



RADIO TEST REPORT


Test Report No. : 32EE0065-HO-01-A-R3

Applicant : Nikon Corporation
Type of Equipment : Wireless Mobile Adapter
Model No. : WU-1b
FCC ID : CGJ2148EA
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 32EE0065-HO-01-A-R2. 32EE0065-HO-01-A-R2 is replaced with this report.

Date of test: January 23 to February 8, 2012

Representative test engineer:


Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:


Masanori Nishiyama
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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13-EM-F0429

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
Average Output Power.....	20
Radiated Spurious Emission	22
Conducted Spurious Emission	35
Conducted Emission Band Edge compliance	54
Power Density	55
99% Occupied Bandwidth	58
APPENDIX 2: Test instruments	60
APPENDIX 3: Photographs of test setup	62
Conducted Emission	62
Radiated Spurious Emission	63
Worst Case Position (Horizontal: X-axis/ Vertical:Y-axis).....	64

SECTION 1: Customer information

Company Name : Nikon Corporation
Address : 6-3, Nishi-Ohi 1-Chome, Shinagawa-ku, Tokyo 140-8601, Japan
Telephone Number : +81-3-3773-8395
Facsimile Number : +81-3-3773-1497
Contact Person : Yoshiaki Harada

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Mobile Adapter
Model No. : WU-1b
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC4.6V
Receipt Date of Sample : January 23, 2012
Country of Mass-production : Japan
Condition of EUT : Engineering 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

Clock frequency in the system : CRYSTAL: 26MHz

Specification of WLAN (IEEE802.11b/g/n)

Type of radio	Wireless LAN (IEEE802.11b/g)	Wireless LAN (IEEE802.11n) 2.4G Band SISO (20M Band)
Equipment Type	Transceiver	
Frequency of Operation	2412MHz - 2462MHz	
Bandwidth & Channel spacing	Bandwidth : 20MHz Ch spacing : 5MHz	
Type of Modulation	11b: DSSS 11g: OFDM	OFDM
Antenna Type	Pattern antenna	
Antenna Gain	1.0dBi	
Power Supply	DC 4.6V	
Operating temperature range	0 to +40 deg. C.	

Variant Model

Model No.: WU-1b has a Model No. WU-1a.

Although they have following difference, they are completely identical in EMC Characteristics.

Model No.	WU-1b	WU-1a
Pin	5 pin	8 pin

Therefore, the full tests were performed with WU-1b as a representative.

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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 February 1, 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

*The revision on February 1, 2012 does not affect the test specification applied to the EUT.

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 30.8dB, 0.15058MHz, N AV 36.2dB, 0.51071MHz, L	Complied *1)	-
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	4.6dB 2390.000MHz, AV, Hori.	Complied	Conducted/ Radiated

*1) This EUT does not connect to AC line, but the test was performed according to the customer's request.

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 (DC4.6V) 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
Receiver Spurious Emission	IC: RSS-Gen 4.10	IC: RSS-Gen 6	14.3dB 2437.000MHz, AV, Hori	Complied	Radiated

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)

[Spurious Emission Tx] The data listed in this report meets the limits unless the uncertainty is taken into consideration.

[Spurious Emission Rx] The data listed in this test report has enough margin, more than the site margin.

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3.5 Test Location

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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)	36Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20)	MCS 1, PN9
*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: 10 Software: mfgtest version 5.90.153	
*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
6dB Bandwidth	11b Tx	2412MHz
Maximum Peak Output Power	11g Tx	2437MHz
Power Density	11n-20 Tx	2462MHz
99% Occupied Bandwidth		
Spurious Emission	11b Tx	2412MHz
	11g Tx	2437MHz
	11n-20 Tx	2462MHz
	11b/g/n-20 Rx	2437MHz
Conducted Emission	11g Tx*	2412MHz
* The mode was used for testing as a representative, because it had the highest peak output power.		

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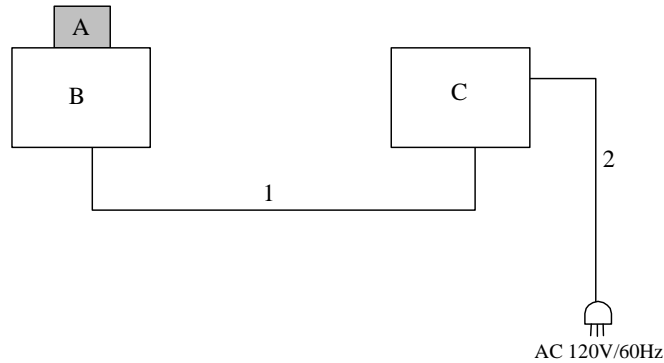
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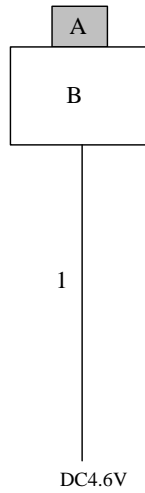
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4.2 Configuration and peripherals
[Conducted emission test]



[All tests except for Conducted emission test]



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Mobile Adapter	WU-1b	1 *1) 2 *2)	MURATA	EUT
B	Jig	-	-	-	-
C	DC Power Supply	PMC35-2A	13090501	Kikusui	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.4	Unshielded	Unshielded	-
2	AC Cable	2.0	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, 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	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 *1)	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m*2) (above 10GHz)		3m (below 10GHz), 1m*2) (above 10GHz)

*1) The test was performed with VBW 10Hz since the EUT had no intervals during which the transmitter was off (see Appendix).

*2) 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/ Average *4)	-	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)

*4) Testing using an average detector was performed in order to confirm that the output power of the EUT met the exclusion limits stated in FCC Part 2 Section 2.1093 and FCC radio frequency (RF) Exposure Guidelines in Supplement C to OET 65 and the EUT was exempt from RF exposure SAR evaluation.

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

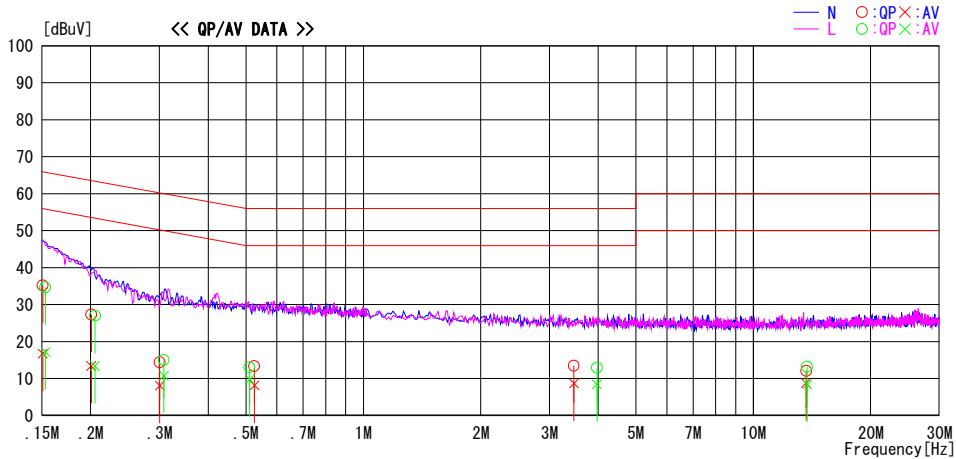
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.3 Semi Anechoic Chamber
 Date : 2012/02/08

Report No. : 32EE0065-HO-01
 Temp./Humi. : 25deg. C / 30% RH
 Engineer : Tomohisa Nakagawa

Mode / Remarks : 11g Tx 2412MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV

