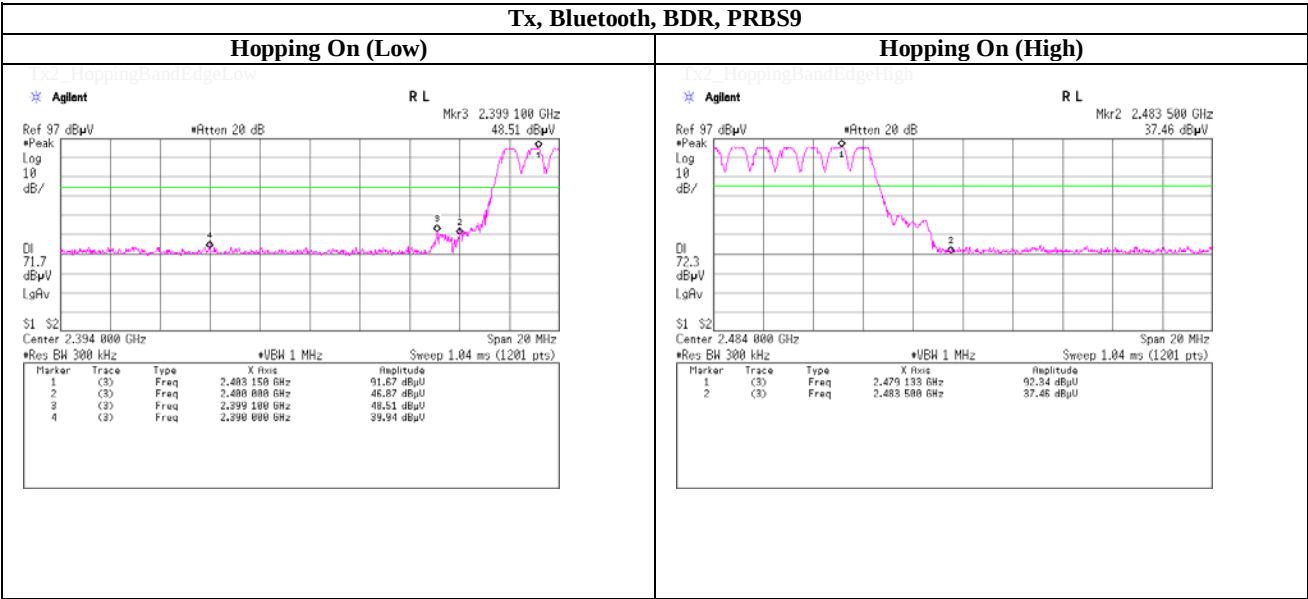
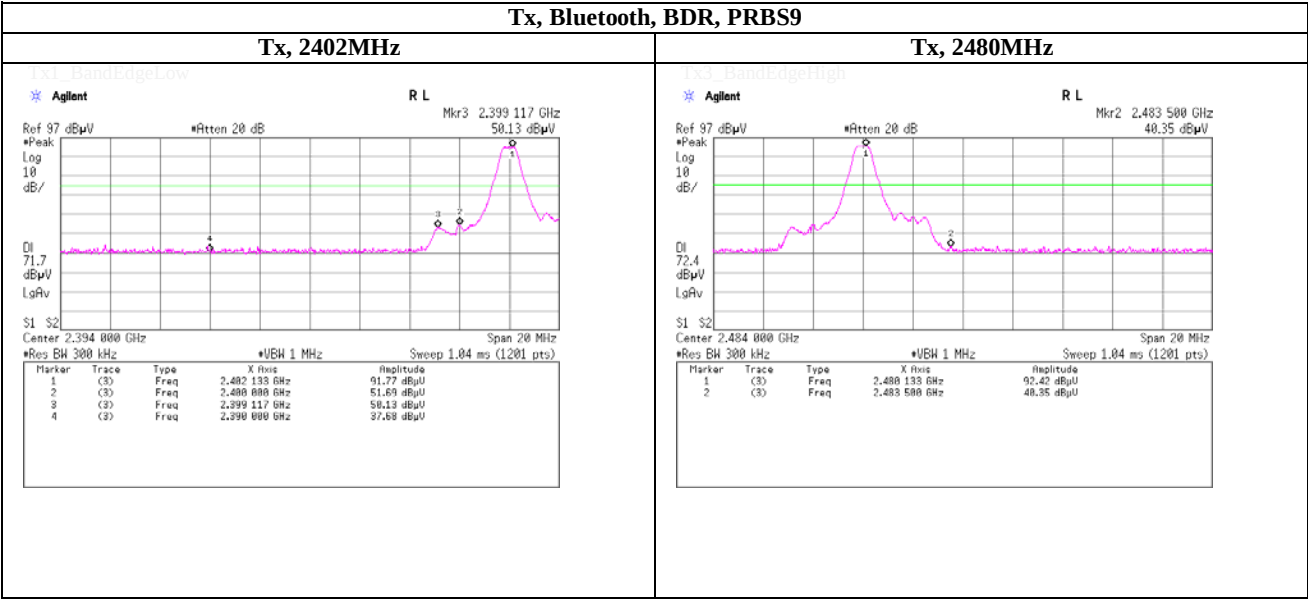
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Spurious emission (Conducted)

