

APPENDIX 2: Data of EMI test

Conducted Emission

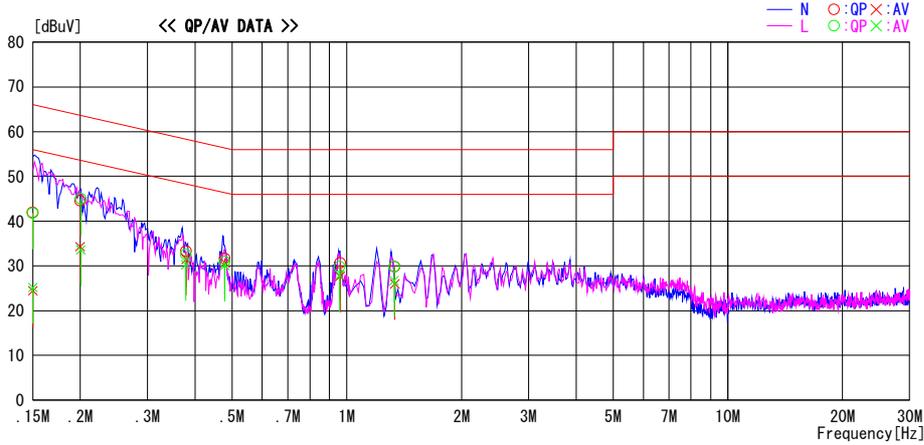
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/06/17

Report No. : 31KE0001-HO-01
 Temp./Humi. : 24deg. C / 58% RH
 Engineer : Masato Tomimasu

Mode / Remarks : Tx 2441MHz DH5

LIMIT : FCC15.207 QP
 FCC15.207 AV

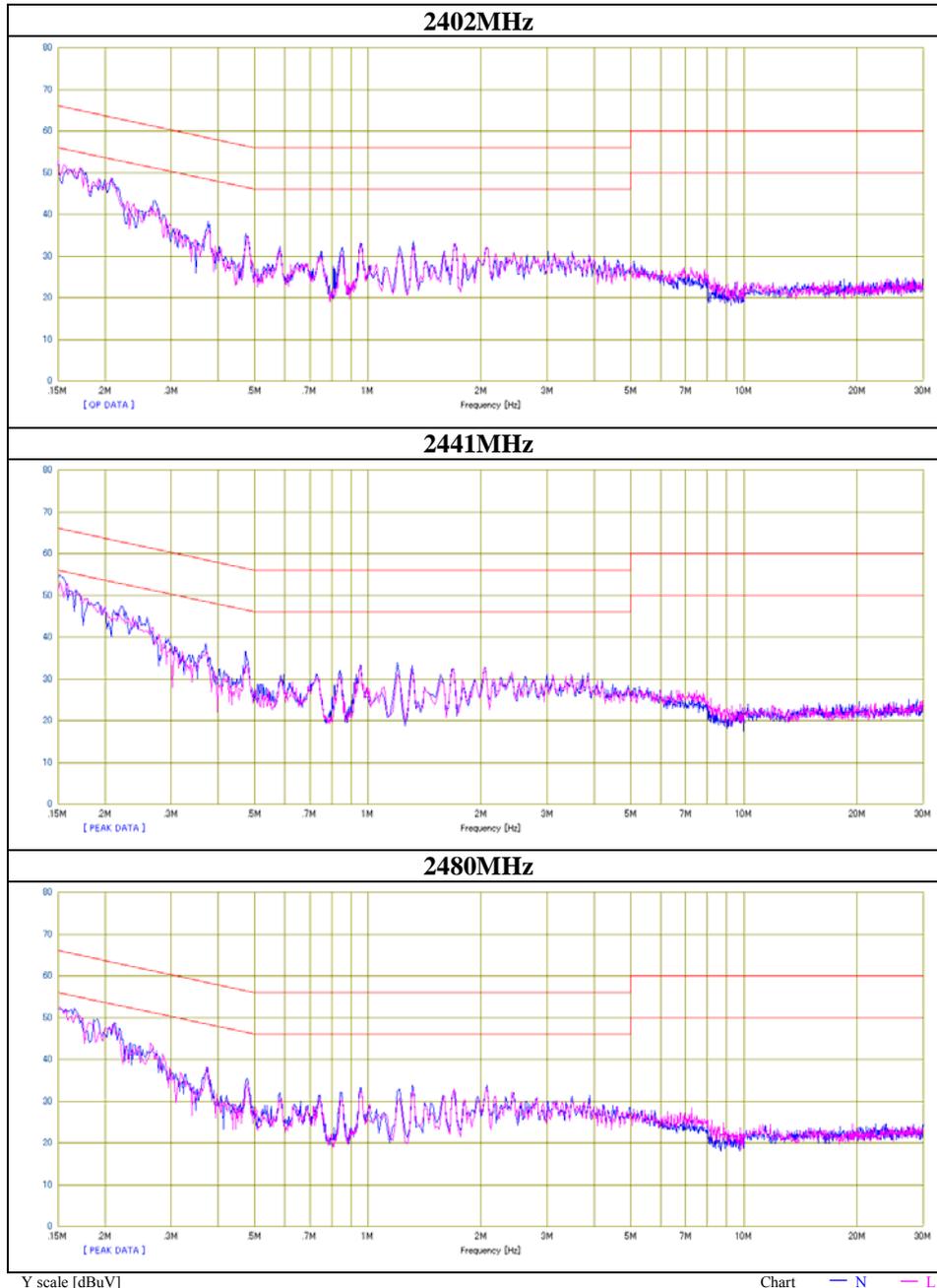


Frequency [MHz]	Reading		Level [dB]	Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]			QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	28.8	11.2	13.2		42.0	24.4	66.0	56.0	24.0	31.6	N	
0.19958	31.3	21.1	13.2		44.5	34.3	63.6	53.6	19.1	19.3	N	
0.37898	20.0	18.2	13.3		33.3	31.5	58.3	48.3	25.0	16.8	N	
0.47915	18.4	17.4	13.3		31.7	30.7	56.4	46.4	24.7	15.7	N	
0.96061	17.3	14.4	13.3		30.6	27.7	56.0	46.0	25.4	18.3	N	
1.33697	16.5	12.6	13.4		29.9	26.0	56.0	46.0	26.2	20.0	N	
0.15000	28.6	12.0	13.2		41.8	25.2	66.0	56.0	24.2	30.8	L	
0.20058	31.7	20.3	13.3		45.0	33.6	63.6	53.6	18.6	20.0	L	
0.37832	19.3	17.0	13.3		32.6	30.3	58.3	48.3	25.7	18.0	L	
0.47841	17.6	16.9	13.3		30.9	30.2	56.4	46.4	25.5	16.3	L	
0.95731	16.5	14.6	13.3		29.8	27.9	56.0	46.0	26.2	18.1	L	
1.33173	16.4	13.4	13.4		29.8	26.8	56.0	46.0	26.2	19.3	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT[dBuV]=READING[dBuV]+C.F[dB] (LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31KE0001-HO-01-A
Date	06/16/2011
Temperature/ Humidity	24 deg. C / 58% RH
Engineer	Masato Tomimasu
Mode	Tx DH5



Conducted Emission

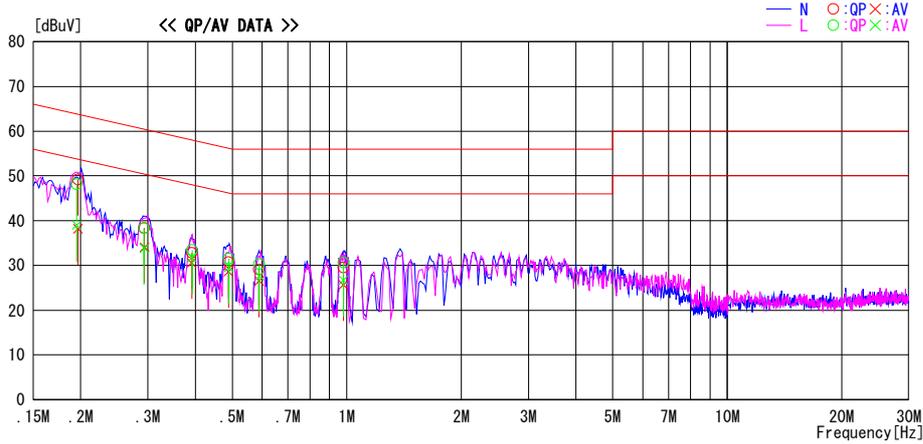
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/06/17

Report No. : 31KE0001-HO-01
Temp./Humi. : 24deg. C / 58% RH
Engineer : Masato Tomimasu

Mode / Remarks : Tx 2441MHz 3DH5

LIMIT : FCC15.207 QP
FCC15.207 AV

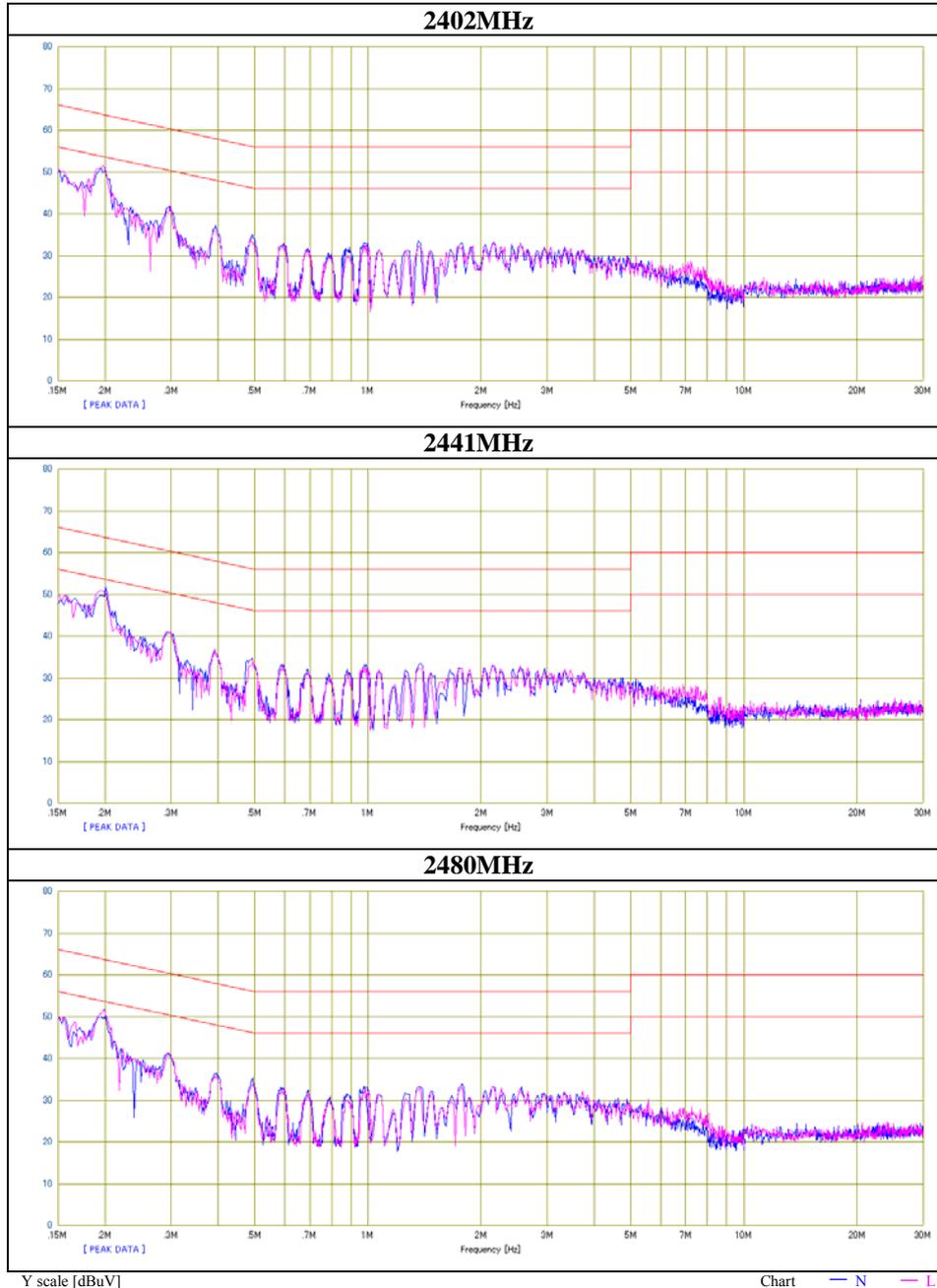


Frequency [MHz]	Reading		Level [dBuV]	Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]			QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.19663	36.0	25.0	13.2	49.2	38.2	63.8	53.8	14.6	15.6	N		
0.29401	25.1	20.8	13.3	38.4	34.1	60.4	50.4	22.0	16.3	N		
0.39121	19.5	17.3	13.3	32.8	30.6	58.0	48.0	25.2	17.4	N		
0.48932	17.4	15.3	13.3	30.7	28.6	56.2	46.2	25.5	17.6	N		
0.58779	15.8	13.2	13.3	29.1	26.5	56.0	46.0	26.9	19.5	N		
0.97996	16.2	12.4	13.3	29.5	25.7	56.0	46.0	26.5	20.3	N		
0.19519	35.0	25.8	13.2	48.2	39.0	63.8	53.8	15.6	14.8	L		
0.29331	25.0	20.5	13.3	38.3	33.8	60.4	50.4	22.1	16.6	L		
0.58916	17.0	14.4	13.3	30.3	27.7	56.0	46.0	25.7	18.3	L		
0.39221	20.2	18.4	13.3	33.5	31.7	58.0	48.0	24.5	16.3	L		
0.48997	18.2	16.3	13.3	31.5	29.6	56.2	46.2	24.7	16.6	L		
0.98065	17.3	13.4	13.3	30.6	26.7	56.0	46.0	25.4	19.3	L		

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C. F [dB] (LISN LOSS + CABLE LOSS)
Except for the above table : adequate margin data below the limits.

