



RADIO TEST REPORT

Test Report No. : 32DE0235-HO-B

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : GSM/GPRS 1900 Phone with 802.11abgn, BT3.0 (EDR)
Model No. : SHW-M410K
FCC ID : A3LSHWM410K
Test regulation : FCC Part 15 Subpart C: 2011
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: November 22 to 24, 2011

Representative test engineer:


Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:


Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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SECTION 1: Customer information

Company Name : SAMSUNG ELECTRONICS CO., LTD.
 Address : 416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY,
 GYEONGGI-DO 443-742, SOUTH KOREA

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : GSM/GPRS 1900 Phone with 802.11abgn, BT3.0 (EDR)
 Model No. : SHW-M410K
 Serial No. : Refer to Section 4, Clause 4.2
 Rating : DC3.7V
 Receipt Date of Sample : November 21, 2011
 Modification of EUT : No Modification by the test lab

2.2 Product Description

Radio Specification

Bluetooth

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Gain	-11.5dBi

WLAN (IEEE802.11a/b/g/n-20)

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5640MHz 5745-5825MHz
Type of Modulation	DSSS, OFDM	OFDM
Bandwidth & Channel spacing	20MHz & 5MHz	20MHz & 20MHz
Antenna Gain	2.4G: -11.5dBi	5G: -11.5dBi

*EUT cannot operate in the frequency range from 5660 to 5700MHz

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] PCS: 1850 – 1910MHz [Down Link] PCS: 1930 – 1990MHz
Type of Modulation	GMSK
Antenna Gain	-3.93dBi

[Additional model]

EUT (SHW-M410K) has a variant model: SHW-M410S

Difference between two models is only software version name to identify each model.

Basic		Additional	
Model	SHW-M410K	Model	SHW-M410S
HW version	REV 0.7	HW version	REV 0.7
SW version	M410K.002	SW version	M410S.000

UL Japan, Inc.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2011, final revised on July 8, 2011 and effective August 8, 2011

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 15.9dB, 21.31713MHz, N AV 12.4dB, 0.33047MHz, L	Complied	-
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (b)	See data	Complied	Conducted
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-210 A8.1 (a)		-	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.8	FCC: Section15.247(a)(b)(1) IC: RSS-210 A8.4 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5 RSS-Gen 6 and 7.2.3	5.8dB 4804.000MHz, AV, Horizontal	Complied	Conducted/ Radiated

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

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	5.6dB	5.9dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	5.7dB	5.8dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	5.7dB	5.8dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	5.7dB	5.8dB	5.1dB	4.2dB

*3m/1m/0.5m = Measurement distance

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (+dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

Conducted Emission test

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

Radiated emission test

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

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation 20dB Bandwidth	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *The EUT support AFH with a minimum of 20 channels, following the Bluetooth protocol to ensure compliance with the pseudo-hopping sequence and dwell time requirements of FCC 15.247.		

***Power of the EUT was set by the software as follows:**

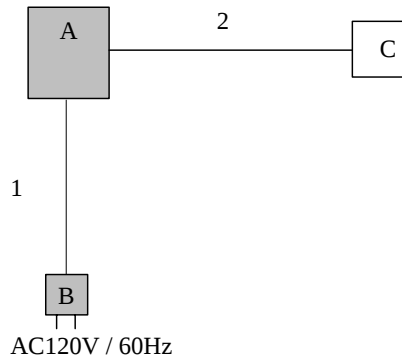
Power settings: Maximum power of the EUT was transmitted on Bluetooth testing mode.
Software: HW: REV0.7, SW: M410K.002

This setting of software is the worst case.

Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GSM/GPRS 1900 Phone with 802.11abgn, BT3.0 (EDR)	SHW-M410K	FI-294-E *1) FI-294-C *2)	SAMSUNG	EUT
B	AC Adapter	ETA0U10KBK	DK2B729TS/7-E	SAMSUNG	EUT
C	Ear phone	-	-	SAMSUNG	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	1.5	Unshielded	Unshielded	-
2	Ear phone Cable	1.2	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	: QP and AV
Measurement range	: 0.15-30MHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	Below 30MHz	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Loop	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m*1) (above 10GHz),		3m (below 10GHz), 1m*1) (above 10GHz),

*1) Distance Factor: $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range : 30M-25GHz

Test data : APPENDIX

Test result : Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

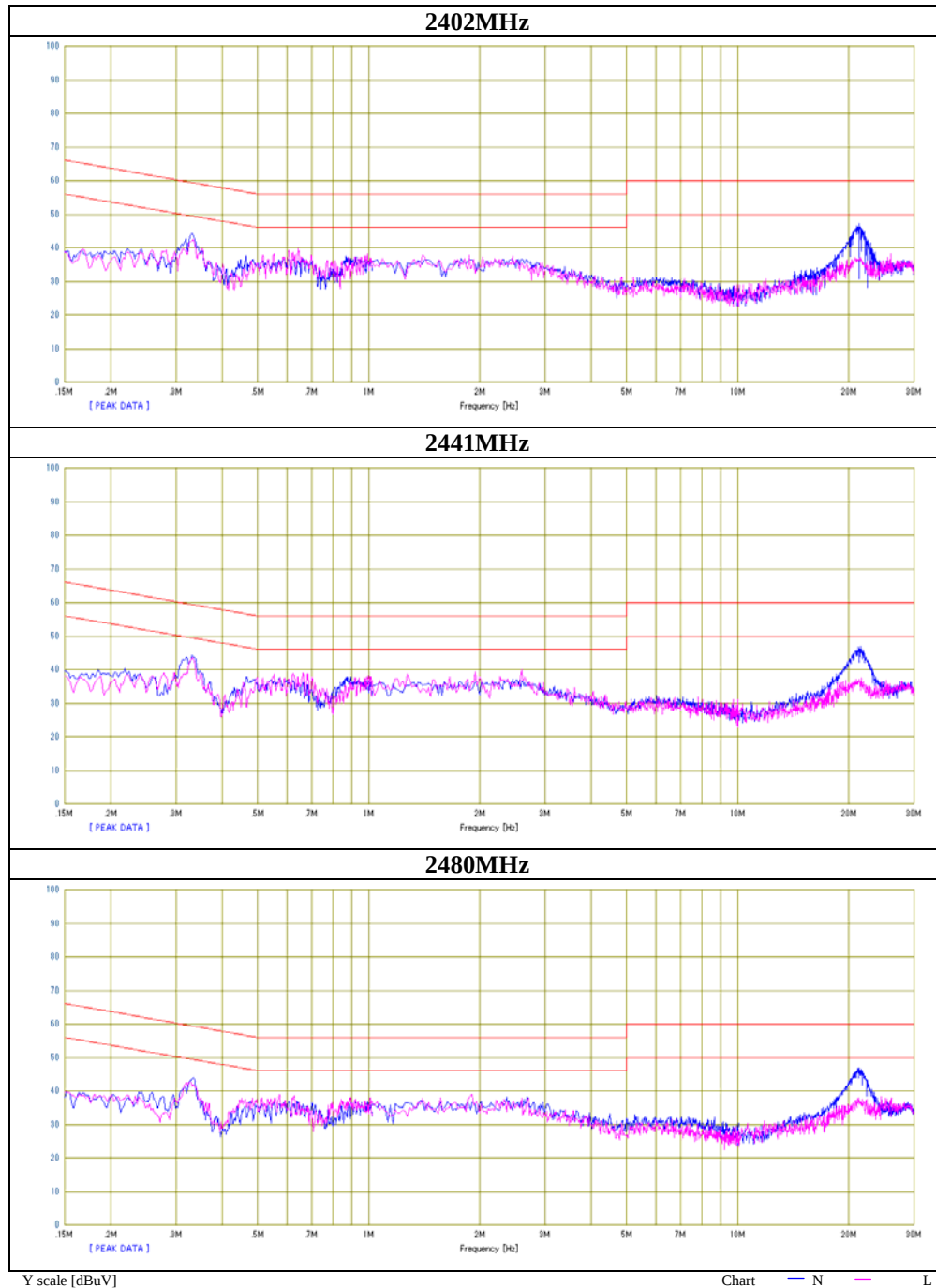
Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	2.5MHz / 3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz / 3MHz	30kHz, 100kHz	100kHz, 300kHz,	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *1)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	20MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
*1) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)							

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

Conducted Emission

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	32DE0235-HO
Date	11/24/2011
Temperature/ Humidity	19 deg.C / 34% RH
Engineer	Katsunori Okai
Mode	BT Tx DH5



Conducted Emission

DATA OF CONDUCTED EMISSION TEST

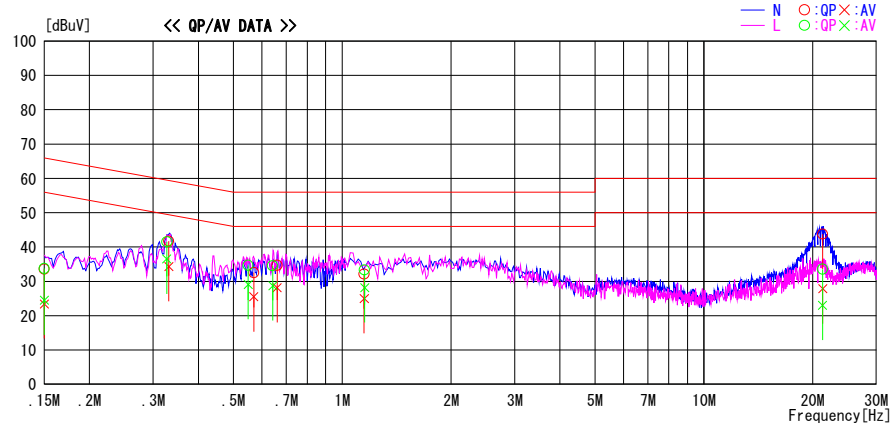
UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2011/11/24

Report No. : 32DE0235-HO

Temp./Humi. : 19deg. C / 34% RH
Engineer : Katsunori Okai

Mode / Remarks : BT Tx 3DH5 2402MHz

LIMIT : FCC15.207 QP
FCC15.207 AV

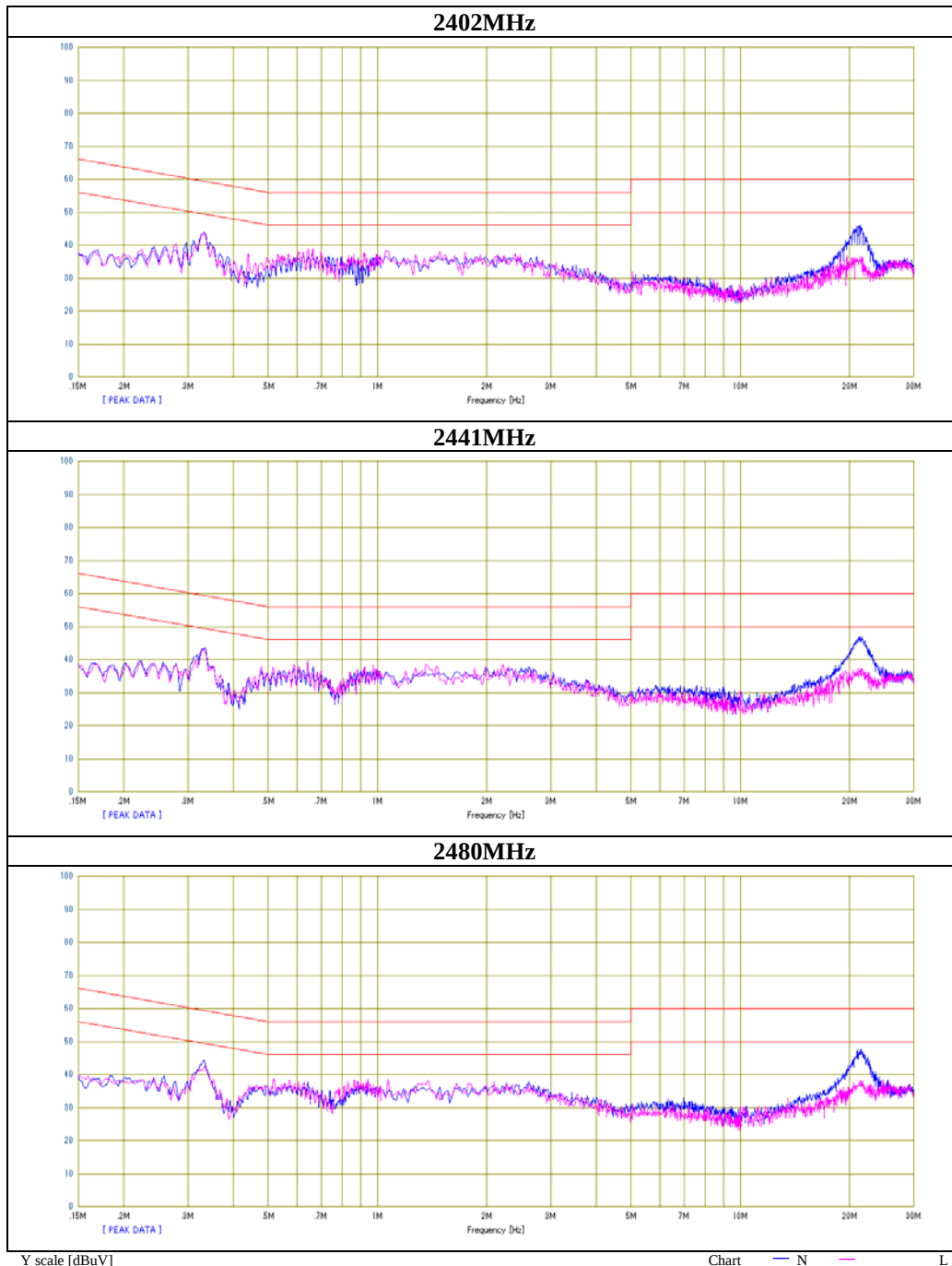


Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP	AV		QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	20.2	10.1	13.3	33.5	23.4	66.0	56.0	32.5	32.6	N	
0.33131	28.3	20.9	13.4	41.7	34.3	59.4	49.4	17.7	15.1	N	
0.56939	19.1	12.1	13.4	32.5	25.5	56.0	46.0	23.5	20.5	N	
0.66033	21.2	14.6	13.5	34.7	28.1	56.0	46.0	21.3	17.9	N	
1.15054	18.5	11.4	13.6	32.1	25.0	56.0	46.0	23.9	21.0	N	
21.31423	26.1	10.1	17.7	43.8	27.8	60.0	50.0	16.2	22.2	N	
0.15000	20.5	11.2	13.3	33.8	24.5	66.0	56.0	32.2	31.5	L	
0.32733	28.1	23.1	13.4	41.5	36.5	59.5	49.5	18.0	13.0	L	
0.54923	21.3	15.7	13.4	34.7	29.1	56.0	46.0	21.3	16.9	L	
0.64203	21.2	15.3	13.4	34.6	28.7	56.0	46.0	21.4	17.3	L	
1.15240	19.7	14.5	13.6	33.3	28.1	56.0	46.0	22.7	17.9	L	
21.28361	15.8	5.3	17.7	33.5	23.0	60.0	50.0	26.5	27.0	L	

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

Conducted Emission

Test place	Head Office EMC Lab. No.1 Semi Anechoic Chamber
Report No.	32DE0235-HO
Date	11/24/2011
Temperature/ Humidity	19 deg. C / 34% RH
Engineer	Katsunori Okai
Mode	BT Tx 3DH5



