

APPENDIX 2: Data of EMI test

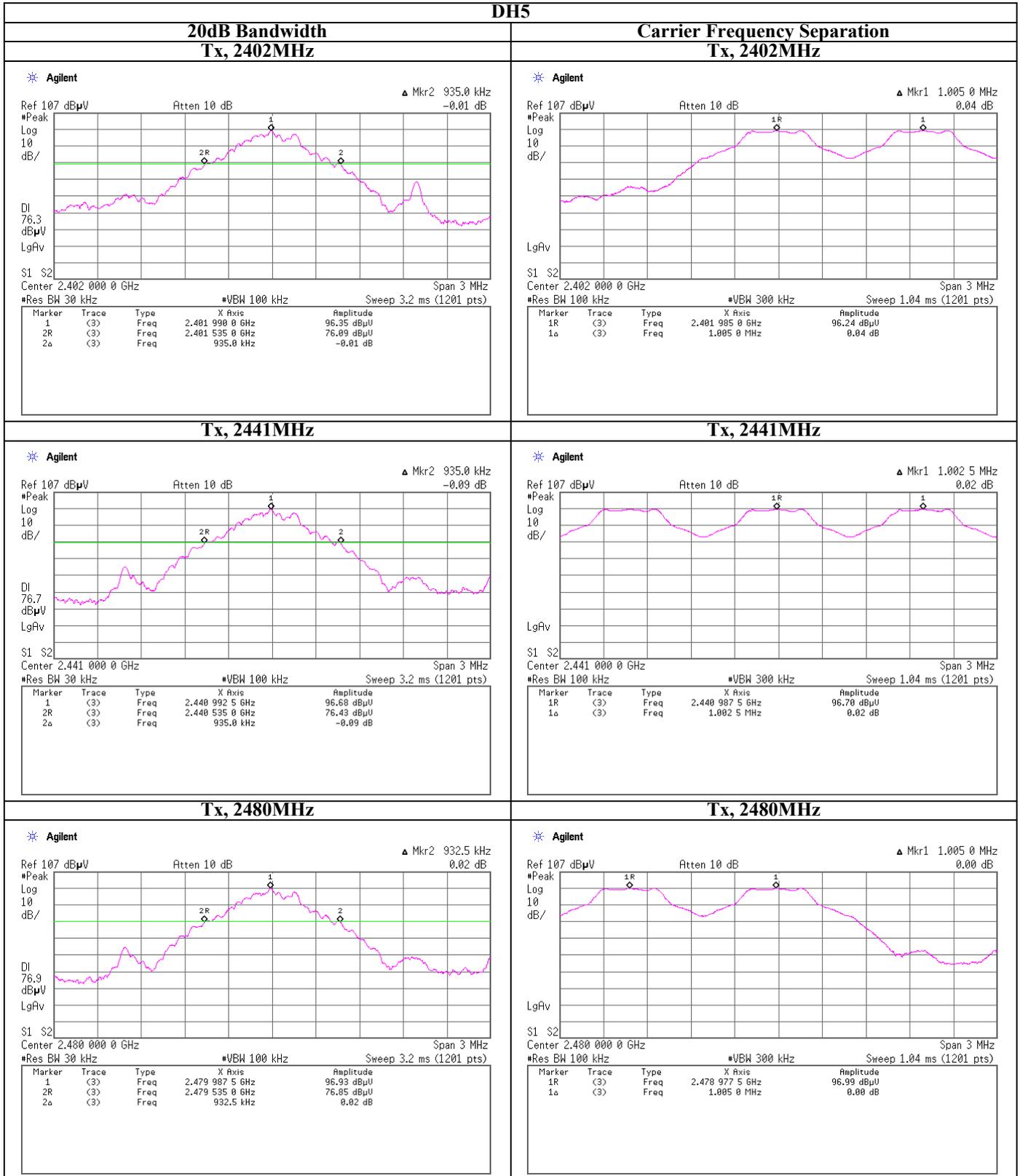
20dB Bandwidth and Carrier Frequency Separation

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date 2010/11/4
Temperature / Humidity 21deg.C. , 51%
Engineer Hikaru Shirasawa
Mode Tx,

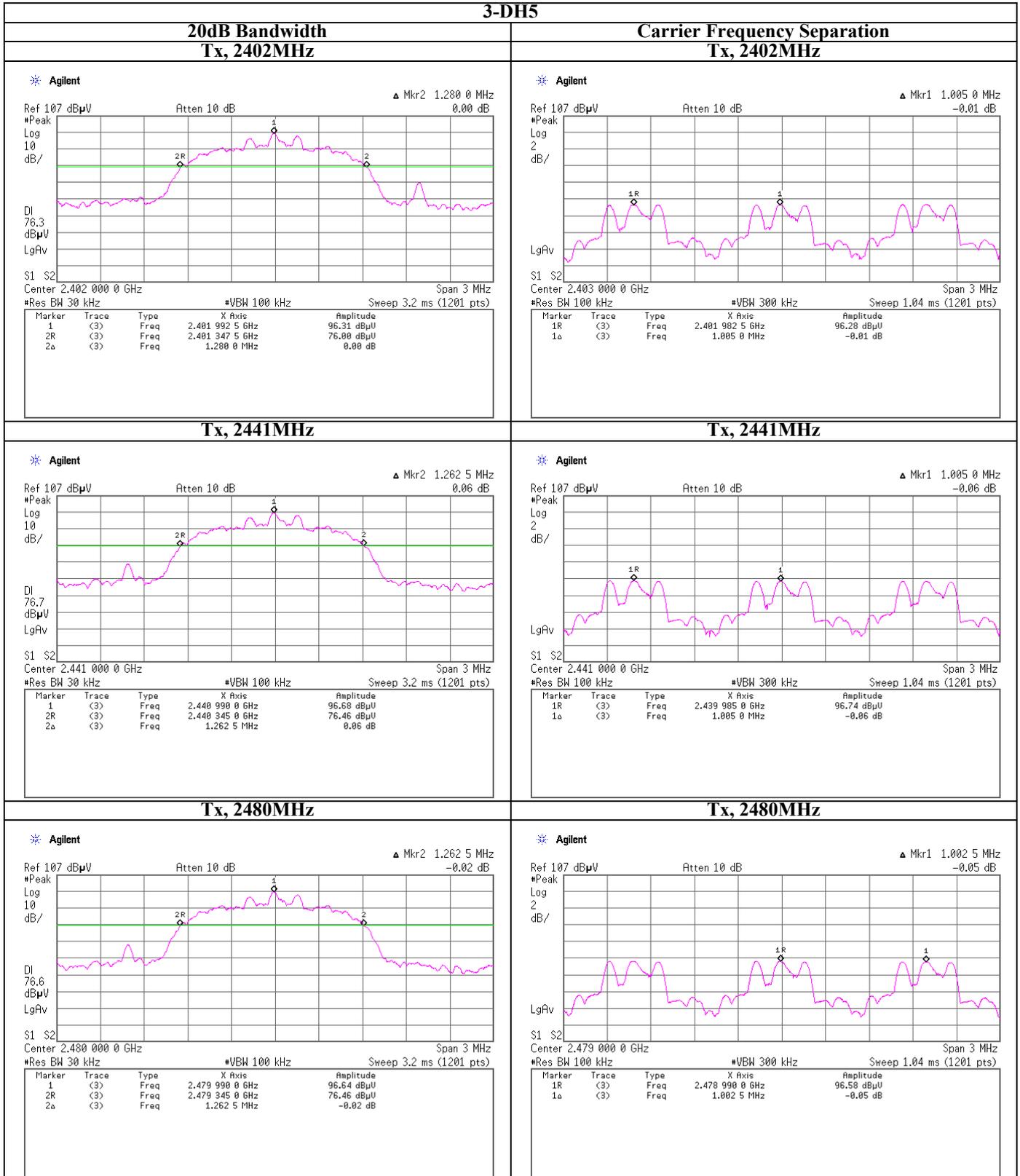
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.935	1.005	>= 0.623
DH5	2441.0	0.935	1.003	>= 0.623
DH5	2480.0	0.933	1.005	>= 0.622
3DH5	2402.0	1.280	1.005	>= 0.853
3DH5	2441.0	1.263	1.005	>= 0.842
3DH5	2480.0	1.263	1.003	>= 0.842
Inquiry	2441.0	0.823	2.000	>= 0.548

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



20dB Bandwidth and Carrier Frequency Separation



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Number of Hopping Frequency (Conducted)

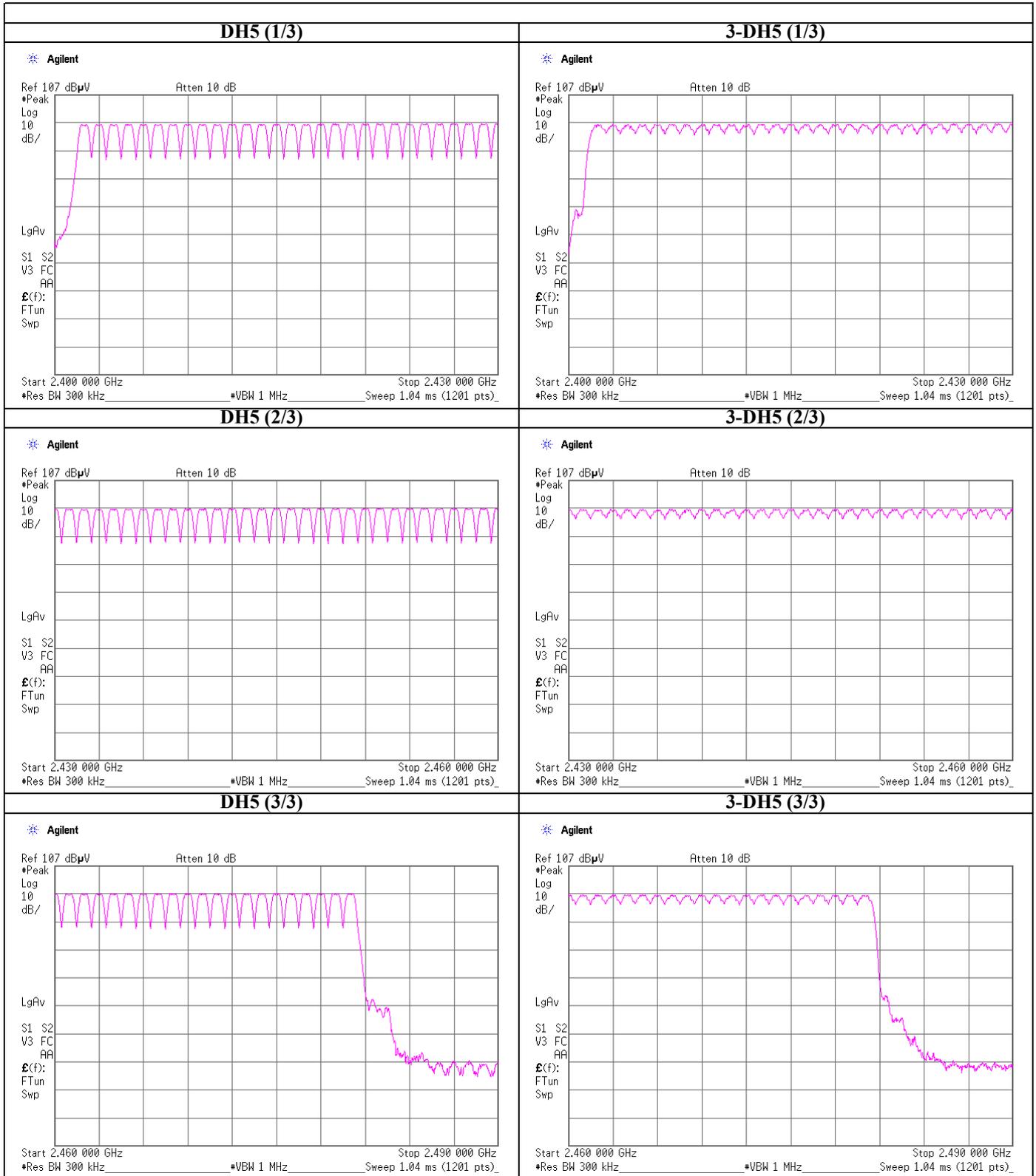
Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date 2010/11/5
Temperature / Humidity 22deg.C. , 53%
Engineer Tatsuya Arai
Mode Tx,

Mode	Number of Channel [times]	Limit [times]
DH5	79	>=15
3-DH5	79	>=15
Inquiry	32	>=15

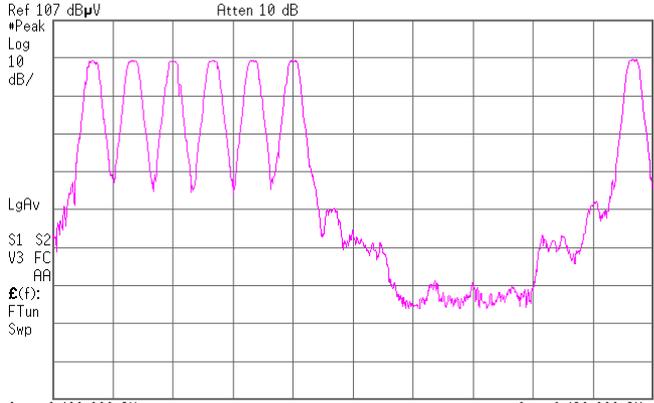
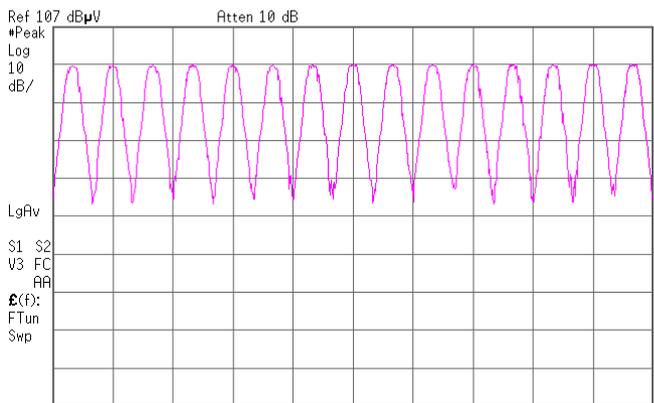
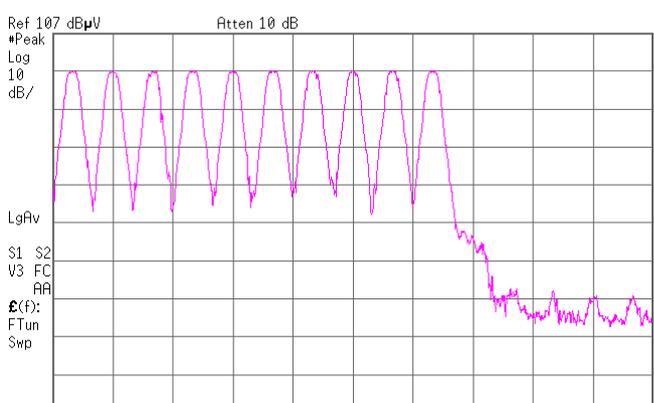
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Number of Hopping Frequency



