



Test report No. : 32GE0033-HO-01-B-R1
Page : 1 of 60
Issued date : May 30, 2012
Revised date : June 6, 2012
FCC ID : ACJ-UN-W700

RADIO TEST REPORT


Test Report No. : 32GE0033-HO-01-B-R1

Applicant : Panasonic Corporation of North America
Type of Equipment : MULTIMEDIA SYSTEM
Model No. : UN-W700
FCC ID : ACJ-UN-W700
Test regulation : FCC Part 15 Subpart C: 2012
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.
6. This report is a revised version of 32GE0033-HO-01-B. 32GE0033-HO-01-B is replaced with this report.

Date of test: May 18 to 24, 2012

Representative test engineer:


Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:


Takahiro Hatakeda
Manager 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>

CONTENTS	PAGE
SECTION 1: Customer information.....	3
SECTION 2: Equipment under test (E.U.T.).....	3
SECTION 3: Test specification, procedures & results.....	4
SECTION 4: Operation of E.U.T. during testing.....	7
SECTION 5: Conducted Emission.....	9
SECTION 6: Radiated Spurious Emission	10
SECTION 7: Antenna Terminal Conducted Tests.....	11
APPENDIX 1: Data of EMI test.....	12
Conducted Emission	12
6dB Bandwidth	16
Maximum Peak Output Power	19
Radiated Spurious Emission	23
Conducted Spurious Emission	33
Conducted Emission Band Edge compliance	51
Power Density	52
99% Occupied Bandwidth	55
APPENDIX 2: Test instruments	57
APPENDIX 3: Photographs of test setup	58
Conducted Emission	58
Radiated Spurious Emission	59
Worst Case Position	60

SECTION 1: Customer information

Company Name : Panasonic Corporation of North America
Address : One Panasonic Way, 4B-8, Secaucus, NJ 07094
Telephone Number : +1-201-348-7758
Facsimile Number : +1-201-392-4564
Contact Person : Richard Mullen

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

2.1 Identification of E.U.T.

Type of Equipment : MULTIMEDIA SYSTEM
Model No. : UN-W700
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC5.0V
Receipt Date of Sample : May 17, 2012
Country of Mass-production : China
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

General Specification

Operation Clock	32.768kHz, 19.2MHz, 24.576MHz, 26MHz, 38.4MHz
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Radio Specification

Specification of Wireless LAN (IEEE802.11b/g/n-20) and Bluetooth (Ver.2.1 + EDR)

Type of radio	Wireless LAN (IEEE802.11b/g/n-20)	Bluetooth
Equipment Type	Transceiver	
Frequency of Operation	Lower frequency=2412MHz Upper frequency=2462MHz	Lower frequency=2402MHz Upper frequency=2480MHz
Bandwidth & Channel spacing	Bandwidth: 20MHz Ch spacing: 5MHz	Bandwidth: 1MHz Ch spacing: 1MHz
Type of Modulation	11b: DSSS 11g, n-20: OFDM	FHSS
Antenna Type	Chip Antenna	
Antenna Connector Type	None	
Antenna Gain	Max 3.0dBi	
Power Supply	DC 3.7V	
Operating temperature range	+0 to +35 deg. C.	

*This test report applies for Wireless LAN (IEEE802.11b/g/n-20).

*Wireless LAN (IEEE802.11b/g/n-20) and Bluetooth (Ver.2.1 + EDR) do not transmit simultaneously.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on March 30, 2012 and effective April 30, 2012

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 12.6dB, 0.42547MHz, L AV 15.8dB, 0.35482MHz, L	Complied	-
6dB Bandwidth	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: -	FCC: Section 15.247 (e) IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5 RSS-Gen 7.2.3	5.1dB 2390.000MHz, AV, Hori.	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.

FCC 15.31 (e)

This EUT provides stable voltage (DC1.8, 2.7, 3.7V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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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	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	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(3m)

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

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3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
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	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)

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	6Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20)	MCS 3, PN9
*Transmitting duty was 100% on all tests. *The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*Power of the EUT was set by the software as follows; Power settings: 11b: 13dBm, 11g/n-20: 11dBm (11ch), 11g/n-20: 13dBm (except for 11ch) Software: WLTEST v.5.90 *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.	

*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission Spurious Emission (Radiated)	11b Tx 11g Tx *1)	2412MHz 2437MHz 2462MHz
Spurious Emission (Conducted) 6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	11b Tx 11g Tx 11n-20 Tx	2412MHz 2437MHz 2462MHz
Conducted Emission Band Edge compliance, Radiated Emission Band Edge compliance	11b Tx 11g Tx 11n-20 Tx	2412MHz 2462MHz

*1) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

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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

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

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	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	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
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-26.5GHz
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
6dB Bandwidth	20MHz	100kHz	300kHz	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)
Peak Power Density	20MHz	30kHz	100kHz	667sec	Peak	Max Hold	Spectrum Analyzer *1) *2)
Conducted Spurious Emission *3)	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				

*1) PSD Option 1 of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

*2) The test was not performed at RBW:3kHz however the measurement is to be performed with RBW:3kHz in the regulation, because, the measurement value with RBW:3kHz is less than the value of RBW:30kHz and the test data met the limit with RBW:30kHz.

*3) 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

APPENDIX 1: Data of EMI test

Conducted Emission

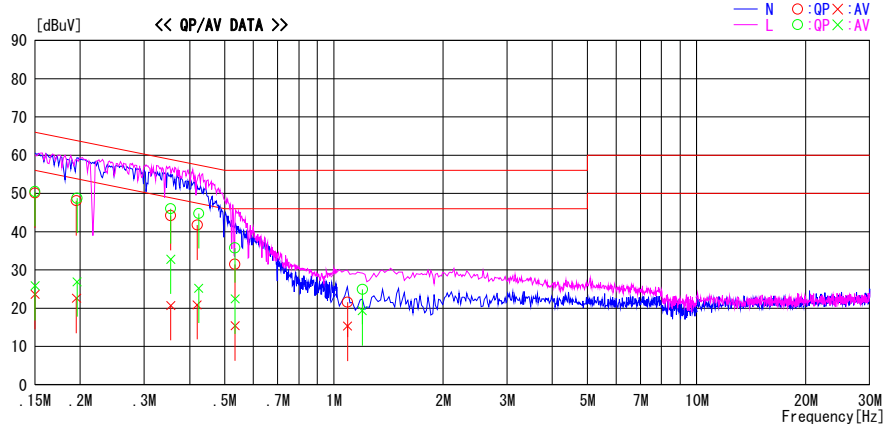
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2012/05/24

Report No. : 32GE0033-HO-01
 Temp./Humi. : 22deg. C / 33% RH
 Engineer : Motoya Imura

Mode / Remarks : Tx 11b 2412MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

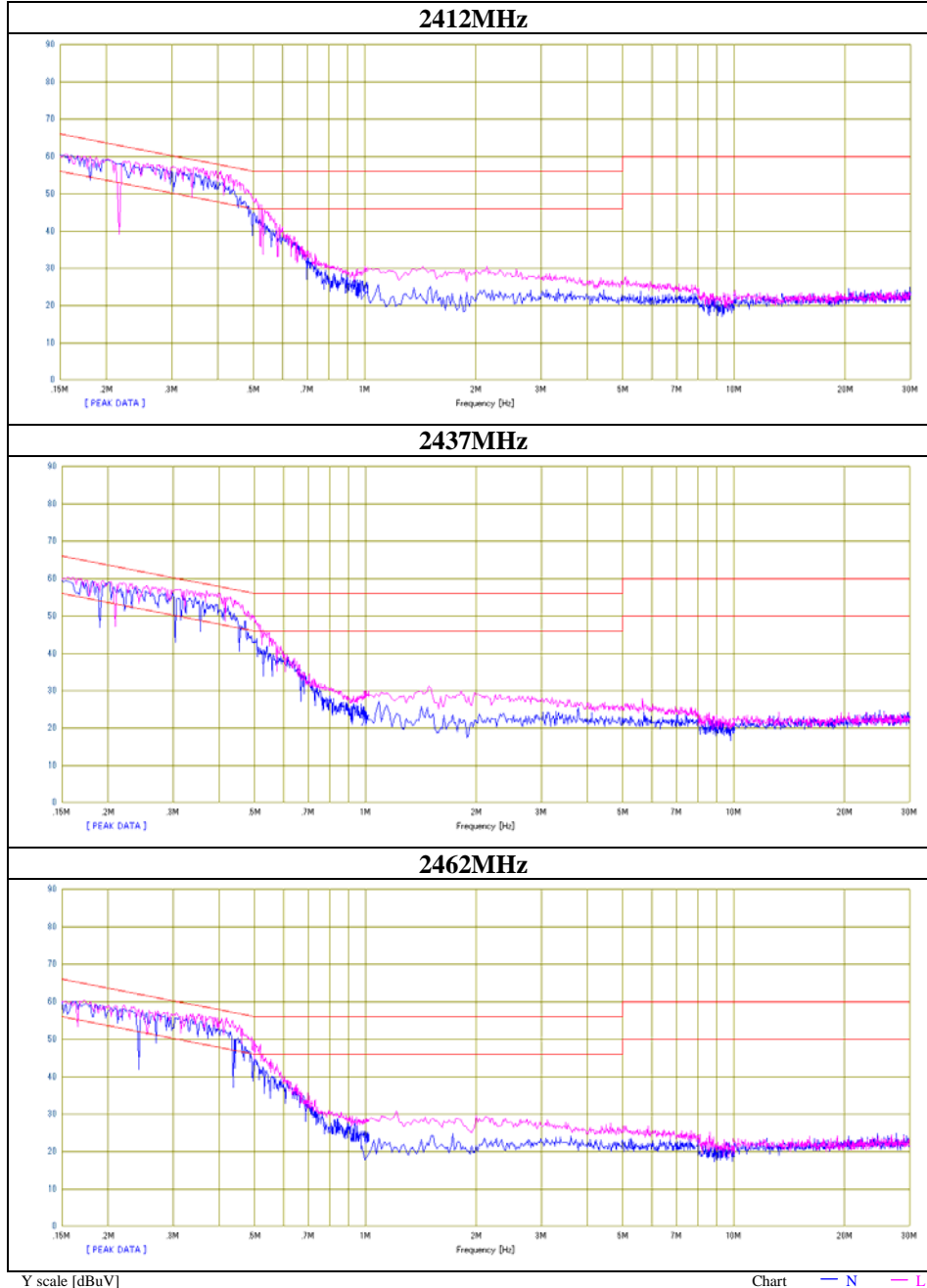


Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	36.8	10.3	13.3	50.1	23.6	66.0	56.0	15.9	32.4	N	
0.19500	34.8	9.3	13.3	48.1	22.6	63.8	53.8	15.7	31.2	N	
0.35483	30.9	7.4	13.3	44.2	20.7	58.8	48.8	14.6	28.1	N	
0.42024	28.4	7.6	13.3	41.7	20.9	57.4	47.4	15.7	26.5	N	
0.53357	18.2	2.1	13.3	31.5	15.4	56.0	46.0	24.5	30.6	N	
1.08920	8.2	1.9	13.4	21.6	15.3	56.0	46.0	34.4	30.7	N	
0.15000	37.2	12.6	13.3	50.5	25.9	66.0	56.0	15.5	30.1	L	
0.19580	35.4	13.6	13.3	48.7	26.9	63.8	53.8	15.1	26.9	L	
0.35482	32.7	19.5	13.3	46.0	32.8	58.8	48.8	12.8	16.0	L	
0.42373	31.4	11.9	13.3	44.7	25.2	57.4	47.4	12.7	22.2	L	
0.53357	22.4	9.1	13.3	35.7	22.4	56.0	46.0	20.3	23.6	L	
1.19812	11.5	5.9	13.4	24.9	19.3	56.0	46.0	31.1	26.7	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.4 Semi Anechoic Chamber
Report No. : 32GE0033-HO-01
Date : 5/24/2012
Temperature/ Humidity : 22 deg. C / 33% RH
Engineer : Motoya Imura
Mode : 11b Tx



Conducted Emission

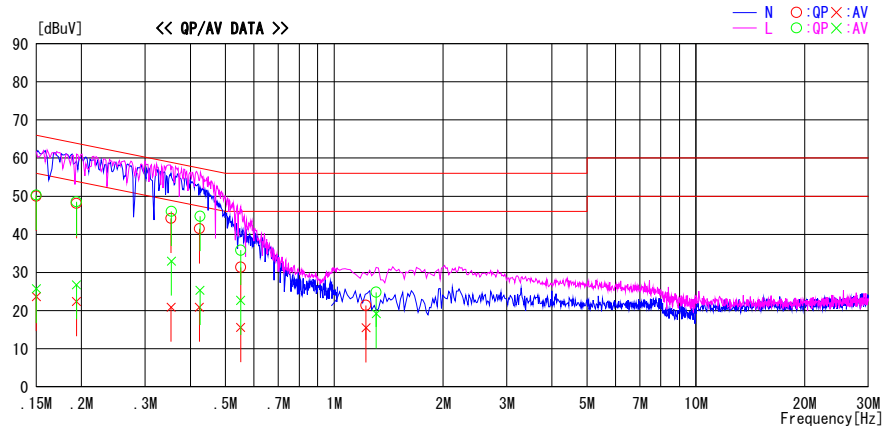
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/05/24

Report No. : 32GE0033-HO-01
 Temp./Humi. : 22deg. C / 33% RH
 Engineer : Motoya Imura

Mode / Remarks : Tx 11g 2412MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

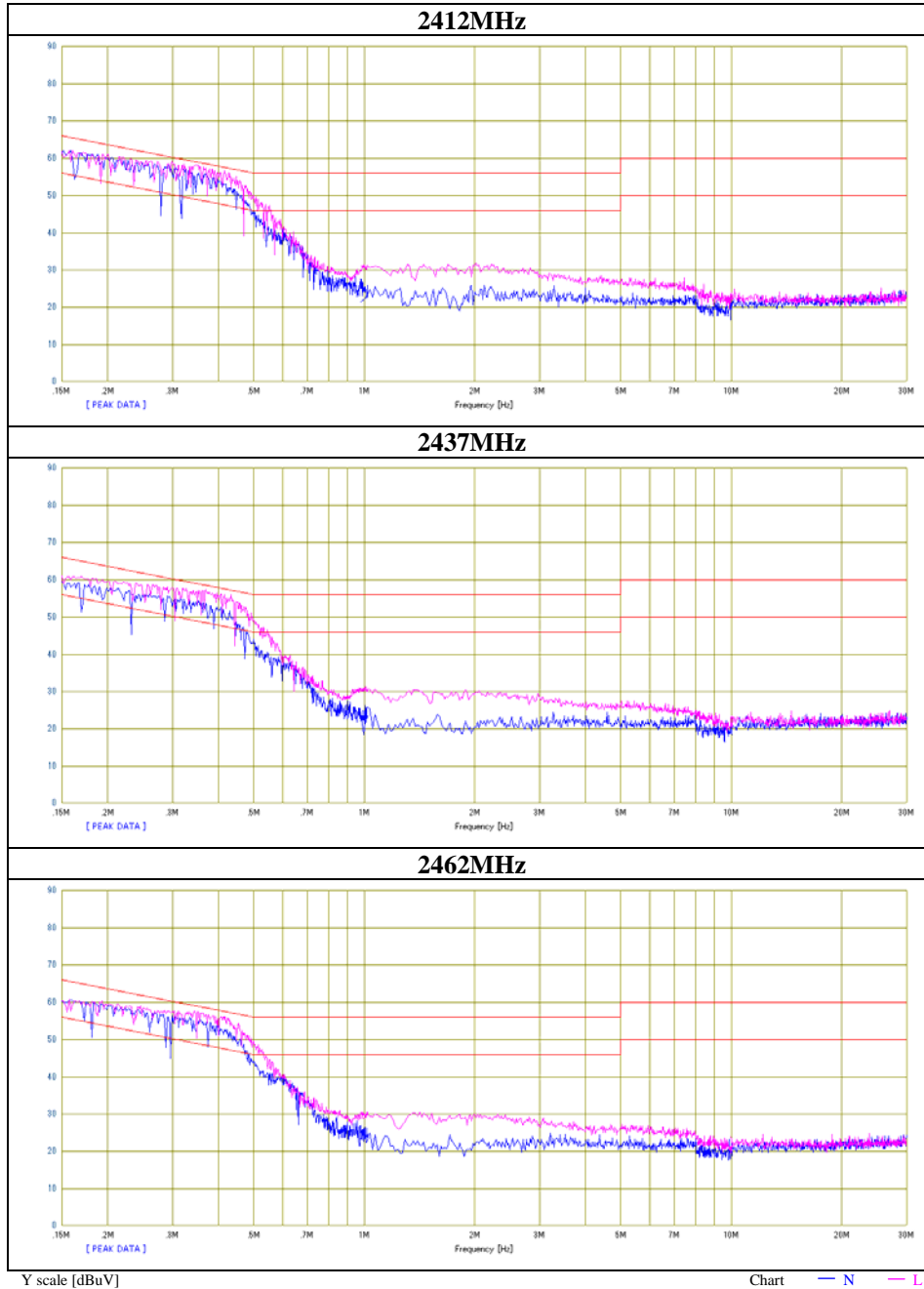


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	36.7	10.4	13.3	50.0	23.7	66.0	56.0	16.0	32.3	N	
0.19359	34.8	9.1	13.3	48.1	22.4	63.9	53.9	15.8	31.5	N	
0.35399	30.9	7.6	13.3	44.2	20.9	58.9	48.9	14.7	28.0	N	
0.42373	28.2	7.6	13.3	41.5	20.9	57.4	47.4	15.9	26.5	N	
0.55100	18.1	2.3	13.3	31.4	15.6	56.0	46.0	24.6	30.4	N	
1.22320	8.0	2.1	13.4	21.4	15.5	56.0	46.0	34.6	30.5	N	
0.15000	37.0	12.5	13.3	50.3	25.8	66.0	56.0	15.7	30.2	L	
0.19359	35.3	13.5	13.3	48.6	26.8	63.9	53.9	15.3	27.1	L	
0.35482	32.7	19.7	13.3	46.0	33.0	58.8	48.8	12.8	15.8	L	
0.42547	31.4	12.0	13.3	44.7	25.3	57.3	47.3	12.6	22.0	L	
0.55100	22.5	9.4	13.3	35.8	22.7	56.0	46.0	20.2	23.3	L	
1.30717	11.4	5.8	13.4	24.8	19.2	56.0	46.0	31.2	26.8	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F.(L1SN 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.4 Semi Anechoic Chamber
Report No.	32GE0033-HO-01
Date	5/24/2012
Temperature/ Humidity	22 deg. C / 33% RH
Engineer	Motoya Imura
Mode	11g Tx