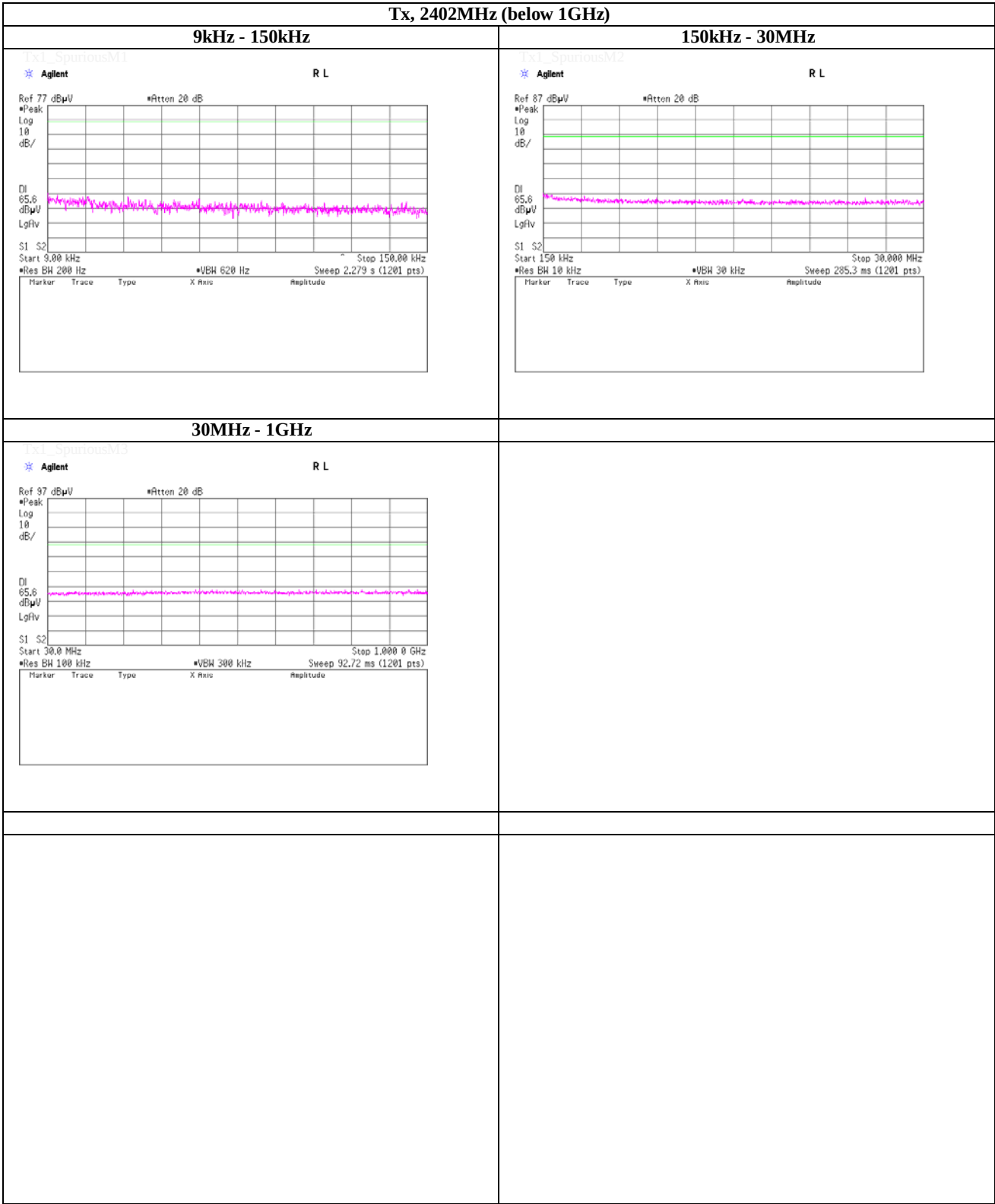
Band Edge compliance



Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)