Number of Hopping Frequency

Inquiry (1/3)	
<p style="margin: 0;">* Agilent</p> <p style="margin: 0;">Ref 107 dBμV Atten 10 dB</p>  <p style="margin: 0;">Start 2.400 000 GHz Stop 2.430 000 GHz #Res BW 300 kHz #VBW 1 MHz Sweep 1.04 ms (1201 pts)</p>	
Inquiry (2/3)	
<p style="margin: 0;">* Agilent</p> <p style="margin: 0;">Ref 107 dBμV Atten 10 dB</p>  <p style="margin: 0;">Start 2.430 000 GHz Stop 2.460 000 GHz #Res BW 300 kHz #VBW 1 MHz Sweep 1.04 ms (1201 pts)</p>	
Inquiry (3/3)	
<p style="margin: 0;">* Agilent</p> <p style="margin: 0;">Ref 107 dBμV Atten 10 dB</p>  <p style="margin: 0;">Start 2.460 000 GHz Stop 2.490 000 GHz #Res BW 300 kHz #VBW 1 MHz Sweep 1.04 ms (1201 pts)</p>	

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Dwell Time (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date 2010/11/5
Temperature / Humidity 22deg.C. , 53%
Engineer Tatsuya Arai
Mode Tx,

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	Limit
			[msec]	[msec]
DH1	50.4 times / 5 sec. x 31.6 sec. = 319 times	0.403	129	400
DH3	25.0 times / 5 sec. x 31.6 sec. = 158 times	1.662	263	400
DH5	16.8 times / 5 sec. x 31.6 sec. = 107 times	2.913	312	400
3DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.418	135	400
3DH3	25.0 times / 5 sec. x 31.6 sec. = 158 times	1.670	264	400
3DH5	16.8 times / 5 sec. x 31.6 sec. = 107 times	2.923	313	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.106	136	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	50	51	50	50	51	50.4
DH3	25	25	25	25	25	25
DH5	17	16	17	17	17	16.8
3DH1	51	51	51	51	51	51
3DH3	25	25	25	25	25	25
3DH5	17	17	17	16	17	16.8

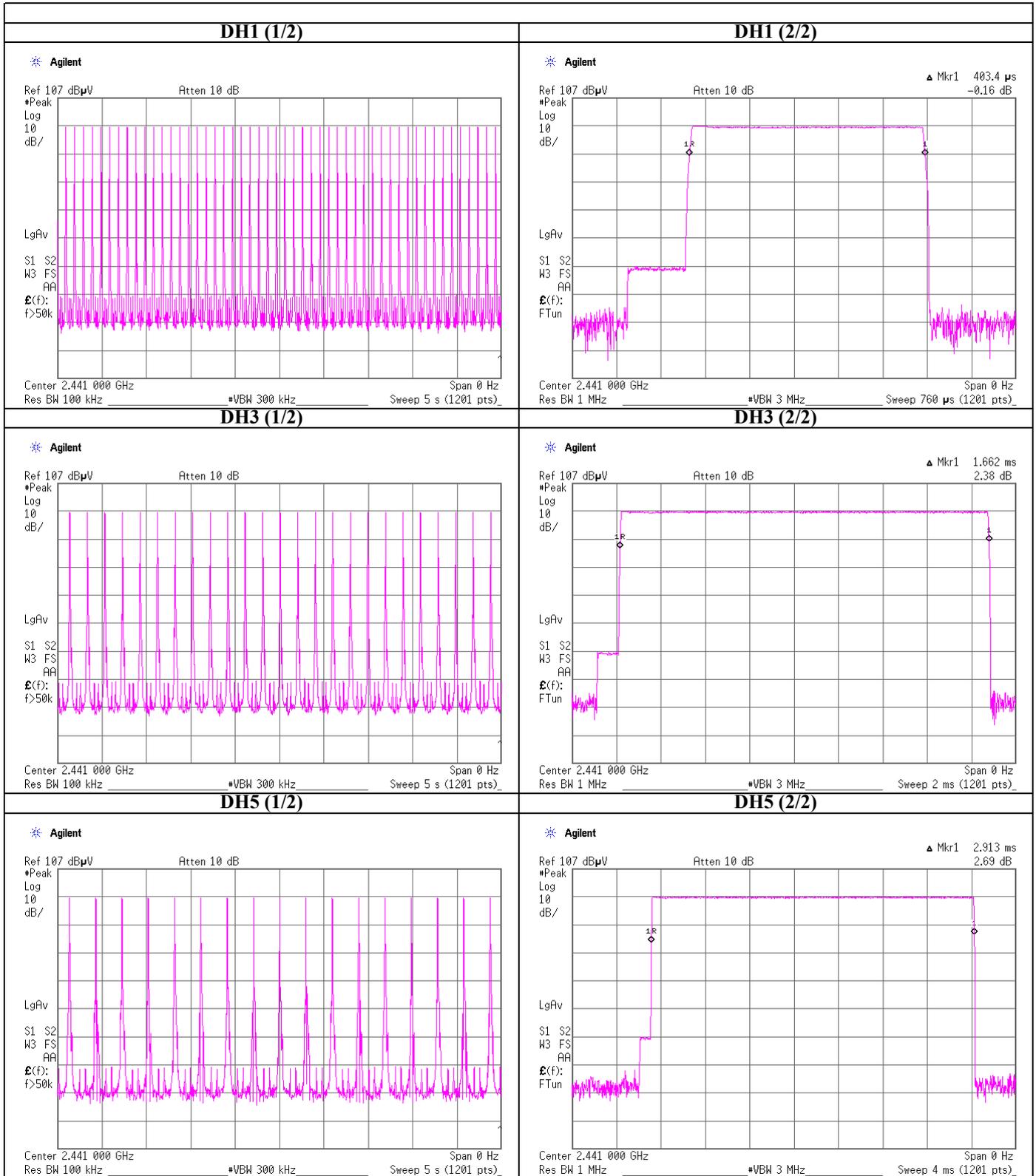
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

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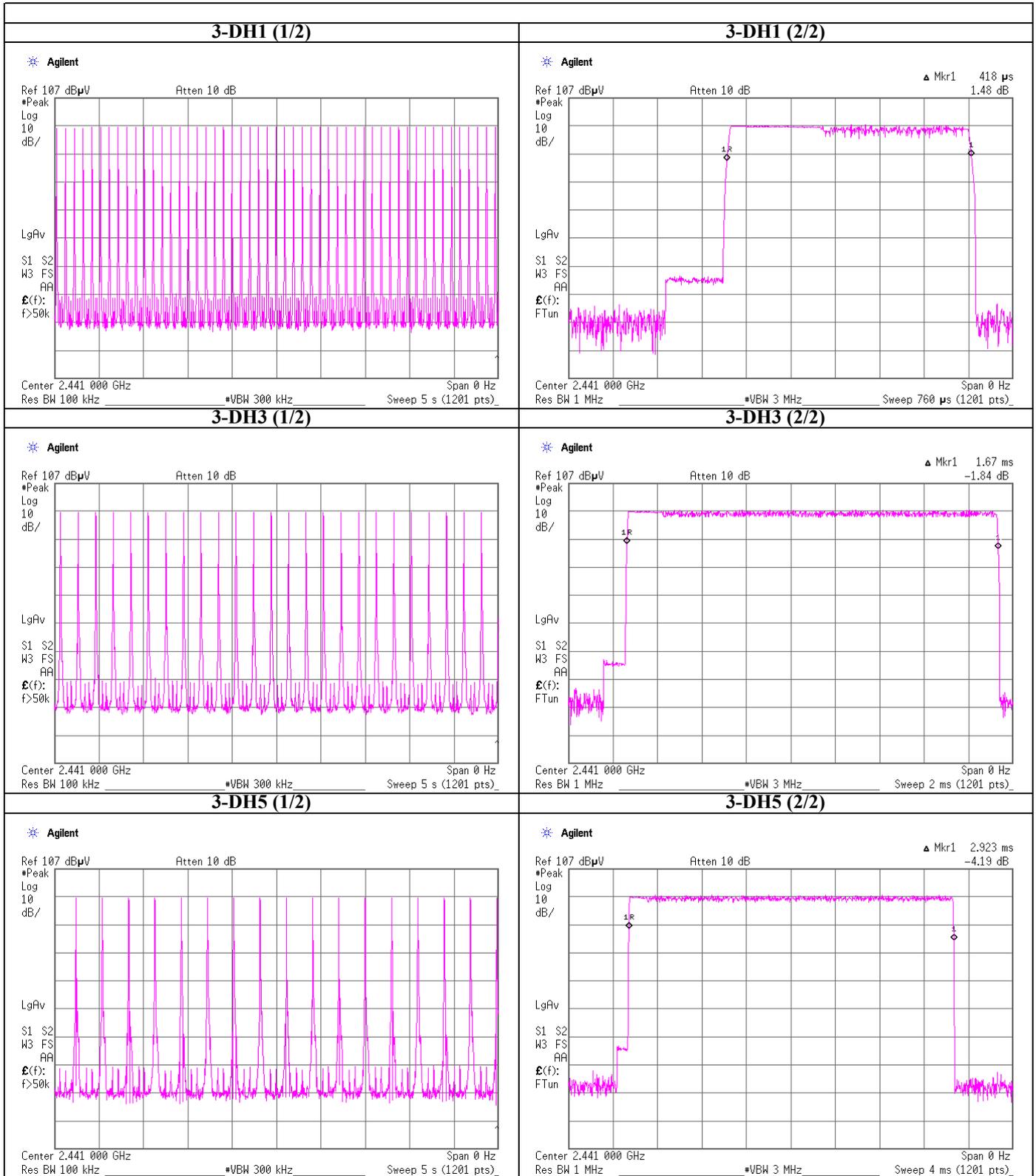
Dwell time



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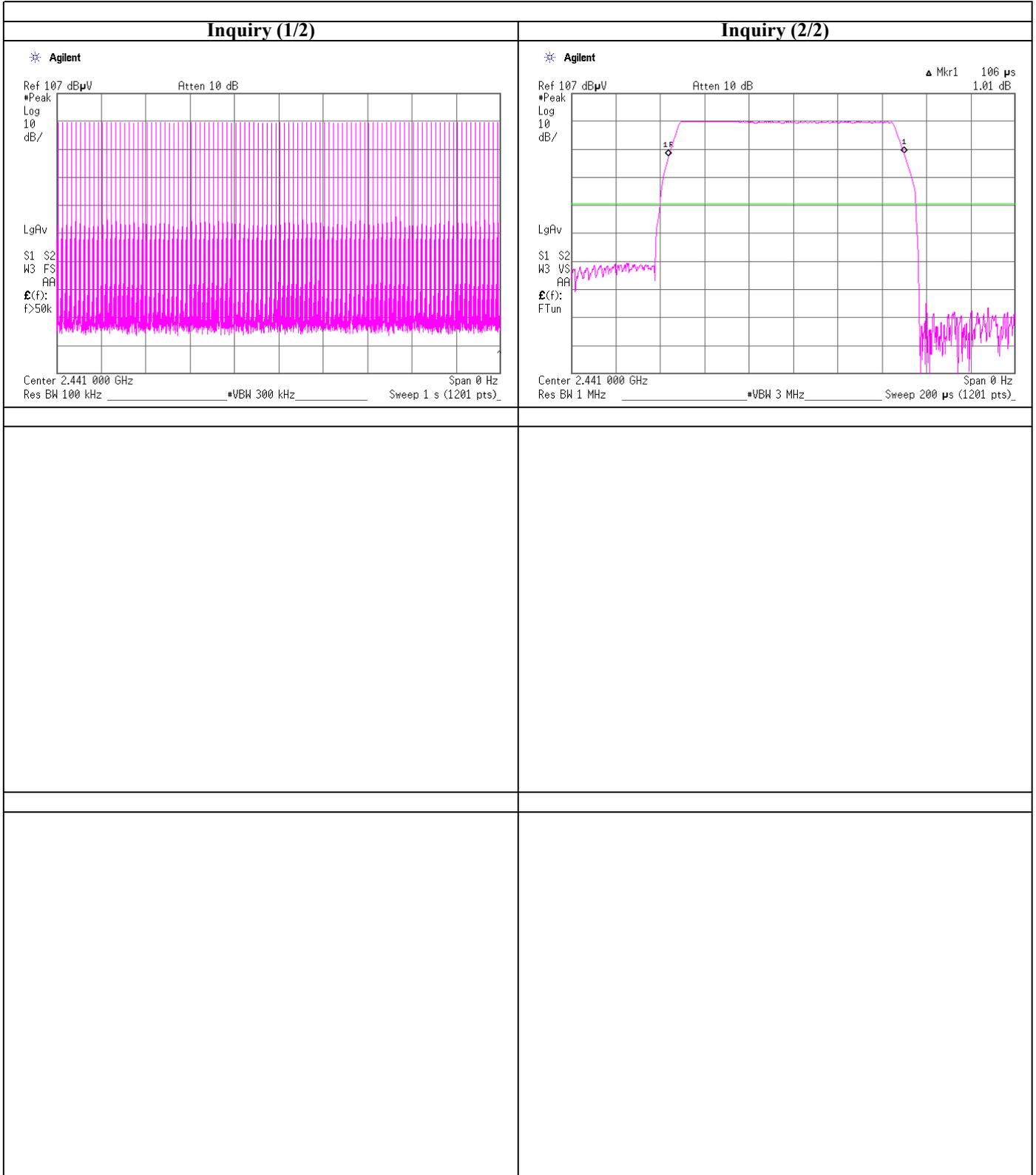
Dwell time