6dB Bandwidth

Test place Head Office EMC Lab. No.11 Measurement Room
Report No. 32GE0033-HO-01
Date 5/18/2012
Temperature/ Humidity 25 deg. C / 37%RH
Engineer Katsunori Okai
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	7.103	>500
2437	7.355	>500
2462	6.772	>500

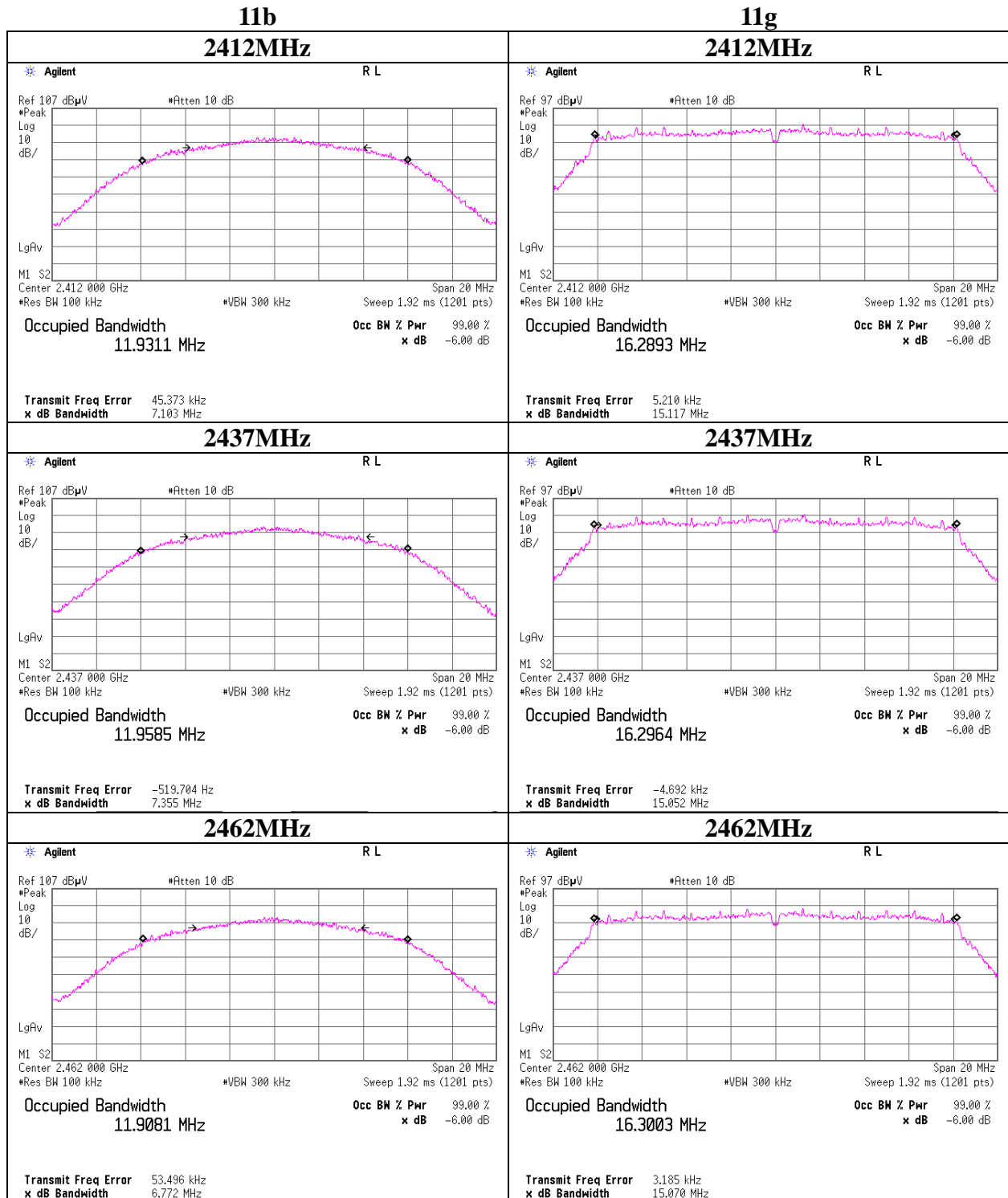
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.117	>500
2437	15.052	>500
2462	15.070	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.299	>500
2437	17.194	>500
2462	16.066	>500

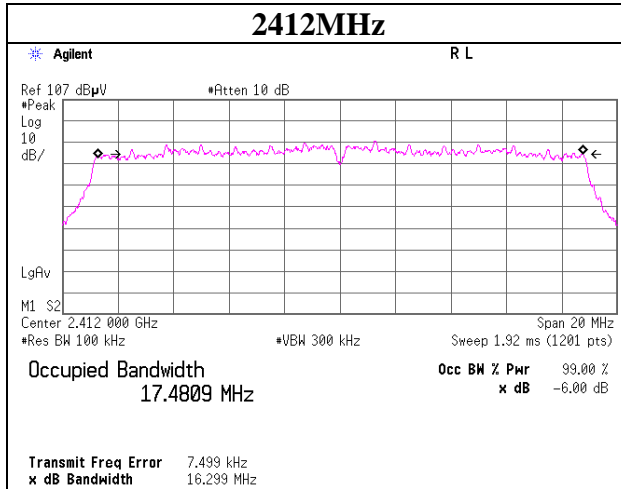
6dB Bandwidth



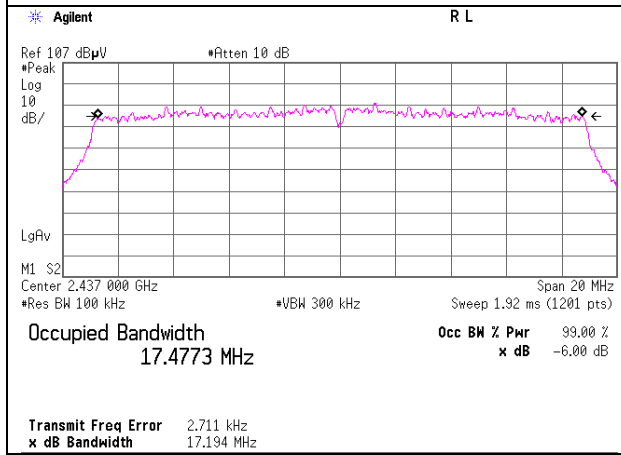
6dB Bandwidth

11n-20

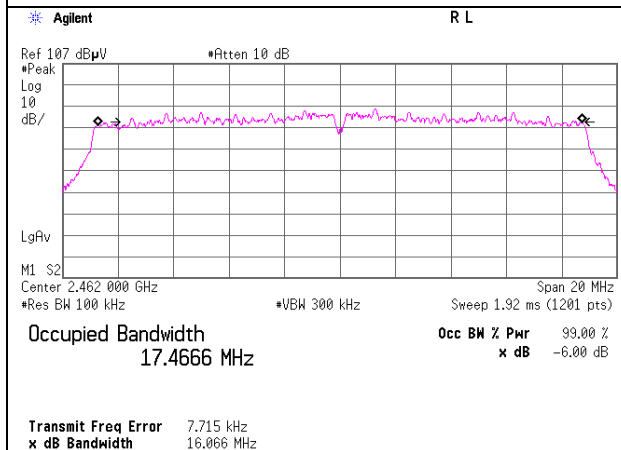
2412MHz



2437MHz



2462MHz



Maximum Peak Output Power

Test place Head Office EMC Lab. No.11 Measurement Room
Report No. 32GE0033-HO-01
Date 5/17/2012
Temperature/ Humidity 21 deg. C / 51% RH
Engineer Katsunori Okai
Mode 11b Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	3.91	2.34	10.00	16.25	42.17	30.00	1000	13.75
2437	4.28	2.34	10.00	16.62	45.92	30.00	1000	13.38
2462	3.94	2.35	10.00	16.29	42.56	30.00	1000	13.71

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading PK [dBm]	Remark
1	3.53	
2	3.83	
5.5	4.16	
11	4.28	*

*: Worst Rate

All comparizon were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	32GE0033-HO-01
Date	5/17/2012
Temperature/ Humidity	21 deg. C / 51% RH
Engineer	Katsunori Okai
Mode	11g Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.29	2.34	10.00	23.63	230.67	30.00	1000	6.37
2437	11.37	2.34	10.00	23.71	234.96	30.00	1000	6.29
2462	10.22	2.35	10.00	22.57	180.72	30.00	1000	7.43

Sample Calculation:

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

2437MHz

Rate [Mbps]	Reading PK [dBm]	Remark
6	11.37	*
9	11.17	
12	10.89	
18	10.92	
24	10.64	
36	11.02	
48	10.79	
54	10.73	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Peak Output Power

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	32GE0033-HO-01
Date	5/17/2012
Temperature/ Humidity	21 deg. C / 51% RH
Engineer	Katsunori Okai
Mode	11n-20 Tx

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.58	2.34	10.00	22.92	195.88	30.00	1000	7.08
2437	10.99	2.34	10.00	23.33	215.28	30.00	1000	6.67
2462	9.91	2.35	10.00	22.26	168.27	30.00	1000	7.74

Sample Calculation:

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

2437MHz

MCS Number	Reading PK [dBm]	Remark
0	10.72	
1	10.94	
2	10.72	
3	10.99	*
4	10.68	
5	10.55	
6	10.92	
7	10.62	

*: Worst Rate

All comparison were carried out on same frequency and measurement factors.

Maximum Average Output Power (Reference data for SAR testing)

IEEE802.11b 1Mbps

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	0.62	2.34	10.00	12.96	19.77
6	2437	1.01	2.34	10.00	13.35	21.63
11	2462	0.67	2.35	10.00	13.02	20.04

IEEE802.11g 6Mbps

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	0.85	2.34	10.00	13.19	20.84
6	2437	1.06	2.34	10.00	13.40	21.88
11	2462	-1.01	2.35	10.00	11.34	13.61

IEEE802.11n-20 MCS0

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	0.65	2.34	10.00	12.99	19.91
6	2437	0.99	2.34	10.00	13.33	21.53
11	2462	-1.28	2.35	10.00	11.07	12.79

