

APPENDIX 2: Data of EMI test

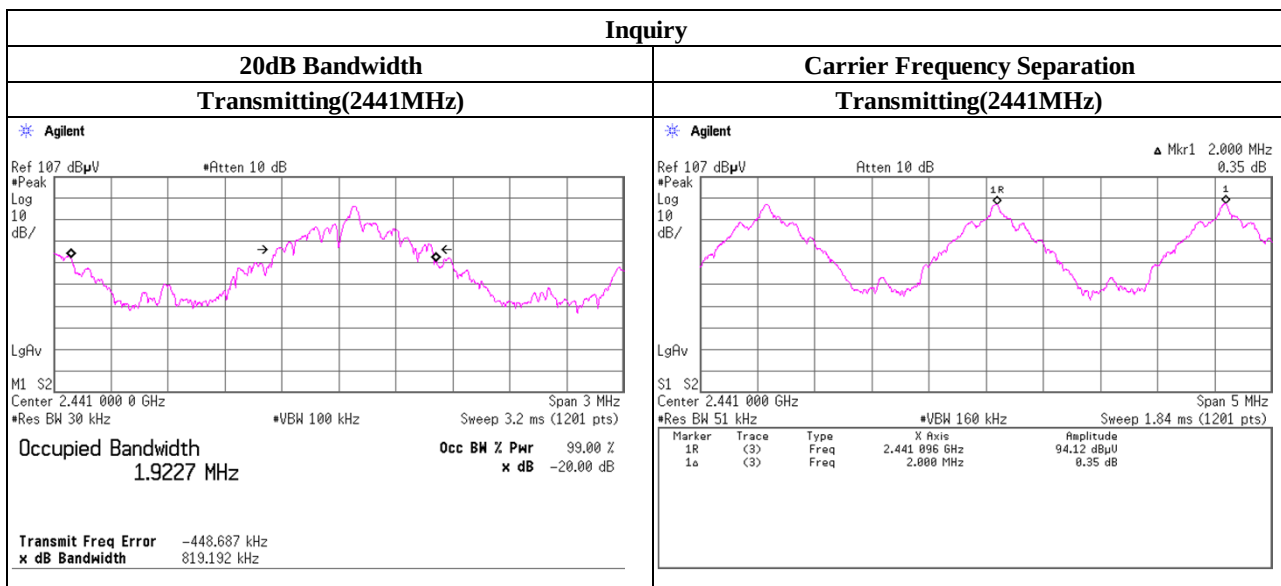
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 15, 2011	,
Temperature / Humidity	27deg.C. , 36%RH	,
Engineer	Akio Hayashi	,
Mode	Tx, Bluetooth, BDR, PRBS9	Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.934	1.000	>= 0.623
DH5	2441.0	0.921	1.000	>= 0.614
DH5	2480.0	0.937	1.000	>= 0.625
Inquiry	2441.0	0.819	2.000	>= 0.546

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

No limit applies to 20dB Bandwidth.



UL Japan, Inc.

Shonan EMC Lab.

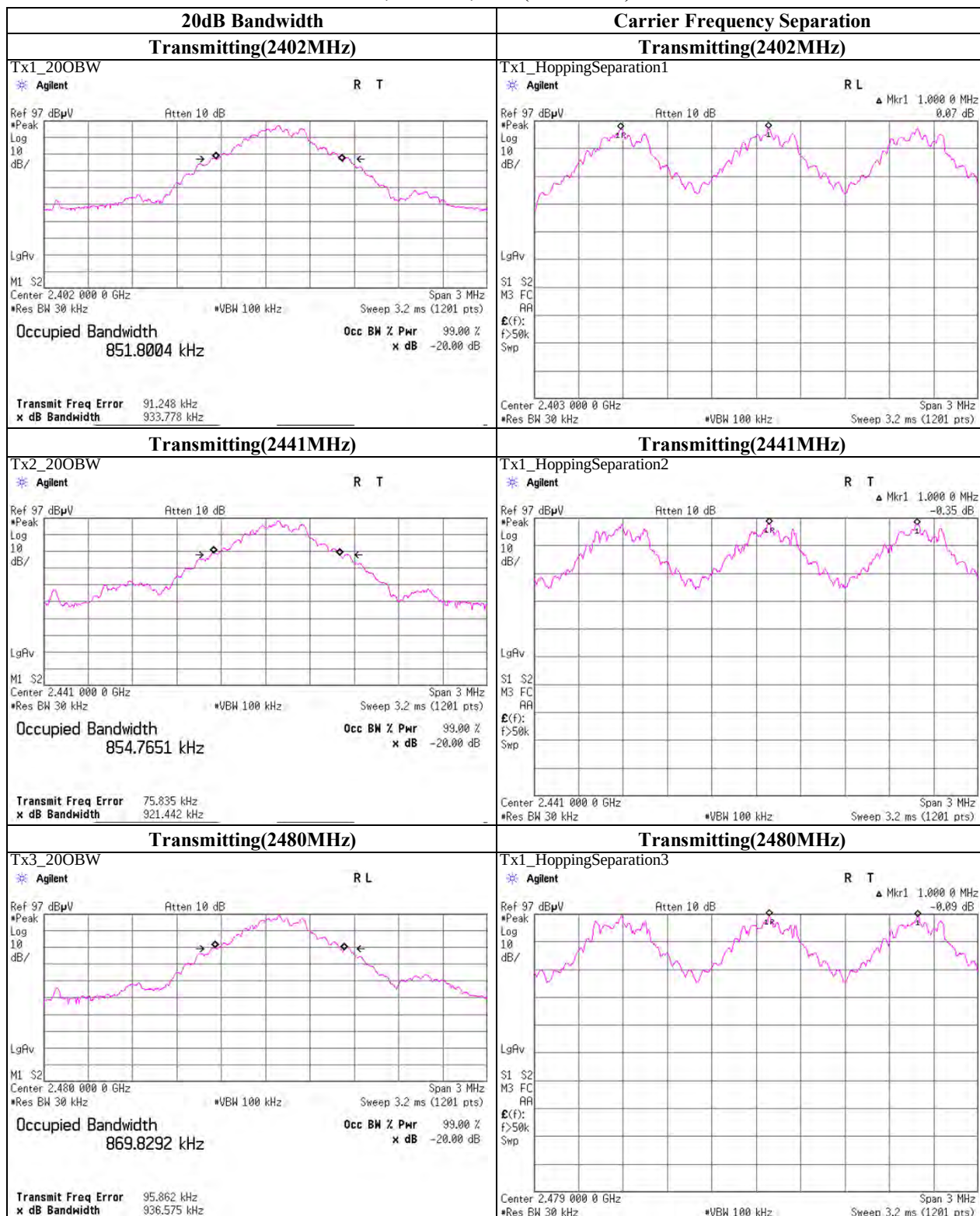
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR (Worst: DH5)



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20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date April 15, 2011 ,
Temperature / Humidity 27deg.C. , 36%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	1.272	1.000	>= 0.848
3-DH5	2441.0	1.284	1.000	>= 0.856
3-DH5	2480.0	1.269	1.000	>= 0.846

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

No limit applies to 20dB Bandwidth.

UL Japan, Inc.

Shonan EMC Lab.

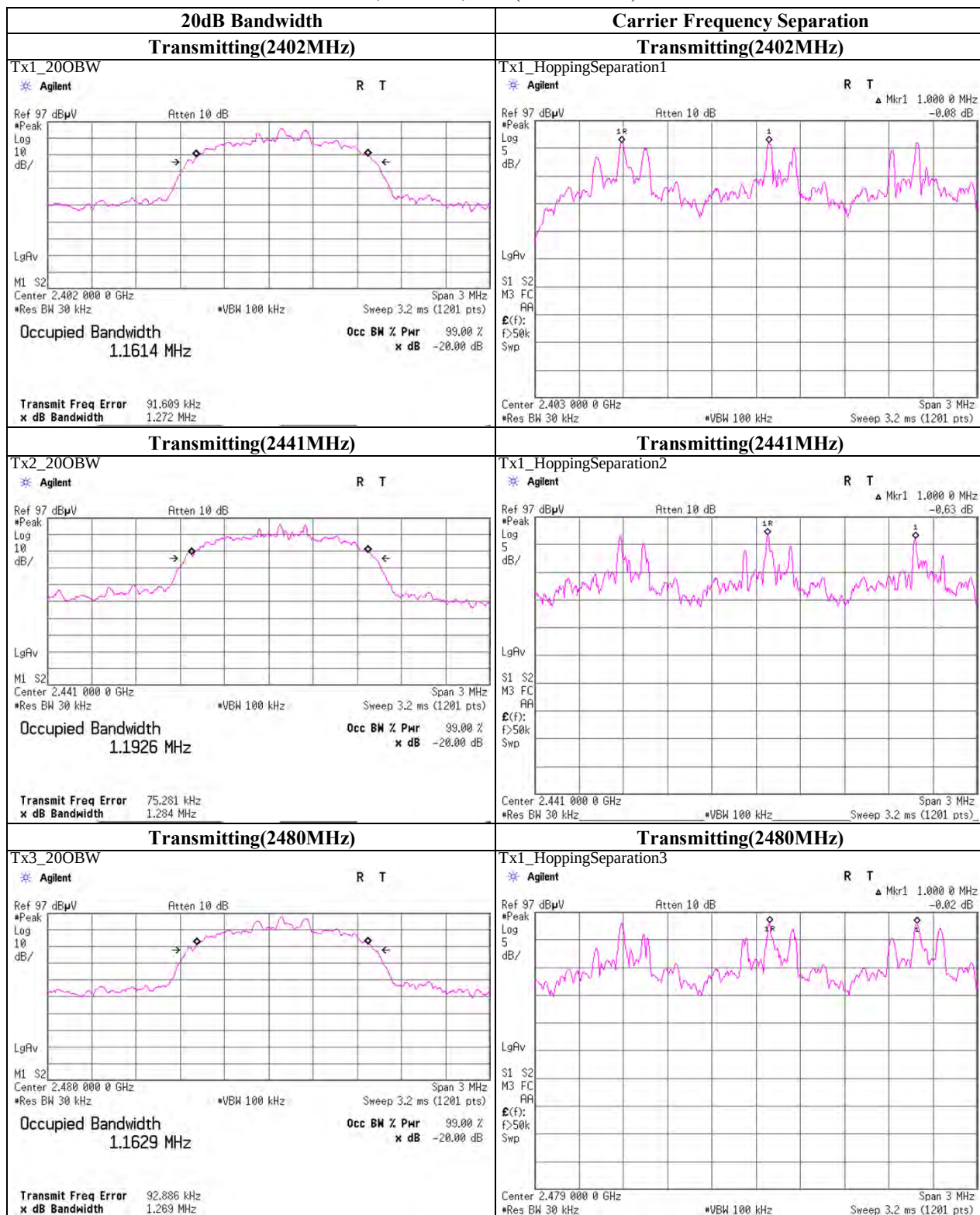
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20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR (Worst: 3-DH5)



UL Japan, Inc.

Shonan EMC Lab.

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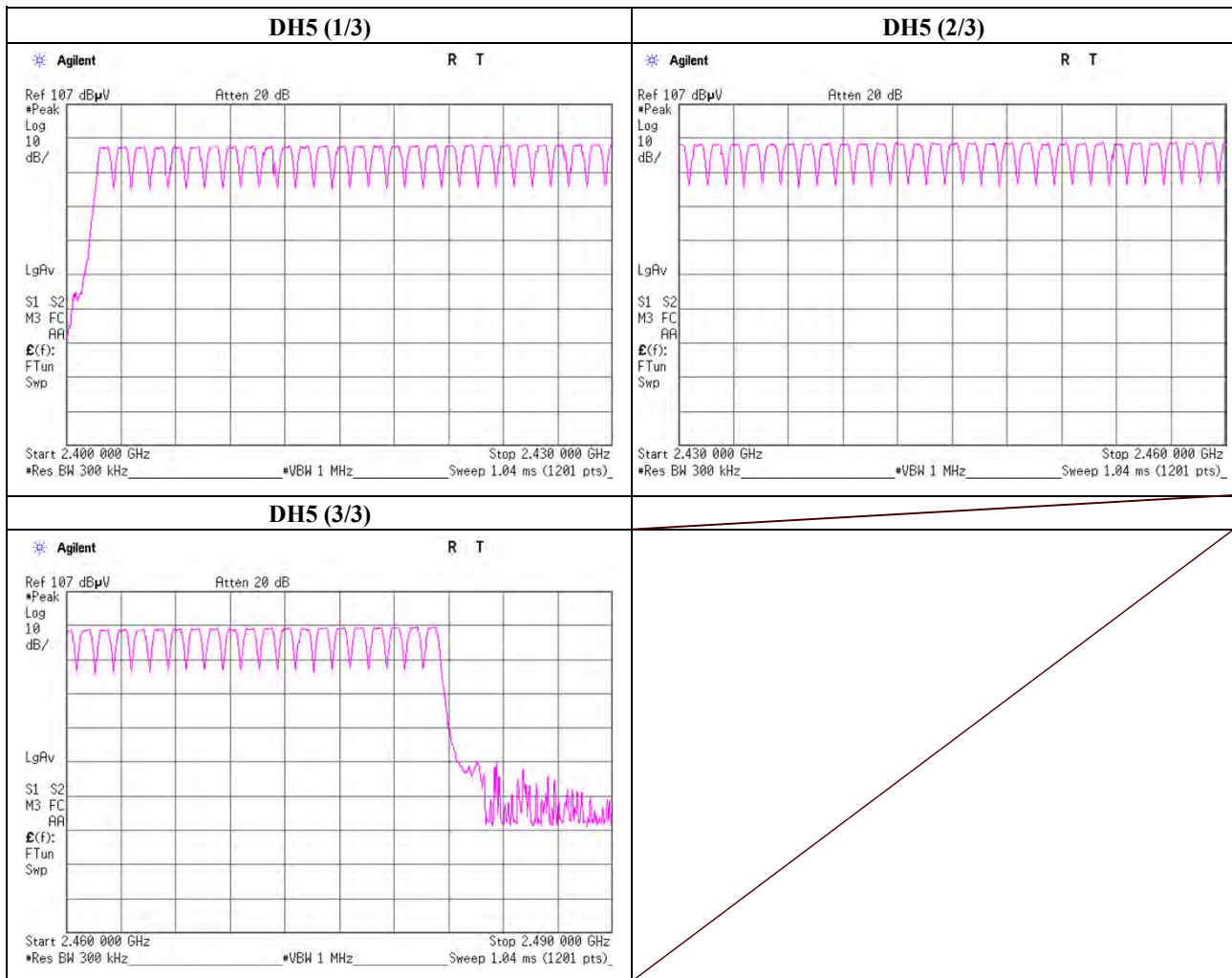
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Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 15, 2011	
Temperature / Humidity	27deg.C. , 36%RH	
Engineer	Akio Hayashi	
Mode	Tx, Bluetooth, BDR, PRBS9	

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



UL Japan, Inc.

Shonan EMC Lab.