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Dwell time



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Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date 2010/11/5
Temperature / Humidity 22deg.C. , 53%
Engineer Tatsuya Arai
Mode Tx,

BDR (DH5)

Ch	Freq. [MHz]	P/M (PK) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	-10.22	0.78	9.97	0.53	1.13	20.97	125	20.44
Mid	2441.0	-9.90	0.78	9.97	0.85	1.22	20.97	125	20.12
High	2480.0	-9.62	0.79	9.97	1.14	1.30	20.97	125	19.83

EDR (2-DH5)

Ch	Freq. [MHz]	P/M (PK) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	-9.62	0.78	9.97	1.13	1.30	20.97	125	19.84
Mid	2441.0	-9.28	0.78	9.97	1.47	1.40	20.97	125	19.50
High	2480.0	-9.25	0.79	9.97	1.51	1.42	20.97	125	19.46

EDR (3-DH5)

Ch	Freq. [MHz]	P/M (PK) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	-9.60	0.78	9.97	1.15	1.30	20.97	125	19.82
Mid	2441.0	-9.19	0.78	9.97	1.56	1.43	20.97	125	19.41
High	2480.0	-9.10	0.79	9.97	1.66	1.47	20.97	125	19.31

Sample Calculation:

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

* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber / No.3 Semi Anechoic Chamber
 Date 2010/11/1 2010/11/3
 Temperature / Humidity 23deg.C. , 58% 23deg.C. , 40%
 Engineer Tatsuya Arai Akio Hayashi
 Mode Tx, 2480 MHz
 Bluetooth, DHS

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.	81.975	QP	41.4	6.9	7.6	31.8	24.1	40.0	15.9	400	132	
Hori.	173.282	QP	42.1	16.0	8.6	31.8	34.9	43.5	8.6	182	133	
Hori.	216.002	QP	36.2	17.1	8.9	31.7	30.5	46.0	15.5	160	117	
Hori.	249.674	QP	37.7	17.6	9.2	31.7	32.8	46.0	13.2	130	107	
Hori.	324.011	QP	41.7	14.7	6.7	31.8	31.3	46.0	14.7	120	356	
Hori.	1426.470	PK	50.7	24.8	12.6	40.0	48.1	73.9	25.8	116	166	
Hori.	1652.632	PK	49.8	25.7	12.8	40.2	48.1	73.9	25.8	110	133	
Hori.	2483.500	PK	46.3	27.6	13.4	40.1	47.2	73.9	26.7	111	341	
Hori.	3305.318	PK	49.3	29.3	4.9	41.1	42.4	73.9	31.5	154	48	
Hori.	4960.000	PK	55.5	31.9	5.6	40.0	53.0	73.9	20.9	111	147	
Hori.	7440.000	PK	45.2	36.9	7.1	38.7	50.5	73.9	23.4	100	0	
Hori.	9920.000	PK	42.7	38.4	8.0	37.5	51.6	73.9	22.3	100	0	
Hori.	12400.000	PK	43.6	39.1	9.4	37.9	54.2	73.9	19.7	100	0	
Hori.	1426.470	AV	43.5	24.8	12.6	40.0	40.9	53.9	13.0	116	166	VBW = 10Hz
Hori.	1652.632	AV	37.6	25.7	12.8	40.2	35.9	53.9	18.0	110	133	VBW = 10Hz
Hori.	3305.318	AV	37.7	29.3	4.9	41.1	30.8	53.9	23.1	154	48	VBW = 10Hz
Vert.	77.250	QP	37.7	6.6	7.6	31.8	20.1	40.0	19.9	100	192	
Vert.	173.269	QP	40.0	16.0	8.6	31.8	32.8	43.5	10.7	100	30	
Vert.	590.075	QP	39.0	19.0	8.4	32.0	34.4	46.0	11.6	100	113	
Vert.	1426.470	PK	50.9	24.8	12.6	40.0	48.3	73.9	25.6	108	230	
Vert.	1652.632	PK	50.1	25.7	12.8	40.2	48.4	73.9	25.5	118	7	
Vert.	2483.500	PK	47.3	27.6	13.4	40.1	48.2	73.9	25.7	114	151	
Vert.	3305.318	PK	48.9	29.3	4.9	41.1	42.0	73.9	31.9	155	232	
Vert.	4960.000	PK	57.6	31.9	5.6	40.0	55.1	73.9	18.8	129	28	
Vert.	7440.000	PK	44.8	36.9	7.1	38.7	50.1	73.9	23.8	100	0	
Vert.	9920.000	PK	42.7	38.4	8.0	37.5	51.6	73.9	22.3	100	0	
Vert.	12400.000	PK	43.2	39.1	9.4	37.9	53.8	73.9	20.1	100	0	
Vert.	1426.470	AV	43.6	24.8	12.6	40.0	41.0	53.9	12.9	108	230	VBW = 10Hz
Vert.	1652.632	AV	40.6	25.7	12.8	40.2	38.9	53.9	15.0	118	7	VBW = 10Hz
Vert.	3305.318	AV	37.1	29.3	4.9	41.1	30.2	53.9	23.7	155	232	VBW = 10Hz

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

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

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	36.9	27.6	13.4	40.1	-24.7	13.1	54.0	40.9	VBW = 300Hz
Hori.	4960.000	AV	50.3	31.9	5.6	40.0	-24.7	23.1	54.0	30.9	VBW = 300Hz
Hori.	7440.000	AV	34.3	36.9	7.1	38.7	-24.7	14.9	54.0	39.1	VBW = 300Hz
Hori.	9920.000	AV	31.6	38.4	8.0	37.5	-24.7	15.8	54.0	38.2	VBW = 300Hz
Hori.	12400.000	AV	32.3	39.1	9.4	37.9	-24.7	18.2	54.0	35.8	VBW = 300Hz
Vert.	2483.500	AV	36.8	27.6	13.4	40.1	-24.7	13.0	54.0	41.0	VBW = 300Hz
Vert.	4960.000	AV	50.3	31.9	5.6	40.0	-24.7	23.1	54.0	30.9	VBW = 300Hz
Vert.	7440.000	AV	34.3	36.9	7.1	38.7	-24.7	14.9	54.0	39.1	VBW = 300Hz
Vert.	9920.000	AV	31.6	38.4	8.0	37.5	-24.7	15.8	54.0	38.2	VBW = 300Hz
Vert.	12400.000	AV	32.2	39.1	9.4	37.9	-24.7	18.1	54.0	35.9	VBW = 300Hz

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

- Gain(Amprifier) + Dwell time factor (Refer to Duty Fctor data)

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

*No noise was detected above the 5th order harmonics.

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber / No.3 Semi Anechoic Chamber
 Date 2010/11/1 2010/11/3
 Temperature / Humidity 23deg.C. , 58% 23deg.C. , 40%
 Engineer Tatsuya Arai Akio Hayashi
 Mode Tx, 2402 MHz
 Bluetooth, 3-DH5

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.	78.612	QP	43.4	6.5	7.6	31.8	25.7	40.0	14.3	253	136	
Hori.	173.262	QP	41.3	16.0	8.6	31.8	34.1	43.5	9.4	190	156	
Hori.	216.002	QP	36.5	17.1	8.9	31.7	30.8	46.0	15.2	173	121	
Hori.	249.833	QP	38.5	17.6	9.2	31.7	33.6	46.0	12.4	140	99	
Hori.	324.020	QP	41.4	14.7	6.7	31.8	31.0	46.0	15.0	100	350	
Hori.	1426.402	PK	51.4	24.8	12.6	40.0	48.8	73.9	25.1	109	237	
Hori.	1602.008	PK	51.1	25.5	12.7	40.1	49.2	73.9	24.7	107	41	
Hori.	2390.000	PK	48.5	27.5	13.3	40.2	49.1	73.9	24.8	156	147	
Hori.	2399.591	PK	50.9	27.5	13.3	40.2	51.5	73.9	22.4	156	147	
Hori.	2400.000	PK	58.8	27.5	13.3	40.2	59.4	73.9	14.5	156	147	
Hori.	3203.987	PK	53.8	29.2	4.9	41.1	46.8	73.9	27.1	101	1	
Hori.	4802.000	PK	52.9	31.5	5.5	40.1	49.8	73.9	24.1	124	159	
Hori.	7206.000	PK	51.7	36.4	6.7	38.3	56.5	73.9	17.4	100	0	
Hori.	9608.000	PK	49.0	37.9	7.8	37.3	57.4	73.9	16.5	100	0	
Hori.	12010.000	PK	51.3	39.4	9.0	38.4	61.3	73.9	12.6	100	0	
Hori.	1426.402	AV	42.6	24.8	12.6	40.0	40.0	53.9	13.9	109	237	VBW = 10Hz
Hori.	1602.008	AV	37.5	25.5	12.7	40.1	35.6	53.9	18.3	107	41	VBW = 10Hz
Hori.	3203.987	AV	40.5	29.2	4.9	41.1	33.5	53.9	20.4	101	1	VBW = 10Hz
Vert.	81.300	QP	37.6	6.8	7.6	31.8	20.2	40.0	19.8	100	232	
Vert.	173.264	QP	39.6	16.0	8.6	31.8	32.4	43.5	11.1	100	30	
Vert.	590.095	QP	38.9	19.0	8.4	32.0	34.3	46.0	11.7	100	127	
Vert.	1426.402	PK	51.5	24.8	12.6	40.0	48.9	73.9	25.0	121	165	
Vert.	1602.008	PK	50.0	25.5	12.7	40.1	48.1	73.9	25.8	100	198	
Vert.	2390.000	PK	49.0	27.5	13.3	40.2	49.6	73.9	24.3	100	0	
Vert.	2399.591	PK	50.2	27.5	13.3	40.2	50.8	73.9	23.1	110	209	
Vert.	2400.000	PK	56.1	27.5	13.3	40.2	56.7	73.9	17.2	110	209	
Vert.	3203.987	PK	48.8	29.2	4.9	41.1	41.8	73.9	32.1	110	219	
Vert.	4802.000	PK	52.0	31.5	5.5	40.1	48.9	73.9	25.0	115	187	
Vert.	7206.000	PK	51.6	36.4	6.7	38.3	56.4	73.9	17.5	100	0	
Vert.	9608.000	PK	49.4	37.9	7.8	37.3	57.8	73.9	16.1	100	0	
Vert.	12010.000	PK	51.5	39.4	9.0	38.4	61.5	73.9	12.4	100	0	
Vert.	1426.402	AV	43.4	24.8	12.6	40.0	40.8	53.9	13.1	121	165	VBW = 10Hz
Vert.	1602.008	AV	37.9	25.5	12.7	40.1	36.0	53.9	17.9	100	198	VBW = 10Hz
Vert.	3203.987	AV	36.7	29.2	4.9	41.1	29.7	53.9	24.2	110	219	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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	35.7	27.5	13.3	40.2	-24.7	11.6	54.0	42.4	VBW = 300Hz
Hori.	2399.591	AV	39.5	27.5	13.3	40.2	-24.7	15.4	54.0	38.6	VBW = 300Hz
Hori.	2400.000	AV	45.5	27.5	13.3	40.2	-24.7	21.4	54.0	32.6	VBW = 300Hz
Hori.	4802.000	AV	41.0	31.5	5.5	40.1	-24.7	13.2	54.0	40.8	VBW = 300Hz
Hori.	7206.000	AV	38.8	36.4	6.7	38.3	-24.7	18.9	54.0	35.1	VBW = 300Hz
Hori.	9608.000	AV	36.4	37.9	7.8	37.3	-24.7	20.1	54.0	33.9	VBW = 300Hz
Hori.	12010.000	AV	38.7	39.4	9.0	38.4	-24.7	24.0	54.0	30.0	VBW = 300Hz
Vert.	2390.000	AV	35.7	27.5	13.3	40.2	-24.7	11.6	54.0	42.4	VBW = 300Hz
Vert.	2399.591	AV	37.9	27.5	13.3	40.2	-24.7	13.8	54.0	40.2	VBW = 300Hz
Vert.	2400.000	AV	42.6	27.5	13.3	40.2	-24.7	18.5	54.0	35.5	VBW = 300Hz
Vert.	4802.000	AV	39.5	31.5	5.5	40.1	-24.7	11.7	54.0	42.3	VBW = 300Hz
Vert.	7206.000	AV	38.8	36.4	6.7	38.3	-24.7	18.9	54.0	35.1	VBW = 300Hz
Vert.	9608.000	AV	36.3	37.9	7.8	37.3	-24.7	20.0	54.0	34.0	VBW = 300Hz
Vert.	12010.000	AV	38.7	39.4	9.0	38.4	-24.7	24.0	54.0	30.0	VBW = 300Hz

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

- Gain(Amplifier) + Dwell time factor (Refer to Duty Fctor data)

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

*No noise was detected above the 5th order harmonics.