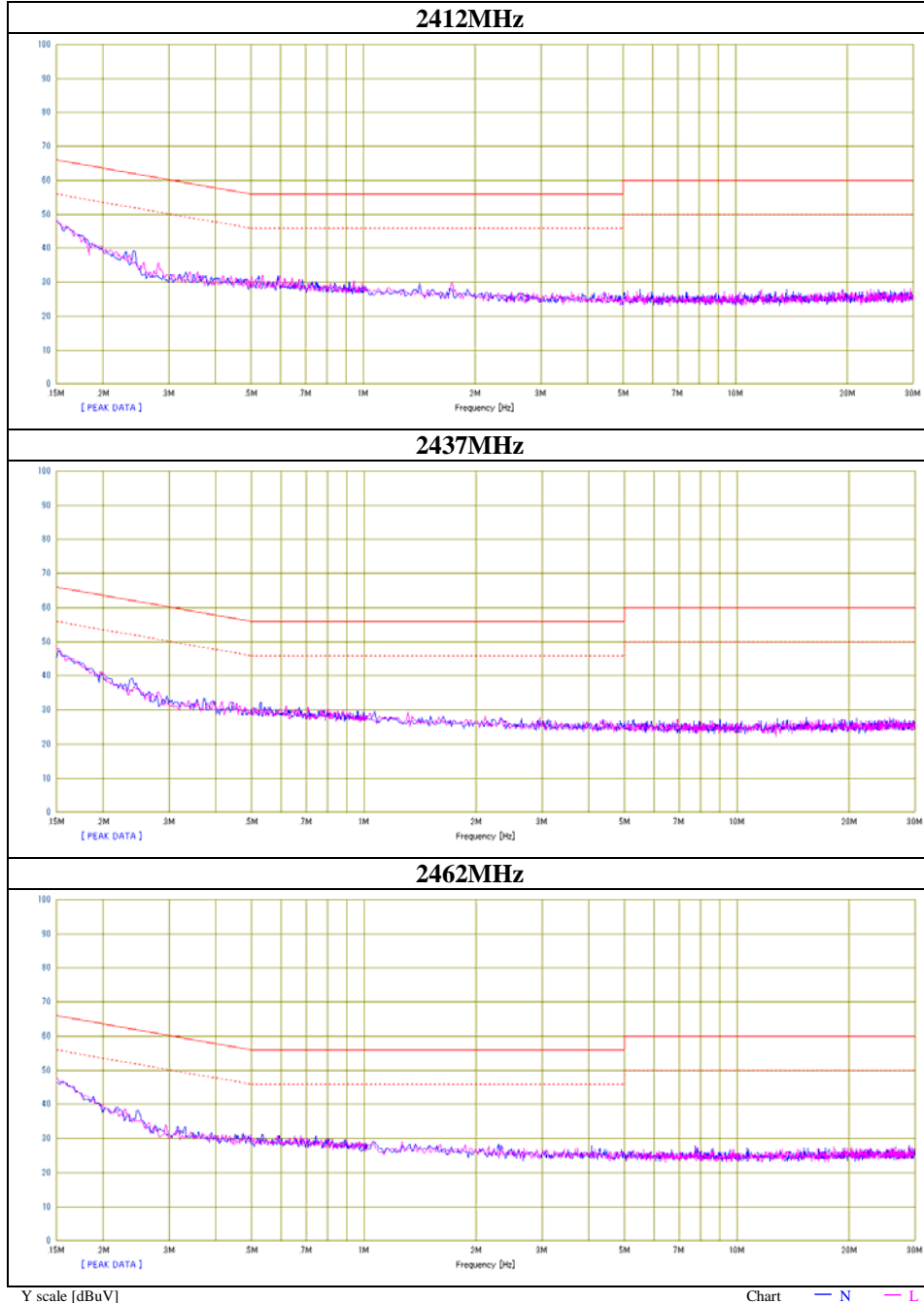


Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
0.15058	22.1	3.6	13.1	35.2	16.7	66.0	56.0	30.8	39.3	N
0.20058	14.1	0.2	13.2	27.3	13.4	63.6	53.6	36.3	40.2	N
0.30068	1.1	-5.3	13.3	14.4	8.0	60.2	50.2	45.8	42.2	N
0.52529	0.0	-5.2	13.3	13.3	8.1	56.0	46.0	42.7	37.9	N
3.46888	-0.2	-5.0	13.6	13.4	8.6	56.0	46.0	42.6	37.4	N
13.65926	-2.3	-5.6	14.3	12.0	8.7	60.0	50.0	48.0	41.3	N
0.15297	21.6	4.0	13.1	34.7	17.1	65.8	55.8	31.1	38.7	L
0.20510	13.8	0.2	13.2	27.0	13.4	63.4	53.4	36.4	40.0	L
0.30810	1.7	-2.5	13.3	15.0	10.8	60.0	50.0	45.0	39.2	L
0.51071	-0.3	-3.5	13.3	13.0	9.8	56.0	46.0	43.0	36.2	L
3.97311	-0.7	-5.2	13.6	12.9	8.4	56.0	46.0	43.1	37.6	L
13.74572	-1.2	-5.9	14.3	13.1	8.4	60.0	50.0	46.9	41.6	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.

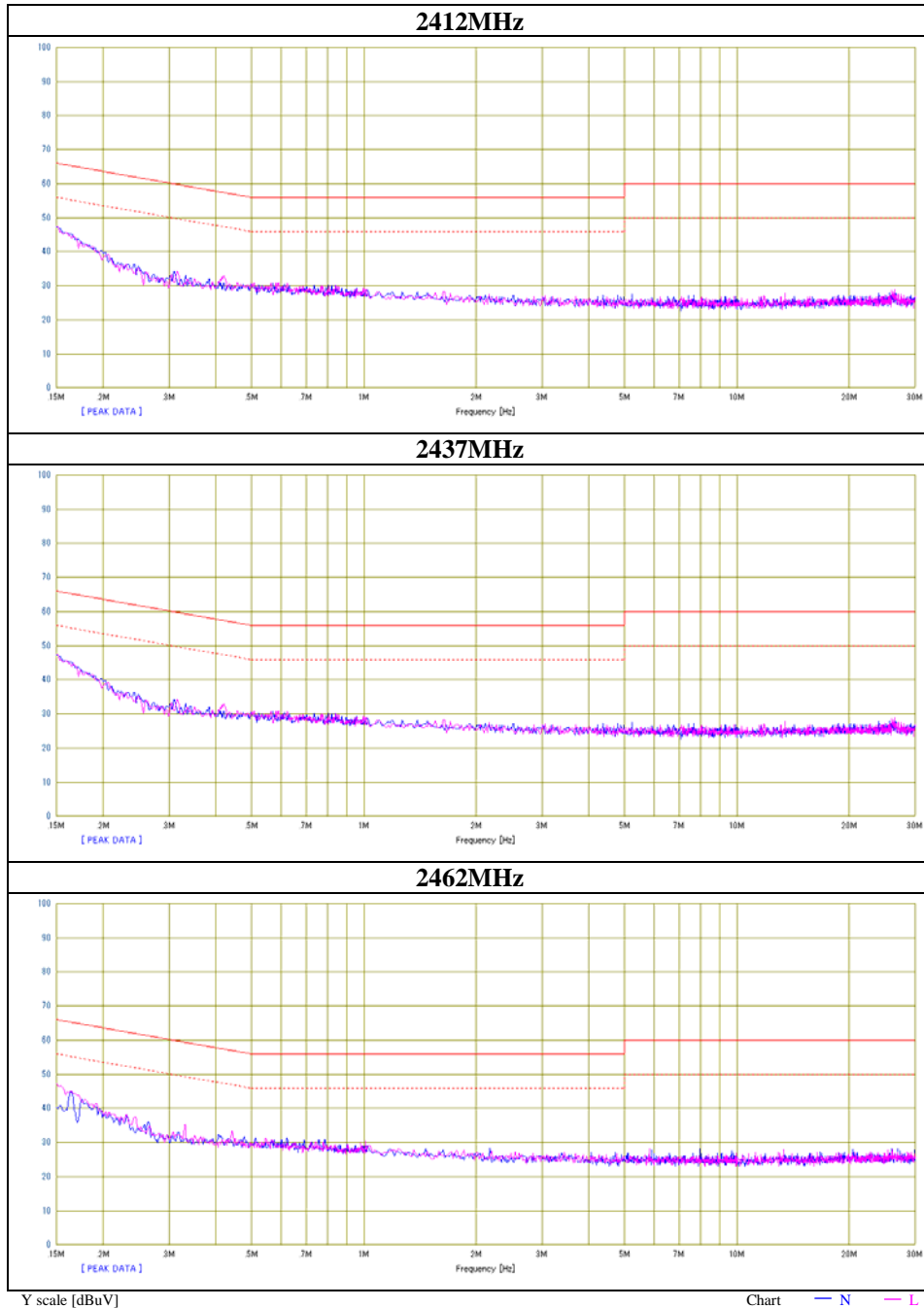
Conducted Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32EE0065-HO-01
Date : 02/08/2012
Temperature/ Humidity : 25 deg. C / 30% RH
Engineer : Tomohisa Nakagawa
Mode : 11b Tx