Conducted Emission

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31KE0001-HO-01-A
Date	06/16/2011
Temperature/ Humidity	24 deg. C / 58% RH
Engineer	Masato Tomimasu
Mode	Tx 3DH5



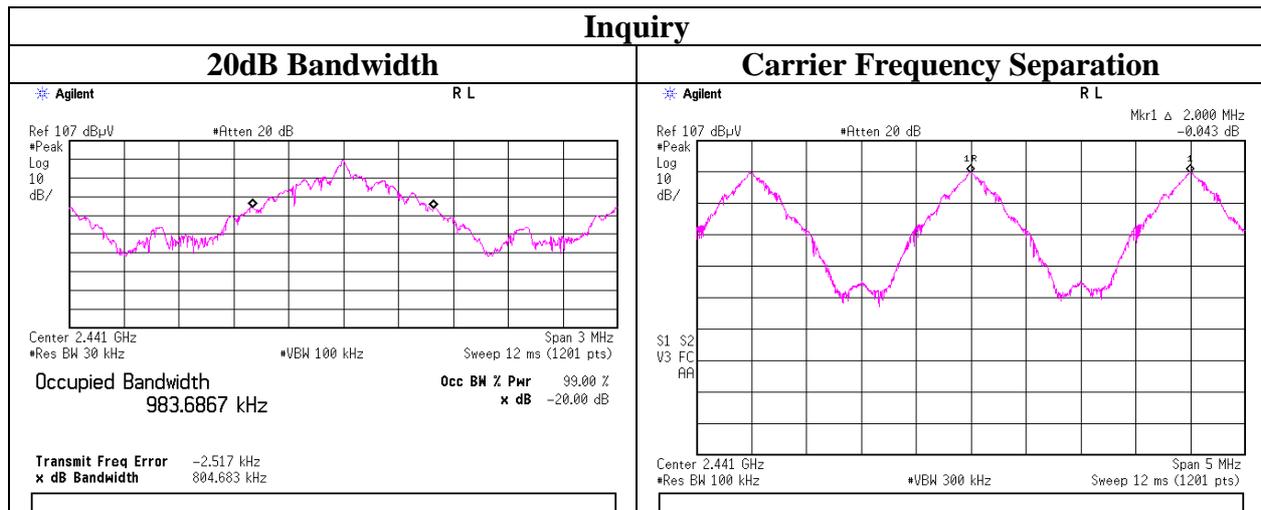
20dB Bandwidth and Carrier Frequency Separation

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	31KE0001-HO-01
Date	06/16/2011
Temperature/ Humidity	24deg. C / 59% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

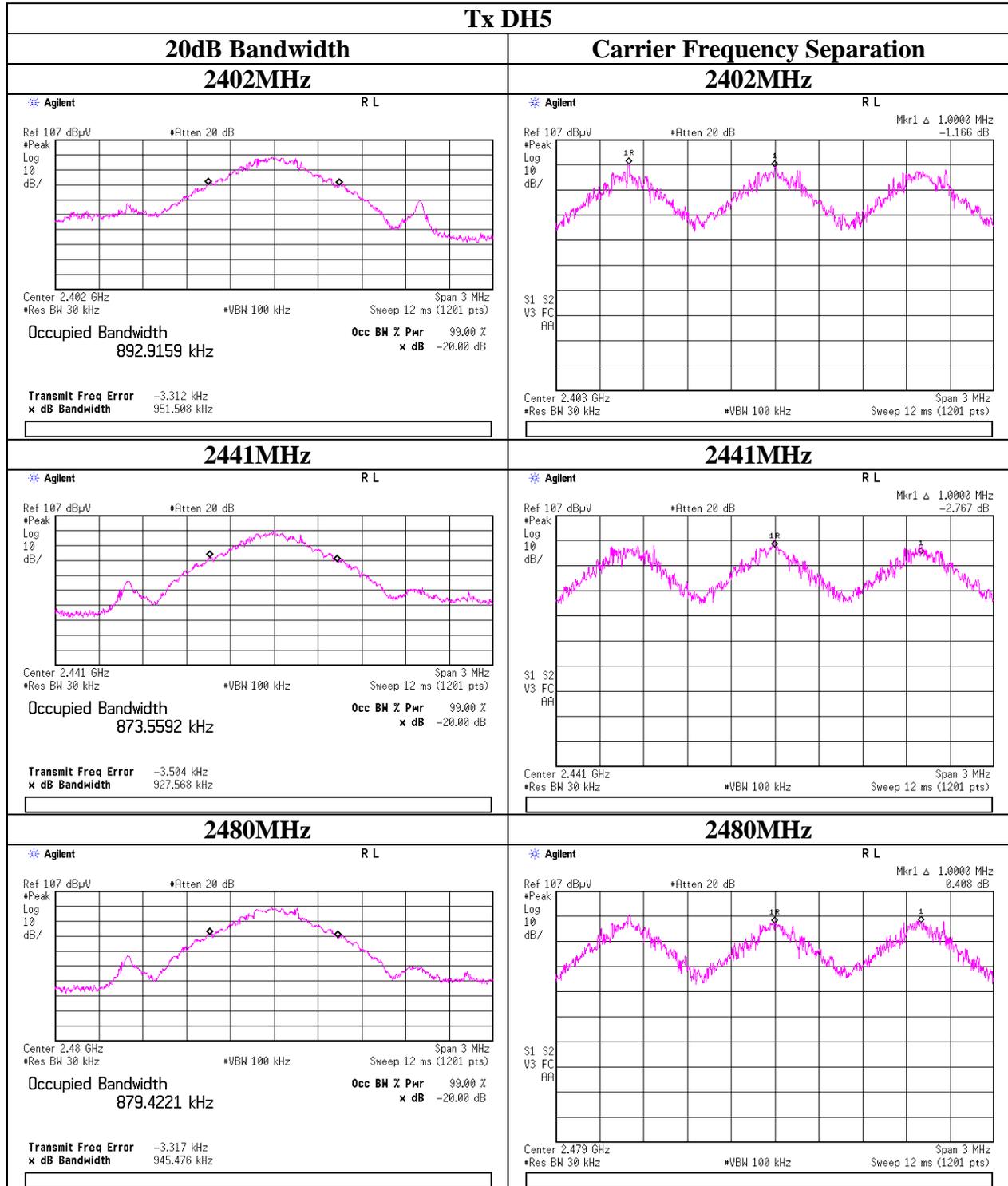
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.952	1.000	≥ 0.634
DH5	2441.0	0.928	1.000	≥ 0.618
DH5	2480.0	0.945	1.000	≥ 0.630
3DH5	2402.0	1.304	1.000	≥ 0.869
3DH5	2441.0	1.263	1.000	≥ 0.842
3DH5	2480.0	1.278	1.000	≥ 0.852
Inquiry	2441.0	0.805	2.000	≥ 0.536

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

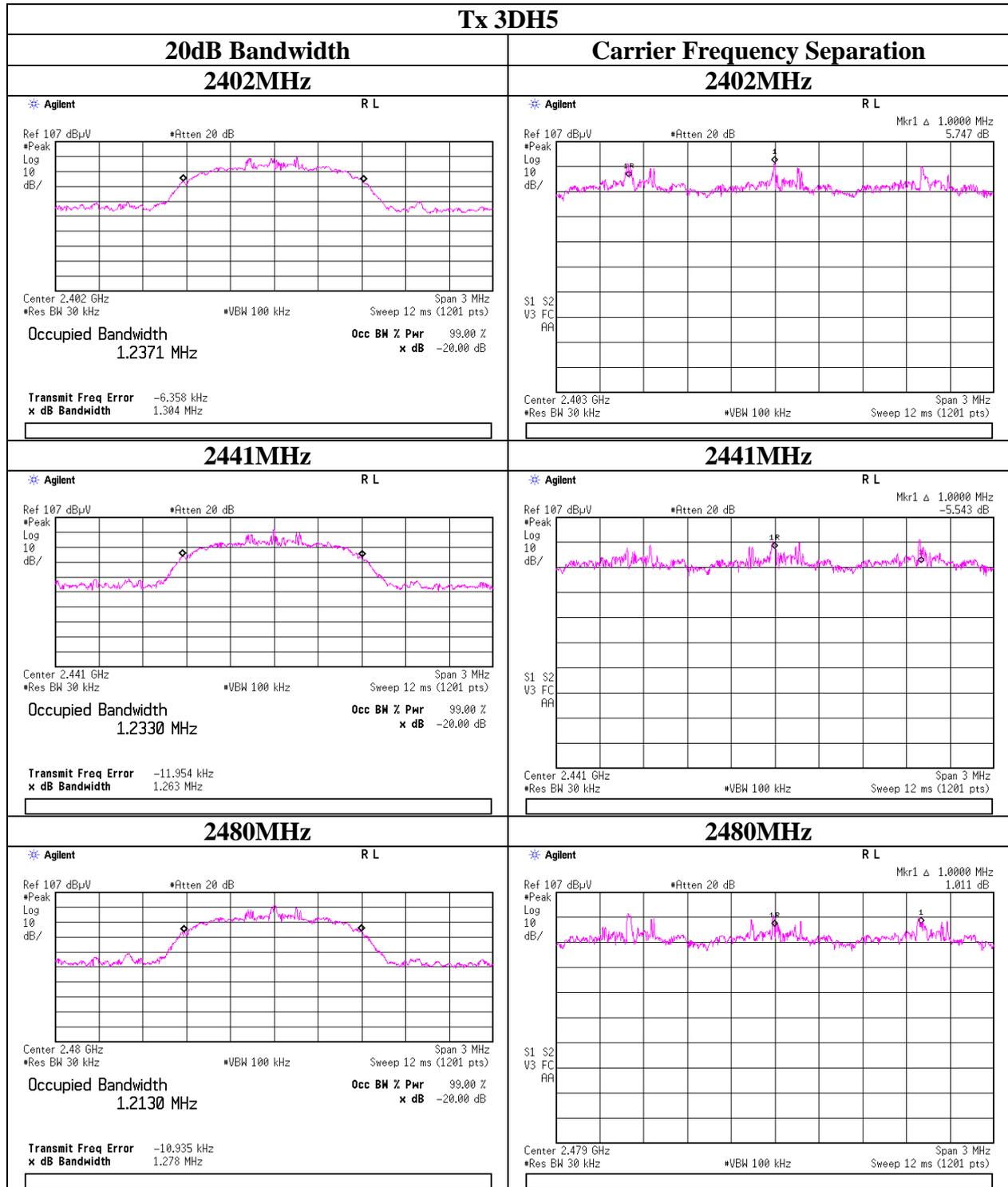
No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



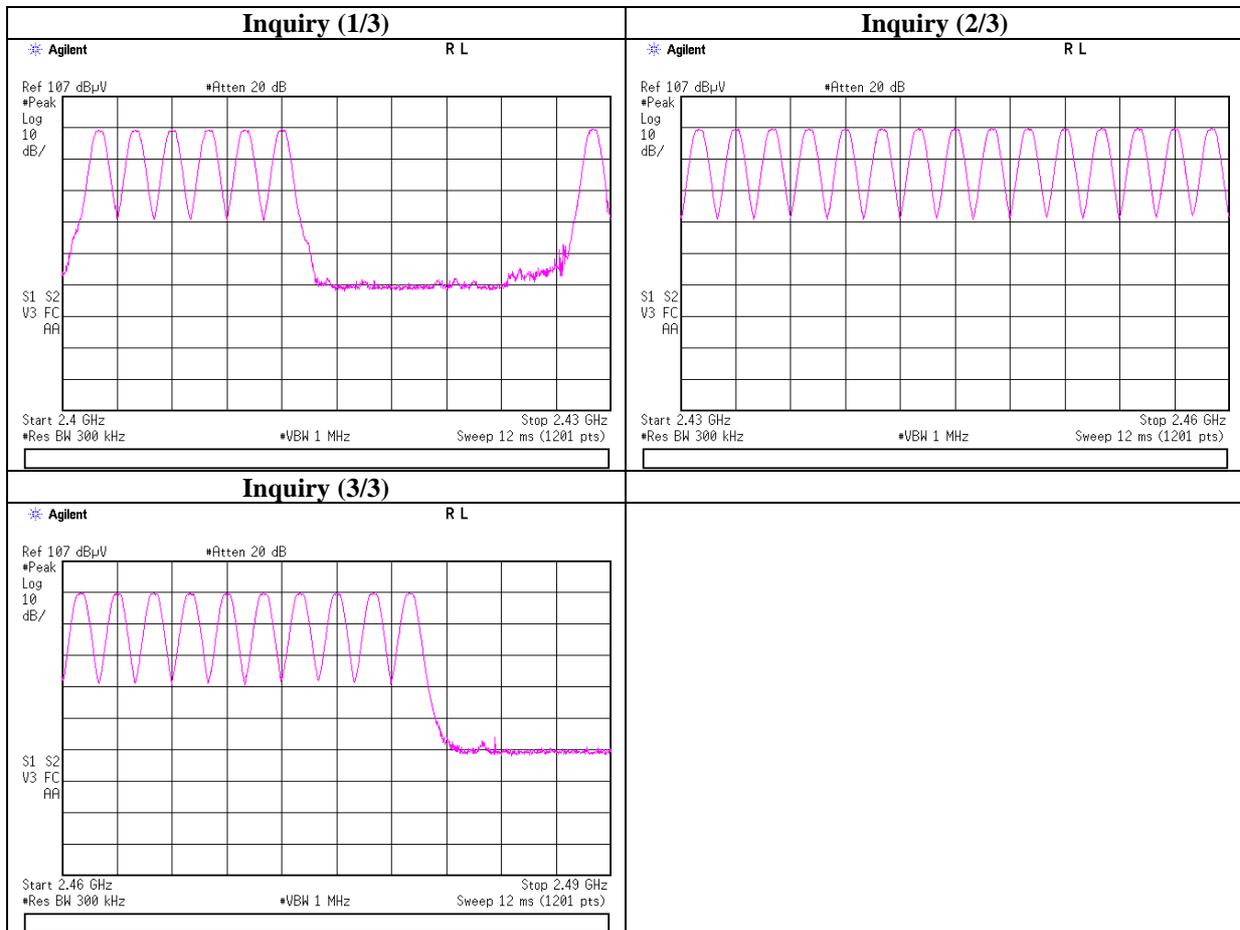
20dB Bandwidth and Carrier Frequency Separation