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber / No.3 Semi Anechoic Chamber
 Date 2010/11/1 2010/11/3
 Temperature / Humidity 23deg.C. , 58% 23deg.C. , 40%
 Engineer Tatsuya Arai Akio Hayashi
 Mode Tx, 2441 MHz
 Bluetooth, 3-DH5

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.	84.651	QP	41.8	7.4	7.7	31.8	25.1	40.0	14.9	196	146	
Hori.	173.269	QP	42.0	16.0	8.6	31.8	34.8	43.5	8.7	180	135	
Hori.	216.008	QP	36.5	17.1	8.9	31.7	30.8	46.0	15.2	162	117	
Hori.	249.888	QP	38.0	17.6	9.2	31.7	33.1	46.0	12.9	133	96	
Hori.	324.018	QP	41.1	14.7	6.7	31.8	30.7	46.0	15.3	100	344	
Hori.	1426.440	PK	52.0	24.8	12.6	40.0	49.4	73.9	24.5	107	219	
Hori.	1626.683	PK	50.6	25.6	12.7	40.1	48.8	73.9	25.1	100	0	
Hori.	3253.328	PK	48.1	29.3	4.8	41.1	41.1	73.9	32.8	136	47	
Hori.	4882.000	PK	50.6	31.7	5.6	40.0	47.9	73.9	26.0	100	22	
Hori.	7323.000	PK	46.0	36.7	6.9	38.5	51.1	73.9	22.8	100	0	
Hori.	9764.000	PK	44.2	38.2	7.8	37.4	52.8	73.9	21.1	100	0	
Hori.	12205.000	PK	44.3	39.2	9.1	38.1	54.5	73.9	19.4	100	0	
Hori.	1426.440	AV	44.0	24.8	12.6	40.0	41.4	53.9	12.5	107	219	VBW = 10Hz
Hori.	1626.683	AV	38.6	25.6	12.7	40.1	36.8	53.9	17.1	100	0	VBW = 10Hz
Hori.	3253.328	AV	35.1	29.3	4.8	41.1	28.1	53.9	25.8	136	47	VBW = 10Hz
Vert.	79.819	QP	37.8	6.5	7.6	31.8	20.1	40.0	19.9	100	36	
Vert.	173.251	QP	39.4	16.0	8.6	31.8	32.2	43.5	11.3	100	38	
Vert.	585.241	QP	38.2	18.9	8.3	32.0	33.4	46.0	12.6	100	125	
Vert.	1426.440	PK	51.3	24.8	12.6	40.0	48.7	73.9	25.2	100	328	
Vert.	1626.683	PK	50.5	25.6	12.7	40.1	48.7	73.9	25.2	100	202	
Vert.	3253.328	PK	48.9	29.3	4.8	41.1	41.9	73.9	32.0	139	0	
Vert.	4882.000	PK	52.7	31.7	5.6	40.0	50.0	73.9	23.9	103	358	
Vert.	7323.000	PK	45.9	36.7	6.9	38.5	51.0	73.9	22.9	100	0	
Vert.	9764.000	PK	44.2	38.2	7.8	37.4	52.8	73.9	21.1	100	0	
Vert.	12205.000	PK	45.5	39.2	9.1	38.1	55.7	73.9	18.2	100	0	
Vert.	1426.440	AV	42.5	24.8	12.6	40.0	39.9	53.9	14.0	100	328	VBW = 10Hz
Vert.	1626.683	AV	39.8	25.6	12.7	40.1	38.0	53.9	15.9	100	202	VBW = 10Hz
Vert.	3253.328	AV	39.6	29.3	4.8	41.1	32.6	53.9	21.3	139	0	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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	39.4	31.7	5.6	40.0	-24.7	12.0	54.0	42.0	VBW = 300Hz
Hori.	7323.000	AV	31.5	36.7	6.9	38.5	-24.7	11.9	54.0	42.1	VBW = 300Hz
Hori.	9764.000	AV	30.1	38.2	7.8	37.4	-24.7	14.0	54.0	40.0	VBW = 300Hz
Hori.	12205.000	AV	31.5	39.2	9.1	38.1	-24.7	17.0	54.0	37.0	VBW = 300Hz
Vert.	4882.000	AV	41.4	31.7	5.6	40.0	-24.7	14.0	54.0	40.0	VBW = 300Hz
Vert.	7323.000	AV	31.5	36.7	6.9	38.5	-24.7	11.9	54.0	42.1	VBW = 300Hz
Vert.	9764.000	AV	30.1	38.2	7.8	37.4	-24.7	14.0	54.0	40.0	VBW = 300Hz
Vert.	12205.000	AV	31.5	39.2	9.1	38.1	-24.7	17.0	54.0	37.0	VBW = 300Hz

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

- Gain(Amplifier) + Dwell time factor (Refer to Duty Fctor data)

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

*No noise was detected above the 5th order harmonics.

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber / No.3 Semi Anechoic Chamber
Date 2010/11/1 2010/11/3
Temperature / Humidity 23deg.C. , 58% 23deg.C. , 40%
Engineer Tatsuya Arai Akio Hayashi
Mode Tx, 2480 MHz
 Bluetooth, 3-DH5

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.	79.950	QP	40.6	6.5	7.6	31.8	22.9	40.0	17.1	196	142	
Hori.	173.264	QP	41.8	16.0	8.6	31.8	34.6	43.5	8.9	193	144	
Hori.	216.300	QP	36.6	17.1	8.9	31.7	30.9	46.0	15.1	165	115	
Hori.	249.788	QP	38.6	17.6	9.2	31.7	33.7	46.0	12.3	136	101	
Hori.	324.027	QP	41.3	14.7	6.7	31.8	30.9	46.0	15.1	100	351	
Hori.	1426.433	PK	49.8	24.8	12.6	40.0	47.2	73.9	26.7	112	237	
Hori.	1652.500	PK	47.8	25.7	12.8	40.2	46.1	73.9	27.8	116	133	
Hori.	2483.500	PK	43.3	27.6	13.4	40.1	44.2	73.9	29.7	110	329	
Hori.	3305.381	PK	50.6	29.3	4.9	41.1	43.7	73.9	30.2	100	187	
Hori.	4960.000	PK	48.7	31.9	5.6	40.0	46.2	73.9	27.7	100	150	
Hori.	7440.000	PK	47.7	36.9	7.1	38.7	53.0	73.9	20.9	100	0	
Hori.	9920.000	PK	44.8	38.4	8.0	37.5	53.7	73.9	20.2	100	0	
Hori.	12400.000	PK	45.2	39.1	9.4	37.9	55.8	73.9	18.1	100	0	
Hori.	1426.433	AV	42.9	24.8	12.6	40.0	40.3	53.9	13.6	112	237	VBW = 10Hz
Hori.	1652.500	AV	37.1	25.7	12.8	40.2	35.4	53.9	18.5	116	133	VBW = 10Hz
Hori.	3305.381	AV	38.2	29.3	4.9	41.1	31.3	53.9	22.6	100	187	VBW = 10Hz
Vert.	81.975	QP	38.6	6.9	7.6	31.8	21.3	40.0	18.7	100	1	
Vert.	173.258	QP	39.8	16.0	8.6	31.8	32.6	43.5	10.9	100	20	
Vert.	585.250	QP	38.8	18.9	8.3	32.0	34.0	46.0	12.0	100	107	
Vert.	1426.433	PK	50.4	24.8	12.6	40.0	47.8	73.9	26.1	120	165	
Vert.	1652.500	PK	49.2	25.7	12.8	40.2	47.5	73.9	26.4	124	356	
Vert.	2483.500	PK	43.4	27.6	13.4	40.1	44.3	73.9	29.6	108	345	
Vert.	3305.381	PK	50.7	29.3	4.9	41.1	43.8	73.9	30.1	140	324	
Vert.	4960.000	PK	48.7	31.9	5.6	40.0	46.2	73.9	27.7	114	26	
Vert.	7440.000	PK	47.7	36.9	7.1	38.7	53.0	73.9	20.9	100	0	
Vert.	9920.000	PK	44.4	38.4	8.0	37.5	53.3	73.9	20.6	100	0	
Vert.	12400.000	PK	45.7	39.1	9.4	37.9	56.3	73.9	17.6	100	0	
Vert.	1426.433	AV	43.4	24.8	12.6	40.0	40.8	53.9	13.1	120	165	VBW = 10Hz
Vert.	1652.500	AV	40.6	25.7	12.8	40.2	38.9	53.9	15.0	124	356	VBW = 10Hz
Vert.	3305.381	AV	39.9	29.3	4.9	41.1	33.0	53.9	20.9	140	324	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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	34.4	27.6	13.4	40.1	-24.7	10.6	54.0	43.4	VBW = 300Hz
Hori.	4960.000	AV	35.8	31.9	5.6	40.0	-24.7	8.6	54.0	45.4	VBW = 300Hz
Hori.	7440.000	AV	35.3	36.9	7.1	38.7	-24.7	15.9	54.0	38.1	VBW = 300Hz
Hori.	9920.000	AV	32.4	38.4	8.0	37.5	-24.7	16.6	54.0	37.4	VBW = 300Hz
Hori.	12400.000	AV	33.0	39.1	9.4	37.9	-24.7	18.9	54.0	35.1	VBW = 300Hz
Vert.	2483.500	AV	34.8	27.6	13.4	40.1	-24.7	11.0	54.0	43.0	VBW = 300Hz
Vert.	4960.000	AV	39.0	31.9	5.6	40.0	-24.7	11.8	54.0	42.2	VBW = 300Hz
Vert.	7440.000	AV	35.3	36.9	7.1	38.7	-24.7	15.9	54.0	38.1	VBW = 300Hz
Vert.	9920.000	AV	32.3	38.4	8.0	37.5	-24.7	16.5	54.0	37.5	VBW = 300Hz
Vert.	12400.000	AV	33.0	39.1	9.4	37.9	-24.7	18.9	54.0	35.1	VBW = 300Hz

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

- Gain(Amplifier) + Dwell time factor (Refer to Duty Fctor data)

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

*No noise was detected above the 5th order harmonics.

UL Japan, Inc.

Shonan EMC Lab.

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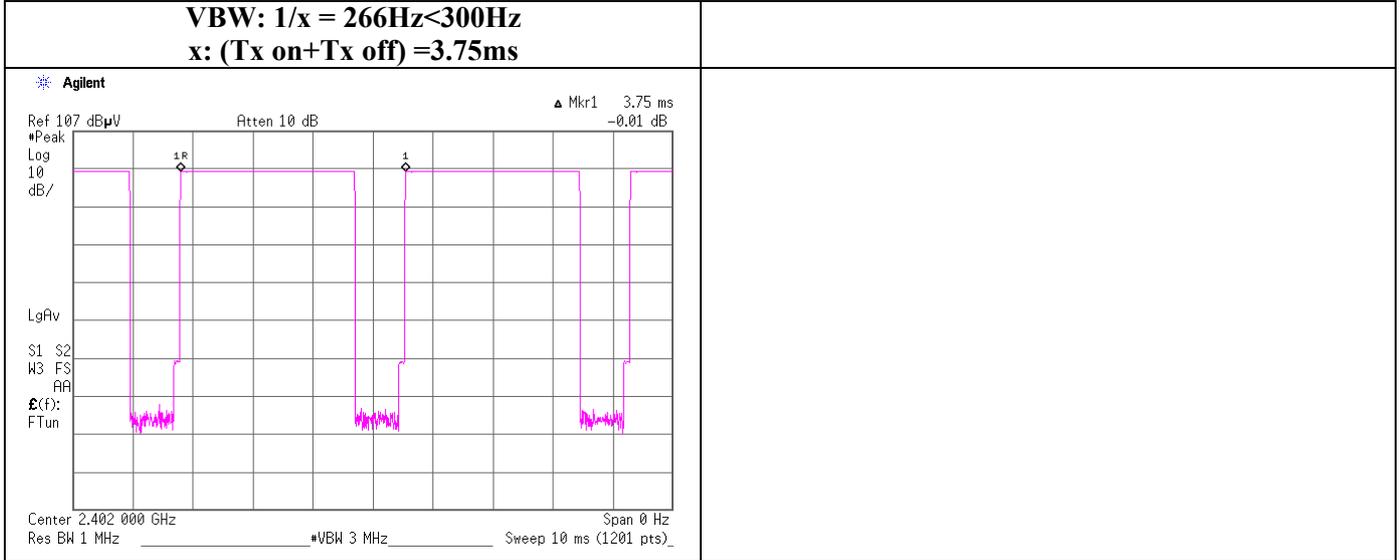
Facsimile : +81 463 50 6401

Spurious emission (Radiated)

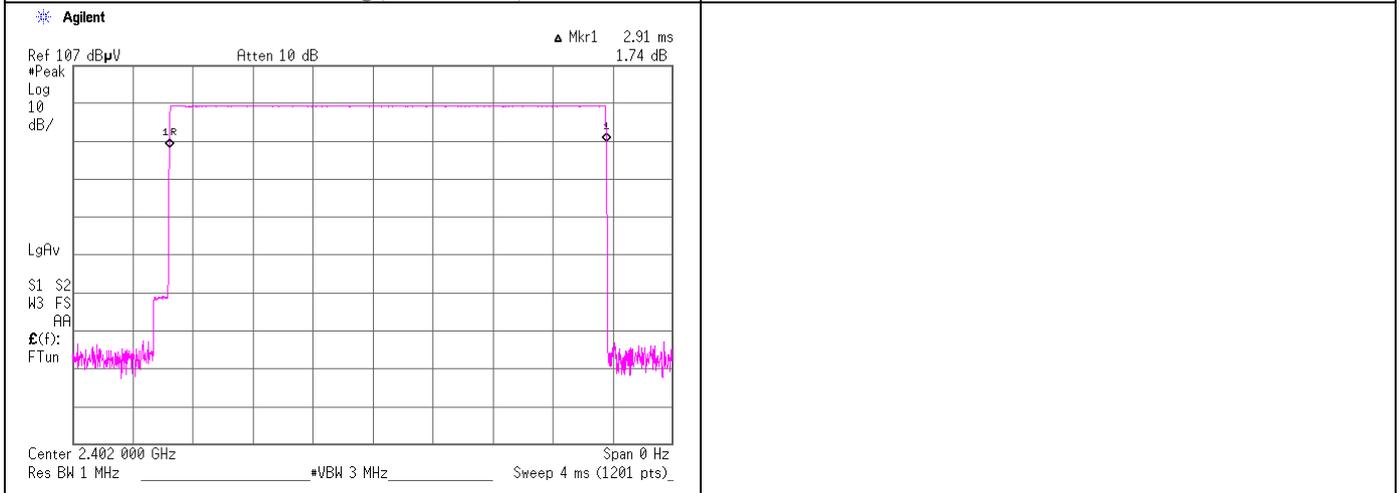
DH5,

VBW (AV) Calculation

VBW: $1/x = 266\text{Hz} < 300\text{Hz}$
x: (Tx on+Tx off) = 3.75ms



Worst 100ms,
***1) Dwell time factor = $20\log(2.91*2/100) = -24.70\text{dB}$**



*1) ON time of some channel during 100ms: Twice
This is the worst case in hopping sequence of Bluetooth.

