

## APPENDIX 1: Data of EMI test

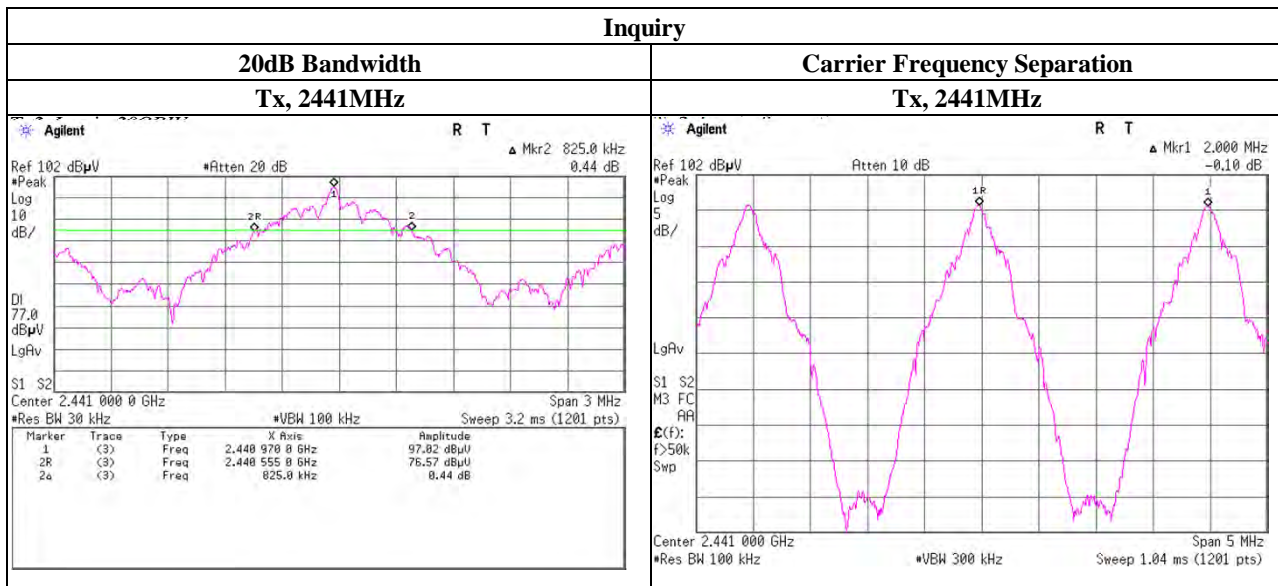
### 20dB Bandwidth and Carrier Frequency Separation

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : November 28, 2011  
 Temperature / Humidity : 25deg.C , 36%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	0.943	1.003	>= 0.628
DH5	2441.0	0.948	1.003	>= 0.632
DH5	2480.0	0.945	1.003	>= 0.630
Inquiry	2441.0	0.825	2.000	>= 0.550

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

No limit applies to 20dB Bandwidth.



**UL Japan, Inc.**

**Shonan EMC Lab.**

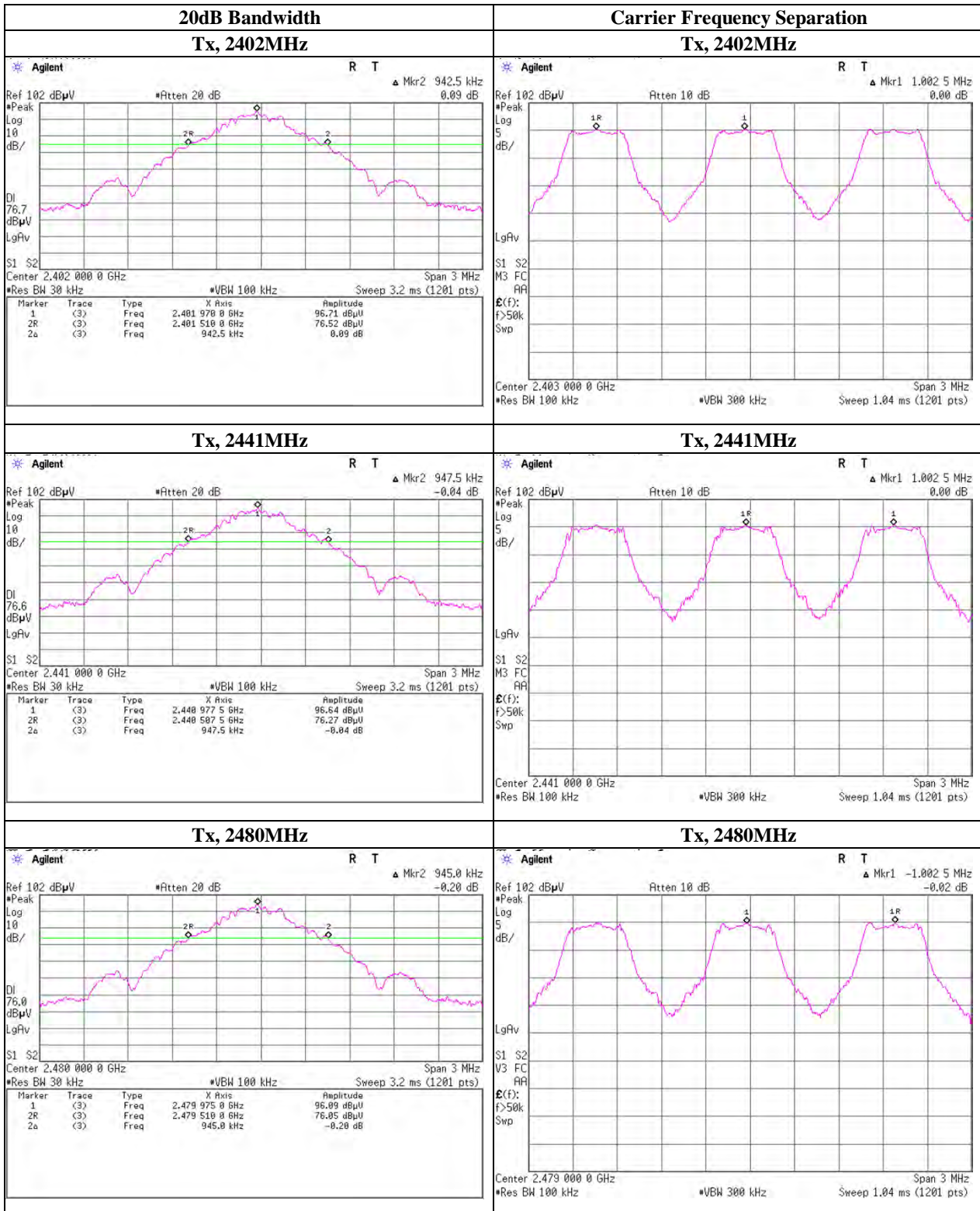
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## 20dB Bandwidth and Carrier Frequency Separation

### Tx, Bluetooth, BDR, PRBS9



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## 20dB Bandwidth and Carrier Frequency Separation

Test place                   UL Japan, Inc. Shonan EMC Lab.    No.5 Shielded Room  
Date                         November 28, 2011  
Temperature / Humidity    25deg.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	1.295	1.003	>= 0.863
3-DH5	2441.0	1.300	1.003	>= 0.867
3-DH5	2480.0	1.303	0.998	>= 0.868

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

No limit applies to 20dB Bandwidth.

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**UL Japan, Inc.**

**Shonan EMC Lab.**

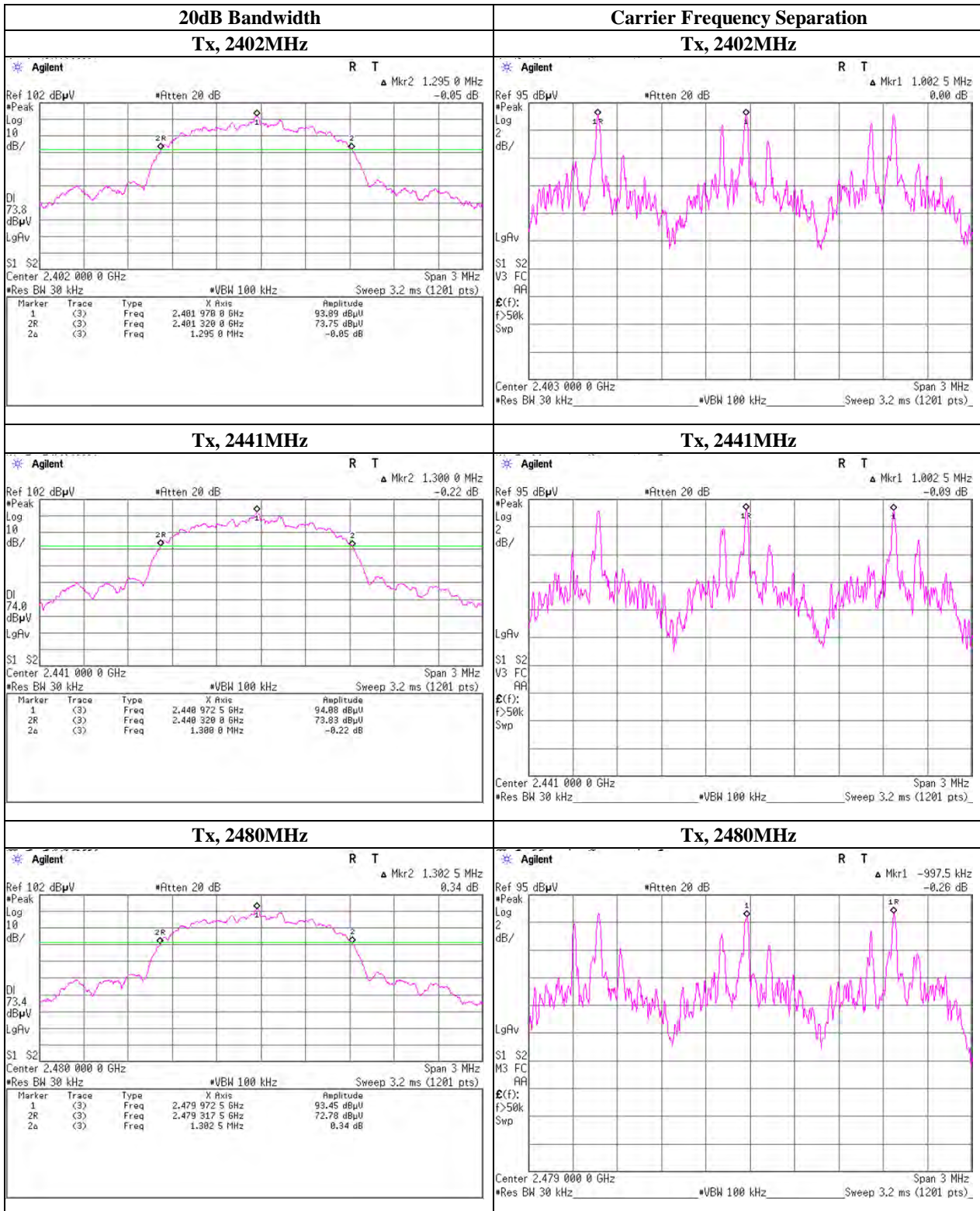
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## 20dB Bandwidth and Carrier Frequency Separation

### Tx, Bluetooth, EDR, PRBS9



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

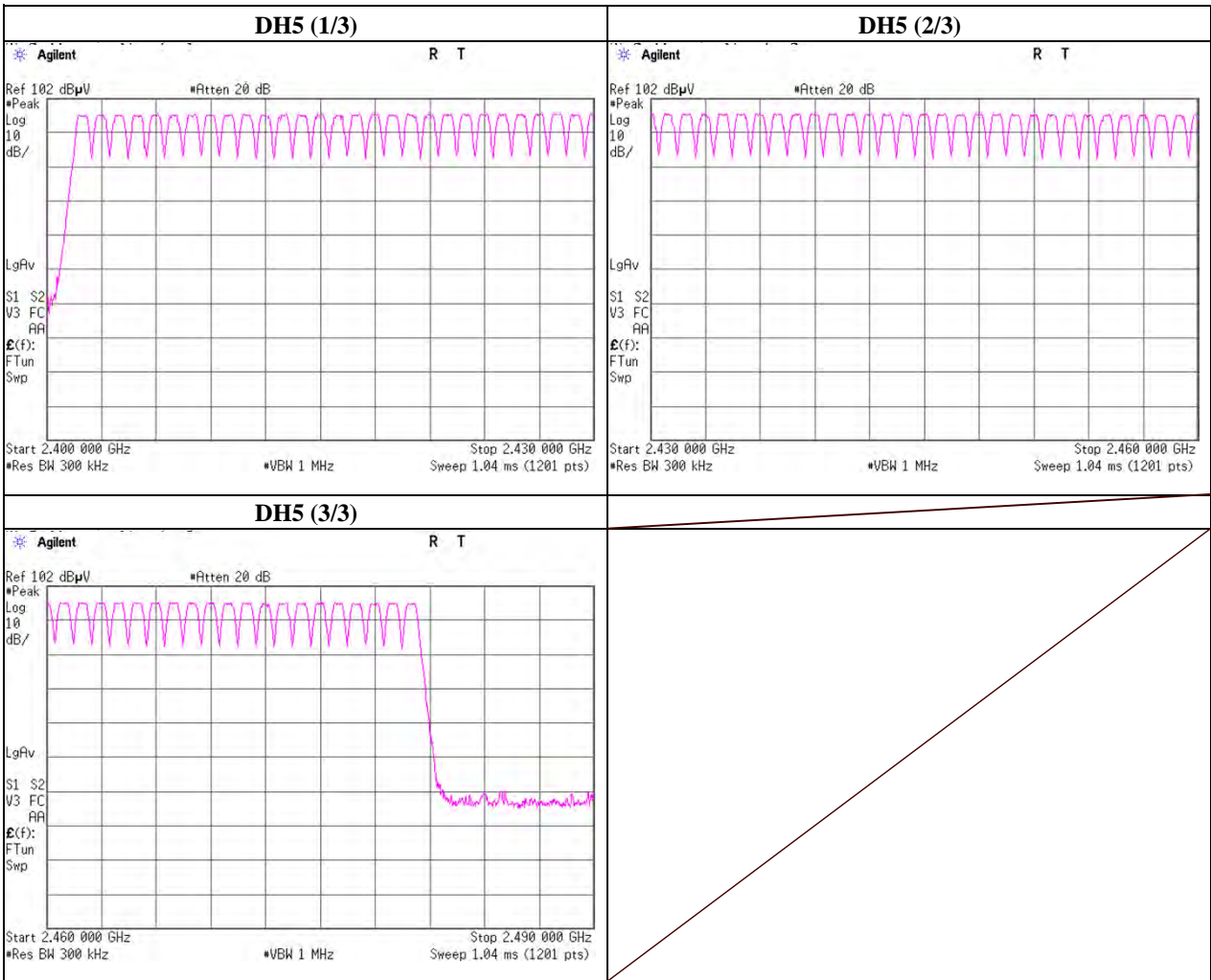
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**Number of Hopping Frequency**

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : November 28, 2011  
 Temperature / Humidity : 25deg.C , 36%RH  
 Engineer : Akio Hayashi  
 Mode : Tx, Bluetooth, BDR, PRBS9

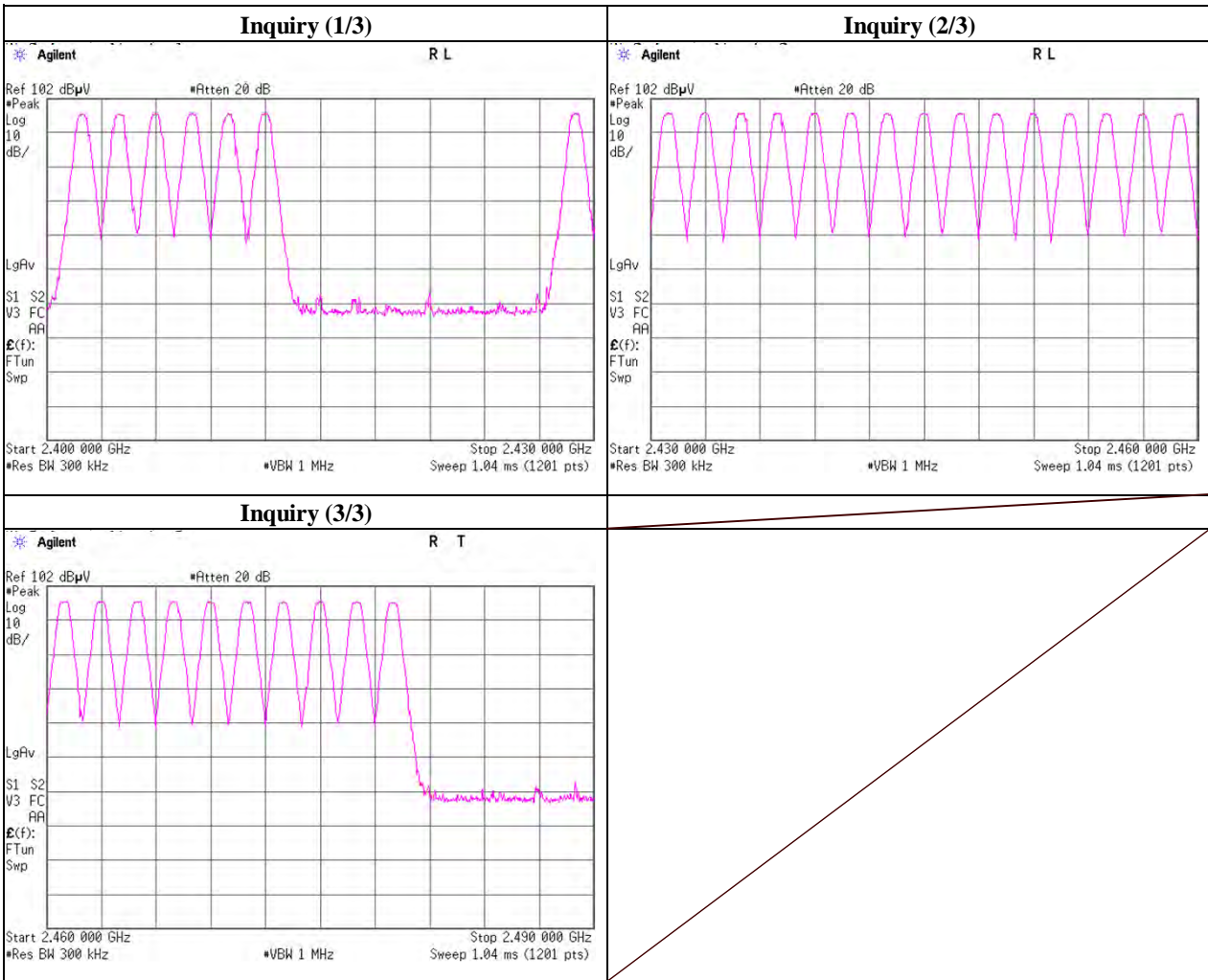
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15



### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.
Date	November 28, 2011
Temperature / Humidity	25deg.C , 36%RH
Engineer	Akio Hayashi
Mode	Tx, Bluetooth, BDR, Inquiry

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



**UL Japan, Inc.**

**Shonan EMC Lab.**

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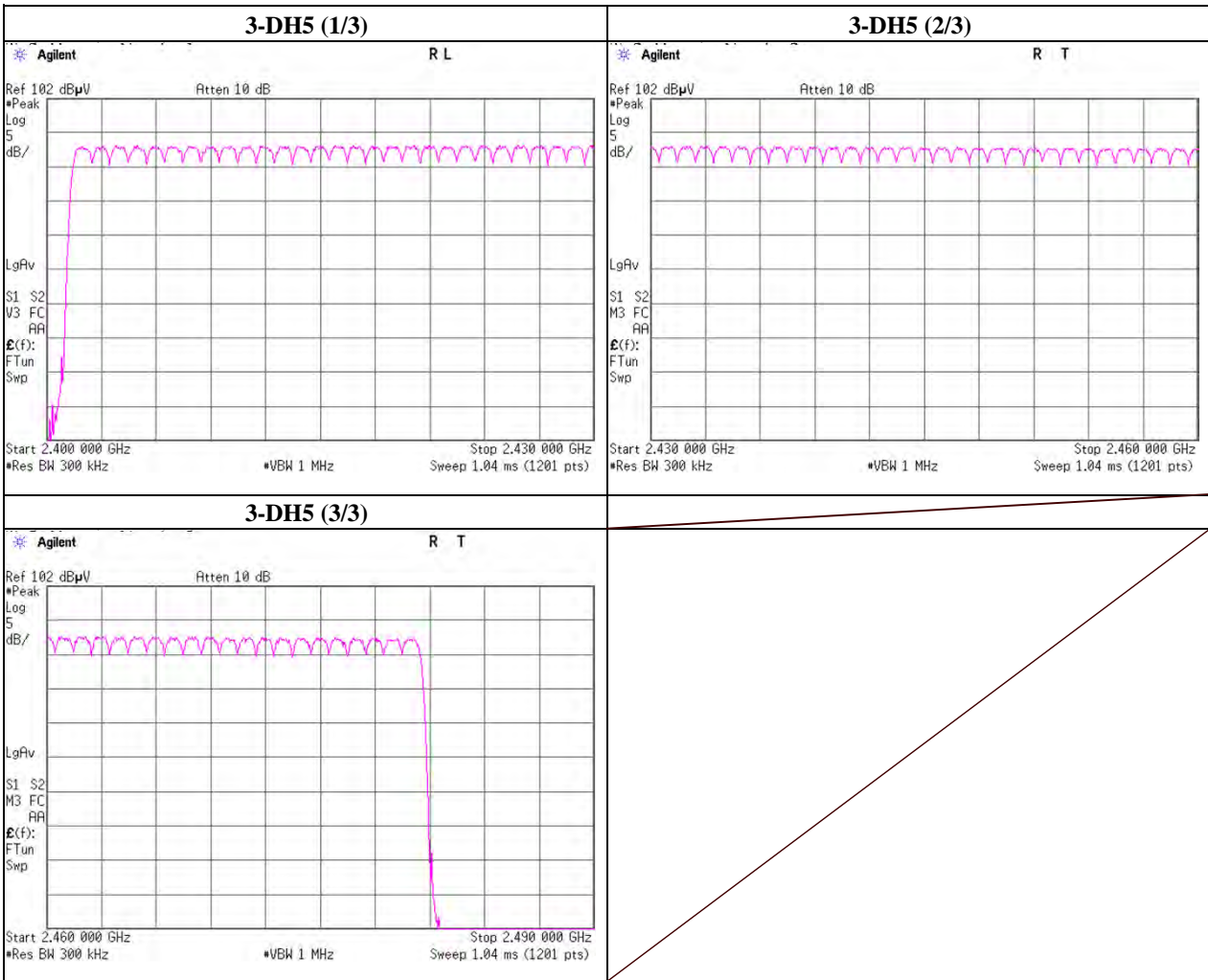
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Facsimile : +81 463 50 6401

### Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.
Date	November 28, 2011
Temperature / Humidity	25deg.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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### Dwell Time

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : November 30, 2011  
 Temperature / Humidity : 26deg.C , 47%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	16.6	/ 5.0 sec. x 31.6 sec. = 105 times	0.397	42	400
DH3	20.0	/ 5.0 sec. x 31.6 sec. = 127 times	1.654	210	400
DH5	17.4	/ 5.0 sec. x 31.6 sec. = 110 times	2.902	319	400
Inquiry	100.0	/ 1.0 sec. x 12.8 sec. = 1280 times	0.099	127	400

Sample Calculation

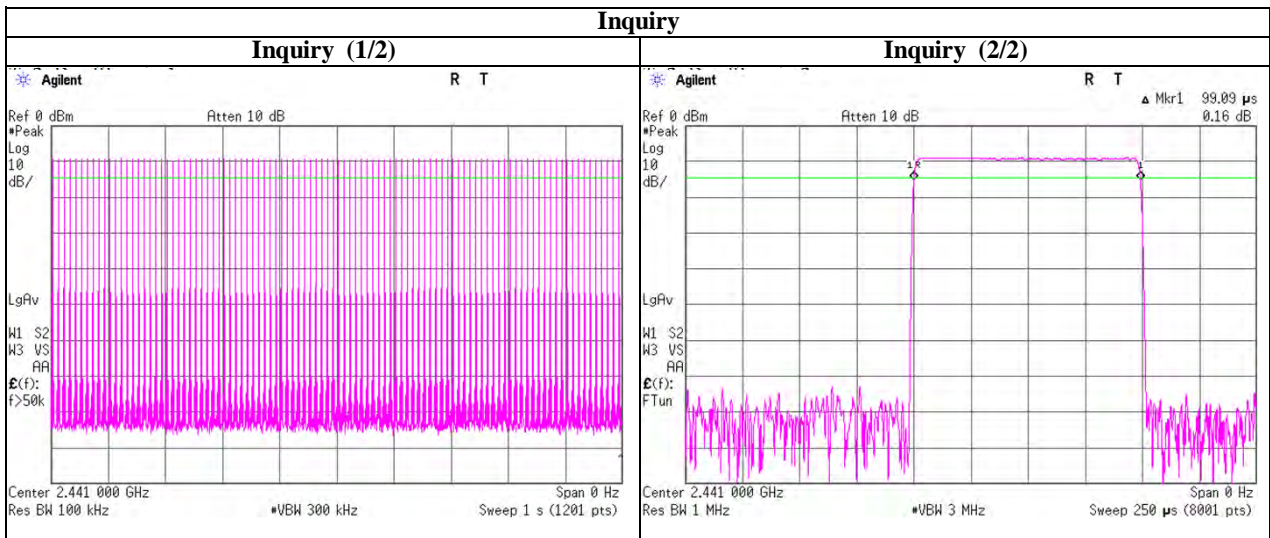
Result = Number of transmission x Length of transmission time

\*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	16	16	17	17	17	16.6
DH3	22	21	19	20	18	20.0
DH5	18	16	20	17	16	17.4

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5



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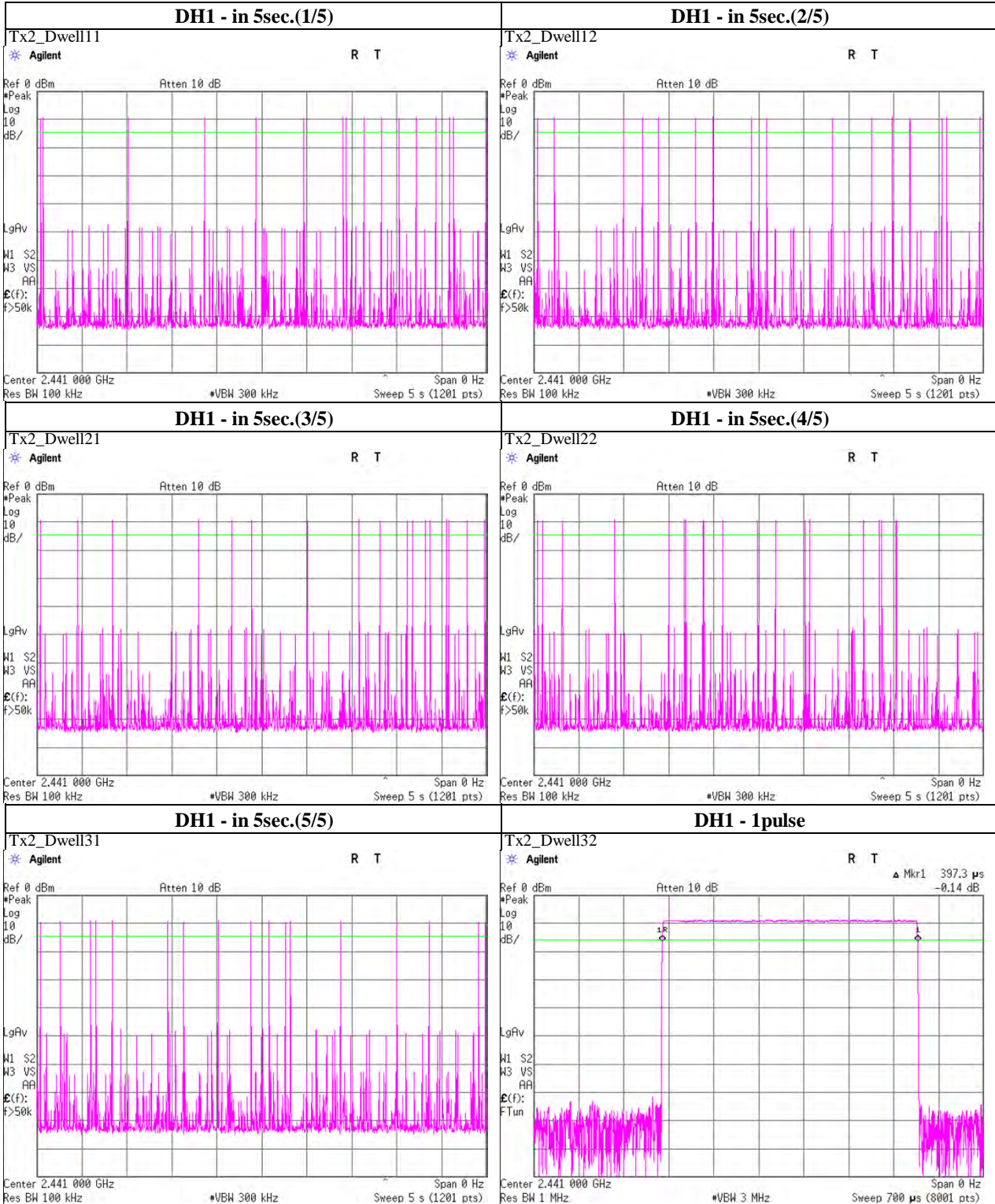
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## Dwell time

### Tx, Bluetooth, BDR, PRBS9



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**Shonan EMC Lab.**

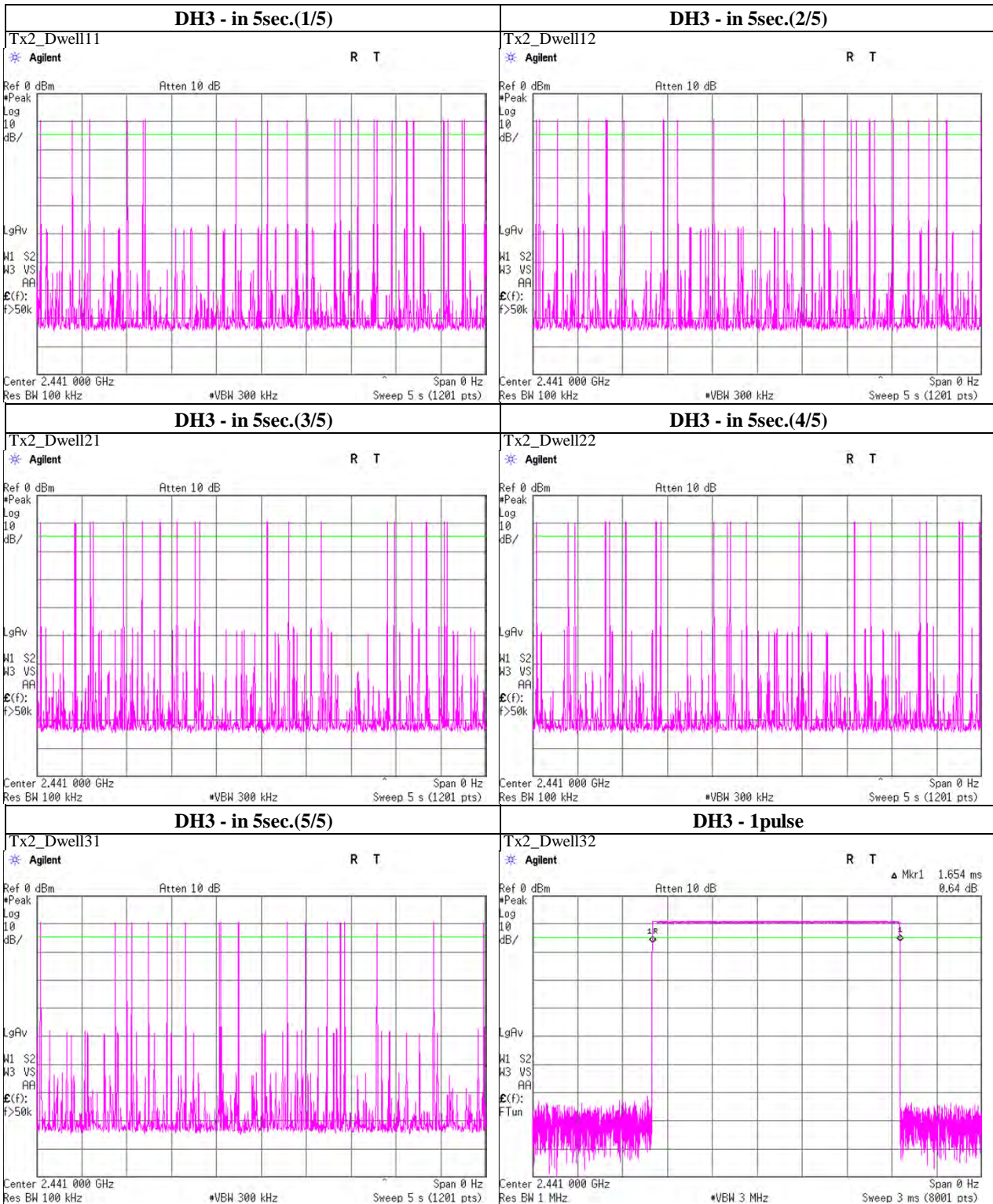
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## Dwell time