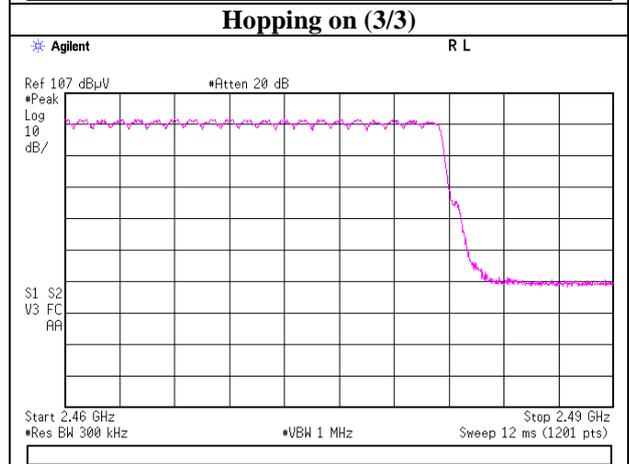
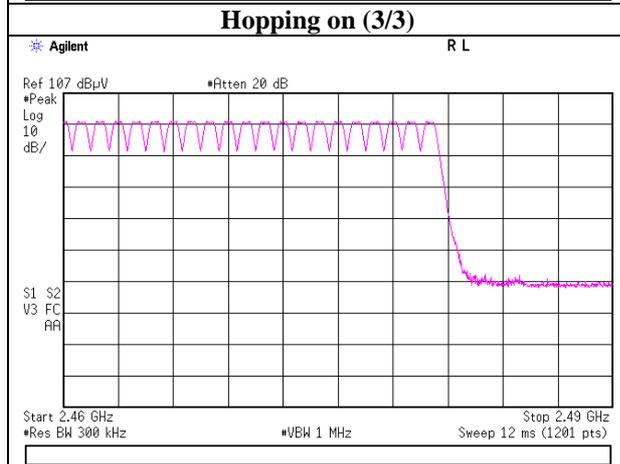
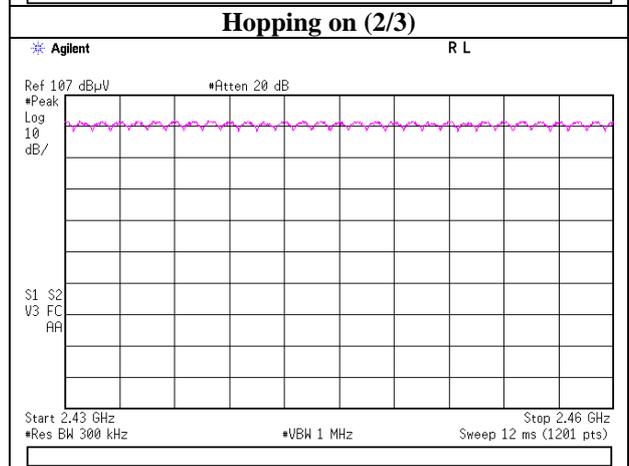
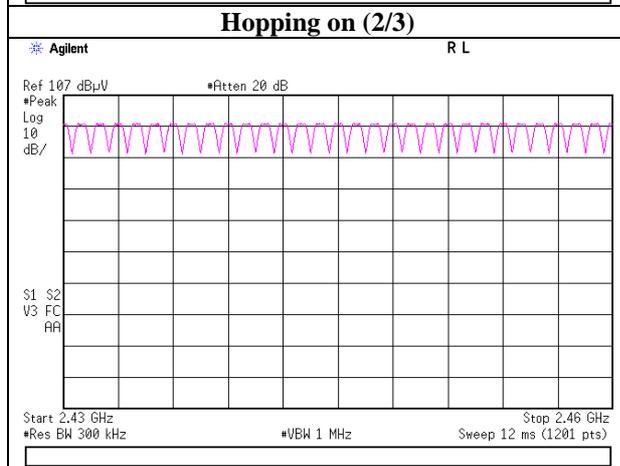
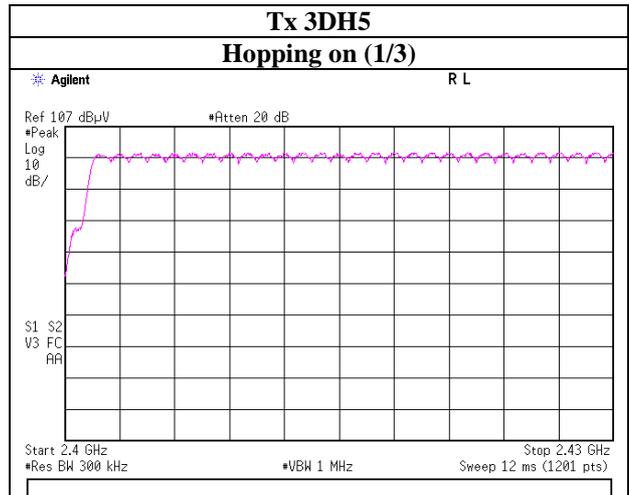
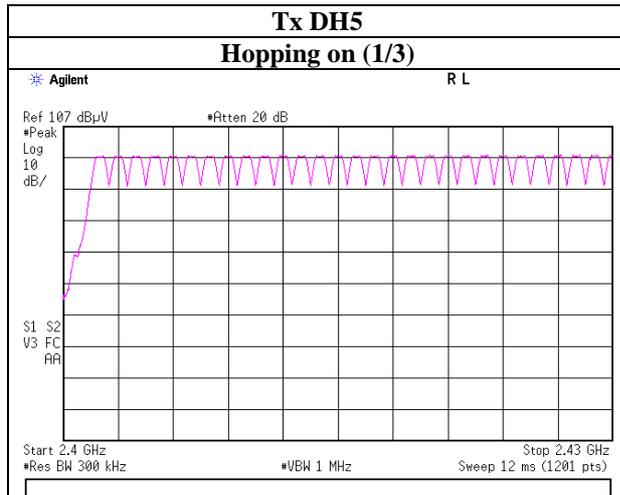
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	31KE0001-HO-01
Date	06/16/2011
Temperature/ Humidity	24deg. C / 59% RH
Engineer	Takumi Shimada
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

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



Number of Hopping Frequency



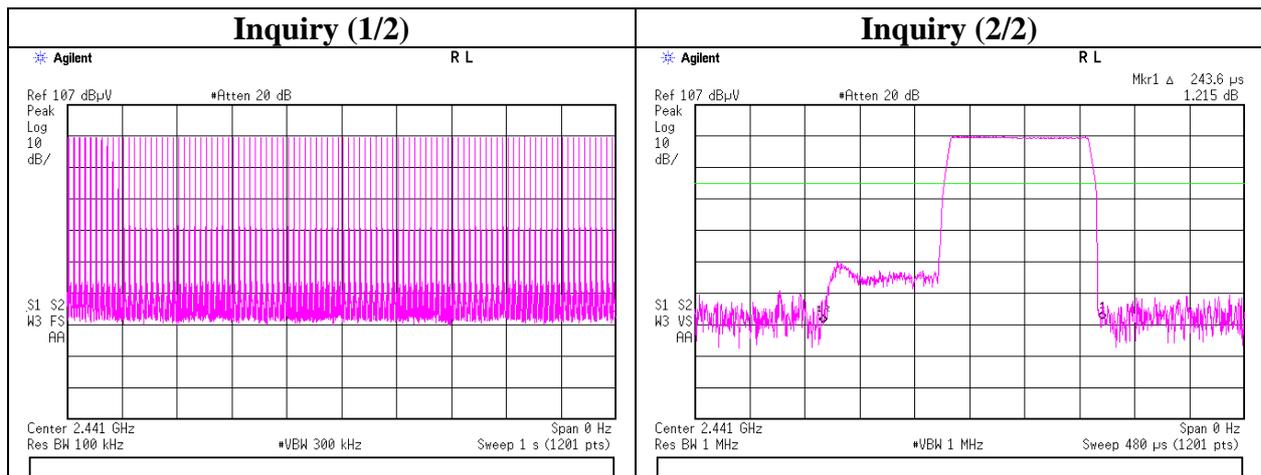
Dwell time

Test place : Head Office EMC Lab. No.6 Shielded Room
 Report No. : 31KE0001-HO-01
 Date : 06/16/2011
 Temperature/ Humidity : 24deg. C / 59% RH
 Engineer : Takumi Shimada
 Mode : Tx (Hopping on) DH5/3DH5/Inquiry

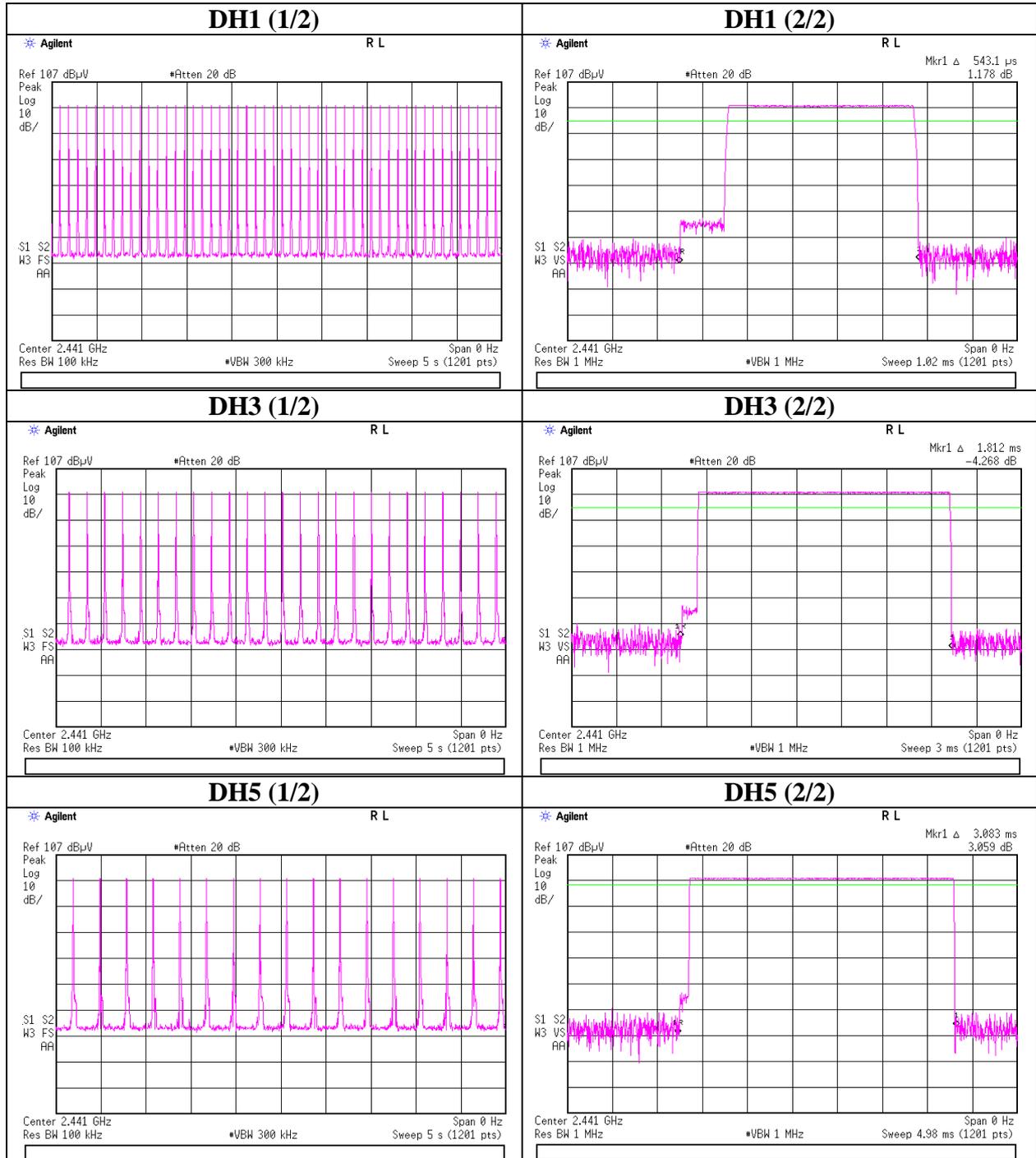
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.543	175	400
DH3	25.0 times / 5 sec. x 31.6 sec. = 158 times	1.812	286	400
DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.083	333	400
3DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.560	181	400
3DH3	25.0 times / 5 sec. x 31.6 sec. = 158 times	1.813	286	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.092	334	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.244	312	400

Sample Calculation

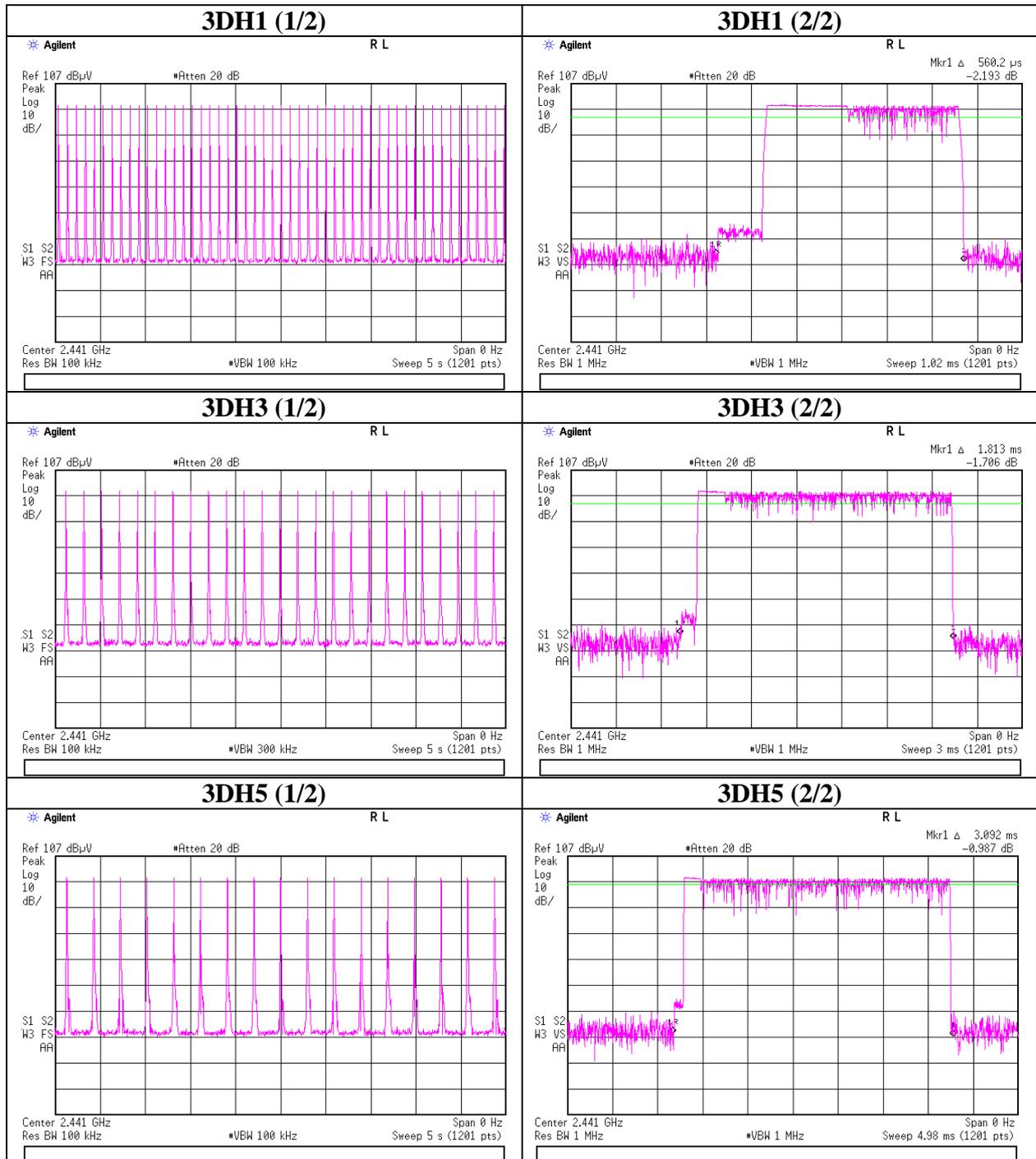
Result = Number of transmission x Length of transmission time