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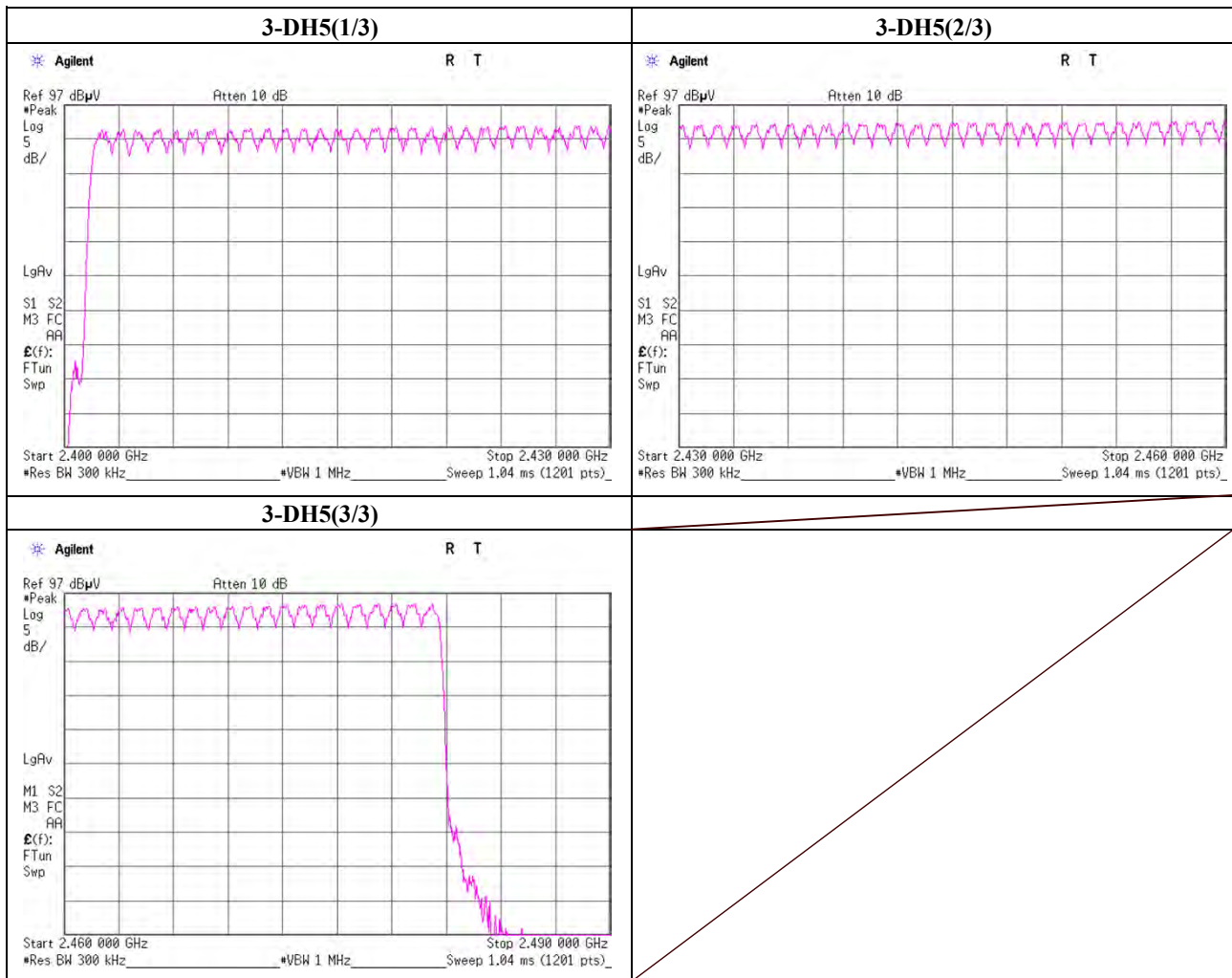
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Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 15, 2011	
Temperature / Humidity	27deg.C. , 36%RH	
Engineer	Akio Hayashi	
Mode	Tx, Bluetooth, EDR, PRBS9	

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



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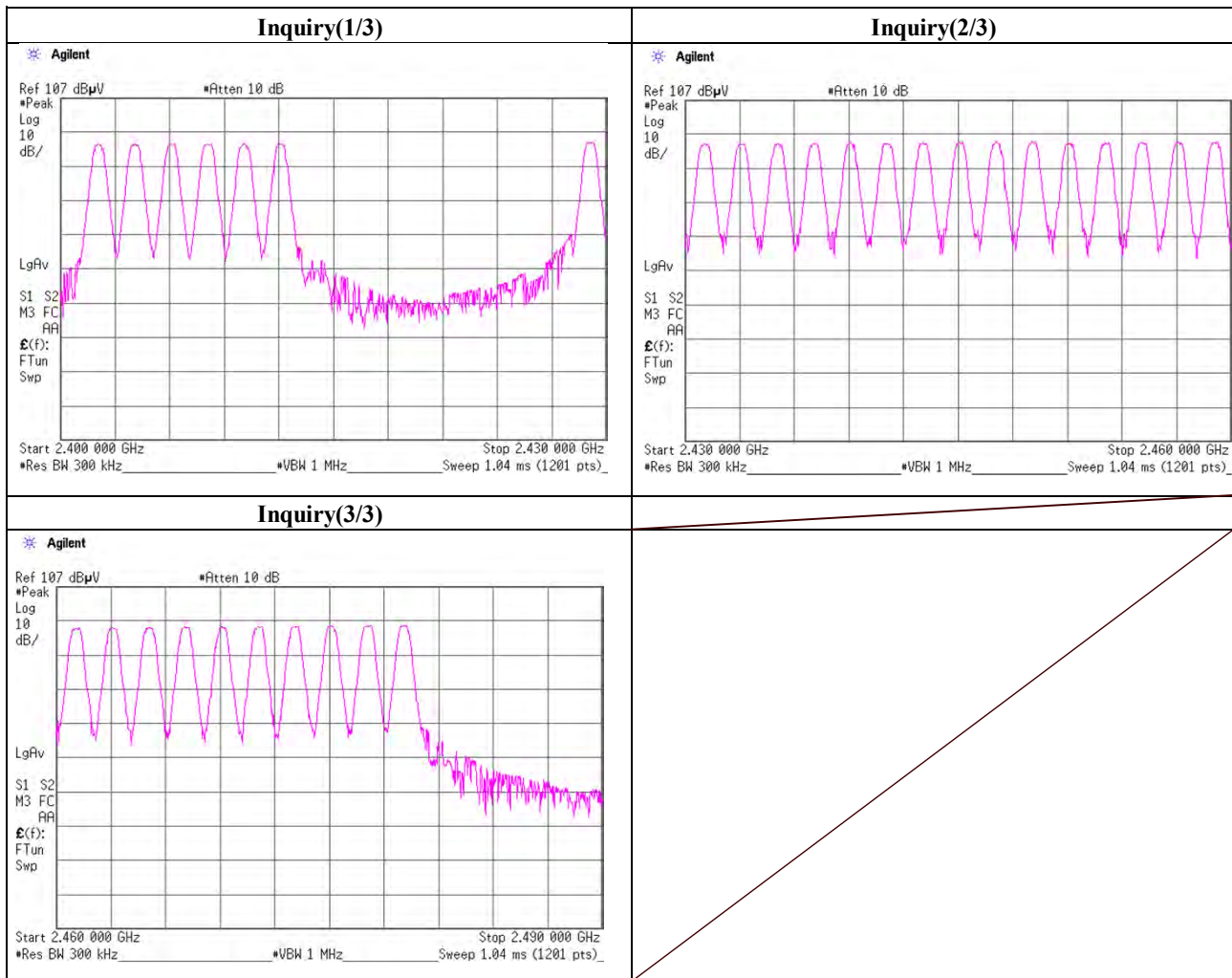
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Facsimile : +81 463 50 6401

Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	April 19, 2011	
Temperature / Humidity	23deg.C. , 43%RH	
Engineer	Makoto Hosaka	
Mode	Inquiry	

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



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Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date April 15, 2011
Temperature / Humidity 27deg.C. , 36%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	51.0	/	5.0 sec.	x	31.6 sec.	= 323 times	0.416	134	400
DH3	17.0	/	5.0 sec.	x	31.6 sec.	= 108 times	1.672	181	400
DH5	11.0	/	5.0 sec.	x	31.6 sec.	= 70 times	2.923	205	400
Inquiry	100.0	/	1.0 sec.	x	12.8 sec.	= 1280 times	0.108	138	400

Sample Calculation

Result = Number of transmission x Length of transmittion time

UL Japan, Inc.

Shonan EMC Lab.

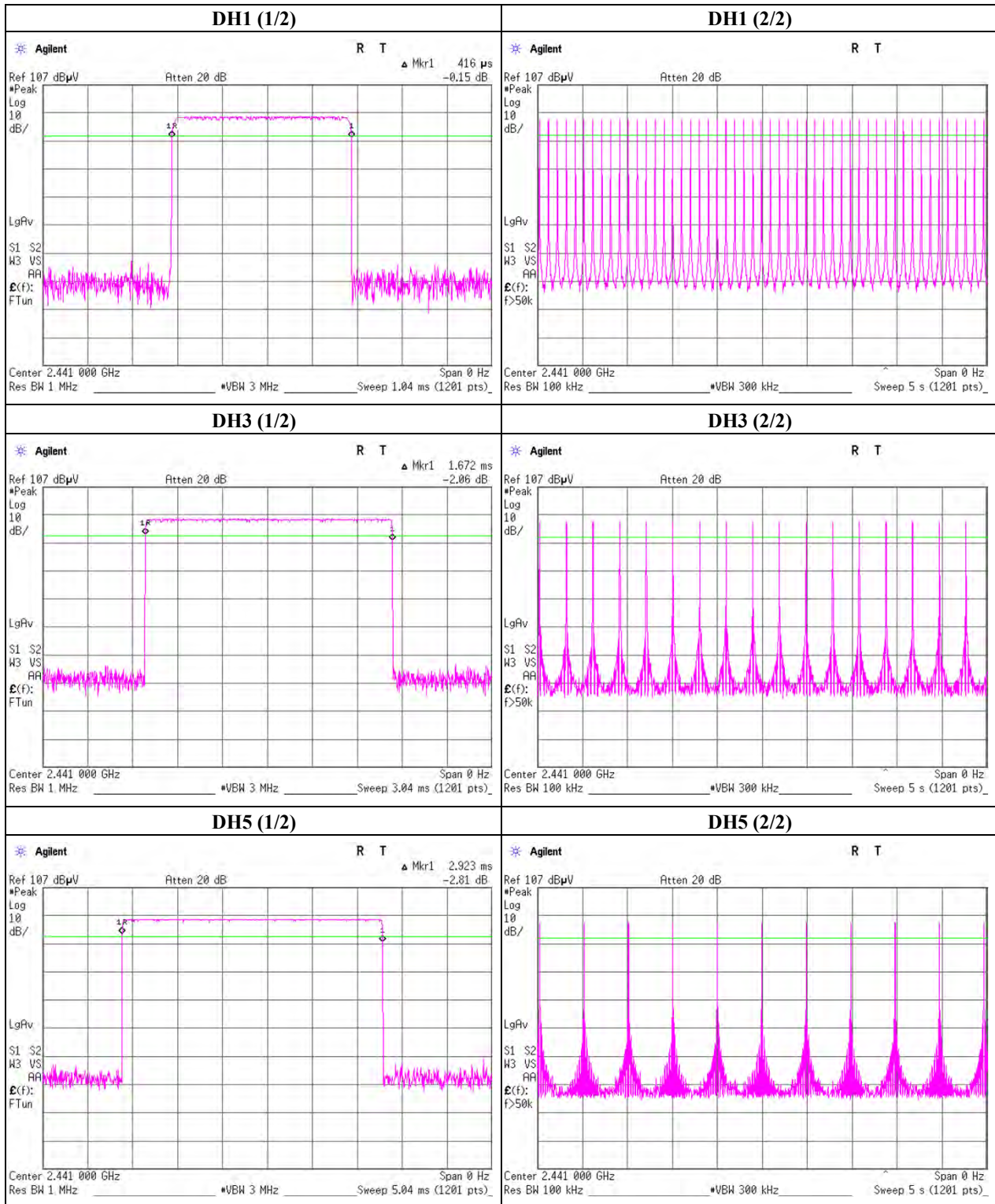
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Dwell time

Tx, Bluetooth, BDR, PRBS9



UL Japan, Inc.

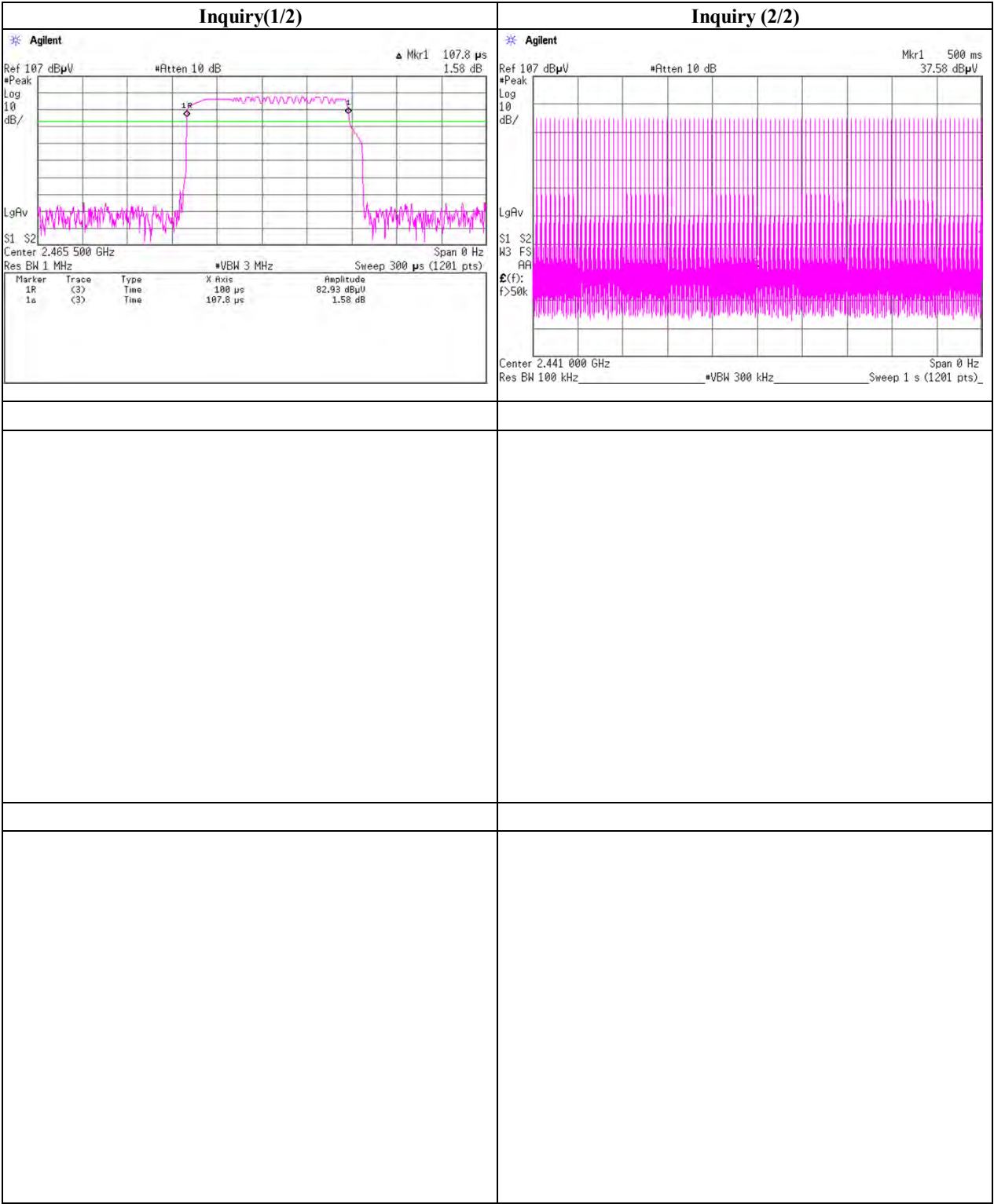
Shonan EMC Lab.