### Tx, Bluetooth, BDR, PRBS9



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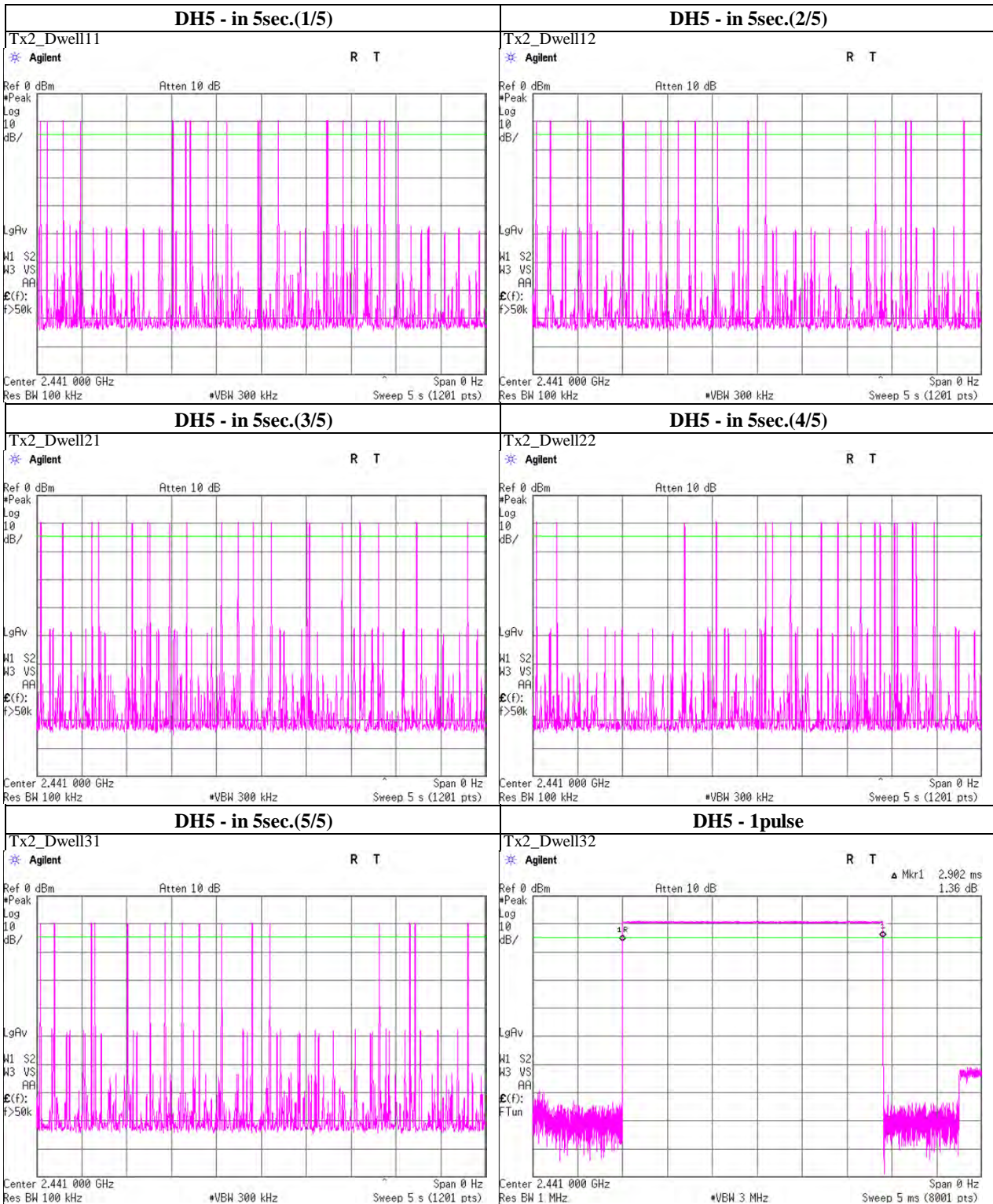
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## Dwell time

### Tx, Bluetooth, BDR, PRBS9



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## Dwell Time

Test place           UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date                 November 30, 2011  
 Temperature / Humidity 26deg.C , 47%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	19.2 / 5.0 sec. x 31.6 sec. = 122 times	0.407	50	400
3-DH3	17.6 / 5.0 sec. x 31.6 sec. = 112 times	1.658	186	400
3-DH5	16.8 / 5.0 sec. x 31.6 sec. = 107 times	2.909	311	400

Sample Calculation

Result = Number of transmission x Length of transmission time

\*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
3-DH1	20	20	19	18	19	19.2
3-DH3	16	16	16	20	20	17.6
3-DH5	16	16	18	15	19	16.8

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

**UL Japan, Inc.**

**Shonan EMC Lab.**

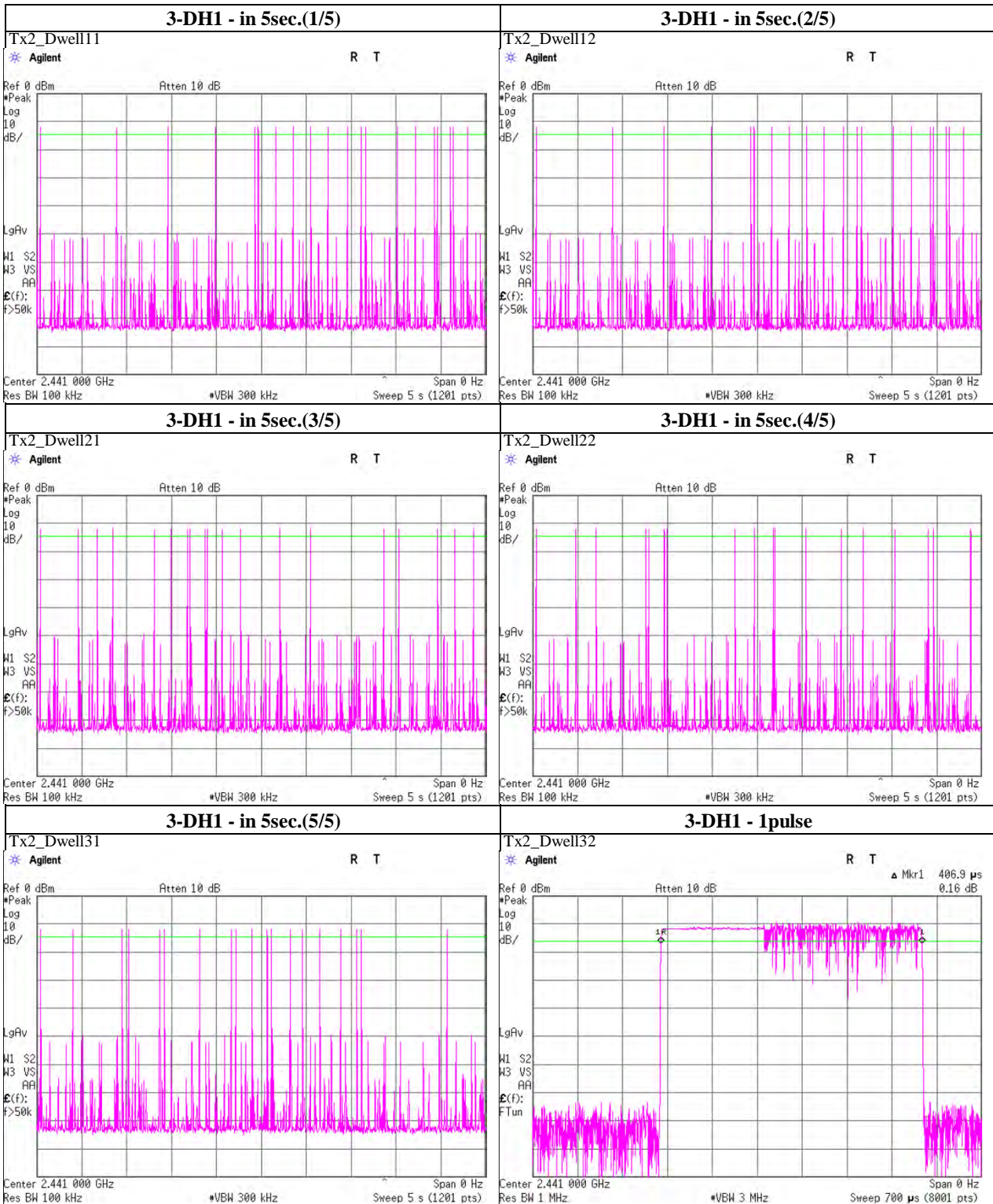
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## Dwell time

### Tx, Bluetooth, EDR, PRBS9



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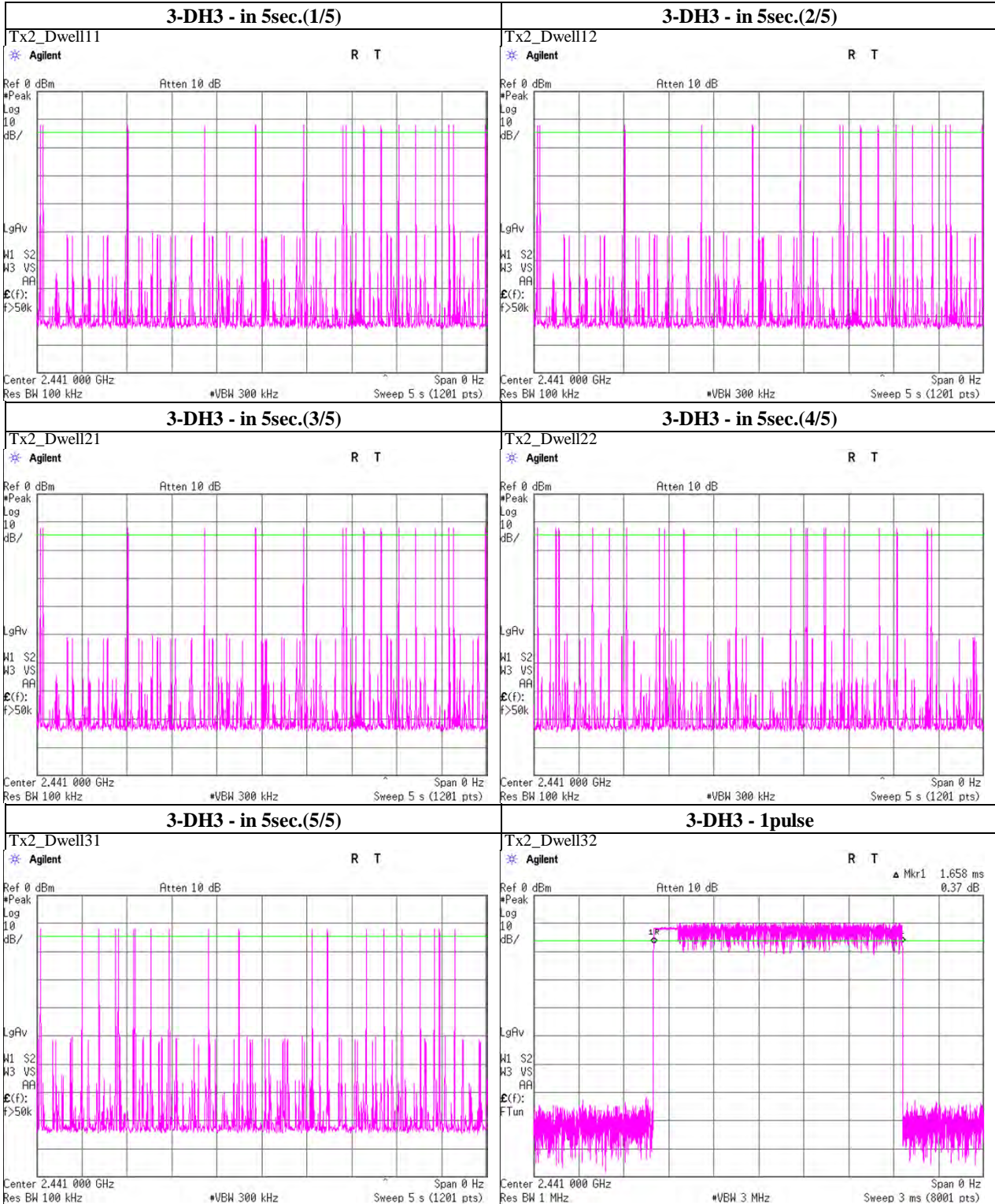
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## Dwell time

### Tx, Bluetooth, EDR, PRBS9



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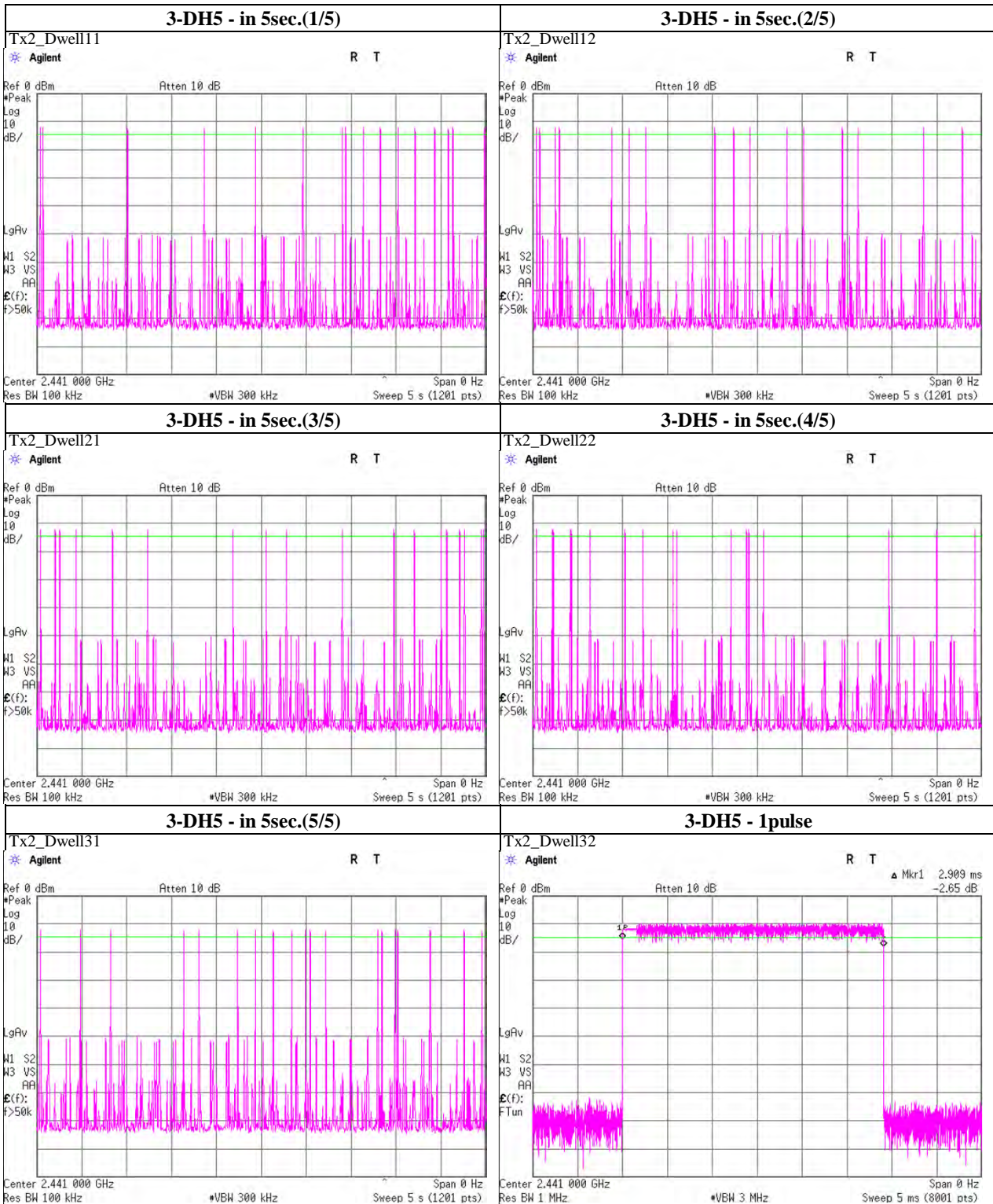
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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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                         November 28, 2011  
 Temperature / Humidity   25deg.C , 36%RH  
 Engineer                   Akio Hayashi  
 Mode                        Tx, Bluetooth, BDR (Worst: DH5)

(\* 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	-9.54	1.38	9.87	1.71	1.48	20.97	125	19.26
DH5	2441.0	-9.38	1.39	9.87	1.88	1.54	20.97	125	19.09
DH5	2480.0	-9.84	1.40	9.87	1.43	1.39	20.97	125	19.54
2-DH5	2402.0	-10.09	1.38	9.87	1.16	1.30	20.97	125	19.81
2-DH5	2441.0	-9.87	1.39	9.87	1.39	1.38	20.97	125	19.58
2-DH5	2480.0	-10.38	1.40	9.87	0.89	1.23	20.97	125	20.08
3-DH5	2402.0	-9.64	1.38	9.87	1.61	1.45	20.97	125	19.36
3-DH5	2441.0	-9.49	1.39	9.87	1.77	1.50	20.97	125	19.20
3-DH5	2480.0	-9.84	1.40	9.87	1.43	1.39	20.97	125	19.54