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11b Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.350	QP	23.0	15.0	7.2	32.0	13.2	40.0	26.8	
Hori	119.254	QP	25.4	12.8	8.3	32.0	14.5	43.5	29.0	
Hori	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Hori	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Hori	742.120	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Hori	958.110	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	2390.000	PK	58.7	26.4	2.2	32.4	54.9	73.9	19.0	
Hori	2397.963	PK	62.3	26.4	2.2	32.4	58.5	73.9	15.4	
Hori	2400.000	PK	62.6	26.4	2.2	32.4	58.8	73.9	15.1	
Hori	4824.000	PK	40.6	30.4	3.8	31.4	43.4	73.9	30.5	No signal.
Hori	7236.000	PK	42.8	35.2	4.6	32.4	50.2	73.9	23.7	No signal.
Hori	9648.000	PK	42.3	38.1	5.5	33.0	52.9	73.9	21.0	No signal.
Hori	24120.000	PK	46.9	38.6	-1.7	31.0	52.8	73.9	21.1	No signal.
Hori	2390.000	AV	46.4	26.4	2.2	32.4	42.6	53.9	11.3	
Hori	2397.963	AV	50.8	26.4	2.2	32.4	47.0	53.9	6.9	
Hori	2400.000	AV	50.5	26.4	2.2	32.4	46.7	53.9	7.2	
Hori	4824.000	AV	28.7	30.4	3.8	31.4	31.5	53.9	22.4	No signal.
Hori	7236.000	AV	30.1	35.2	4.6	32.4	37.5	53.9	16.4	No signal.
Hori	9648.000	AV	30.1	38.1	5.5	33.0	40.7	53.9	13.2	No signal.
Hori	24120.000	AV	35.1	38.6	-1.7	31.0	41.0	53.9	12.9	No signal.
Vert	39.350	QP	27.8	15.0	7.2	32.0	18.0	40.0	22.0	
Vert	119.254	QP	22.9	12.8	8.3	32.0	12.0	43.5	31.5	
Vert	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Vert	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Vert	742.120	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Vert	958.110	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Vert	2390.000	PK	54.2	26.4	2.2	32.4	50.4	73.9	23.5	
Vert	2397.963	PK	57.3	26.4	2.2	32.4	53.5	73.9	20.4	
Vert	2400.000	PK	57.4	26.4	2.2	32.4	53.6	73.9	20.3	
Vert	4824.000	PK	40.4	30.4	3.8	31.4	43.2	73.9	30.7	No signal.
Vert	7236.000	PK	42.0	35.2	4.6	32.4	49.4	73.9	24.5	No signal.
Vert	9648.000	PK	42.5	38.1	5.5	33.0	53.1	73.9	20.8	No signal.
Vert	24120.000	PK	46.7	38.6	-1.7	31.0	52.6	73.9	21.3	No signal.
Vert	2390.000	AV	42.2	26.4	2.2	32.4	38.4	53.9	15.5	
Vert	2397.963	AV	45.7	26.4	2.2	32.4	41.9	53.9	12.0	
Vert	2400.000	AV	45.3	26.4	2.2	32.4	41.5	53.9	12.4	
Vert	4824.000	AV	28.8	30.4	3.8	31.4	31.6	53.9	22.3	No signal.
Vert	7236.000	AV	30.1	35.2	4.6	32.4	37.5	53.9	16.4	No signal.
Vert	9648.000	AV	30.1	38.1	5.5	33.0	40.7	53.9	13.2	No signal.
Vert	24120.000	AV	35.1	38.6	-1.7	31.0	41.0	53.9	12.9	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11b Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.343	QP	23.1	15.0	7.2	32.0	13.3	40.0	26.7	
Hori	116.267	QP	25.7	12.5	8.3	32.0	14.5	43.5	29.0	
Hori	287.749	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Hori	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Hori	742.123	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Hori	958.121	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	4874.000	PK	41.0	30.5	3.8	31.4	43.9	73.9	30.0	No signal.
Hori	7311.000	PK	42.2	35.2	4.6	32.5	49.5	73.9	24.4	No signal.
Hori	9748.000	PK	42.6	38.3	5.5	33.0	53.4	73.9	20.5	No signal.
Hori	24370.000	PK	47.0	38.8	-1.7	30.9	53.2	73.9	20.7	No signal.
Hori	4874.000	AV	28.8	30.5	3.8	31.4	31.7	53.9	22.2	No signal.
Hori	7311.000	AV	30.2	35.2	4.6	32.5	37.5	53.9	16.4	No signal.
Hori	9748.000	AV	30.3	38.3	5.5	33.0	41.1	53.9	12.8	No signal.
Hori	24370.000	AV	34.2	38.8	-1.7	30.9	40.4	53.9	13.5	No signal.
Vert	39.343	QP	27.7	15.0	7.2	32.0	17.9	40.0	22.1	
Vert	116.267	QP	22.9	12.5	8.3	32.0	11.7	43.5	31.8	
Vert	287.749	QP	22.2	19.5	9.7	32.0	19.4	46.0	26.6	No signal.
Vert	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Vert	742.123	QP	22.2	22.7	12.4	32.0	25.3	46.0	20.7	No signal.
Vert	958.121	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Vert	4874.000	PK	40.8	30.5	3.8	31.4	43.7	73.9	30.2	No signal.
Vert	7311.000	PK	42.6	35.2	4.6	32.5	49.9	73.9	24.0	No signal.
Vert	9748.000	PK	42.8	38.3	5.5	33.0	53.6	73.9	20.3	No signal.
Vert	24370.000	PK	46.3	38.8	-1.7	30.9	52.5	73.9	21.4	No signal.
Vert	4874.000	AV	28.9	30.5	3.8	31.4	31.8	53.9	22.1	No signal.
Vert	7311.000	AV	30.1	35.2	4.6	32.5	37.4	53.9	16.5	No signal.
Vert	9748.000	AV	30.3	38.3	5.5	33.0	41.1	53.9	12.8	No signal.
Vert	24370.000	AV	34.2	38.8	-1.7	30.9	40.4	53.9	13.5	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11b Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.352	QP	22.9	15.0	7.2	32.0	13.1	40.0	26.9	
Hori	116.756	QP	25.5	12.5	8.3	32.0	14.3	43.5	29.2	
Hori	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Hori	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Hori	742.124	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Hori	959.120	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	2483.500	PK	62.6	26.5	2.2	32.3	59.0	73.9	14.9	
Hori	2488.670	PK	60.5	26.5	2.2	32.3	56.9	73.9	17.0	
Hori	4924.000	PK	41.6	30.5	3.8	31.4	44.5	73.9	29.4	No signal.
Hori	7386.000	PK	42.6	35.2	4.6	32.5	49.9	73.9	24.0	No signal.
Hori	9848.000	PK	42.7	38.5	5.5	33.1	53.6	73.9	20.3	No signal.
Hori	24620.000	PK	46.4	38.9	-1.7	30.9	52.7	73.9	21.2	No signal.
Hori	2483.500	AV	49.2	26.5	2.2	32.3	45.6	53.9	8.3	
Hori	2488.670	AV	48.5	26.5	2.2	32.3	44.9	53.9	9.0	
Hori	4924.000	AV	29.2	30.5	3.8	31.4	32.1	53.9	21.8	No signal.
Hori	7386.000	AV	30.3	35.2	4.6	32.5	37.6	53.9	16.3	No signal.
Hori	9848.000	AV	30.6	38.5	5.5	33.1	41.5	53.9	12.4	No signal.
Hori	24620.000	AV	35.0	38.9	-1.7	30.9	41.3	53.9	12.6	No signal.
Vert	39.352	QP	27.4	15.0	7.2	32.0	17.6	40.0	22.4	
Vert	116.756	QP	22.9	12.5	8.3	32.0	11.7	43.5	31.8	
Vert	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Vert	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Vert	742.124	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Vert	959.120	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Vert	2483.500	PK	56.9	26.5	2.2	32.3	53.3	73.9	20.6	
Vert	2488.670	PK	55.7	26.5	2.2	32.3	52.1	73.9	21.8	
Vert	4924.000	PK	41.1	30.5	3.8	31.4	44.0	73.9	29.9	No signal.
Vert	7386.000	PK	43.0	35.2	4.6	32.5	50.3	73.9	23.6	No signal.
Vert	9848.000	PK	42.7	38.5	5.5	33.1	53.6	73.9	20.3	No signal.
Vert	24620.000	PK	47.2	38.9	-1.7	30.9	53.5	73.9	20.4	No signal.
Vert	2483.500	AV	44.7	26.5	2.2	32.3	41.1	53.9	12.8	
Vert	2488.670	AV	43.8	26.5	2.2	32.3	40.2	53.9	13.7	
Vert	4924.000	AV	29.1	30.5	3.8	31.4	32.0	53.9	21.9	No signal.
Vert	7386.000	AV	30.3	35.2	4.6	32.5	37.6	53.9	16.3	No signal.
Vert	9848.000	AV	30.6	38.5	5.5	33.1	41.5	53.9	12.4	No signal.
Vert	24620.000	AV	35.0	38.9	-1.7	30.9	41.3	53.9	12.6	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11g Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.353	QP	23.0	15.0	7.2	32.0	13.2	40.0	26.8	
Hori	119.223	QP	25.4	12.8	8.3	32.0	14.5	43.5	29.0	
Hori	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Hori	423.321	QP	22.1	18.0	10.6	32.0	18.7	46.0	27.3	No signal.
Hori	742.120	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Hori	958.452	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	2373.600	PK	62.6	26.4	2.2	32.4	58.8	73.9	15.1	
Hori	2390.000	PK	70.4	26.4	2.2	32.4	66.6	73.9	7.3	
Hori	2400.000	PK	85.0	26.4	2.2	32.4	81.2	-	-	See 20dBc Data Sheet
Hori	4824.000	PK	40.3	30.4	3.8	31.4	43.1	73.9	30.8	No signal.
Hori	7236.000	PK	41.7	35.2	4.6	32.4	49.1	73.9	24.8	No signal.
Hori	9648.000	PK	42.0	38.1	5.5	33.0	52.6	73.9	21.3	No signal.
Hori	24120.000	PK	46.3	38.6	-1.7	31.0	52.2	73.9	21.7	No signal.
Hori	2373.600	AV	48.7	26.4	2.2	32.4	44.9	53.9	9.0	
Hori	2390.000	AV	52.5	26.4	2.2	32.4	48.7	53.9	5.2	
Hori	2400.000	AV	62.0	26.4	2.2	32.4	58.2	-	-	See 20dBc Data Sheet
Hori	4824.000	AV	28.7	30.4	3.8	31.4	31.5	53.9	22.4	No signal.
Hori	7236.000	AV	30.0	35.2	4.6	32.4	37.4	53.9	16.5	No signal.
Hori	9648.000	AV	30.1	38.1	5.5	33.0	40.7	53.9	13.2	No signal.
Hori	24120.000	AV	35.1	38.6	-1.7	31.0	41.0	53.9	12.9	No signal.
Vert	39.353	QP	27.8	15.0	7.2	32.0	18.0	40.0	22.0	
Vert	119.223	QP	22.9	12.8	8.3	32.0	12.0	43.5	31.5	
Vert	287.741	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Vert	423.321	QP	22.1	18.0	10.6	32.0	18.7	46.0	27.3	No signal.
Vert	742.120	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Vert	958.452	QP	21.4	25.6	13.4	31.0	29.4	46.0	16.6	No signal.
Vert	2373.600	PK	59.3	26.4	2.2	32.4	55.5	73.9	18.4	
Vert	2390.000	PK	64.3	26.4	2.2	32.4	60.5	73.9	13.4	
Vert	2400.000	PK	79.0	26.4	2.2	32.4	75.2	-	-	See 20dBc Data Sheet
Vert	4824.000	PK	41.1	30.4	3.8	31.4	43.9	73.9	30.0	No signal.
Vert	7236.000	PK	41.6	35.2	4.6	32.4	49.0	73.9	24.9	No signal.
Vert	9648.000	PK	41.9	38.1	5.5	33.0	52.5	73.9	21.4	No signal.
Vert	24120.000	PK	47.0	38.6	-1.7	31.0	52.9	73.9	21.0	No signal.
Vert	2373.600	AV	44.6	26.4	2.2	32.4	40.8	53.9	13.1	
Vert	2390.000	AV	47.6	26.4	2.2	32.4	43.8	53.9	10.1	
Vert	2400.000	AV	54.5	26.4	2.2	32.4	50.7	-	-	See 20dBc Data Sheet
Vert	4824.000	AV	28.7	30.4	3.8	31.4	31.5	53.9	22.4	No signal.
Vert	7236.000	AV	30.1	35.2	4.6	32.4	37.5	53.9	16.4	No signal.
Vert	9648.000	AV	30.2	38.1	5.5	33.0	40.8	53.9	13.1	No signal.
Vert	24120.000	AV	35.1	38.6	-1.7	31.0	41.0	53.9	12.9	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11g Tx 2437MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.241	QP	23.2	15.1	7.2	32.0	13.5	40.0	26.5	
Hori	119.256	QP	26.2	12.8	8.3	32.0	15.3	43.5	28.2	
Hori	287.737	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Hori	436.412	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Hori	742.470	QP	22.1	22.7	12.4	32.0	25.2	46.0	20.8	No signal.
Hori	958.123	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	4874.000	PK	41.9	30.5	3.8	31.4	44.8	73.9	29.1	No signal.
Hori	7311.000	PK	42.8	35.2	4.6	32.5	50.1	73.9	23.8	No signal.
Hori	9748.000	PK	43.6	38.3	5.5	33.0	54.4	73.9	19.5	No signal.
Hori	24370.000	PK	46.6	38.8	-1.7	30.9	52.8	73.9	21.1	No signal.
Hori	4874.000	AV	28.9	30.5	3.8	31.4	31.8	53.9	22.1	No signal.
Hori	7311.000	AV	30.1	35.2	4.6	32.5	37.4	53.9	16.5	No signal.
Hori	9748.000	AV	30.3	38.3	5.5	33.0	41.1	53.9	12.8	No signal.
Hori	24370.000	AV	34.2	38.8	-1.7	30.9	40.4	53.9	13.5	No signal.
Vert	39.241	QP	28.1	15.1	7.2	32.0	18.4	40.0	21.6	
Vert	119.256	QP	22.9	12.8	8.3	32.0	12.0	43.5	31.5	
Vert	287.737	QP	22.4	19.5	9.7	32.0	19.6	46.0	26.4	No signal.
Vert	436.412	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Vert	742.470	QP	22.1	22.7	12.4	32.0	25.2	46.0	20.8	No signal.
Vert	958.123	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Vert	4874.000	PK	42.4	30.5	3.8	31.4	45.3	73.9	28.6	No signal.
Vert	7311.000	PK	43.3	35.2	4.6	32.5	50.6	73.9	23.3	No signal.
Vert	9748.000	PK	43.9	38.3	5.5	33.0	54.7	73.9	19.2	No signal.
Vert	24370.000	PK	46.5	38.8	-1.7	30.9	52.7	73.9	21.2	No signal.
Vert	4874.000	AV	28.8	30.5	3.8	31.4	31.7	53.9	22.2	No signal.
Vert	7311.000	AV	30.2	35.2	4.6	32.5	37.5	53.9	16.4	No signal.
Vert	9748.000	AV	30.3	38.3	5.5	33.0	41.1	53.9	12.8	No signal.
Vert	24370.000	AV	34.2	38.8	-1.7	30.9	40.4	53.9	13.5	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012 05/19/2012 5/23/2012
Temperature/ Humidity 24 deg. C / 37% RH 22 deg. C / 40% RH 22 deg. C / 33% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama Motoya Imura
(1-10GHz) (Above 10GHz) (below 1GHz)
Mode 11g Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	39.329	QP	23.0	15.1	7.2	32.0	13.3	40.0	26.7	
Hori	121.452	QP	25.3	13.1	8.3	32.0	14.7	43.5	28.8	
Hori	225.723	QP	22.4	17.0	9.3	32.0	16.7	46.0	29.3	No signal.
Hori	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Hori	742.131	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Hori	958.131	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Hori	2483.500	PK	71.5	26.5	2.2	32.3	67.9	73.9	6.0	
Hori	2500.490	PK	60.7	26.5	2.2	32.3	57.1	73.9	16.8	
Hori	4924.000	PK	41.9	30.5	3.8	31.4	44.8	73.9	29.1	No signal.
Hori	7386.000	PK	42.5	35.2	4.6	32.5	49.8	73.9	24.1	No signal.
Hori	9848.000	PK	43.3	38.5	5.5	33.1	54.2	73.9	19.7	No signal.
Hori	24620.000	PK	47.4	38.9	-1.7	30.9	53.7	73.9	20.2	No signal.
Hori	2483.500	AV	51.0	26.5	2.2	32.3	47.4	53.9	6.5	
Hori	2500.490	AV	47.0	26.5	2.2	32.3	43.4	53.9	10.5	
Hori	4924.000	AV	29.2	30.5	3.8	31.4	32.1	53.9	21.8	No signal.
Hori	7386.000	AV	30.3	35.2	4.6	32.5	37.6	53.9	16.3	No signal.
Hori	9848.000	AV	30.5	38.5	5.5	33.1	41.4	53.9	12.5	No signal.
Hori	24620.000	AV	35.0	38.9	-1.7	30.9	41.3	53.9	12.6	No signal.
Vert	39.329	QP	27.9	15.1	7.2	32.0	18.2	40.0	21.8	
Vert	121.452	QP	22.9	13.1	8.3	32.0	12.3	43.5	31.2	
Vert	225.723	QP	22.4	17.0	9.3	32.0	16.7	46.0	29.3	No signal.
Vert	436.390	QP	22.1	18.1	10.7	31.9	19.0	46.0	27.0	No signal.
Vert	742.131	QP	22.0	22.7	12.4	32.0	25.1	46.0	20.9	No signal.
Vert	958.131	QP	21.5	25.6	13.4	31.0	29.5	46.0	16.5	No signal.
Vert	2483.500	PK	66.3	26.5	2.2	32.3	62.7	73.9	11.2	
Vert	2500.490	PK	53.5	26.5	2.2	32.3	49.9	73.9	24.0	
Vert	4924.000	PK	41.9	30.5	3.8	31.4	44.8	73.9	29.1	No signal.
Vert	7386.000	PK	43.2	35.2	4.6	32.5	50.5	73.9	23.4	No signal.
Vert	9848.000	PK	43.7	38.5	5.5	33.1	54.6	73.9	19.3	No signal.
Vert	24620.000	PK	46.3	38.9	-1.7	30.9	52.6	73.9	21.3	No signal.
Vert	2483.500	AV	45.5	26.5	2.2	32.3	41.9	53.9	12.0	
Vert	2500.490	AV	41.1	26.5	2.2	32.3	37.5	53.9	16.4	
Vert	4924.000	AV	29.2	30.5	3.8	31.4	32.1	53.9	21.8	No signal.
Vert	7386.000	AV	30.3	35.2	4.6	32.5	37.6	53.9	16.3	No signal.
Vert	9848.000	AV	30.6	38.5	5.5	33.1	41.5	53.9	12.4	No signal.
Vert	24620.000	AV	35.0	38.9	-1.7	30.9	41.3	53.9	12.6	No signal.

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).

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.3 Semi Anechoic Chamber
Report No. 32GE0033-HO-01
Date 05/18/2012
Temperature/ Humidity 24 deg. C / 37% RH
Engineer Hironobu Ohnishi
(Band Edge)
Mode 11n-20 Tx 2412MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2373.600	PK	63.4	26.4	2.2	32.4	59.6	73.9	14.3	
Hori	2390.000	PK	69.3	26.4	2.2	32.4	65.5	73.9	8.4	
Hori	2400.000	PK	79.4	26.4	2.2	32.4	75.6	-	-	See 20dBc Data Sheet
Hori	2373.600	AV	48.2	26.4	2.2	32.4	44.4	53.9	9.5	
Hori	2390.000	AV	52.6	26.4	2.2	32.4	48.8	53.9	5.1	
Hori	2400.000	AV	60.4	26.4	2.2	32.4	56.6	-	-	See 20dBc Data Sheet
Vert	2373.600	PK	57.2	26.4	2.2	32.4	53.4	73.9	20.5	
Vert	2390.000	PK	63.7	26.4	2.2	32.4	59.9	73.9	14.0	
Vert	2400.000	PK	74.1	26.4	2.2	32.4	70.3	-	-	See 20dBc Data Sheet
Vert	2373.600	AV	44.1	26.4	2.2	32.4	40.3	53.9	13.6	
Vert	2390.000	AV	47.8	26.4	2.2	32.4	44.0	53.9	9.9	
Vert	2400.000	AV	54.2	26.4	2.2	32.4	50.4	-	-	See 20dBc Data Sheet

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).

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	2412.000	PK	106.4	26.4	2.2	32.4	102.6	-	-	Carrier
Hori	2400.000	PK	65.5	26.4	2.2	32.4	61.7	82.6	20.9	
Vert	2412.000	PK	102.0	26.4	2.2	32.4	98.2	-	-	Carrier
Vert	2400.000	PK	59.2	26.4	2.2	32.4	55.4	78.2	22.8	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Report No. 32GE0033-HO-01
 Date 05/18/2012
 Temperature/ Humidity 24 deg. C / 37% RH
 Engineer Hironobu Ohnishi
 (Band Edge)
 Mode 11n-20 Tx 2462MHz

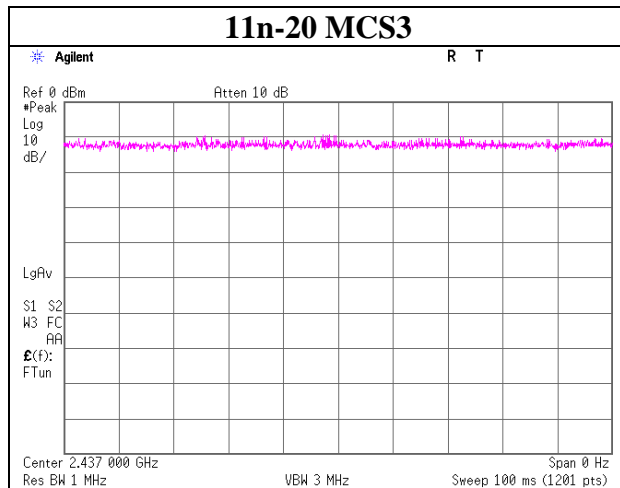
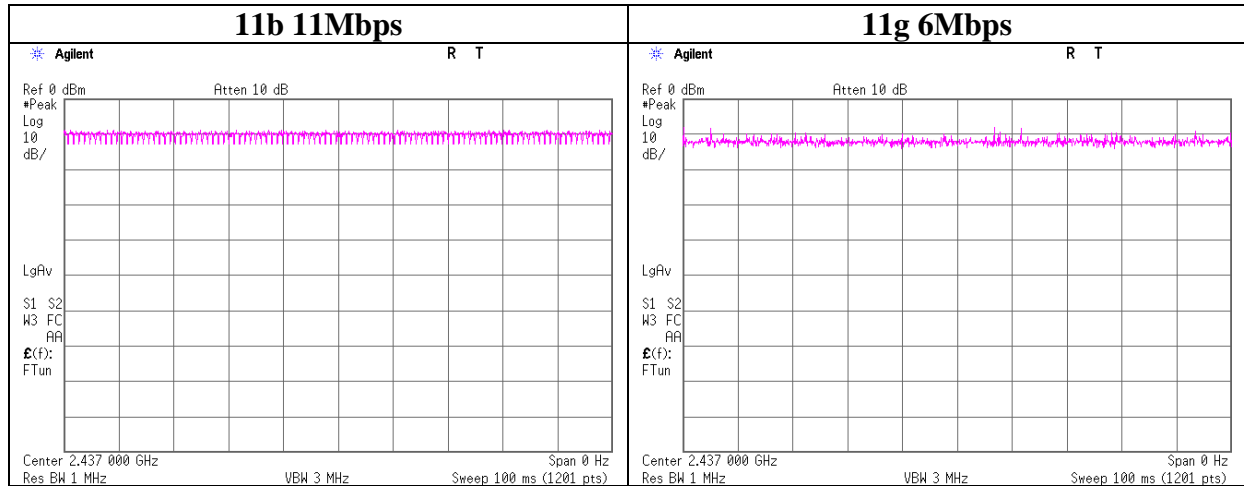
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	70.0	26.5	2.2	32.3	66.4	73.9	7.5	
Hori	2500.490	PK	59.6	26.5	2.2	32.3	56.0	73.9	17.9	
Hori	2483.500	AV	50.9	26.5	2.2	32.3	47.3	53.9	6.6	
Hori	2500.490	AV	46.8	26.5	2.2	32.3	43.2	53.9	10.7	
Vert	2483.500	PK	62.5	26.5	2.2	32.3	58.9	73.9	15.0	
Vert	2500.490	PK	55.1	26.5	2.2	32.3	51.5	73.9	22.4	
Vert	2483.500	AV	46.0	26.5	2.2	32.3	42.4	53.9	11.5	
Vert	2500.490	AV	41.8	26.5	2.2	32.3	38.2	53.9	15.7	

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).