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Facsimile : +81 463 50 6401

Dwell time



Dwell Time

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date April 15, 2011
Temperature / Humidity 27deg.C. , 36%RH
Engineer Akio Hayashi
Mode Tx, Bluetooth, EDR, 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]
3-DH1	51.0	/	5.0 sec.	x	31.6 sec.	=	323 times	0.421	136	400
3-DH3	13.0	/	5.0 sec.	x	31.6 sec.	=	83 times	1.675	139	400
3-DH5	13.0	/	5.0 sec.	x	31.6 sec.	=	83 times	2.927	243	400

Sample Calculation

Result = Number of transmission x Length of transimition time

UL Japan, Inc.

Shonan EMC Lab.

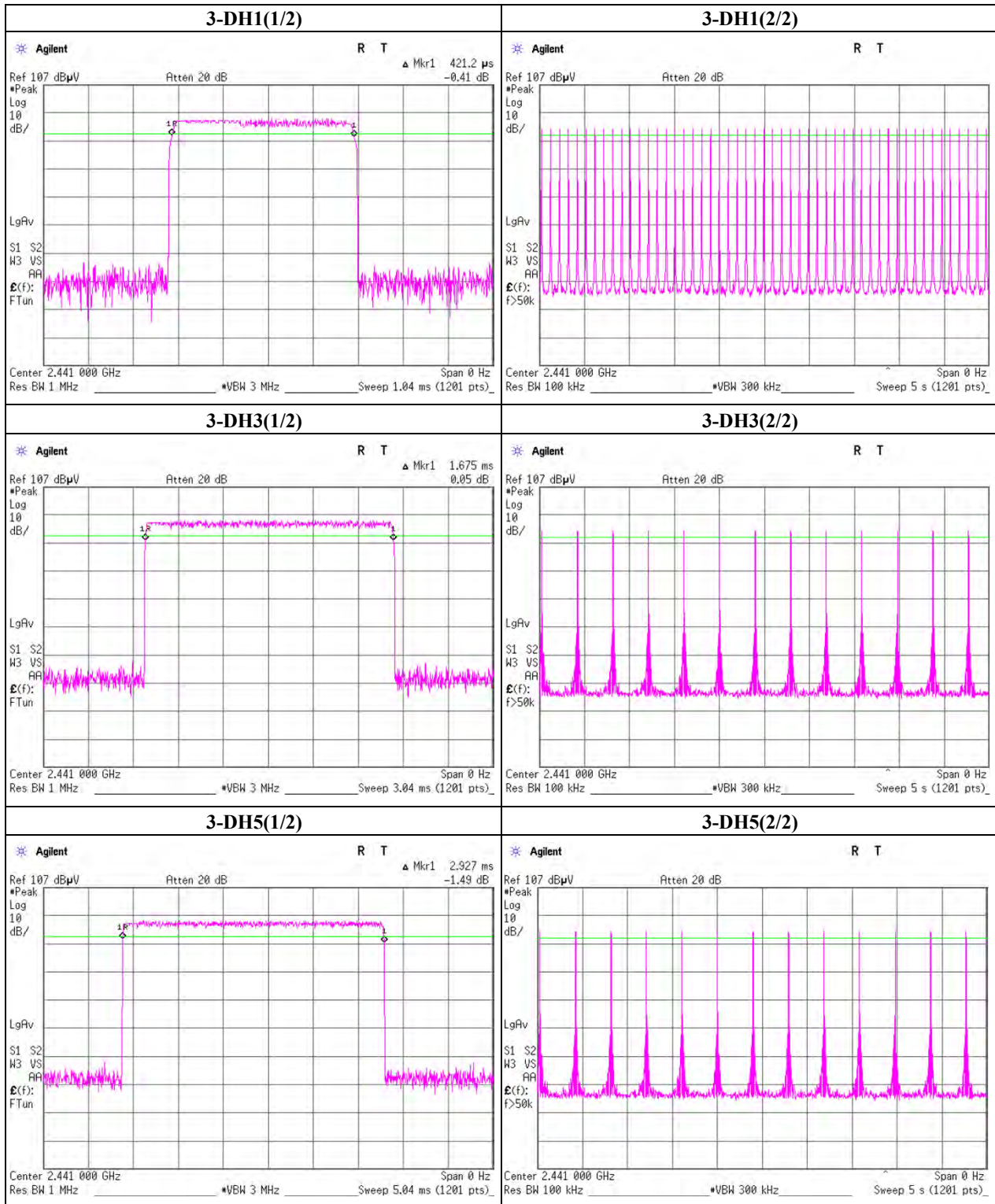
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Dwell time

Tx, Bluetooth, EDR, PRBS9



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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date April 15, 2011
 Temperature / Humidity 27deg.C. , 46%RH
 Engineer Akio Hayashi
 Mode Tx, Bluetooth

	Freq.	P/M (PK) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-12.24	1.25	9.57	-1.42	0.72	20.97	125	22.38
DH5	2441.0	-11.30	1.26	9.57	-0.47	0.90	20.97	125	21.43
DH5	2480.0	-10.22	1.27	9.57	0.62	1.15	20.97	125	20.34
2-DH5	2402.0	-12.48	1.25	9.57	-1.66	0.68	20.97	125	22.62
2-DH5	2441.0	-11.64	1.26	9.57	-0.81	0.83	20.97	125	21.77
2-DH5	2480.0	-10.47	1.27	9.57	0.37	1.09	20.97	125	20.59
3-DH5	2402.0	-12.10	1.25	9.57	-1.28	0.75	20.97	125	22.24
3-DH5	2441.0	-11.33	1.26	9.57	-0.50	0.89	20.97	125	21.46
3-DH5	2480.0	-10.19	1.27	9.57	0.65	1.16	20.97	125	20.31

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Atten. Loss

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		
Test Site	No.1 Semi Anechoic chamber		No.1 Semi Anechoic chamber
Date	April 18, 2011		April 20, 2011
Temperature / Humidity	22deg.C. , 44%RH		22deg.C.
Engineer	Hikaru Shirasawa		Takahiro Suzuki
Mode	Tx, 2402 MHz		
	Tx, Bluetooth, BDR, PRBS9		

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.	316.085	QP	31.9	14.5	6.7	31.8	21.3	46.0	24.7	151	304	
Hori.	338.662	QP	31.8	15.0	6.8	31.8	21.8	46.0	24.2	137	313	
Hori.	2390.000	PK	57.6	27.1	13.3	40.6	57.4	73.9	16.5	124	105	
Hori.	4804.000	PK	54.6	30.8	5.3	41.5	49.2	73.9	24.7	100	158	
Hori.	7206.000	PK	49.6	36.0	6.3	40.7	51.2	73.9	22.7	100	35	
Hori.	9608.000	PK	48.3	38.3	7.8	40.5	53.9	73.9	20.0	100	158	
Hori.	12010.000	PK	47.7	39.1	8.4	39.5	55.7	73.9	18.2	100	249	
Hori.	2390.000	AV	35.4	27.1	13.3	40.6	35.2	53.9	18.7	124	105	VBW:200Hz
Hori.	4804.000	AV	46.3	30.8	5.3	41.5	40.9	53.9	13.0	100	158	VBW:200Hz
Hori.	7206.000	AV	34.9	36.0	6.3	40.7	36.5	53.9	17.4	100	35	VBW:10Hz
Hori.	9608.000	AV	34.0	38.3	7.8	40.5	39.6	53.9	14.3	100	158	VBW:10Hz
Hori.	12010.000	AV	33.5	39.1	8.4	39.5	41.5	53.9	12.4	100	249	VBW:10Hz
Vert.	2390.000	PK	57.8	27.1	13.3	40.6	57.6	73.9	16.3	100	114	
Vert.	4804.000	PK	56.3	30.8	5.3	41.5	50.9	73.9	23.0	116	158	
Vert.	7206.000	PK	49.2	36.0	6.3	40.7	50.8	73.9	23.1	100	54	
Vert.	9608.000	PK	48.5	38.3	7.8	40.5	54.1	73.9	19.8	100	111	
Vert.	12010.000	PK	47.4	39.1	8.4	39.5	55.4	73.9	18.5	100	268	
Vert.	2390.000	AV	35.1	27.1	13.3	40.6	34.9	53.9	19.0	100	114	VBW:200Hz
Vert.	4804.000	AV	49.7	30.8	5.3	41.5	44.3	53.9	9.6	116	158	VBW:200Hz
Vert.	7206.000	AV	35.0	36.0	6.3	40.7	36.6	53.9	17.3	100	54	VBW:10Hz
Vert.	9608.000	AV	33.9	38.3	7.8	40.5	39.5	53.9	14.4	100	111	VBW:10Hz
Vert.	12010.000	AV	33.3	39.1	8.4	39.5	41.3	53.9	12.6	100	268	VBW:10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-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	94.5	27.1	13.5	40.6	94.5	-	-	Carrier
Hori.	2400.000	PK	53.3	27.1	13.5	40.6	53.3	74.5	21.2	
Vert.	2402.000	PK	95.9	27.1	13.5	40.6	95.9	-	-	Carrier
Vert.	2400.000	PK	54.7	27.1	13.5	40.6	54.7	75.9	21.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	
Test Site	No.1 Semi Anechoic chamber	No.1 Semi Anechoic chamber
Date	April 18, 2011	April 20, 2011
Temperature / Humidity	22deg.C. , 44%RH	22deg.C.
Engineer	Hikaru Shirasawa	Takahiro Suzuki
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, BDR, PRBS9	

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.	316.098	QP	31.7	14.5	6.7	31.8	21.1	46.0	24.9	140	323	
Hori.	338.657	QP	32.1	15.0	6.8	31.8	22.1	46.0	23.9	119	314	
Hori.	4882.000	PK	55.0	31.1	5.3	41.5	49.9	73.9	24.0	100	199	
Hori.	7323.000	PK	49.2	36.3	6.3	40.7	51.1	73.9	22.8	100	43	
Hori.	9764.000	PK	48.7	38.4	7.9	40.5	54.5	73.9	19.4	100	124	
Hori.	12205.000	PK	47.4	39.2	8.4	39.5	55.5	73.9	18.4	100	265	
Hori.	4882.000	AV	41.1	31.1	5.3	41.5	36.0	53.9	17.9	100	199	VBW:200Hz
Hori.	7323.000	AV	34.5	36.3	6.3	40.7	36.4	53.9	17.5	100	43	VBW:10Hz
Hori.	9764.000	AV	33.9	38.4	7.9	40.5	39.7	53.9	14.2	100	124	VBW:10Hz
Hori.	12205.000	AV	33.3	39.2	8.4	39.5	41.4	53.9	12.5	100	265	VBW:10Hz
Vert.	4882.000	PK	54.9	31.1	5.3	41.5	49.8	73.9	24.1	100	155	
Vert.	7323.000	PK	48.5	36.3	6.3	40.7	50.4	73.9	23.5	100	53	
Vert.	9764.000	PK	48.7	38.4	7.9	40.5	54.5	73.9	19.4	100	114	
Vert.	12205.000	PK	47.7	39.2	8.4	39.5	55.8	73.9	18.1	100	215	
Vert.	4882.000	AV	47.4	31.1	5.3	41.5	42.3	53.9	11.6	100	155	VBW:200Hz
Vert.	7323.000	AV	34.4	36.3	6.3	40.7	36.3	53.9	17.6	100	53	VBW:10Hz
Vert.	9764.000	AV	34.0	38.4	7.9	40.5	39.8	53.9	14.1	100	114	VBW:10Hz
Vert.	12205.000	AV	33.1	39.2	8.4	39.5	41.2	53.9	12.7	100	215	VBW:10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		
Test Site	No.1 Semi Anechoic chamber		No.1 Semi Anechoic chamber
Date	April 18, 2011		April 20, 2011
Temperature / Humidity	22deg.C. , 44%RH		22deg.C.
Engineer	Hikaru Shirasawa		Takahiro Suzuki
Mode	Tx, 2480 MHz		
	Tx, Bluetooth, BDR, PRBS9		

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.	316.089	QP	31.4	14.5	6.7	31.8	20.8	46.0	25.2	147	329	
Hori.	338.663	QP	31.8	15.0	6.8	31.8	21.8	46.0	24.2	143	332	
Hori.	2483.500	PK	66.3	27.1	13.5	40.5	66.4	73.9	7.5	105	232	
Hori.	4960.000	PK	51.9	31.3	5.3	41.5	47.0	73.9	26.9	100	105	
Hori.	7440.000	PK	49.6	36.5	6.4	40.8	51.7	73.9	22.2	100	100	
Hori.	9920.000	PK	48.5	38.4	8.0	40.5	54.4	73.9	19.5	100	111	
Hori.	12400.000	PK	47.6	39.2	8.5	39.4	55.9	73.9	18.0	100	109	
Hori.	2483.500	AV	47.0	27.1	13.5	40.5	47.1	53.9	6.8	105	232	VBW:200Hz
Hori.	4960.000	AV	38.0	31.3	5.3	41.5	33.1	53.9	20.8	100	105	VBW:10Hz
Hori.	7440.000	AV	34.5	36.5	6.4	40.8	36.6	53.9	17.3	100	100	VBW:10Hz
Hori.	9920.000	AV	34.4	38.4	8.0	40.5	40.3	53.9	13.6	100	111	VBW:10Hz
Hori.	12400.000	AV	32.9	39.2	8.5	39.4	41.2	53.9	12.7	100	109	VBW:10Hz
Vert.	2483.500	PK	68.9	27.1	13.5	40.5	69.0	73.9	4.9	100	160	
Vert.	4960.000	PK	54.5	31.3	5.3	41.5	49.6	73.9	24.3	100	114	
Vert.	7440.000	PK	48.9	36.5	6.4	40.8	51.0	73.9	22.9	100	53	
Vert.	9920.000	PK	48.2	38.4	8.0	40.5	54.1	73.9	19.8	100	124	
Vert.	12400.000	PK	47.3	39.2	8.5	39.4	55.6	73.9	18.3	102	163	
Vert.	2483.500	AV	49.7	27.1	13.5	40.5	49.8	53.9	4.1	100	160	VBW:200Hz
Vert.	4960.000	AV	40.5	31.3	5.3	41.5	35.6	53.9	18.3	100	114	VBW:10Hz
Vert.	7440.000	AV	34.6	36.5	6.4	40.8	36.7	53.9	17.2	100	53	VBW:10Hz
Vert.	9920.000	AV	34.1	38.4	8.0	40.5	40.0	53.9	13.9	100	124	VBW:10Hz
Vert.	12400.000	AV	32.7	39.2	8.5	39.4	41.0	53.9	12.9	102	163	VBW:10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab.
 Test Site No.1 Semi Anechoic chamber , No.1 Semi Anechoic chamber
 Date April 18, 2011 , April 20, 2011
 Temperature / Humidity 22deg.C. , 44%RH , 22deg.C.
 Engineer Hikaru Shirasawa , Takahiro Suzuki
 Mode Tx, 2402 MHz
 Tx, Bluetooth, EDR, PRBS9