Dwell time



Dwell time



Maximum Peak Output Power

Test place : Head Office EMC Lab. No.6 Shielded Room
 Report No. : 31KE0001-HO-01
 Date : 06/16/2011
 Temperature/ Humidity : 24 deg. C / 56% RH
 Engineer : Hisayoshi Sato
 Mode : Tx (Hopping off) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-9.17	0.50	10.02	1.35	1.36	20.97	125	19.62
DH5	2441.0	-8.79	0.50	10.02	1.73	1.49	20.97	125	19.24
DH5	2480.0	-8.88	0.50	10.02	1.64	1.46	20.97	125	19.33
2DH5	2402.0	-7.52	0.50	10.02	3.00	2.00	20.97	125	17.97
2DH5	2441.0	-7.30	0.50	10.02	3.22	2.10	20.97	125	17.75
2DH5	2480.0	-7.58	0.50	10.02	2.94	1.97	20.97	125	18.03
3DH5	2402.0	-7.48	0.50	10.02	3.04	2.01	20.97	125	17.93
3DH5	2441.0	-7.25	0.50	10.02	3.27	2.12	20.97	125	17.70
3DH5	2480.0	-7.53	0.50	10.02	2.99	1.99	20.97	125	17.98
Inquiry	2441.0	-10.22	0.50	10.02	0.30	1.07	20.97	125	20.67

Sample Calculation:

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

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.040	QP	35.6	9.8	7.0	28.7	23.7	40.0	16.3	
Hori	108.016	QP	33.1	11.4	7.5	28.4	23.6	43.5	19.9	
Hori	200.040	QP	30.4	16.8	8.2	28.0	27.4	43.5	16.1	
Hori	360.482	QP	32.5	16.4	9.1	28.1	29.9	46.0	16.1	
Hori	856.125	QP	28.7	21.9	11.1	28.1	33.6	46.0	12.4	
Hori	901.179	QP	29.1	22.1	11.3	28.0	34.5	46.0	11.5	
Hori	1601.970	PK	47.7	25.8	2.1	33.0	42.6	73.9	31.3	
Hori	2390.000	PK	43.8	27.4	2.6	32.4	41.4	73.9	32.5	
Hori	2400.000	PK	63.0	27.4	2.6	32.4	60.6	-	-	See 20dBc Data Sheet
Hori	4804.000	PK	43.7	31.3	5.2	31.4	48.8	73.9	25.1	
Hori	7206.000	PK	41.8	35.5	6.3	31.6	52.0	73.9	21.9	
Hori	9608.000	PK	41.2	38.4	7.0	31.9	54.7	73.9	19.2	
Hori	24020.000	PK	45.5	40.5	-0.9	29.6	55.5	73.9	18.4	
Hori	1601.970	AV	41.7	25.8	2.1	33.0	36.6	53.9	17.3	
Hori	2390.000	AV	32.2	27.4	2.6	32.4	29.8	53.9	24.2	
Hori	2400.000	AV	54.1	27.4	2.6	32.4	51.7	-	-	See 20dBc Data Sheet
Hori	4804.000	AV	35.8	31.3	5.2	31.4	40.9	53.9	13.0	
Hori	7206.000	AV	30.0	35.5	6.3	31.6	40.2	53.9	13.7	
Hori	9608.000	AV	29.8	38.4	7.0	31.9	43.3	53.9	10.6	
Hori	24020.000	AV	34.0	40.5	-0.9	29.6	44.0	53.9	9.9	
Vert	54.038	QP	36.3	9.8	7.0	28.7	24.4	40.0	15.6	
Vert	108.430	QP	37.0	11.5	7.5	28.4	27.6	43.5	15.9	
Vert	200.045	QP	27.1	16.8	8.2	28.0	24.1	43.5	19.4	
Vert	360.479	QP	34.0	16.4	9.1	28.1	31.4	46.0	14.6	
Vert	856.132	QP	26.0	21.9	11.1	28.1	30.9	46.0	15.1	
Vert	901.201	QP	26.2	22.1	11.3	28.0	31.6	46.0	14.4	
Vert	1601.997	PK	46.2	25.8	2.1	33.0	41.1	73.9	32.8	
Vert	2390.000	PK	44.9	27.4	2.6	32.4	42.5	73.9	31.4	
Vert	2400.000	PK	64.7	27.4	2.6	32.4	62.3	-	-	See 20dBc Data Sheet
Vert	4804.000	PK	44.5	31.3	5.2	31.4	49.6	73.9	24.3	
Vert	7206.000	PK	41.5	35.5	6.3	31.6	51.7	73.9	22.2	
Vert	9608.000	PK	42.8	38.4	7.0	31.9	56.3	73.9	17.6	
Vert	24020.000	PK	45.2	40.5	-0.9	29.6	55.2	73.9	18.7	
Vert	1601.997	AV	39.3	25.8	2.1	33.0	34.2	53.9	19.7	
Vert	2390.000	AV	32.8	27.4	2.6	32.4	30.4	53.9	23.5	
Vert	2400.000	AV	55.7	27.4	2.6	32.4	53.3	-	-	See 20dBc Data Sheet
Vert	4804.000	AV	37.2	31.3	5.2	31.4	42.3	53.9	11.6	
Vert	7206.000	AV	30.2	35.5	6.3	31.6	40.4	53.9	13.5	
Vert	9608.000	AV	30.0	38.4	7.0	31.9	43.5	53.9	10.5	
Vert	24020.000	AV	34.1	40.5	-0.9	29.6	44.1	53.9	9.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz $20\log(3.0m/1.0m) = 9.5dB$

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission
20dBc Data Sheet

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Report No. : 31KE0001HO-01
 Date : 06/08/2011
 Temperature/ Humidity : 22 deg. C / 59% RH
 Engineer : Takumi Shimada
 Mode : Above 1GHz
 Tx, DH5 2402MHz

20dBc Data Sheet

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	100.7	27.4	2.6	32.4	98.3	-	-	Carrier
Hori	2400.000	PK	54.3	27.4	2.6	32.4	51.9	78.3	26.4	
Vert	2402.000	PK	102.6	27.4	2.6	32.4	100.2	-	-	Carrier
Vert	2400.000	PK	56.0	27.4	2.6	32.4	53.6	80.2	26.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.037	QP	35.8	9.8	7.0	28.7	23.9	40.0	16.1	
Hori	108.152	QP	33.3	11.5	7.5	28.4	23.9	43.5	19.6	
Hori	200.025	QP	30.2	16.8	8.2	28.0	27.2	43.5	16.3	
Hori	360.482	QP	33.3	16.4	9.1	28.1	30.7	46.0	15.3	
Hori	856.132	QP	28.5	21.9	11.1	28.1	33.4	46.0	12.6	
Hori	901.178	QP	29.7	22.1	11.3	28.0	35.1	46.0	10.9	
Hori	1626.671	PK	49.3	25.8	2.2	32.9	44.4	73.9	29.5	
Hori	4882.000	PK	44.1	31.5	5.2	31.3	49.5	73.9	24.4	
Hori	7323.000	PK	42.5	35.7	6.3	31.6	52.9	73.9	21.0	
Hori	9764.000	PK	41.8	38.5	7.0	31.8	55.5	73.9	18.4	
Hori	24410.000	PK	45.1	40.4	-1.0	29.5	55.0	73.9	18.9	
Hori	1626.671	AV	44.4	25.8	2.2	32.9	39.5	53.9	14.4	
Hori	4882.000	AV	36.2	31.5	5.2	31.3	41.6	53.9	12.3	
Hori	7323.000	AV	30.2	35.7	6.3	31.6	40.6	53.9	13.3	
Hori	9764.000	AV	29.8	38.5	7.0	31.8	43.5	53.9	10.4	
Hori	24410.000	AV	33.8	40.4	-1.0	29.5	43.7	53.9	10.2	
Vert	54.039	QP	36.1	9.8	7.0	28.7	24.2	40.0	15.8	
Vert	108.243	QP	36.8	11.5	7.5	28.4	27.4	43.5	16.1	
Vert	200.042	QP	27.0	16.8	8.2	28.0	24.0	43.5	19.5	
Vert	360.481	QP	34.2	16.4	9.1	28.1	31.6	46.0	14.4	
Vert	856.131	QP	26.1	21.9	11.1	28.1	31.0	46.0	15.0	
Vert	901.182	QP	26.5	22.1	11.3	28.0	31.9	46.0	14.1	
Vert	1626.663	PK	48.5	25.8	2.2	32.9	43.6	73.9	30.3	
Vert	4882.000	PK	45.0	31.5	5.2	31.3	50.4	73.9	23.5	
Vert	7323.000	PK	42.7	35.7	6.3	31.6	53.1	73.9	20.8	
Vert	9764.000	PK	41.4	38.5	7.0	31.8	55.1	73.9	18.8	
Vert	24410.000	PK	45.0	40.4	-1.0	29.5	54.9	73.9	19.0	
Vert	1626.663	AV	43.6	25.8	2.2	32.9	38.7	53.9	15.2	
Vert	4882.000	AV	38.1	31.5	5.2	31.3	43.5	53.9	10.4	
Vert	7323.000	AV	31.4	35.7	6.3	31.6	41.8	53.9	12.1	
Vert	9764.000	AV	30.3	38.5	7.0	31.8	44.0	53.9	9.9	
Vert	24410.000	AV	33.9	40.4	-1.0	29.5	43.8	53.9	10.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.025	QP	37.2	9.8	7.0	28.7	25.3	40.0	14.7	
Hori	107.993	QP	36.6	11.4	7.5	28.4	27.1	43.5	16.4	
Hori	199.796	QP	25.2	16.7	8.2	28.0	22.1	43.5	21.4	
Hori	360.475	QP	32.8	16.4	9.1	28.1	30.2	46.0	15.8	
Hori	856.153	QP	28.2	21.9	11.1	28.1	33.1	46.0	12.9	
Hori	901.182	QP	29.3	22.1	11.3	28.0	34.7	46.0	11.3	
Hori	1652.652	PK	48.9	25.9	2.2	32.9	44.1	73.9	29.8	
Hori	2483.500	PK	46.2	27.6	2.7	32.4	44.1	73.9	29.8	
Hori	4960.000	PK	42.4	31.7	5.3	31.3	48.1	73.9	25.8	
Hori	7440.000	PK	42.3	35.8	6.4	31.7	52.8	73.9	21.1	
Hori	9920.000	PK	41.5	38.7	5.5	31.8	53.9	73.9	20.0	
Hori	24800.000	PK	46.6	40.3	-1.0	29.4	56.5	73.9	17.5	
Hori	1652.652	AV	44.7	25.9	2.2	32.9	39.9	53.9	14.0	
Hori	2483.500	AV	34.7	27.6	2.7	32.4	32.6	53.9	21.3	
Hori	4960.000	AV	32.8	31.7	5.3	31.3	38.5	53.9	15.4	
Hori	7440.000	AV	31.2	35.8	6.4	31.7	41.7	53.9	12.2	
Hori	9920.000	AV	30.0	38.7	7.2	31.8	44.1	53.9	9.8	
Hori	24800.000	AV	35.3	40.3	-1.0	29.4	45.2	53.9	8.7	
Vert	54.021	QP	36.7	9.8	7.0	28.7	24.8	40.0	15.2	
Vert	107.989	QP	36.2	11.4	7.5	28.4	26.7	43.5	16.8	
Vert	200.148	QP	26.3	16.8	8.2	28.0	23.3	43.5	20.2	
Vert	360.479	QP	34.0	16.4	9.1	28.1	31.4	46.0	14.6	
Vert	856.123	QP	26.3	21.9	11.1	28.1	31.2	46.0	14.8	
Vert	901.196	QP	26.4	22.1	11.3	28.0	31.8	46.0	14.2	
Vert	1652.662	PK	48.5	25.9	2.2	32.9	43.7	73.9	30.2	
Vert	2483.500	PK	47.8	27.6	2.7	32.4	45.7	73.9	28.3	
Vert	4960.000	PK	45.2	31.7	5.3	31.3	50.9	73.9	23.0	
Vert	7440.000	PK	43.0	35.8	6.4	31.7	53.5	73.9	20.4	
Vert	9920.000	PK	41.6	38.7	7.2	31.8	55.7	73.9	18.2	
Vert	24800.000	PK	46.3	40.3	-1.0	29.4	56.2	73.9	17.7	
Vert	1652.662	AV	43.3	25.9	2.2	32.9	38.5	53.9	15.4	
Vert	2483.500	AV	36.2	27.6	2.7	32.4	34.1	53.9	19.8	
Vert	4960.000	AV	38.0	31.7	5.3	31.3	43.7	53.9	10.2	
Vert	7440.000	AV	31.8	35.8	6.4	31.7	42.3	53.9	11.6	
Vert	9920.000	AV	30.0	38.7	7.2	31.8	44.1	53.9	9.8	
Vert	24800.000	AV	35.2	40.3	-1.0	29.4	45.1	53.9	8.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, 3DH5 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.042	QP	35.7	9.8	7.0	28.7	23.8	40.0	16.2	
Hori	108.006	QP	34.8	11.4	7.5	28.4	25.3	43.5	18.2	
Hori	117.895	QP	30.1	12.9	7.6	28.4	22.2	43.5	21.3	
Hori	360.476	QP	32.9	16.4	9.1	28.1	30.3	46.0	15.7	
Hori	856.134	QP	28.9	21.9	11.1	28.1	33.8	46.0	12.2	
Hori	901.191	QP	29.8	22.1	11.3	28.0	35.2	46.0	10.8	
Hori	1602.005	PK	47.7	25.8	2.1	33.0	42.6	73.9	31.3	
Hori	2390.000	PK	42.6	27.4	2.6	32.4	40.2	73.9	33.7	
Hori	2400.000	PK	69.3	27.4	2.6	32.4	66.9	-	-	See 20dBc Data Sheet
Hori	4804.000	PK	42.1	31.3	5.2	31.4	47.2	73.9	26.7	
Hori	7206.000	PK	42.5	35.5	6.3	31.6	52.7	73.9	21.2	
Hori	9608.000	PK	41.3	38.4	7.0	31.9	54.8	73.9	19.1	
Hori	24020.000	PK	45.4	40.5	-0.9	29.6	55.4	73.9	18.5	
Hori	1602.005	AV	41.7	25.8	2.1	33.0	36.6	53.9	17.4	
Hori	2390.000	AV	31.0	27.4	2.6	32.4	28.6	53.9	25.3	
Hori	2400.000	AV	56.2	27.4	2.6	32.4	53.8	-	-	See 20dBc Data Sheet
Hori	4804.000	AV	30.9	31.3	5.2	31.4	36.0	53.9	17.9	
Hori	7206.000	AV	30.0	35.5	6.3	31.6	40.2	53.9	13.7	
Hori	9608.000	AV	29.8	38.4	7.0	31.9	43.3	53.9	10.6	
Hori	24020.000	AV	34.0	40.5	-0.9	29.6	44.0	53.9	9.9	
Vert	54.011	QP	36.6	9.8	7.0	28.7	24.7	40.0	15.3	
Vert	107.994	QP	35.7	11.4	7.5	28.4	26.2	43.5	17.3	
Vert	117.573	QP	25.6	12.9	7.6	28.4	17.7	43.5	25.8	
Vert	360.494	QP	33.7	16.4	9.1	28.1	31.1	46.0	14.9	
Vert	856.129	QP	25.8	21.9	11.1	28.1	30.7	46.0	15.3	
Vert	901.190	QP	28.3	22.1	11.3	28.0	33.7	46.0	12.3	
Vert	1601.992	PK	47.4	25.8	2.1	33.0	42.3	73.9	31.6	
Vert	2390.000	PK	45.0	27.4	2.6	32.4	42.6	73.9	31.3	
Vert	2400.000	PK	73.7	27.4	2.6	32.4	71.3	-	-	See 20dBc Data Sheet
Vert	4804.000	PK	43.4	31.3	5.2	31.4	48.5	73.9	25.5	
Vert	7206.000	PK	41.6	35.5	6.3	31.6	51.8	73.9	22.1	
Vert	9608.000	PK	41.4	38.4	7.0	31.9	54.9	73.9	19.0	
Vert	24020.000	PK	45.0	40.5	-0.9	29.6	55.0	73.9	18.9	
Vert	1601.992	AV	39.3	25.8	2.1	33.0	34.2	53.9	19.8	
Vert	2390.000	AV	32.9	27.4	2.6	32.4	30.5	53.9	23.5	
Vert	2400.000	AV	60.5	27.4	2.6	32.4	58.1	-	-	See 20dBc Data Sheet
Vert	4804.000	AV	31.9	31.3	5.2	31.4	37.0	53.9	16.9	
Vert	7206.000	AV	30.1	35.5	6.3	31.6	40.3	53.9	13.6	
Vert	9608.000	AV	29.9	38.4	7.0	31.9	43.4	53.9	10.5	
Vert	24020.000	AV	34.0	40.5	-0.9	29.6	44.0	53.9	9.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission
20dBc Data Sheet