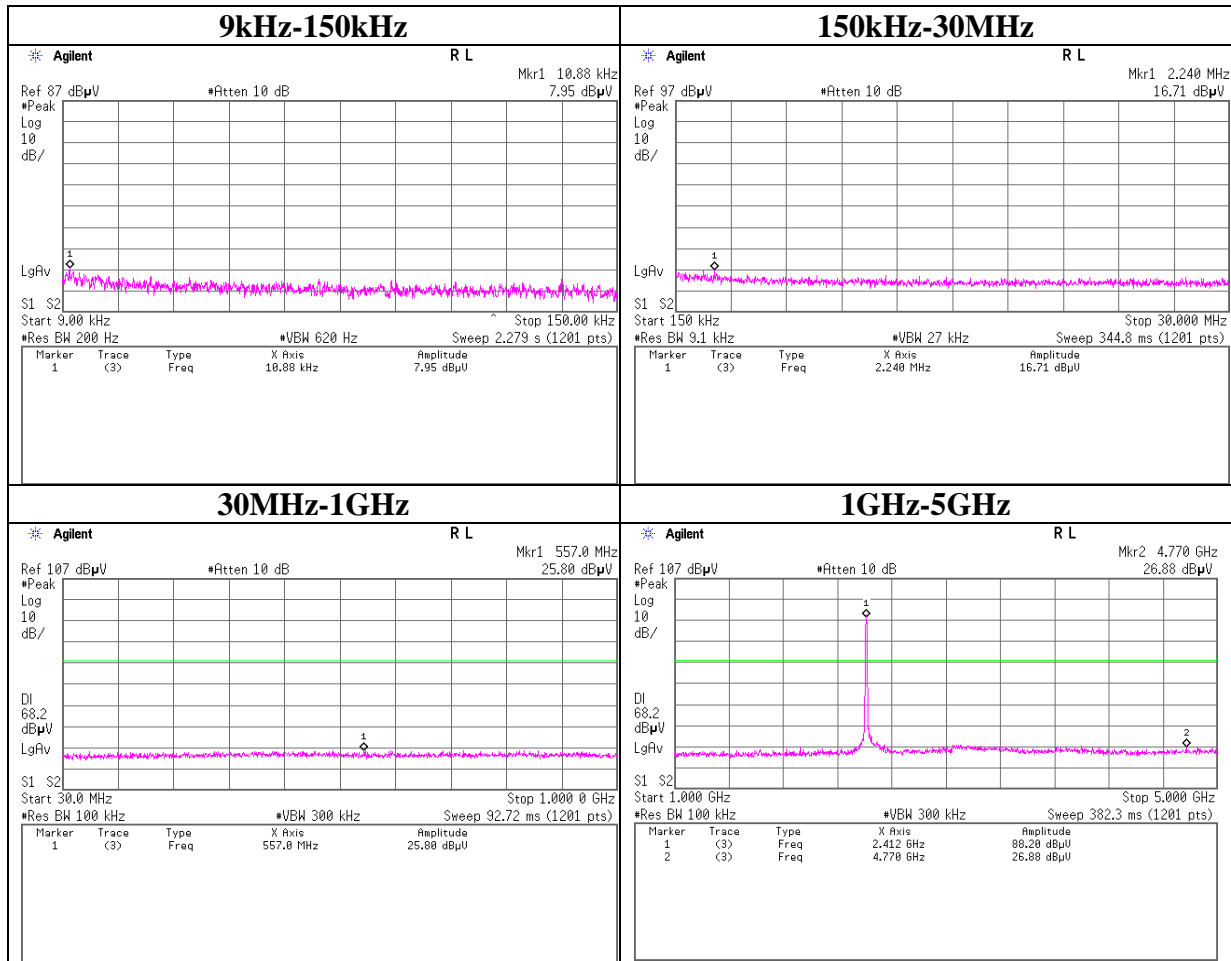
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 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Duty Cycle