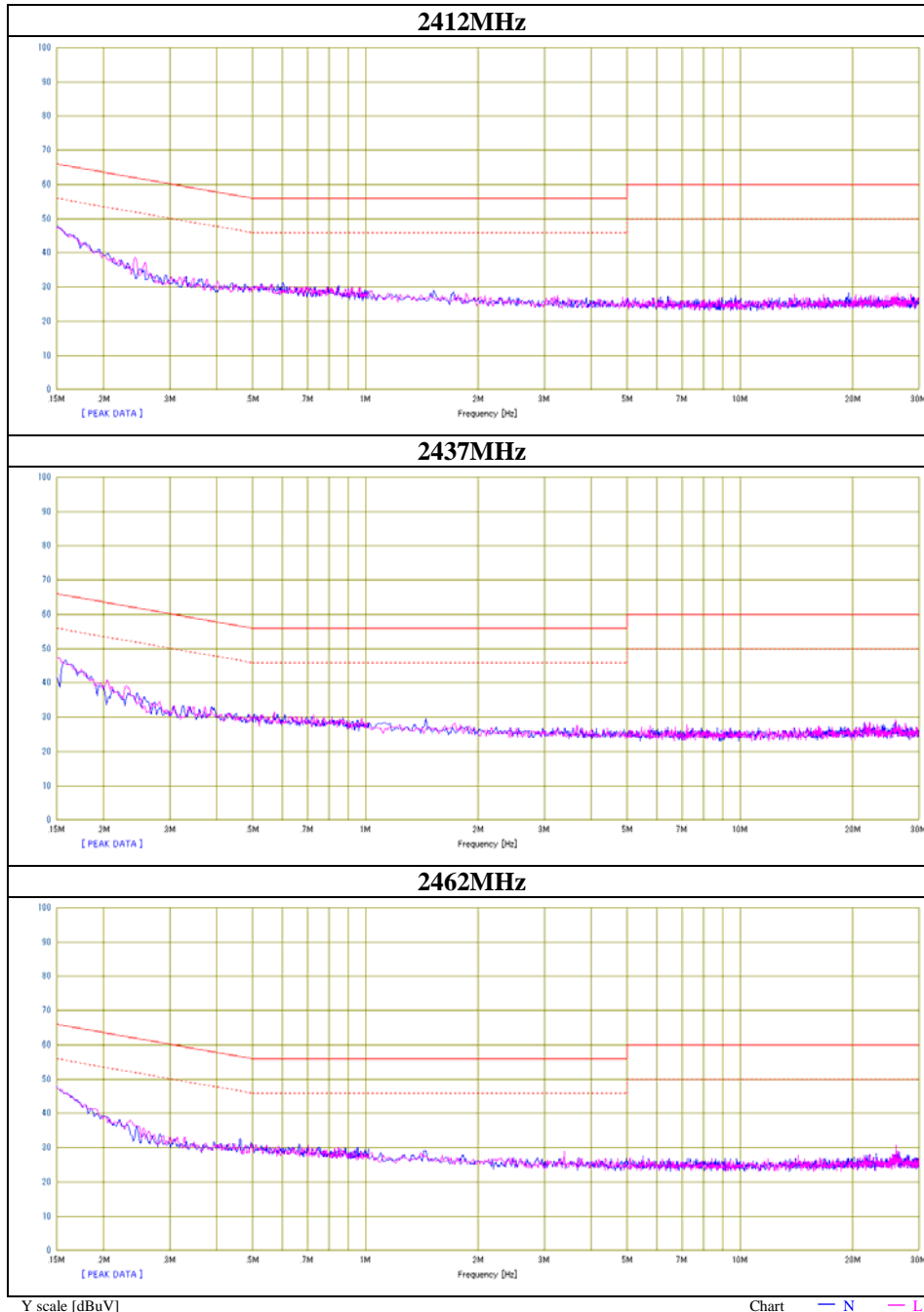
Conducted Emission

Test place : Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. : 32EE0065-HO-01
Date : 02/08/2012
Temperature/ Humidity : 25 deg. C / 30% RH
Engineer : Tomohisa Nakagawa
Mode : 11g Tx



Conducted Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32EE0065-HO-01
Date	02/08/2012
Temperature/ Humidity	25 deg. C / 30% RH
Engineer	Tomohisa Nakagawa
Mode	11n-20 Tx



6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32EE0065-HO-01
Date 01/23/2012
Temperature/ Humidity 22 deg. C / 46% RH
Engineer Takumi Shimada
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	7.134	>500
2437	7.366	>500
2462	7.737	>500

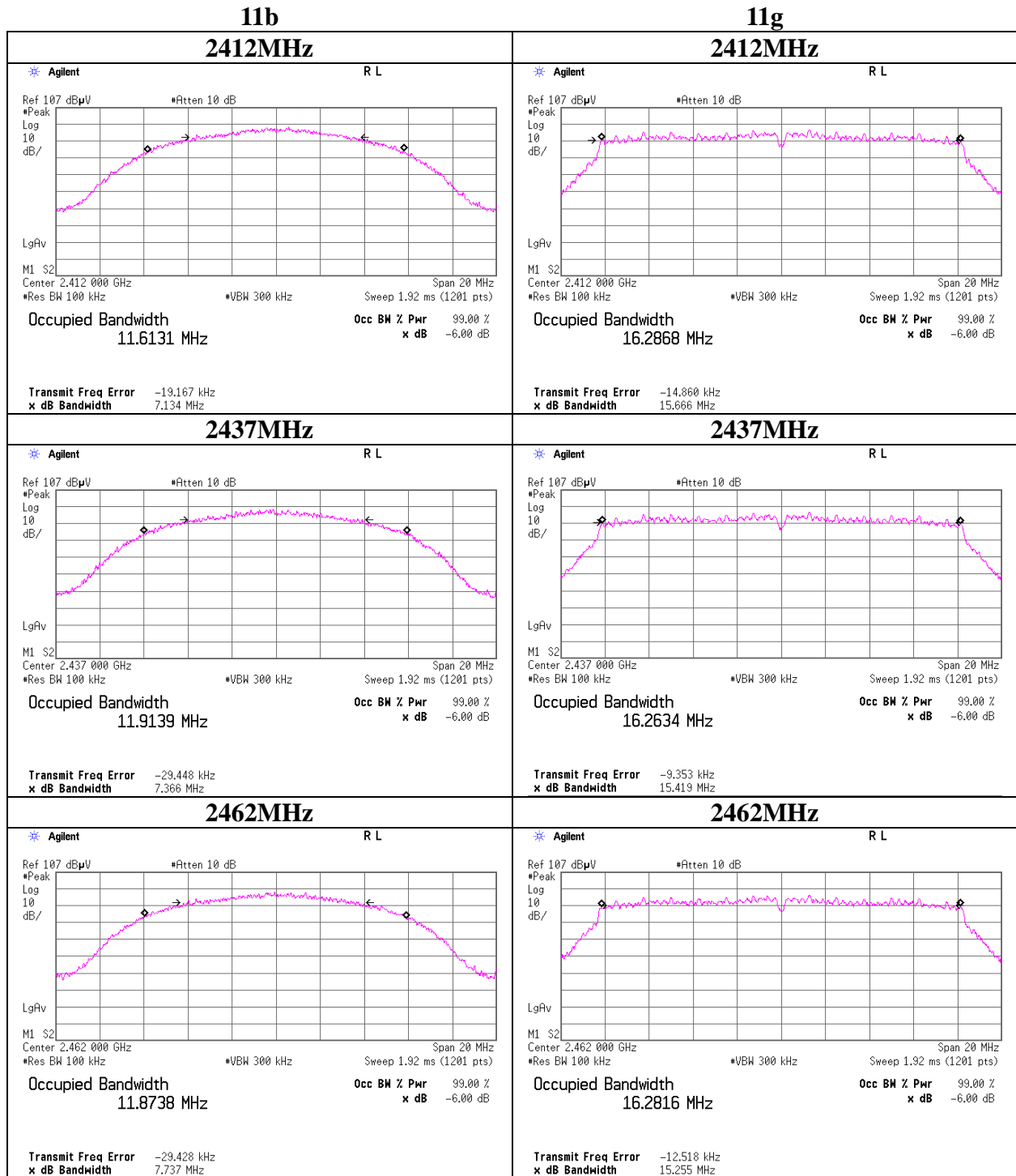
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.666	>500
2437	15.419	>500
2462	15.255	>500