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Report No. : 31KE0001HO-01
 Date : 06/08/2011
 Temperature/ Humidity : 22 deg. C / 59% RH
 Engineer : Takumi Shimada
 Mode : Above 1GHz
 Tx, 3DH5 2402MHz

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	97.0	27.4	2.6	32.4	94.6	-	-	Carrier
Hori	2400.000	PK	52.1	27.4	2.6	32.4	49.7	74.6	24.9	
Vert	2402.000	PK	101.5	27.4	2.6	32.4	99.1	-	-	Carrier
Vert	2400.000	PK	56.7	27.4	2.6	32.4	54.3	79.1	24.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, 3DH5 2441MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.025	QP	35.4	9.8	7.0	28.7	23.5	40.0	16.5	
Hori	108.102	QP	35.0	11.5	7.5	28.4	25.6	43.5	17.9	
Hori	117.693	QP	30.2	12.9	7.6	28.4	22.3	43.5	21.2	
Hori	360.424	QP	32.7	16.4	9.1	28.1	30.1	46.0	15.9	
Hori	856.138	QP	29.2	21.9	11.1	28.1	34.1	46.0	11.9	
Hori	901.188	QP	29.5	22.1	11.3	28.0	34.9	46.0	11.1	
Hori	1626.671	PK	48.8	25.8	2.2	32.9	43.9	73.9	30.0	
Hori	4882.000	PK	42.4	31.5	5.2	31.3	47.8	73.9	26.1	
Hori	7323.000	PK	41.4	35.7	6.3	31.6	51.8	73.9	22.1	
Hori	9764.000	PK	41.7	38.5	7.0	31.8	55.4	73.9	18.5	
Hori	24410.000	PK	45.2	40.4	-1.0	29.5	55.1	73.9	18.8	
Hori	1626.671	AV	45.0	25.8	2.2	32.9	40.1	53.9	13.8	
Hori	4882.000	AV	31.5	31.5	5.2	31.3	36.9	53.9	17.0	
Hori	7323.000	AV	30.1	35.7	6.3	31.6	40.5	53.9	13.4	
Hori	9764.000	AV	29.7	38.5	7.0	31.8	43.4	53.9	10.5	
Hori	24410.000	AV	33.8	40.4	-1.0	29.5	43.7	53.9	10.2	
Vert	54.022	QP	36.2	9.8	7.0	28.7	24.3	40.0	15.7	
Vert	108.020	QP	35.2	11.4	7.5	28.4	25.7	43.5	17.8	
Vert	117.593	QP	25.9	12.9	7.6	28.4	18.0	43.5	25.5	
Vert	360.493	QP	33.8	16.4	9.1	28.1	31.2	46.0	14.8	
Vert	856.131	QP	26.1	21.9	11.1	28.1	31.0	46.0	15.0	
Vert	901.192	QP	27.8	22.1	11.3	28.0	33.2	46.0	12.8	
Vert	1626.663	PK	48.6	25.8	2.2	32.9	43.7	73.9	30.2	
Vert	4882.000	PK	42.9	31.5	5.2	31.3	48.3	73.9	25.6	
Vert	7323.000	PK	41.8	35.7	6.3	31.6	52.2	73.9	21.7	
Vert	9764.000	PK	41.0	38.5	7.0	31.8	54.7	73.9	19.2	
Vert	24410.000	PK	45.1	40.4	-1.0	29.5	55.0	73.9	18.9	
Vert	1626.663	AV	43.8	25.8	2.2	32.9	38.9	53.9	15.0	
Vert	4882.000	AV	33.0	31.5	5.2	31.3	38.4	53.9	15.6	
Vert	7323.000	AV	30.0	35.7	6.3	31.6	40.4	53.9	13.5	
Vert	9764.000	AV	29.7	38.5	7.0	31.8	43.4	53.9	10.5	
Vert	24410.000	AV	33.9	40.4	-1.0	29.5	43.8	53.9	10.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31KE0001HO-01
Date 06/08/2011 06/10/2011
Temperature/ Humidity 22 deg. C / 59% RH 24 deg. C / 61% RH
Engineer Takumi Shimada Takumi Shimada
Above 1GHz Below 1GHz
Mode Tx, 3DH5 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.017	QP	34.7	9.8	7.0	28.7	22.8	40.0	17.2	
Hori	108.153	QP	32.1	11.5	7.5	28.4	22.7	43.5	20.8	
Hori	117.683	QP	29.7	12.9	7.6	28.4	21.8	43.5	21.7	
Hori	360.324	QP	32.3	16.4	9.1	28.1	29.7	46.0	16.3	
Hori	856.132	QP	28.1	21.9	11.1	28.1	33.0	46.0	13.0	
Hori	901.195	QP	29.4	22.1	11.3	28.0	34.8	46.0	11.2	
Hori	1652.664	PK	50.6	25.9	2.2	32.9	45.8	73.9	28.1	
Hori	2483.500	PK	51.0	27.6	2.7	32.4	48.9	73.9	25.0	
Hori	4960.000	PK	41.5	31.7	5.3	31.3	47.2	73.9	26.7	
Hori	7440.000	PK	42.6	35.8	6.4	31.7	53.1	73.9	20.8	
Hori	9920.000	PK	41.7	38.7	7.2	31.8	55.8	73.9	18.1	
Hori	24800.000	PK	46.6	40.3	-1.0	29.4	56.5	73.9	17.5	
Hori	1652.664	AV	46.8	25.9	2.2	32.9	42.0	53.9	12.0	
Hori	2483.500	AV	39.9	27.6	2.7	32.4	37.8	53.9	16.1	
Hori	4960.000	AV	29.8	31.7	5.3	31.3	35.5	53.9	18.4	
Hori	7440.000	AV	32.0	35.8	6.4	31.7	42.5	53.9	11.4	
Hori	9920.000	AV	29.9	38.7	7.2	31.8	44.0	53.9	9.9	
Hori	24800.000	AV	35.2	40.3	-1.0	29.4	45.1	53.9	8.8	
Vert	54.028	QP	34.8	9.8	7.0	28.7	22.9	40.0	17.1	
Vert	108.002	QP	33.9	11.4	7.5	28.4	24.4	43.5	19.1	
Vert	117.680	QP	25.2	12.9	7.6	28.4	17.3	43.5	26.2	
Vert	360.399	QP	33.2	16.4	9.1	28.1	30.6	46.0	15.4	
Vert	856.153	QP	26.4	21.9	11.1	28.1	31.3	46.0	14.7	
Vert	901.186	QP	27.6	22.1	11.3	28.0	33.0	46.0	13.0	
Vert	1652.662	PK	47.4	25.9	2.2	32.9	42.6	73.9	31.3	
Vert	2483.500	PK	51.2	27.6	2.7	32.4	49.1	73.9	24.8	
Vert	4960.000	PK	40.7	31.7	5.3	31.3	46.4	73.9	27.5	
Vert	7440.000	PK	42.1	35.8	6.4	31.7	52.6	73.9	21.3	
Vert	9920.000	PK	41.7	38.7	7.2	31.8	55.8	73.9	18.1	
Vert	24800.000	PK	46.4	40.3	-1.0	29.4	56.3	73.9	17.6	
Vert	1652.662	AV	43.1	25.9	2.2	32.9	38.3	53.9	15.6	
Vert	2483.500	AV	39.2	27.6	2.7	32.4	37.1	53.9	16.8	
Vert	4960.000	AV	30.5	31.7	5.3	31.3	36.2	53.9	17.7	
Vert	7440.000	AV	31.1	35.8	6.4	31.7	41.6	53.9	12.4	
Vert	9920.000	AV	29.9	38.7	7.2	31.8	44.0	53.9	9.9	
Vert	24800.000	AV	35.3	40.3	-1.0	29.4	45.2	53.9	8.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

*The 10th harmonic was not seen so the result was its base noise level.

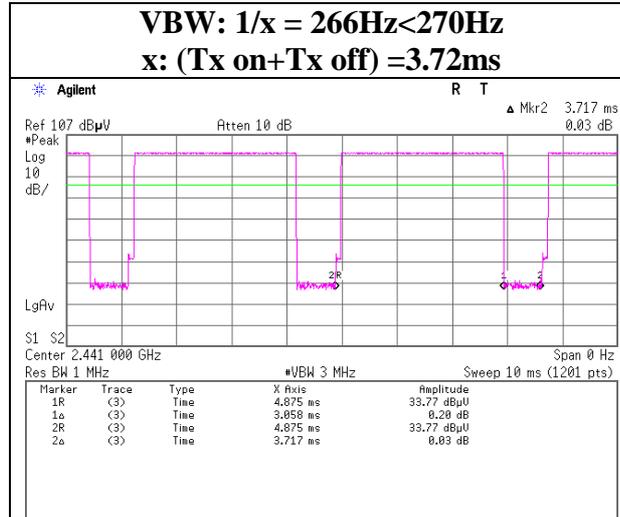
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 270Hz. For other average detectors, VBW was set at 10Hz.