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.	316.093	QP	32.0	14.5	6.7	31.8	21.4	46.0	24.6	140	315	
Hori.	338.677	QP	31.9	15.0	6.8	31.8	21.9	46.0	24.1	128	327	
Hori.	2390.000	PK	57.4	27.1	13.3	40.6	57.2	73.9	16.7	124	103	
Hori.	4804.000	PK	54.4	30.8	5.3	41.5	49.0	73.9	24.9	100	160	
Hori.	7206.000	PK	49.4	36.0	6.3	40.7	51.0	73.9	22.9	100	38	
Hori.	9608.000	PK	48.0	38.3	7.8	40.5	53.6	73.9	20.3	100	156	
Hori.	12010.000	PK	47.5	39.1	8.4	39.5	55.5	73.9	18.4	100	247	
Hori.	2390.000	AV	35.5	27.1	13.3	40.6	35.3	53.9	18.6	124	103	VBW:100Hz
Hori.	4804.000	AV	46.0	30.8	5.3	41.5	40.6	53.9	13.3	100	160	VBW:100Hz
Hori.	7206.000	AV	35.0	36.0	6.3	40.7	36.6	53.9	17.3	100	38	VBW:10Hz
Hori.	9608.000	AV	33.8	38.3	7.8	40.5	39.4	53.9	14.5	100	156	VBW:10Hz
Hori.	12010.000	AV	33.6	39.1	8.4	39.5	41.6	53.9	12.3	100	247	VBW:10Hz
Vert.	2390.000	PK	57.6	27.1	13.3	40.6	57.4	73.9	16.5	100	161	
Vert.	4804.000	PK	56.6	30.8	5.3	41.5	51.2	73.9	22.7	116	156	
Vert.	7206.000	PK	49.0	36.0	6.3	40.7	50.6	73.9	23.3	100	51	
Vert.	9608.000	PK	48.6	38.3	7.8	40.5	54.2	73.9	19.7	100	114	
Vert.	12010.000	PK	47.2	39.1	8.4	39.5	55.2	73.9	18.7	100	267	
Vert.	2390.000	AV	35.0	27.1	13.3	40.6	34.8	53.9	19.1	100	161	VBW:100Hz
Vert.	4804.000	AV	49.6	30.8	5.3	41.5	44.2	53.9	9.7	116	156	VBW:100Hz
Vert.	7206.000	AV	35.2	36.0	6.3	40.7	36.8	53.9	17.1	100	51	VBW:10Hz
Vert.	9608.000	AV	34.0	38.3	7.8	40.5	39.6	53.9	14.3	100	114	VBW:10Hz
Vert.	12010.000	AV	33.6	39.1	8.4	39.5	41.6	53.9	12.3	100	267	VBW:10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-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	94.2	27.1	13.5	40.6	94.2	-	-	Carrier
Hori.	2400.000	PK	53.2	27.1	13.5	40.6	53.2	74.2	21.0	
Vert.	2402.000	PK	95.7	27.1	13.5	40.6	95.7	-	-	Carrier
Vert.	2400.000	PK	54.5	27.1	13.5	40.6	54.5	75.7	21.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

UL Japan, Inc.

Shonan EMC Lab.

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	
Test Site	No.1 Semi Anechoic chamber	No.1 Semi Anechoic chamber
Date	April 18, 2011	April 20, 2011
Temperature / Humidity	22deg.C. , 44%RH	22deg.C.
Engineer	Hikaru Shirasawa	Takahiro Suzuki
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, EDR, PRBS9	

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.	316.085	QP	31.6	14.5	6.7	31.8	21.0	46.0	25.0	143	300	
Hori.	338.664	QP	32.1	15.0	6.8	31.8	22.1	46.0	23.9	153	307	
Hori.	4882.000	PK	54.7	31.1	5.3	41.5	49.6	73.9	24.3	100	200	
Hori.	7323.000	PK	49.0	36.3	6.3	40.7	50.9	73.9	23.0	100	47	
Hori.	9764.000	PK	48.5	38.4	7.9	40.5	54.3	73.9	19.6	100	126	
Hori.	12205.000	PK	47.1	39.2	8.4	39.5	55.2	73.9	18.7	100	260	
Hori.	4882.000	AV	40.8	31.1	5.3	41.5	35.7	53.9	18.2	100	200	VBW:100Hz
Hori.	7323.000	AV	34.1	36.3	6.3	40.7	36.0	53.9	17.9	100	47	VBW:10Hz
Hori.	9764.000	AV	34.0	38.4	7.9	40.5	39.8	53.9	14.1	100	126	VBW:10Hz
Hori.	12205.000	AV	33.6	39.2	8.4	39.5	41.7	53.9	12.2	100	260	VBW:10Hz
Vert.	4882.000	PK	55.2	31.1	5.3	41.5	50.1	73.9	23.8	100	152	
Vert.	7323.000	PK	48.3	36.3	6.3	40.7	50.2	73.9	23.7	100	51	
Vert.	9764.000	PK	48.9	38.4	7.9	40.5	54.7	73.9	19.2	100	111	
Vert.	12205.000	PK	47.3	39.2	8.4	39.5	55.4	73.9	18.5	100	214	
Vert.	4882.000	AV	47.2	31.1	5.3	41.5	42.1	53.9	11.8	100	152	VBW:100Hz
Vert.	7323.000	AV	34.1	36.3	6.3	40.7	36.0	53.9	17.9	100	51	VBW:10Hz
Vert.	9764.000	AV	33.7	38.4	7.9	40.5	39.5	53.9	14.4	100	111	VBW:10Hz
Vert.	12205.000	AV	32.7	39.2	8.4	39.5	40.8	53.9	13.1	100	214	VBW:10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		
Test Site	No.1 Semi Anechoic chamber		No.1 Semi Anechoic chamber
Date	April 18, 2011		April 20, 2011
Temperature / Humidity	22deg.C. , 44%RH		22deg.C.
Engineer	Hikaru Shirasawa		Takahiro Suzuki
Mode	Tx, 2480 MHz		
	Tx, Bluetooth, EDR, PRBS9		

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.	316.074	QP	31.8	14.5	6.7	31.8	21.2	46.0	24.8	155	303	
Hori.	338.662	QP	31.9	15.0	6.8	31.8	21.9	46.0	24.1	150	340	
Hori.	2483.500	PK	66.5	27.1	13.5	40.5	66.6	73.9	7.3	105	233	
Hori.	4960.000	PK	52.0	31.3	5.3	41.5	47.1	73.9	26.8	100	106	
Hori.	7440.000	PK	49.4	36.5	6.4	40.8	51.5	73.9	22.4	100	103	
Hori.	9920.000	PK	48.7	38.4	8.0	40.5	54.6	73.9	19.3	100	106	
Hori.	12400.000	PK	47.8	39.2	8.5	39.4	56.1	73.9	17.8	100	110	
Hori.	2483.500	AV	46.8	27.1	13.5	40.5	46.9	53.9	7.0	105	233	VBW:100Hz
Hori.	4960.000	AV	37.6	31.3	5.3	41.5	32.7	53.9	21.2	100	106	VBW:10Hz
Hori.	7440.000	AV	34.2	36.5	6.4	40.8	36.3	53.9	17.6	100	103	VBW:10Hz
Hori.	9920.000	AV	34.1	38.4	8.0	40.5	40.0	53.9	13.9	100	106	VBW:10Hz
Hori.	12400.000	AV	33.0	39.2	8.5	39.4	41.3	53.9	12.6	100	110	VBW:10Hz
Vert.	2483.500	PK	69.0	27.1	13.5	40.5	69.1	73.9	4.8	100	158	
Vert.	4960.000	PK	54.2	31.3	5.3	41.5	49.3	73.9	24.6	100	112	
Vert.	7440.000	PK	49.0	36.5	6.4	40.8	51.1	73.9	22.8	100	58	
Vert.	9920.000	PK	48.1	38.4	8.0	40.5	54.0	73.9	19.9	100	125	
Vert.	12400.000	PK	47.0	39.2	8.5	39.4	55.3	73.9	18.6	102	164	
Vert.	2483.500	AV	49.5	27.1	13.5	40.5	49.6	53.9	4.3	100	158	VBW:100Hz
Vert.	4960.000	AV	40.3	31.3	5.3	41.5	35.4	53.9	18.5	100	112	VBW:10Hz
Vert.	7440.000	AV	34.4	36.5	6.4	40.8	36.5	53.9	17.4	100	58	VBW:10Hz
Vert.	9920.000	AV	33.8	38.4	8.0	40.5	39.7	53.9	14.2	100	125	VBW:10Hz
Vert.	12400.000	AV	32.5	39.2	8.5	39.4	40.8	53.9	13.1	102	164	VBW:10Hz

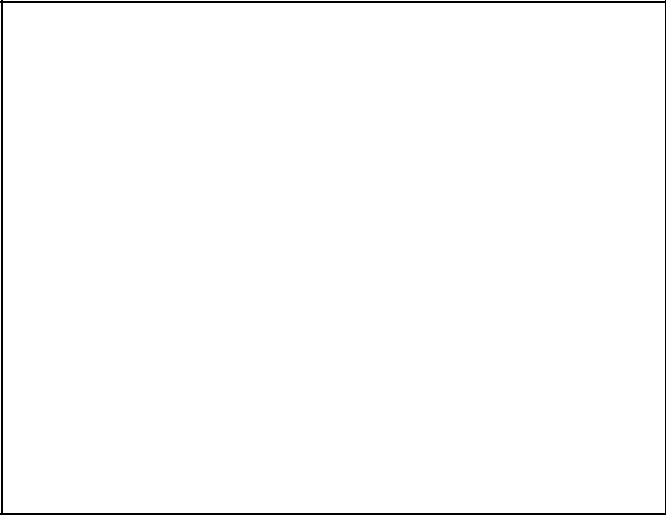
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

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

*Above 5th harmonics were not seen .

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

x: (T_x on+T_x off)=6.248ms

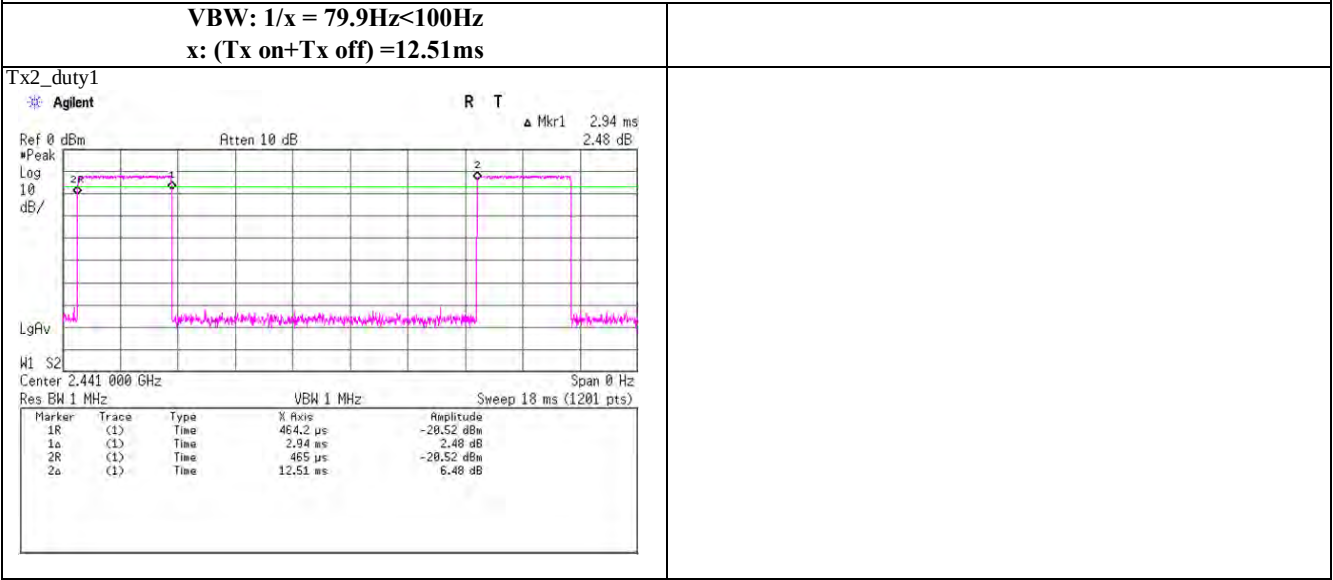


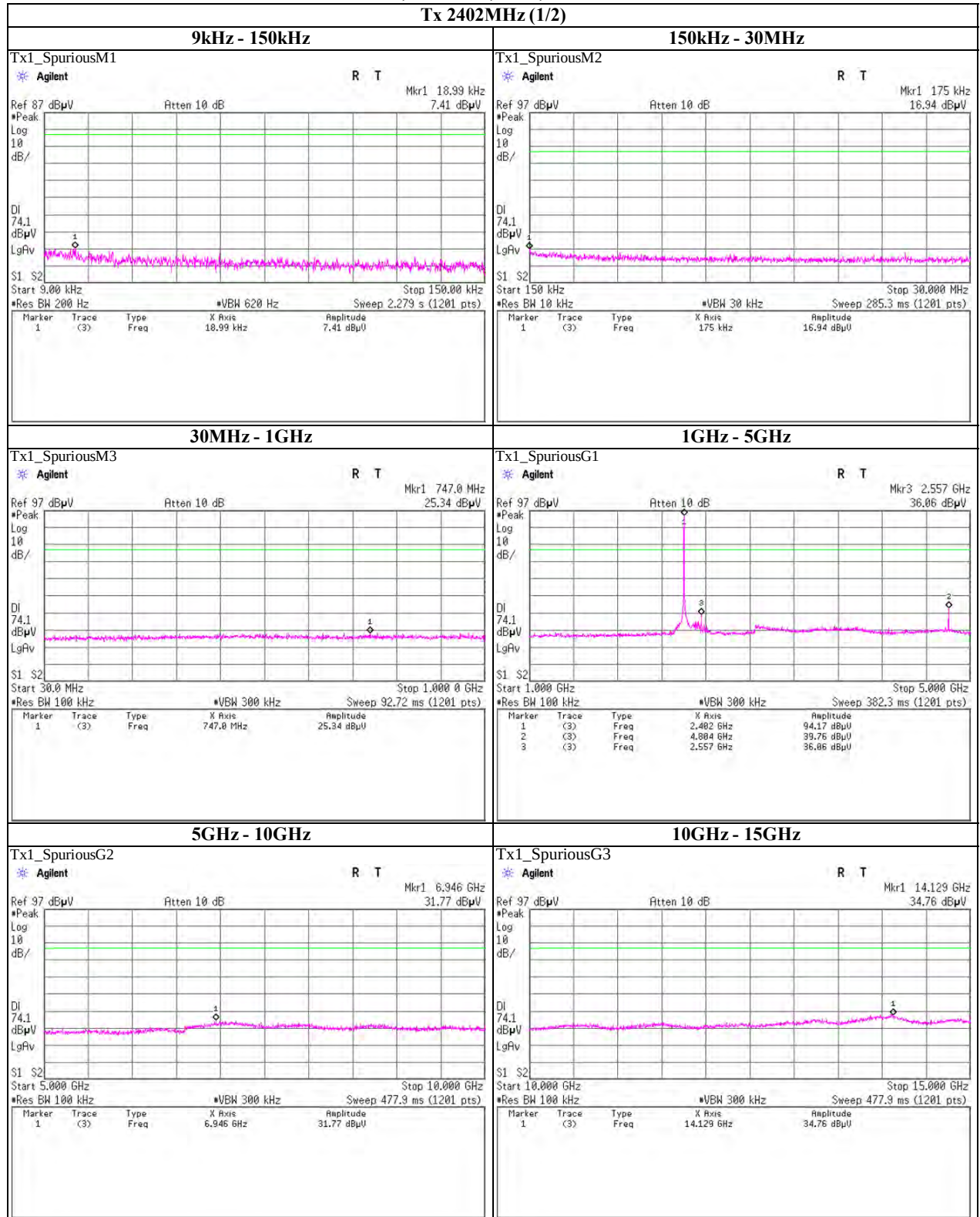
Facsimile : +81 463 50 6401

Spurious emission (Radiated)