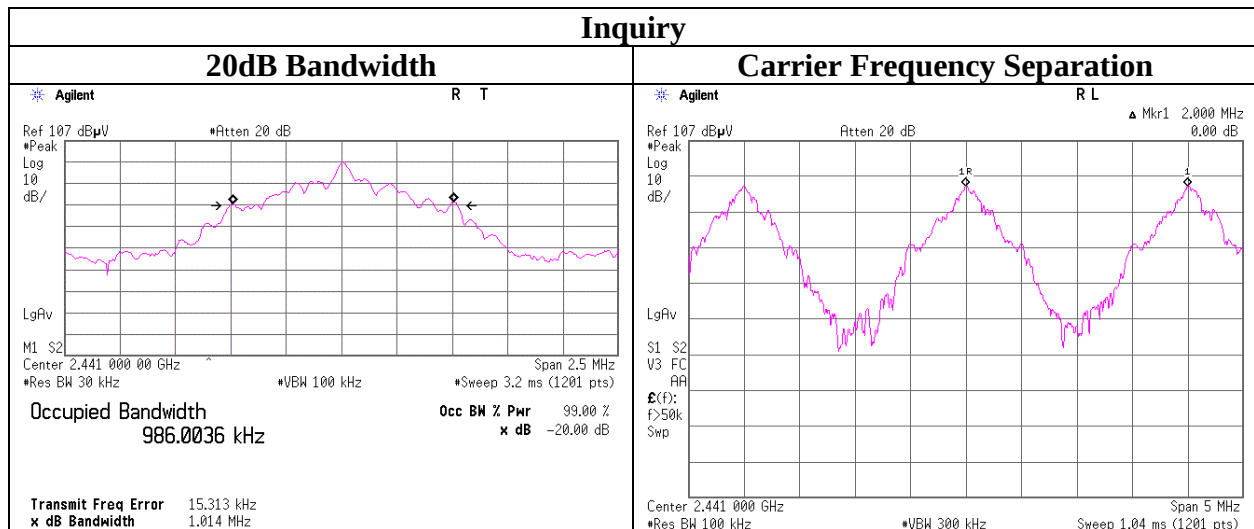
20dB Bandwidth and Carrier Frequency Separation

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	32DE0235-HO
Date	11/22/2011
Temperature/ Humidity	23 deg. C / 43% RH
Engineer	Tomohisa Nakagawa
Mode	Tx (Hopping on/off) DH5/3DH5/Inquiry

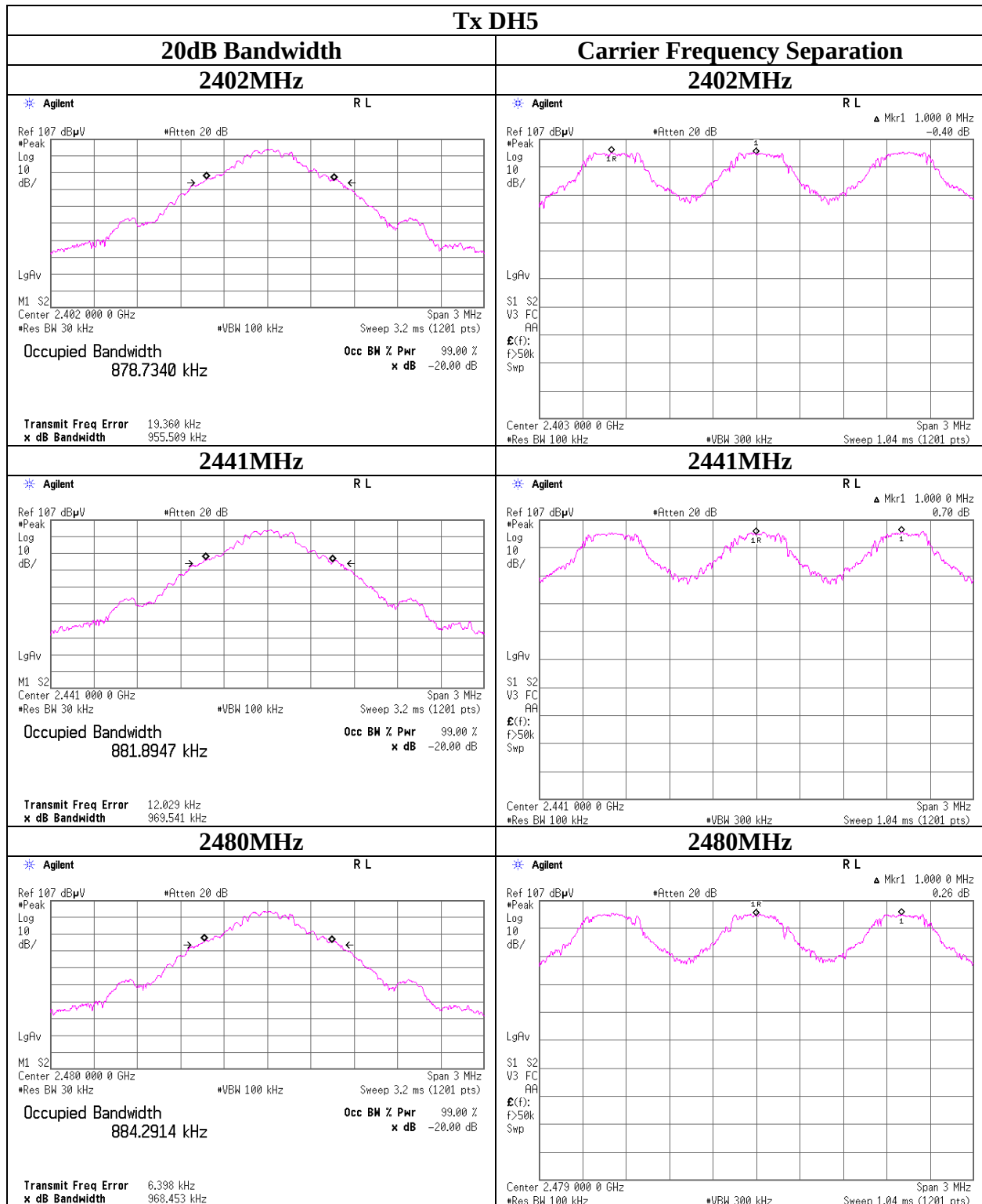
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.956	1.000	>= 0.637
DH5	2441.0	0.970	1.000	>= 0.646
DH5	2480.0	0.968	1.000	>= 0.646
3DH5	2402.0	1.336	1.000	>= 0.891
3DH5	2441.0	1.329	1.000	>= 0.886
3DH5	2480.0	1.337	1.000	>= 0.891
Inquiry	2441.0	1.014	2.000	>= 0.676

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

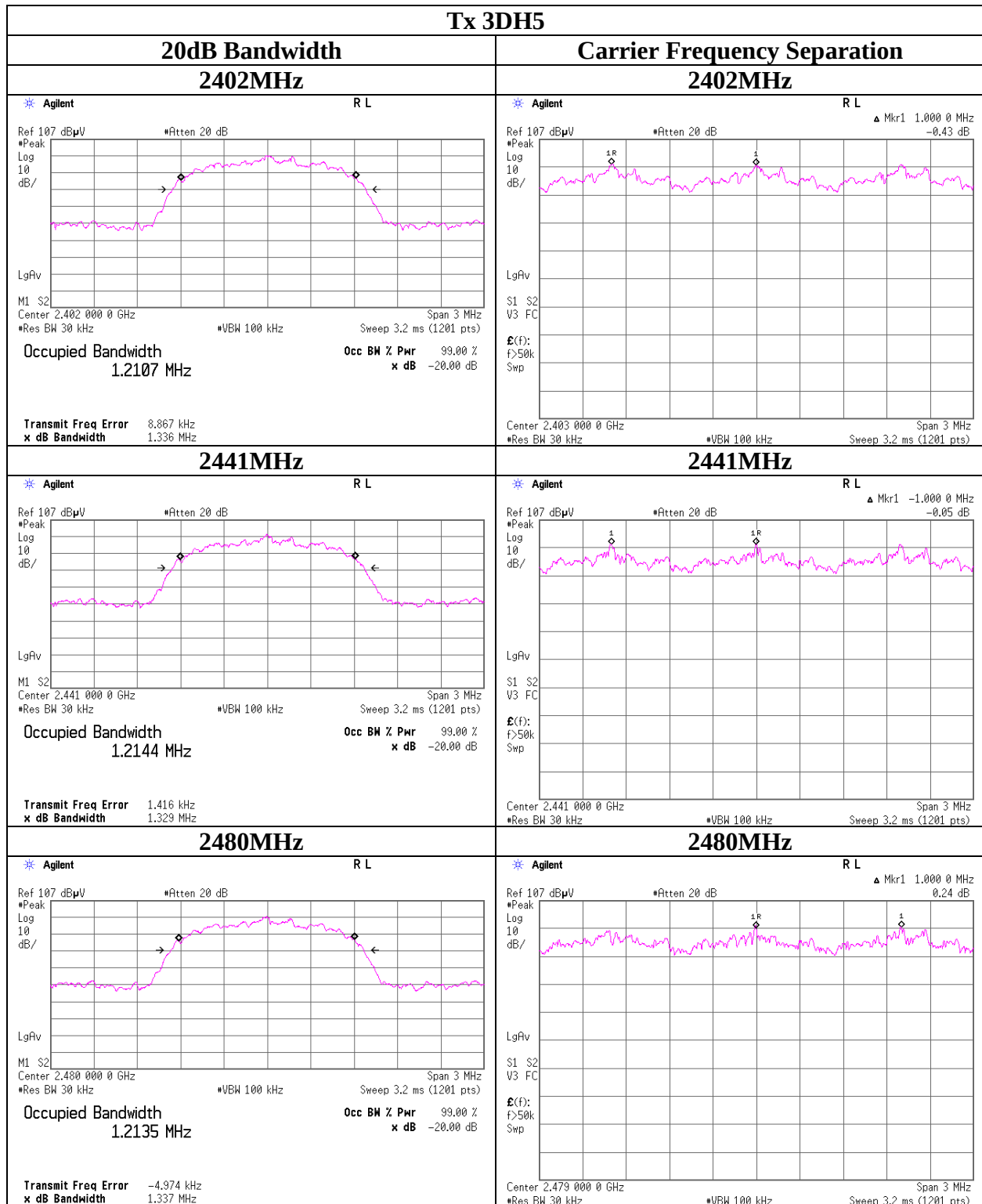
No limit applies to 20dB Bandwidth.



20dB Bandwidth and Carrier Frequency Separation



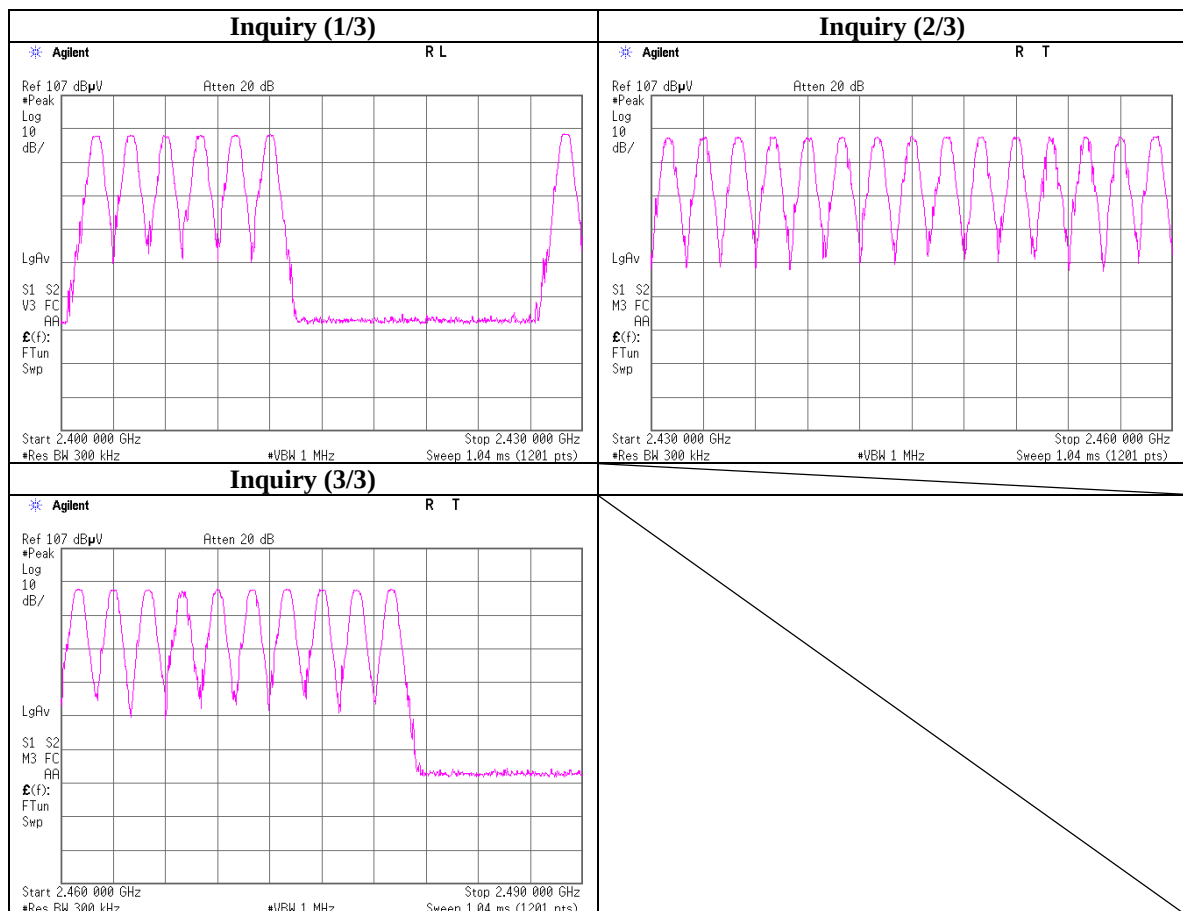
20dB Bandwidth and Carrier Frequency Separation



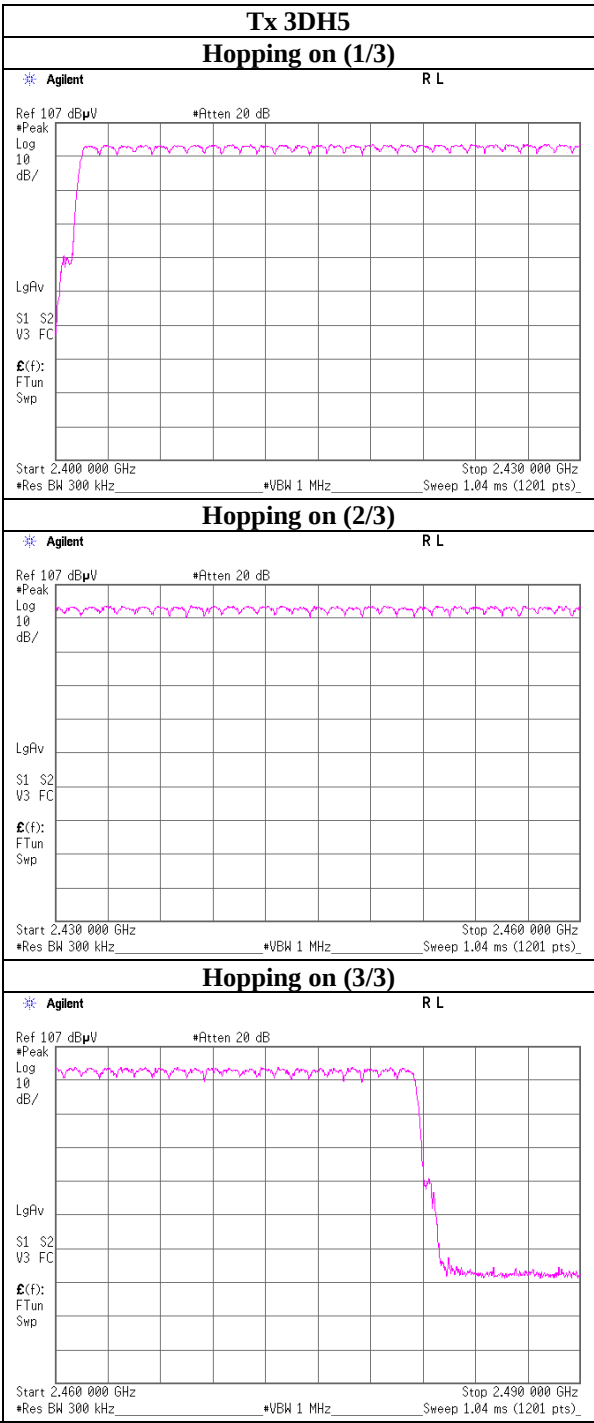
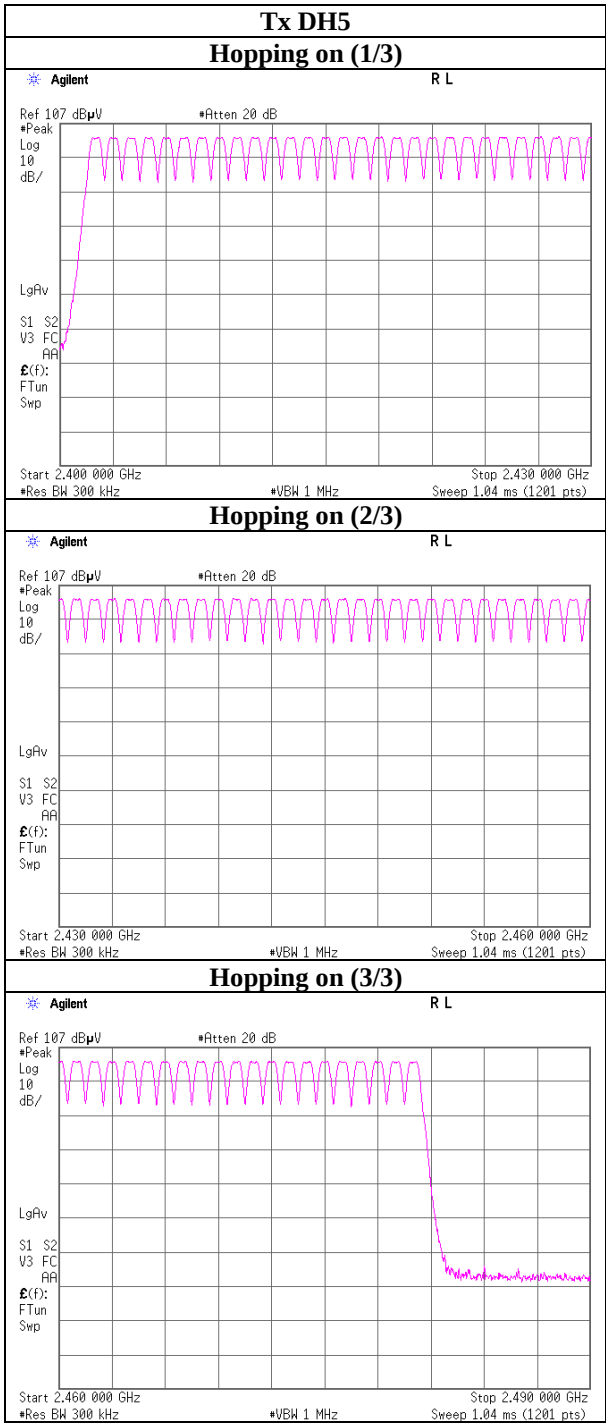
Number of Hopping Frequency