VBW (AV) Calculation

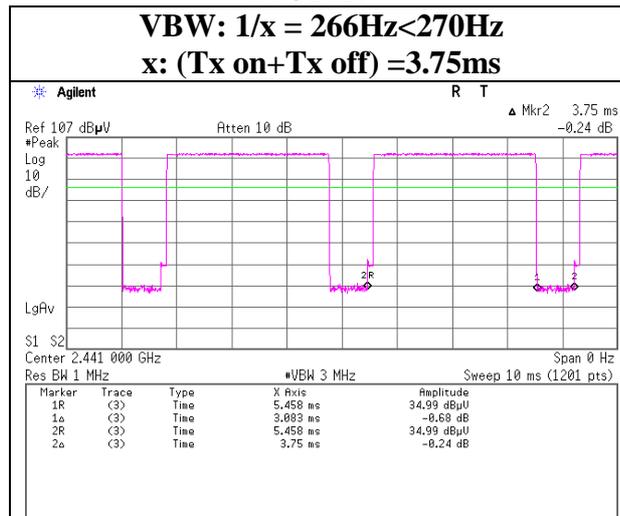
Tx DH5

VBW: $1/x = 266\text{Hz} < 270\text{Hz}$
x: (Tx on+Tx off) = 3.72ms



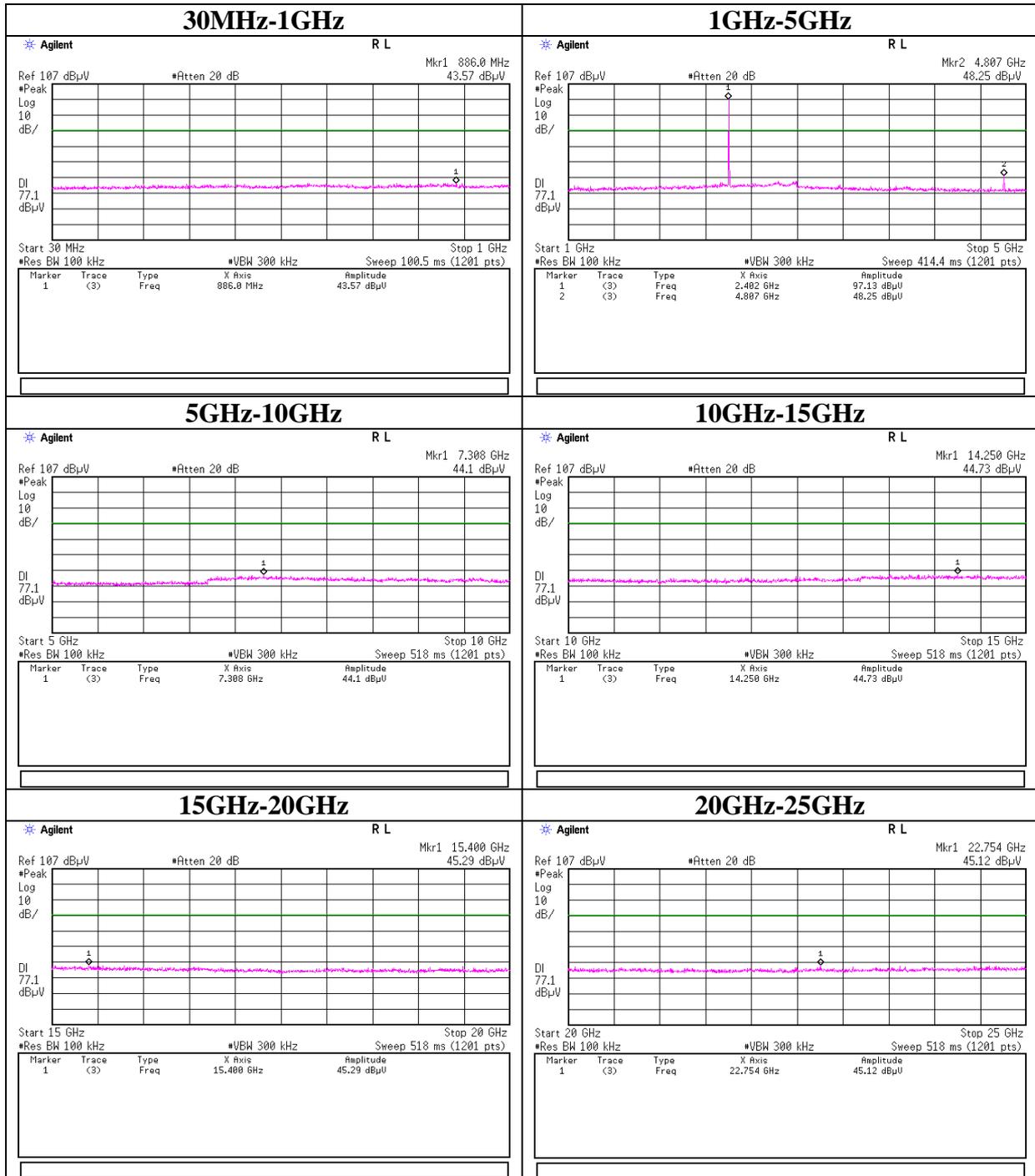
Tx 3DH5

VBW: $1/x = 266\text{Hz} < 270\text{Hz}$
x: (Tx on+Tx off) = 3.75ms



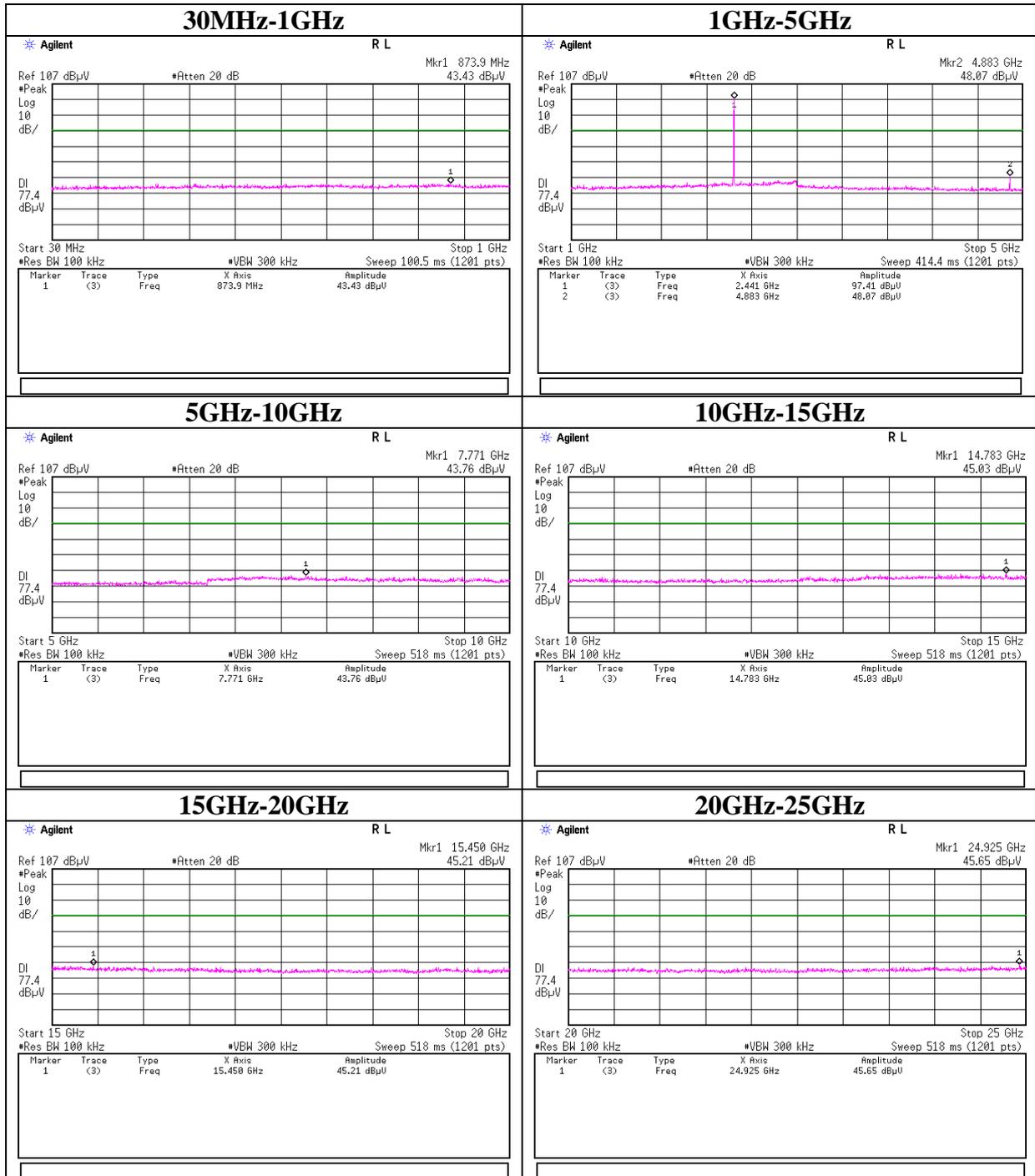
Conducted Spurious Emission

Tx DH5 2402MHz



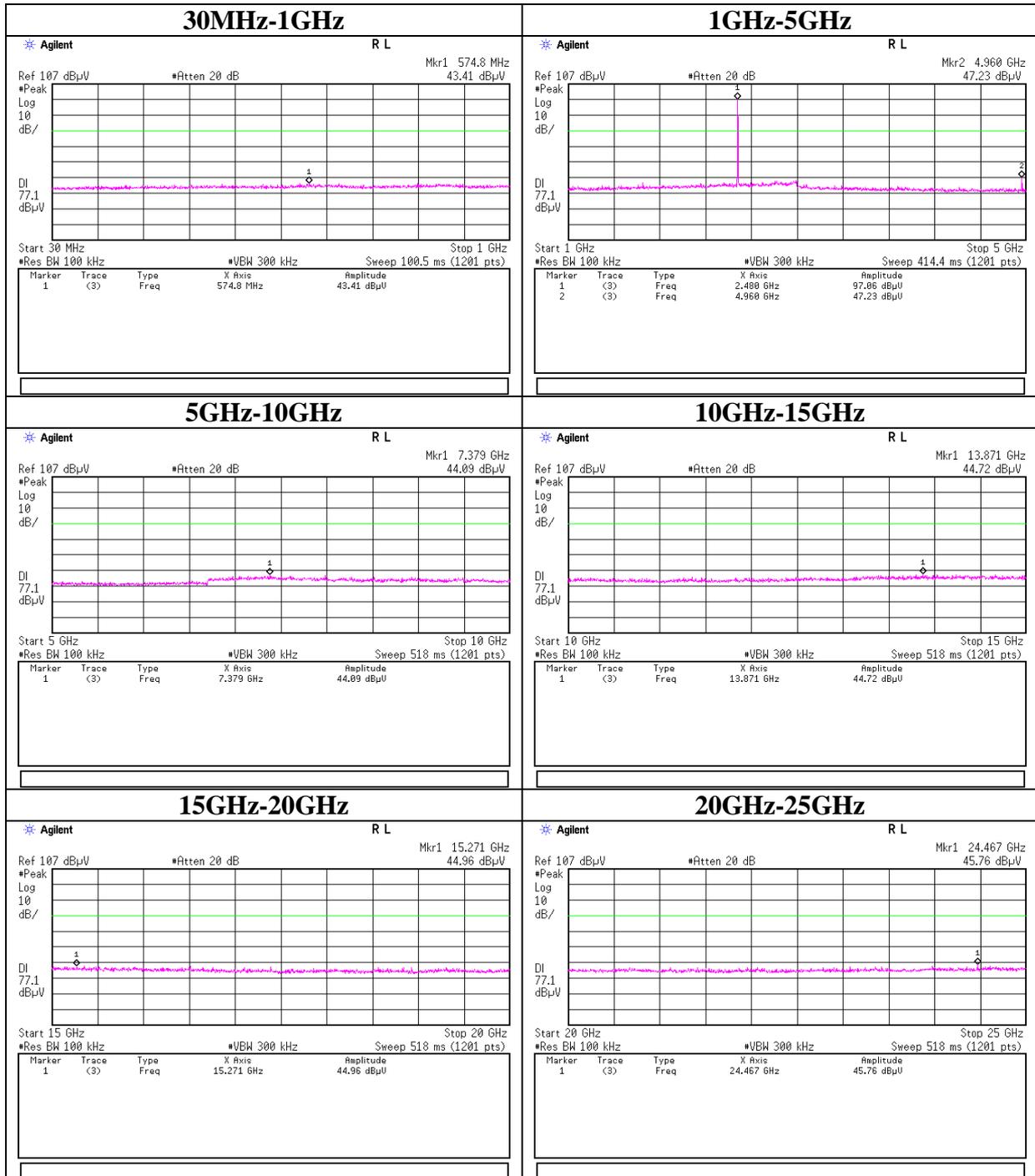
Conducted Spurious Emission

Tx DH5 2441MHz