11n-20

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.080	>500
2437	15.129	>500
2462	15.079	>500

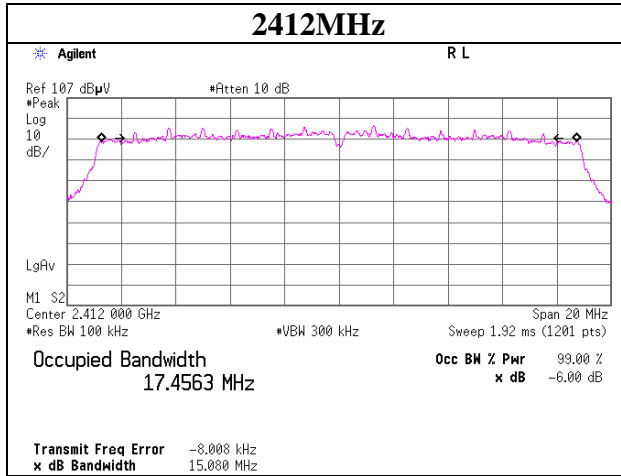
6dB Bandwidth



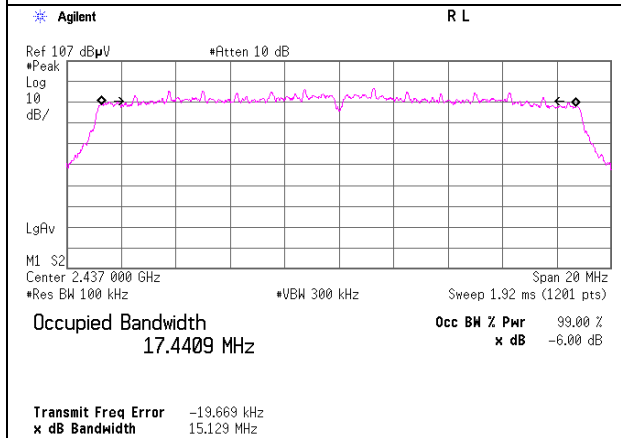
6dB Bandwidth

11n-20

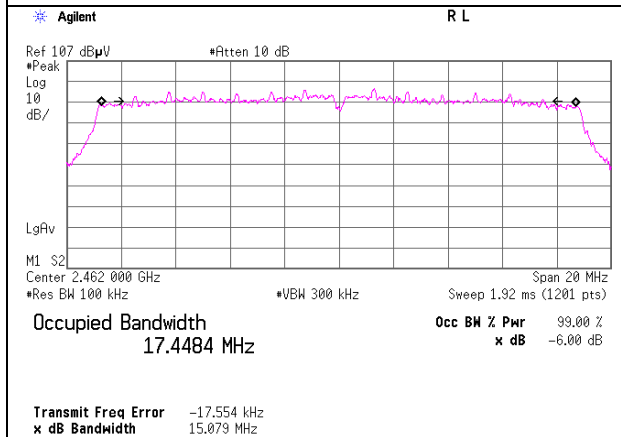
2412MHz



2437MHz



2462MHz



Maximum Peak Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32EE0065-HO-01
Date	01/23/2012
Temperature/ Humidity	22 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	11b/g/n-20 Tx

[PK]

11b **11Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-0.70	1.63	9.96	10.89	12.27	30.00	1000	19.11
2437	-0.76	1.63	9.96	10.83	12.11	30.00	1000	19.17
2462	-0.98	1.64	9.96	10.62	11.53	30.00	1000	19.38

11g **36Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.86	1.63	9.96	19.45	88.10	30.00	1000	10.55
2437	7.51	1.63	9.96	19.10	81.28	30.00	1000	10.90
2462	7.17	1.64	9.96	18.77	75.34	30.00	1000	11.23

11n-20 **MCS1**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	7.33	1.63	9.96	18.92	77.98	30.00	1000	11.08
2437	7.17	1.63	9.96	18.76	75.16	30.00	1000	11.24
2462	6.87	1.64	9.96	18.47	70.31	30.00	1000	11.53

Sample Calculation:

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

Average Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	32EE0065-HO-01
Date	01/23/2012
Temperature/ Humidity	22 deg. C / 46% RH
Engineer	Takumi Shimada
Mode	11b/g/n-20 Tx

[AV]

11b **11Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-4.11	1.63	9.96	7.48	5.60	30.00	1000	22.52
2437	-4.15	1.63	9.96	7.44	5.55	30.00	1000	22.56
2462	-4.51	1.64	9.96	7.09	5.12	30.00	1000	22.91

11g **36Mbps**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-3.52	1.63	9.96	8.07	6.41	30.00	1000	21.93
2437	-3.65	1.63	9.96	7.94	6.22	30.00	1000	22.06
2462	-3.91	1.64	9.96	7.69	5.87	30.00	1000	22.31

11n-20 **MCS1**

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	-3.40	1.63	9.96	8.19	6.59	30.00	1000	21.81
2437	-3.66	1.63	9.96	7.93	6.21	30.00	1000	22.07
2462	-3.81	1.64	9.96	7.79	6.01	30.00	1000	22.21

Sample Calculation:

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

Worst Rate Check

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32EE0065-HO-01
Date 01/23/2012
Temperature/ Humidity 22 deg. C / 46% RH
Engineer Takumi Shimada
Mode 11b/g/n-20 Tx

11b 2437MHz

Rate [Mbps]	Reading (PK) [dBm]	Remark
1	-1.16	
2	-0.93	
5.5	-1.14	
11	-0.76	*

11g 2437MHz

Rate [Mbps]	Reading (PK) [dBm]	Remark
6	7.46	
9	7.48	
12	6.88	
18	7.04	
24	6.90	
36	7.51	*
48	7.28	
54	7.11	

11n-20 2437MHz

MCS	Reading (PK) [dBm]	Remark
0	7.02	
1	7.17	*
2	6.82	
3	6.88	
4	6.91	
5	6.60	
6	6.96	
7	7.05	

*: Worst Rate

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

UL Japan, Inc.

Head Office EMC Lab.