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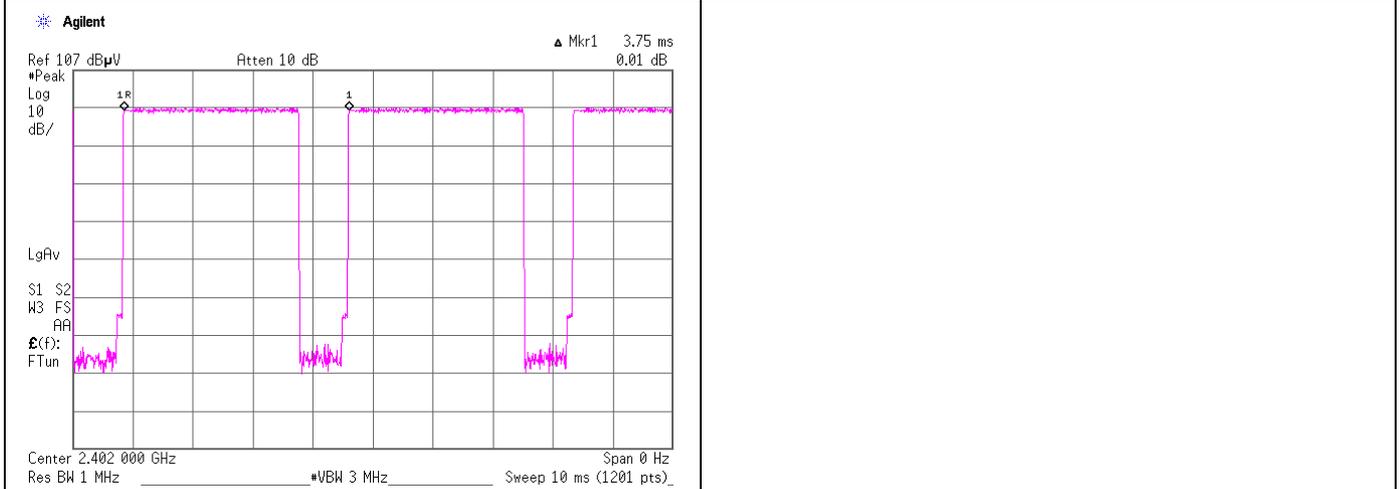
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Spurious emission (Radiated)

3-DH5,

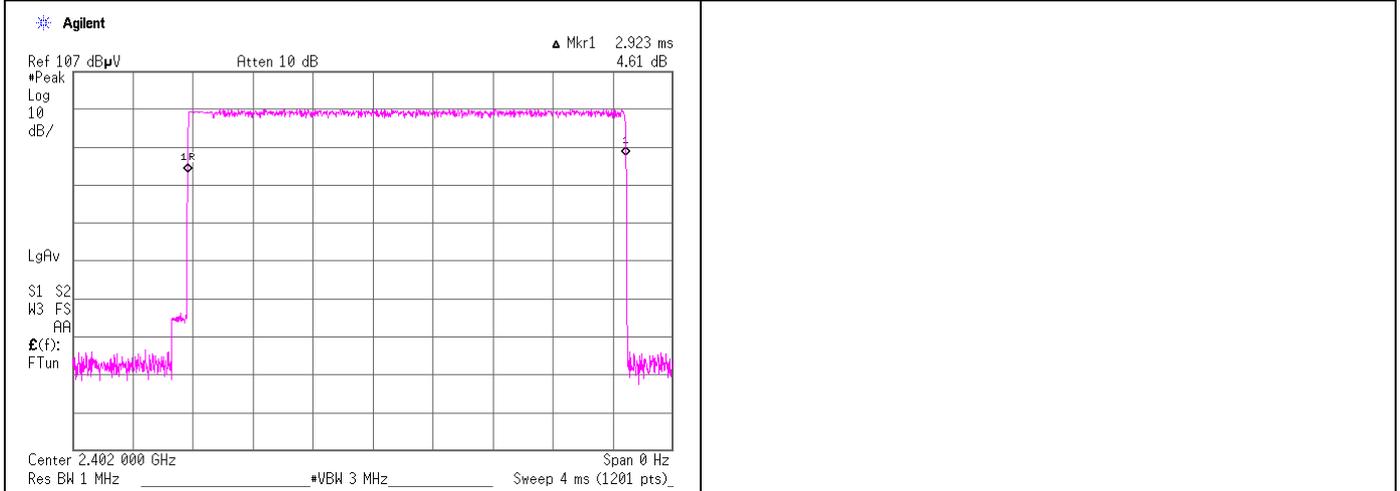
VBW (AV) Calculation

**VBW: $1/x = 266\text{Hz} < 300\text{Hz}$
x: (Tx on+Tx off) = 3.75ms**



Worst 100ms,

***1) Dwell time factor = $20\log(2.923*2/100) = -24.66\text{dB}$**



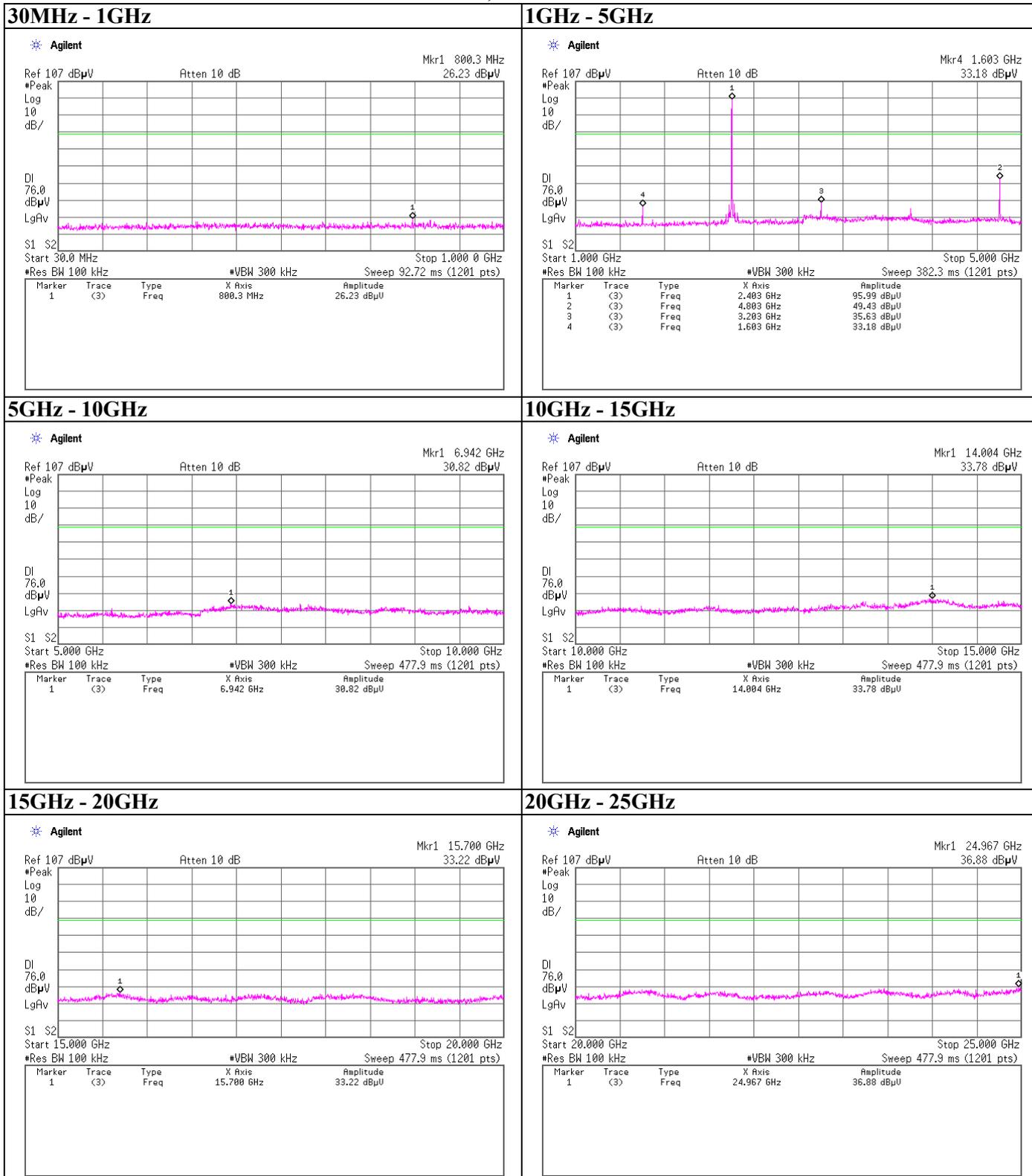
*1) ON time of some channel during 100ms: Twice
This is the worst case in hopping sequence of Bluetooth.

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Spurious emission (Conducted)

DH5,
 Tx, 2402MHz

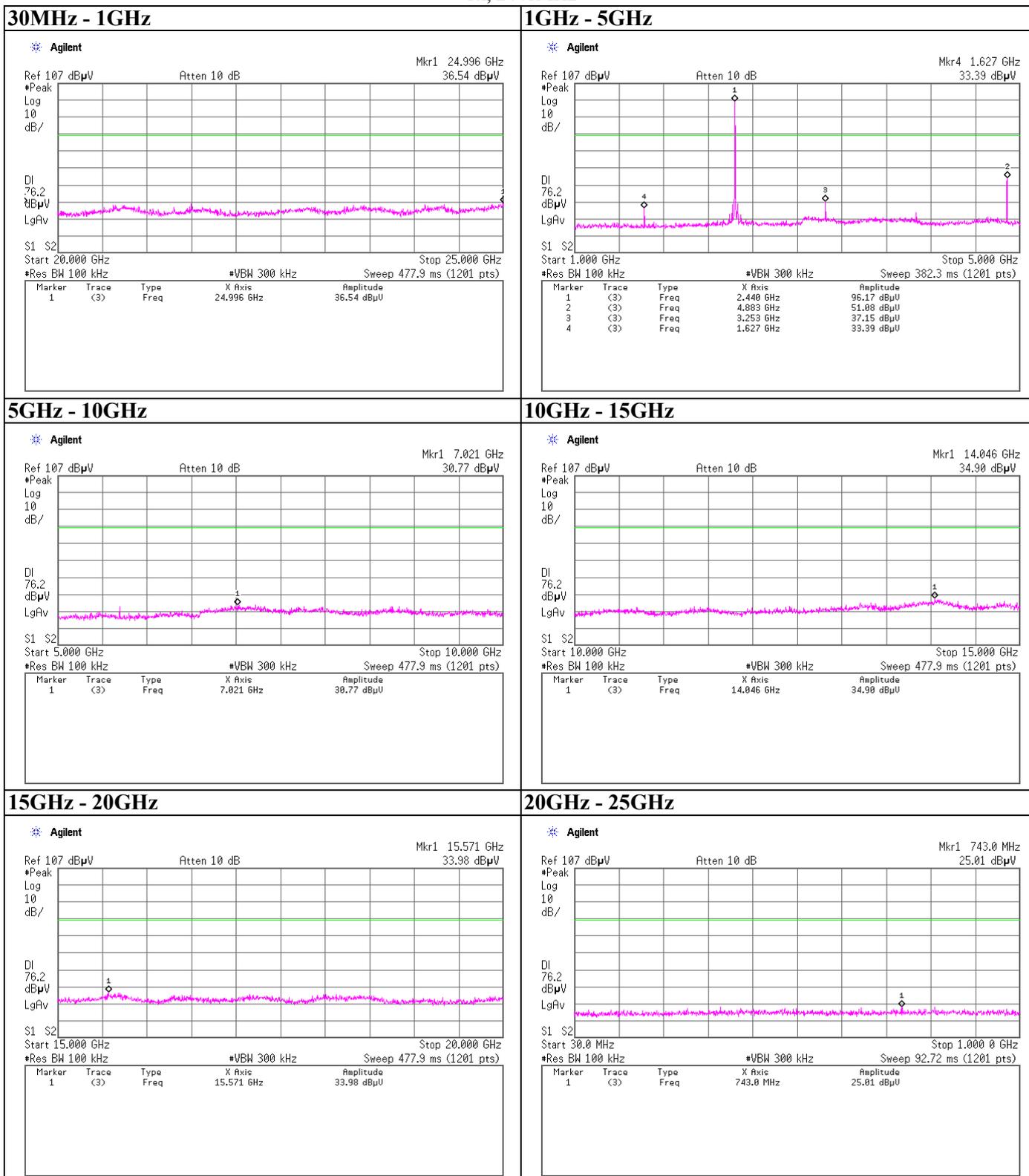


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Spurious emission (Conducted)