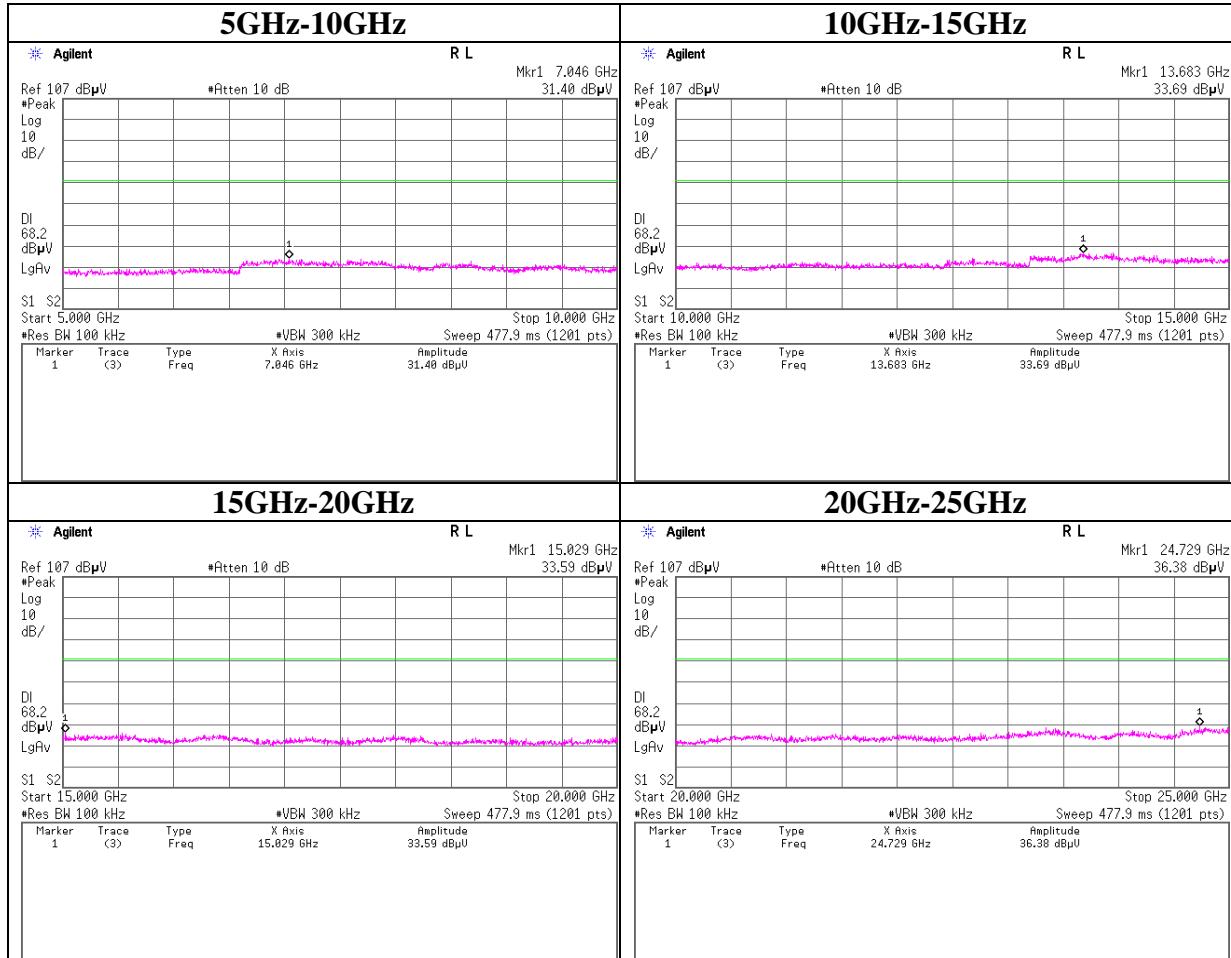
Conducted Spurious Emission

11b Tx 2412MHz



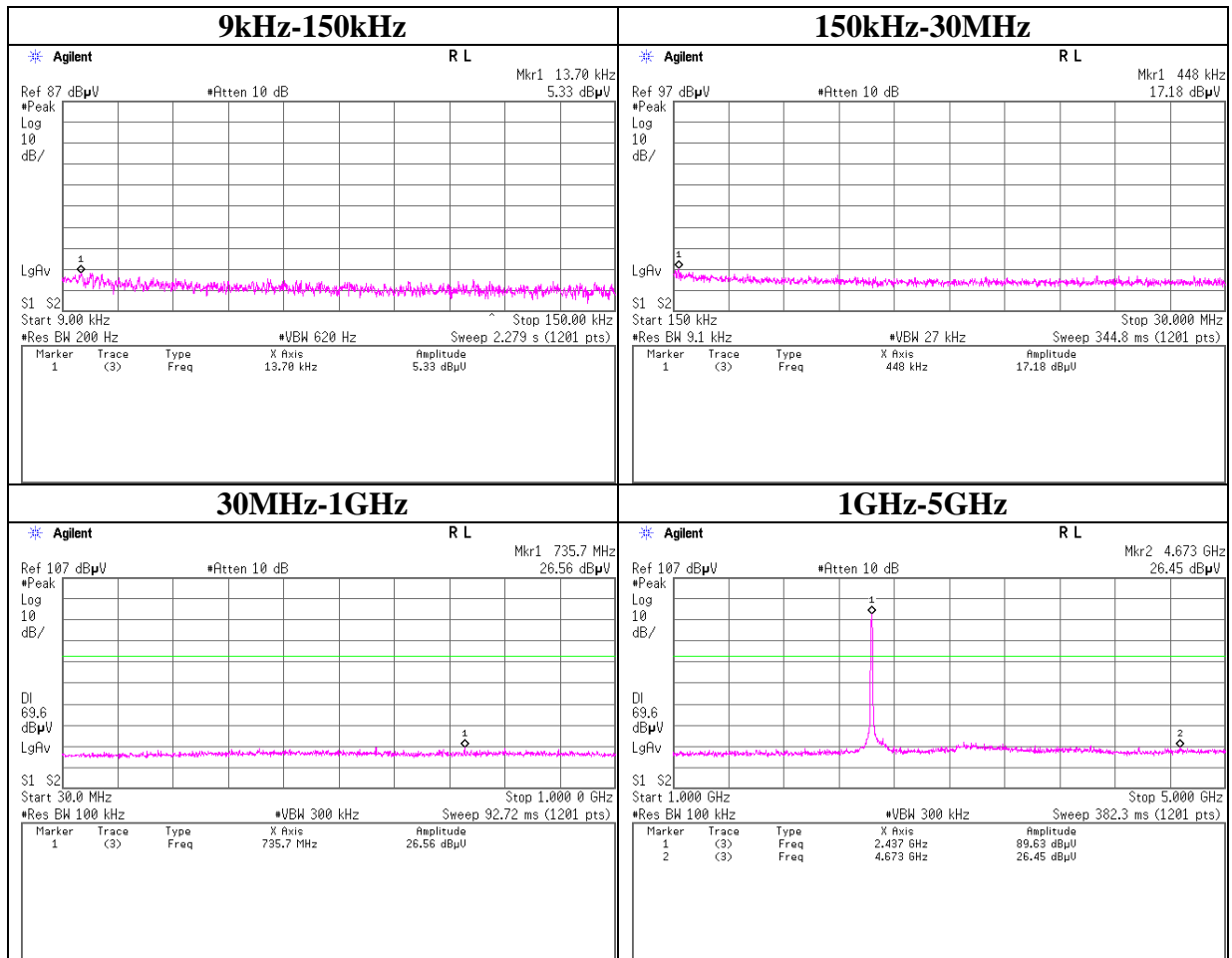
Conducted Spurious Emission

11b Tx 2412MHz



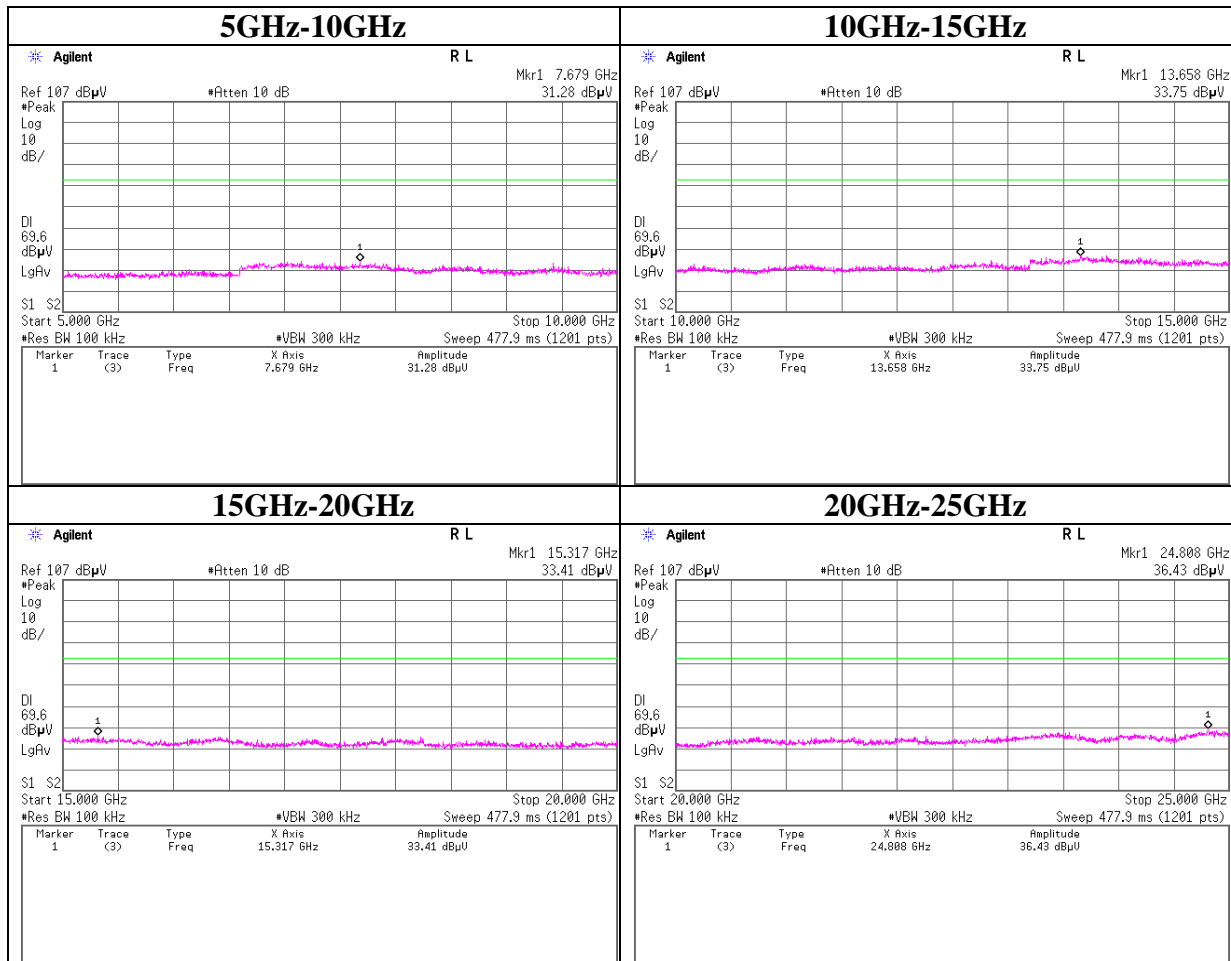
Conducted Spurious Emission

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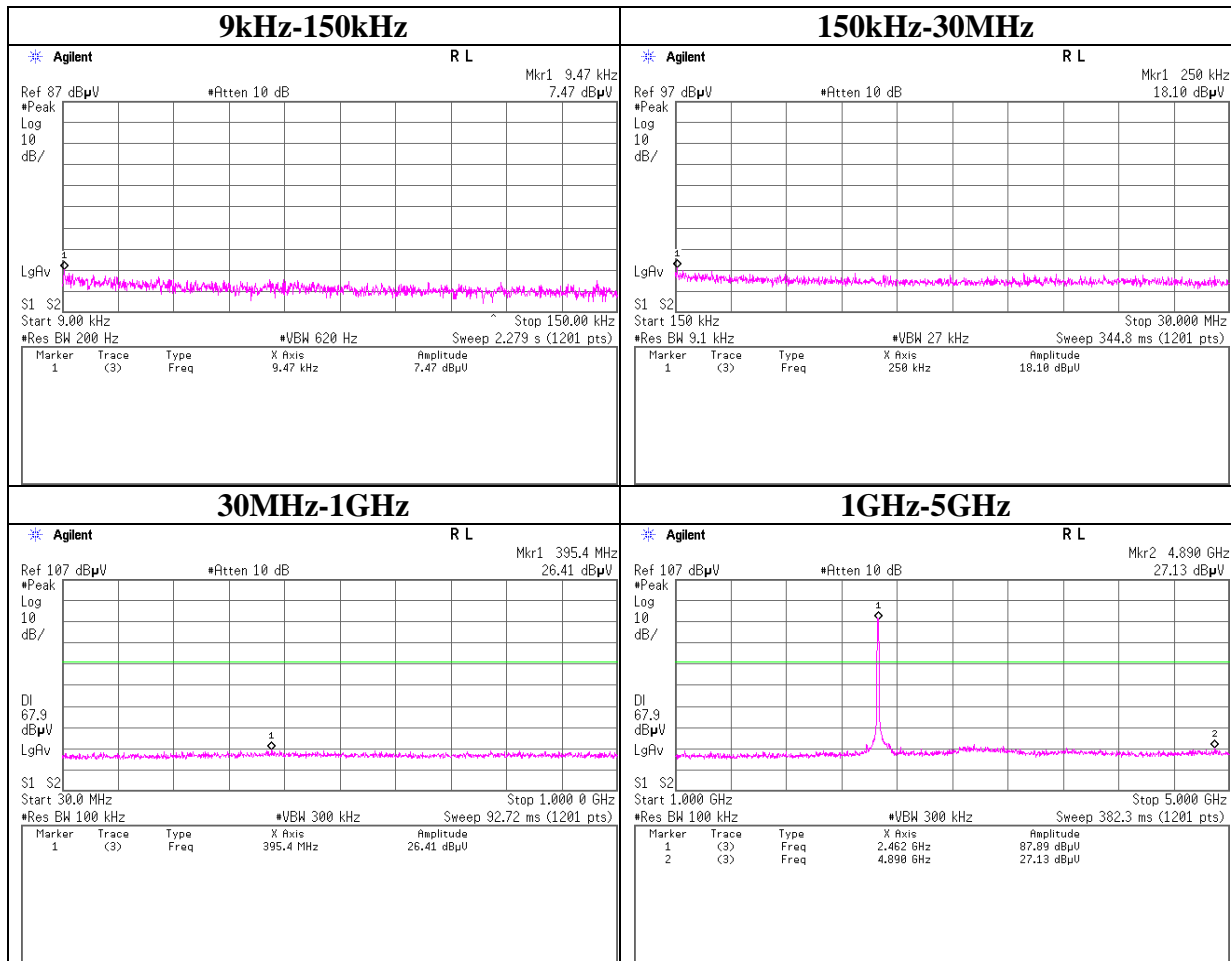
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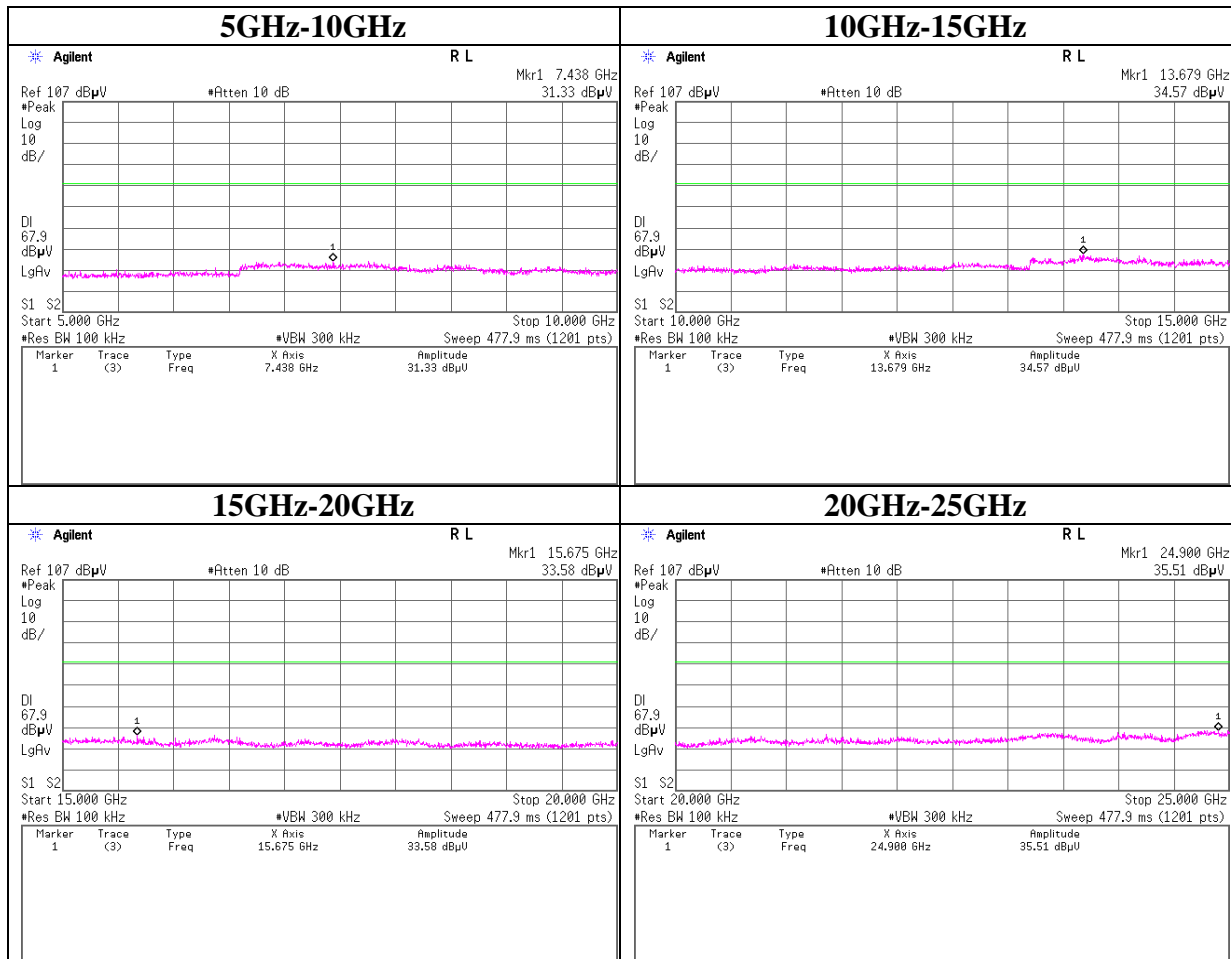
Conducted Spurious Emission

11b Tx 2462MHz



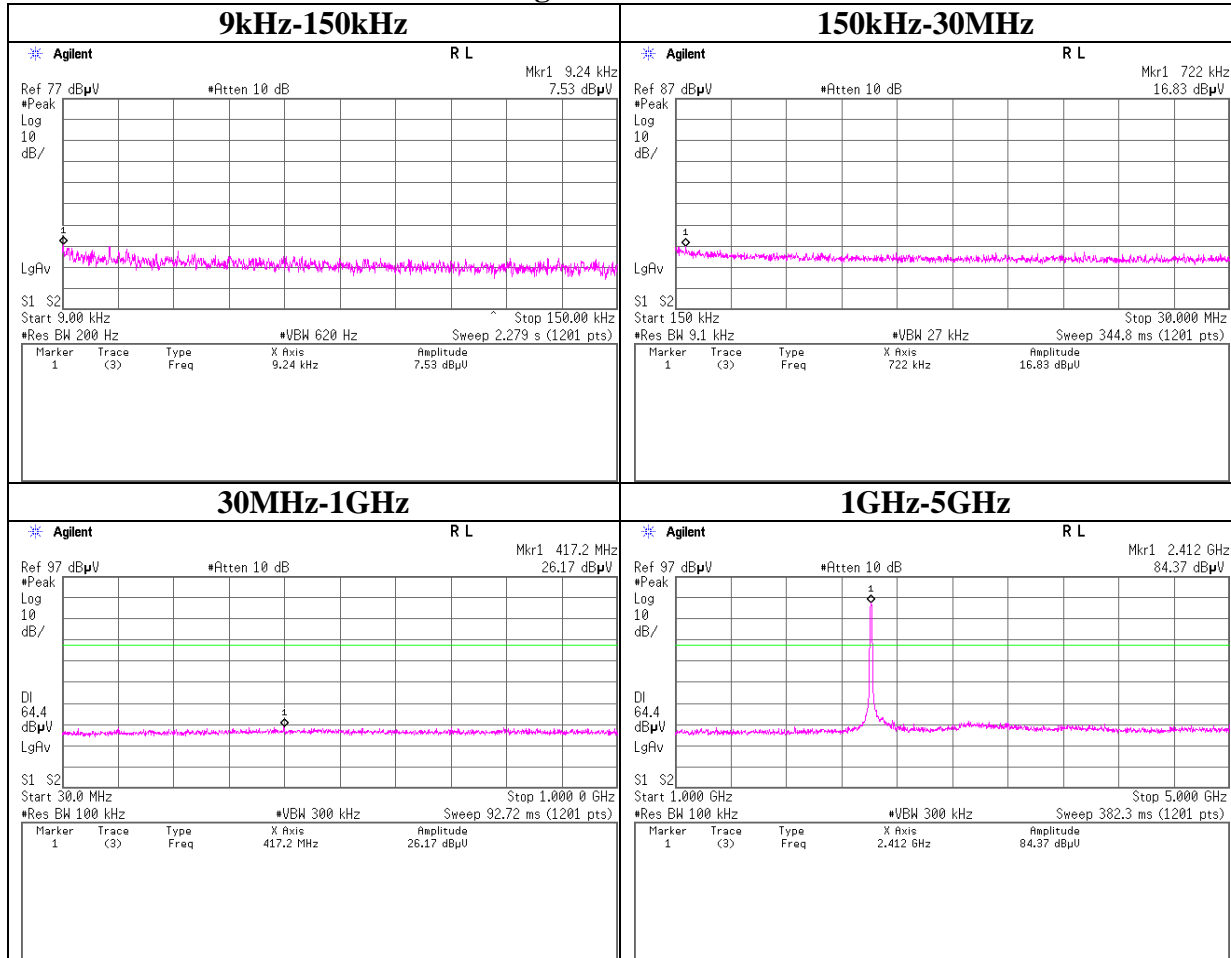
Conducted Spurious Emission

11b Tx 2462MHz



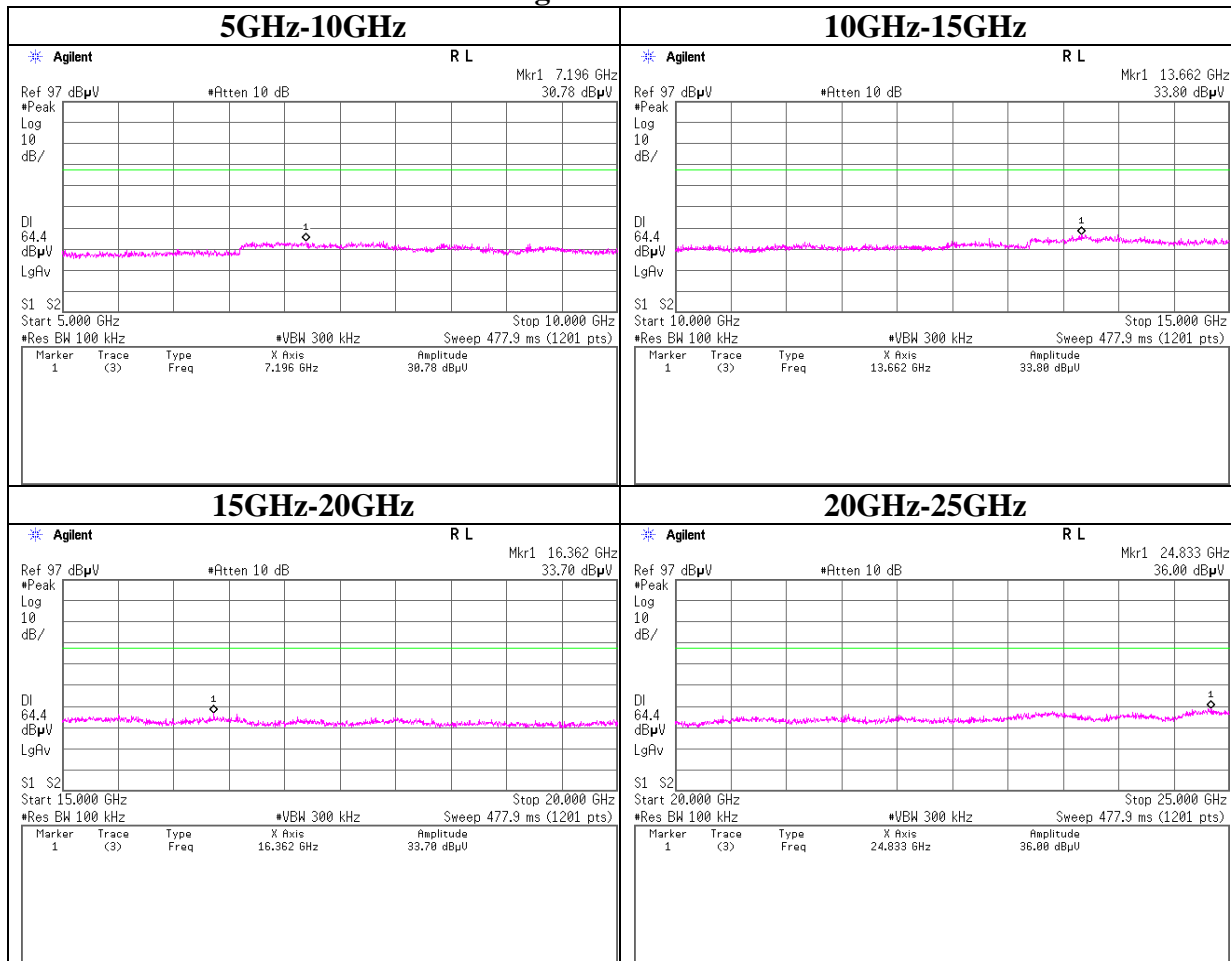
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11g Tx 2412MHz