Tx, Bluetooth, EDR, PRBS9

VBW (AV) Calculation



Spurious emission (Conducted)**Tx, Bluetooth, BDR, PRBS9****Tx 2402MHz (1/2)****UL Japan, Inc.****Shonan EMC Lab.**

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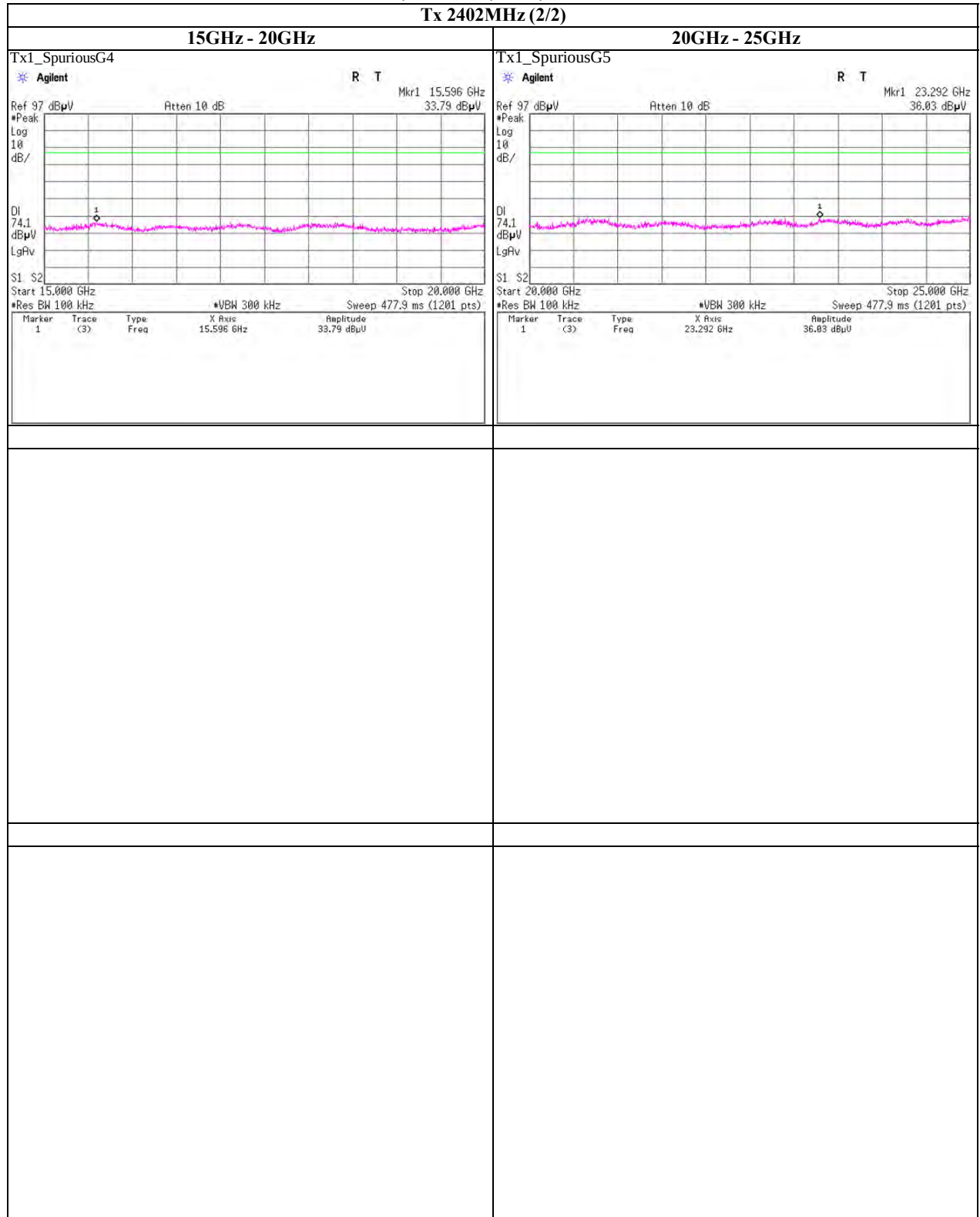
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

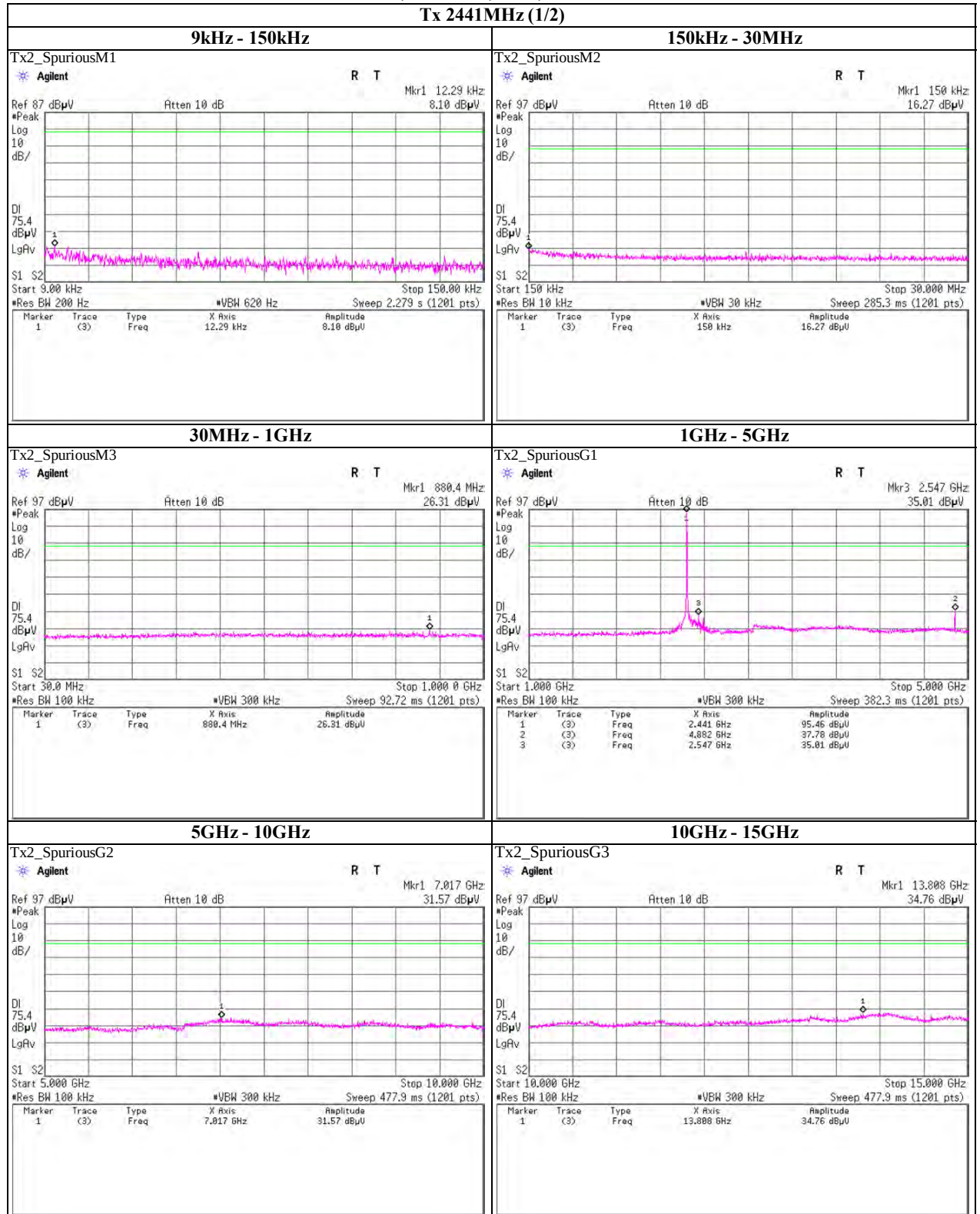
Tx 2402MHz (2/2)

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

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Telephone : +81 463 50 6400

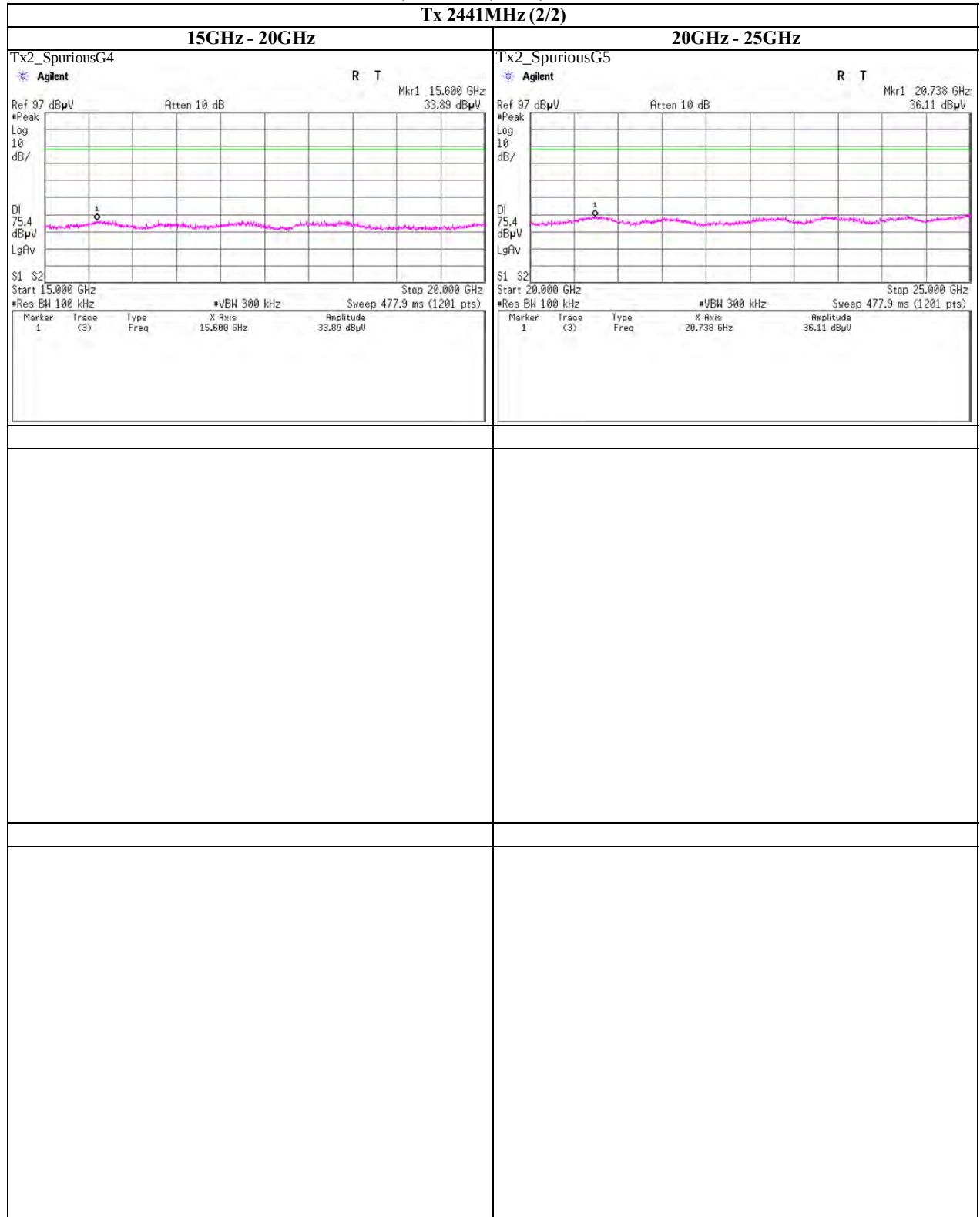
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, Bluetooth, BDR, PRBS9****Tx 2441MHz (1/2)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

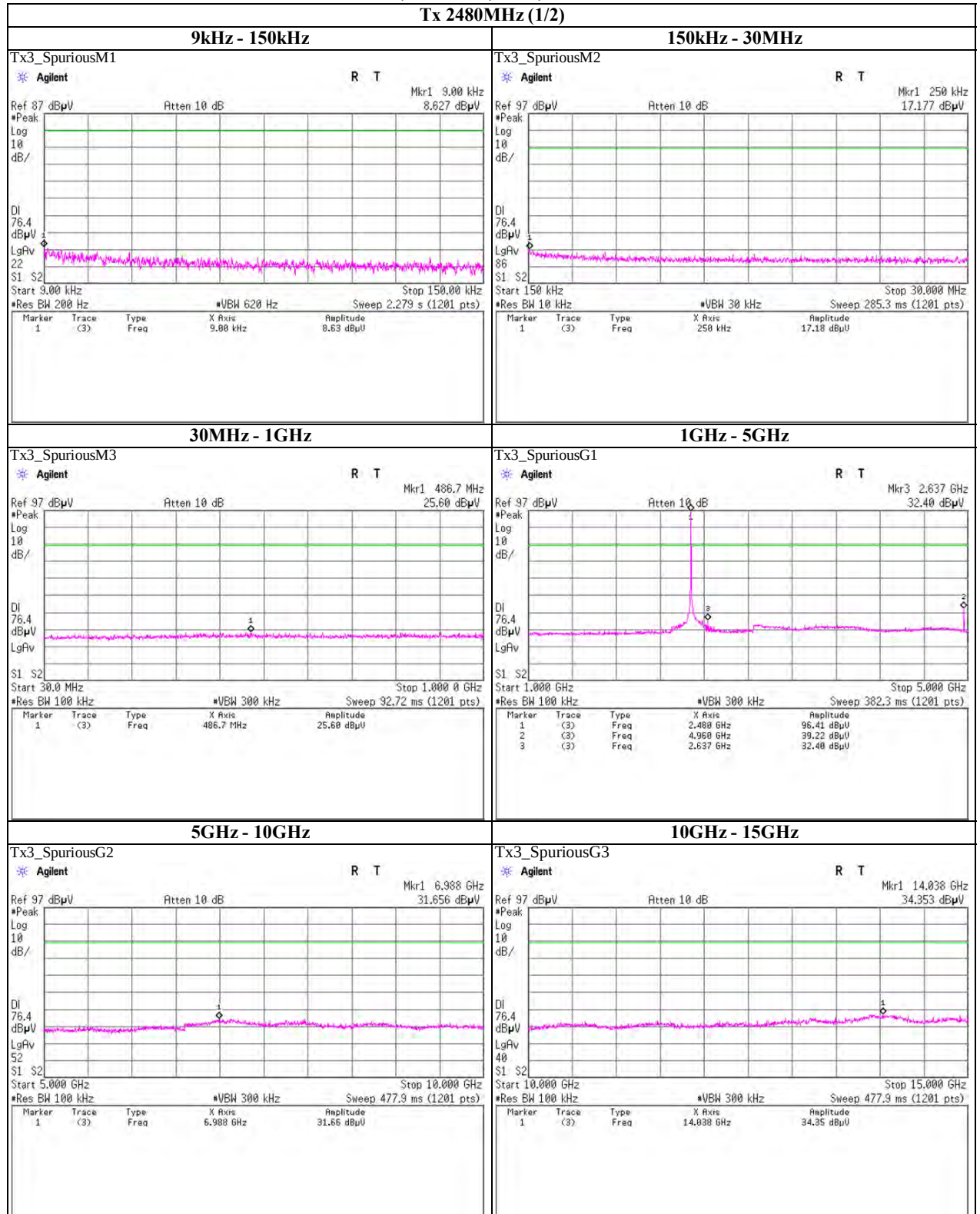
Tx 2441MHz (2/2)