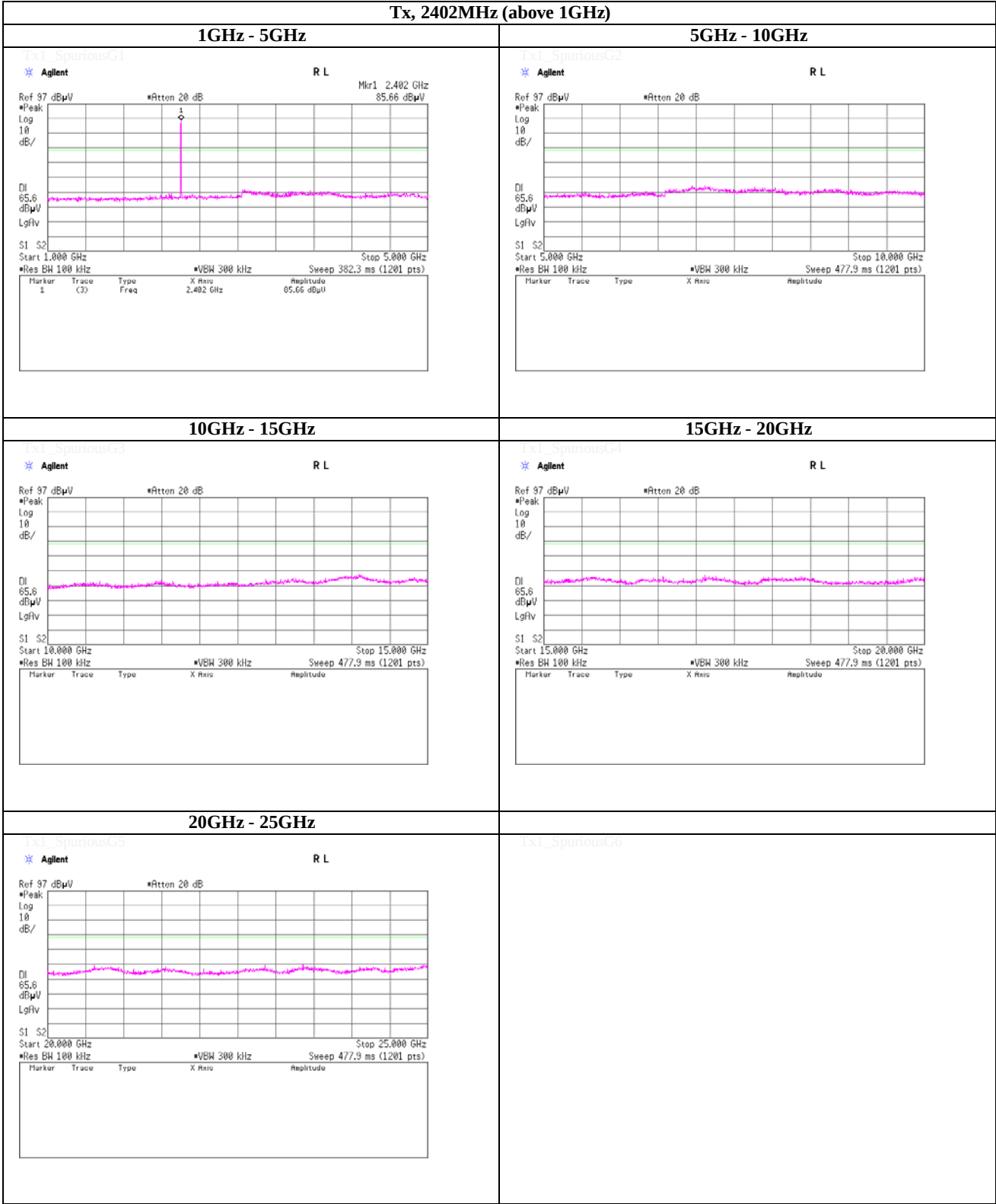


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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)

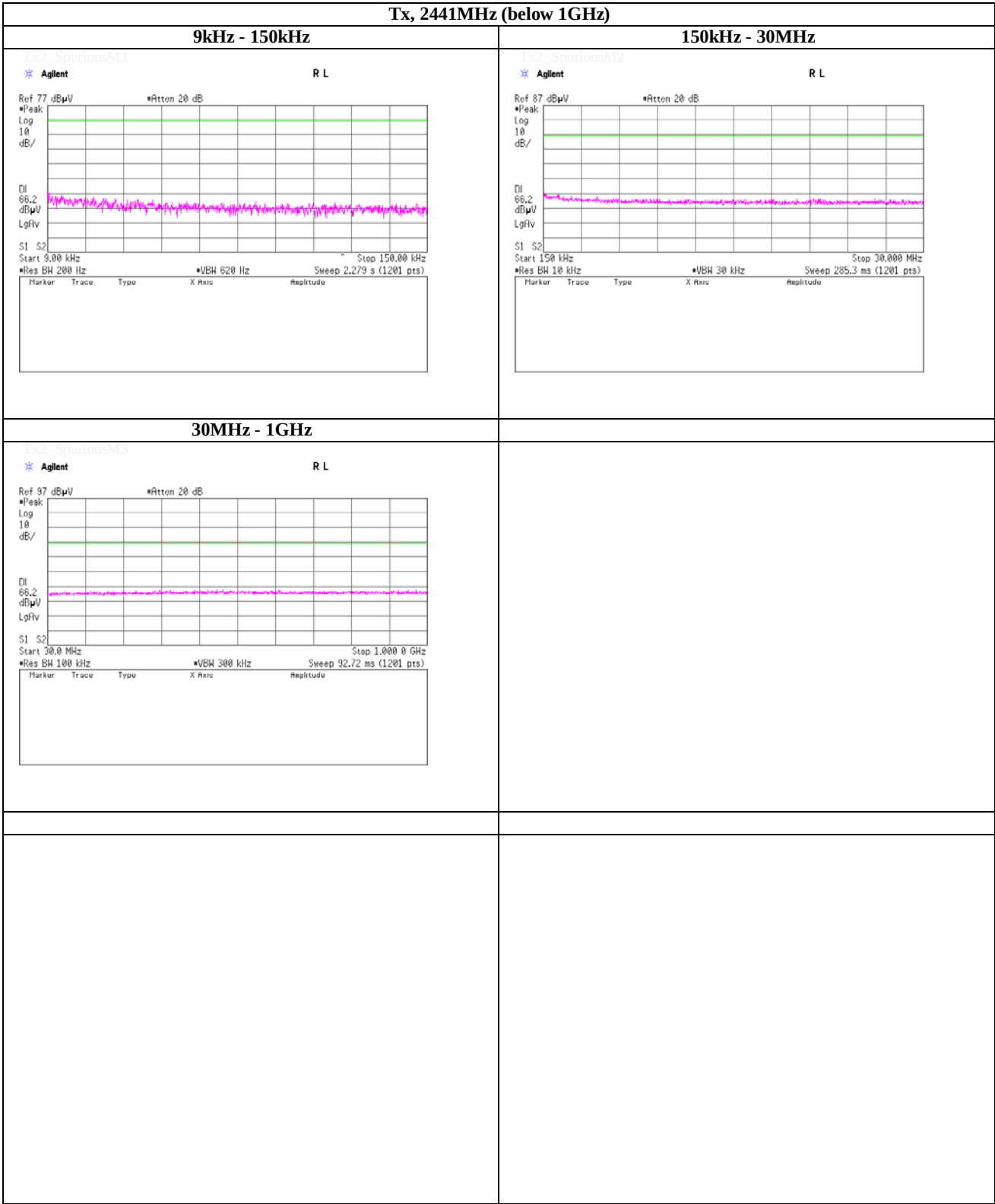


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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)