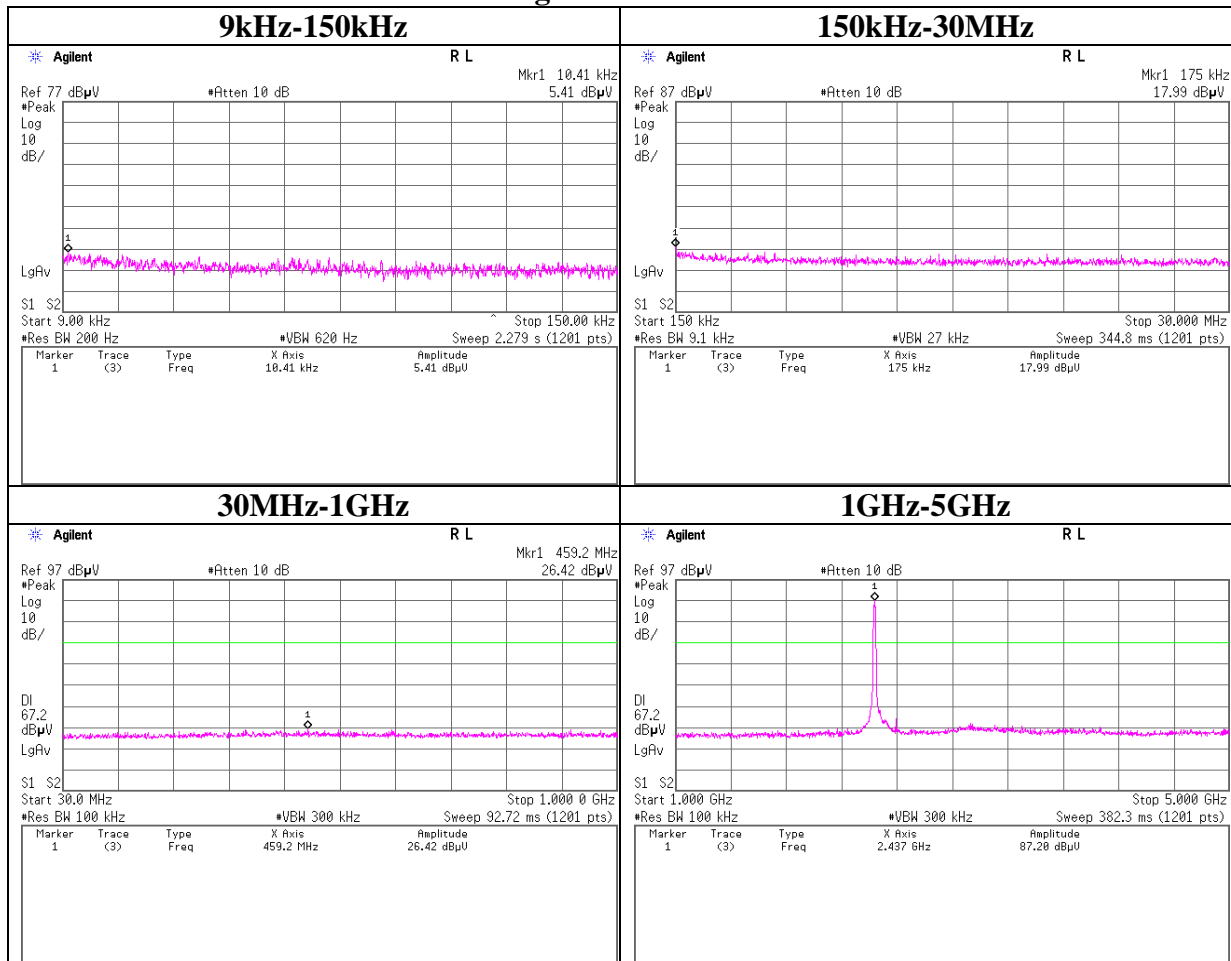
Conducted Spurious Emission

11g Tx 2412MHz



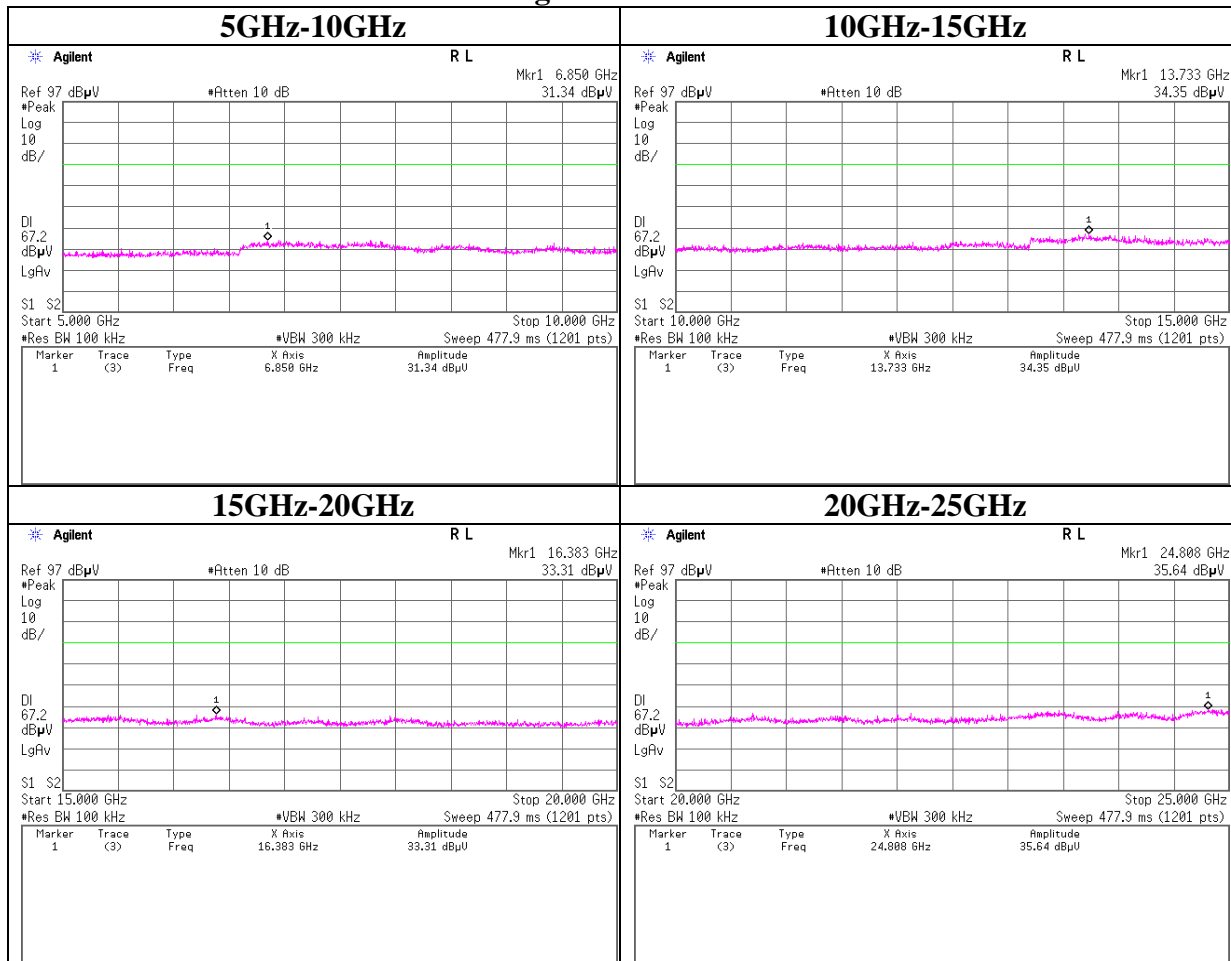
Conducted Spurious Emission

11g Tx 2437MHz



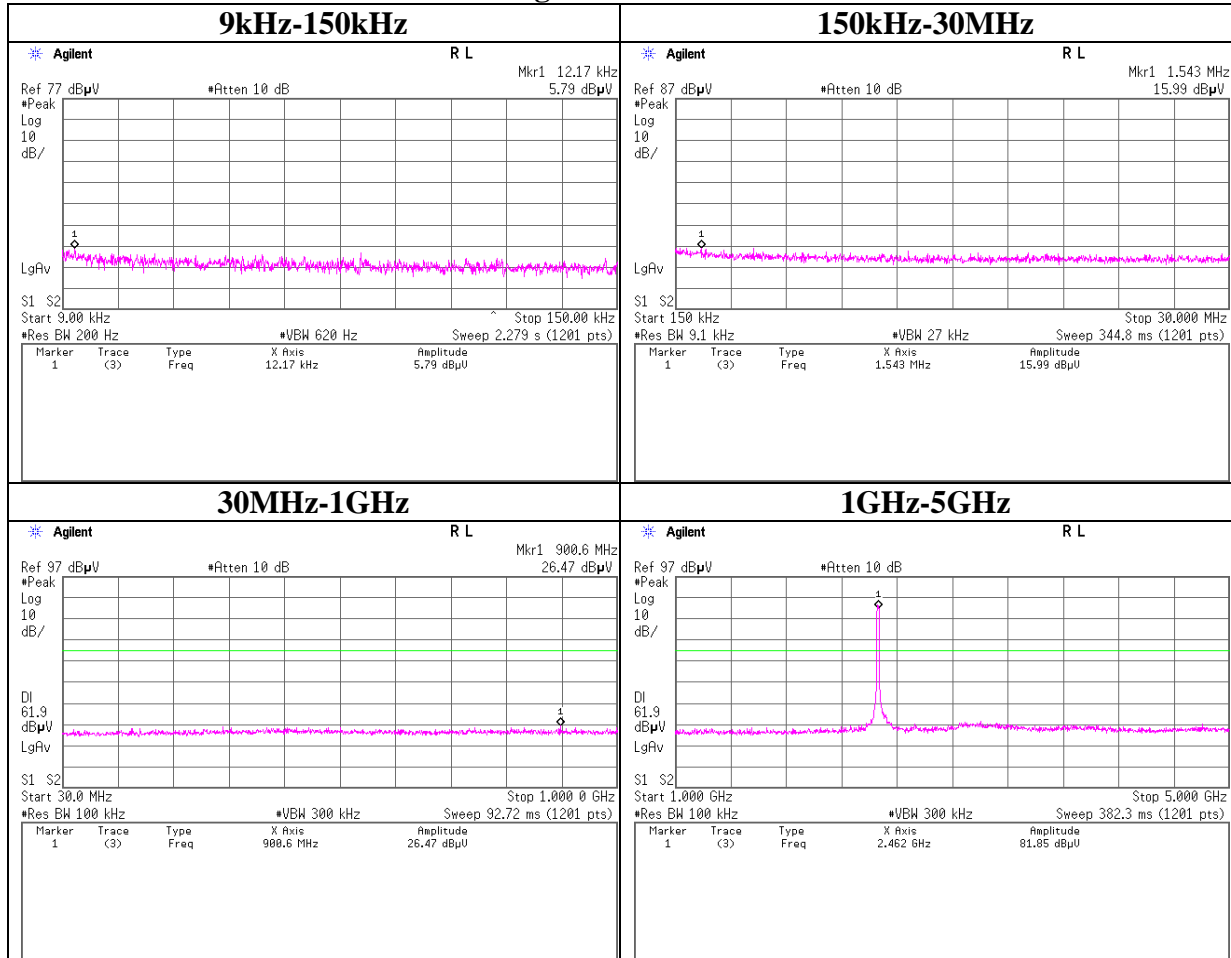
Conducted Spurious Emission

11g Tx 2437MHz



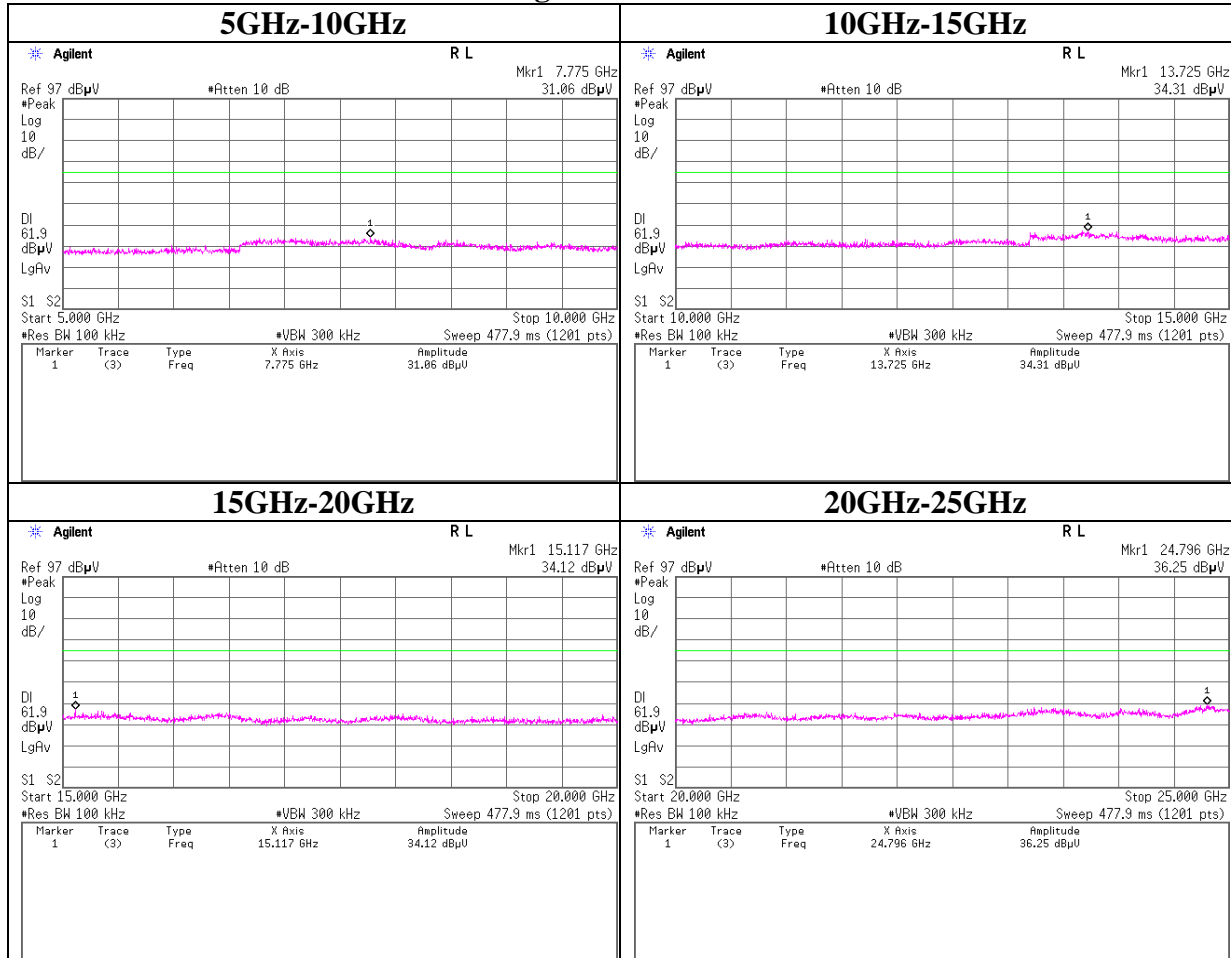
Conducted Spurious Emission

11g Tx 2462MHz



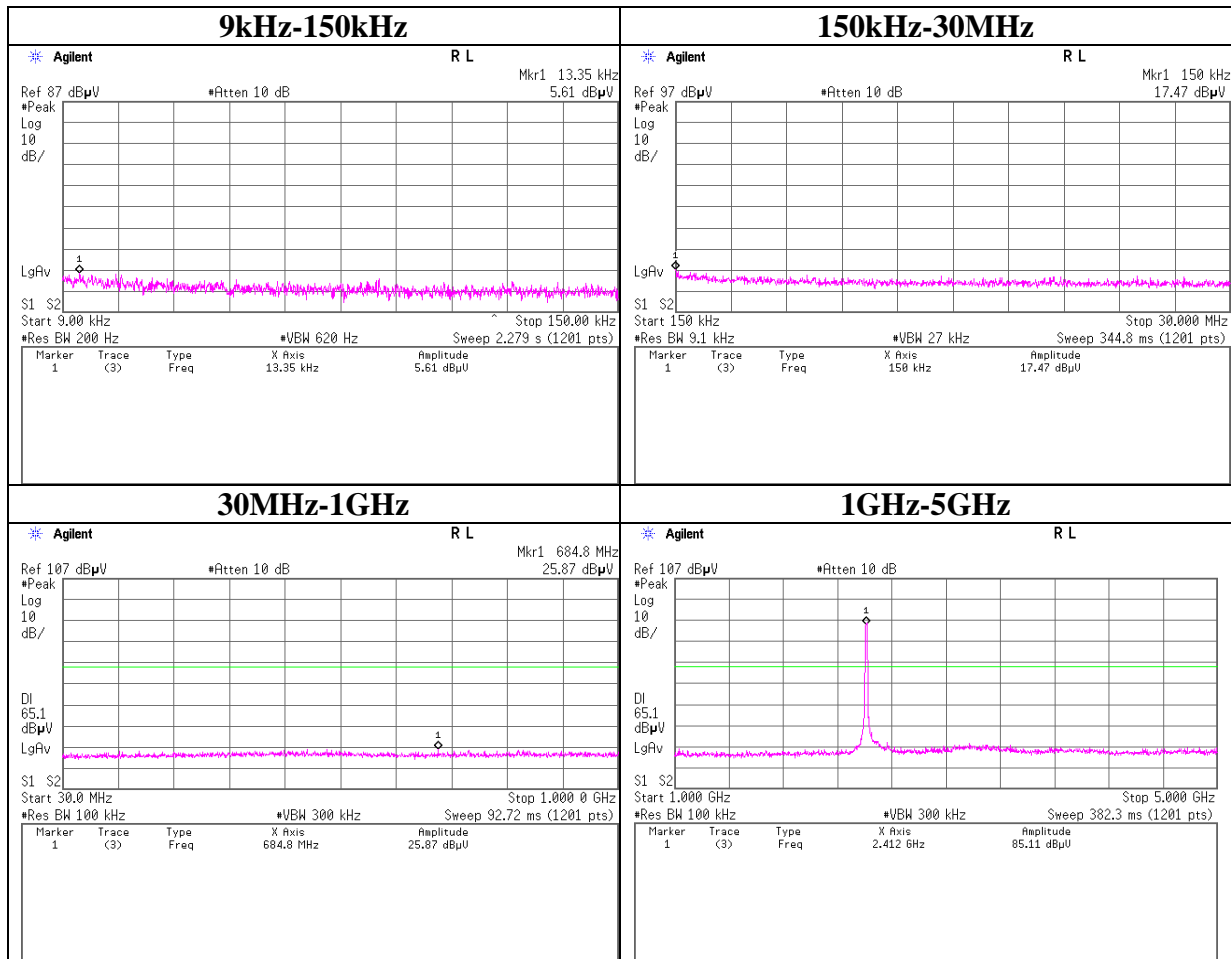
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11g Tx 2462MHz