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Telephone : +81 463 50 6400

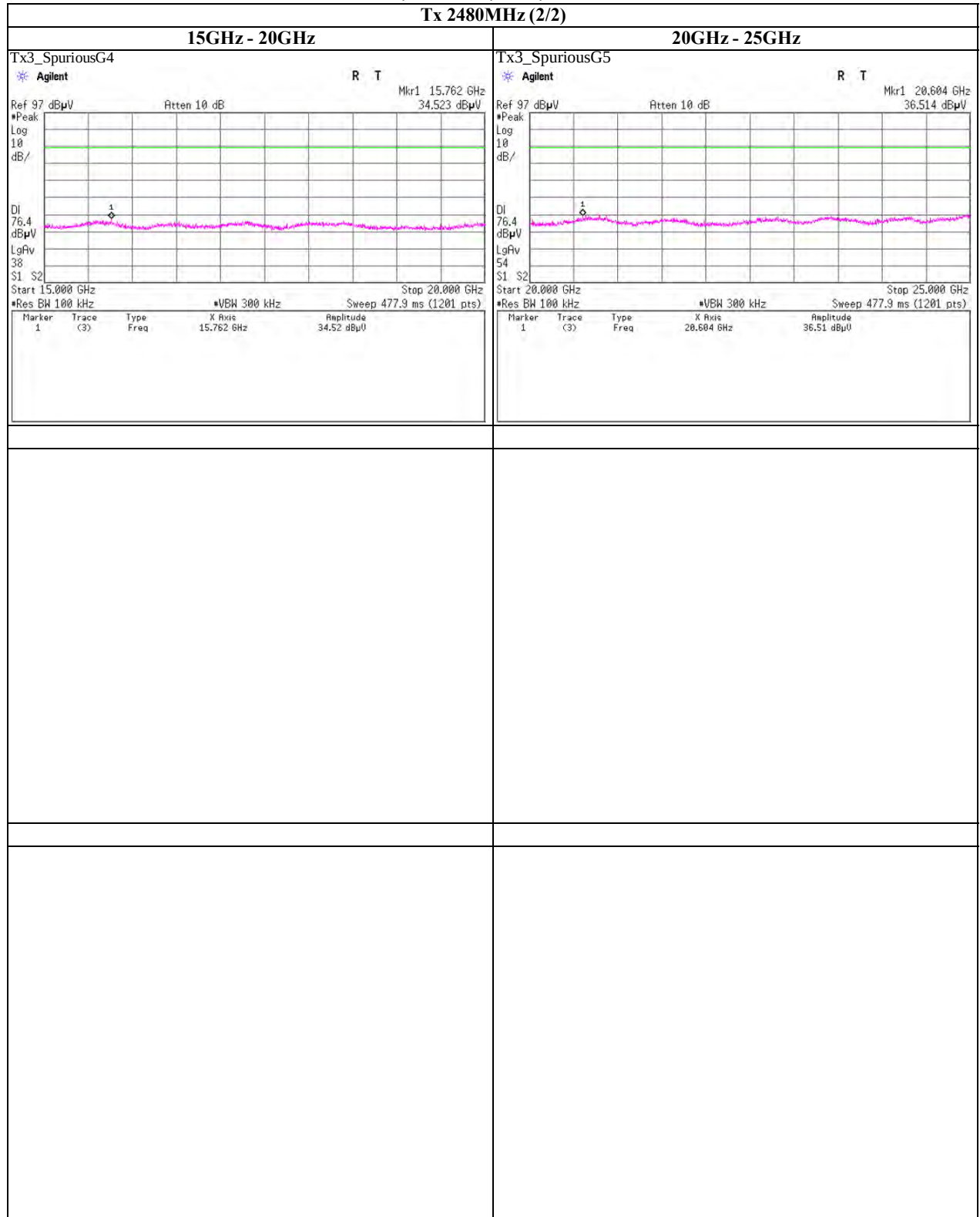
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, Bluetooth, BDR, PRBS9****Tx 2480MHz (1/2)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

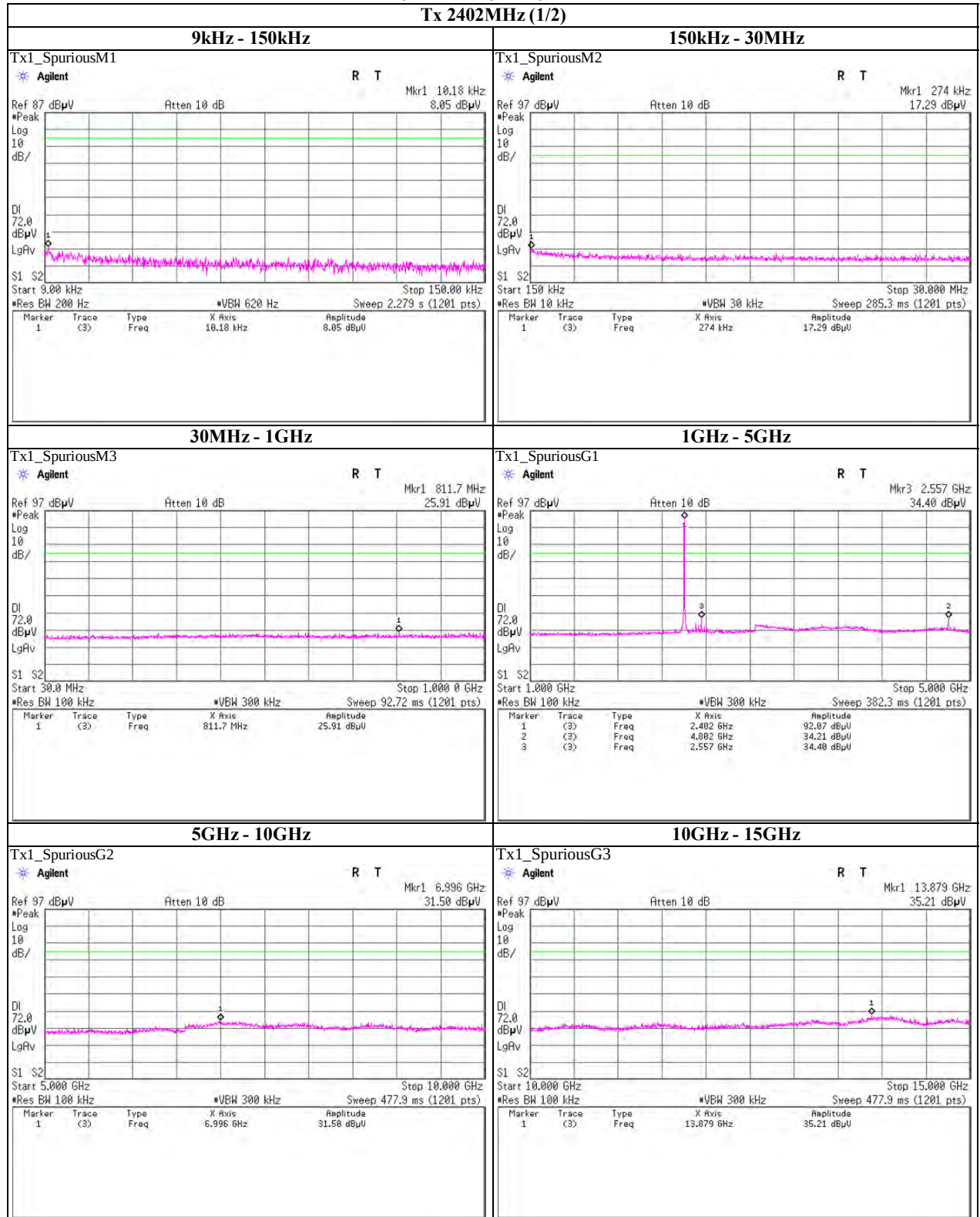
Tx 2480MHz (2/2)

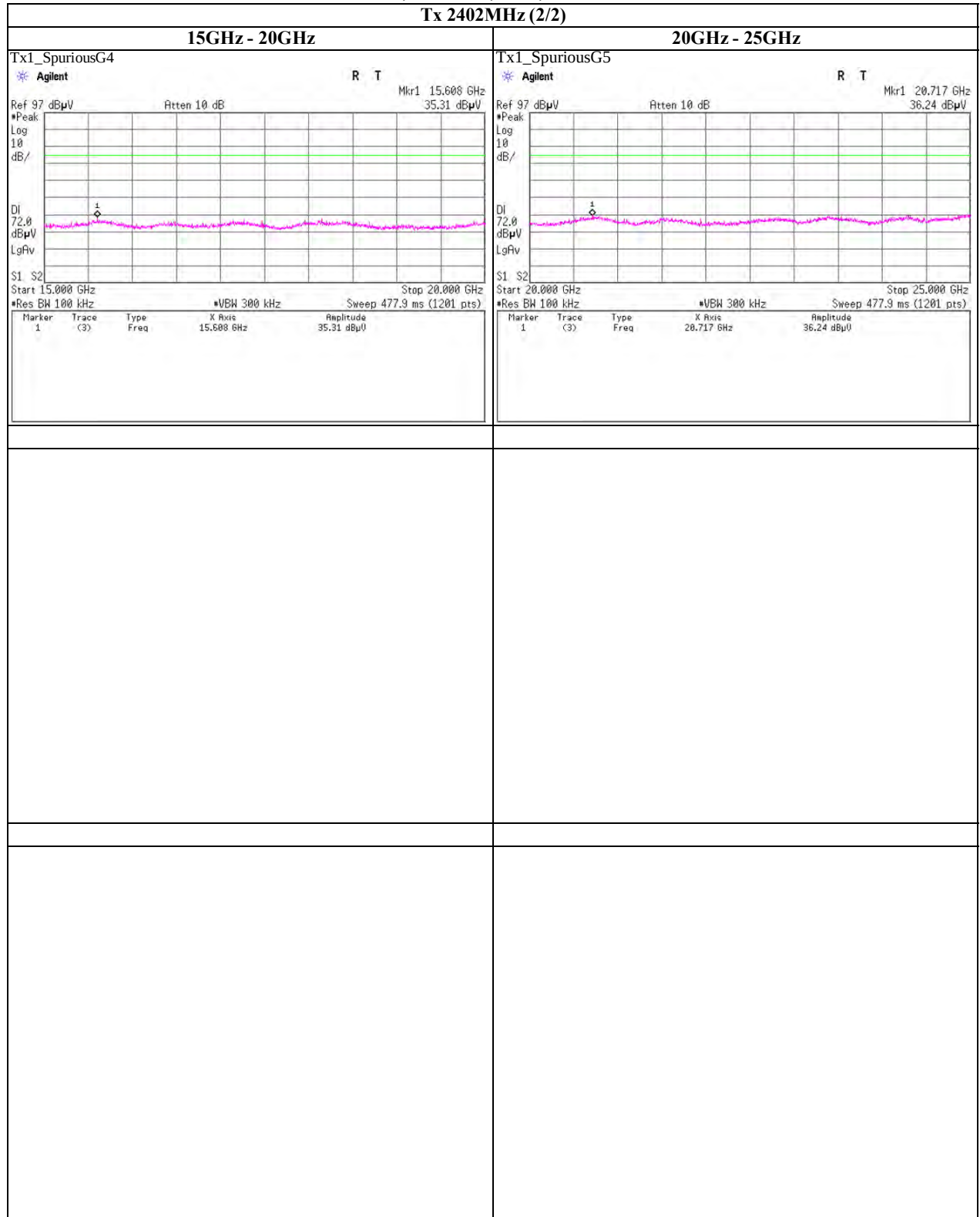
**UL Japan, Inc.****Shonan EMC Lab.**

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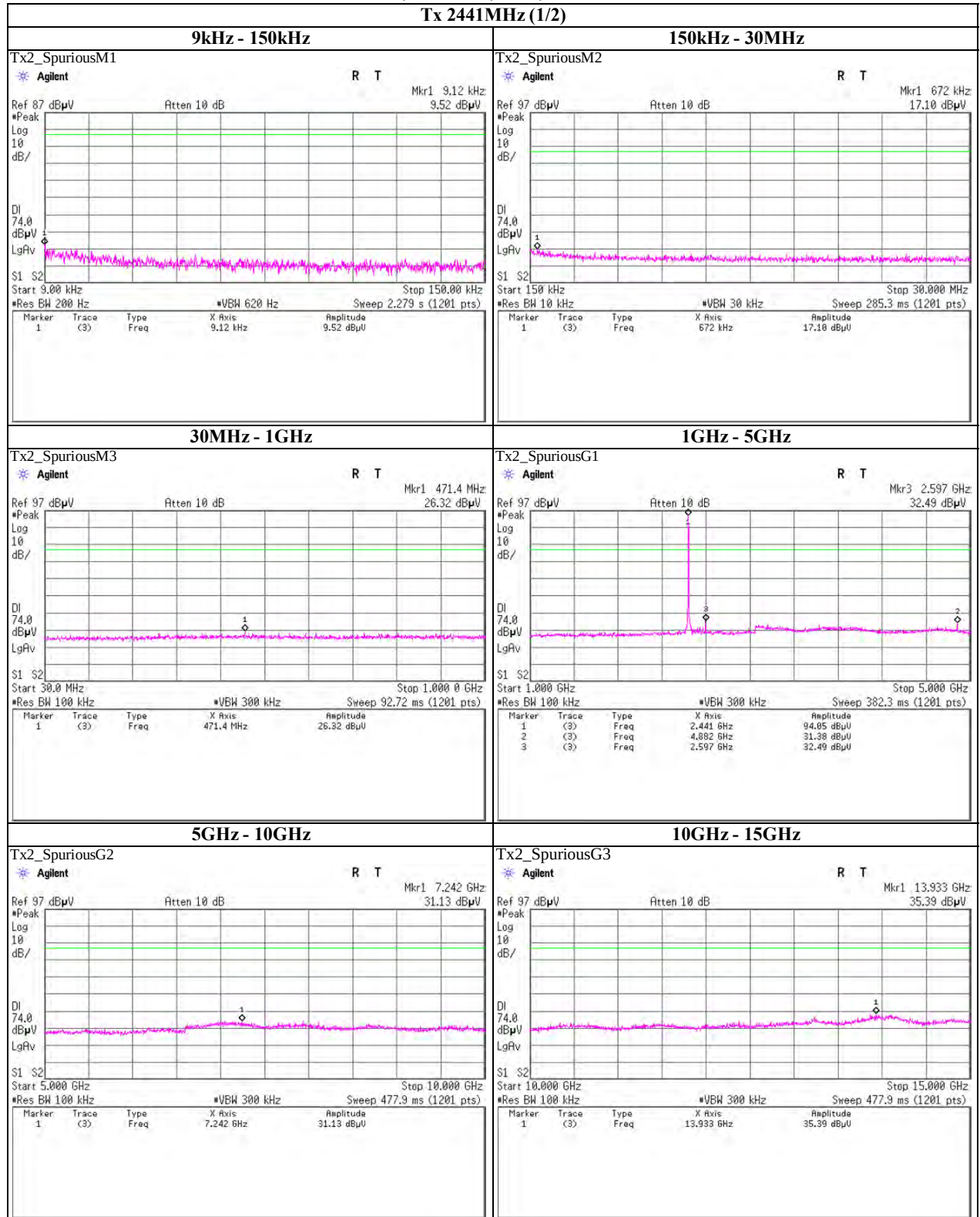
Spurious emission (Conducted)**Tx, Bluetooth, EDR, PRBS9****Tx 2402MHz (1/2)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