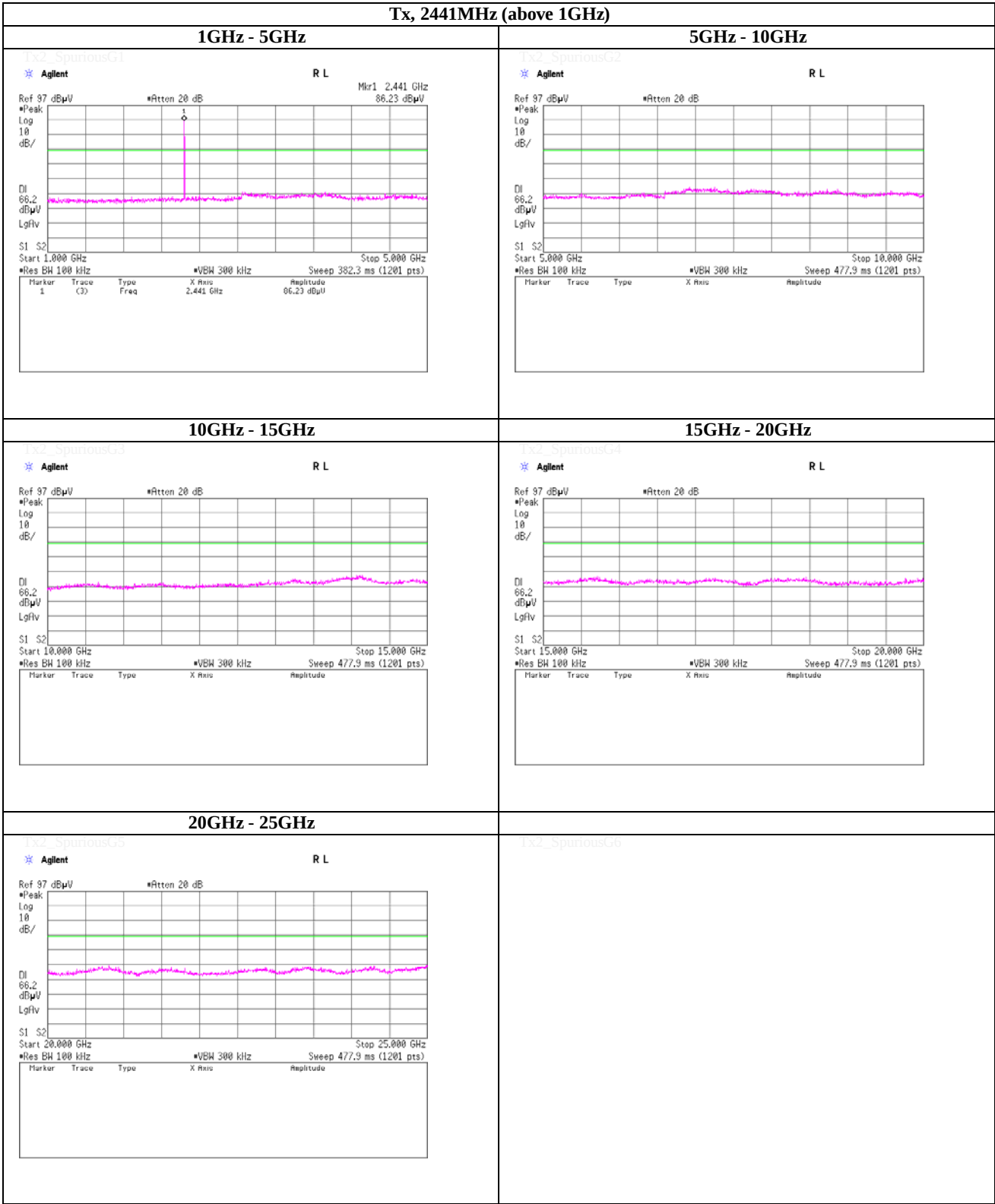


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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)