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 28, 2011                   November 28, 2011  
 Temperature / Humidity   22deg.C , 33%RH                   22deg.C , 33%RH  
 Engineer                  Shinichi Takano                    Hikaru Shirasawa  
 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.	152.403	QP	49.2	14.9	7.6	32.1	39.6	43.5	3.9	295	273	
Hori.	208.843	QP	47.3	16.2	8.0	32.0	39.5	43.5	4.0	149	89	
Hori.	231.430	QP	47.3	16.7	8.2	32.0	40.2	46.0	5.8	142	302	
Hori.	623.965	QP	25.4	19.4	9.9	31.9	22.8	46.0	23.2	102	63	
Hori.	1799.598	PK	54.0	25.8	13.3	41.0	52.1	73.9	21.8	100	272	
Hori.	2349.970	PK	45.6	27.1	13.7	41.1	45.3	73.9	28.6	124	143	
Hori.	2376.020	PK	47.7	27.2	13.8	41.1	47.6	73.9	26.3	124	143	
Hori.	2390.000	PK	46.1	27.2	13.8	41.1	46.0	73.9	27.9	124	143	
Hori.	2400.000	PK	48.6	27.3	13.8	41.1	48.6	73.9	25.3	124	143	
Hori.	4318.585	PK	53.0	30.3	5.8	41.6	47.5	73.9	26.4	102	234	
Hori.	4804.000	PK	52.5	31.1	6.0	41.1	48.5	73.9	25.4	100	166	
Hori.	7206.000	PK	47.9	36.5	7.4	41.3	50.5	73.9	23.4	100	0	
Hori.	9608.000	PK	45.4	38.2	8.7	38.8	53.5	73.9	20.4	100	0	
Hori.	12010.000	PK	46.3	39.3	10.2	39.2	56.6	73.9	17.3	100	0	
Hori.	1799.598	AV	47.9	25.8	13.3	41.0	46.0	53.9	7.9	100	272	VBW:10Hz
Hori.	2349.970	AV	36.0	27.1	13.7	41.1	35.7	53.9	18.2	124	143	VBW:270Hz
Hori.	2376.020	AV	35.6	27.2	13.8	41.1	35.5	53.9	18.4	124	143	VBW:270Hz
Hori.	2390.000	AV	35.6	27.2	13.8	41.1	35.5	53.9	18.4	124	143	VBW:270Hz
Hori.	2400.000	AV	38.4	27.3	13.8	41.1	38.4	53.9	15.5	124	143	VBW:270Hz
Hori.	4318.585	AV	46.0	30.3	5.8	41.6	40.5	53.9	13.4	102	234	VBW:10Hz
Hori.	4804.000	AV	46.0	31.1	6.0	41.1	42.0	53.9	11.9	100	166	VBW:270Hz
Hori.	7206.000	AV	37.6	36.5	7.4	41.3	40.2	53.9	13.7	100	0	VBW:270Hz
Hori.	9608.000	AV	35.0	38.2	8.7	38.8	43.1	53.9	10.8	100	0	VBW:270Hz
Hori.	12010.000	AV	36.4	39.3	10.2	39.2	46.7	53.9	7.2	100	0	VBW:270Hz
Vert.	74.443	QP	48.7	6.4	7.0	32.1	30.0	40.0	10.0	100	90	
Vert.	623.993	QP	28.8	19.4	9.9	31.9	26.2	46.0	19.8	118	358	
Vert.	699.990	QP	38.1	20.5	10.1	31.8	36.9	46.0	9.1	100	0	
Vert.	2349.970	PK	45.9	27.1	13.7	41.1	45.6	73.9	28.3	100	195	
Vert.	2376.020	PK	46.0	27.2	13.8	41.1	45.9	73.9	28.0	100	195	
Vert.	2390.000	PK	46.9	27.2	13.8	41.1	46.8	73.9	27.1	100	195	
Vert.	2400.000	PK	49.1	27.3	13.8	41.1	49.1	73.9	24.8	100	195	
Vert.	4804.000	PK	53.1	31.1	6.0	41.1	49.1	73.9	24.8	100	216	
Vert.	7206.000	PK	47.0	36.5	7.4	41.3	49.6	73.9	24.3	100	0	
Vert.	9608.000	PK	45.0	38.2	8.7	38.8	53.1	73.9	20.8	100	0	
Vert.	12010.000	PK	46.0	39.3	10.2	39.2	56.3	73.9	17.6	100	0	
Vert.	2349.970	AV	35.8	27.1	13.7	41.1	35.5	53.9	18.4	100	195	VBW:10Hz
Vert.	2376.020	AV	36.4	27.2	13.8	41.1	36.3	53.9	17.6	100	195	VBW:270Hz
Vert.	2390.000	AV	35.6	27.2	13.8	41.1	35.5	53.9	18.4	100	195	VBW:270Hz
Vert.	2400.000	AV	38.3	27.3	13.8	41.1	38.3	53.9	15.6	100	195	VBW:270Hz
Vert.	4804.000	AV	47.7	31.1	6.0	41.1	43.7	53.9	10.2	100	216	VBW:270Hz
Vert.	7206.000	AV	37.1	36.5	7.4	41.3	39.7	53.9	14.2	100	0	VBW:270Hz
Vert.	9608.000	AV	35.1	38.2	8.7	38.8	43.2	53.9	10.7	100	0	VBW:270Hz
Vert.	12010.000	AV	36.5	39.3	10.2	39.2	46.8	53.9	7.1	100	0	VBW:270Hz

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

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

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.    No.3 Semi Anechoic Chamber  
Date                           November 28, 2011                   November 28, 2011  
Temperature / Humidity    22deg.C , 33%RH                   22deg.C , 33%RH  
Engineer                    Shinichi Takano                    Hikaru Shirasawa  
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.	124.178	QP	45.6	13.1	7.4	32.1	34.0	43.5	9.5	166	278	
Hori.	152.403	QP	49.3	14.9	7.6	32.1	39.7	43.5	3.8	215	265	
Hori.	208.856	QP	47.2	16.2	8.0	32.0	39.4	43.5	4.1	154	88	
Hori.	623.976	QP	24.6	19.4	9.9	31.9	22.0	46.0	24.0	100	37	
Hori.	1799.584	PK	53.5	25.8	13.3	41.0	51.6	73.9	22.3	100	271	
Hori.	2413.000	PK	46.5	27.3	13.8	41.1	46.5	73.9	27.4	124	141	
Hori.	4319.971	PK	53.6	30.3	5.8	41.6	48.1	73.9	25.8	101	235	
Hori.	4882.000	PK	51.9	31.2	6.0	40.9	48.2	73.9	25.7	100	158	
Hori.	7323.000	PK	47.0	36.8	7.4	41.4	49.8	73.9	24.1	100	0	
Hori.	9764.000	PK	44.5	38.5	8.7	38.8	52.9	73.9	21.0	100	0	
Hori.	12205.000	PK	45.4	39.3	10.3	39.2	55.8	73.9	18.1	100	0	
Hori.	1799.584	AV	47.8	25.8	13.3	41.0	45.9	53.9	8.0	100	271	VBW:10Hz
Hori.	2413.000	AV	36.4	27.3	13.8	41.1	36.4	53.9	17.5	124	141	VBW:270Hz
Hori.	4319.971	AV	46.1	30.3	5.8	41.6	40.6	53.9	13.3	101	235	VBW:10Hz
Hori.	4882.000	AV	45.7	31.2	6.0	40.9	42.0	53.9	11.9	100	158	VBW:270Hz
Hori.	7323.000	AV	36.8	36.8	7.4	41.4	39.6	53.9	14.3	100	0	VBW:270Hz
Hori.	9764.000	AV	34.7	38.5	8.7	38.8	43.1	53.9	10.8	100	0	VBW:270Hz
Hori.	12205.000	AV	35.4	39.3	10.3	39.2	45.8	53.9	8.1	100	0	VBW:270Hz
Vert.	74.361	QP	47.6	6.4	7.0	32.1	28.9	40.0	11.1	100	99	
Vert.	623.976	QP	29.4	19.4	9.9	31.9	26.8	46.0	19.2	100	12	
Vert.	2413.000	PK	46.2	27.3	13.8	41.1	46.2	73.9	27.7	100	196	
Vert.	4882.000	PK	52.9	31.2	6.0	40.9	49.2	73.9	24.7	100	221	
Vert.	7323.000	PK	46.5	36.8	7.4	41.4	49.3	73.9	24.6	100	0	
Vert.	9764.000	PK	44.2	38.5	8.7	38.8	52.6	73.9	21.3	100	0	
Vert.	12205.000	PK	45.4	39.3	10.3	39.2	55.8	73.9	18.1	100	0	
Vert.	2413.000	AV	36.5	27.3	13.8	41.1	36.5	53.9	17.4	100	196	VBW:270Hz
Vert.	4882.000	AV	46.9	31.2	6.0	40.9	43.2	53.9	10.7	100	221	VBW:270Hz
Vert.	7323.000	AV	36.7	36.8	7.4	41.4	39.5	53.9	14.4	100	0	VBW:270Hz
Vert.	9764.000	AV	34.7	38.5	8.7	38.8	43.1	53.9	10.8	100	0	VBW:270Hz
Vert.	12205.000	AV	35.5	39.3	10.3	39.2	45.9	53.9	8.0	100	0	VBW:270Hz

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

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

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 28, 2011                   November 28, 2011  
 Temperature / Humidity   22deg.C , 33%RH                   22deg.C , 33%RH  
 Engineer                  Shinichi Takano                    Hikaru Shirasawa  
 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.	99.999	QP	51.0	9.7	7.2	32.1	35.8	43.5	7.7	321	267	
Hori.	152.218	QP	48.6	14.9	7.6	32.1	39.0	43.5	4.5	279	286	
Hori.	208.105	QP	46.1	16.2	8.0	32.0	38.3	43.5	5.2	145	102	
Hori.	624.120	QP	24.9	19.4	9.9	31.9	22.3	46.0	23.7	100	197	
Hori.	1799.684	PK	54.0	25.8	13.3	41.0	52.1	73.9	21.8	100	272	
Hori.	2453.000	PK	46.2	27.4	13.7	41.1	46.2	73.9	27.7	100	126	
Hori.	2483.500	PK	47.0	27.5	13.7	41.1	47.1	73.9	26.8	100	126	
Hori.	2507.000	PK	47.3	27.5	13.9	41.1	47.6	73.9	26.3	100	126	
Hori.	4318.560	PK	53.2	30.3	5.8	41.6	47.7	73.9	26.2	101	233	
Hori.	4960.000	PK	48.3	31.4	6.0	40.8	44.9	73.9	29.0	150	216	
Hori.	7440.000	PK	46.8	37.0	7.3	41.5	49.6	73.9	24.3	100	0	
Hori.	9920.000	PK	44.1	38.8	8.8	38.8	52.9	73.9	21.0	100	0	
Hori.	12400.000	PK	43.5	39.4	10.3	39.2	54.0	73.9	19.9	100	0	
Hori.	1799.684	AV	45.7	25.8	13.3	41.0	43.8	53.9	10.1	100	272	VBW:10Hz
Hori.	2453.000	AV	33.8	27.4	13.7	41.1	33.8	53.9	20.1	100	126	VBW:270Hz
Hori.	2483.500	AV	33.7	27.5	13.7	41.1	33.8	53.9	20.1	100	126	VBW:270Hz
Hori.	2507.000	AV	33.8	27.5	13.9	41.1	34.1	53.9	19.8	100	126	VBW:270Hz
Hori.	4318.560	AV	46.0	30.3	5.8	41.6	40.5	53.9	13.4	101	233	VBW:10Hz
Hori.	4960.000	AV	39.1	31.4	6.0	40.8	35.7	53.9	18.2	150	216	VBW:270Hz
Hori.	7440.000	AV	36.3	37.0	7.3	41.5	39.1	53.9	14.8	100	0	VBW:270Hz
Hori.	9920.000	AV	33.6	38.8	8.8	38.8	42.4	53.9	11.5	100	0	VBW:270Hz
Hori.	12400.000	AV	33.8	39.4	10.3	39.2	44.3	53.9	9.6	100	0	VBW:270Hz
Vert.	74.947	QP	47.8	6.4	7.0	32.1	29.1	40.0	10.9	100	92	
Vert.	624.120	QP	29.4	19.4	9.9	31.9	26.8	46.0	19.2	100	37	
Vert.	2453.000	PK	46.0	27.4	13.7	41.1	46.0	73.9	27.9	100	46	
Vert.	2483.500	PK	47.6	27.5	13.7	41.1	47.7	73.9	26.2	100	46	
Vert.	2507.000	PK	47.9	27.5	13.9	41.1	48.2	73.9	25.7	100	46	
Vert.	4960.000	PK	48.0	31.4	6.0	40.8	44.6	73.9	29.3	100	226	
Vert.	7440.000	PK	46.6	37.0	7.3	41.5	49.4	73.9	24.5	100	0	
Vert.	9920.000	PK	43.7	38.8	8.8	38.8	52.5	73.9	21.4	100	0	
Vert.	12400.000	PK	44.3	39.4	10.3	39.2	54.8	73.9	19.1	100	0	
Vert.	2453.000	AV	33.9	27.4	13.7	41.1	33.9	53.9	20.0	100	46	VBW:270Hz
Vert.	2483.500	AV	33.8	27.5	13.7	41.1	33.9	53.9	20.0	100	46	VBW:270Hz
Vert.	2507.000	AV	34.1	27.5	13.9	41.1	34.4	53.9	19.5	100	46	VBW:270Hz
Vert.	4960.000	AV	39.8	31.4	6.0	40.8	36.4	53.9	17.5	100	226	VBW:270Hz
Vert.	7440.000	AV	36.6	37.0	7.3	41.5	39.4	53.9	14.5	100	0	VBW:270Hz
Vert.	9920.000	AV	33.9	38.8	8.8	38.8	42.7	53.9	11.2	100	0	VBW:270Hz
Vert.	12400.000	AV	34.1	39.4	10.3	39.2	44.6	53.9	9.3	100	0	VBW:270Hz

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

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

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## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.    No.3 Semi Anechoic Chamber  
 Date                         November 28, 2011                   November 28, 2011  
 Temperature / Humidity   22deg.C , 33%RH                   22deg.C , 33%RH  
 Engineer                  Shinichi Takano                    Hikaru Shirasawa  
 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.	99.801	QP	52.2	9.7	7.2	32.1	37.0	43.5	6.5	310	261	
Hori.	152.217	QP	47.9	14.9	7.6	32.1	38.3	43.5	5.2	278	269	
Hori.	189.095	QP	47.3	15.9	7.9	32.0	39.1	43.5	4.4	173	88	
Hori.	208.108	QP	45.9	16.2	8.0	32.0	38.1	43.5	5.4	142	289	
Hori.	623.121	QP	26.2	19.3	9.9	31.9	23.5	46.0	22.5	100	187	
Hori.	1799.564	PK	53.8	25.8	13.3	41.0	51.9	73.9	22.0	100	272	
Hori.	2390.000	PK	46.5	27.2	13.8	41.1	46.4	73.9	27.5	100	135	
Hori.	2400.000	PK	48.6	27.3	13.8	41.1	48.6	73.9	25.3	100	135	
Hori.	4318.572	PK	53.9	30.3	5.8	41.6	48.4	73.9	25.5	101	234	
Hori.	4804.000	PK	51.4	31.1	6.0	41.1	47.4	73.9	26.5	100	165	
Hori.	7206.000	PK	48.6	36.5	7.4	41.3	51.2	73.9	22.7	100	0	
Hori.	9608.000	PK	45.9	38.2	8.7	38.8	54.0	73.9	19.9	100	0	
Hori.	12010.000	PK	47.1	39.3	10.2	39.2	57.4	73.9	16.5	100	0	
Hori.	1799.564	AV	47.8	25.8	13.3	41.0	45.9	53.9	8.0	100	272	VBW:10Hz
Hori.	2390.000	AV	35.5	27.2	13.8	41.1	35.4	53.9	18.5	100	135	VBW:270Hz
Hori.	2400.000	AV	37.7	27.3	13.8	41.1	37.7	53.9	16.2	100	135	VBW:270Hz
Hori.	4318.572	AV	46.2	30.3	5.8	41.6	40.7	53.9	13.2	101	234	VBW:10Hz
Hori.	4804.000	AV	42.5	31.1	6.0	41.1	38.5	53.9	15.4	100	165	VBW:270Hz
Hori.	7206.000	AV	37.5	36.5	7.4	41.3	40.1	53.9	13.8	100	0	VBW:270Hz
Hori.	9608.000	AV	35.1	38.2	8.7	38.8	43.2	53.9	10.7	100	0	VBW:270Hz
Hori.	12010.000	AV	36.6	39.3	10.2	39.2	46.9	53.9	7.0	100	0	VBW:270Hz
Vert.	73.731	QP	47.9	6.5	7.0	32.1	29.3	40.0	10.7	100	102	
Vert.	623.121	QP	29.5	19.3	9.9	31.9	26.8	46.0	19.2	100	38	
Vert.	2390.000	PK	46.7	27.2	13.8	41.1	46.6	73.9	27.3	100	193	
Vert.	2400.000	PK	49.7	27.3	13.8	41.1	49.7	73.9	24.2	100	193	
Vert.	4804.000	PK	51.0	31.1	6.0	41.1	47.0	73.9	26.9	100	215	
Vert.	7206.000	PK	47.1	36.5	7.4	41.3	49.7	73.9	24.2	100	0	
Vert.	9608.000	PK	45.0	38.2	8.7	38.8	53.1	73.9	20.8	100	0	
Vert.	12010.000	PK	47.2	39.3	10.2	39.2	57.5	73.9	16.4	100	0	
Vert.	2390.000	AV	35.6	27.2	13.8	41.1	35.5	53.9	18.4	100	193	VBW:270Hz
Vert.	2400.000	AV	39.1	27.3	13.8	41.1	39.1	53.9	14.8	100	193	VBW:270Hz
Vert.	4804.000	AV	43.2	31.1	6.0	41.1	39.2	53.9	14.7	100	215	VBW:270Hz
Vert.	7206.000	AV	37.6	36.5	7.4	41.3	40.2	53.9	13.7	100	0	VBW:270Hz
Vert.	9608.000	AV	35.2	38.2	8.7	38.8	43.3	53.9	10.6	100	0	VBW:270Hz
Vert.	12010.000	AV	36.5	39.3	10.2	39.2	46.8	53.9	7.1	100	0	VBW:270Hz