DH5,
 Tx, 2441MHz

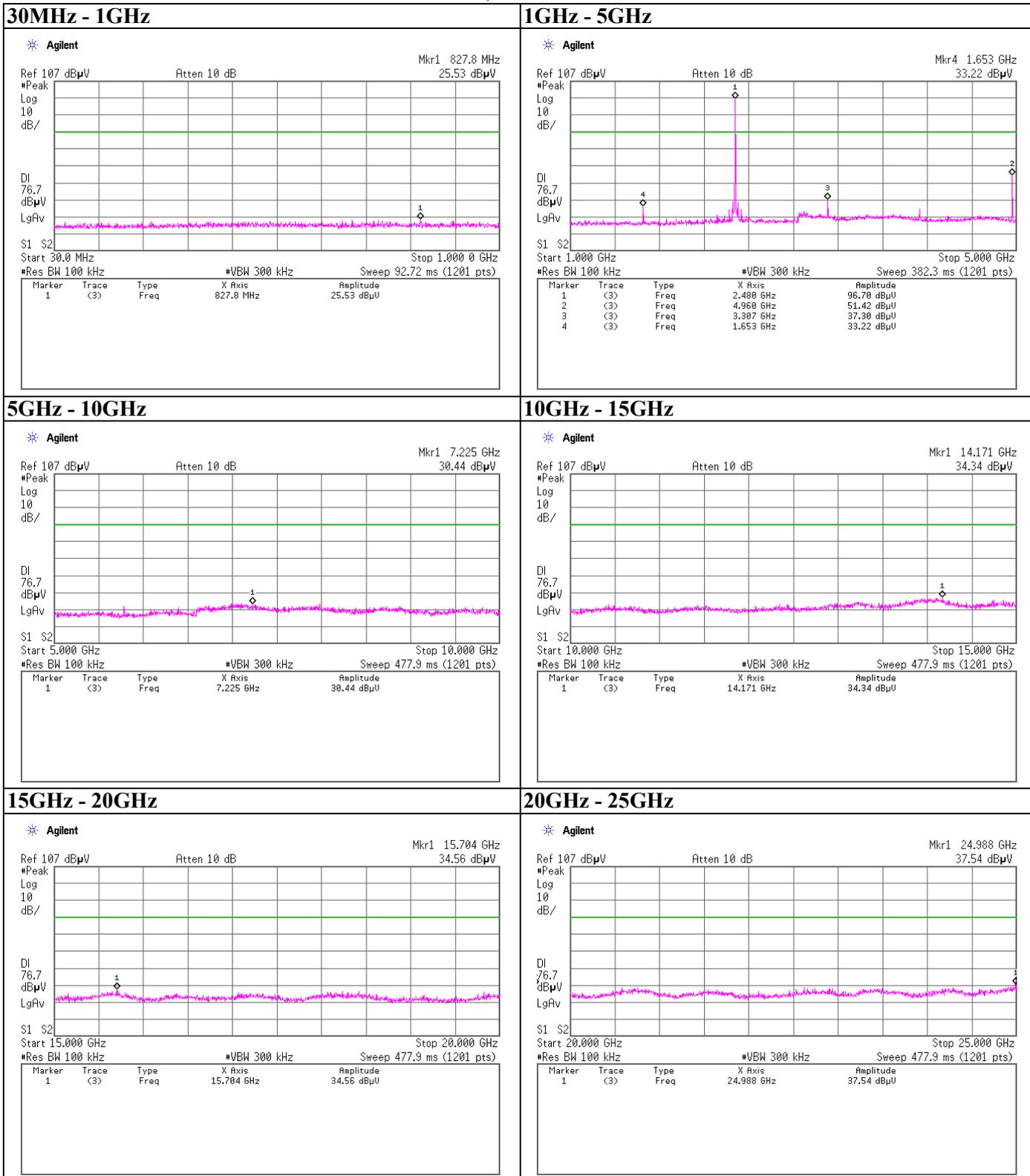


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Spurious emission (Conducted)

DH5,
 Tx, 2480MHz

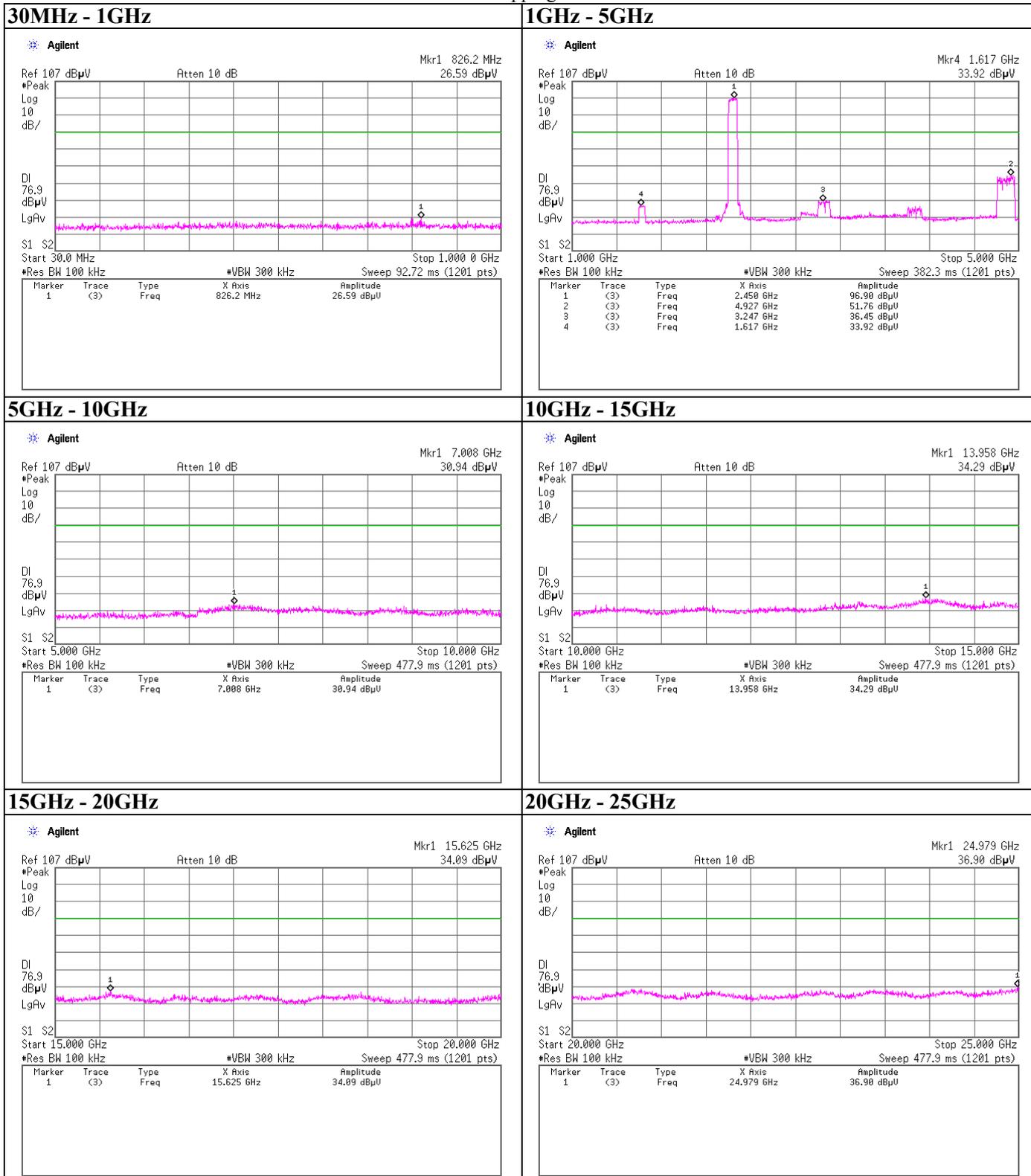


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Spurious emission (Conducted)

DH5,
Hopping

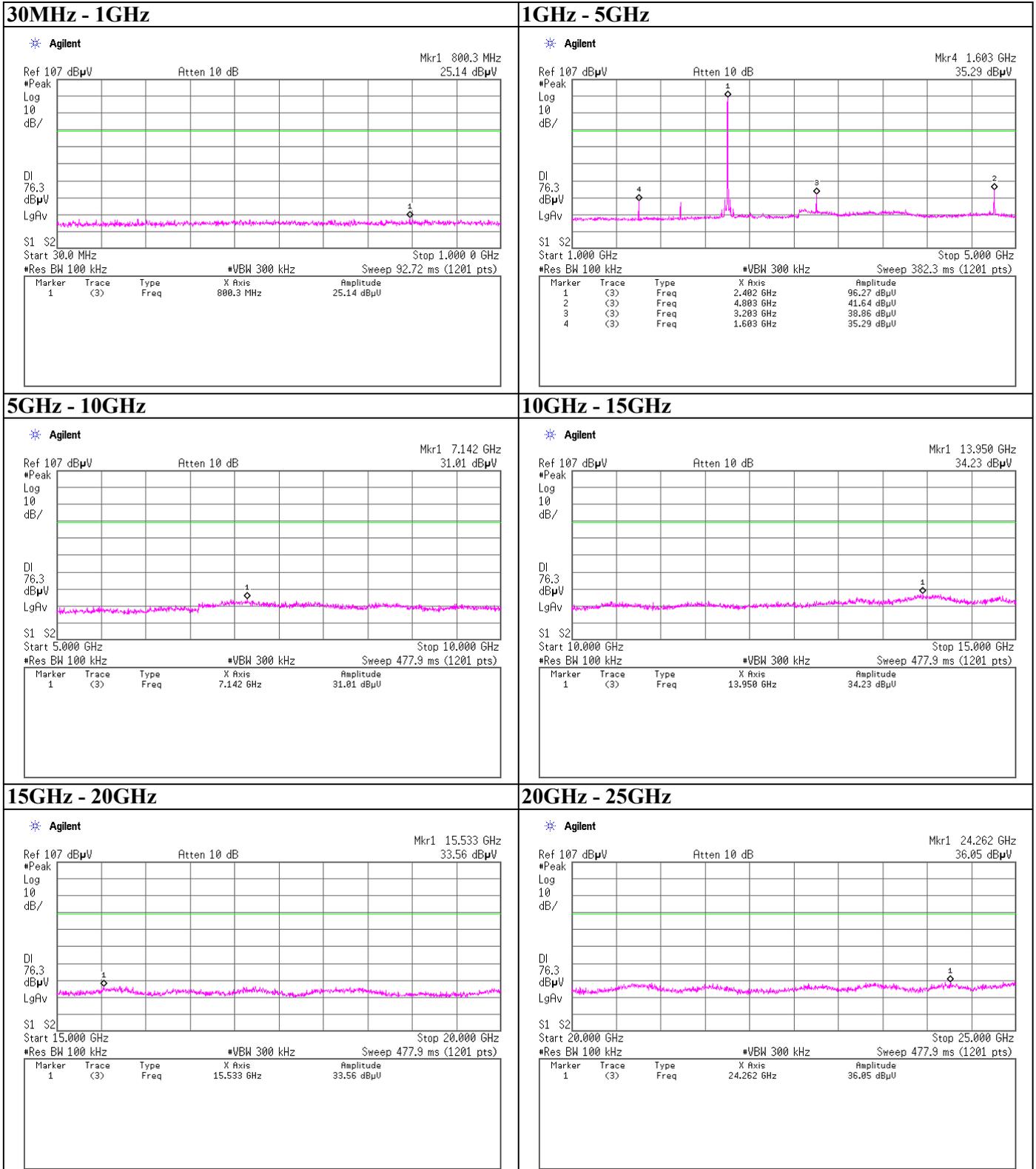


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Spurious emission (Conducted)

3-DH5,
Tx, 2402MHz

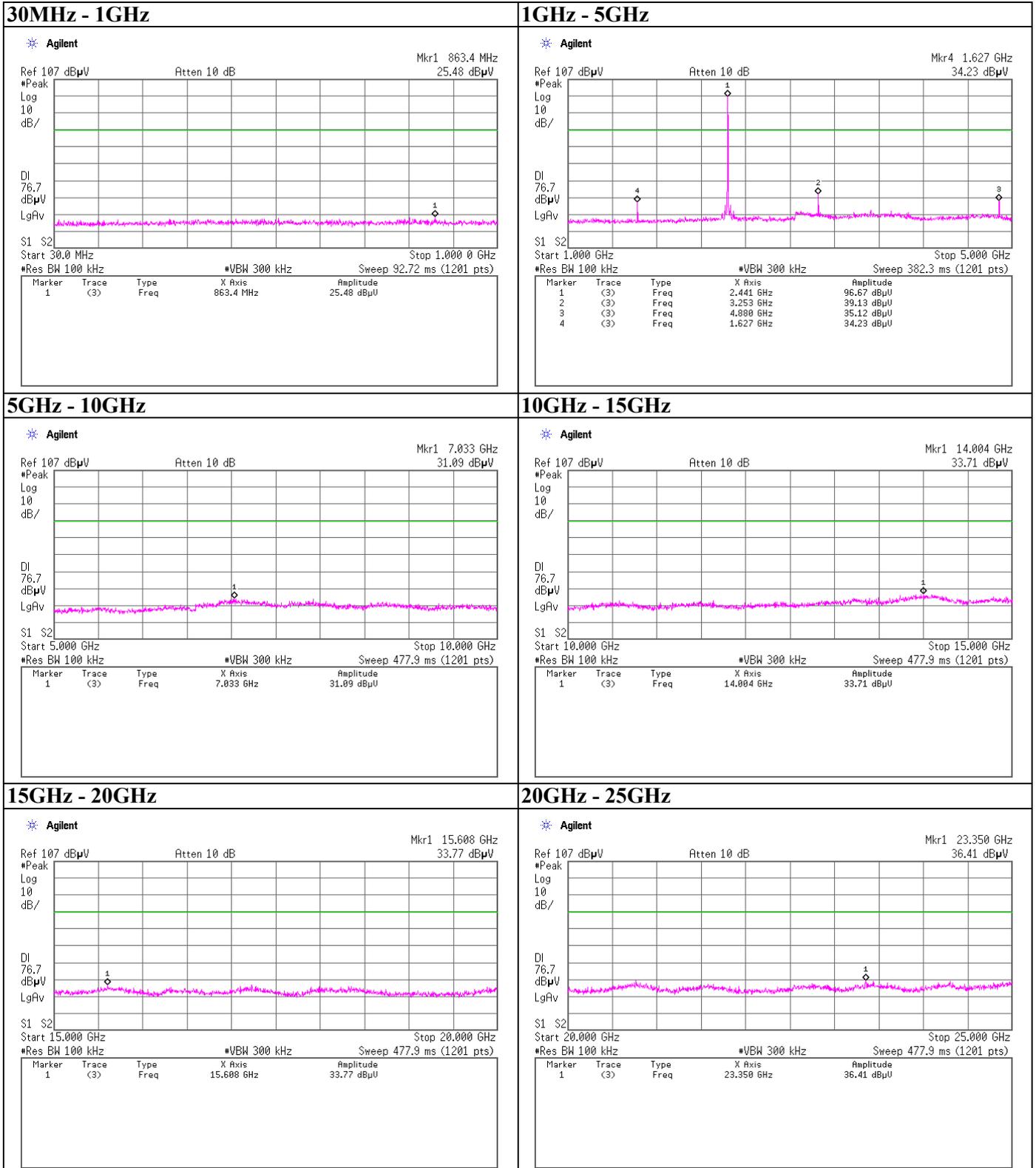


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Spurious emission (Conducted)