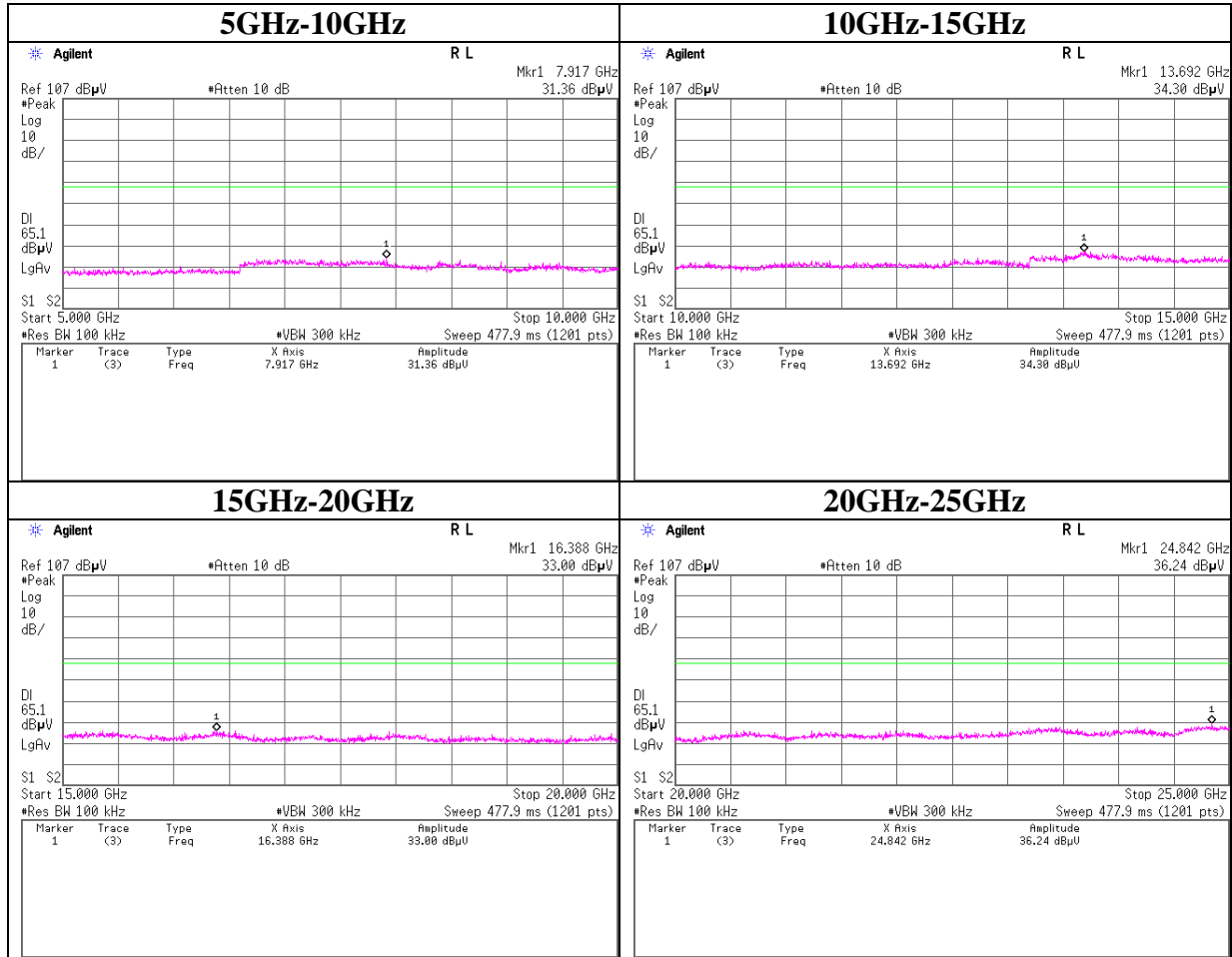
Conducted Spurious Emission

11n-20 Tx 2412MHz



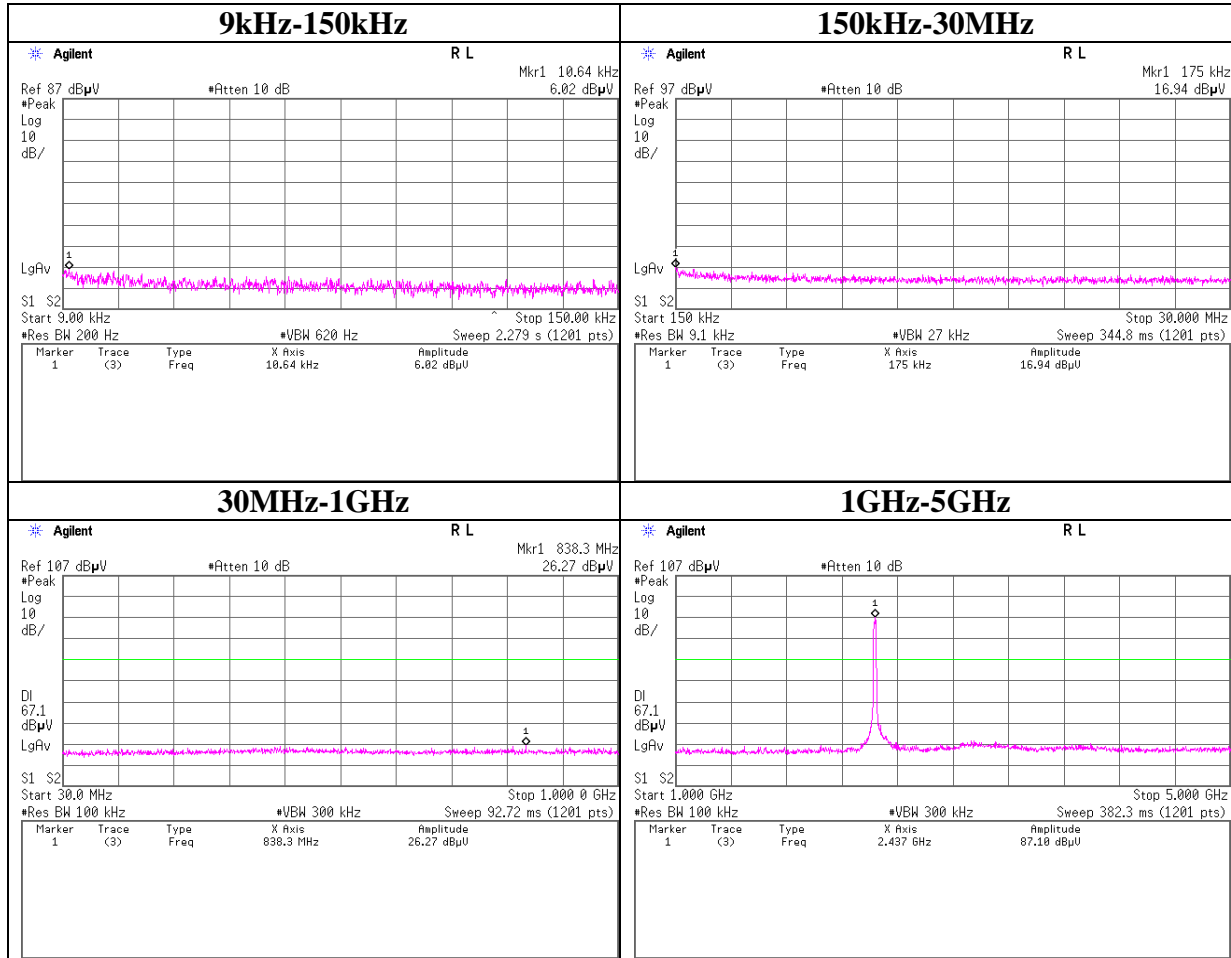
Conducted Spurious Emission

11n-20 Tx 2412MHz



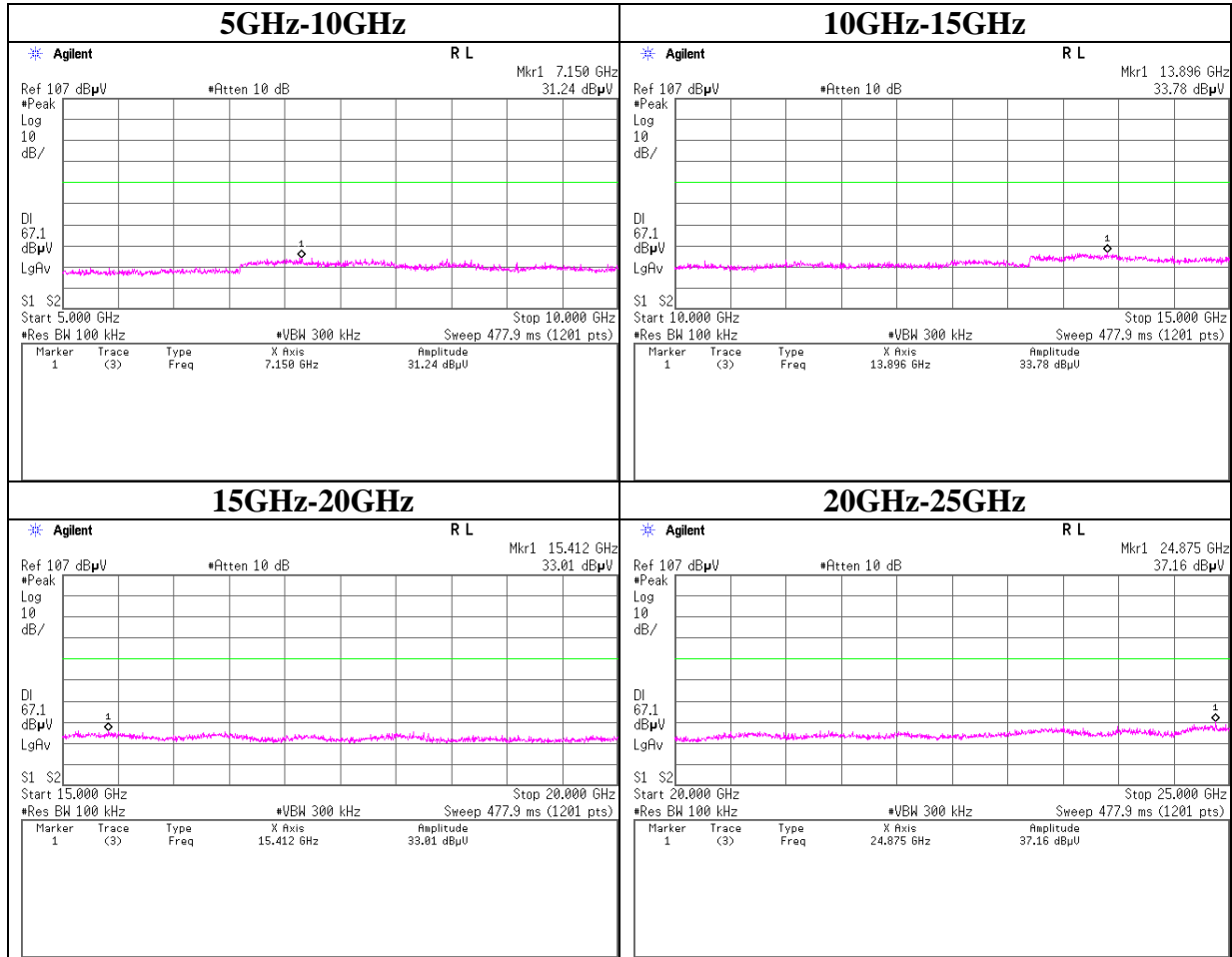
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11n-20 Tx 2437MHz



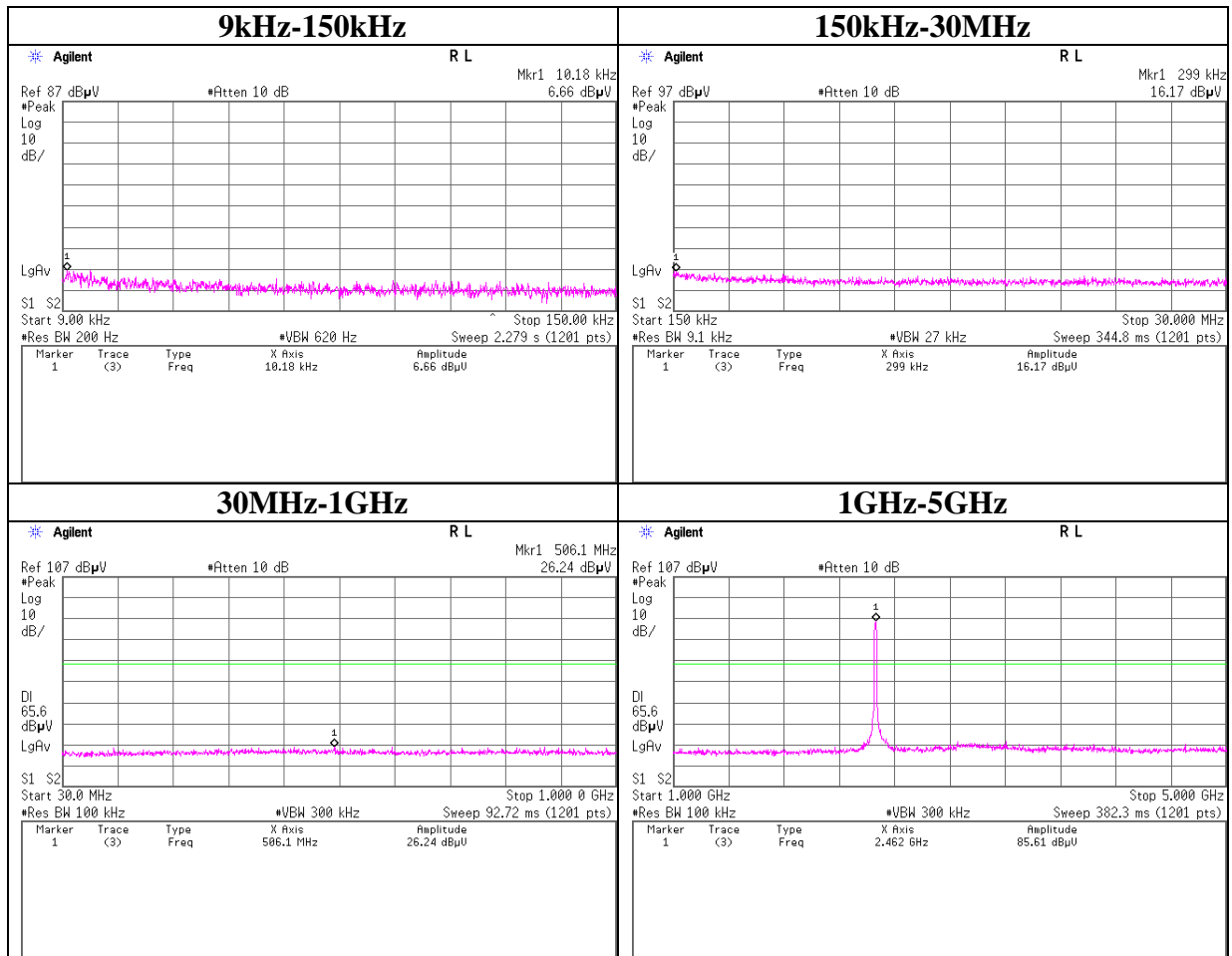
Conducted Spurious Emission

11n-20 Tx 2437MHz



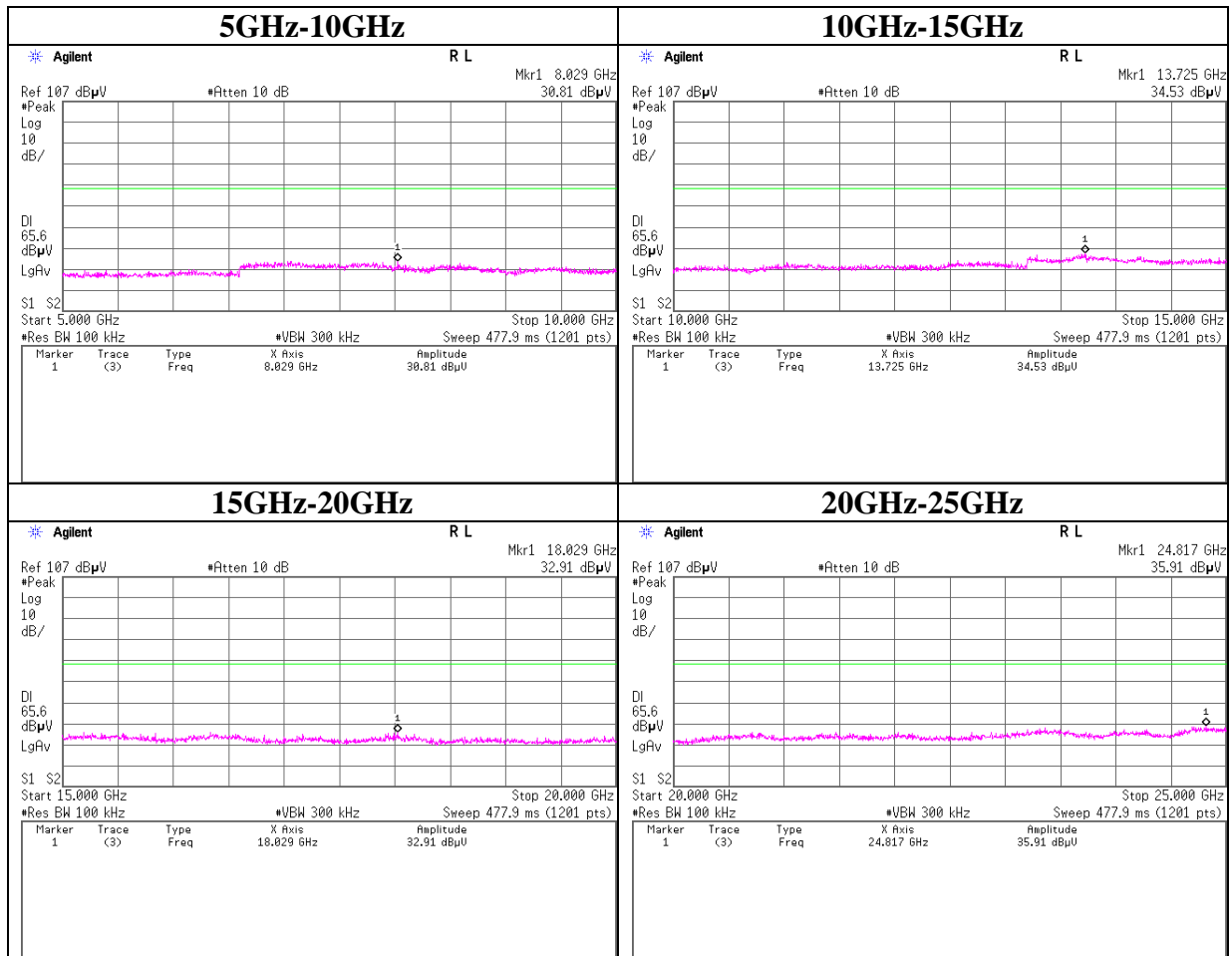
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11n-20 Tx 2462MHz