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	32DE0235-HO
Date	11/22/2011
Temperature/ Humidity	23 deg.C/ 43% RH
Engineer	Tomohisa Nakagawa
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. 32DE0235-HO
Date 11/22/2011
Temperature/ Humidity 23 deg. C / 43% RH
Engineer Tomohisa Nakagawa
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	50.8 times	/	5 sec. x	31.6 sec. = 322 times	0.393	127	400
DH3	23.4 times	/	5 sec. x	31.6 sec. = 148 times	1.652	244	400
DH5	16.0 times	/	5 sec. x	31.6 sec. = 102 times	2.931	299	400
3DH1	49.2 times	/	5 sec. x	31.6 sec. = 311 times	0.403	125	400
3DH3	26.6 times	/	5 sec. x	31.6 sec. = 169 times	1.660	281	400
3DH5	18.4 times	/	5 sec. x	31.6 sec. = 117 times	2.920	342	400
Inquiry	100.0 times	/	1 sec. x	12.8 sec. = 1280 times	0.093	119	400

Sample Calculation

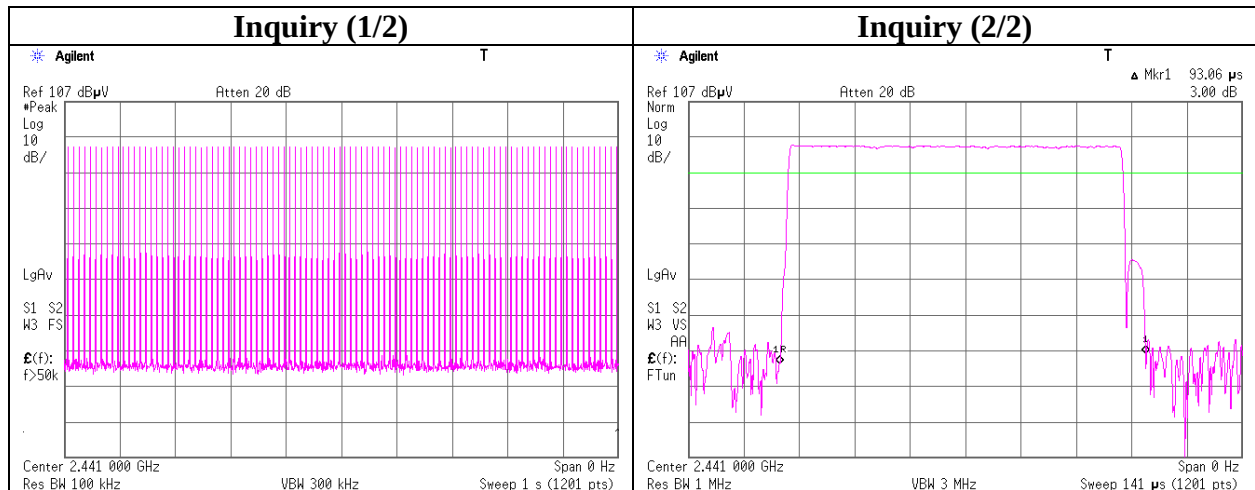
Result = Number of transmission x Length of transmittion time

*Average data of 5 tests.(except Inquiry)

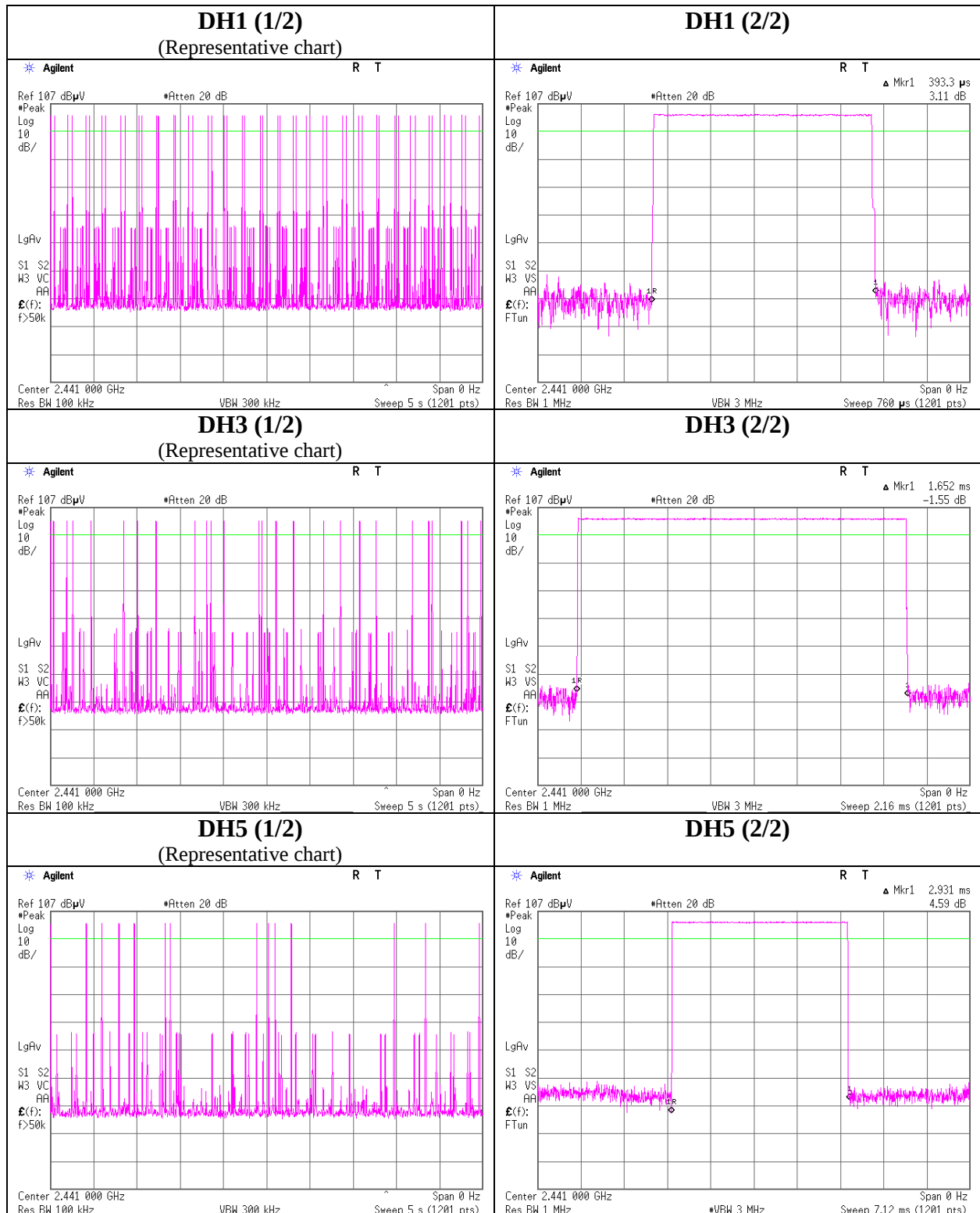
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	52	50	50	50.8
DH3	26	26	25	20	20	23.4
DH5	14	15	16	17	18	16
3DH1	47	51	47	50	51	49.2
3DH3	29	29	24	25	26	26.6
3DH5	20	18	18	15	21	18.4

Sample Calculation

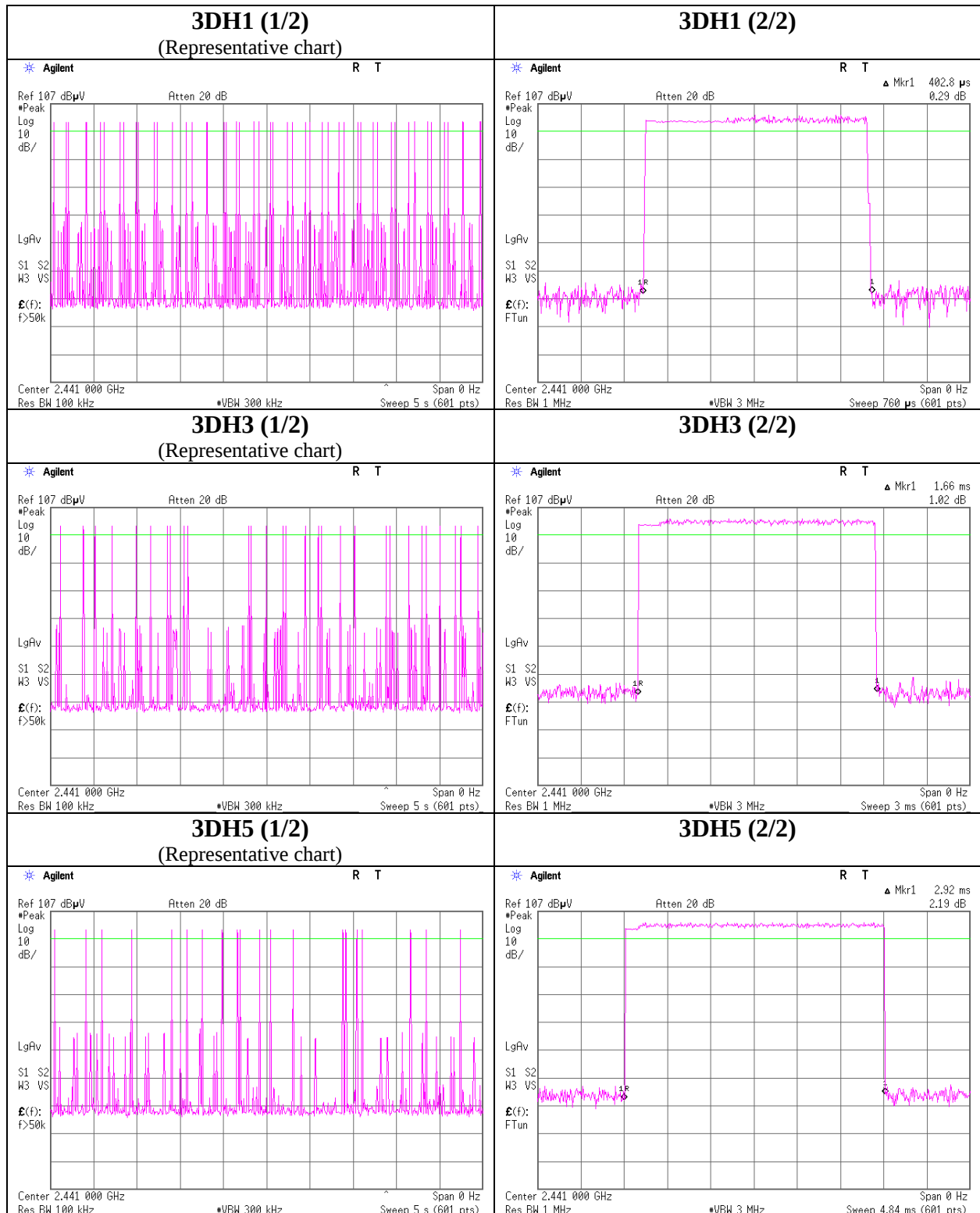
Average= Summation(Sampling 1 to 5) / 5



Dwell time



Dwell time



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Shielded Room
Report No. 32DE0235-HO
Date 11/22/2011
Temperature/ Humidity 23 deg.C / 43% RH
Engineer Tomohisa Nakagawa
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	-3.87	0.00	13.48	9.61	9.14	20.97	125	11.36
DH5	2441.0	-3.85	0.00	13.50	9.65	9.23	20.97	125	11.32
DH5	2480.0	-4.05	0.00	13.51	9.46	8.83	20.97	125	11.51
3DH5	2402.0	-3.37	0.00	13.48	10.11	10.26	20.97	125	10.86
3DH5	2441.0	-3.40	0.00	13.50	10.10	10.23	20.97	125	10.87
3DH5	2480.0	-3.57	0.00	13.51	9.94	9.86	20.97	125	11.03
Inquiry	2441.0	-10.97	0.00	13.50	2.53	1.79	20.97	125	18.44

Sample Calculation:

Result = Reading + Cable Loss + 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. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	126.160	QP	24.1	13.2	7.7	28.2	16.8	43.5	26.7	
Hori	393.220	QP	28.2	17.2	9.3	28.2	26.5	46.0	19.5	
Hori	884.744	QP	28.9	22.1	11.2	27.9	34.3	46.0	11.7	
Hori	2390.000	PK	44.2	26.5	2.2	32.6	40.3	73.9	33.6	
Hori	2395.605	PK	50.0	26.5	2.2	32.6	46.1	73.9	27.8	
Hori	2400.000	PK	61.4	26.5	2.2	32.6	57.5	73.9	16.4	
Hori	4804.000	PK	50.2	30.6	3.9	31.9	52.8	73.9	21.1	
Hori	7206.000	PK	42.9	35.3	4.5	32.4	50.3	73.9	23.6	
Hori	9608.000	PK	43.4	37.9	5.3	32.9	53.7	73.9	20.2	
Hori	24020.000	PK	47.1	41.0	-1.7	31.6	54.8	73.9	19.1	
Hori	2390.000	AV	32.1	26.5	2.2	32.6	28.2	53.9	25.7	
Hori	2395.605	AV	39.9	26.5	2.2	32.6	36.0	53.9	17.9	
Hori	2400.000	AV	41.0	26.5	2.2	32.6	37.1	53.9	16.8	
Hori	4804.000	AV	45.5	30.6	3.9	31.9	48.1	53.9	5.8	
Hori	7206.000	AV	30.5	35.3	4.5	32.4	37.9	53.9	16.0	
Hori	9608.000	AV	31.2	37.9	5.3	32.9	41.5	53.9	12.4	
Hori	24020.000	AV	33.3	41.0	-1.7	31.6	41.0	53.9	12.9	
Vert	126.160	QP	32.6	13.2	7.7	28.2	25.3	43.5	18.2	
Vert	393.220	QP	25.1	17.2	9.3	28.2	23.4	46.0	22.6	
Vert	884.744	QP	25.8	22.1	11.2	27.9	31.2	46.0	14.8	
Vert	2390.000	PK	45.5	26.5	2.2	32.6	41.6	73.9	32.3	
Vert	2395.555	PK	49.9	26.5	2.2	32.6	46.0	73.9	27.9	
Vert	2400.000	PK	62.1	26.5	2.2	32.6	58.2	73.9	15.7	
Vert	4804.000	PK	49.4	30.6	3.9	31.9	52.0	73.9	21.9	
Vert	7206.000	PK	43.7	35.3	4.5	32.4	51.1	73.9	22.8	
Vert	9608.000	PK	43.6	37.9	5.3	32.9	53.9	73.9	20.0	
Vert	24020.000	PK	45.5	41.0	-1.7	31.6	53.2	73.9	20.7	
Vert	2390.000	AV	32.3	26.5	2.2	32.6	28.4	53.9	25.5	
Vert	2395.555	AV	40.6	26.5	2.2	32.6	36.7	53.9	17.2	
Vert	2400.000	AV	41.7	26.5	2.2	32.6	37.8	53.9	16.1	
Vert	4804.000	AV	44.1	30.6	3.9	31.9	46.7	53.9	7.2	
Vert	7206.000	AV	31.4	35.3	4.5	32.4	38.8	53.9	15.1	
Vert	9608.000	AV	31.3	37.9	5.3	32.9	41.6	53.9	12.3	
Vert	24020.000	AV	33.3	41.0	-1.7	31.6	41.0	53.9	12.9	

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	126.200	QP	23.9	13.2	7.7	28.2	16.6	43.5	26.9	
Hori	393.220	QP	28.2	17.2	9.3	28.2	26.5	46.0	19.5	
Hori	884.744	QP	28.9	22.1	11.2	27.9	34.3	46.0	11.7	
Hori	4882.000	PK	48.8	30.7	3.8	31.9	51.4	73.9	22.5	
Hori	7323.000	PK	42.7	35.3	4.6	32.4	50.2	73.9	23.7	
Hori	9764.000	PK	41.7	38.2	5.3	32.9	52.3	73.9	21.6	
Hori	24410.000	PK	45.8	40.8	-1.7	31.4	53.5	73.9	20.4	
Hori	4882.000	AV	43.2	30.7	3.8	31.9	45.8	53.9	8.1	
Hori	7323.000	AV	31.2	35.3	4.6	32.4	38.7	53.9	15.2	
Hori	9764.000	AV	31.0	38.2	5.3	32.9	41.6	53.9	12.3	
Hori	24410.000	AV	34.0	40.8	-1.7	31.4	41.7	53.9	12.2	
Vert	126.200	QP	31.6	13.2	7.7	28.2	24.3	43.5	19.2	
Vert	393.220	QP	25.0	17.2	9.3	28.2	23.3	46.0	22.7	
Vert	884.744	QP	25.8	22.1	11.2	27.9	31.2	46.0	14.8	
Vert	4882.000	PK	47.2	30.7	3.8	31.9	49.8	73.9	24.1	
Vert	7323.000	PK	42.5	35.3	4.6	32.4	50.0	73.9	23.9	
Vert	9764.000	PK	42.3	38.2	5.3	32.9	52.9	73.9	21.0	
Vert	24410.000	PK	45.9	40.8	-1.7	31.4	53.6	73.9	20.3	
Vert	4882.000	AV	41.5	30.7	3.8	31.9	44.1	53.9	9.8	
Vert	7323.000	AV	30.8	35.3	4.6	32.4	38.3	53.9	15.6	
Vert	9764.000	AV	31.2	38.2	5.3	32.9	41.8	53.9	12.1	
Vert	24410.000	AV	34.1	40.8	-1.7	31.4	41.8	53.9	12.1	

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	125.080	QP	23.6	13.1	7.7	28.2	16.2	43.5	27.3	
Hori	393.220	QP	28.2	17.2	9.3	28.2	26.5	46.0	19.5	
Hori	884.744	QP	28.9	22.1	11.2	27.9	34.3	46.0	11.7	
Hori	2483.500	PK	55.4	26.5	2.3	32.6	51.6	73.9	22.3	
Hori	2486.485	PK	47.2	26.5	2.3	32.6	43.4	73.9	30.5	
Hori	4960.000	PK	46.7	30.9	3.9	31.9	49.6	73.9	24.3	
Hori	7440.000	PK	41.7	35.4	4.6	32.4	49.3	73.9	24.6	
Hori	9920.000	PK	41.4	38.4	5.4	32.9	52.3	73.9	21.6	
Hori	24800.000	PK	46.8	40.6	-1.6	31.2	54.6	73.9	19.3	
Hori	2483.500	AV	37.9	26.5	2.3	32.6	34.1	53.9	19.8	
Hori	2486.485	AV	37.5	26.5	2.3	32.6	33.7	53.9	20.2	
Hori	4960.000	AV	40.5	30.9	3.9	31.9	43.4	53.9	10.5	
Hori	7440.000	AV	31.1	35.4	4.6	32.4	38.7	53.9	15.2	
Hori	9920.000	AV	31.4	38.4	5.4	32.9	42.3	53.9	11.6	
Hori	24800.000	AV	34.8	40.6	-1.6	31.2	42.6	53.9	11.3	
Vert	125.080	QP	31.1	13.1	7.7	28.2	23.7	43.5	19.8	
Vert	393.220	QP	25.2	17.2	9.3	28.2	23.5	46.0	22.5	
Vert	884.744	QP	25.7	22.1	11.2	27.9	31.1	46.0	14.9	
Vert	2483.500	PK	54.3	26.5	2.3	32.6	50.5	73.9	23.4	
Vert	2486.501	PK	46.1	26.5	2.3	32.6	42.3	73.9	31.6	
Vert	4960.000	PK	43.7	30.9	3.9	31.9	46.6	73.9	27.3	
Vert	7440.000	PK	44.2	35.4	4.6	32.4	51.8	73.9	22.1	
Vert	9920.000	PK	42.3	38.4	5.4	32.9	53.2	73.9	20.7	
Vert	24800.000	PK	46.4	40.6	-1.6	31.2	54.2	73.9	19.7	
Vert	2483.500	AV	38.0	26.5	2.3	32.6	34.2	53.9	19.7	
Vert	2486.501	AV	35.4	26.5	2.3	32.6	31.6	53.9	22.3	
Vert	4960.000	AV	37.8	30.9	3.9	31.9	40.7	53.9	13.2	
Vert	7440.000	AV	33.3	35.4	4.6	32.4	40.9	53.9	13.0	
Vert	9920.000	AV	31.2	38.4	5.4	32.9	42.1	53.9	11.8	
Vert	24800.000	AV	34.8	40.6	-1.6	31.2	42.6	53.9	11.3	

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	128.480	QP	24.1	13.4	7.7	28.2	17.0	43.5	26.5	
Hori	393.220	QP	28.2	17.2	9.3	28.2	26.5	46.0	19.5	
Hori	884.744	QP	28.8	22.1	11.2	27.9	34.2	46.0	11.8	
Hori	933.896	QP	27.2	22.6	11.4	27.8	33.4	46.0	12.6	
Hori	2390.000	PK	45.2	26.5	2.2	32.6	41.3	73.9	32.6	See 20dBc Data Sheet
Hori	2400.000	PK	71.9	26.5	2.2	32.6	68.0	-	-	
Hori	4804.000	PK	44.8	30.6	3.9	31.9	47.4	73.9	26.5	
Hori	7206.000	PK	43.9	35.3	4.5	32.4	51.3	73.9	22.6	
Hori	9608.000	PK	42.9	37.9	5.3	32.9	53.2	73.9	20.7	
Hori	24020.000	PK	45.8	41.0	-1.7	31.6	53.5	73.9	20.4	
Hori	2390.000	AV	32.3	26.5	2.2	32.6	28.4	53.9	25.5	See 20dBc Data Sheet
Hori	2400.000	AV	55.0	26.5	2.2	32.6	51.1	-	-	
Hori	4804.000	AV	37.9	30.6	3.9	31.9	40.5	53.9	13.4	
Hori	7206.000	AV	34.5	35.3	4.5	32.4	41.9	53.9	12.0	
Hori	9608.000	AV	31.6	37.9	5.3	32.9	41.9	53.9	12.0	
Hori	24020.000	AV	33.2	41.0	-1.7	31.6	40.9	53.9	13.0	
Vert	128.480	QP	31.3	13.4	7.7	28.2	24.2	43.5	19.3	
Vert	393.220	QP	25.2	17.2	9.3	28.2	23.5	46.0	22.5	
Vert	884.744	QP	25.8	22.1	11.2	27.9	31.2	46.0	14.8	
Vert	2390.000	PK	45.5	26.5	2.2	32.6	41.6	73.9	32.3	See 20dBc Data Sheet
Vert	2400.000	PK	72.1	26.5	2.2	32.6	68.2	-	-	
Vert	4804.000	PK	47.3	30.6	3.9	31.9	49.9	73.9	24.0	
Vert	7206.000	PK	42.2	35.3	4.5	32.4	49.6	73.9	24.3	
Vert	9608.000	PK	42.8	37.9	5.3	32.9	53.1	73.9	20.8	
Vert	24020.000	PK	45.4	41.0	-1.7	31.6	53.1	73.9	20.8	
Vert	2390.000	AV	32.4	26.5	2.2	32.6	28.5	53.9	25.4	See 20dBc Data Sheet
Vert	2400.000	AV	55.2	26.5	2.2	32.6	51.3	-	-	
Vert	4804.000	AV	39.2	30.6	3.9	31.9	41.8	53.9	12.1	
Vert	7206.000	AV	31.4	35.3	4.5	32.4	38.8	53.9	15.1	
Vert	9608.000	AV	31.5	37.9	5.3	32.9	41.8	53.9	12.1	
Vert	24020.000	AV	33.2	41.0	-1.7	31.6	40.9	53.9	13.0	

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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	104.9	26.5	2.2	32.6	101.0	-	-	Carrier
Hori	2400.000	PK	49.1	26.5	2.2	32.6	45.2	81.0	35.8	
Vert	2402.000	PK	104.8	26.5	2.2	32.6	100.9	-	-	Carrier
Vert	2400.000	PK	49.0	26.5	2.2	32.6	45.1	80.9	35.8	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	124.960	QP	23.5	13.1	7.7	28.2	16.1	43.5	27.4	
Hori	393.220	QP	28.3	17.2	9.3	28.2	26.6	46.0	19.4	
Hori	884.744	QP	28.8	22.1	11.2	27.9	34.2	46.0	11.8	
Hori	933.896	QP	27.0	22.6	11.4	27.8	33.2	46.0	12.8	
Hori	4882.000	PK	47.9	30.7	3.8	31.9	50.5	73.9	23.4	
Hori	7323.000	PK	41.1	35.3	4.6	32.4	48.6	73.9	25.3	
Hori	9764.000	PK	42.8	38.2	5.3	32.9	53.4	73.9	20.5	
Hori	24410.000	PK	46.3	40.8	-1.7	31.4	54.0	73.9	19.9	
Hori	4882.000	AV	38.8	30.7	3.8	31.9	41.4	53.9	12.5	
Hori	7323.000	AV	30.4	35.3	4.6	32.4	37.9	53.9	16.0	
Hori	9764.000	AV	31.3	38.2	5.3	32.9	41.9	53.9	12.0	
Hori	24410.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	
Vert	124.960	QP	30.9	13.1	7.7	28.2	23.5	43.5	20.0	
Vert	393.220	QP	25.3	17.2	9.3	28.2	23.6	46.0	22.4	
Vert	884.744	QP	25.7	22.1	11.2	27.9	31.1	46.0	14.9	
Vert	4882.000	PK	47.1	30.7	3.8	31.9	49.7	73.9	24.2	
Vert	7323.000	PK	42.5	35.3	4.6	32.4	50.0	73.9	23.9	
Vert	9764.000	PK	42.2	38.2	5.3	32.9	52.8	73.9	21.1	
Vert	24410.000	PK	46.5	40.8	-1.7	31.4	54.2	73.9	19.7	
Vert	4882.000	AV	36.9	30.7	3.8	31.9	39.5	53.9	14.4	
Vert	7323.000	AV	30.6	35.3	4.6	32.4	38.1	53.9	15.8	
Vert	9764.000	AV	31.3	38.2	5.3	32.9	41.9	53.9	12.0	
Vert	24410.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	

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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/23/2011 11/23/2011
Temperature/ Humidity 21 deg. C / 33% RH 19 deg. C / 34% RH
Engineer Hironobu Ohnishi Katsunori Okai
(30-1000MHz) (1-26.5GHz)
Mode 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	126.560	QP	24.3	13.2	7.7	28.2	17.0	43.5	26.5	
Hori	393.220	QP	28.2	17.2	9.3	28.2	26.5	46.0	19.5	
Hori	884.744	QP	28.8	22.1	11.2	27.9	34.2	46.0	11.8	
Hori	933.896	QP	27.3	22.6	11.4	27.8	33.5	46.0	12.5	
Hori	2483.500	PK	46.5	26.5	2.3	32.6	42.7	73.9	31.2	
Hori	2486.499	PK	49.7	26.5	2.3	32.6	45.9	73.9	28.0	
Hori	4960.000	PK	45.2	30.9	3.9	31.9	48.1	73.9	25.8	
Hori	7440.000	PK	41.6	35.4	4.6	32.4	49.2	73.9	24.7	
Hori	9920.000	PK	43.2	38.4	5.4	32.9	54.1	73.9	19.8	
Hori	24800.000	PK	47.2	40.6	-1.6	31.2	55.0	73.9	18.9	
Hori	2483.500	AV	30.3	26.5	2.3	32.6	26.5	53.9	27.4	
Hori	2486.499	AV	35.4	26.5	2.3	32.6	31.6	53.9	22.3	
Hori	4960.000	AV	36.1	30.9	3.9	31.9	39.0	53.9	14.9	
Hori	7440.000	AV	30.4	35.4	4.6	32.4	38.0	53.9	15.9	
Hori	9920.000	AV	31.2	38.4	5.4	32.9	42.1	53.9	11.8	
Hori	24800.000	AV	34.8	40.6	-1.6	31.2	42.6	53.9	11.3	
Vert	126.560	QP	31.6	13.2	7.7	28.2	24.3	43.5	19.2	
Vert	393.220	QP	25.2	17.2	9.3	28.2	23.5	46.0	22.5	
Vert	884.744	QP	25.7	22.1	11.2	27.9	31.1	46.0	14.9	
Vert	2483.500	PK	49.9	26.5	2.3	32.6	46.1	73.9	27.8	
Vert	2486.505	PK	50.6	26.5	2.3	32.6	46.8	73.9	27.1	
Vert	4960.000	PK	44.6	30.9	3.9	31.9	47.5	73.9	26.4	
Vert	7440.000	PK	41.6	35.4	4.6	32.4	49.2	73.9	24.7	
Vert	9920.000	PK	41.5	38.4	5.4	32.9	52.4	73.9	21.5	
Vert	24800.000	PK	46.5	40.6	-1.6	31.2	54.3	73.9	19.6	
Vert	2483.500	AV	34.2	26.5	2.3	32.6	30.4	53.9	23.5	
Vert	2486.505	AV	34.5	26.5	2.3	32.6	30.7	53.9	23.2	
Vert	4960.000	AV	34.0	30.9	3.9	31.9	36.9	53.9	17.0	
Vert	7440.000	AV	30.5	35.4	4.6	32.4	38.1	53.9	15.8	
Vert	9920.000	AV	31.2	38.4	5.4	32.9	42.1	53.9	11.8	
Vert	24800.000	AV	34.8	40.6	-1.6	31.2	42.6	53.9	11.3	