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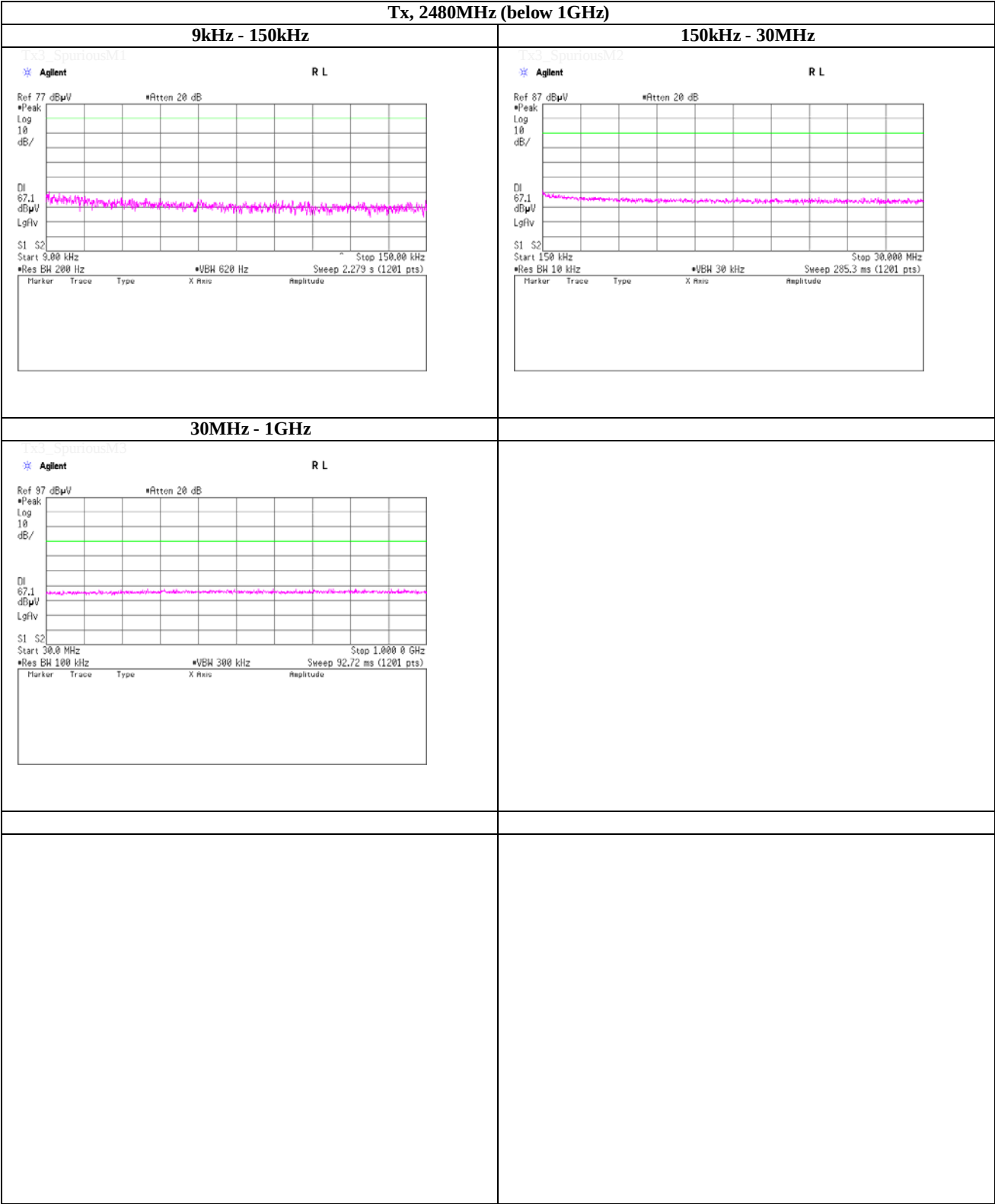
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Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)