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

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

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.    No.3 Semi Anechoic Chamber  
Date                           November 28, 2011                   November 28, 2011  
Temperature / Humidity    22deg.C , 33%RH                   22deg.C , 33%RH  
Engineer                    Shinichi Takano                    Hikaru Shirasawa  
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.	152.393	QP	49.7	14.9	7.6	32.1	40.1	43.5	3.4	207	267	
Hori.	208.852	QP	47.2	16.2	8.0	32.0	39.4	43.5	4.1	155	83	
Hori.	624.120	QP	26.7	19.4	9.9	31.9	24.1	46.0	21.9	100	181	
Hori.	1799.180	PK	53.6	25.8	13.3	41.0	51.7	73.9	22.2	100	271	
Hori.	4318.535	PK	54.4	30.3	5.8	41.6	48.9	73.9	25.0	102	234	
Hori.	4882.000	PK	49.4	31.2	6.0	40.9	45.7	73.9	28.2	100	162	
Hori.	7323.000	PK	46.8	36.8	7.4	41.4	49.6	73.9	24.3	100	0	
Hori.	9764.000	PK	44.5	38.5	8.7	38.8	52.9	73.9	21.0	100	0	
Hori.	12205.000	PK	46.0	39.3	10.3	39.2	56.4	73.9	17.5	100	0	
Hori.	1799.180	AV	47.7	25.8	13.3	41.0	45.8	53.9	8.1	100	271	VBW:10Hz
Hori.	4318.535	AV	46.3	30.3	5.8	41.6	40.8	53.9	13.1	102	234	VBW:10Hz
Hori.	4882.000	AV	40.9	31.2	6.0	40.9	37.2	53.9	16.7	100	162	VBW:270Hz
Hori.	7323.000	AV	36.7	36.8	7.4	41.4	39.5	53.9	14.4	100	0	VBW:270Hz
Hori.	9764.000	AV	34.7	38.5	8.7	38.8	43.1	53.9	10.8	100	0	VBW:270Hz
Hori.	12205.000	AV	35.5	39.3	10.3	39.2	45.9	53.9	8.0	100	0	VBW:270Hz
Vert.	74.343	QP	48.5	6.4	7.0	32.1	29.8	40.0	10.2	102	103	
Vert.	624.120	QP	29.8	19.4	9.9	31.9	27.2	46.0	18.8	100	25	
Vert.	699.999	QP	38.3	20.5	10.1	31.8	37.1	46.0	8.9	100	1	
Vert.	733.339	QP	39.7	20.7	10.2	31.7	38.9	46.0	7.1	100	358	
Vert.	4882.000	PK	51.3	31.2	6.0	40.9	47.6	73.9	26.3	100	221	
Vert.	7323.000	PK	47.1	36.8	7.4	41.4	49.9	73.9	24.0	100	0	
Vert.	9764.000	PK	44.9	38.5	8.7	38.8	53.3	73.9	20.6	100	0	
Vert.	12205.000	PK	45.6	39.3	10.3	39.2	56.0	73.9	17.9	100	0	
Vert.	4882.000	AV	42.7	31.2	6.0	40.9	39.0	53.9	14.9	100	221	VBW:270Hz
Vert.	7323.000	AV	36.6	36.8	7.4	41.4	39.4	53.9	14.5	100	0	VBW:270Hz
Vert.	9764.000	AV	34.5	38.5	8.7	38.8	42.9	53.9	11.0	100	0	VBW:270Hz
Vert.	12205.000	AV	35.4	39.3	10.3	39.2	45.8	53.9	8.1	100	0	VBW:270Hz

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

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

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## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.    No.3 Semi Anechoic Chamber  
Date                           November 28, 2011                   November 28, 2011  
Temperature / Humidity    22deg.C , 33%RH                   22deg.C , 33%RH  
Engineer                   Shinichi Takano                   Hikaru Shirasawa  
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.	152.275	QP	48.7	14.9	7.6	32.1	39.1	43.5	4.4	295	270	
Hori.	209.090	QP	46.8	16.2	8.0	32.0	39.0	43.5	4.5	144	97	
Hori.	231.825	QP	46.3	16.7	8.2	32.0	39.2	46.0	6.8	141	236	
Hori.	623.760	QP	25.9	19.3	9.9	31.9	23.2	46.0	22.8	100	0	
Hori.	1799.565	PK	53.7	25.8	13.3	41.0	51.8	73.9	22.1	100	273	
Hori.	2483.500	PK	46.4	27.5	13.7	41.1	46.5	73.9	27.4	100	125	
Hori.	4318.525	PK	53.0	30.3	5.8	41.6	47.5	73.9	26.4	103	231	
Hori.	4960.000	PK	48.3	31.4	6.0	40.8	44.9	73.9	29.0	100	217	
Hori.	7440.000	PK	47.3	37.0	7.3	41.5	50.1	73.9	23.8	100	0	
Hori.	9920.000	PK	46.2	38.8	8.8	38.8	55.0	73.9	18.9	100	0	
Hori.	12400.000	PK	45.9	39.4	10.3	39.2	56.4	73.9	17.5	100	0	
Hori.	1799.565	AV	48.1	25.8	13.3	41.0	46.2	53.9	7.7	100	273	VBW:10Hz
Hori.	2483.500	AV	35.6	27.5	13.7	41.1	35.7	53.9	18.2	100	125	VBW:270Hz
Hori.	4318.525	AV	46.0	30.3	5.8	41.6	40.5	53.9	13.4	103	231	VBW:10Hz
Hori.	4960.000	AV	39.1	31.4	6.0	40.8	35.7	53.9	18.2	100	217	VBW:270Hz
Hori.	7440.000	AV	36.4	37.0	7.3	41.5	39.2	53.9	14.7	100	0	VBW:270Hz
Hori.	9920.000	AV	33.7	38.8	8.8	38.8	42.5	53.9	11.4	100	0	VBW:270Hz
Hori.	12400.000	AV	34.0	39.4	10.3	39.2	44.5	53.9	9.4	100	0	VBW:270Hz
Vert.	74.340	QP	48.1	6.4	7.0	32.1	29.4	40.0	10.6	100	65	
Vert.	623.760	QP	29.0	19.3	9.9	31.9	26.3	46.0	19.7	100	49	
Vert.	699.798	QP	39.2	20.5	10.1	31.8	38.0	46.0	8.0	100	357	
Vert.	2483.500	PK	46.2	27.5	13.7	41.1	46.3	73.9	27.6	100	46	
Vert.	4960.000	PK	47.5	31.4	6.0	40.8	44.1	73.9	29.8	100	220	
Vert.	7440.000	PK	48.5	37.0	7.3	41.5	51.3	73.9	22.6	100	0	
Vert.	9920.000	PK	45.2	38.8	8.8	38.8	54.0	73.9	19.9	100	0	
Vert.	12400.000	PK	45.8	39.4	10.3	39.2	56.3	73.9	17.6	100	0	
Vert.	2483.500	AV	35.7	27.5	13.7	41.1	35.8	53.9	18.1	100	46	VBW:270Hz
Vert.	4960.000	AV	39.2	31.4	6.0	40.8	35.8	53.9	18.1	100	220	VBW:270Hz
Vert.	7440.000	AV	36.7	37.0	7.3	41.5	39.5	53.9	14.4	100	0	VBW:270Hz
Vert.	9920.000	AV	33.8	38.8	8.8	38.8	42.6	53.9	11.3	100	0	VBW:270Hz
Vert.	12400.000	AV	34.0	39.4	10.3	39.2	44.5	53.9	9.4	100	0	VBW:270Hz

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

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

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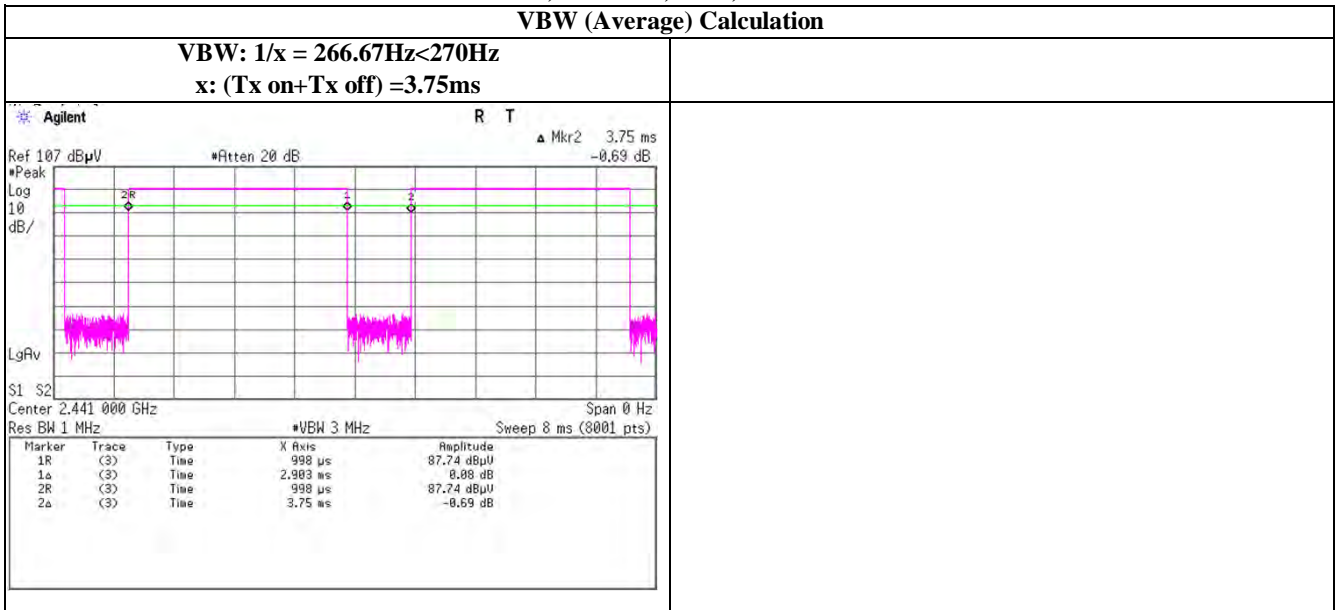
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## VBW (Average) Calculation chart

**Tx, Bluetooth, BDR, PRBS9**

**VBW (Average) Calculation**



**UL Japan, Inc.**

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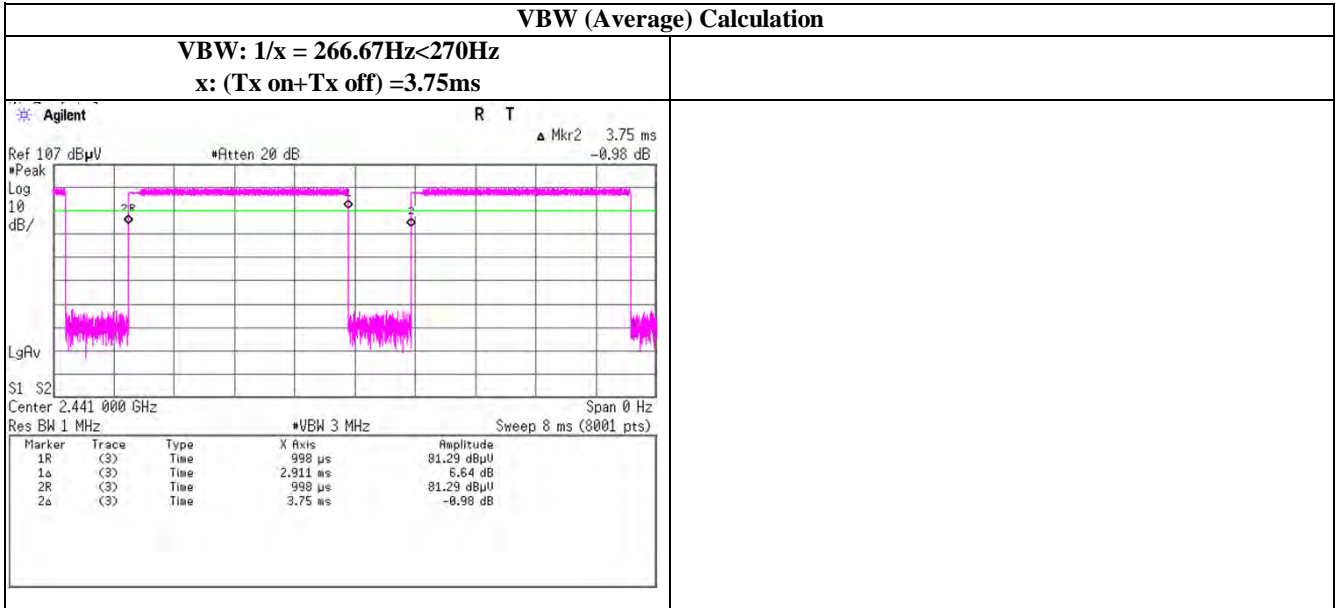
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## VBW (Average) Calculation chart

**Tx, Bluetooth, EDR, PRBS9**

**VBW (Average) Calculation**



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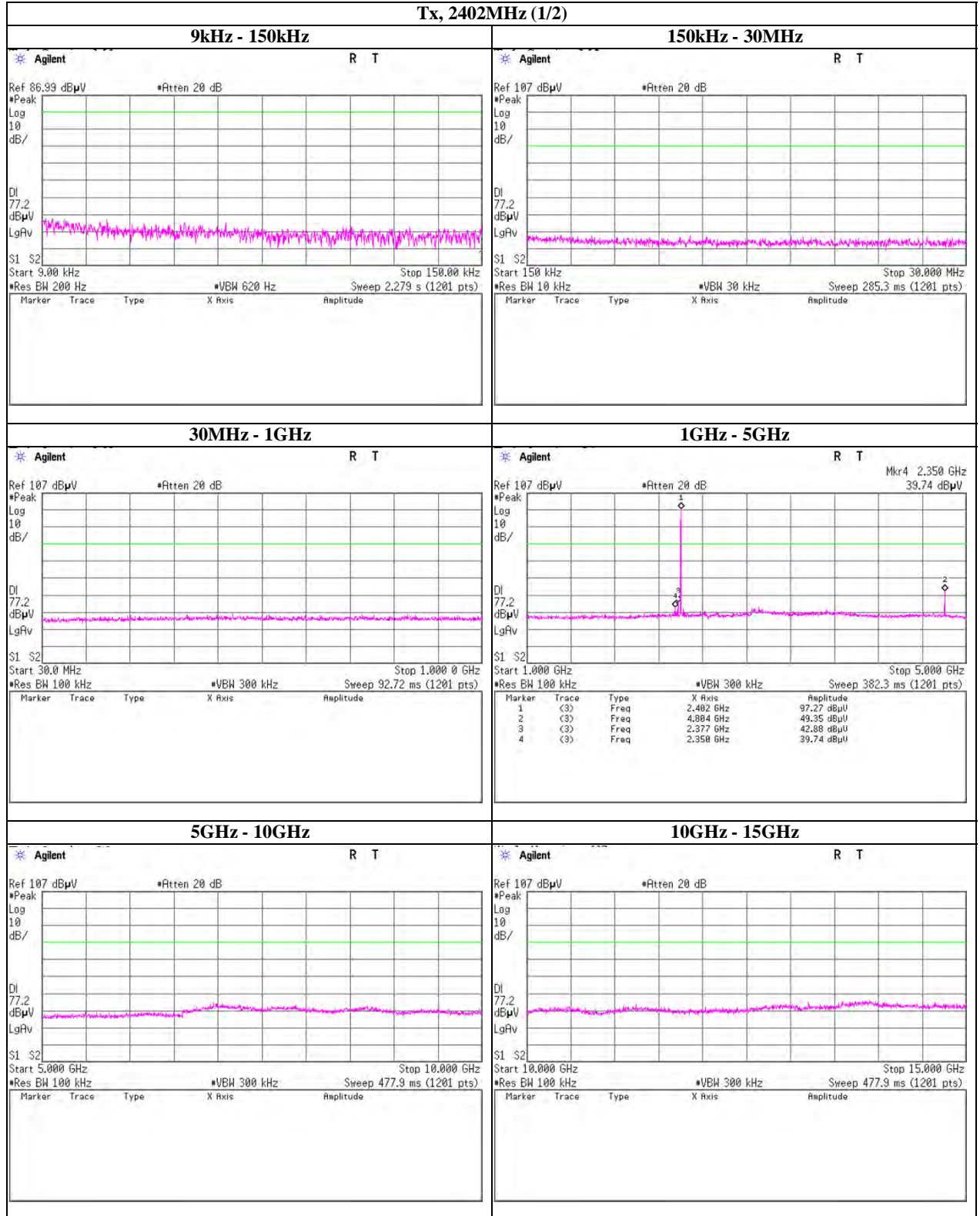
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### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)