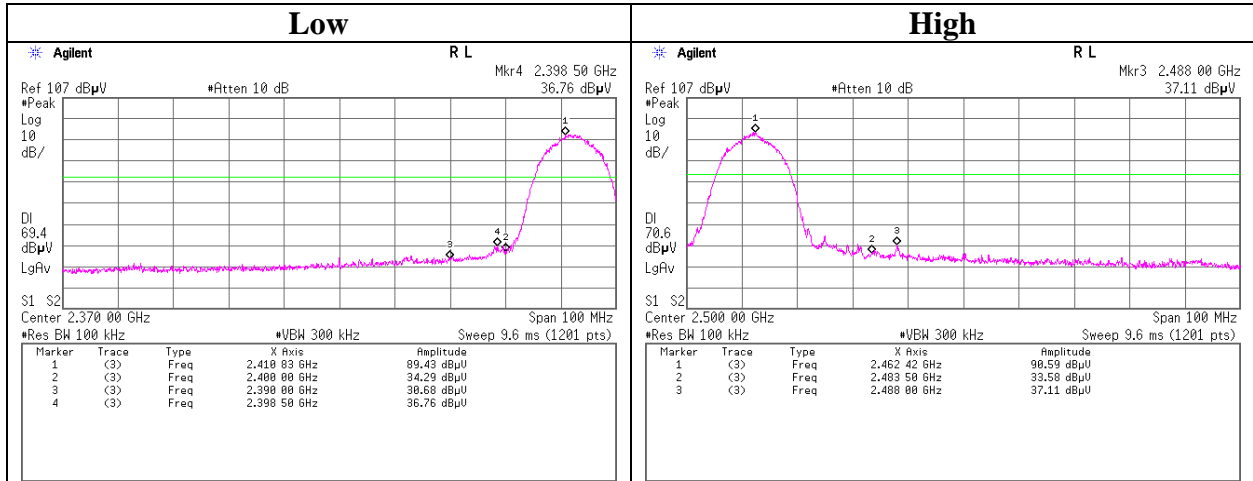
Conducted Spurious Emission

11n-20 Tx 2462MHz

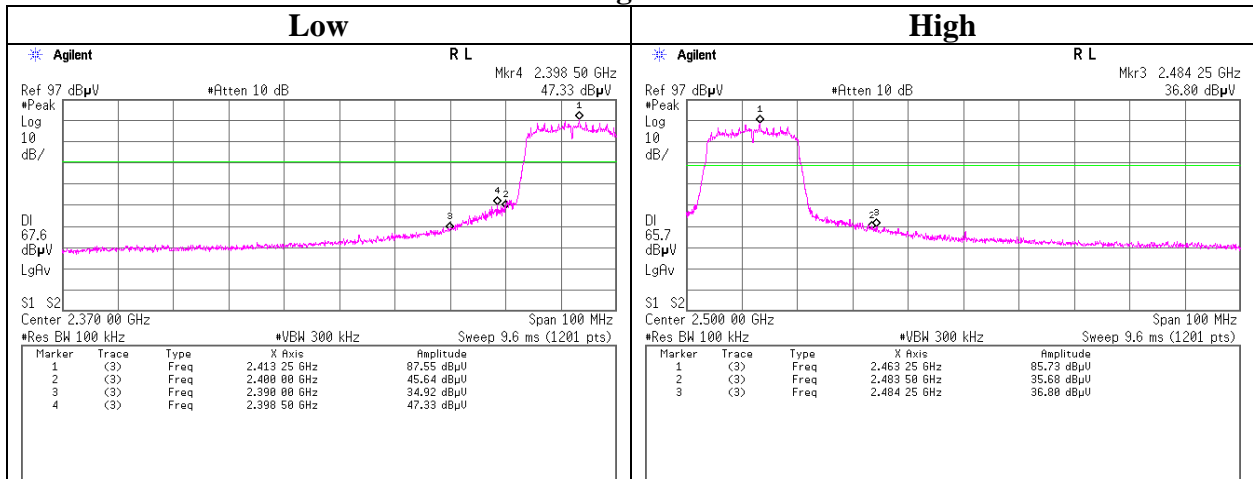


Conducted Emission Band Edge compliance

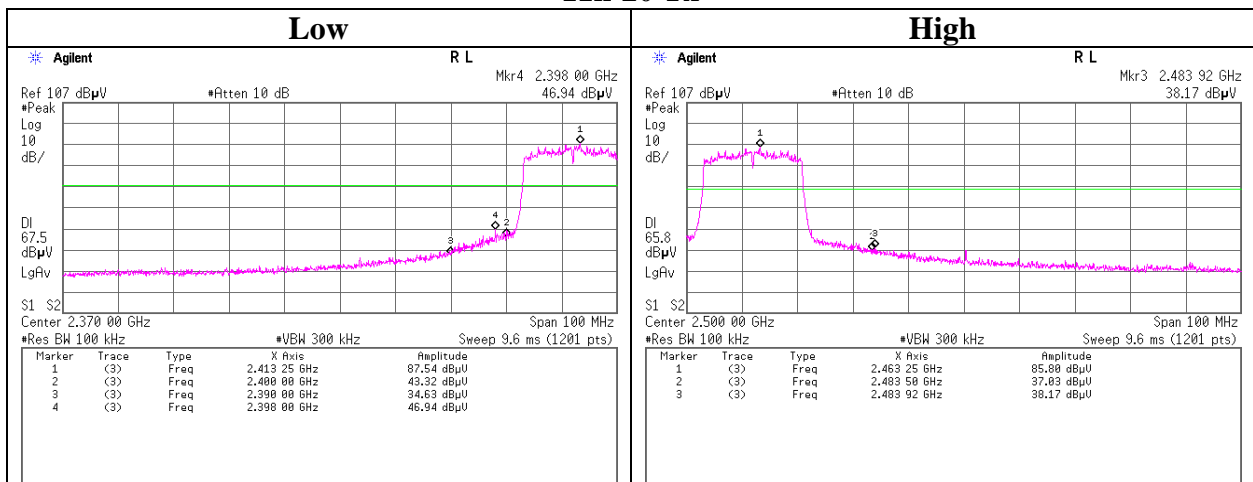
11b Tx



11g Tx



11n-20 Tx



Power Density

Test place Head Office EMC Lab. No.11 Measurement Room
Report No. 32GE0033-HO
Date 5/18/2012
Temperature/ Humidity 25 deg. C / 37% RH
Engineer Katsunori Okai
Mode Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-21.06	2.34	19.98	1.26	8.00	6.74
2437.00	-20.83	2.34	19.98	1.49	8.00	6.51
2462.00	-20.99	2.35	19.98	1.34	8.00	6.66

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-23.32	2.34	19.98	-1.00	8.00	9.00
2437.00	-23.24	2.34	19.98	-0.92	8.00	8.92
2462.00	-25.12	2.35	19.98	-2.79	8.00	10.79

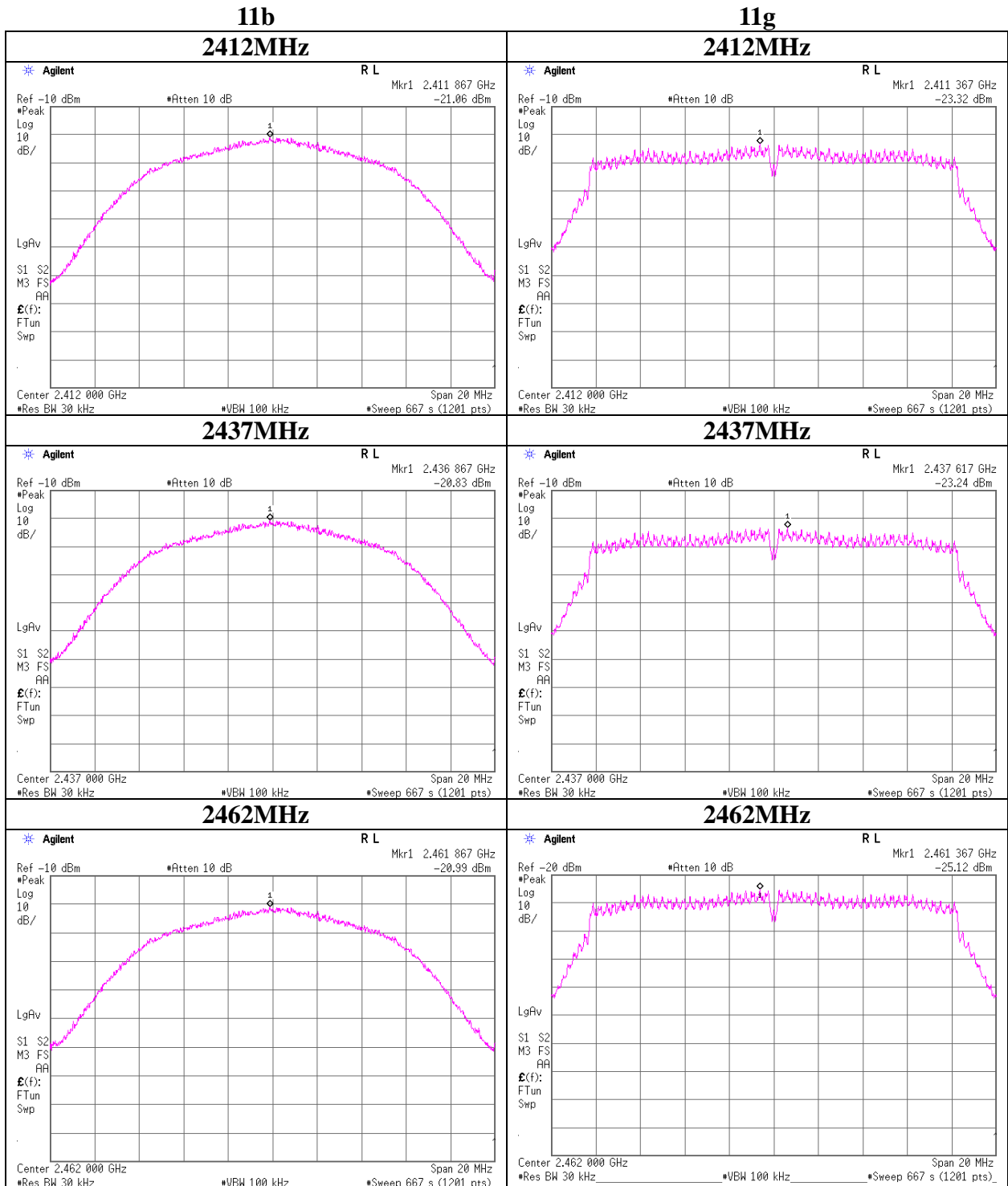
11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-23.41	2.34	19.98	-1.09	8.00	9.09
2437.00	-23.22	2.34	19.98	-0.90	8.00	8.90
2462.00	-25.51	2.35	19.98	-3.18	8.00	11.18

Sample Calculation:

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

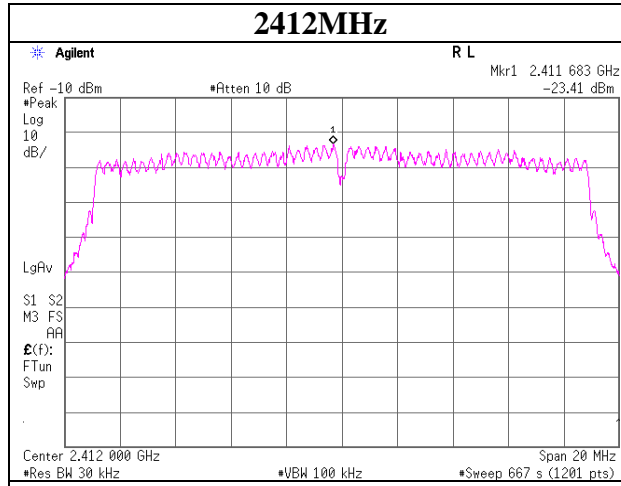
Power Density



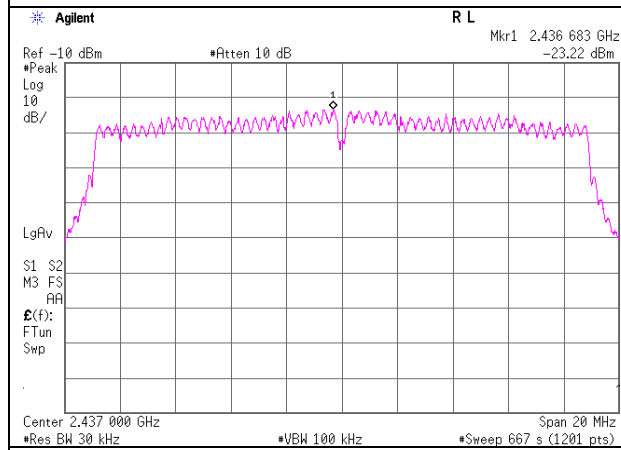
Power Density

11n-20

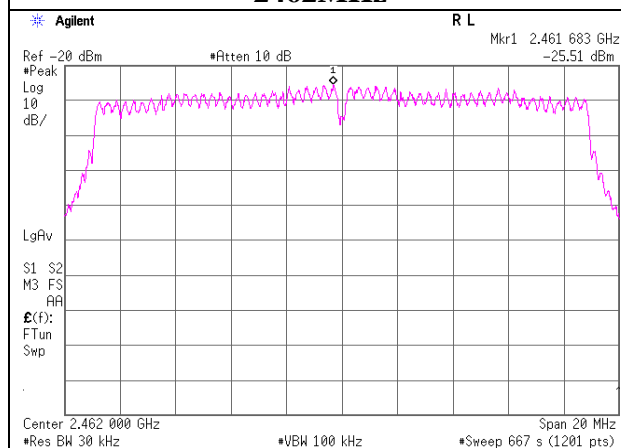
2412MHz



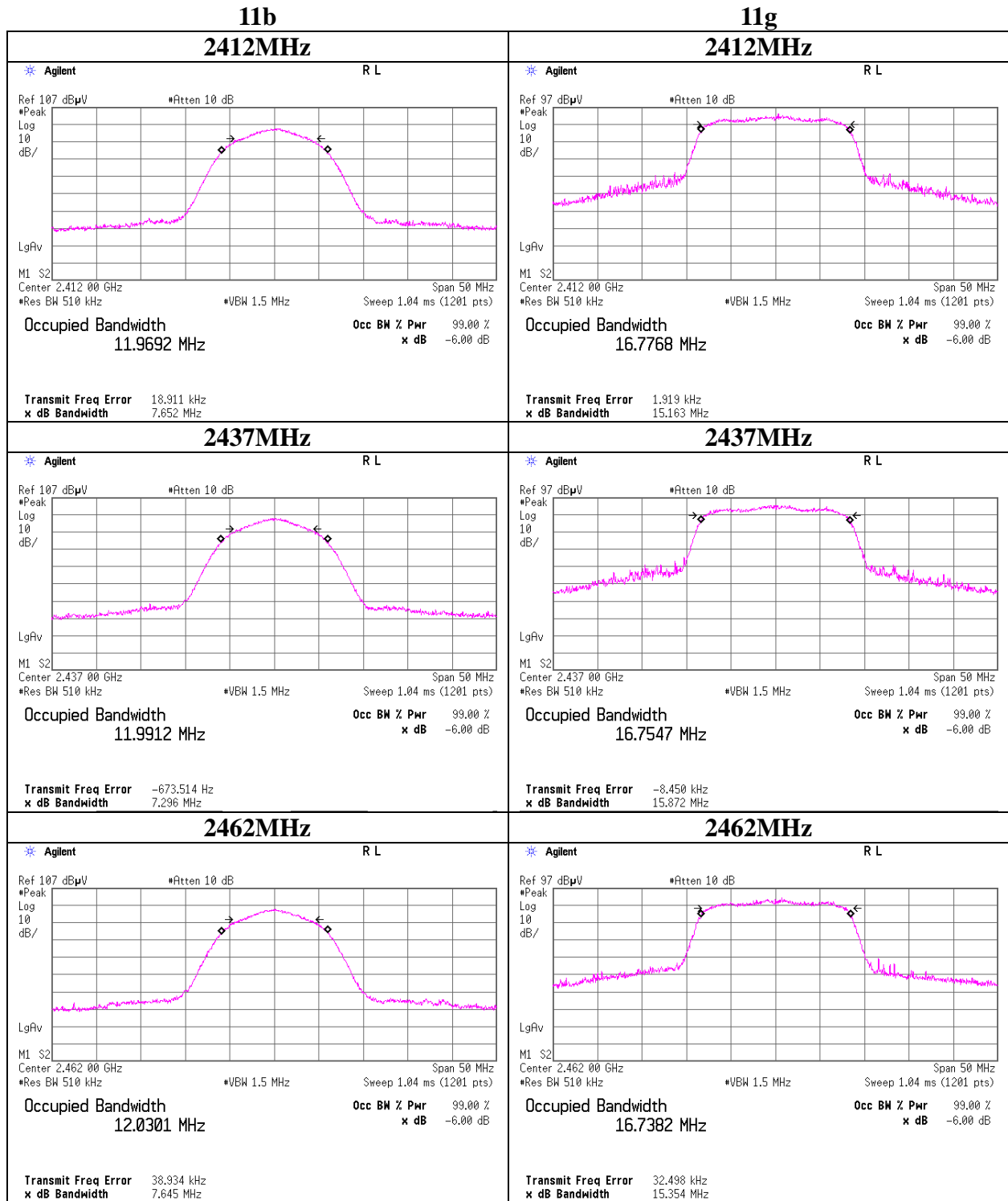
2437MHz



2462MHz



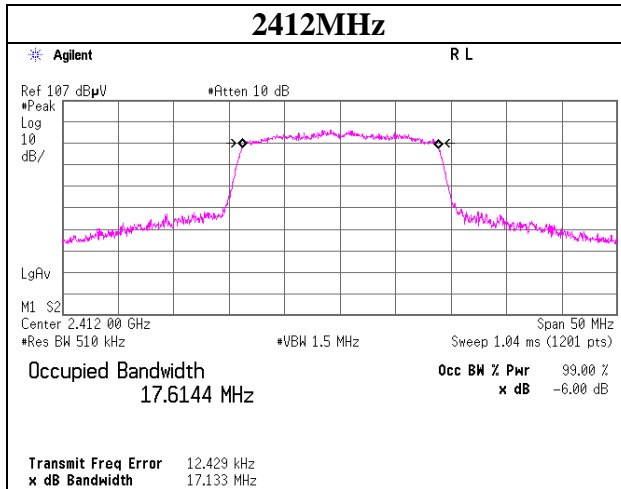
99% Occupied Bandwidth



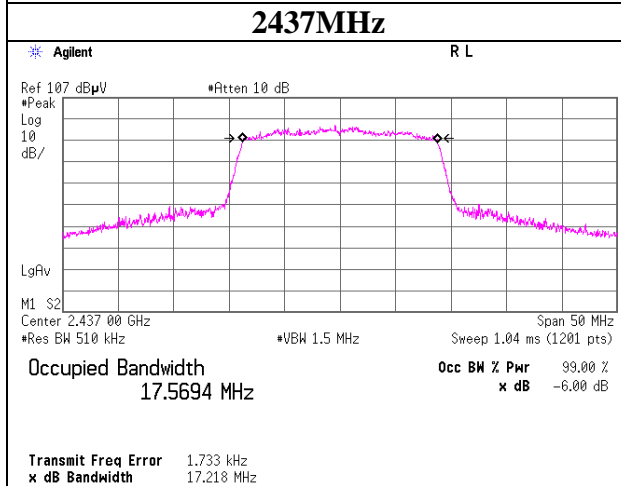
99% Occupied Bandwidth

11n-20

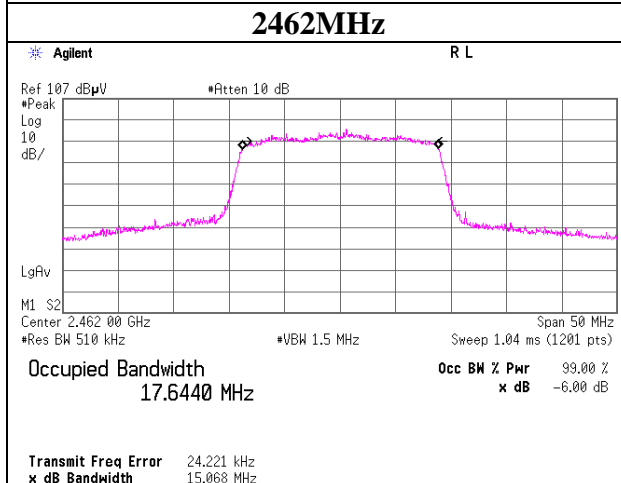
2412MHz



2437MHz



2462MHz



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2011/12/09 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2011/10/28 * 12
MAT-21	Attenuator(20dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-120	901247	AT	2012/01/12 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/AT	2011/11/23 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2012/03/29 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/21 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE/CE	2011/11/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2012/04/05 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/11/16 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/11/16 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2012/03/15 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2012/03/05 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2012/02/06 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/suciform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2011/07/04 * 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