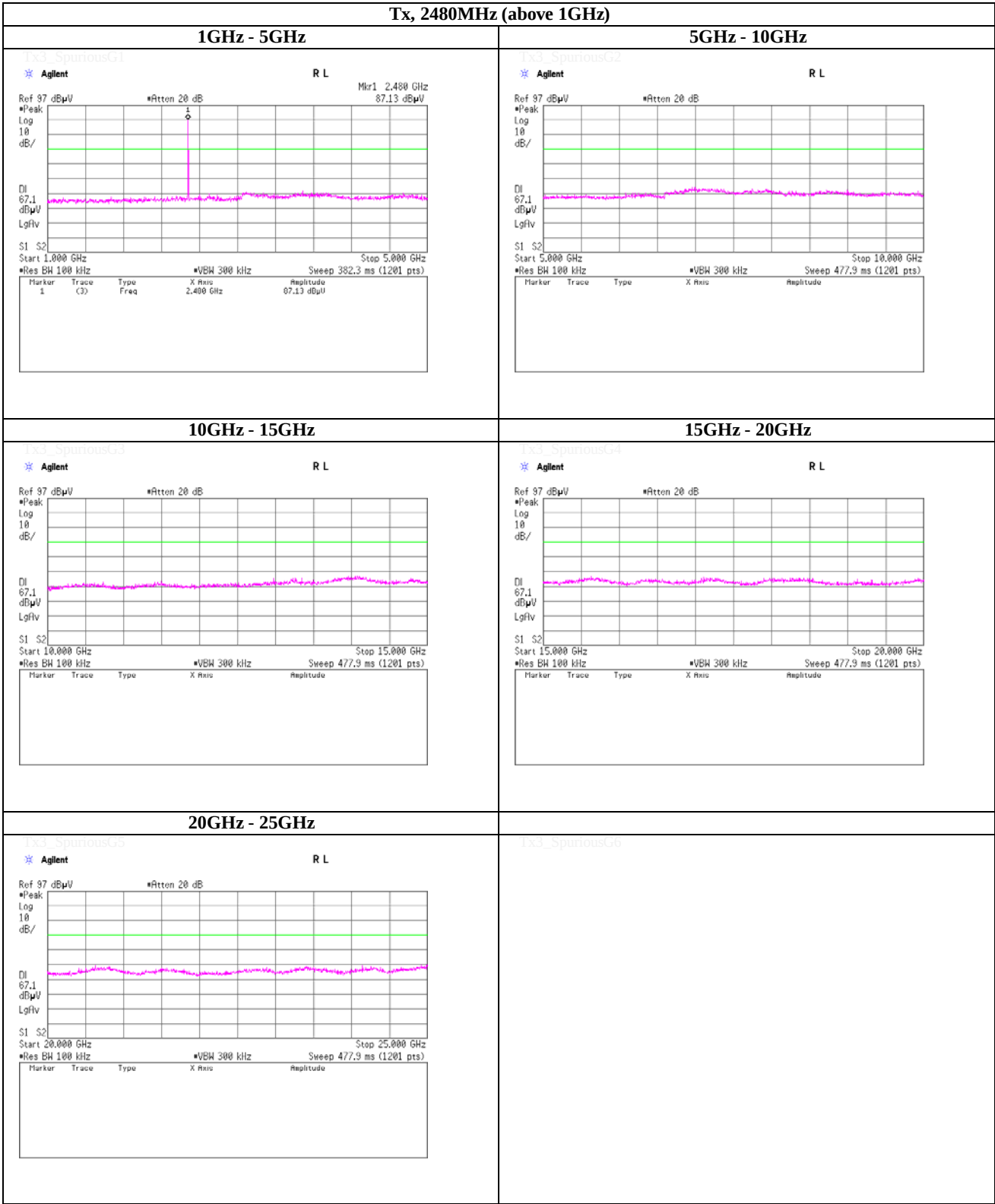


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Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

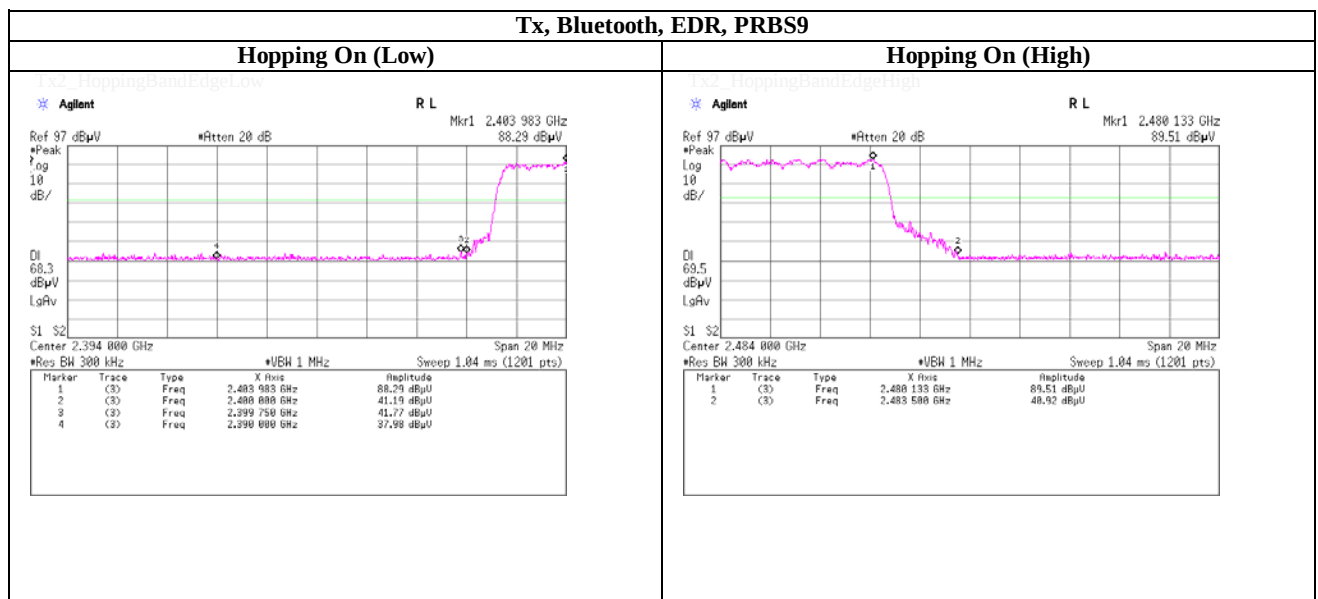
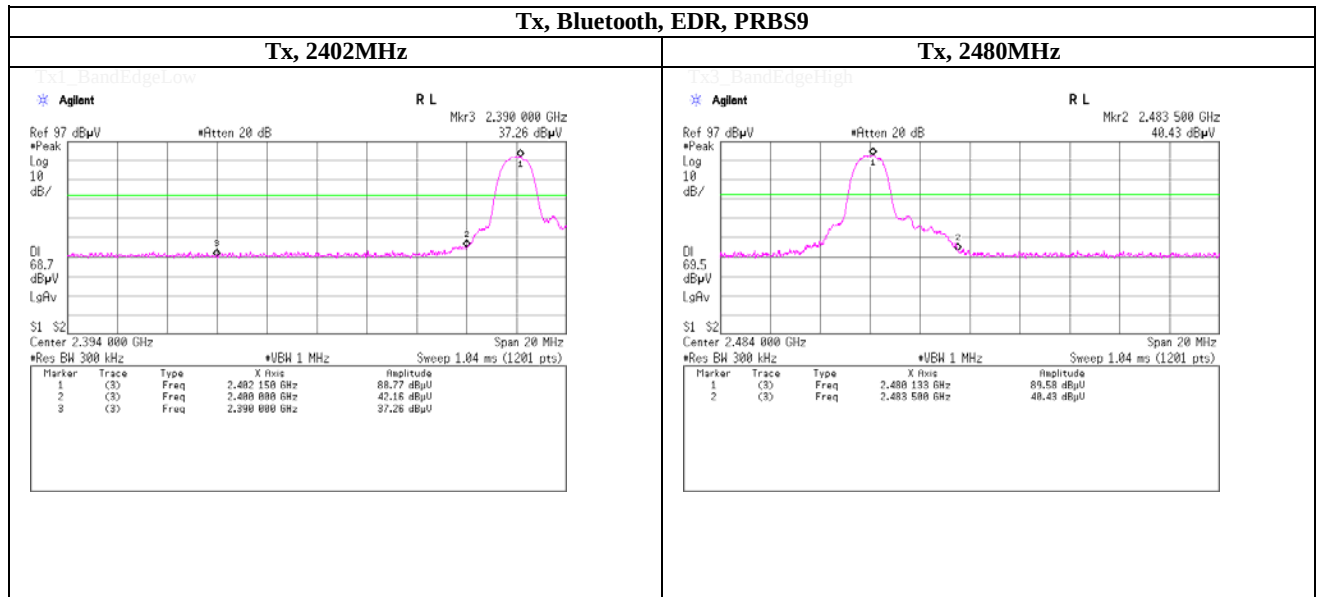
Tx, 2480MHz (above 1GHz)