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

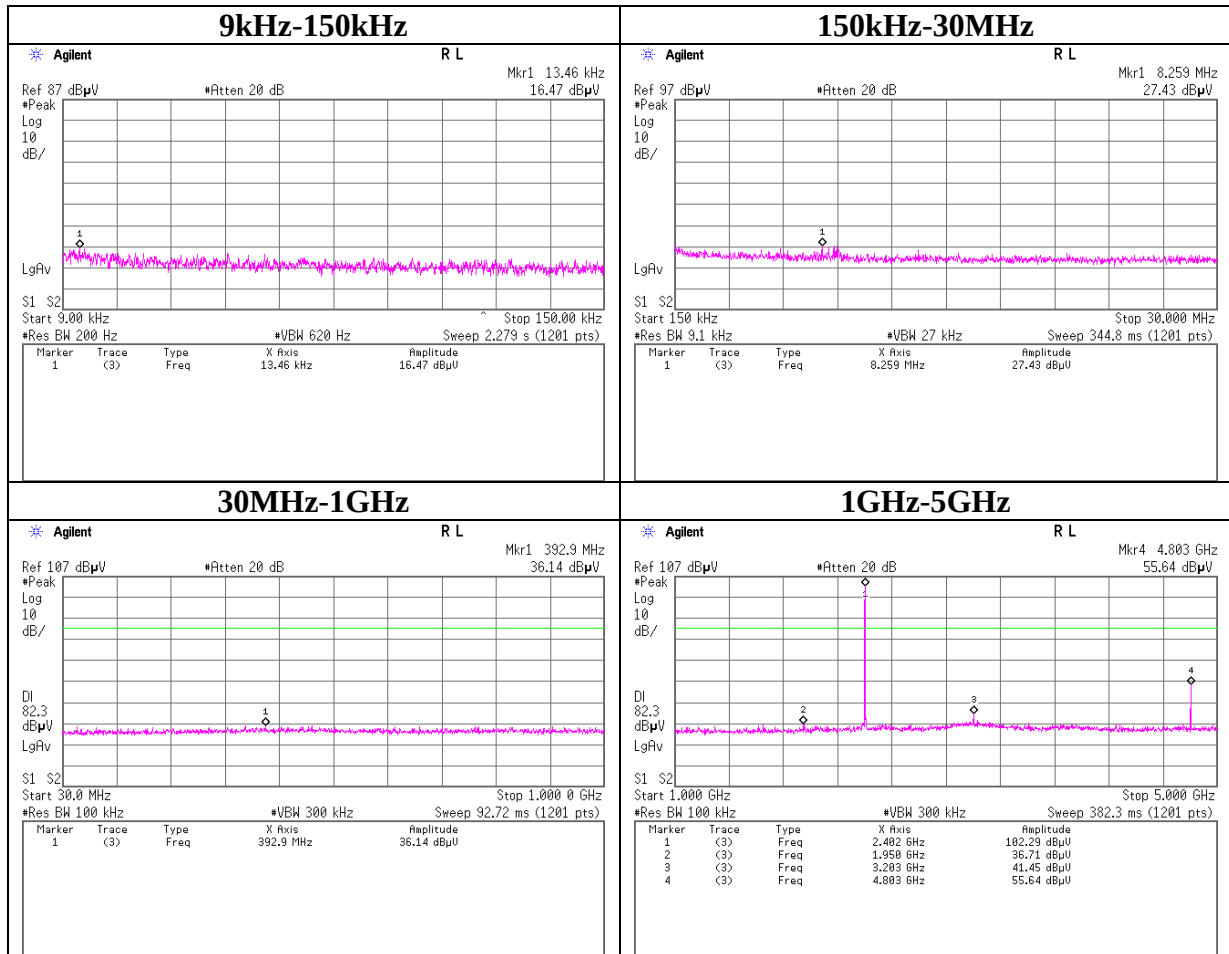
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

*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
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