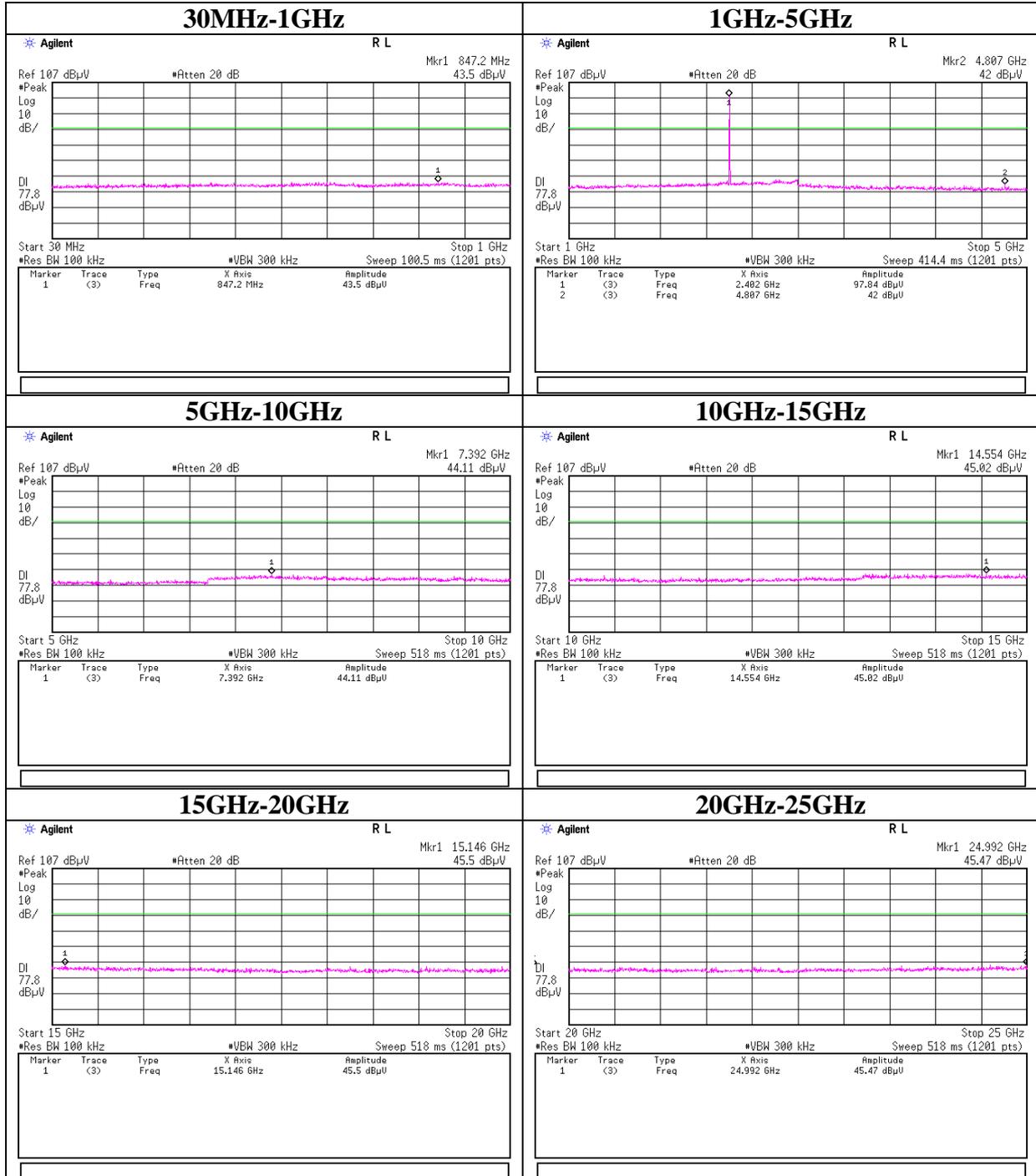
Conducted Spurious Emission

Tx DH5 2480MHz



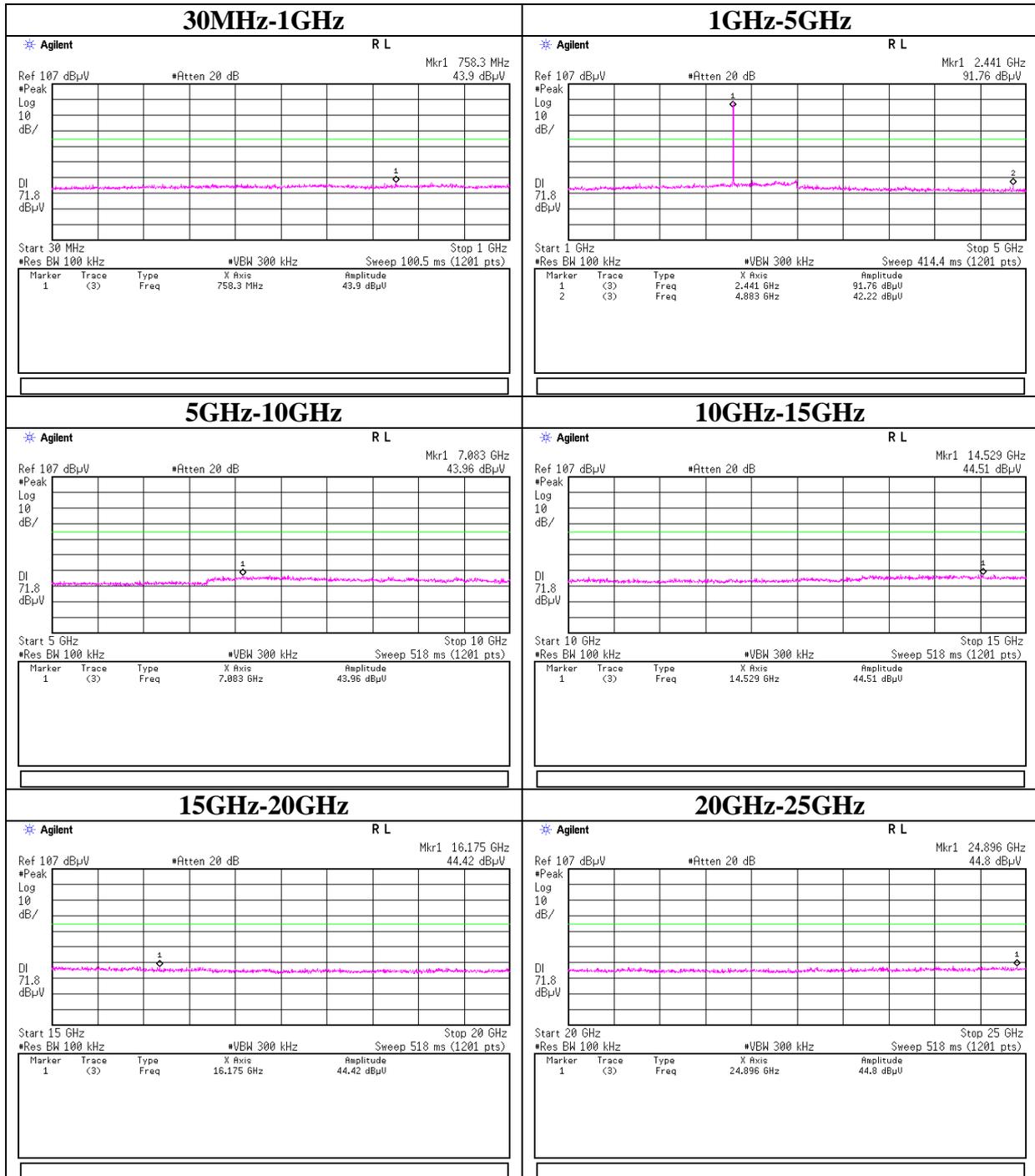
Conducted Spurious Emission

Tx 3DH5 2402MHz



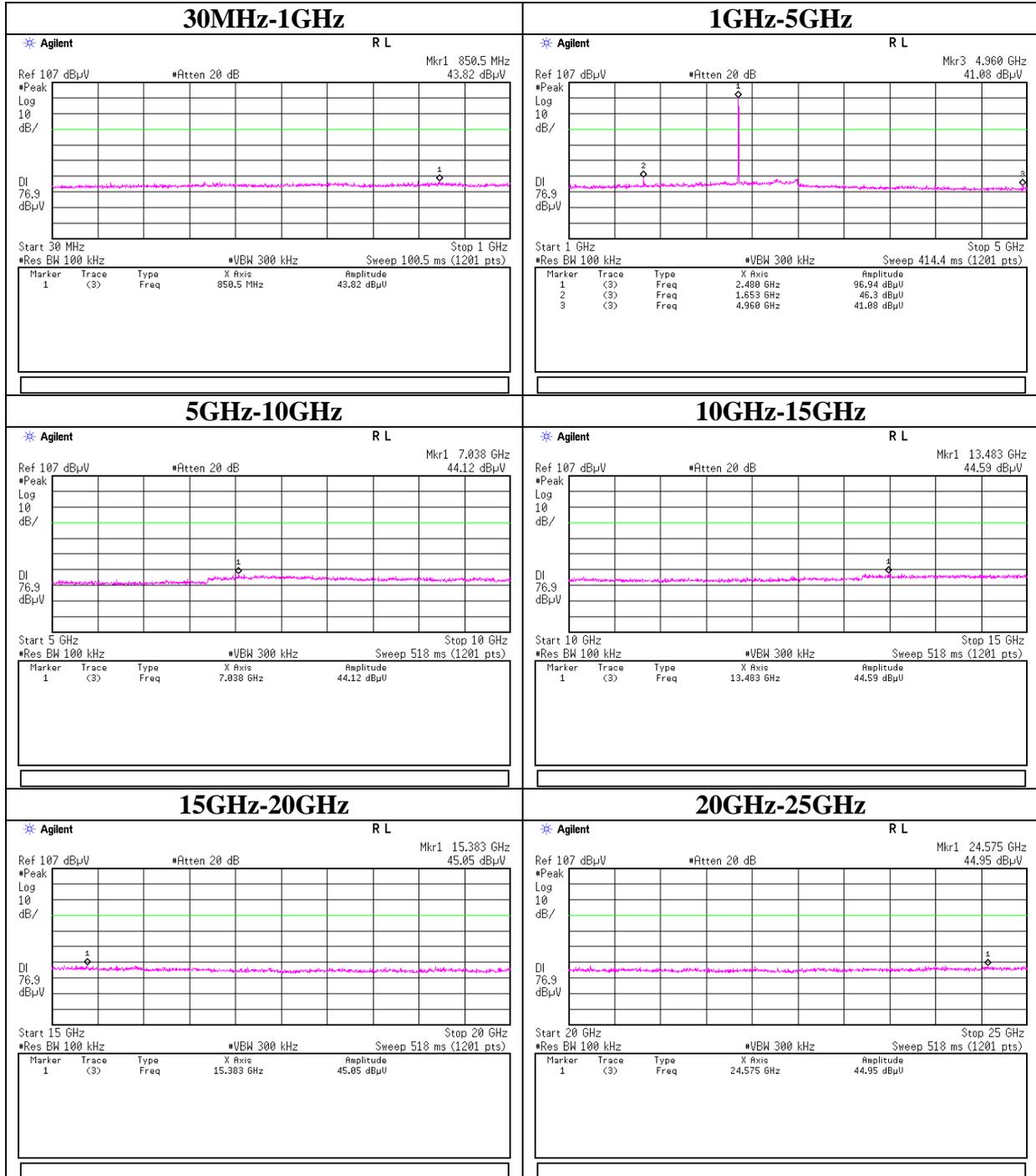
Conducted Spurious Emission

Tx 3DH5 2441MHz



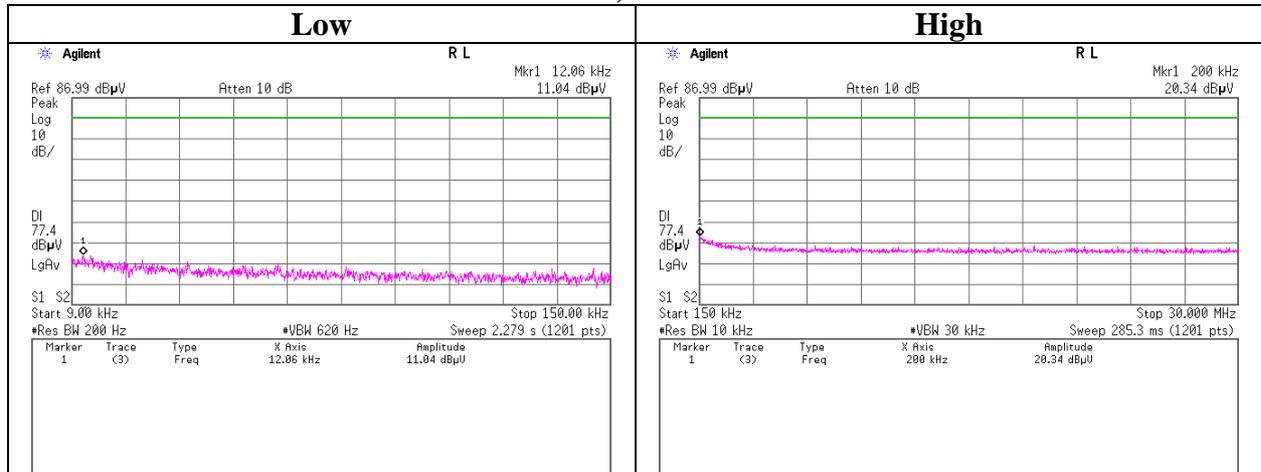
Conducted Spurious Emission

Tx 3DH5 2480MHz

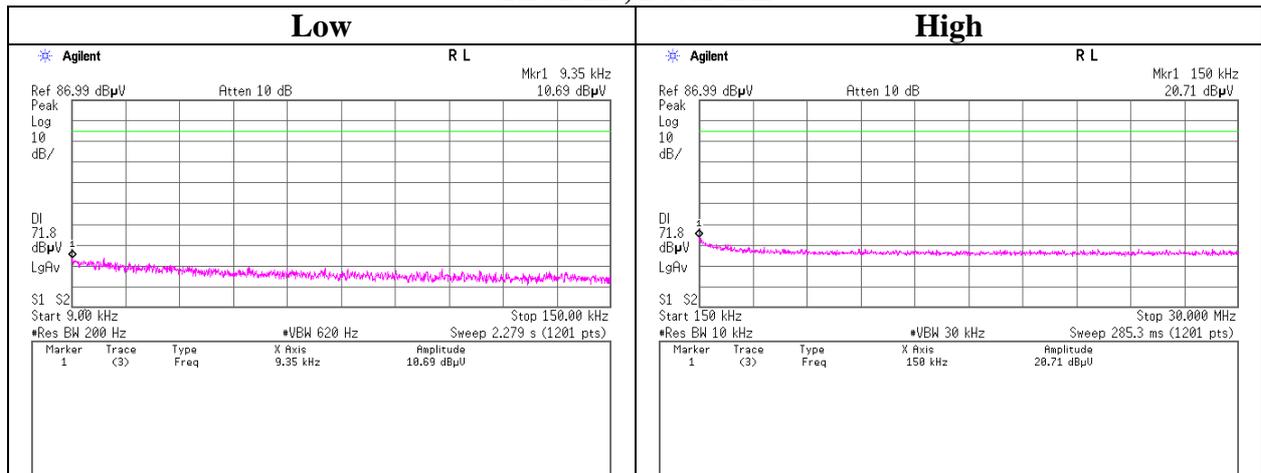


Conducted Spurious Emission(Below 30MHz)