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Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	32EE0065-HO-01		
Date	01/24/2012	01/25/2012	01/30/2012
Temperature/ Humidity	23 deg. C / 38% RH	23 deg. C / 30% RH	20 deg. C / 30% RH
Engineer	Katsunori Okai	Hiroshi Kukita	Tomohisa Nakagawa
	(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	49.350	QP	24.4	11.3	7.5	32.2	11.0	40.0	29.0	
Hori	399.558	QP	37.7	17.7	10.7	32.0	34.1	46.0	11.9	
Hori	2160.003	PK	44.2	26.1	2.1	32.8	39.6	73.9	34.3	
Hori	2252.271	PK	49.8	26.2	2.1	32.7	45.4	73.9	28.5	
Hori	2332.002	PK	54.0	26.3	2.2	32.7	49.8	73.9	24.1	
Hori	2390.000	PK	51.8	26.4	2.2	32.6	47.8	73.9	26.1	
Hori	2400.000	PK	58.4	26.4	2.2	32.6	54.4	73.9	19.5	
Hori	4824.000	PK	47.4	30.4	3.8	31.9	49.7	73.9	24.2	
Hori	7236.000	PK	41.6	35.2	4.6	32.4	49.0	73.9	24.9	
Hori	9648.000	PK	41.3	38.1	5.5	32.9	52.0	73.9	21.9	
Hori	24120.000	PK	49.1	38.6	-0.9	31.6	55.2	73.9	18.7	
Hori	2160.003	AV	36.1	26.1	2.1	32.8	31.5	53.9	22.4	
Hori	2252.271	AV	39.4	26.2	2.1	32.7	35.0	53.9	18.9	
Hori	2332.002	AV	43.0	26.3	2.2	32.7	38.8	53.9	15.1	
Hori	2390.000	AV	38.1	26.4	2.2	32.6	34.1	53.9	19.8	
Hori	2400.000	AV	45.6	26.4	2.2	32.6	41.6	53.9	12.3	
Hori	4824.000	AV	38.8	30.4	3.8	31.9	41.1	53.9	12.8	
Hori	7236.000	AV	29.9	35.2	4.6	32.4	37.3	53.9	16.6	
Hori	9648.000	AV	29.8	38.1	5.5	32.9	40.5	53.9	13.4	
Hori	24120.000	AV	36.6	38.6	-0.9	31.6	42.7	53.9	11.2	
Vert	49.350	QP	37.7	11.3	7.5	32.2	24.3	40.0	15.7	
Vert	399.558	QP	37.6	17.7	10.7	32.0	34.0	46.0	12.0	
Vert	2160.001	PK	52.1	26.1	2.1	32.8	47.5	73.9	26.4	
Vert	2252.017	PK	57.1	26.2	2.1	32.7	52.7	73.9	21.2	
Vert	2331.771	PK	57.5	26.3	2.2	32.7	53.3	73.9	20.6	
Vert	2390.000	PK	52.0	26.4	2.2	32.6	48.0	73.9	25.9	
Vert	2400.000	PK	56.8	26.4	2.2	32.6	52.8	73.9	21.1	
Vert	4824.000	PK	52.7	30.4	3.8	31.9	55.0	73.9	18.9	
Vert	7236.000	PK	41.3	35.2	4.6	32.4	48.7	73.9	25.2	
Vert	9648.000	PK	41.4	38.1	5.5	32.9	52.1	73.9	21.8	
Vert	24120.000	PK	49.3	38.6	-0.9	31.6	55.4	73.9	18.5	
Vert	2160.001	AV	46.0	26.1	2.1	32.8	41.4	53.9	12.5	
Vert	2252.017	AV	46.7	26.2	2.1	32.7	42.3	53.9	11.6	
Vert	2331.771	AV	47.3	26.3	2.2	32.7	43.1	53.9	10.8	
Vert	2390.000	AV	38.7	26.4	2.2	32.6	34.7	53.9	19.2	
Vert	2400.000	AV	44.4	26.4	2.2	32.6	40.4	53.9	13.5	
Vert	4824.000	AV	43.6	30.4	3.8	31.9	45.9	53.9	8.0	
Vert	7236.000	AV	29.8	35.2	4.6	32.4	37.2	53.9	16.7	
Vert	9648.000	AV	30.0	38.1	5.5	32.9	40.7	53.9	13.2	
Vert	24120.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/24/2012 01/25/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 38% RH 23 deg. C / 30% RH 20 deg. C / 30% RH
Engineer Katsunori Okai Hiroshi Kukita Tomohisa Nakagawa
(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	49.152	QP	24.2	11.3	7.5	32.2	10.8	40.0	29.2	
Hori	399.628	QP	36.5	17.7	10.7	32.0	32.9	46.0	13.1	
Hori	2160.000	PK	43.1	26.1	2.1	32.8	38.5	73.9	35.4	
Hori	2276.933	PK	48.9	26.2	2.1	32.7	44.5	73.9	29.4	
Hori	2357.201	PK	52.2	26.3	2.2	32.7	48.0	73.9	25.9	
Hori	4874.000	PK	49.7	30.5	3.8	31.9	52.1	73.9	21.8	
Hori	7311.000	PK	42.0	35.2	4.6	32.4	49.4	73.9	24.5	
Hori	9748.000	PK	42.1	38.3	5.5	32.9	53.0	73.9	20.9	
Hori	24370.000	PK	49.1	38.6	-0.9	31.6	55.2	73.9	18.7	
Hori	2160.000	AV	32.8	26.1	2.1	32.8	28.2	53.9	25.7	
Hori	2276.933	AV	38.3	26.2	2.1	32.7	33.9	53.9	20.0	
Hori	2357.201	AV	41.3	26.3	2.2	32.7	37.1	53.9	16.8	
Hori	4874.000	AV	37.0	30.5	3.8	31.9	39.4	53.9	14.5	
Hori	7311.000	AV	28.9	35.2	4.6	32.4	36.3	53.9	17.6	
Hori	9748.000	AV	28.4	38.3	5.5	32.9	39.3	53.9	14.6	
Hori	24370.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	
Vert	49.152	QP	36.7	11.3	7.5	32.2	23.3	40.0	16.7	
Vert	399.628	QP	34.0	17.7	10.7	32.0	30.4	46.0	15.6	
Vert	2160.000	PK	51.2	26.1	2.1	32.8	46.6	73.9	27.3	
Vert	2276.831	PK	54.0	26.2	2.1	32.7	49.6	73.9	24.3	
Vert	2357.003	PK	55.1	26.3	2.2	32.7	50.9	73.9	23.0	
Vert	4874.000	PK	51.4	30.5	3.8	31.9	53.8	73.9	20.1	
Vert	7311.000	PK	40.6	35.2	4.6	32.4	48.0	73.9	25.9	
Vert	9748.000	PK	41.7	38.3	5.5	32.9	52.6	73.9	21.3	
Vert	24370.000	PK	49.2	38.6	-0.9	31.6	55.3	73.9	18.6	
Vert	2160.000	AV	43.3	26.1	2.1	32.8	38.7	53.9	15.2	
Vert	2276.831	AV	43.9	26.2	2.1	32.7	39.5	53.9	14.4	
Vert	2357.003	AV	44.7	26.3	2.2	32.7	40.5	53.9	13.4	
Vert	4874.000	AV	41.5	30.5	3.8	31.9	43.9	53.9	10.0	
Vert	7311.000	AV	29.9	35.2	4.6	32.4	37.3	53.9	16.6	
Vert	9748.000	AV	29.7	38.3	5.5	32.9	40.6	53.9	13.3	
Vert	24370.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/24/2012 01/25/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 38% RH 23 deg. C / 30% RH 20 deg. C / 30% RH
Engineer Katsunori Okai Hiroshi Kukita Tomohisa Nakagawa
(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	49.152	QP	23.0	11.3	7.5	32.2	9.6	40.0	30.4	
Hori	399.613	QP	34.1	17.7	10.7	32.0	30.5	46.0	15.5	
Hori	2160.003	PK	46.3	26.1	2.1	32.8	41.7	73.9	32.2	
Hori	2302.679	PK	49.6	26.3	2.1	32.7	45.3	73.9	28.6	
Hori	2382.171	PK	53.6	26.4	2.2	32.6	49.6	73.9	24.3	
Hori	2483.500	PK	49.2	26.5	2.2	32.6	45.3	73.9	28.6	