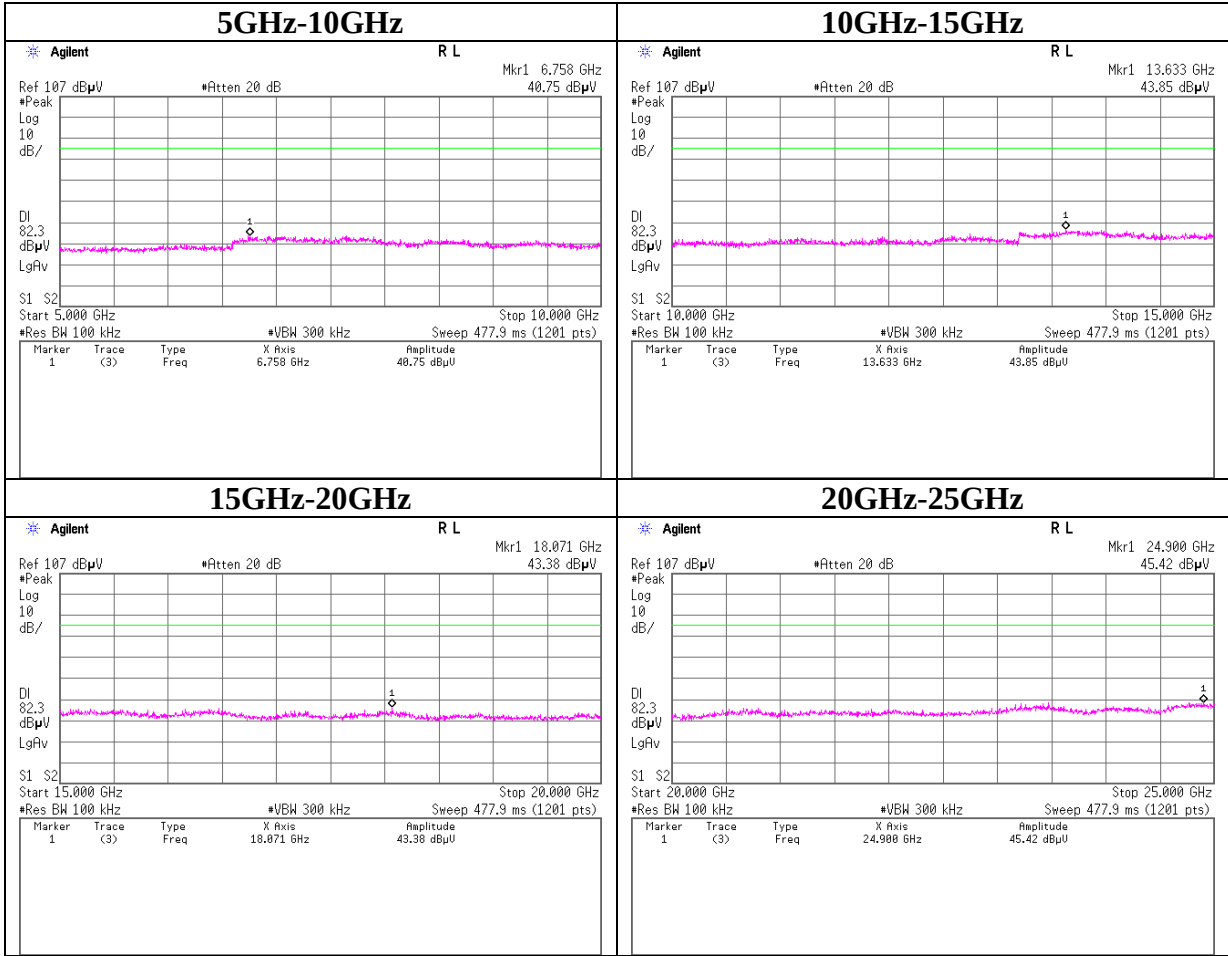
Conducted Spurious Emission

Tx DH5 2402MHz



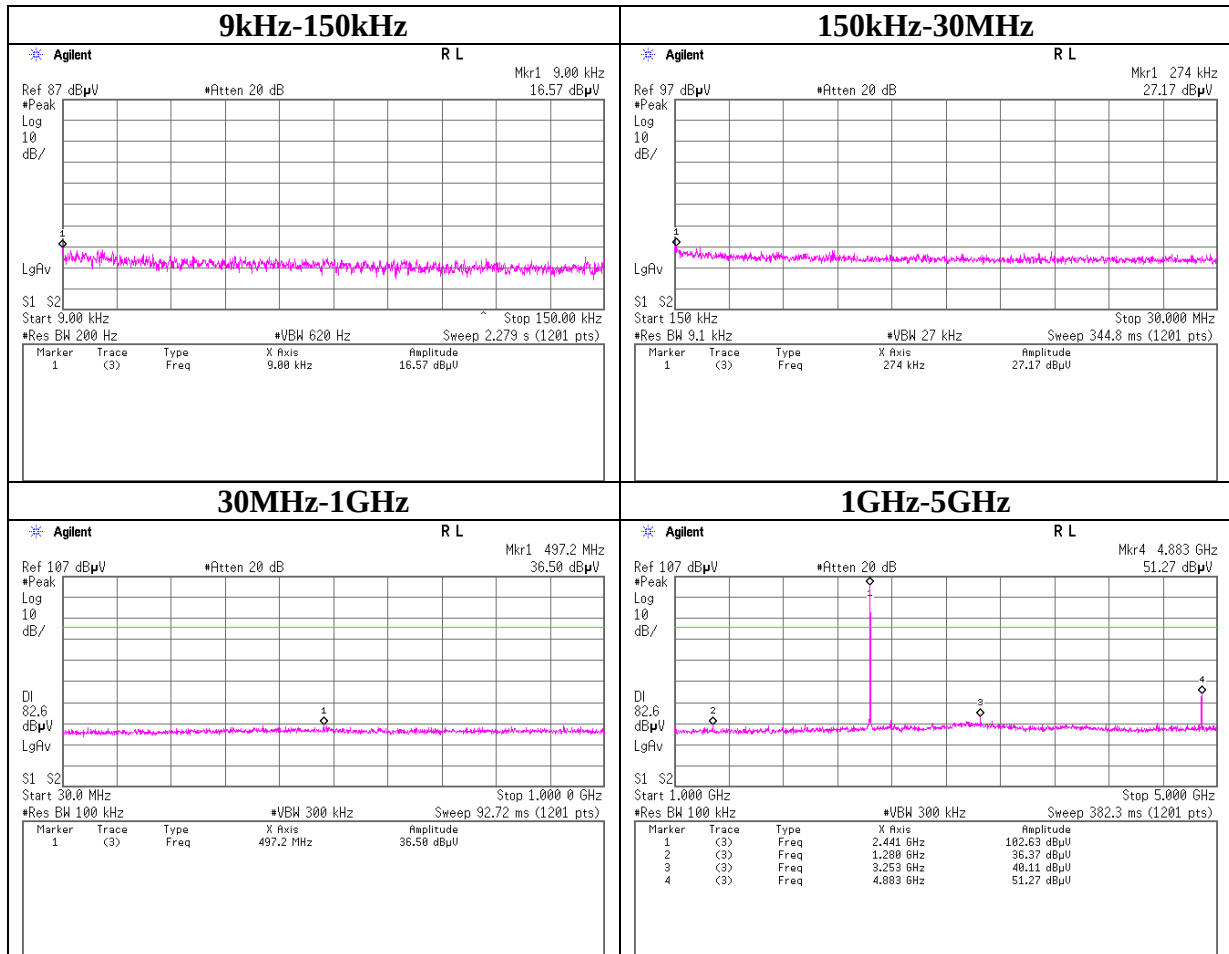
Conducted Spurious Emission

Tx DH5 2402MHz



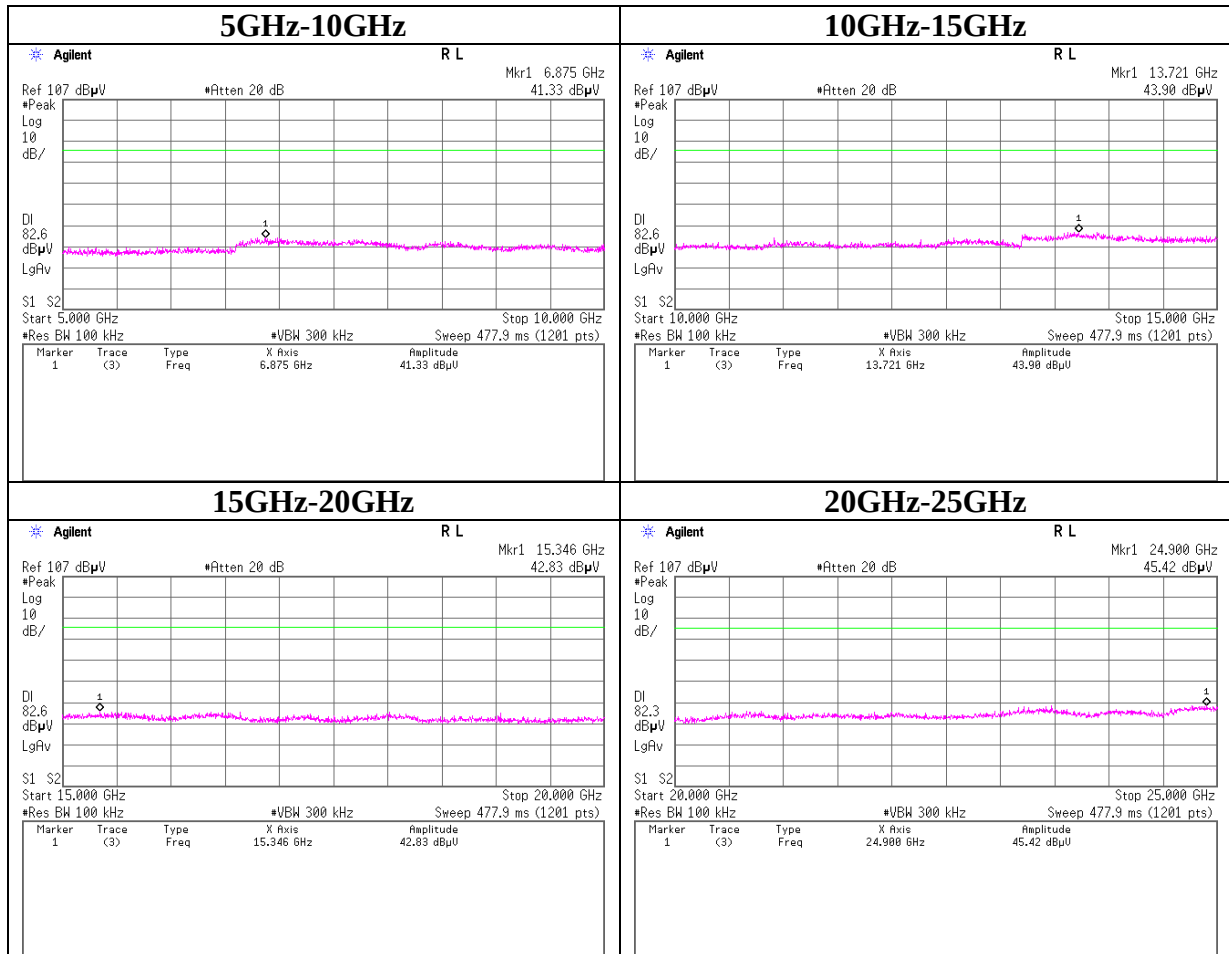
Conducted Spurious Emission

Tx DH5 2441MHz



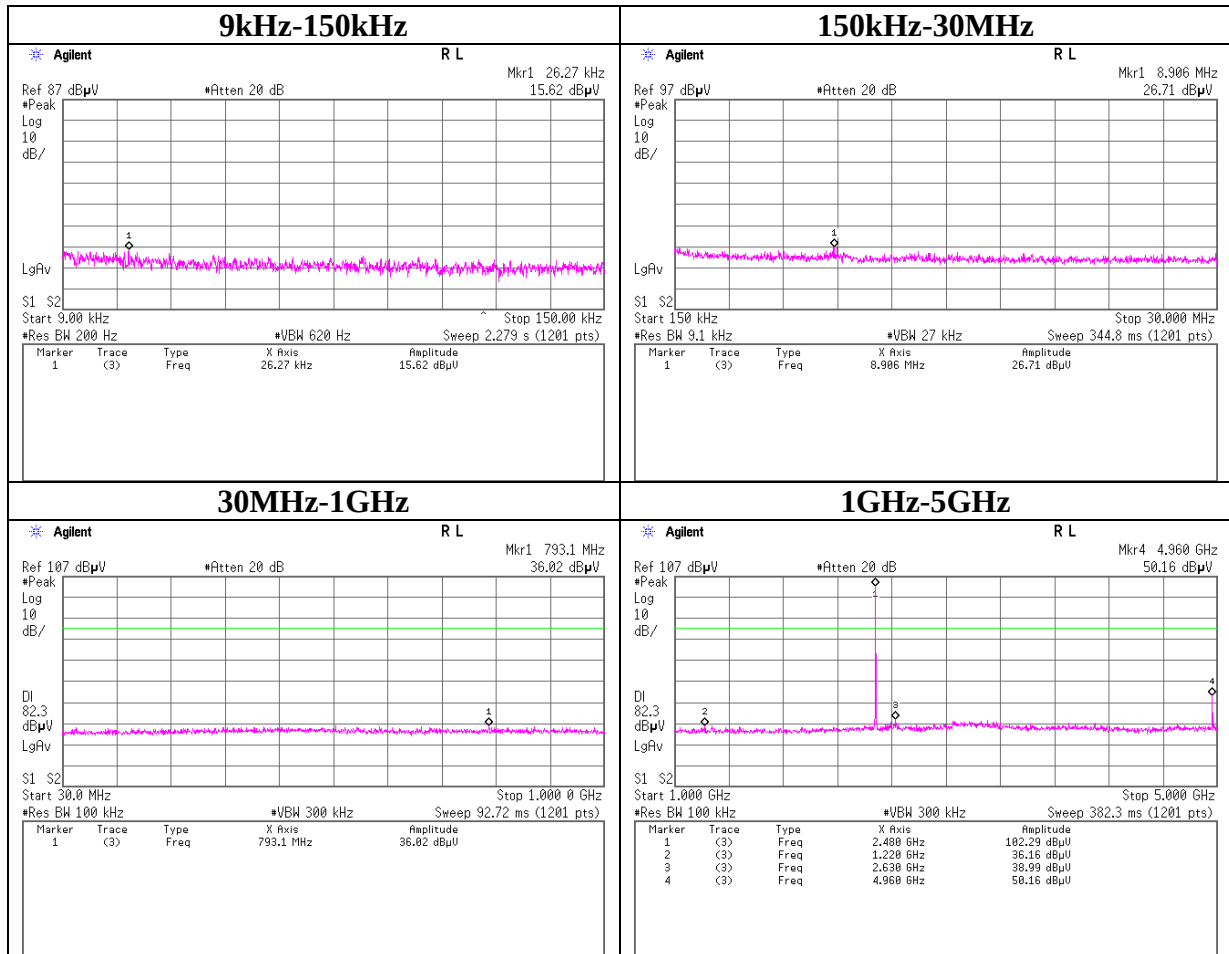
Conducted Spurious Emission

Tx DH5 2441MHz



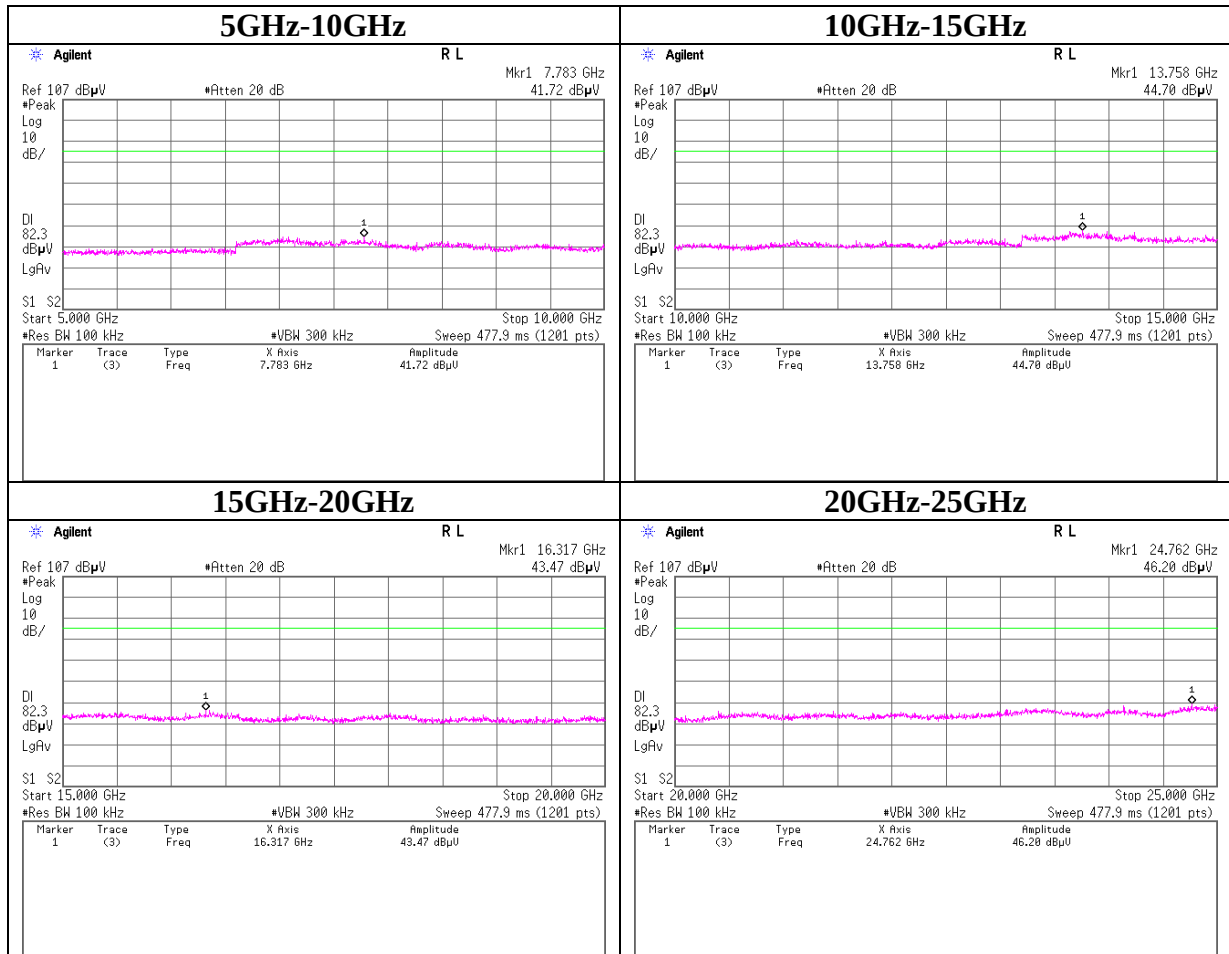
Conducted Spurious Emission

Tx DH5 2480MHz



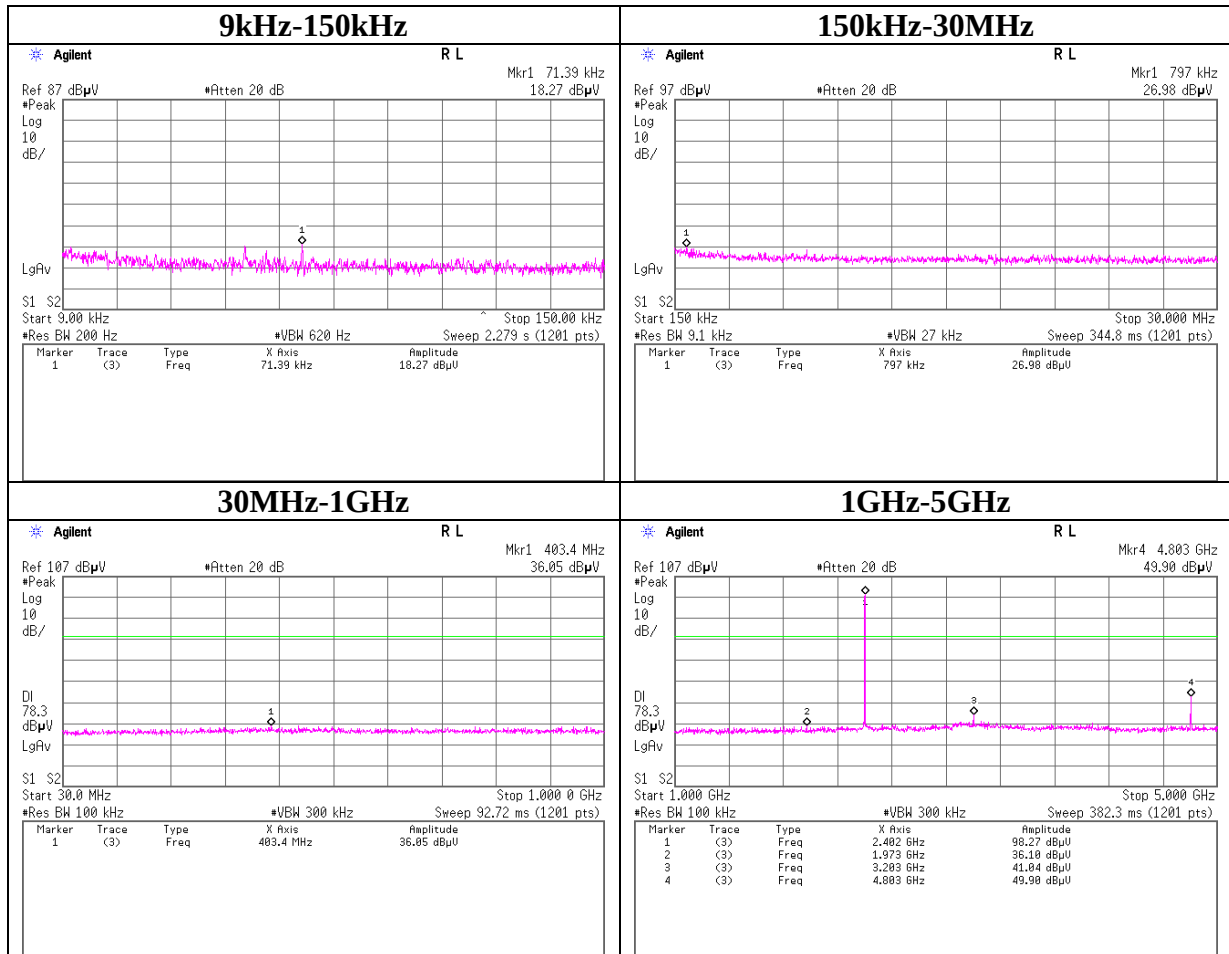
Conducted Spurious Emission

Tx DH5 2480MHz



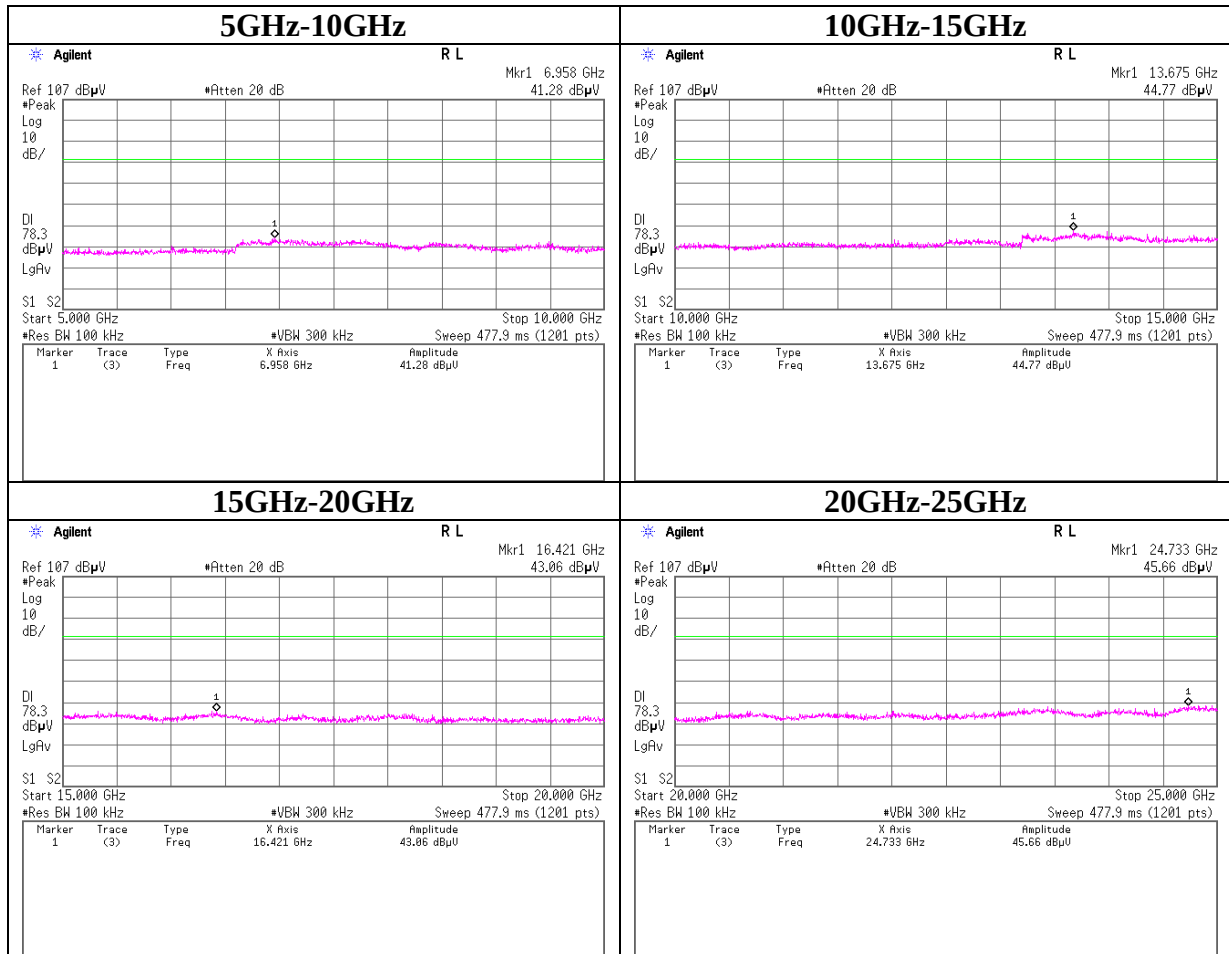
Conducted Spurious Emission

Tx 3DH5 2402MHz



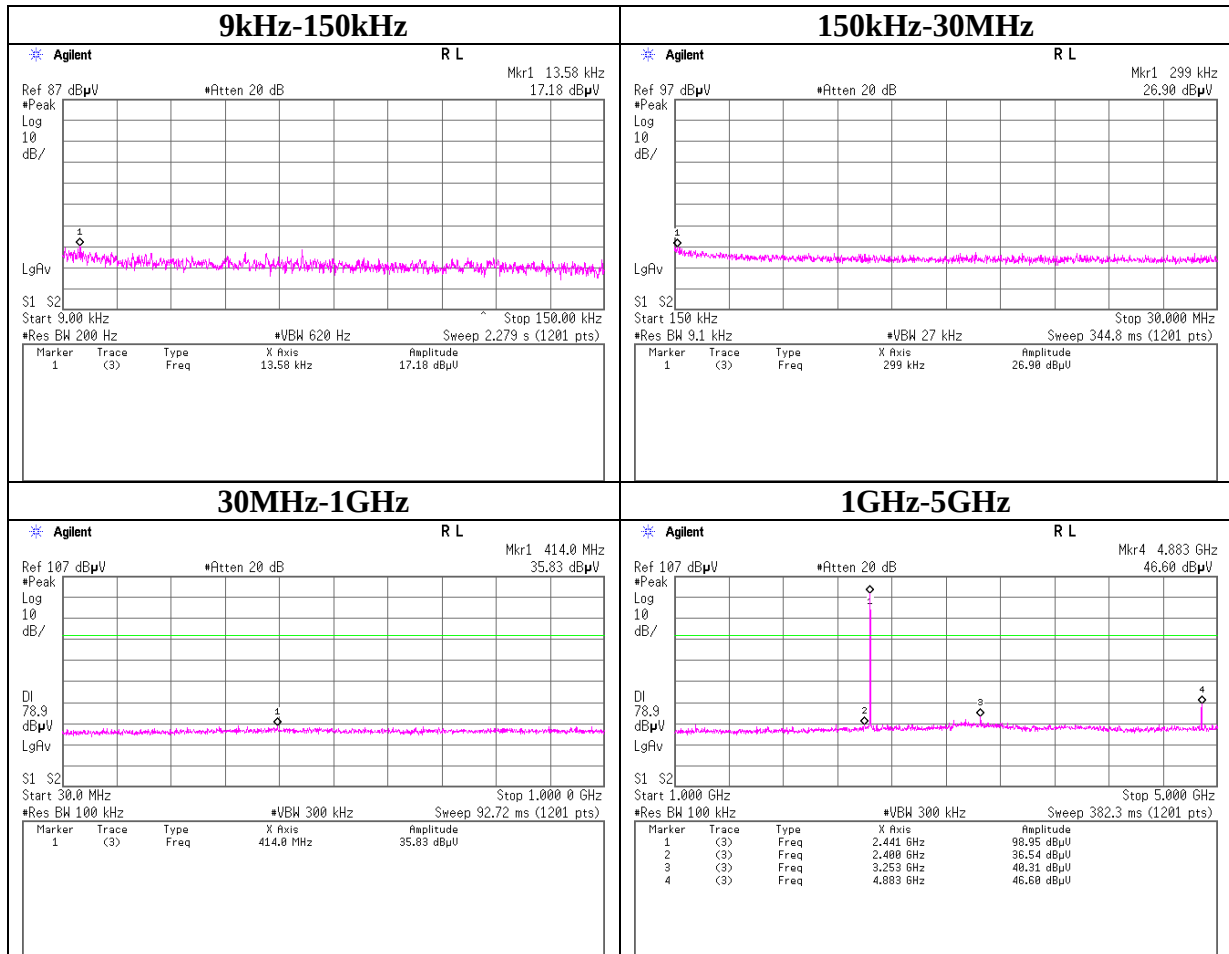
Conducted Spurious Emission

Tx 3DH5 2402MHz



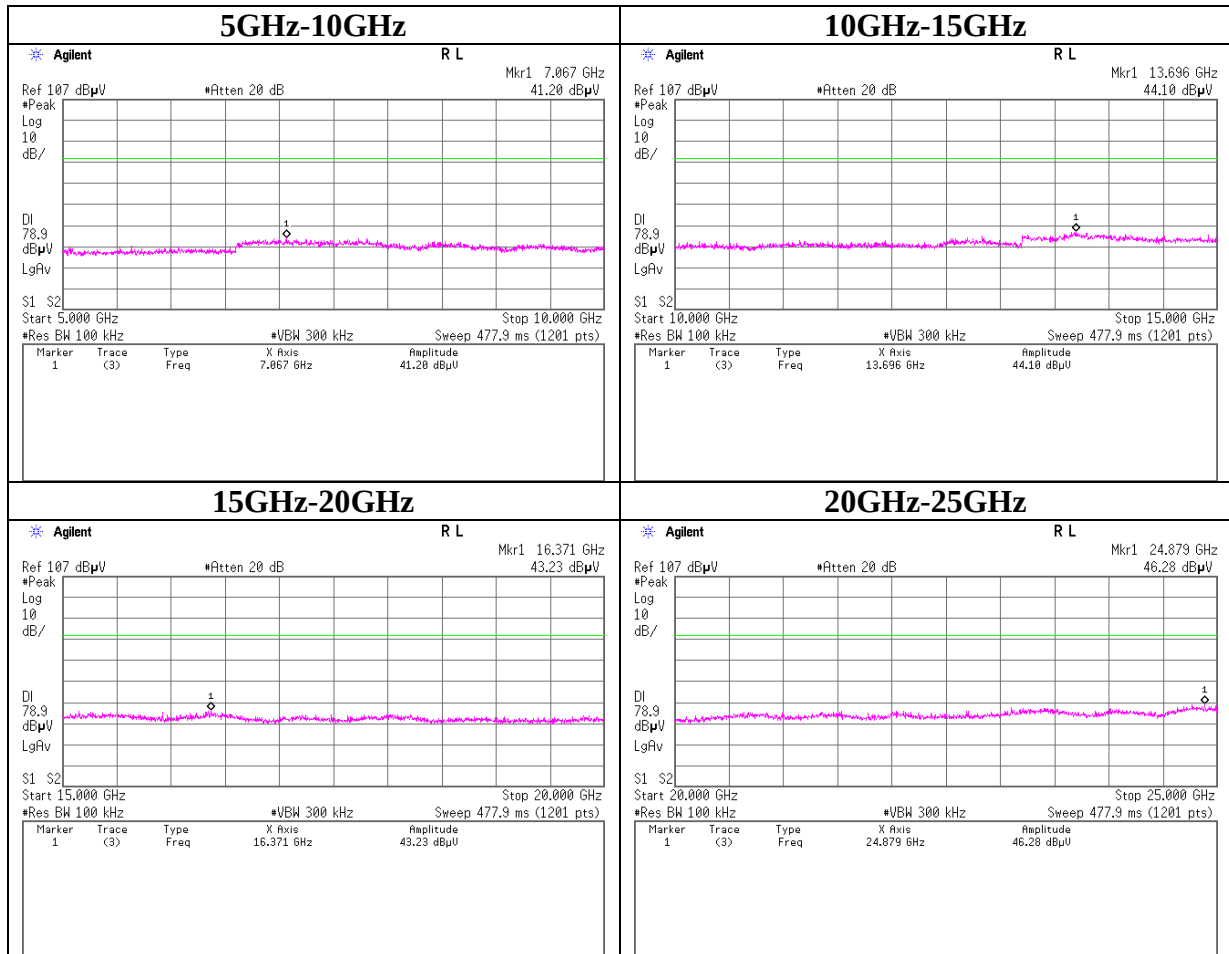
Conducted Spurious Emission

Tx 3DH5 2441MHz



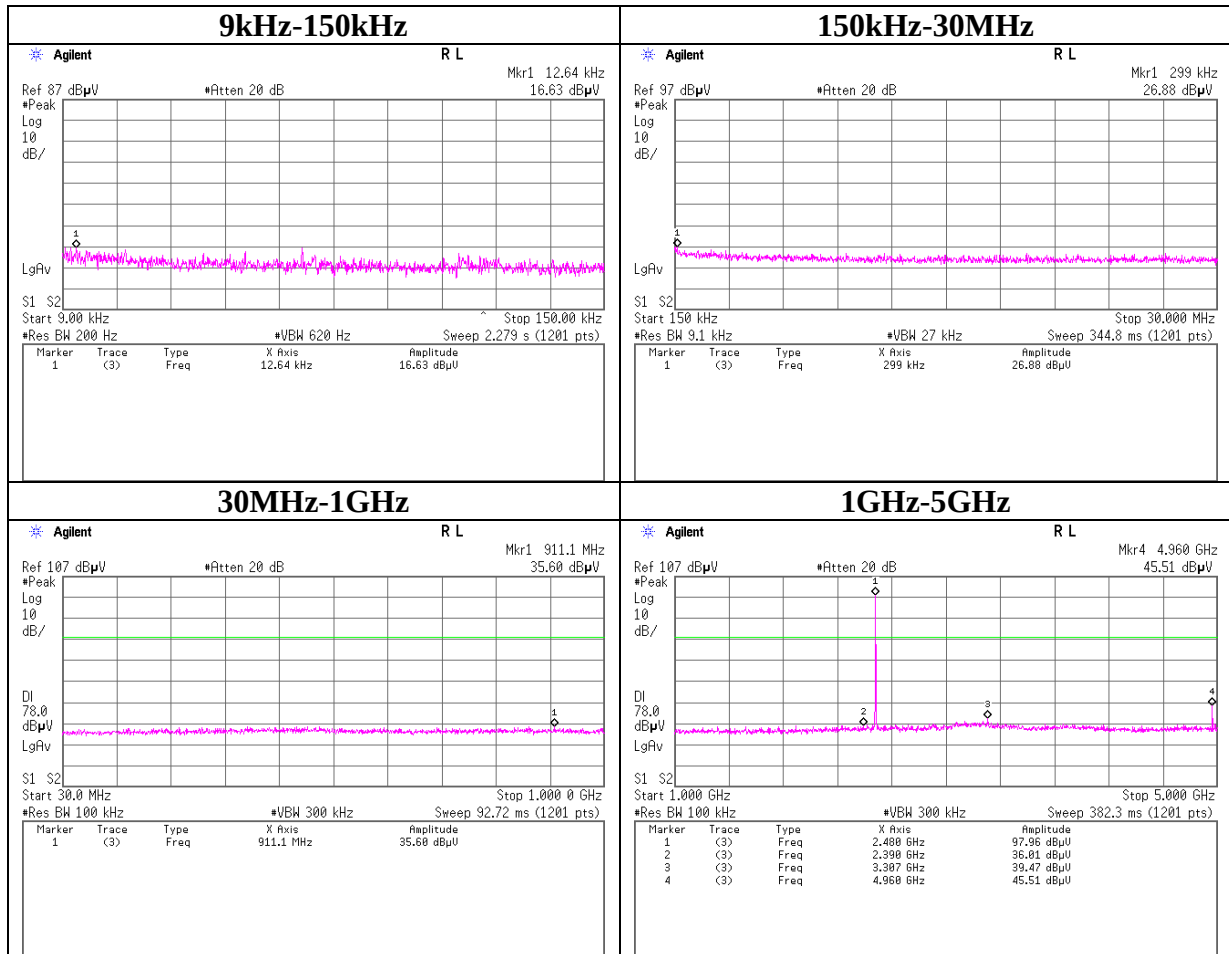
Conducted Spurious Emission

Tx 3DH5 2441MHz



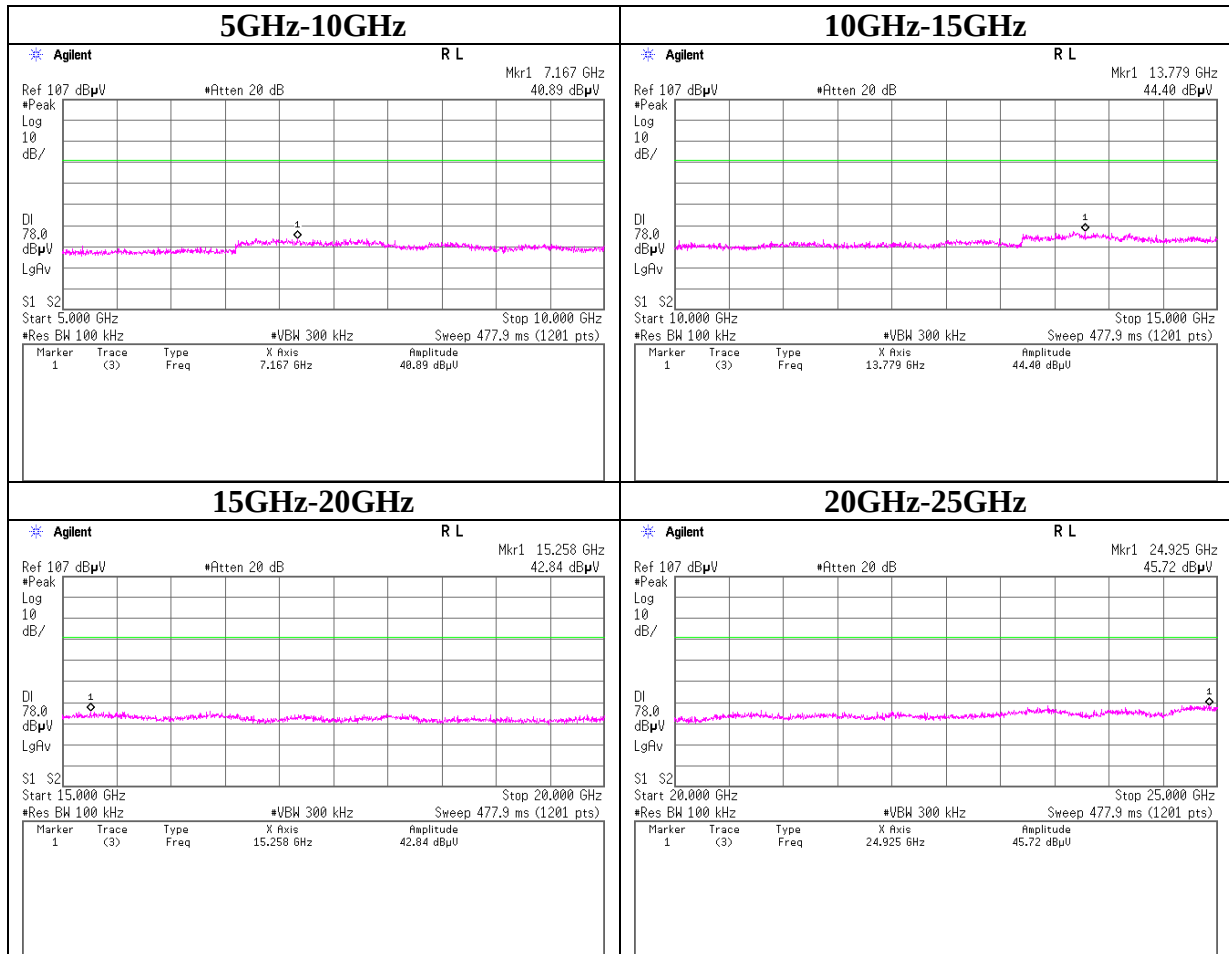
Conducted Spurious Emission