Spurious emission (Conducted)**Tx, Bluetooth, EDR, PRBS9****Tx 2402MHz (2/2)****UL Japan, Inc.****Shonan EMC Lab.**

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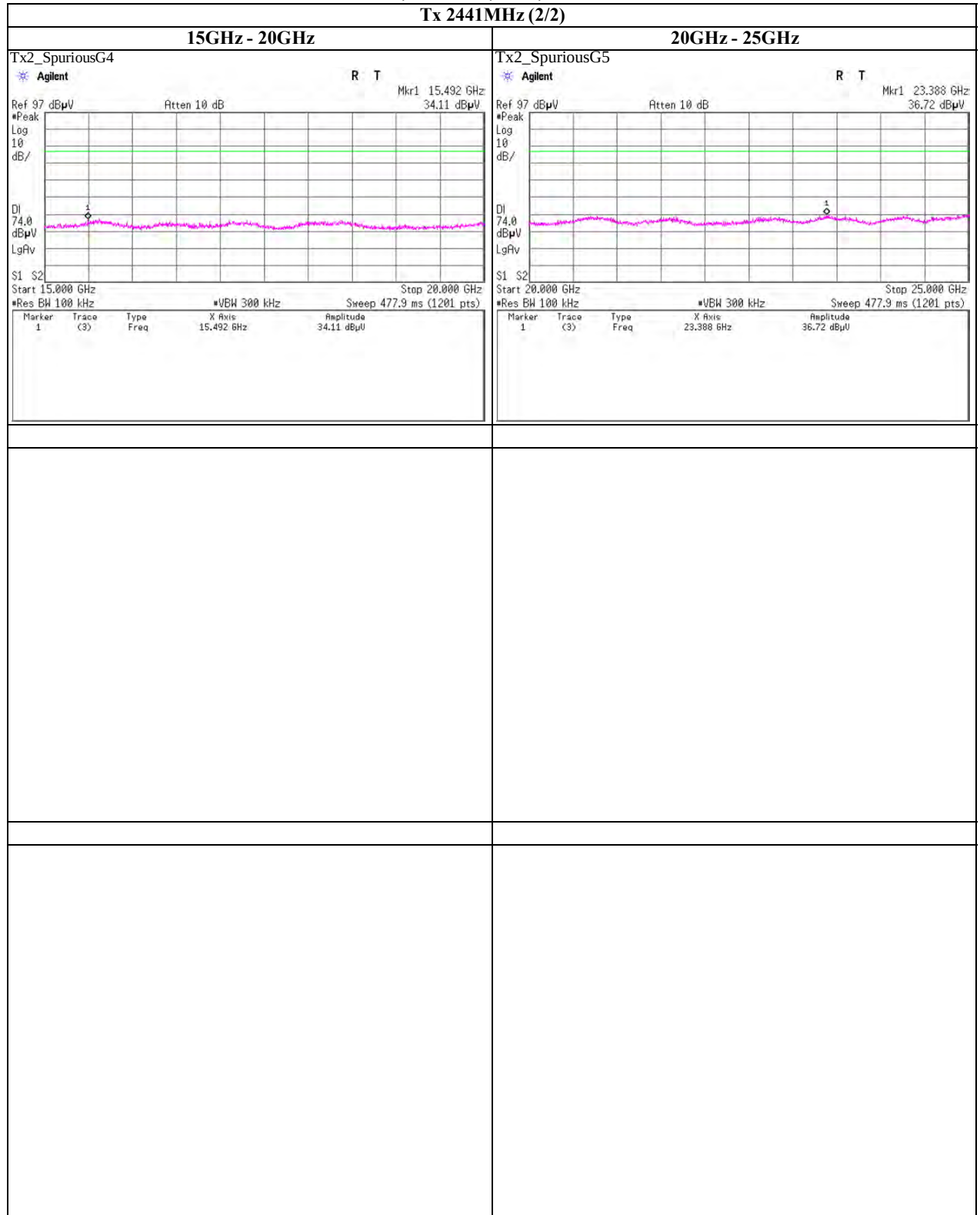
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Tx, Bluetooth, EDR, PRBS9****Tx 2441MHz (1/2)****UL Japan, Inc.****Shonan EMC Lab.****1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN****Telephone : +81 463 50 6400****Facsimile : +81 463 50 6401**

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

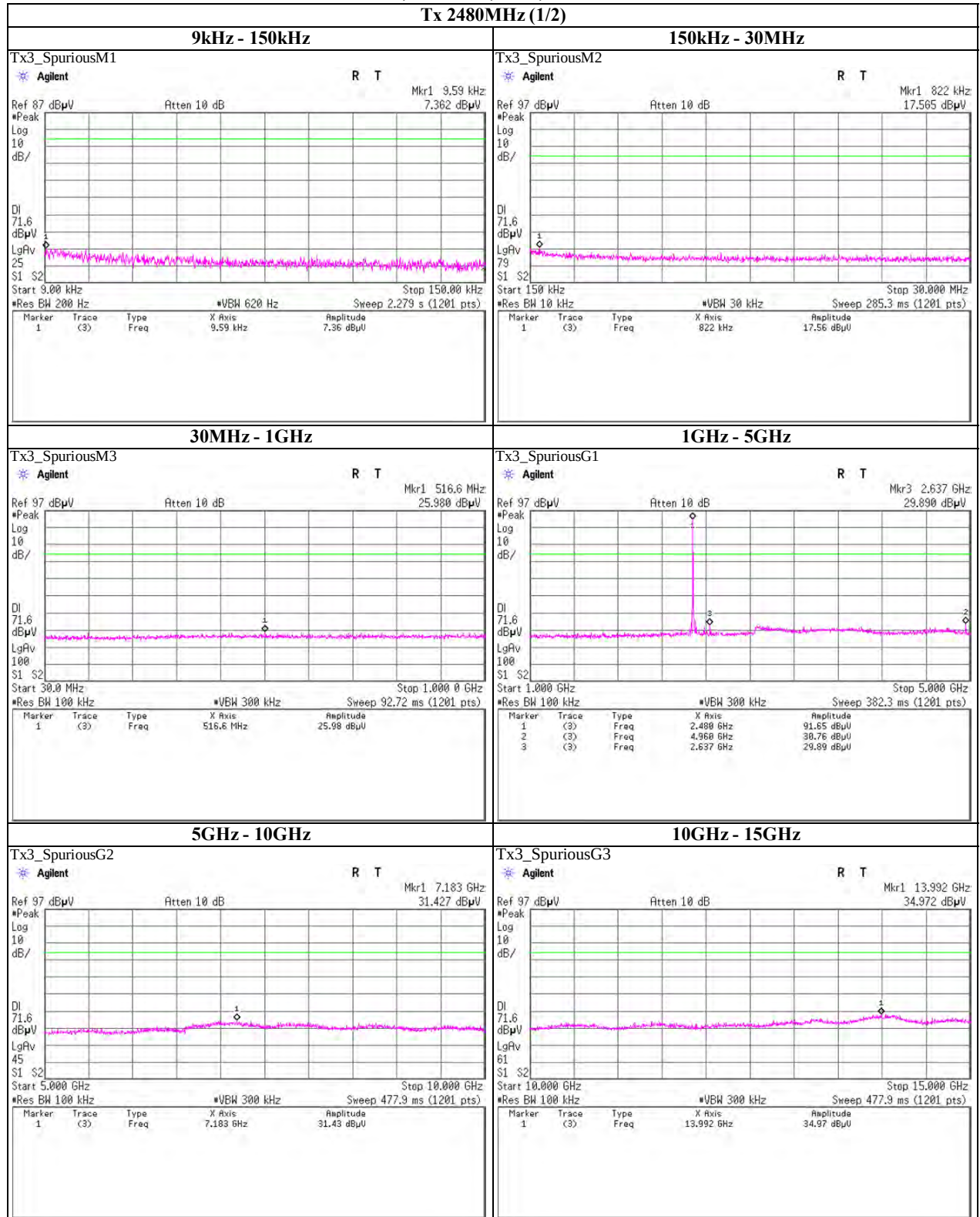
Tx 2441MHz (2/2)

**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 (1/2)****UL Japan, Inc.****Shonan EMC Lab.**

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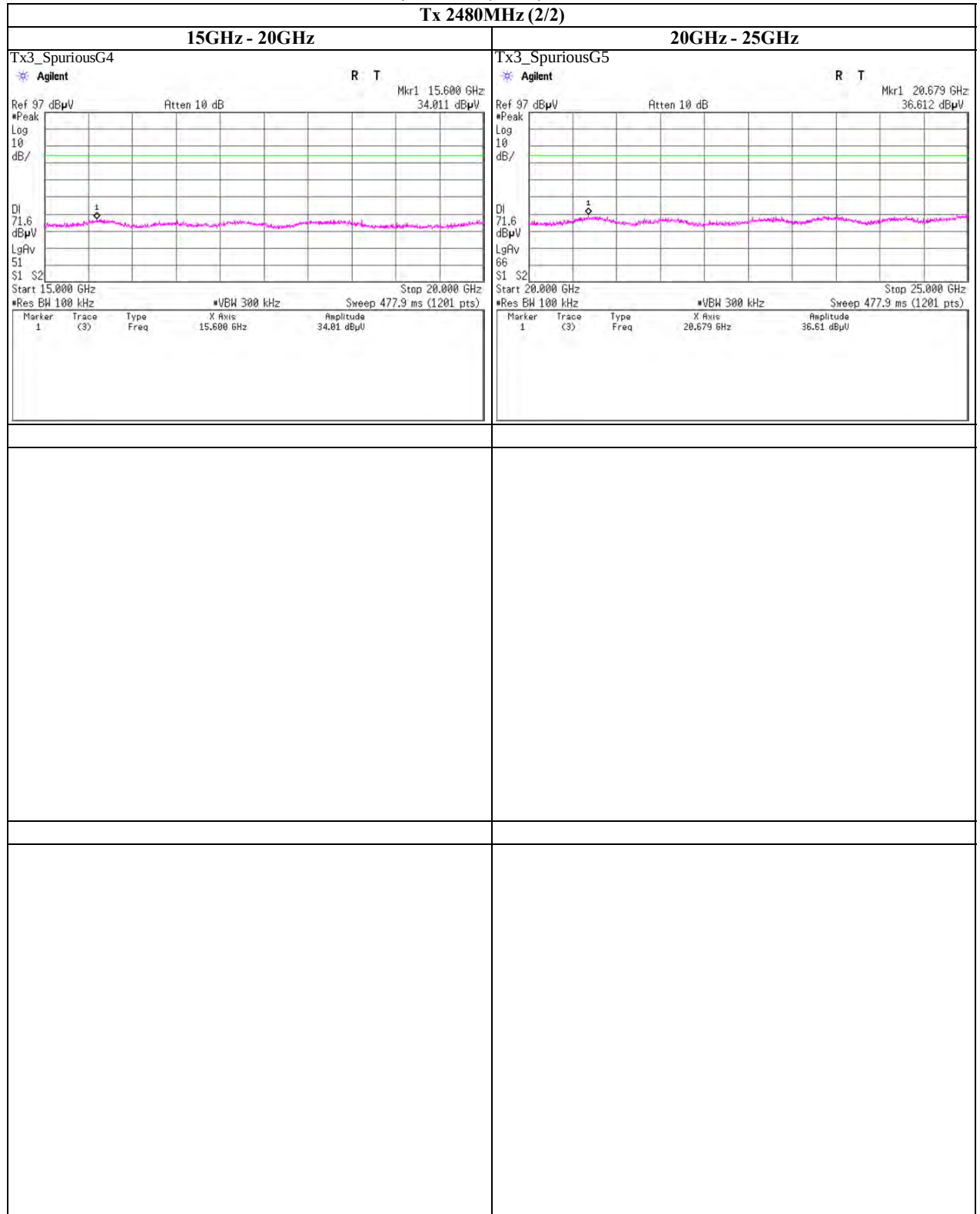
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

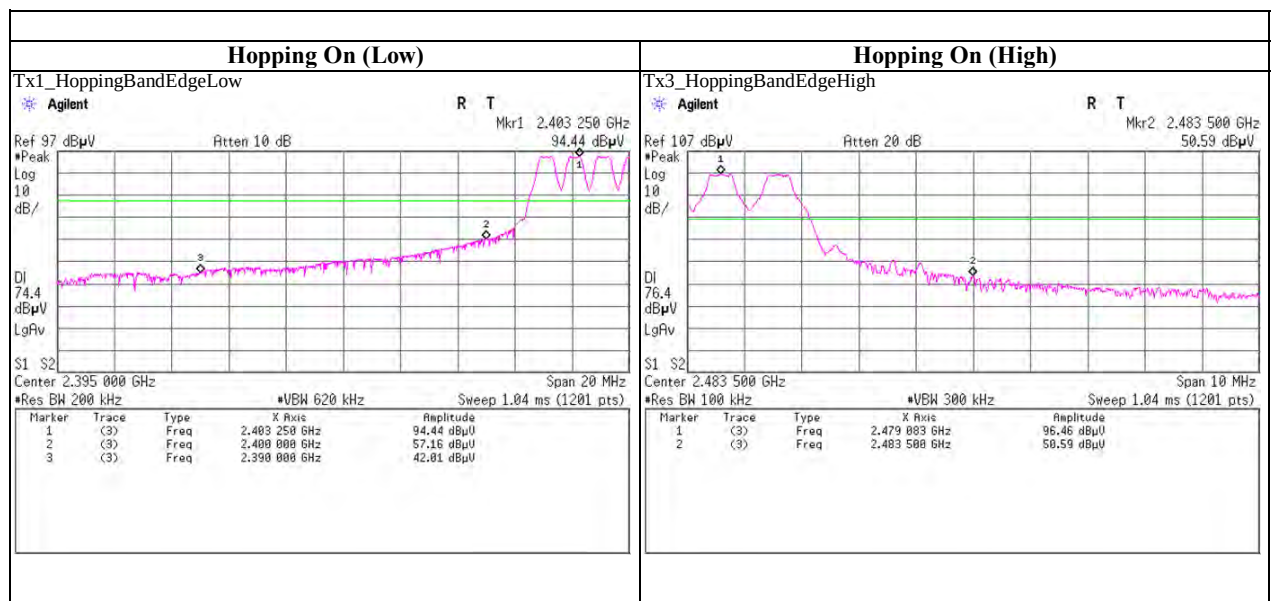
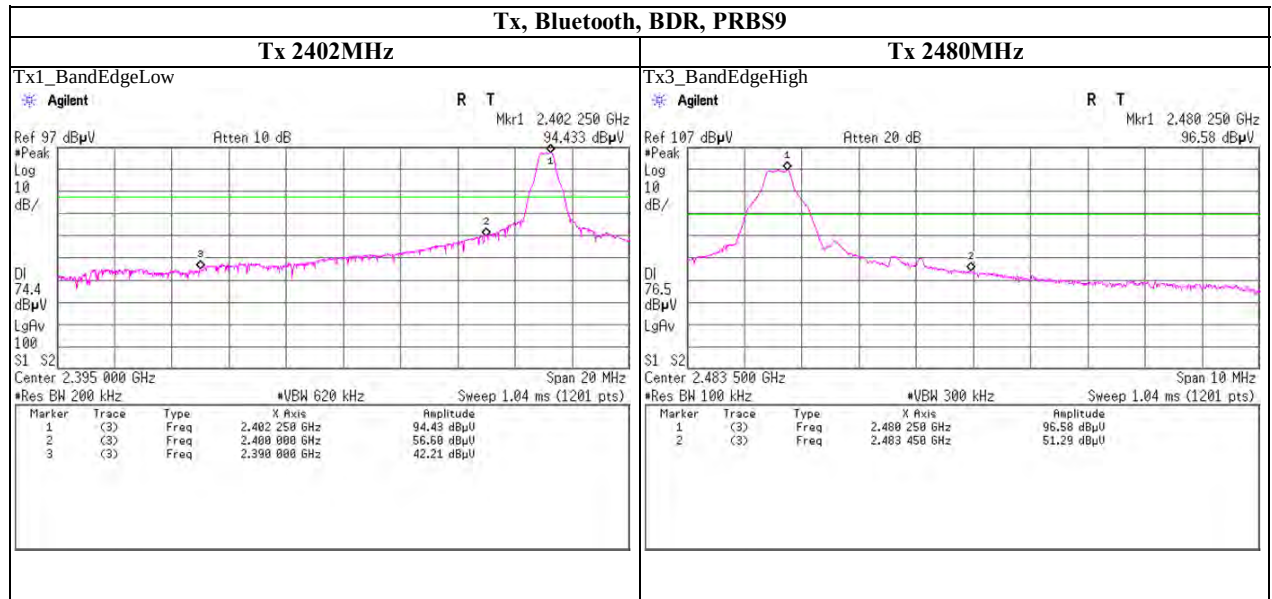
Tx 2480MHz (2/2)