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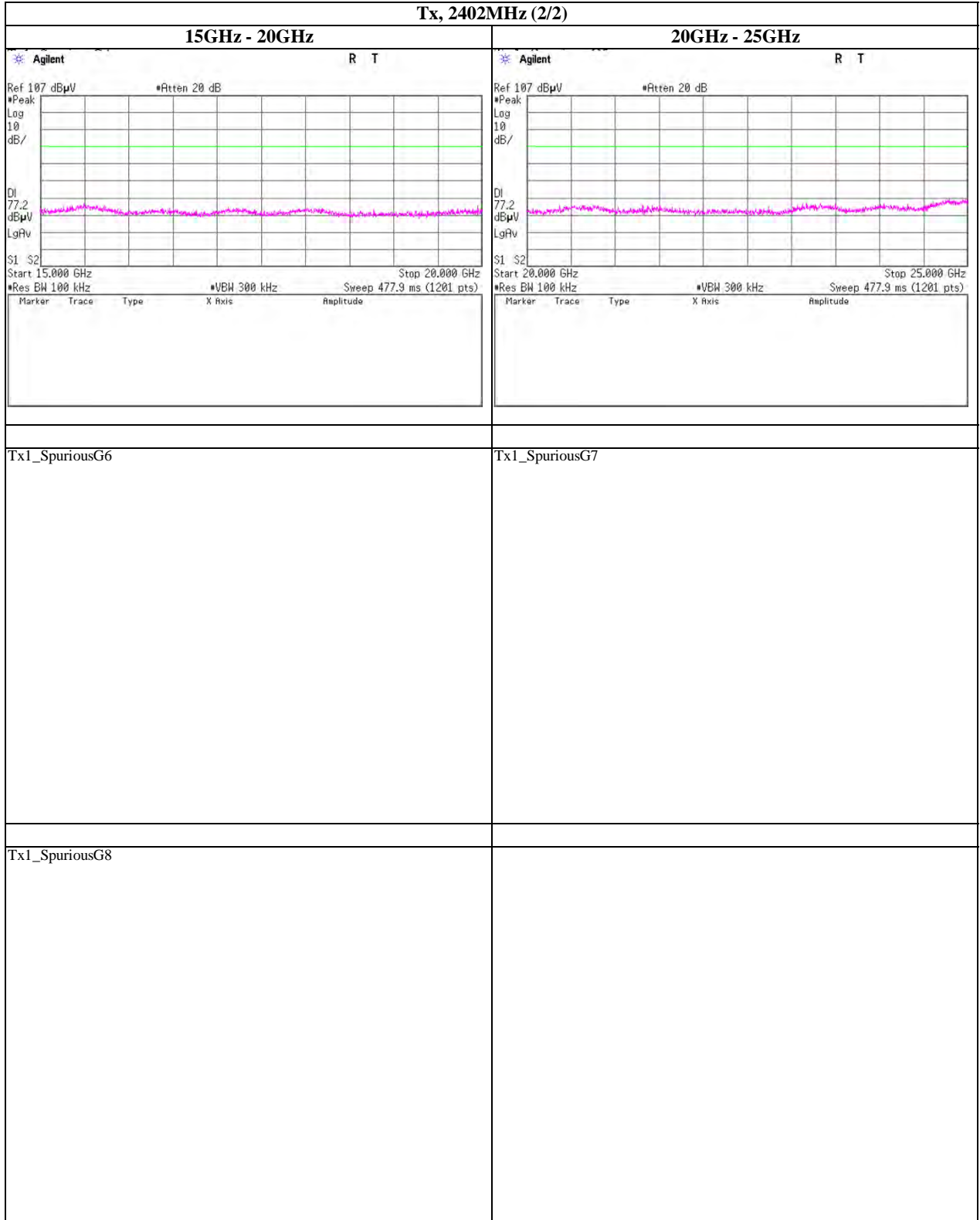
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### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (2/2)



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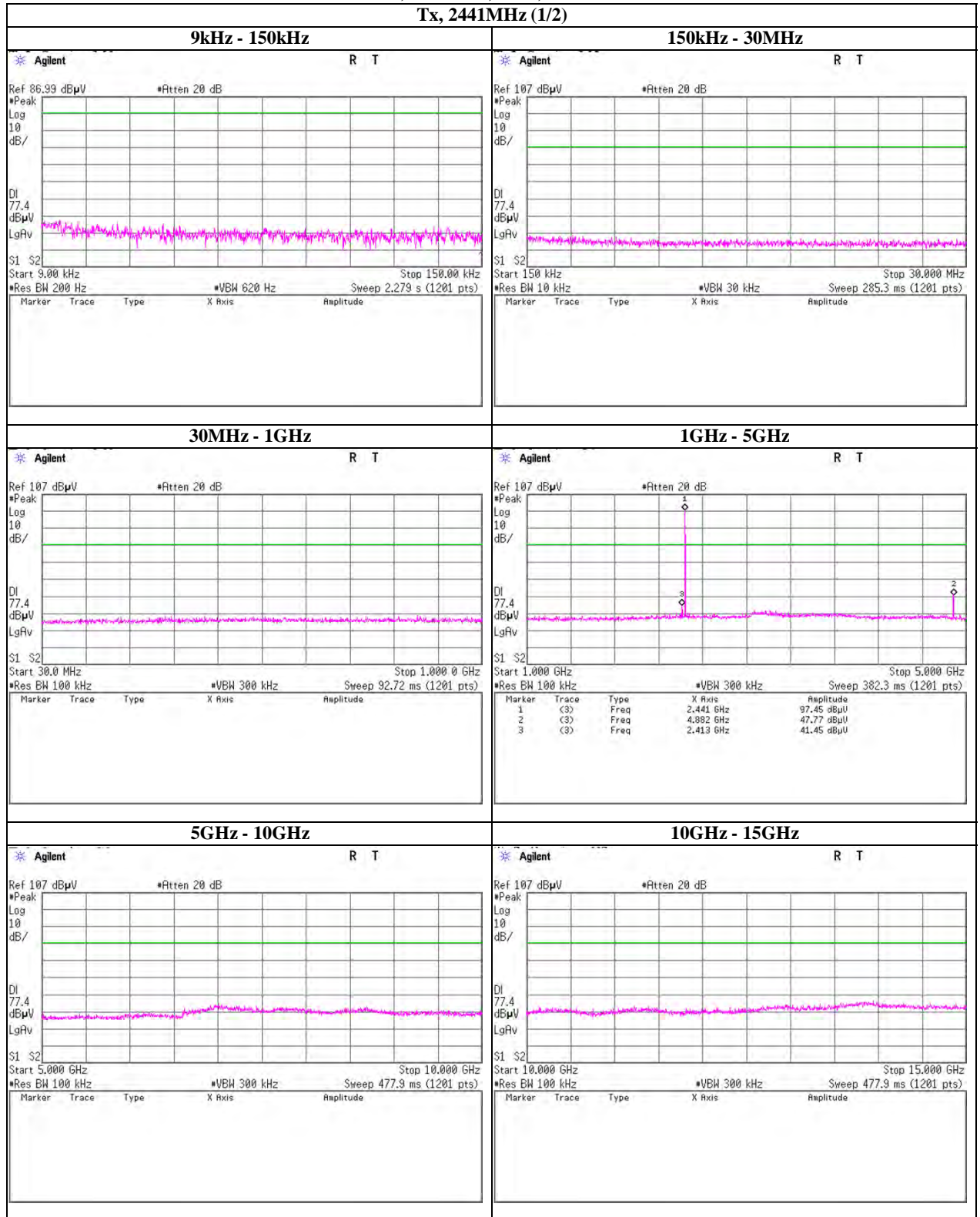
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**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2441MHz (1/2)**



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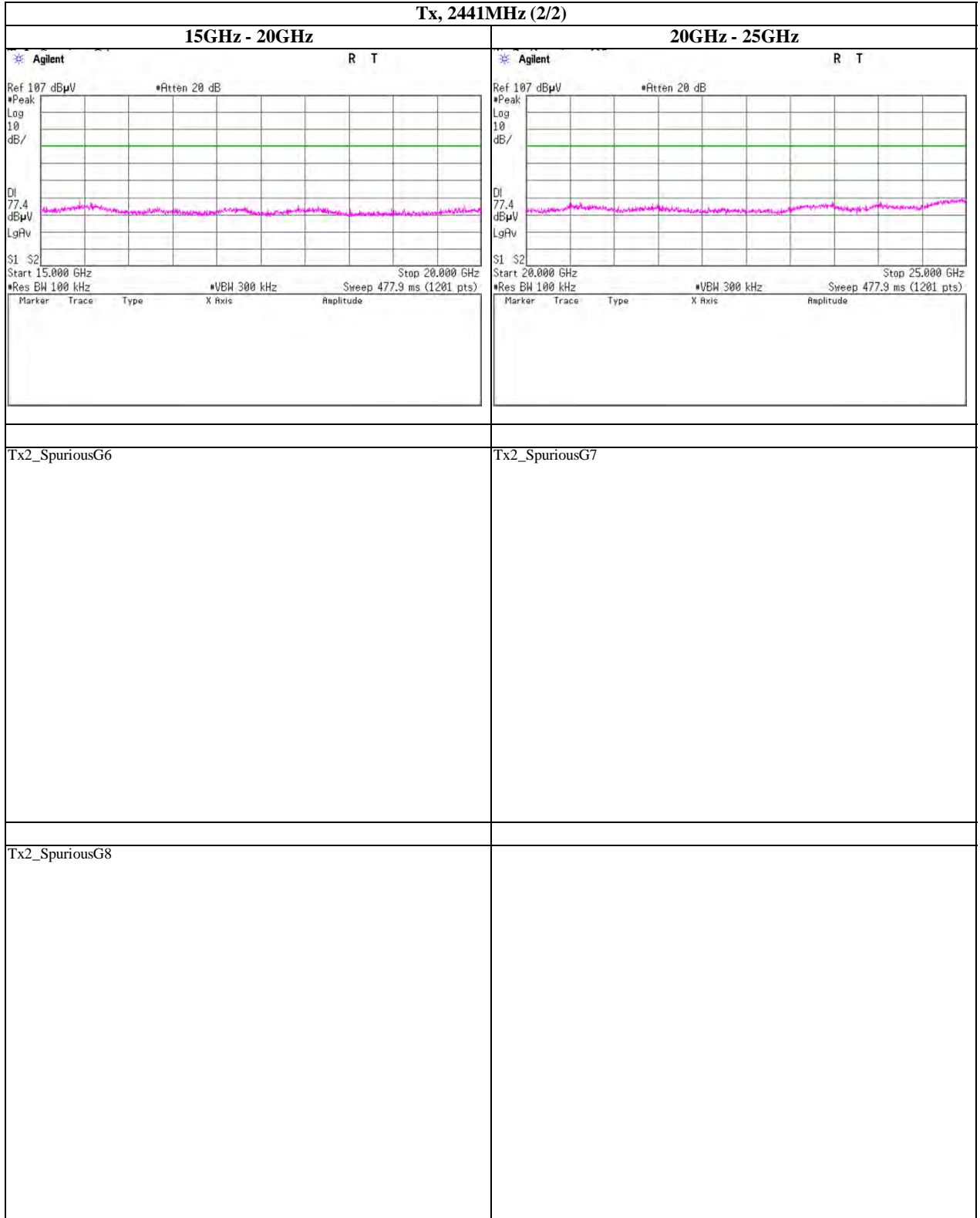
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**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2441MHz (2/2)**



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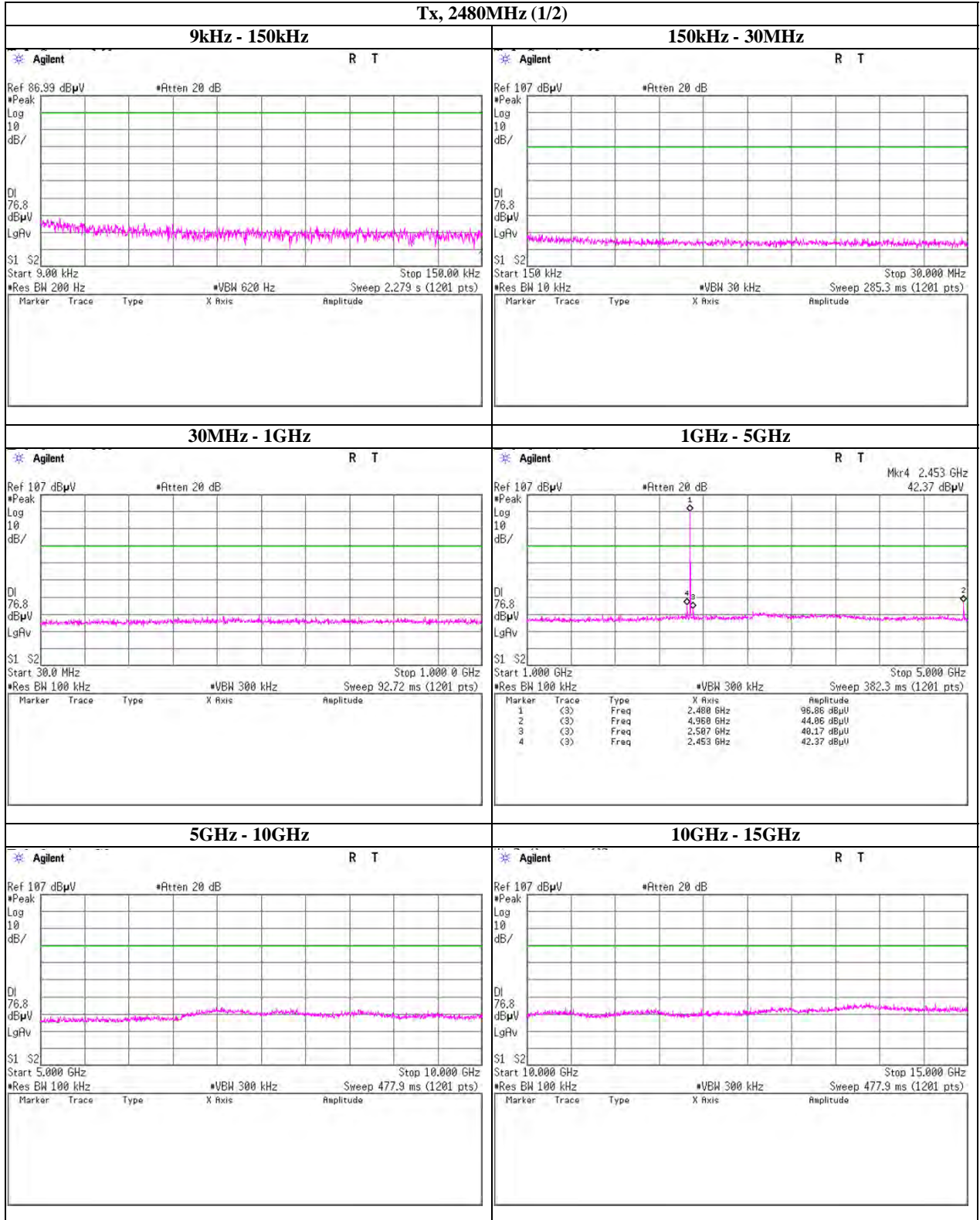
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Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (1/2)



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**Spurious emission (Conducted)**

**Tx, Bluetooth, BDR, PRBS9**

**Tx, 2480MHz (2/2)**



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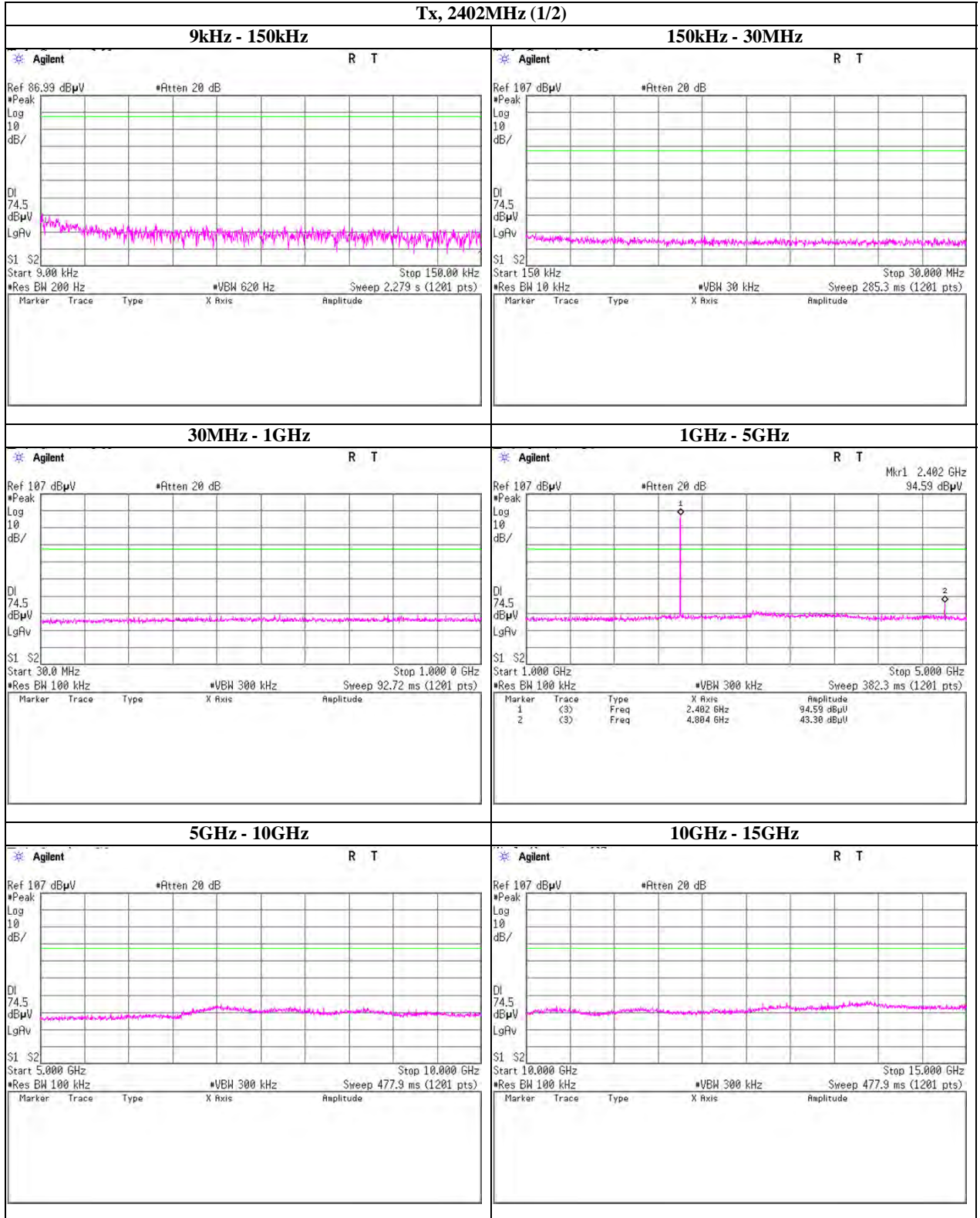
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)