3-DH5,
 Tx, 2441MHz

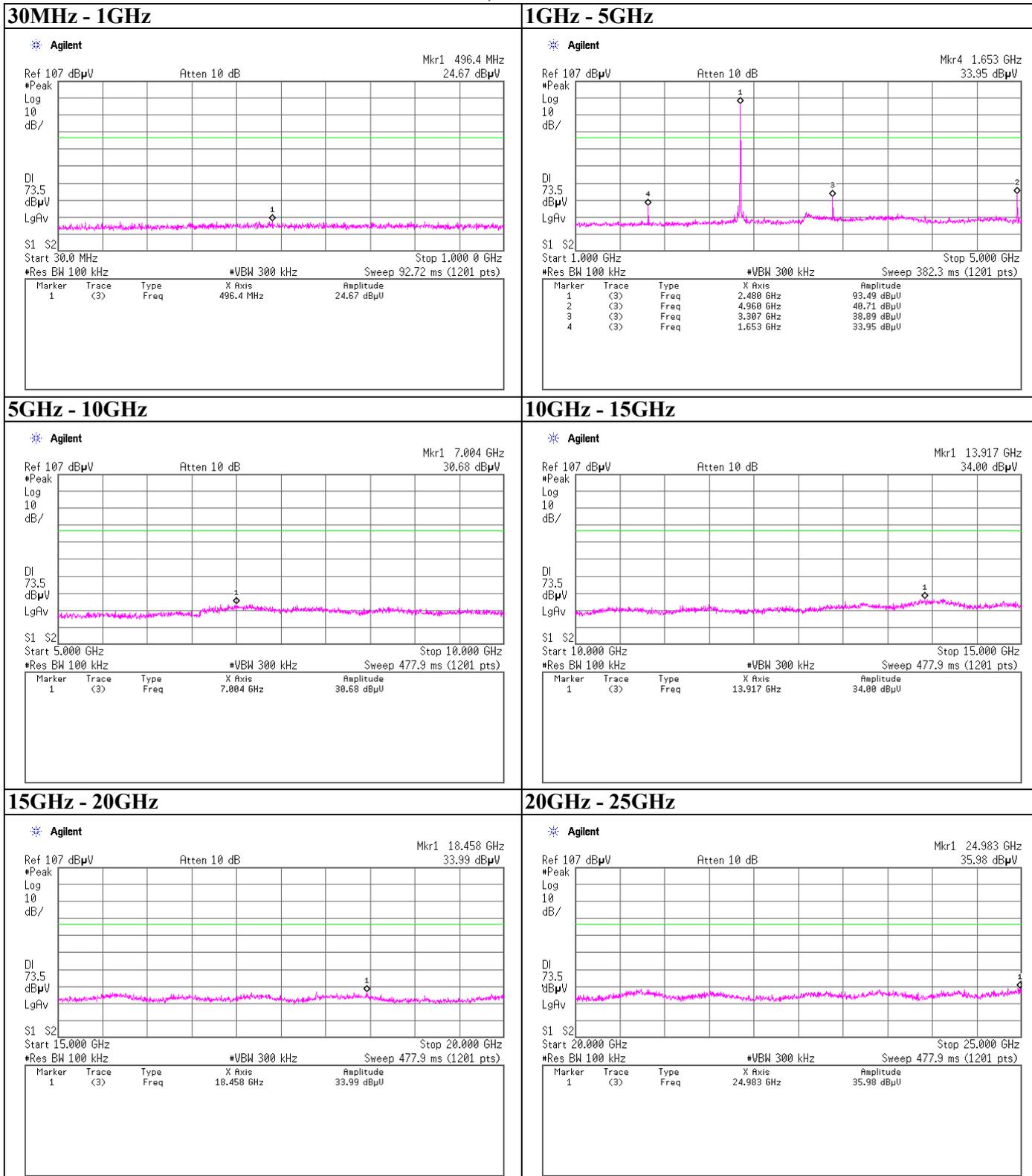


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Spurious emission (Conducted)

3-DH5,
Tx, 2480MHz

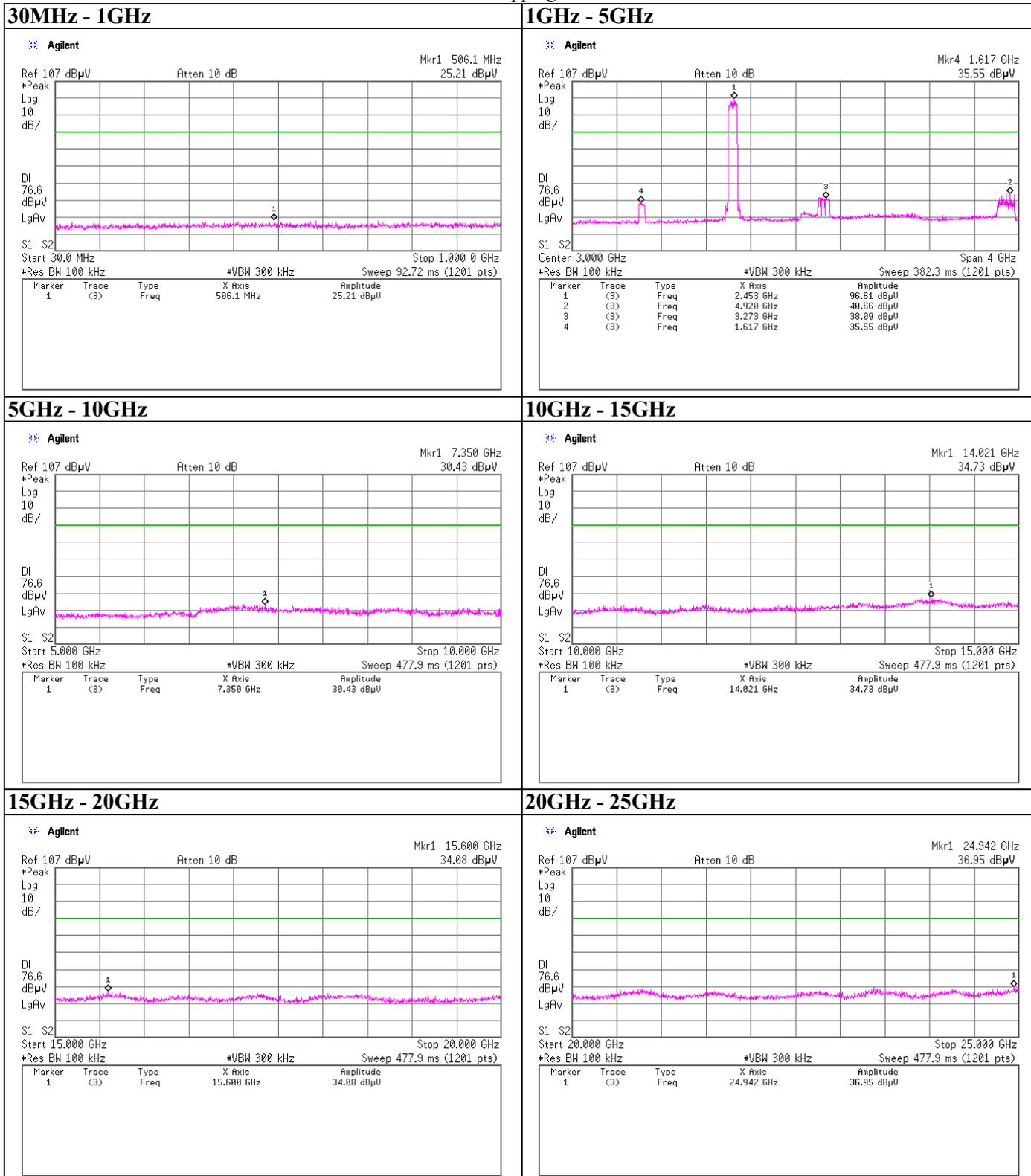


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Spurious emission (Conducted)

3-DH5,
Hopping



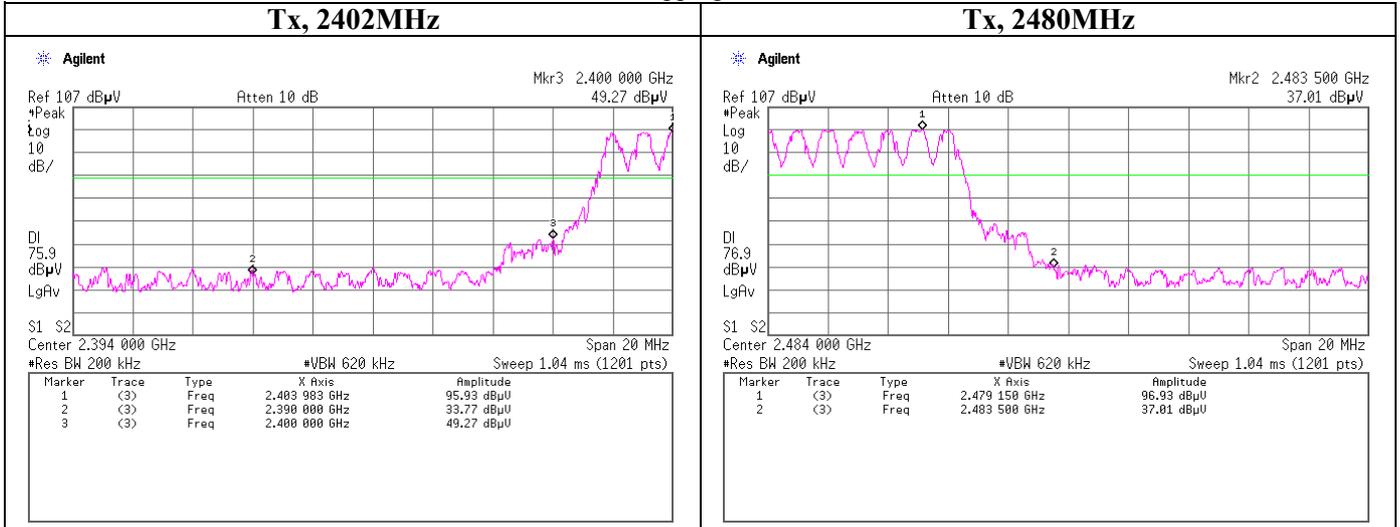
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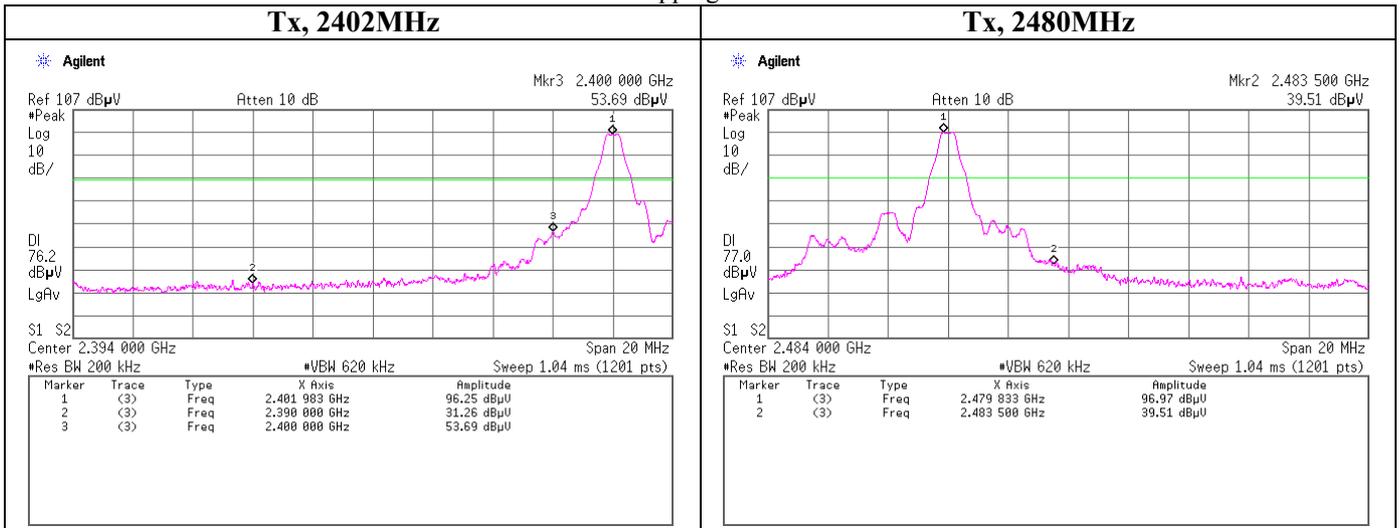
Spurious emission (Conducted)