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Spurious emission (Conducted)

Band Edge compliance



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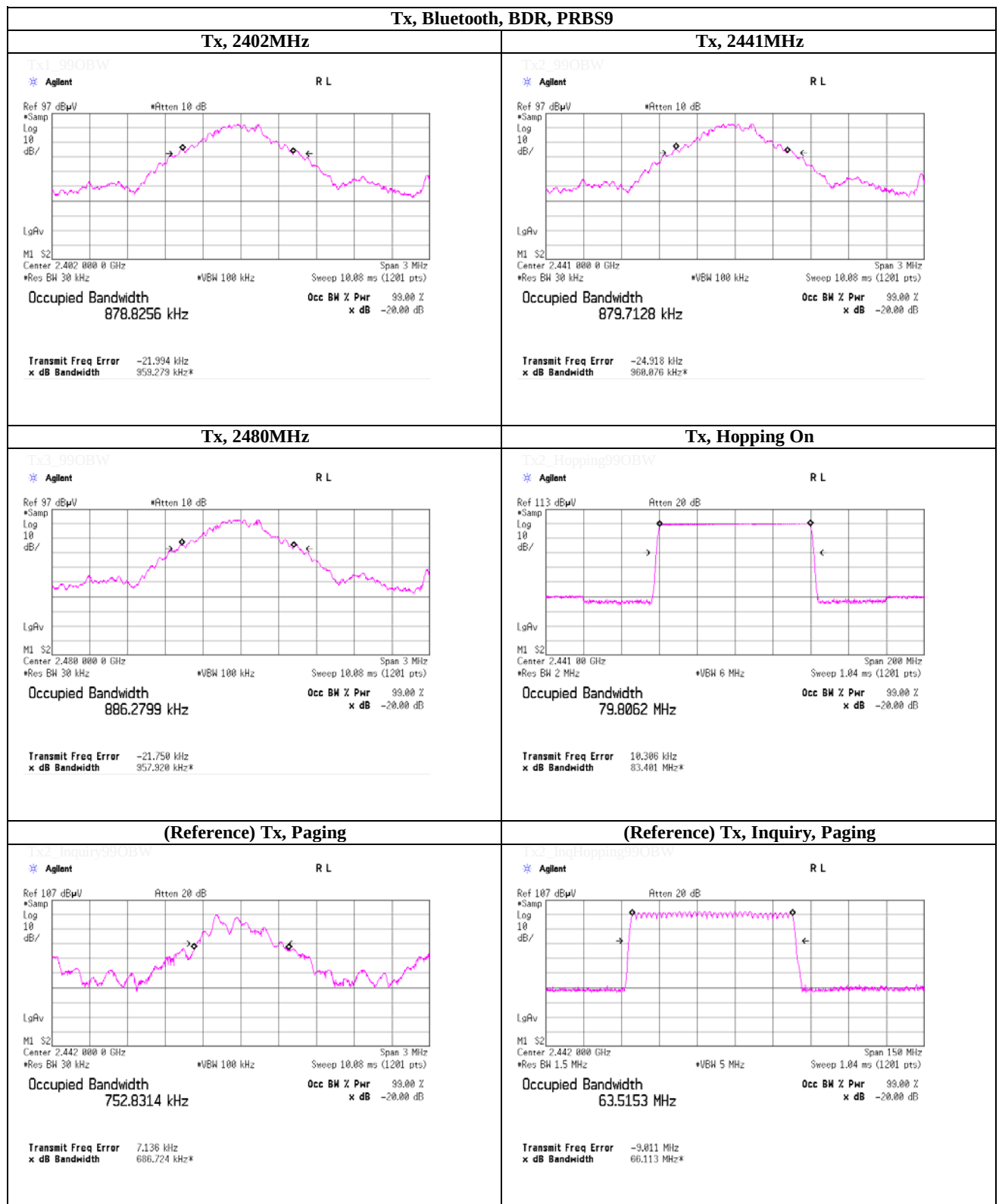
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99% Occupied Bandwidth



UL Japan, Inc.