Hori	2542.071	PK	49.2	26.6	2.3	32.5	45.6	73.9	28.3	
Hori	4924.000	PK	47.6	30.5	3.8	31.9	50.0	73.9	23.9	
Hori	7386.000	PK	41.1	35.2	4.6	32.4	48.5	73.9	25.4	
Hori	9848.000	PK	41.4	38.5	5.5	32.9	52.5	73.9	21.4	
Hori	24620.000	PK	49.3	38.6	-0.9	31.6	55.4	73.9	18.5	
Hori	2160.003	AV	37.0	26.1	2.1	32.8	32.4	53.9	21.5	
Hori	2302.679	AV	38.1	26.3	2.1	32.7	33.8	53.9	20.1	
Hori	2382.171	AV	42.7	26.4	2.2	32.6	38.7	53.9	15.2	
Hori	2483.500	AV	36.2	26.5	2.2	32.6	32.3	53.9	21.6	
Hori	2542.071	AV	38.9	26.6	2.3	32.5	35.3	53.9	18.6	
Hori	4924.000	AV	38.1	30.5	3.8	31.9	40.5	53.9	13.4	
Hori	7386.000	AV	30.5	35.2	4.6	32.4	37.9	53.9	16.0	
Hori	9848.000	AV	30.1	38.5	5.5	32.9	41.2	53.9	12.7	
Hori	24620.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	
Vert	49.152	QP	37.9	11.3	7.5	32.2	24.5	40.0	15.5	
Vert	399.628	QP	36.2	17.7	10.7	32.0	32.6	46.0	13.4	
Vert	2160.003	PK	46.0	26.1	2.1	32.8	41.4	73.9	32.5	
Vert	2302.679	PK	46.1	26.3	2.1	32.7	41.8	73.9	32.1	
Vert	2381.677	PK	51.8	26.4	2.2	32.6	47.8	73.9	26.1	
Vert	2483.500	PK	47.2	26.5	2.2	32.6	43.3	73.9	30.6	
Vert	2541.731	PK	46.6	26.6	2.3	32.5	43.0	73.9	30.9	
Vert	4924.000	PK	52.0	30.5	3.8	31.9	54.4	73.9	19.5	
Vert	7386.000	PK	41.2	35.2	4.6	32.4	48.6	73.9	25.3	
Vert	9848.000	PK	41.6	38.5	5.5	32.9	52.7	73.9	21.2	
Vert	24620.000	PK	49.2	38.6	-0.9	31.6	55.3	73.9	18.6	
Vert	2160.003	AV	37.9	26.1	2.1	32.8	33.3	53.9	20.6	
Vert	2302.679	AV	35.6	26.3	2.1	32.7	31.3	53.9	22.6	
Vert	2381.677	AV	40.3	26.4	2.2	32.6	36.3	53.9	17.6	
Vert	2483.500	AV	35.1	26.5	2.2	32.6	31.2	53.9	22.7	
Vert	2541.731	AV	35.3	26.6	2.3	32.5	31.7	53.9	22.2	
Vert	4924.000	AV	42.7	30.5	3.8	31.9	45.1	53.9	8.8	
Vert	7386.000	AV	30.1	35.2	4.6	32.4	37.5	53.9	16.4	
Vert	9848.000	AV	30.1	38.5	5.5	32.9	41.2	53.9	12.7	
Vert	24620.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/25/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 30% RH 20 deg. C / 30% RH
Engineer Hiroshi Kukita Tomohisa Nakagawa
Above 10GHz Below 10GHz
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	49.152	QP	22.5	11.3	7.5	32.2	9.1	40.0	30.9	
Hori	399.613	QP	32.0	17.7	10.7	32.0	28.4	46.0	17.6	
Hori	2160.027	PK	52.1	26.1	2.1	32.8	47.5	73.9	26.4	
Hori	2252.000	PK	55.8	26.2	2.1	32.7	51.4	73.9	22.5	
Hori	2328.000	PK	56.1	26.3	2.2	32.7	51.9	73.9	22.0	
Hori	2390.000	PK	67.5	26.4	2.2	32.6	63.5	73.9	10.4	
Hori	2399.830	PK	72.1	28.1	2.5	32.2	70.5	-	-	See 20dBc Data Sheet
Hori	2400.000	PK	75.8	26.4	2.2	32.6	71.8	-	-	See 20dBc Data Sheet
Hori	2492.830	PK	48.4	28.5	2.6	32.2	47.3	73.9	26.6	
Hori	4824.000	PK	49.7	30.4	3.8	31.9	52.0	73.9	21.9	
Hori	7236.000	PK	42.9	35.2	4.6	32.4	50.3	73.9	23.6	
Hori	9648.000	PK	42.0	38.1	5.5	32.9	52.7	73.9	21.2	
Hori	24120.000	PK	49.3	38.7	-0.9	31.6	55.5	73.9	18.4	
Hori	2160.027	AV	44.5	26.1	2.1	32.8	39.9	53.9	14.0	
Hori	2252.000	AV	43.1	26.2	2.1	32.7	38.7	53.9	15.2	
Hori	2328.000	AV	44.1	26.3	2.2	32.7	39.9	53.9	14.0	
Hori	2390.000	AV	50.8	26.4	2.2	32.6	46.8	53.9	7.1	
Hori	2399.830	AV	49.0	28.1	2.5	32.2	47.4	-	-	See 20dBc Data Sheet
Hori	2400.000	AV	52.7	26.4	2.2	32.6	48.7	-	-	See 20dBc Data Sheet
Hori	2492.830	AV	38.0	28.5	2.6	32.2	36.9	53.9	17.0	
Hori	4824.000	AV	36.4	30.4	3.8	31.9	38.7	53.9	15.2	
Hori	7236.000	AV	29.7	35.2	4.6	32.4	37.1	53.9	16.8	
Hori	9648.000	AV	29.8	38.1	5.5	32.9	40.5	53.9	13.4	
Hori	24120.000	AV	36.7	38.7	-0.9	31.6	42.9	53.9	11.0	
Vert	49.152	QP	28.4	11.3	7.5	32.2	15.0	40.0	25.0	
Vert	399.628	QP	36.5	17.7	10.7	32.0	32.9	46.0	13.1	
Vert	2160.027	PK	51.2	26.1	2.1	32.8	46.6	73.9	27.3	
Vert	2252.000	PK	54.8	26.2	2.1	32.7	50.4	73.9	23.5	
Vert	2330.550	PK	55.9	26.3	2.2	32.7	51.7	73.9	22.2	
Vert	2390.000	PK	66.1	26.4	2.2	32.6	62.1	73.9	11.8	
Vert	2399.830	PK	67.8	28.1	2.5	32.2	66.2	-	-	See 20dBc Data Sheet
Vert	2400.000	PK	71.5	26.4	2.2	32.6	67.5	-	-	See 20dBc Data Sheet
Vert	2492.830	PK	46.0	28.5	2.6	32.2	44.9	73.9	29.0	
Vert	4824.000	PK	43.9	30.4	3.8	31.9	46.2	73.9	27.7	
Vert	7236.000	PK	42.6	35.2	4.6	32.4	50.0	73.9	23.9	
Vert	9648.000	PK	42.3	38.1	5.5	32.9	53.0	73.9	20.9	
Vert	24120.000	PK	49.4	38.7	-0.9	31.6	55.6	73.9	18.3	
Vert	2160.027	AV	43.7	26.1	2.1	32.8	39.1	53.9	14.8	
Vert	2252.000	AV	42.5	26.2	2.1	32.7	38.1	53.9	15.8	
Vert	2330.550	AV	42.7	26.3	2.2	32.7	38.5	53.9	15.4	
Vert	2390.000	AV	47.5	26.4	2.2	32.6	43.5	53.9	10.4	
Vert	2399.830	AV	46.3	28.1	2.5	32.2	44.7	-	-	See 20dBc Data Sheet
Vert	2400.000	AV	50.0	26.4	2.2	32.6	46.0	-	-	See 20dBc Data Sheet
Vert	2492.830	AV	36.0	28.5	2.6	32.2	34.9	53.9	19.0	
Vert	4824.000	AV	41.5	30.4	3.8	31.9	43.8	53.9	10.1	
Vert	7236.000	AV	30.0	35.2	4.6	32.4	37.4	53.9	16.5	
Vert	9648.000	AV	29.8	38.1	5.5	32.9	40.5	53.9	13.4	
Vert	24120.000	AV	36.7	38.7	-0.9	31.6	42.9	53.9	11.0	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
 Report No. : 32EE0065-HO-01
 Date : 01/25/2012 01/30/2012
 Temperature/ Humidity : 23 deg. C / 30% RH 20 deg. C / 30% RH
 Engineer : Hiroshi Kukita Tomohisa Nakagawa
 Mode : 11g Tx 2412MHz