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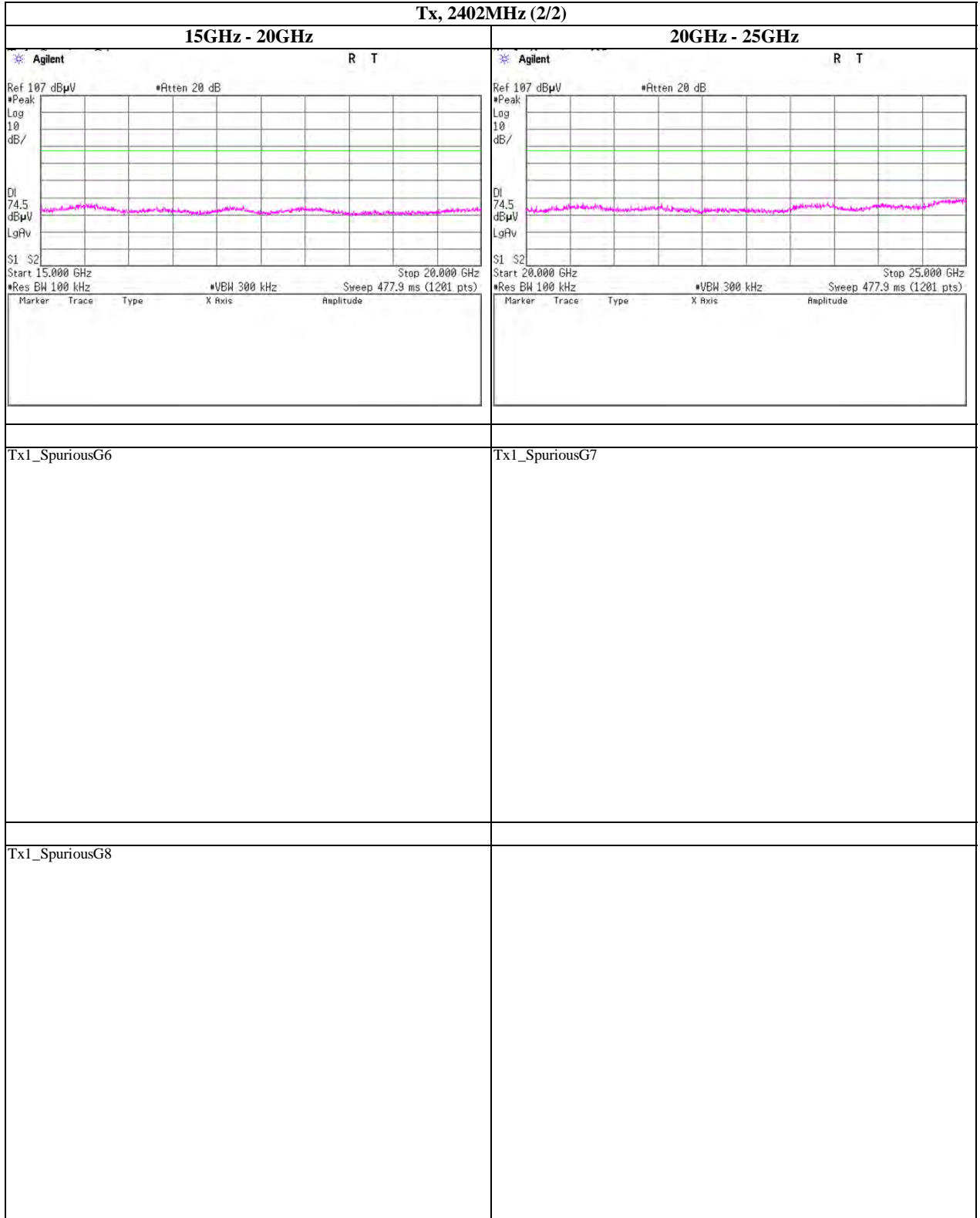
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**Spurious emission (Conducted)**

**Tx, Bluetooth, EDR, PRBS9**

**Tx, 2402MHz (2/2)**



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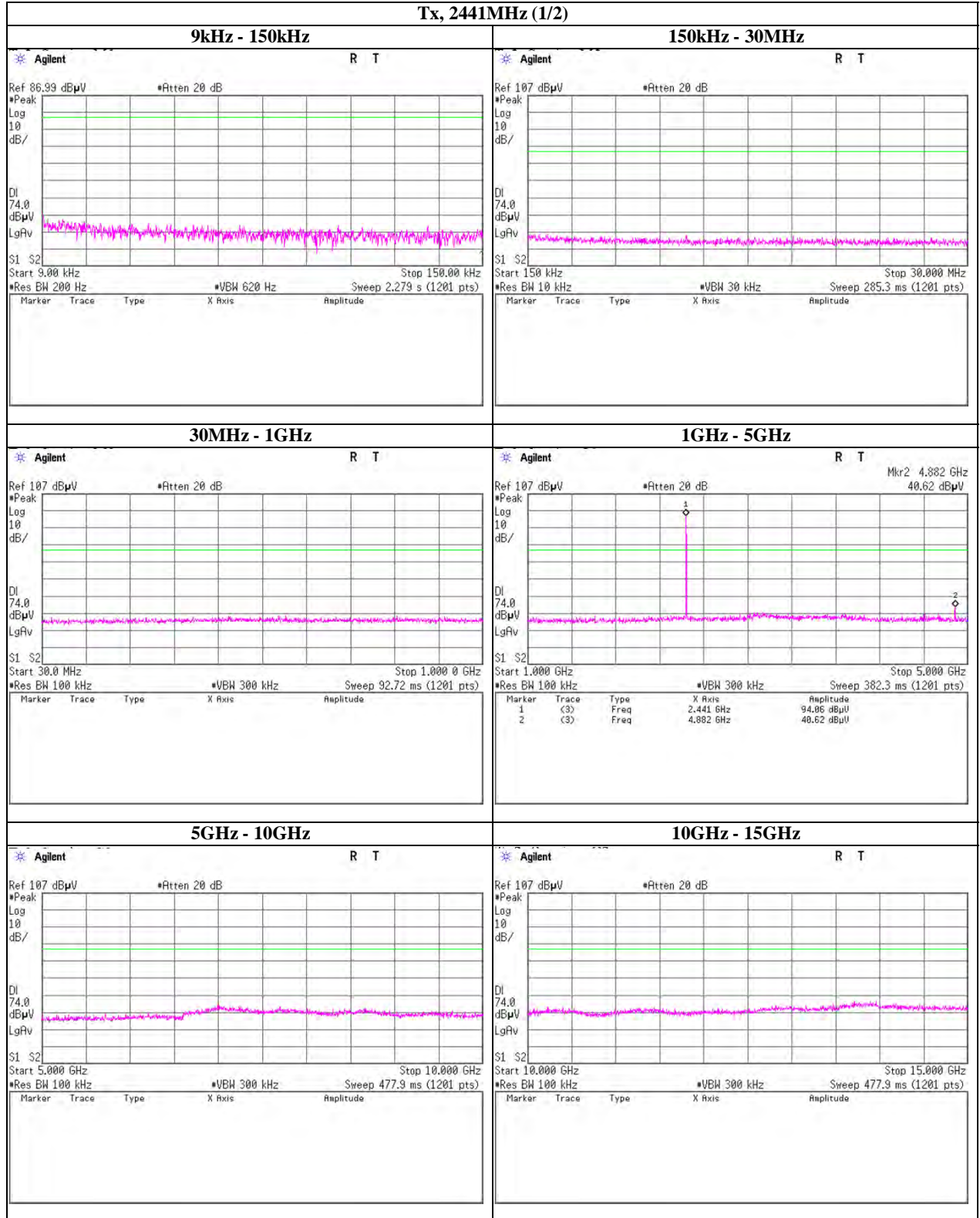
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (1/2)



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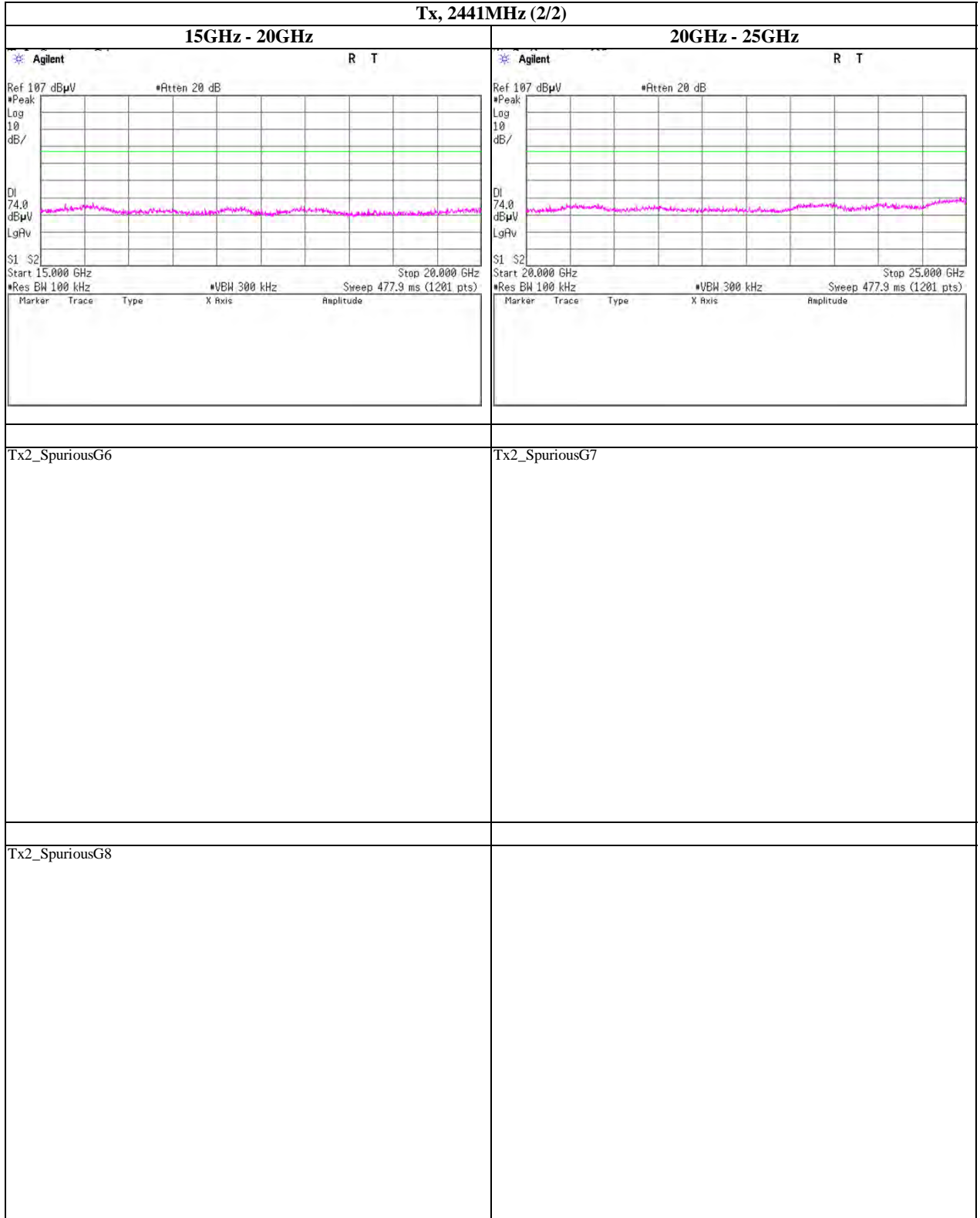
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (2/2)



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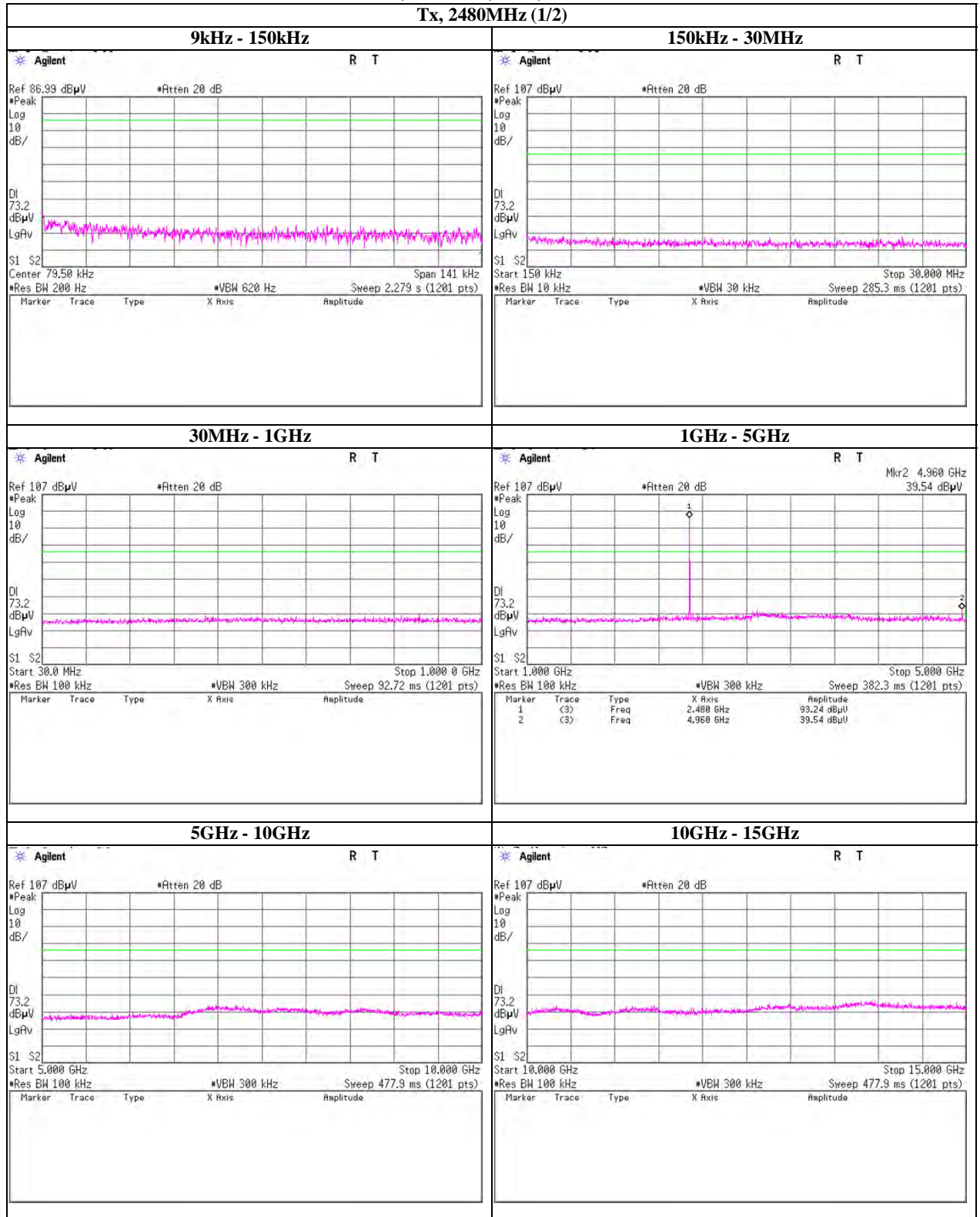
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)