Tx 3DH5 2480MHz



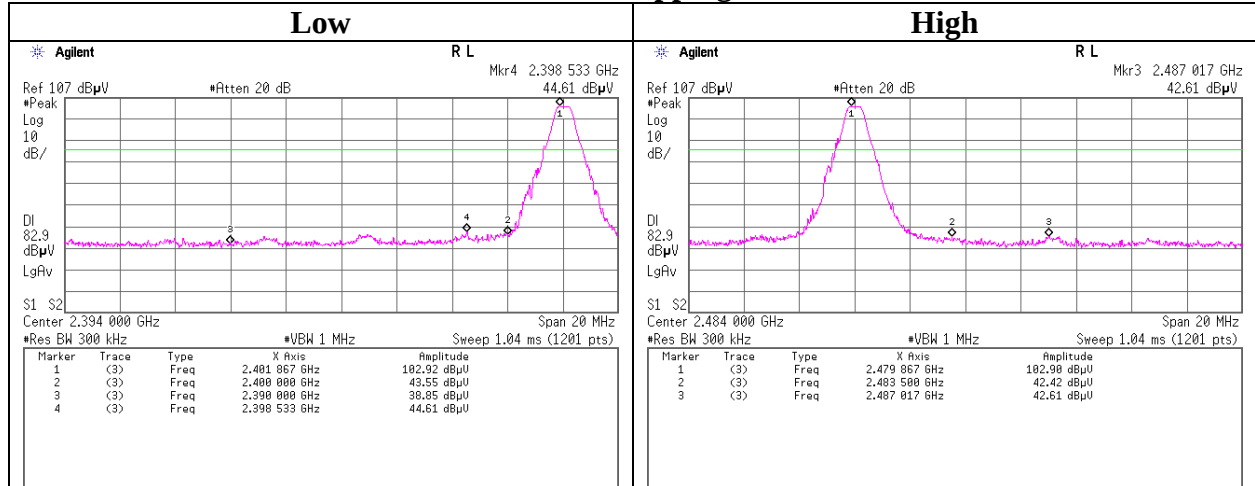
Conducted Spurious Emission

Tx 3DH5 2480MHz

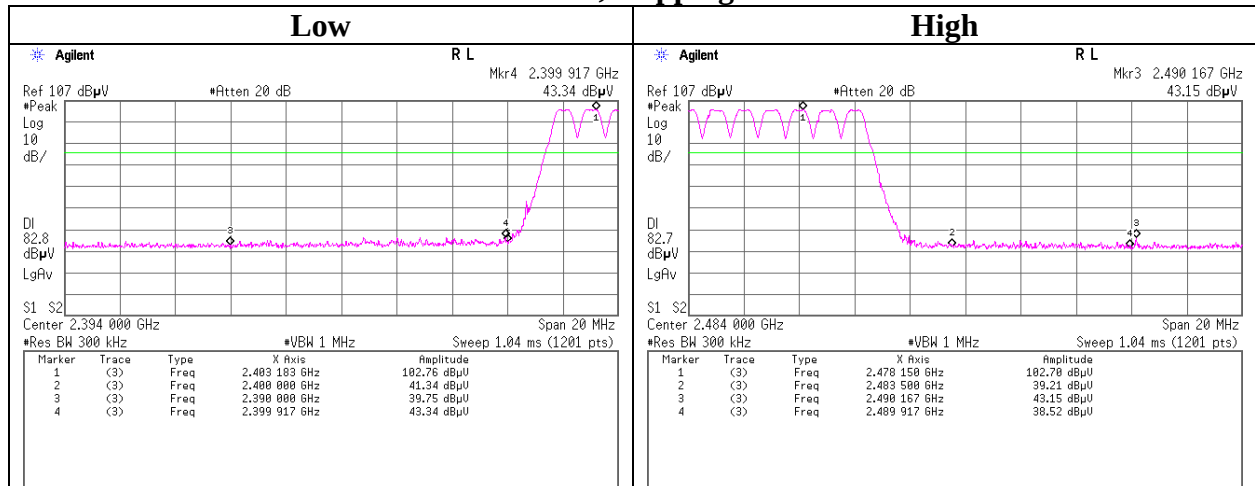


Conducted Emission Band Edge compliance

Tx DH5, Hopping off

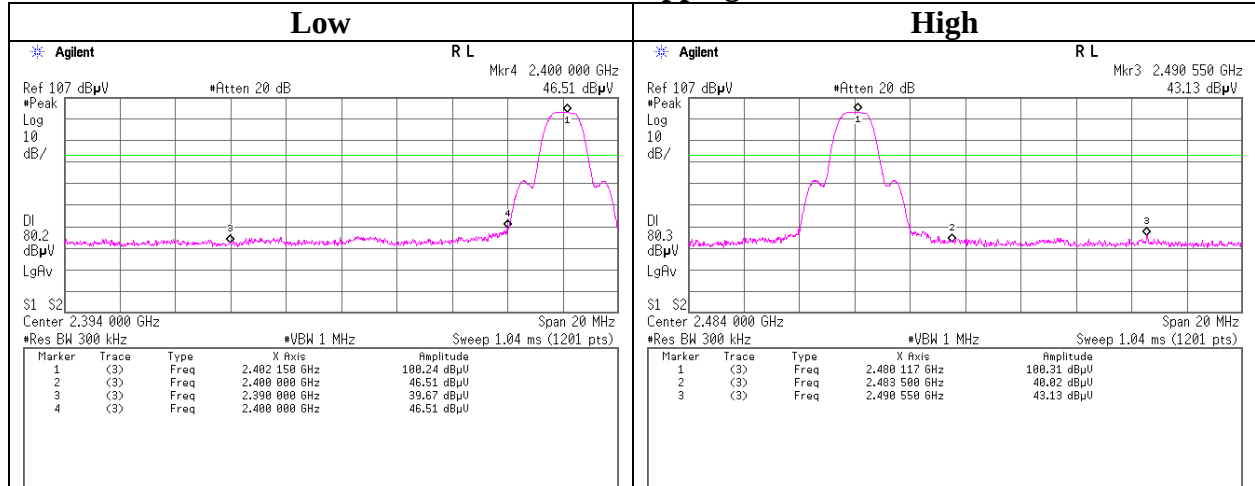


Tx DH5, Hopping on

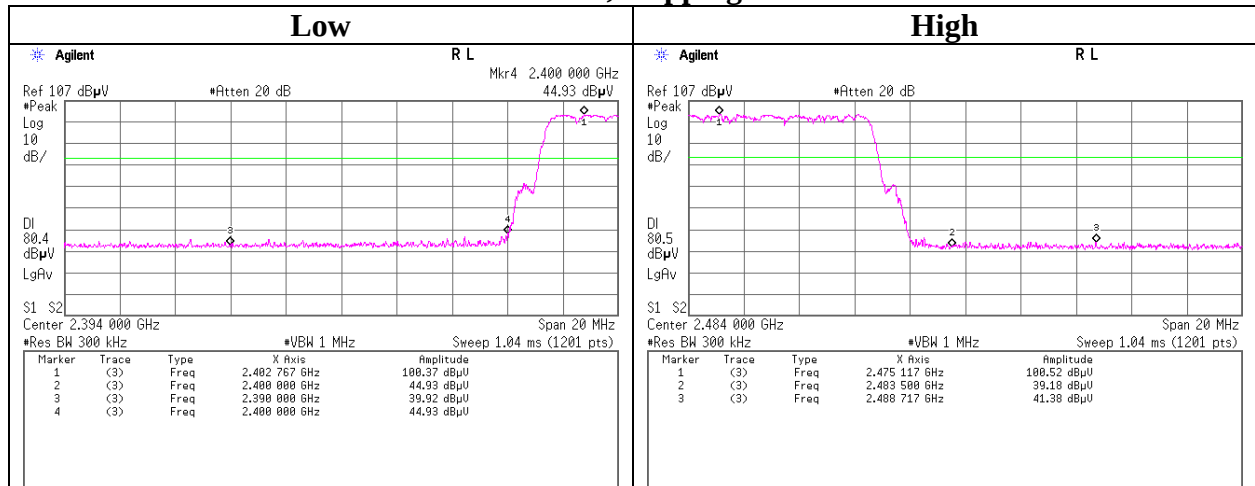


Conducted Emission Band Edge compliance

Tx 3DH5, Hopping off



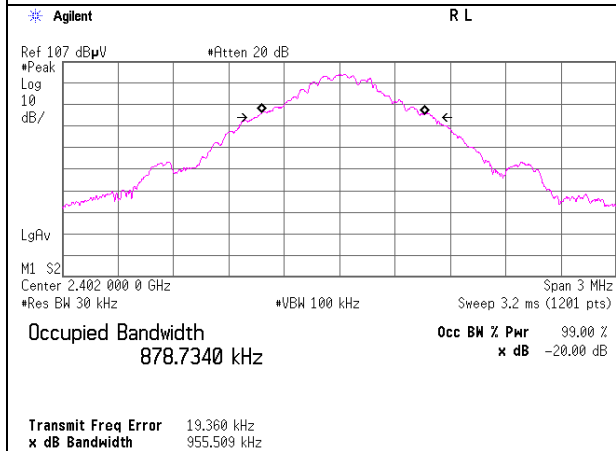
Tx 3DH5, Hopping on



99% Occupied Bandwidth

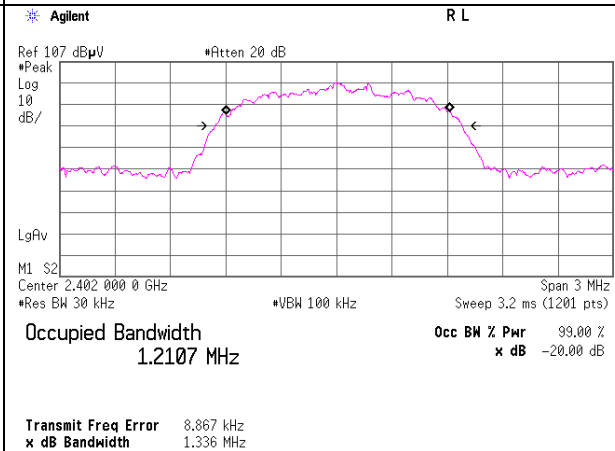
Tx DH5, Hopping off

2402MHz

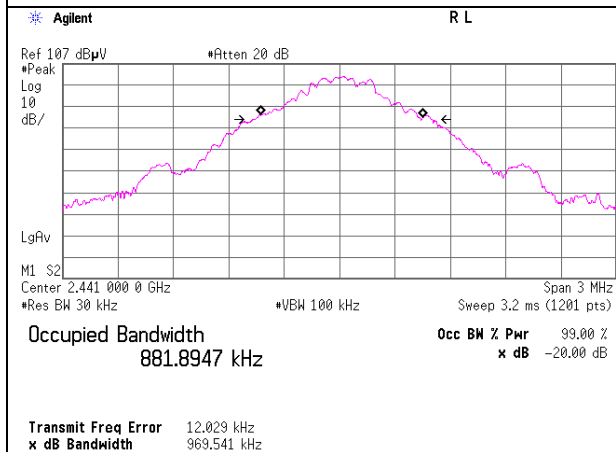


Tx 3DH5, Hopping off

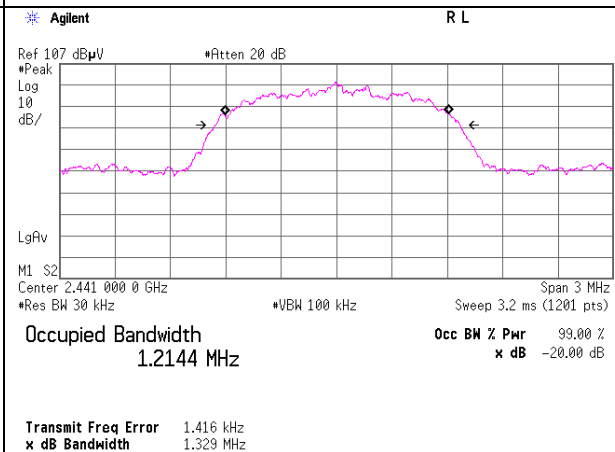
2402MHz



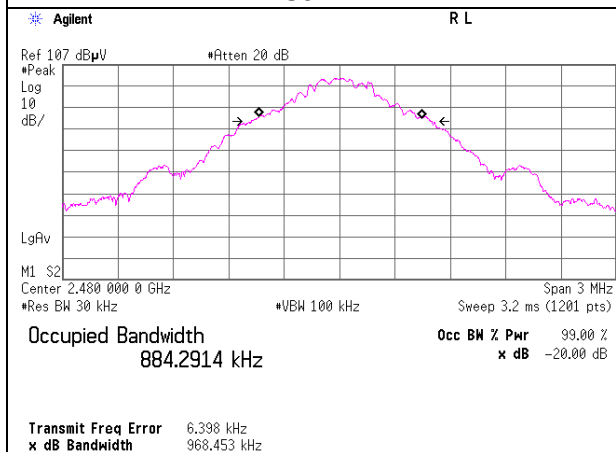
2441MHz



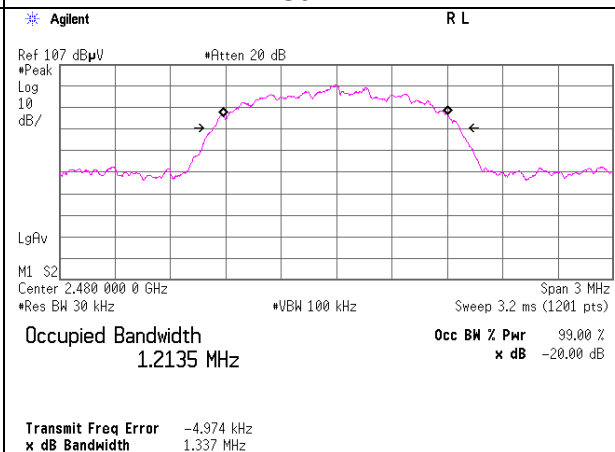
2441MHz



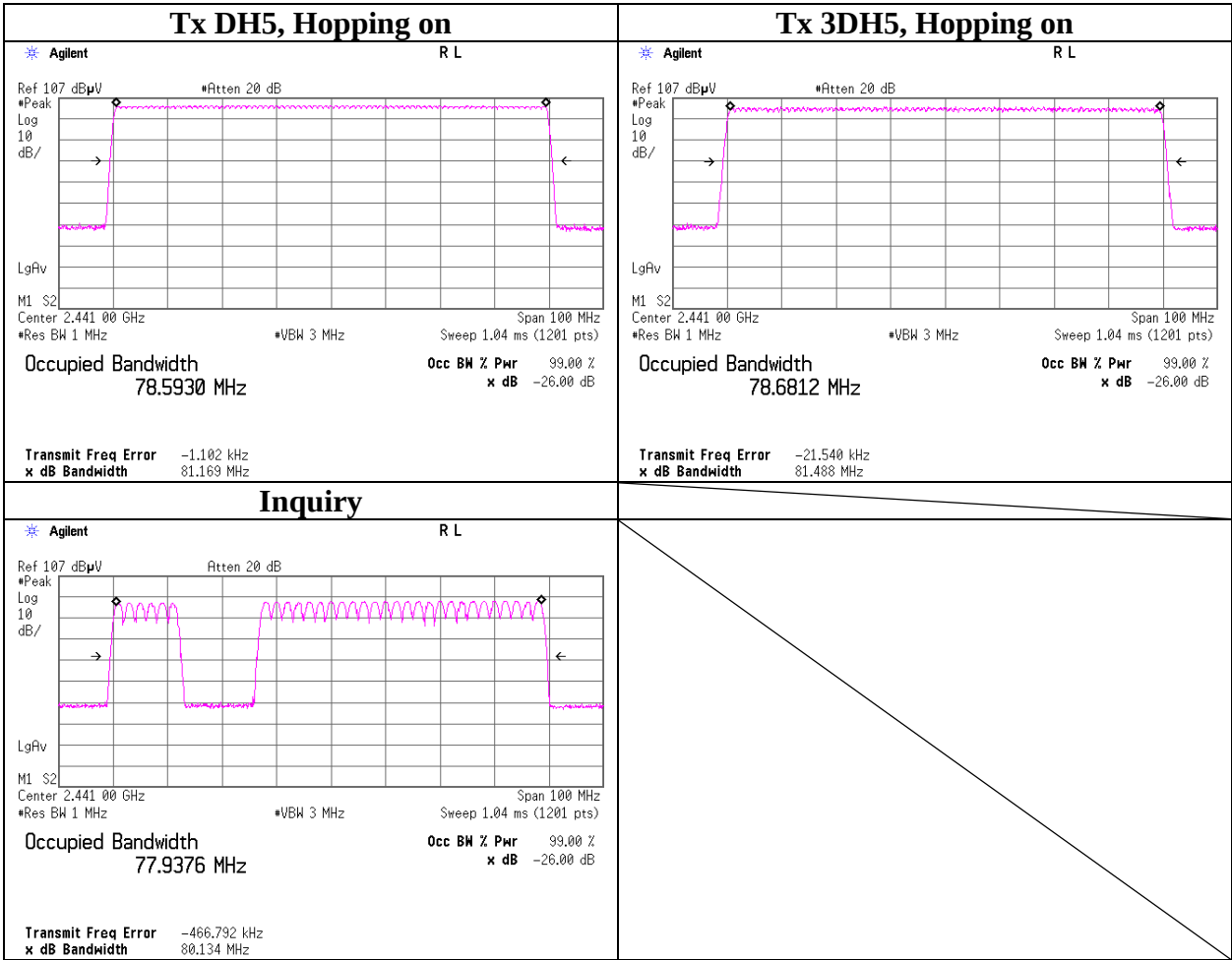
2480MHz



2480MHz



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2011/02/15 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2011/08/09 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	AT	2011/09/27 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE/CE	2011/07/10 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE/CE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE/CE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2011/06/19 * 12
MHA-01	Horn Antenna 18-26.5GHz	EMCO	3160-09	1266	RE	2011/06/20 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ES140	100084	CE	2010/12/07 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2011/02/20 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFME421(Switcher)	- /01068(Switcher)	CE	2011/01/16 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12

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

All equipment is calibrated with valid calibrations. Each measurement data 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

UL Japan, Inc.

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