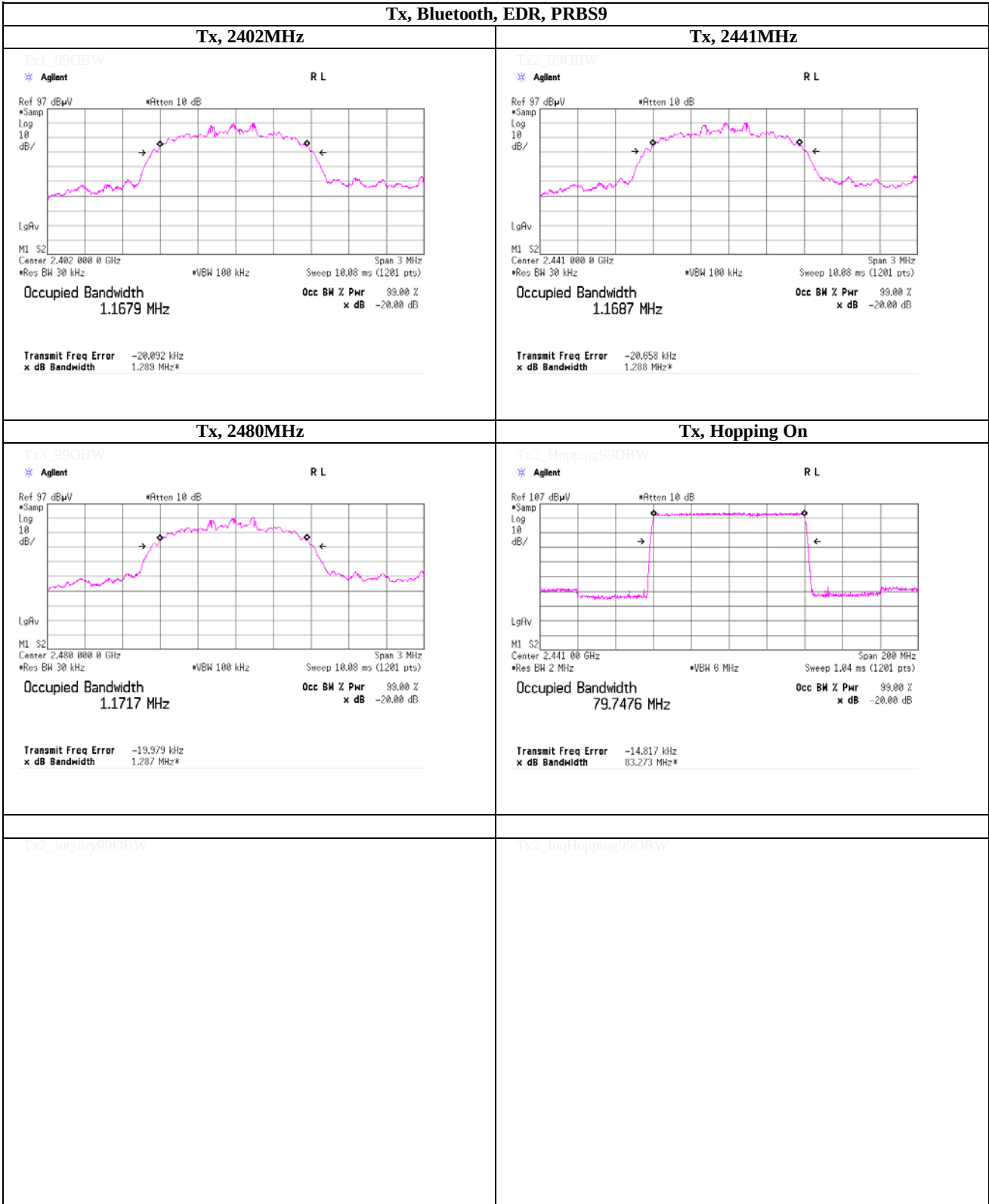
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99% Occupied Bandwidth



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APPENDIX 2

Test Instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2012/03/16 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SCC-G27	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	SEP-20-12-001	AT	2012/09/26 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2012/11/15 * 12
SAT20-05	Attenuator	Weinschel Corp.	54A-20	Y5649	AT	2012/11/15 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SCC-H4	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
SCC-H5	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
STM-G4	Terminator	Weinschel	M1459A	U6592	AT	2012/07/18 * 12
KPM-08	Power meter	Anritsu	ML2495A	6K00003356	AT	2012/09/14 * 12
KPSS-04	Power sensor	Anritsu	MA2411B	012088	AT	2012/09/14 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE/CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE/CE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2012/09/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2012/02/06 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12

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 :

CE: Conducted emission ,
 RE: Radiated emission ,
 AT: Antenna terminal conducted tests

APPENDIX 2

Test Instruments

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2012/04/10 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	RE	2012/06/14 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE/CE	2012/02/07 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2012/02/17 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2012/04/10 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2012/02/23 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2012/03/26 * 12

The expiration date of the calibration is the end of the expired month .

As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :

CE: Conducted emission,

RE: Radiated emission,

AT: Antenna terminal conducted tests