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	97.9	26.4	2.2	32.6	93.9	-	-	Carrier
Hori	2399.830	PK	57.4	28.1	2.5	32.2	55.8	73.9	18.1	
Hori	2400.000	PK	58.4	26.4	2.2	32.6	54.4	73.9	19.5	
Vert	2412.000	PK	95.2	26.4	2.2	32.6	91.2	-	-	Carrier
Vert	2399.830	PK	54.5	28.1	2.5	32.2	52.9	71.2	18.3	
Vert	2400.000	PK	55.8	26.4	2.2	32.6	51.8	71.2	19.4	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/25/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 30% RH 20 deg. C / 30% RH
Engineer Hiroshi Kukita Tomohisa Nakagawa
Above 10GHz Below 10GHz
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	53.287	QP	23.4	10.0	7.5	32.2	8.7	40.0	31.3	
Hori	399.613	QP	33.2	17.7	10.7	32.0	29.6	46.0	16.4	
Hori	2160.001	PK	53.1	26.1	2.1	32.8	48.5	73.9	25.4	
Hori	2276.333	PK	55.5	26.2	2.1	32.7	51.1	73.9	22.8	
Hori	2358.388	PK	56.1	26.3	2.2	32.6	52.0	73.9	21.9	
Hori	2517.617	PK	46.9	28.6	2.6	32.2	45.9	73.9	28.0	
Hori	4874.000	PK	48.8	30.5	3.8	31.9	51.2	73.9	22.7	
Hori	7311.000	PK	41.2	35.2	4.6	32.4	48.6	73.9	25.3	
Hori	9748.000	PK	40.6	38.3	5.5	32.9	51.5	73.9	22.4	
Hori	24370.000	PK	49.2	38.6	-0.9	31.6	55.3	73.9	18.6	
Hori	2160.001	AV	43.5	26.1	2.1	32.8	38.9	53.9	15.0	
Hori	2276.333	AV	44.0	26.2	2.1	32.7	39.6	53.9	14.3	
Hori	2358.388	AV	43.5	26.3	2.2	32.6	39.4	53.9	14.5	
Hori	2517.617	AV	35.3	28.6	2.6	32.2	34.3	53.9	19.6	
Hori	4874.000	AV	36.0	30.5	3.8	31.9	38.4	53.9	15.5	
Hori	7311.000	AV	30.0	35.2	4.6	32.4	37.4	53.9	16.5	
Hori	9748.000	AV	29.7	38.3	5.5	32.9	40.6	53.9	13.3	
Hori	24370.000	AV	36.6	38.6	-0.9	31.6	42.7	53.9	11.2	
Vert	53.287	QP	29.6	10.0	7.5	32.2	14.9	40.0	25.1	
Vert	399.628	QP	35.9	17.7	10.7	32.0	32.3	46.0	13.7	
Vert	2160.001	PK	51.8	26.1	2.1	32.8	47.2	73.9	26.7	
Vert	2276.333	PK	55.3	26.2	2.1	32.7	50.9	73.9	23.0	
Vert	2358.388	PK	55.1	26.3	2.2	32.6	51.0	73.9	22.9	
Vert	2517.211	PK	46.0	28.6	2.6	32.2	45.0	73.9	28.9	
Vert	4874.000	PK	52.9	30.5	3.8	31.9	55.3	73.9	18.6	
Vert	7311.000	PK	42.5	35.2	4.6	32.4	49.9	73.9	24.0	
Vert	9748.000	PK	41.9	38.3	5.5	32.9	52.8	73.9	21.1	
Vert	24370.000	PK	49.2	38.6	-0.9	31.6	55.3	73.9	18.6	
Vert	2160.001	AV	45.0	26.1	2.1	32.8	40.4	53.9	13.5	
Vert	2276.333	AV	43.6	26.2	2.1	32.7	39.2	53.9	14.7	
Vert	2358.388	AV	41.9	26.3	2.2	32.6	37.8	53.9	16.1	
Vert	2517.211	AV	34.5	28.6	2.6	32.2	33.5	53.9	20.4	
Vert	4874.000	AV	39.7	30.5	3.8	31.9	42.1	53.9	11.8	
Vert	7311.000	AV	29.8	35.2	4.6	32.4	37.2	53.9	16.7	
Vert	9748.000	AV	29.7	38.3	5.5	32.9	40.6	53.9	13.3	
Vert	24370.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/25/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 30% RH 20 deg. C / 30% RH
Engineer Hiroshi Kukita Tomohisa Nakagawa
Above 10GHz Below 10GHz
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	53.287	QP	24.0	10.0	7.5	32.2	9.3	40.0	30.7	
Hori	399.554	QP	36.0	17.7	10.7	32.0	32.4	46.0	13.6	
Hori	2160.112	PK	52.2	26.1	2.1	32.8	47.6	73.9	26.3	
Hori	2301.917	PK	54.4	26.3	2.1	32.7	50.1	73.9	23.8	
Hori	2375.313	PK	55.6	26.4	2.2	32.6	51.6	73.9	22.3	
Hori	2483.500	PK	66.3	26.5	2.2	32.6	62.4	73.9	11.5	
Hori	2553.500	PK	50.7	26.6	2.3	32.5	47.1	73.9	26.8	
Hori	4924.000	PK	46.7	30.5	3.8	31.9	49.1	73.9	24.8	
Hori	7386.000	PK	41.2	35.2	4.6	32.4	48.6	73.9	25.3	
Hori	9848.000	PK	41.9	38.5	5.5	32.9	53.0	73.9	20.9	
Hori	24620.000	PK	49.3	38.6	-0.9	31.6	55.4	73.9	18.5	
Hori	2160.112	AV	44.4	26.1	2.1	32.8	39.8	53.9	14.1	
Hori	2301.917	AV	40.9	26.3	2.1	32.7	36.6	53.9	17.3	
Hori	2375.313	AV	42.8	26.4	2.2	32.6	38.8	53.9	15.1	
Hori	2483.500	AV	46.1	26.5	2.2	32.6	42.2	53.9	11.7	
Hori	2553.500	AV	38.2	26.6	2.3	32.5	34.6	53.9	19.3	
Hori	4924.000	AV	34.3	30.5	3.8	31.9	36.7	53.9	17.2	
Hori	7386.000	AV	30.3	35.2	4.6	32.4	37.7	53.9	16.2	
Hori	9848.000	AV	30.0	38.5	5.5	32.9	41.1	53.9	12.8	
Hori	24620.000	AV	36.6	38.6	-0.9	31.6	42.7	53.9	11.2	
Vert	53.287	QP	30.0	10.0	7.5	32.2	15.3	40.0	24.7	
Vert	399.554	QP	35.6	17.7	10.7	32.0	32.0	46.0	14.0	
Vert	2160.112	PK	51.2	26.1	2.1	32.8	46.6	73.9	27.4	
Vert	2301.917	PK	55.2	26.3	2.1	32.7	50.9	73.9	23.0	
Vert	2375.313	PK	52.4	26.4	2.2	32.6	48.4	73.9	25.5	
Vert	2483.500	PK	61.8	26.5	2.2	32.6	57.9	73.9	16.0	
Vert	2541.042	PK	51.3	26.6	2.3	32.5	47.7	73.9	26.2	
Vert	4924.000	PK	54.7	30.5	3.2	31.9	56.5	73.9	17.4	
Vert	7386.000	PK	43.3	35.2	4.6	32.4	50.7	73.9	23.2	
Vert	9848.000	PK	42.0	38.5	5.5	32.9	53.1	73.9	20.8	
Vert	24620.000	PK	49.1	38.6	-0.9	31.6	55.2	73.9	18.7	
Vert	2160.112	AV	44.5	26.1	2.1	32.8	39.9	53.9	14.0	
Vert	2301.917	AV	43.3	26.3	2.1	32.7	39.0	53.9	14.9	
Vert	2375.313	AV	40.6	26.4	2.2	32.6	36.6	53.9	17.3	
Vert	2483.500	AV	43.6	26.5	2.2	32.6	39.7	53.9	14.2	
Vert	2541.042	AV	38.4	26.6	2.3	32.5	34.8	53.9	19.1	
Vert	4924.000	AV	41.4	30.5	3.8	31.9	43.8	53.9	10.1	
Vert	7386.000	AV	30.3	35.2	4.6	32.4	37.7	53.9	16.2	
Vert	9848.000	AV	30.2	38.5	5.5	32.9	41.3	53.9	12.6	
Vert	24620.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber		
Report No.	32EE0065-HO-01		
Date	01/25/2012	01/30/2012	01/30/2012
Temperature/ Humidity	23 deg. C / 30% RH	20 deg. C / 30% RH	23 deg. C / 31% RH
Engineer	Hiroshi Kukita	Tomohisa Nakagawa	Hironobu Ohnishi
	Above 10GHz	1-10GHz	Below 1GHz
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	54.720	QP	24.8	9.5	7.5	32.2	9.6	40.0	30.4	
Hori	399.660	QP	33.3	17.7	10.7	32.0	29.7	46.0	16.3	
Hori	2159.885	PK	51.4	26.1	2.1	32.8	46.8	73.9	27.1	
Hori	2252.230	PK	55.4	26.2	2.1	32.7	51.0	73.9	22.9	
Hori	2332.083	PK	55.7	26.3	2.2	32.7	51.5	73.9	22.4	
Hori	2390.000	PK	67.7	26.4	2.2	32.6	63.7	73.9	10.2	
Hori	2399.830	PK	72.2	28.1	2.5	32.2	70.6	-	-	- See 20dBc Data Sheet
Hori	2400.000	PK	75.9	26.4	2.2	32.6	71.9	-	-	- See 20dBc Data Sheet
Hori	2490.917	PK	46.3	28.5	2.6	32.2	45.2	73.9	28.7	
Hori	4824.000	PK	47.6	30.4	3.8	31.9	49.9	73.9	24.0	
Hori	7236.000	PK	40.3	35.2	4.6	32.4	47.7	73.9	26.2	
Hori	9648.000	PK	40.6	38.1	5.5	32.9	51.3	73.9	22.6	
Hori	24120.000	PK	49.2	38.7	-0.9	31.6	55.4	73.9	18.5	
Hori	2159.885	AV	45.0	26.1	2.1	32.8	40.4	53.9	13.5	
Hori	2252.230	AV	43.9	26.2	2.1	32.7	39.5	53.9	14.4	
Hori	2332.083	AV	45.1	26.3	2.2	32.7	40.9	53.9	13.0	
Hori	2390.000	AV	53.3	26.4	2.2	32.6	49.3	53.9	4.6	
Hori	2399.830	AV	49.7	28.1	2.5	32.2	48.1	-	-	- See 20dBc Data Sheet
Hori	2400.000	AV	53.4	26.4	2.2	32.6	49.4	-	-	- See 20dBc Data Sheet
Hori	2490.917	AV	35.3	28.5	2.6	32.2	34.2	53.9	19.7	
Hori	4824.000	AV	35.6	30.4	3.8	31.9	37.9	53.9	16.0	
Hori	7236.000	AV	29.7	35.2	4.6	32.4	37.1	53.9	16.8	
Hori	9648.000	AV	29.8	38.1	5.5	32.9	40.5	53.9	13.4	
Hori	24120.000	AV	36.7	38.7	-0.9	31.6	42.9	53.9	11.0	
Vert	54.720	QP	36.0	9.5	7.5	32.2	20.8	40.0	19.2	
Vert	399.660	QP	31.4	17.7	10.7	32.0	27.8	46.0	18.2	
Vert	2159.885	PK	51.6	26.1	2.1	32.8	47.0	73.9	26.9	
Vert	2252.230	PK	55.1	26.2	2.1	32.7	50.7	73.9	23.2	
Vert	2332.083	PK	57.8	26.3	2.2	32.7	53.6	73.9	20.3	
Vert	2390.000	PK	63.6	26.4	2.2	32.6	59.6	73.9	14.3	
Vert	2399.830	PK	67.5	28.1	2.5	32.2	65.9	-	-	- See 20dBc Data Sheet
Vert	2400.000	PK	71.2	26.4	2.2	32.6	67.2	-	-	- See 20dBc Data Sheet
Vert	4824.000	PK	54.7	30.4	3.8	31.9	57.0	73.9	16.9	
Vert	7236.000	PK	41.8	35.2	4.6	32.4	49.2	73.9	24.7	
Vert	9648.000	PK	42.6	38.1	5.5	32.9	53.3	73.9	20.6	
Vert	24120.000	PK	49.3	38.7	-0.9	31.6	55.5	73.9	18.4	
Vert	2159.885	AV	44.5	26.1	2.1	32.8	39.9	53.9	14.0	
Vert	2252.230	AV	43.8	26.2	2.1	32.7	39.4	53.9	14.5	
Vert	2332.083	AV	45.5	26.3	2.2	32.7	41.3	53.9	12.6	
Vert	2390.000	AV	48.1	26.4	2.2	32.6	44.1	53.9	9.8	
Vert	2399.830	AV	45.5	28.1	2.5	32.2	43.9	-	-	- See 20dBc Data Sheet
Vert	2400.000	AV	49.2	26.4	2.2	32.6	45.2	-	-	- See 20dBc Data Sheet
Vert	2491.225	AV	34.7	28.5	2.6	32.2	33.6	53.9	20.3	
Vert	2491.225	AV	45.7	28.5	2.6	32.2	44.6	53.9	9.3	
Vert	4824.000	AV	40.7	30.4	3.8	31.9	43.0	53.9	10.9	
Vert	7236.000	AV	29.7	35.2	4.6	32.4	37.1	53.9	16.8	
Vert	9648.000	AV	29.9	38.1	5.5	32.9	40.6	53.9	13.4	
Vert	24120.000	AV	36.6	38.7	-0.9	31.6	42.8	53.9	11.1	