Tx DH5, 2441MHz

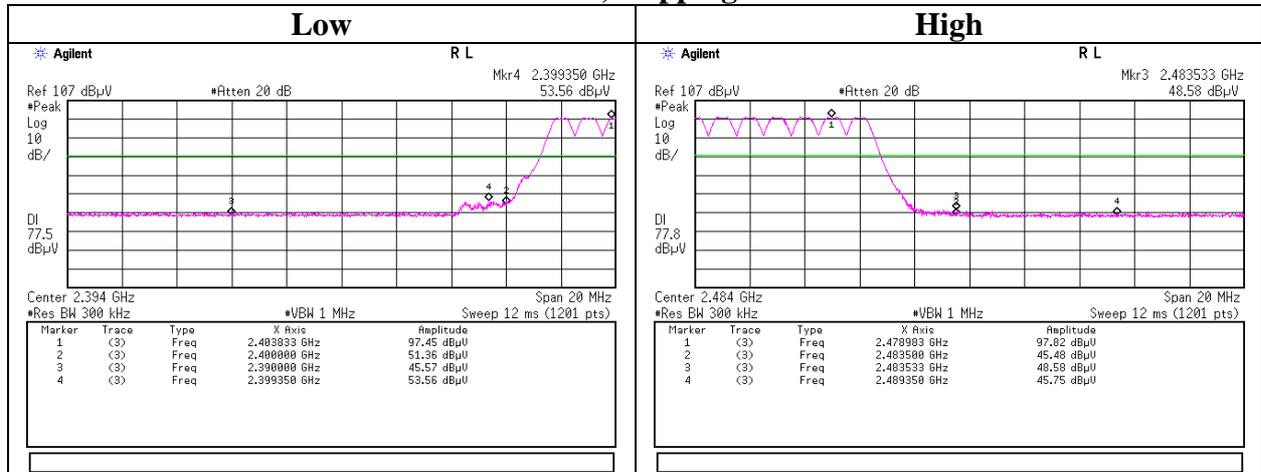


Tx 3DH5, 2441MHz

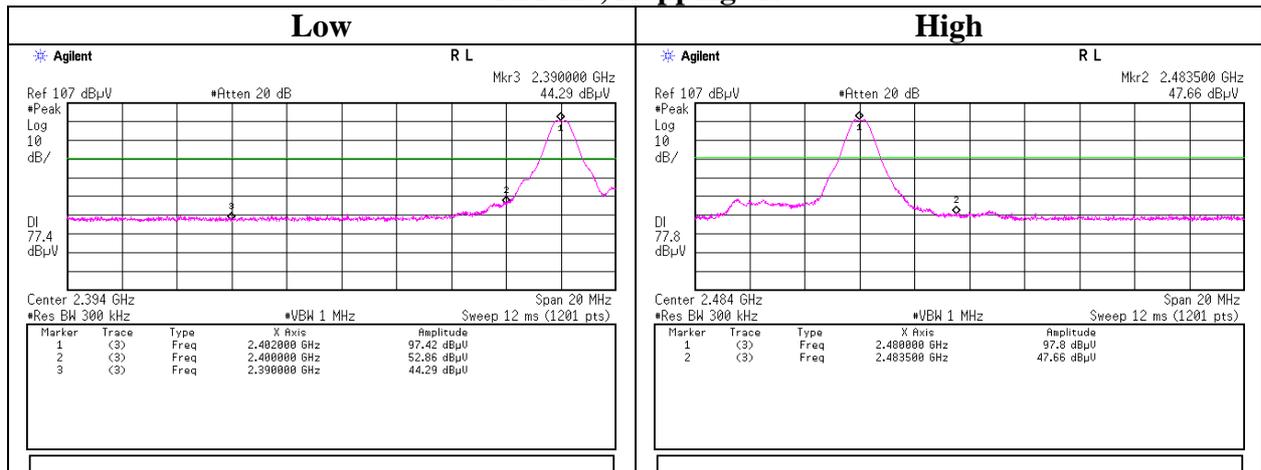


Conducted Emission Band Edge compliance

Tx DH5, Hopping on

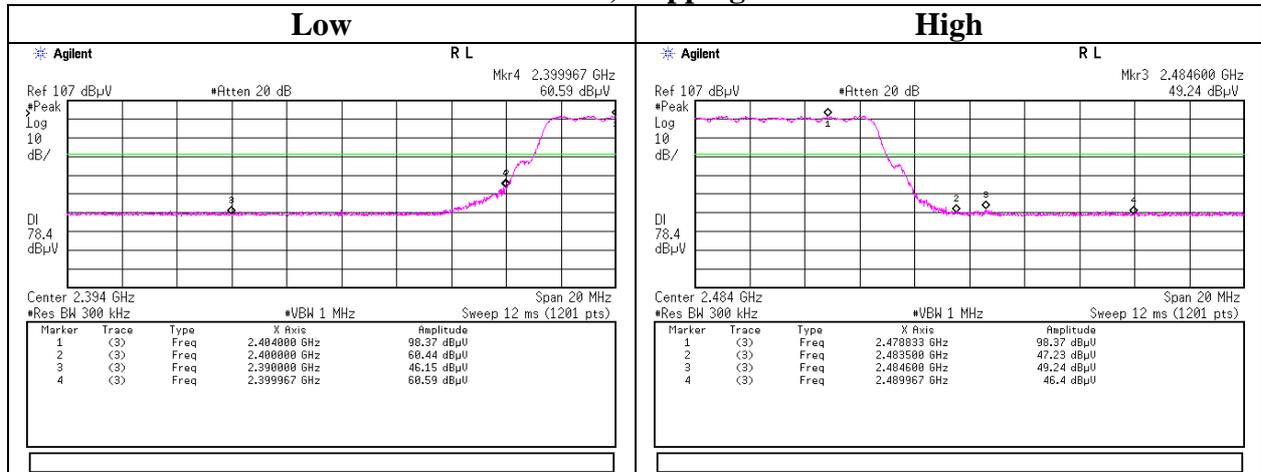


Tx DH5, Hopping off

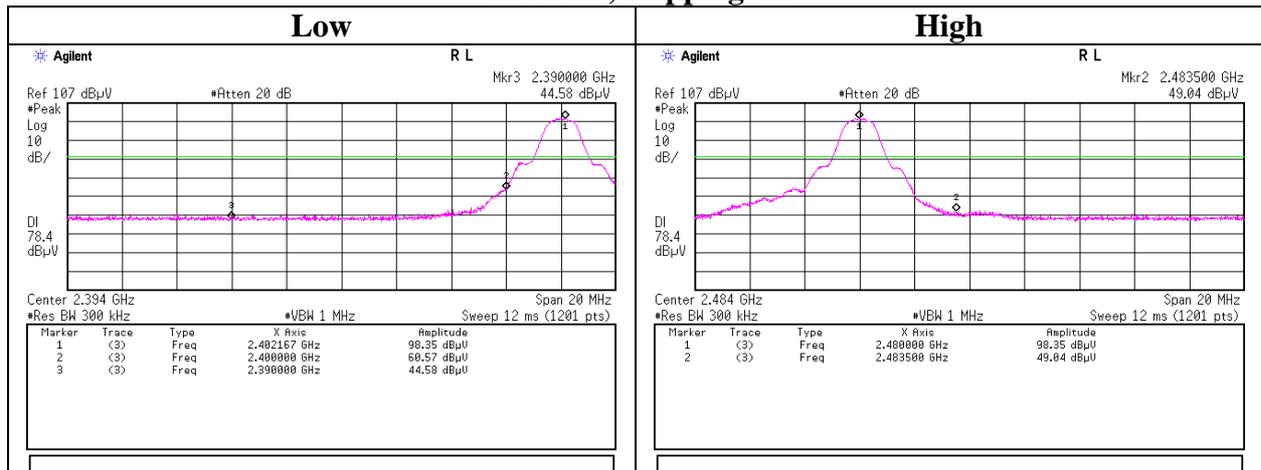


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping on

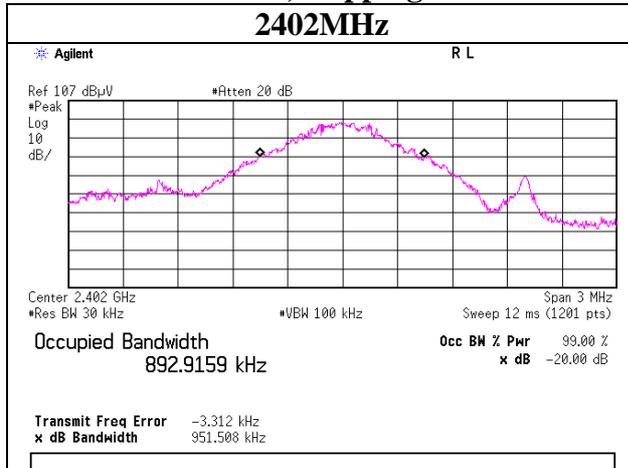


Tx 3DH5, Hopping off

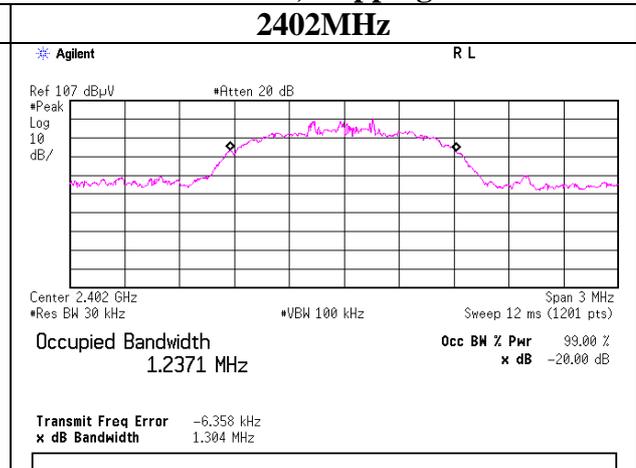


99% Occupied Bandwidth

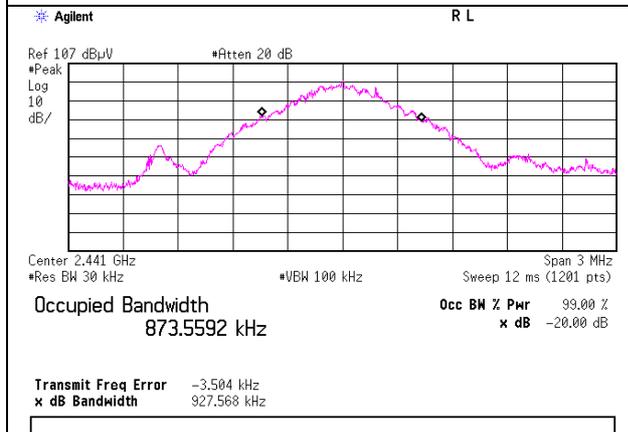
Tx DH5, Hopping off



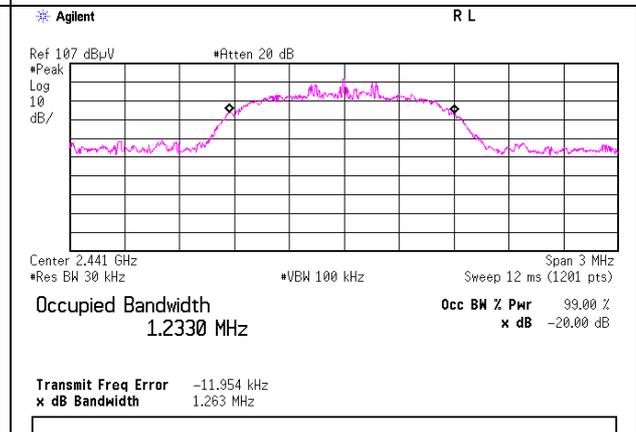
Tx 3DH5, Hopping off



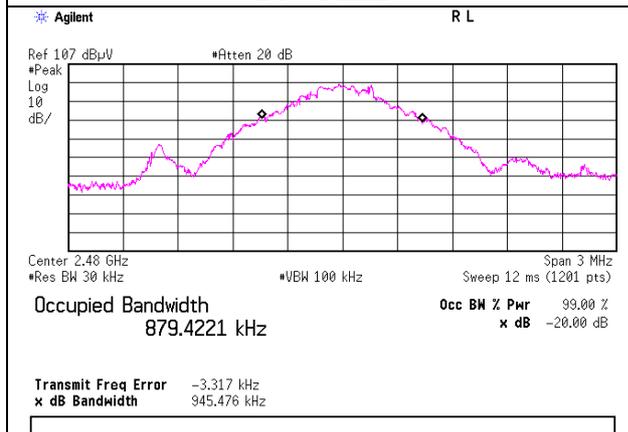
2441MHz



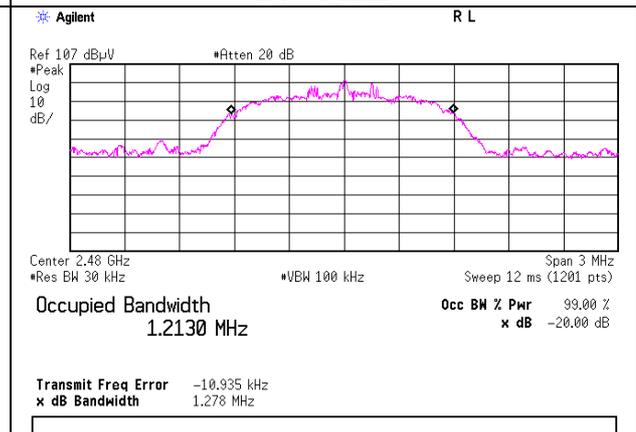
2441MHz



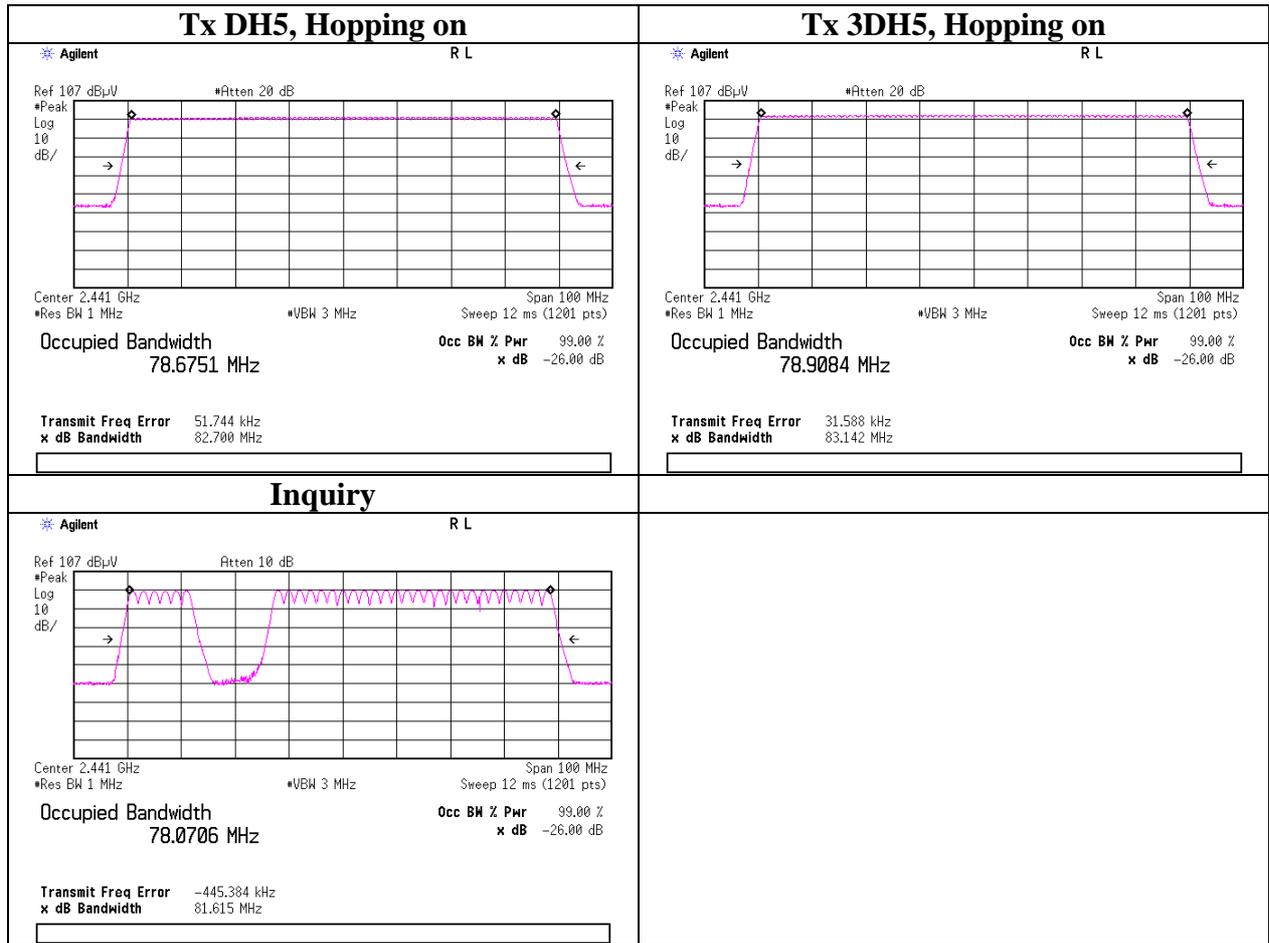
2480MHz



2480MHz



99% Occupied Bandwidth



APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2010/06/22 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2010/08/20 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2010/08/20 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	-	AT	2011/01/19 * 12
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	AT	2011/04/15 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2011/04/08 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2010/09/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2011/02/15 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2010/09/30 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2011/01/16 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	148048-143(1m) / 292410(5m)	RE	2010/09/30 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2010/12/02 * 12
MHF-18	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	7002	RE	2010/09/21 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2010/10/11 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2010/10/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2010/09/09 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	CE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	CE	-
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	CE	2010/10/27 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE (EUT)	2011/02/20 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2011/01/05 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2010/07/21 * 12

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

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

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

Test Item: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test