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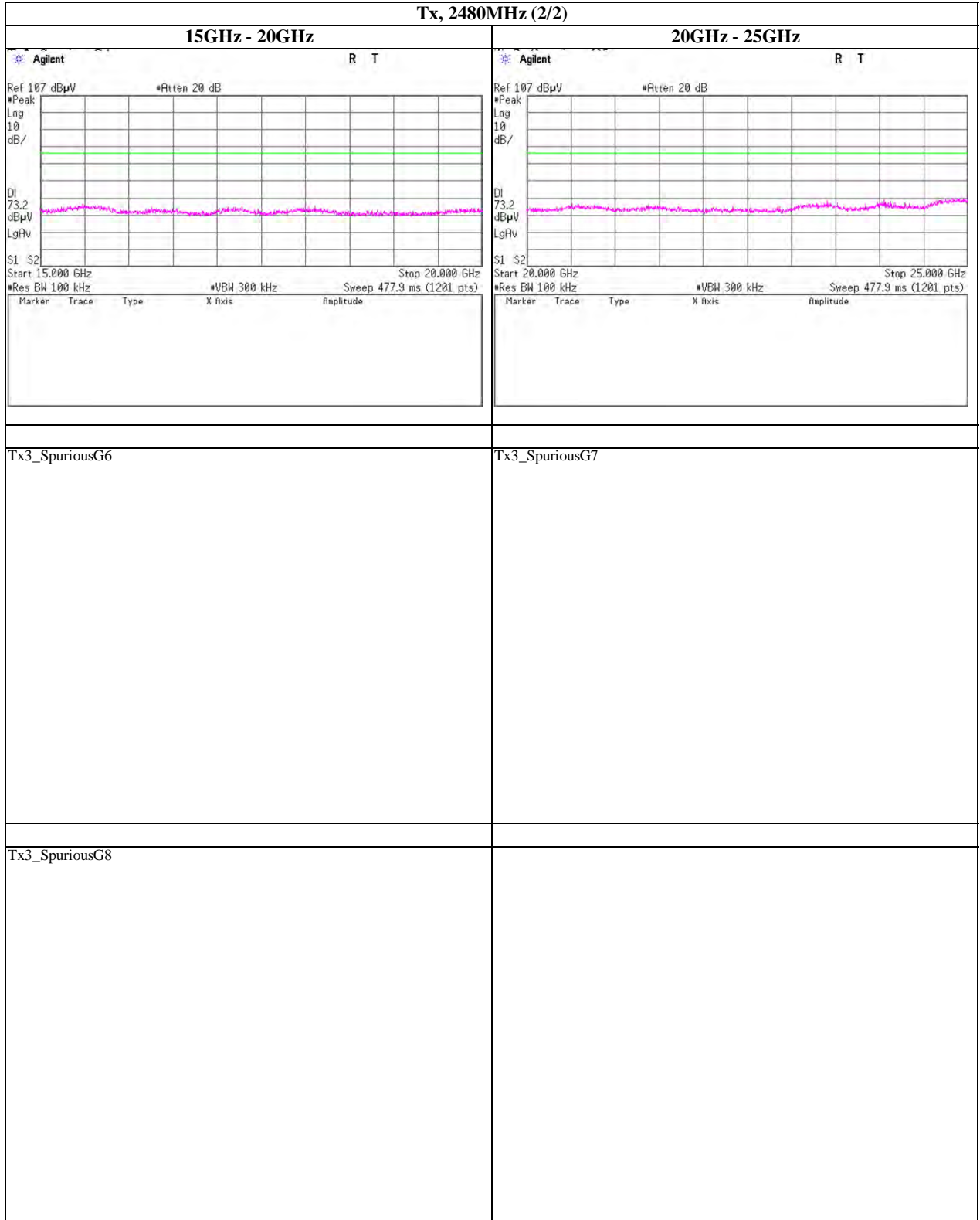
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### Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)



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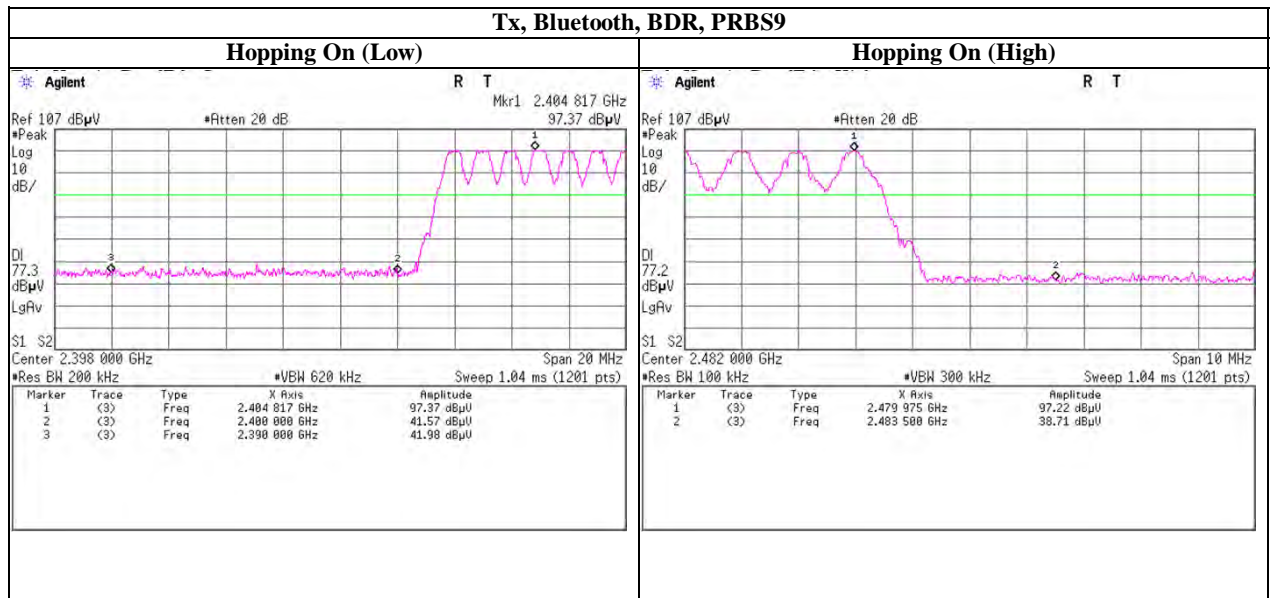
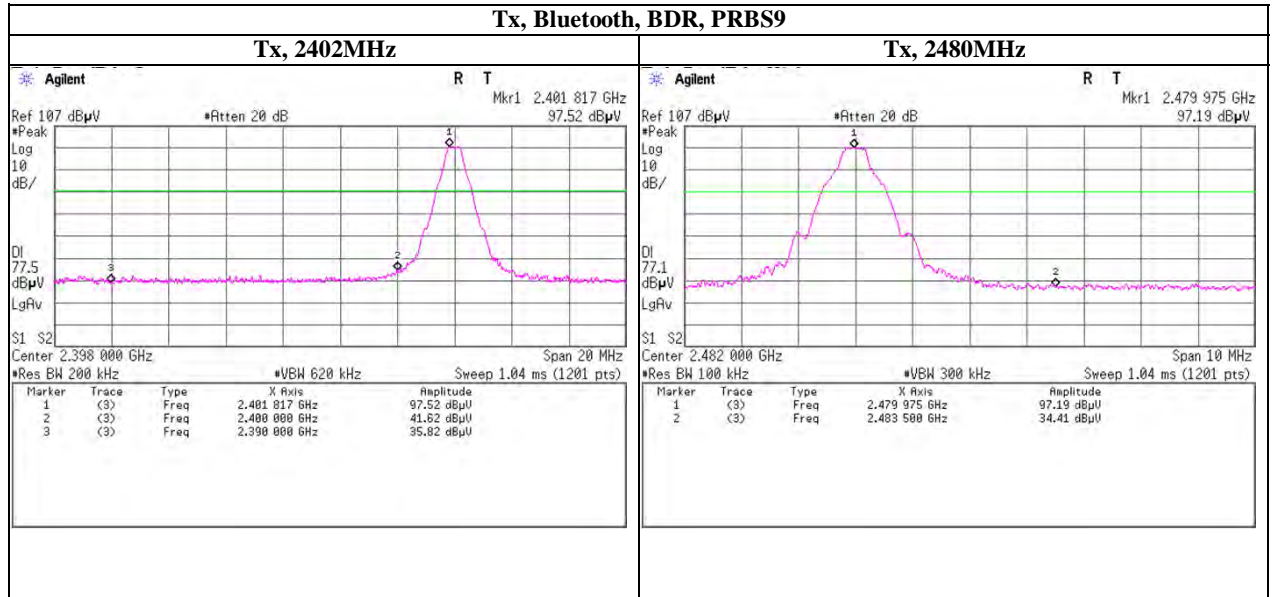
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## Spurious emission (Conducted)

### Band Edge compliance



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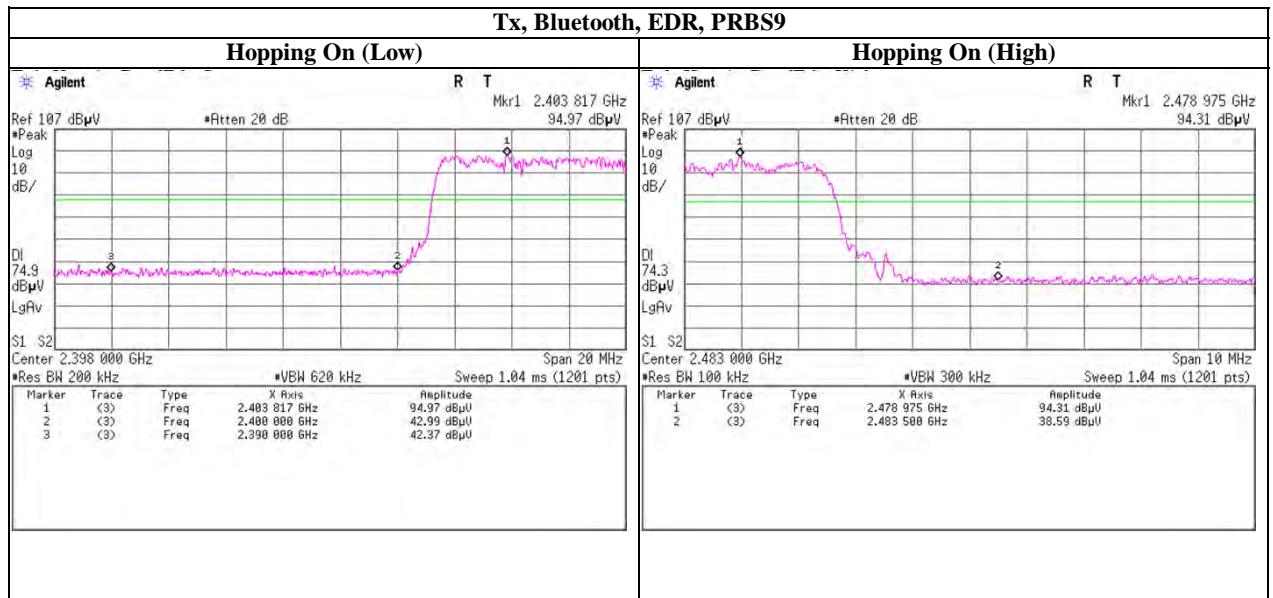
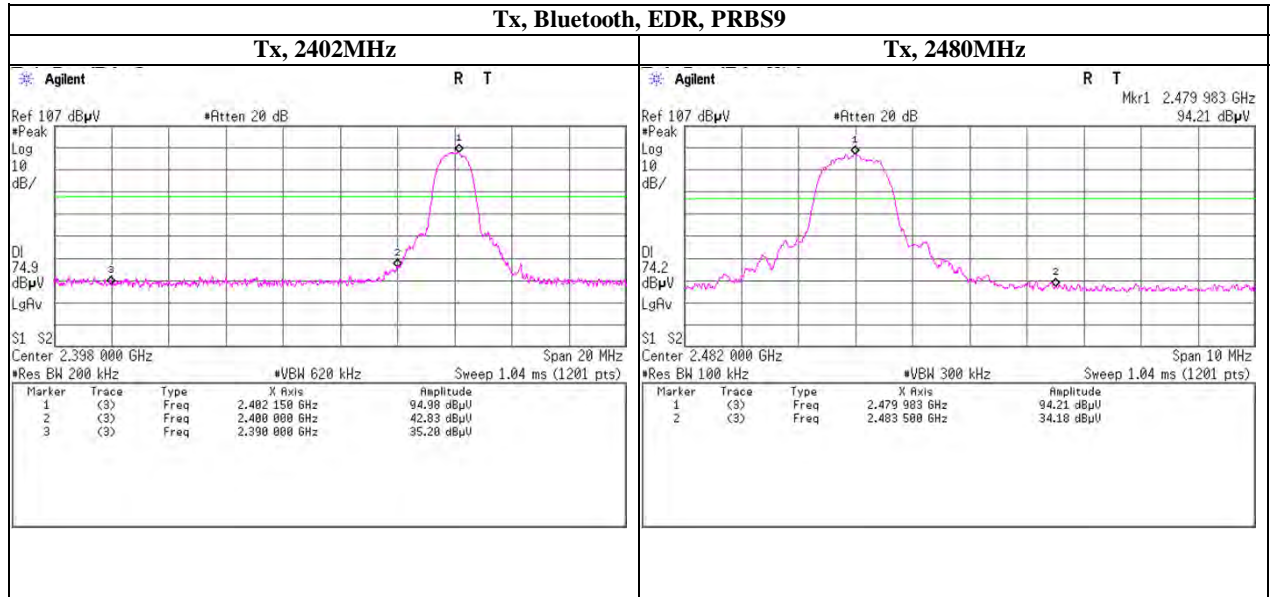
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## Spurious emission (Conducted)

### Band Edge compliance



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**99% Occupied Bandwidth**

Tx, Bluetooth, BDR, PRBS9	
<p style="text-align: center;"><b>Tx, 2402MHz</b></p> <p>Agilent R L              Ref 102 dBµV *Atten 20 dB              *Samp Log 10 dB/              LgAv              M1 S2              Center 2.402 000 0 GHz Span 3 MHz              *Res BW 30 kHz *VBW 100 kHz Sweep 10.00 ms (1201 pts)  <b>Occupied Bandwidth</b> 878.1973 kHz  <b>Occ BW % Pwr</b> 99.00 %  <b>x dB</b> -20.00 dB              Transmit Freq Error -30.251 kHz  <b>x dB Bandwidth</b> 934.989 kHz*</p>	<p style="text-align: center;"><b>Tx, 2441MHz</b></p> <p>Agilent R T              Ref 102 dBµV *Atten 20 dB              *Samp Log 10 dB/              LgAv              M1 S2              Center 2.441 000 0 GHz Span 3 MHz              *Res BW 30 kHz *VBW 100 kHz Sweep 10.00 ms (1201 pts)  <b>Occupied Bandwidth</b> 873.6353 kHz  <b>Occ BW % Pwr</b> 99.00 %  <b>x dB</b> -20.00 dB              Transmit Freq Error -30.885 kHz  <b>x dB Bandwidth</b> 932.637 kHz*</p>
<p style="text-align: center;"><b>Tx, 2480MHz</b></p> <p>Agilent R T              Ref 102 dBµV *Atten 20 dB              *Samp Log 10 dB/              LgAv              M1 S2              Center 2.480 000 0 GHz Span 3 MHz              *Res BW 30 kHz *VBW 100 kHz Sweep 10.00 ms (1201 pts)  <b>Occupied Bandwidth</b> 871.2590 kHz  <b>Occ BW % Pwr</b> 99.00 %  <b>x dB</b> -20.00 dB              Transmit Freq Error -31.818 kHz  <b>x dB Bandwidth</b> 932.536 kHz*</p>	<p style="text-align: center;"><b>Tx, Hopping On</b></p> <p>Agilent R T              Ref 112 dBµV *Atten 20 dB              *Samp Log 10 dB/              LgAv              M1 S2              Center 2.441 000 GHz Span 200 MHz              *Res BW 2 MHz *VBW 6 MHz Sweep 1.04 ms (1201 pts)  <b>Occupied Bandwidth</b> 79.7253 MHz  <b>Occ BW % Pwr</b> 99.00 %  <b>x dB</b> -20.00 dB              Transmit Freq Error -70.104 kHz  <b>x dB Bandwidth</b> 83.288 MHz*</p>
Tx4_99OBW	Tx4_Hopping99OBW

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### 99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
<p style="text-align: center;"><b>Tx, 2402MHz</b></p> <p style="text-align: center;">Occupied Bandwidth 1.1807 MHz</p> <p style="text-align: center;">Transmit Freq Error    -29.631 kHz x dB Bandwidth        1.281 MHz*</p>	<p style="text-align: center;"><b>Tx, 2441MHz</b></p> <p style="text-align: center;">Occupied Bandwidth 1.1797 MHz</p> <p style="text-align: center;">Transmit Freq Error    -30.837 kHz x dB Bandwidth        1.278 MHz*</p>
<p style="text-align: center;"><b>Tx, 2480MHz</b></p> <p style="text-align: center;">Occupied Bandwidth 1.1783 MHz</p> <p style="text-align: center;">Transmit Freq Error    -31.842 kHz x dB Bandwidth        1.280 MHz*</p>	<p style="text-align: center;"><b>Tx, Hopping On</b></p> <p style="text-align: center;">Occupied Bandwidth 79.7146 MHz</p> <p style="text-align: center;">Transmit Freq Error    -57.976 kHz x dB Bandwidth        83.391 MHz*</p>
<p>Tx4_99OBW</p>	<p>Tx4_Hopping99OBW</p>

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**APPENDIX 2**  
**Test Instruments**

 Page : 55 of 56  
 Issued date : December 8, 2011  
 FCC ID : AJDK048

**EMI test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	03/02/2011 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	04/12/2011 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	04/12/2011 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	02/02/2011 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	03/23/2011 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	11/09/2011 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	07/19/2011 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	04/28/2011 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	05/27/2011 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	08/28/2011 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	02/23/2011 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	03/07/2011 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SAT10-04	Attenuator(above1GHz)	Agilent	8493C-010	74863	RE	12/15/2010 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	12/15/2010 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	03/16/2011 * 12
SHA-07	Horn Antenna	ETS-LINDGREN	3116	00108256	RE	03/15/2011 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	02/17/2011 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	02/17/2011 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	10/23/2011 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	04/28/2011 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	10/23/2011 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	07/28/2011 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	09/23/2011 * 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 disturbance voltage