Band Edge compliance
 DH5,

Hopping ON



Hopping OFF



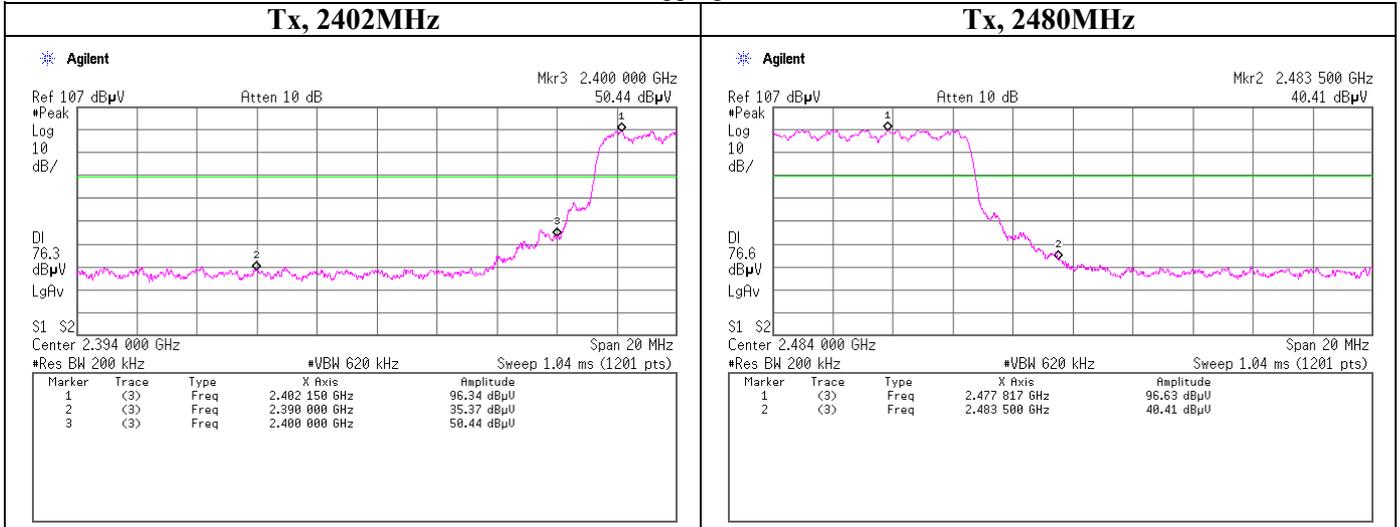
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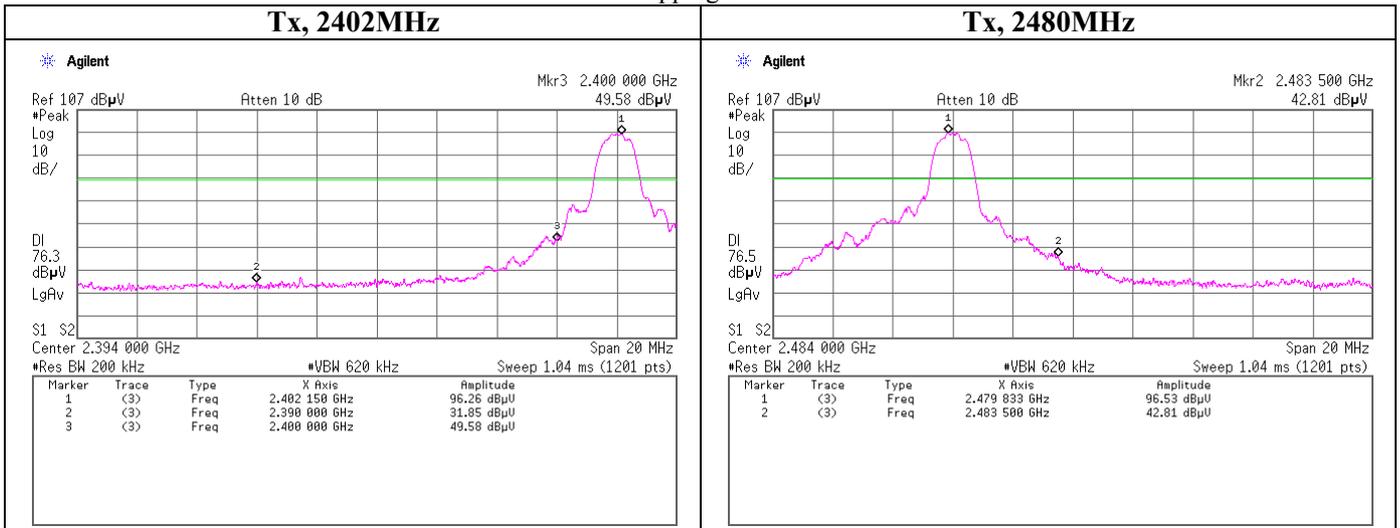
Spurious emission (Conducted)

Band Edge compliance
 3-DH5,

Hopping ON



Hopping OFF

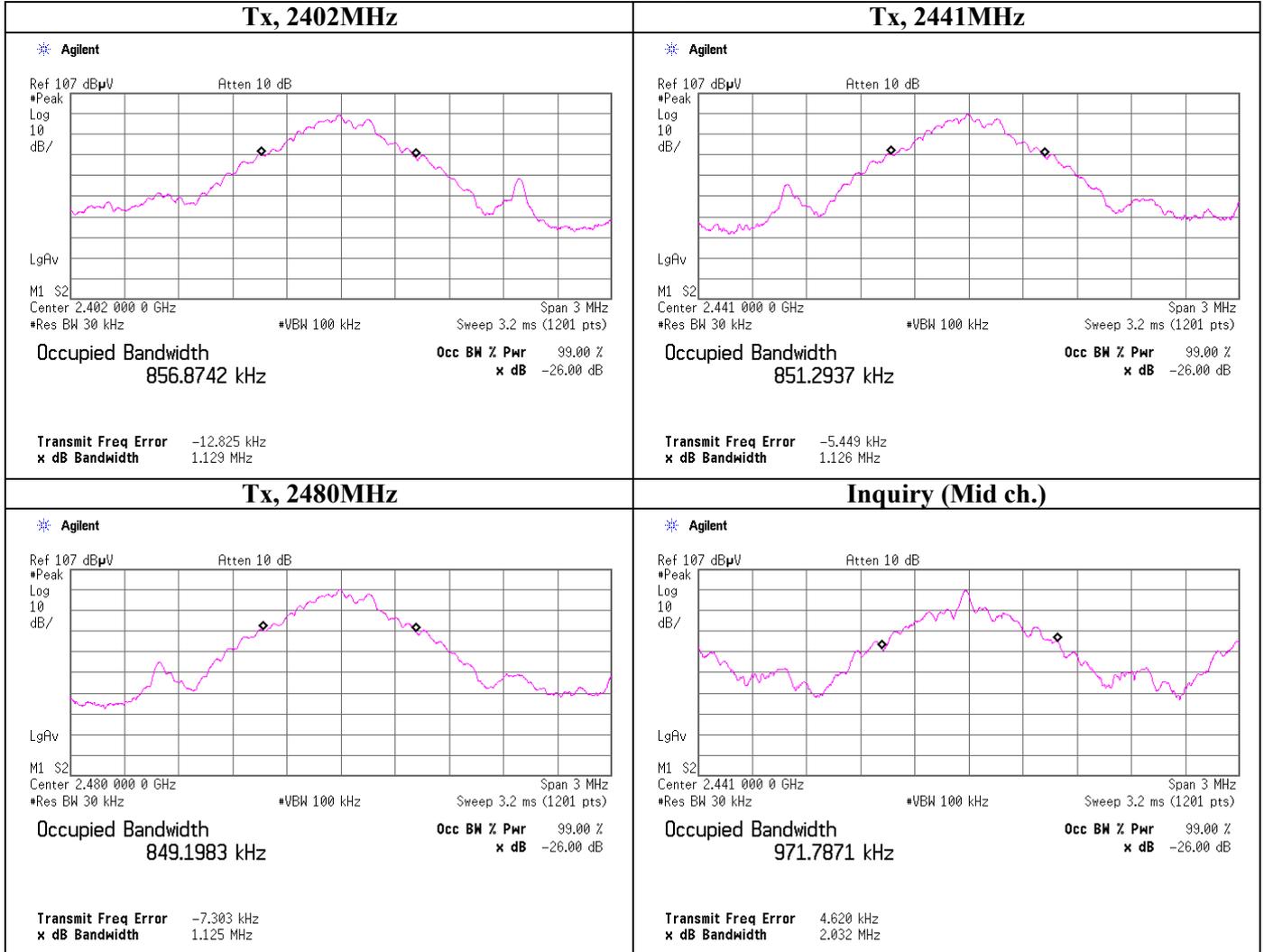


UL Japan, Inc.
Shonan EMC Lab.

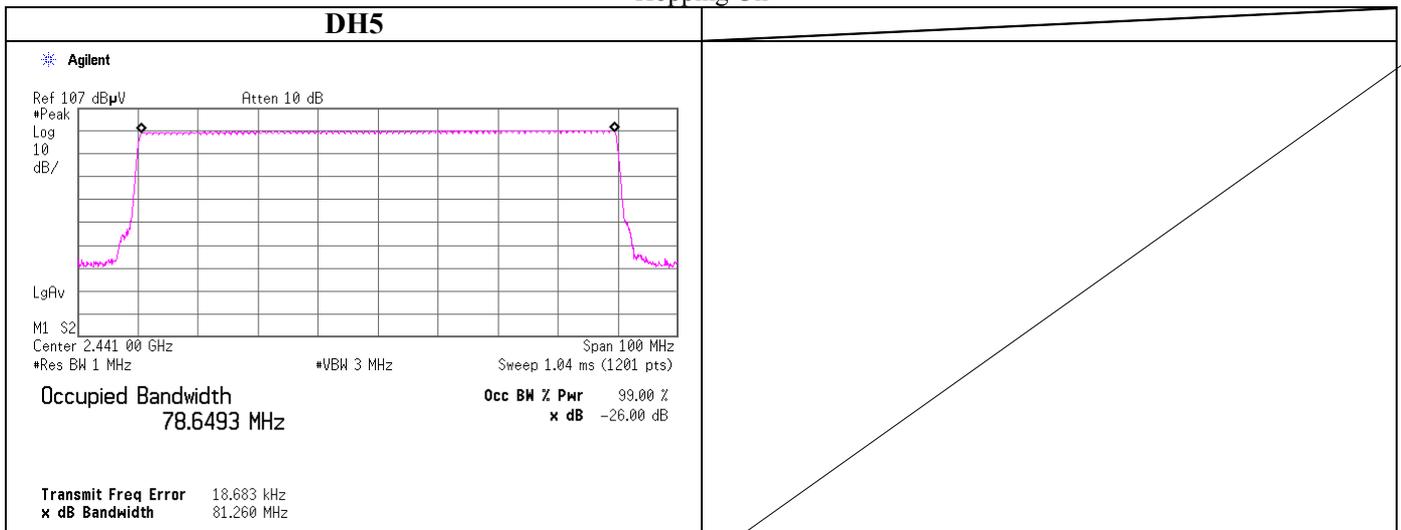
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
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99% Occupied Bandwidth

DH5, Hopping Off

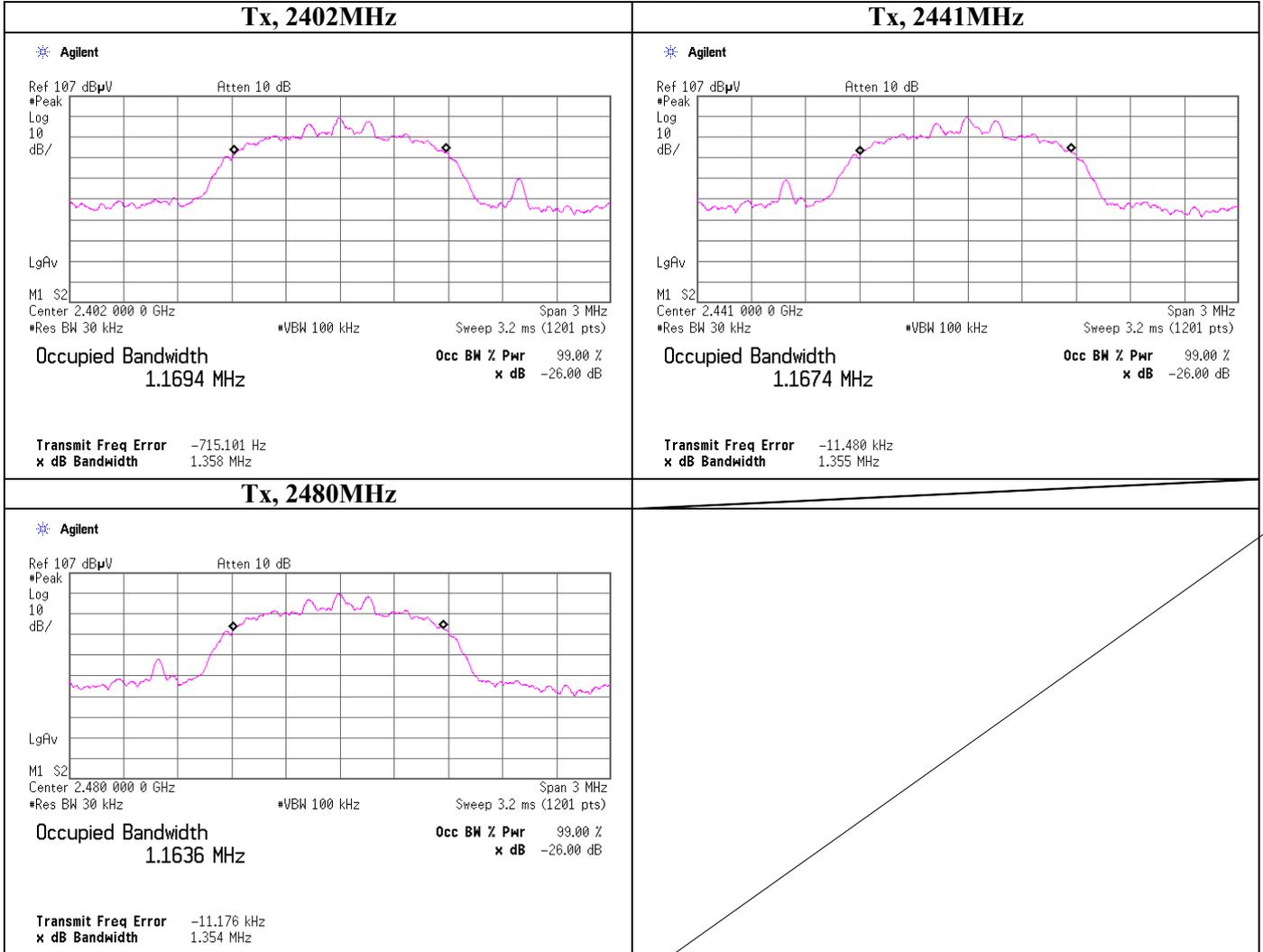


Hopping On



99% Occupied Bandwidth

3-DH5, Hopping Off



UL Japan, Inc.
Shonan EMC Lab.

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