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

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Telephone : +81 463 50 6400

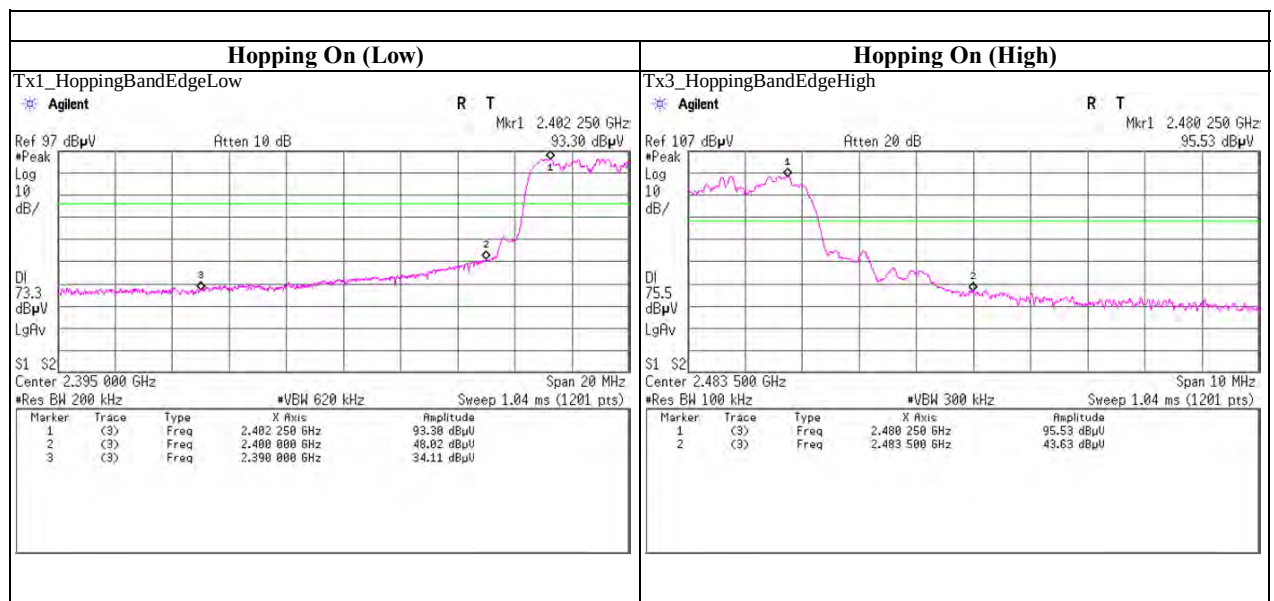
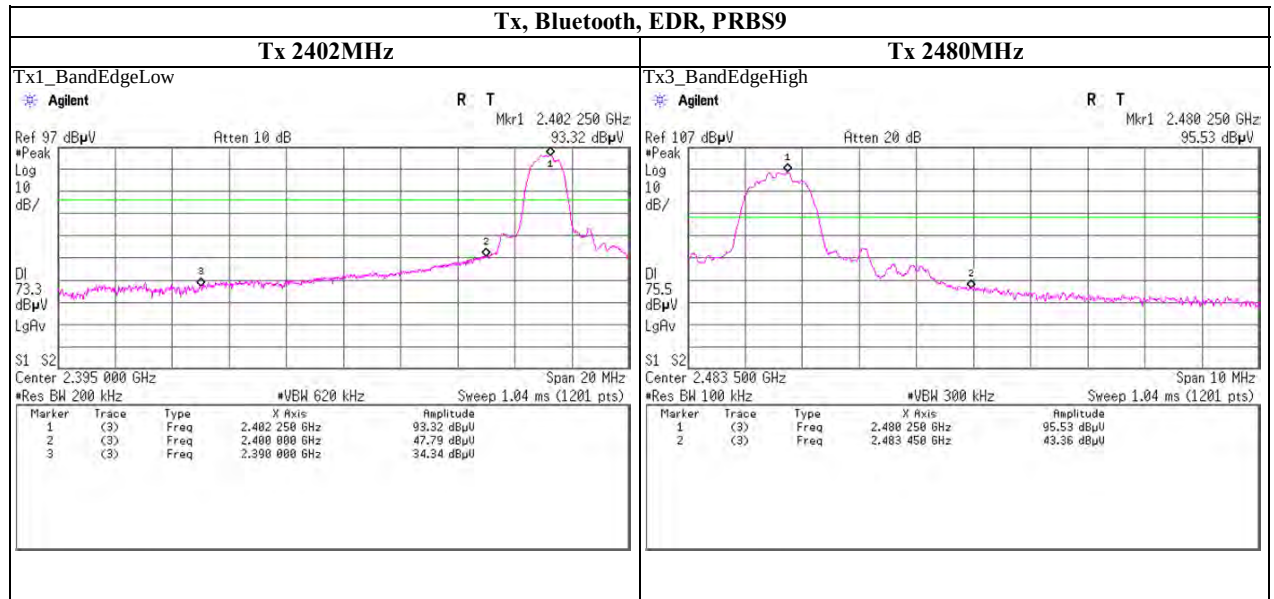
Facsimile : +81 463 50 6401

Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

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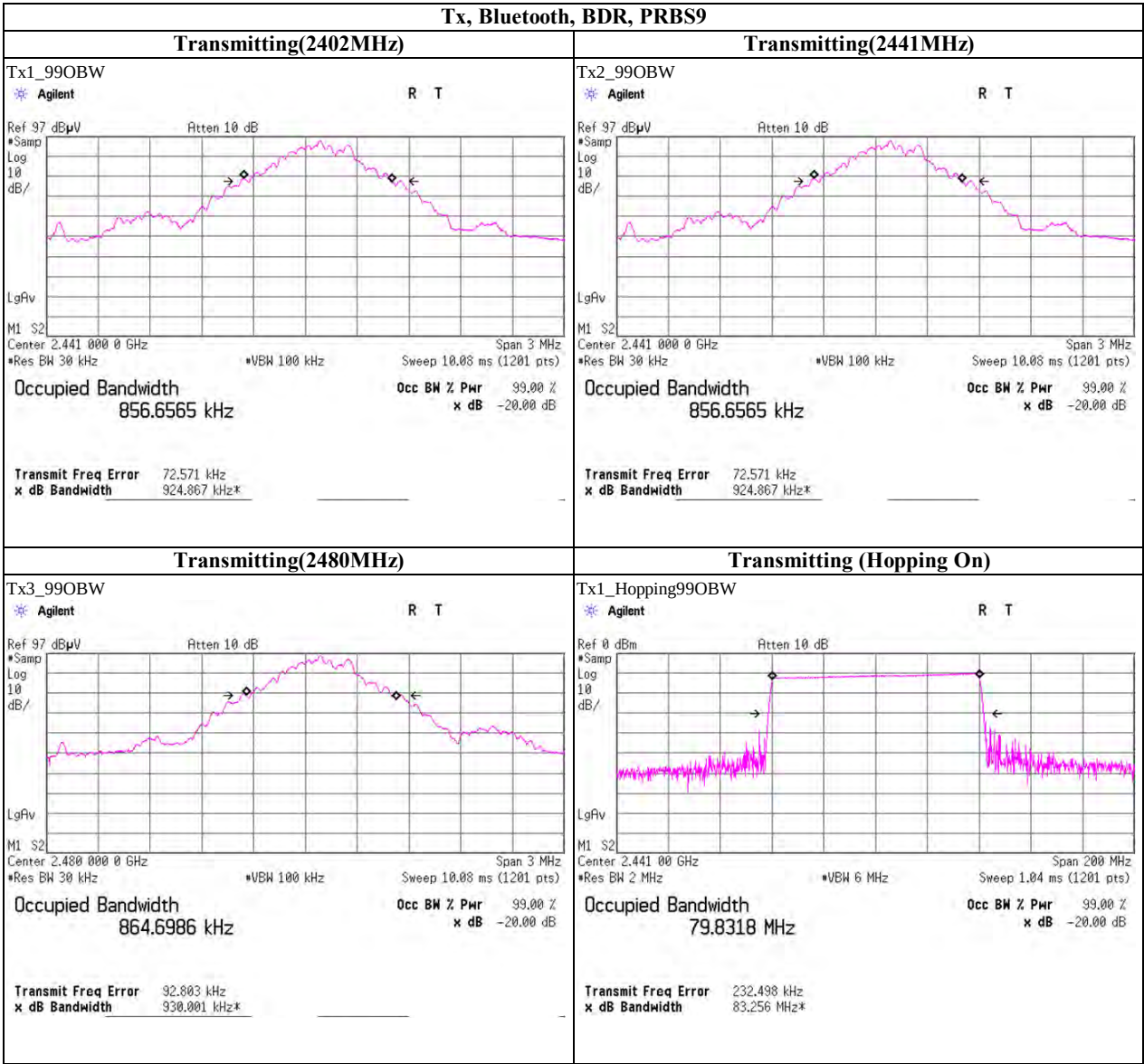
Spurious emission (Conducted)**Band Edge compliance****UL Japan, Inc.****Shonan EMC Lab.**

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

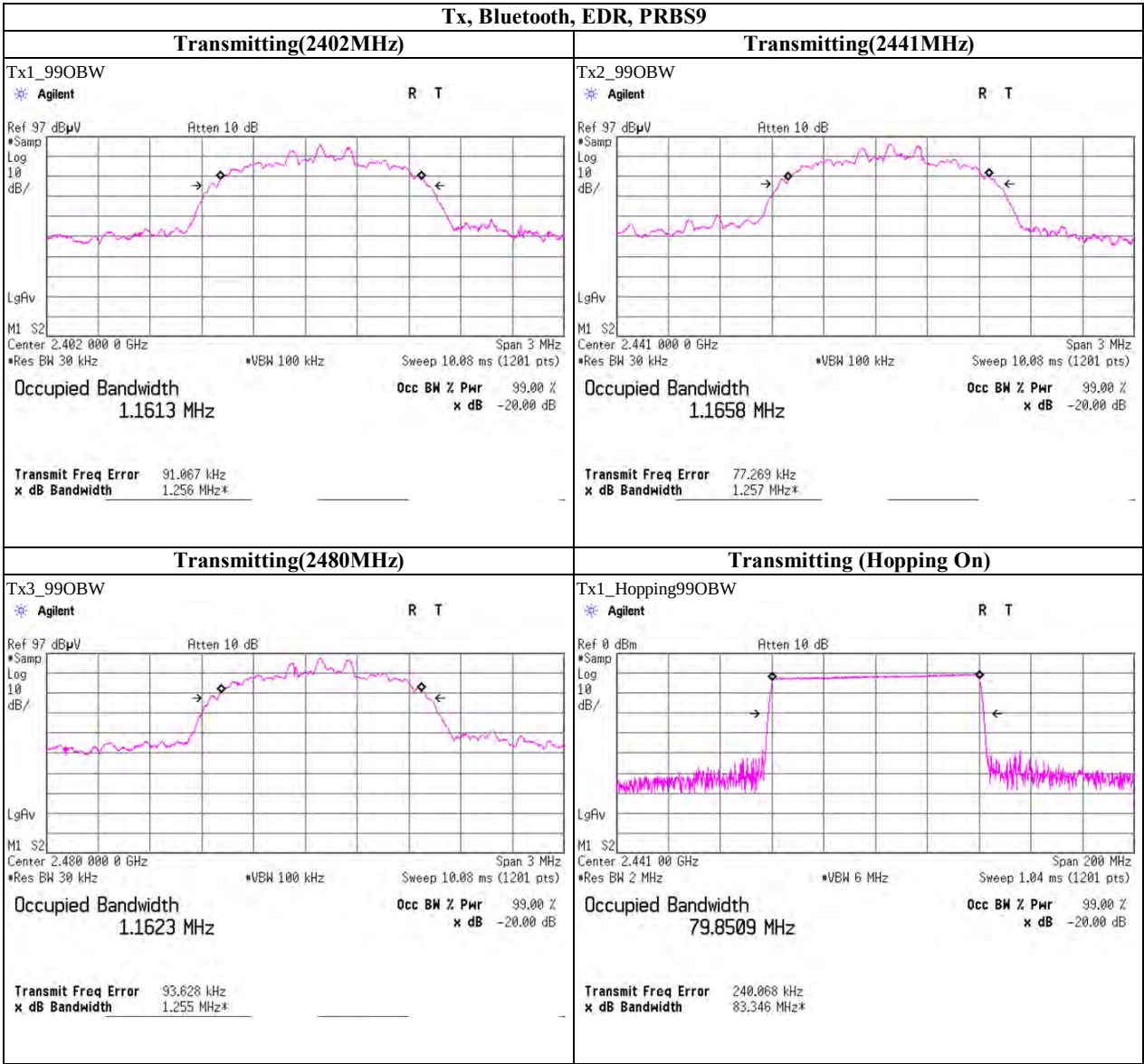
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99% Occupied Bandwidth



99% Occupied Bandwidth



APPENDIX 3 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2011/03/07 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2010/11/16 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2011/03/23 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2010/11/24 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2011/03/02 * 12
KPM-08	Power meter	Anritsu	ML2495A	6K00003356	AT	2010/09/22 * 12
KPSS-04	Power sensor	Anritsu	MA2411B	012088	AT	2010/09/22 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,LMF)	-	RE	-
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2011/02/17 * 12
SAT6-01	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2011/02/17 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2010/10/11 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2010/04/02 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2010/04/02 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2010/10/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2011/02/23 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2010/10/29 * 12
SJM-12	Measure	PROMART	SEN1935	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2010/09/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2010/08/08 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2011/03/23 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2010/04/16 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2010/05/25 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2011/03/16 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2011/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2011/03/16 * 12
KFL-01	Highpass Filter	Hewlett Packard	84300 80038	004	RE	2010/04/22 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/03/23 * 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 traceable calibrations . Each calibration is traceable to the national or international standards .

Test Item :

RE: Radiated emission ,

AT: Antenna terminal disturbance voltage