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber	
Report No.	32EE0065-HO-01	
Date	01/25/2012	01/30/2012
Temperature/ Humidity	23 deg. C / 30% RH	20 deg. C / 30% RH
Engineer	Hiroshi Kukita	Tomohisa Nakagawa
Mode	11n-20 Tx 2412MHz	

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	98.8	26.4	2.2	32.6	94.8	-	-	Carrier
Hori	2399.830	PK	59.2	28.1	2.5	32.2	57.6	74.8	17.2	
Hori	2400.000	PK	60.5	26.4	2.2	32.6	56.5	74.8	18.3	
Vert	2412.000	PK	94.6	26.4	2.2	32.6	90.6	-	-	Carrier
Vert	2399.830	PK	54.1	28.1	2.5	32.2	52.5	70.6	18.1	
Vert	2400.000	PK	55.4	26.4	2.2	32.6	51.4	70.6	19.2	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/25/2012 01/30/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 30% RH 20 deg. C / 30% RH 23 deg. C / 31% RH
Engineer Hiroshi Kukita Tomohisa Nakagawa Hironobu Ohnishi
Above 10GHz 1-10GHz Below 1GHz
Mode 11n-20 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	49.152	QP	24.8	11.3	7.5	32.2	11.4	40.0	28.6	
Hori	399.630	QP	29.3	17.7	10.7	32.0	25.7	46.0	20.3	
Hori	2160.118	PK	52.4	26.1	2.1	32.8	47.8	73.9	26.1	
Hori	2278.342	PK	53.6	26.2	2.1	32.7	49.2	73.9	24.7	
Hori	2358.388	PK	56.4	26.3	2.2	32.6	52.3	73.9	21.6	
Hori	4874.000	PK	48.2	30.5	3.8	31.9	50.6	73.9	23.3	
Hori	7311.000	PK	41.0	35.2	4.6	32.4	48.4	73.9	25.5	
Hori	9748.000	PK	40.6	38.3	5.5	32.9	51.5	73.9	22.4	
Hori	24370.000	PK	49.1	38.6	-0.9	31.6	55.2	73.9	18.7	
Hori	2160.118	AV	46.4	26.1	2.1	32.8	41.8	53.9	12.1	
Hori	2278.342	AV	43.0	26.2	2.1	32.7	38.6	53.9	15.3	
Hori	2358.388	AV	44.7	26.3	2.2	32.6	40.6	53.9	13.3	
Hori	4874.000	AV	36.9	30.5	3.8	31.9	39.3	53.9	14.6	
Hori	7311.000	AV	29.9	35.2	4.6	32.4	37.3	53.9	16.6	
Hori	9748.000	AV	29.5	38.3	5.5	32.9	40.4	53.9	13.5	
Hori	24370.000	AV	36.6	38.6	-0.9	31.6	42.7	53.9	11.2	
Vert	49.152	QP	36.1	11.3	7.5	32.2	22.7	40.0	17.3	
Vert	399.630	QP	28.3	17.7	10.7	32.0	24.7	46.0	21.3	
Vert	2160.118	PK	51.4	26.1	2.1	32.8	46.8	73.9	27.1	
Vert	2278.342	PK	54.9	26.2	2.1	32.7	50.5	73.9	23.4	
Vert	2358.388	PK	54.6	26.3	2.2	32.6	50.5	73.9	23.4	
Vert	4874.000	PK	51.5	30.5	3.8	31.9	53.9	73.9	20.0	
Vert	7311.000	PK	41.7	35.2	4.6	32.4	49.1	73.9	24.8	
Vert	9748.000	PK	42.3	38.3	5.5	32.9	53.2	73.9	20.7	
Vert	24370.000	PK	49.1	38.6	-0.9	31.6	55.2	73.9	18.7	
Vert	2160.118	AV	45.2	26.1	2.1	32.8	40.6	53.9	13.3	
Vert	2278.342	AV	44.0	26.2	2.1	32.7	39.6	53.9	14.3	
Vert	2358.388	AV	43.2	26.3	2.2	32.6	39.1	53.9	14.8	
Vert	4874.000	AV	40.2	30.5	3.8	31.9	42.6	53.9	11.3	
Vert	7311.000	AV	29.9	35.2	4.6	32.4	37.3	53.9	16.6	
Vert	9748.000	AV	29.5	38.3	5.5	32.9	40.4	53.9	13.5	
Vert	24370.000	AV	36.6	38.6	-0.9	31.6	42.7	53.9	11.2	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and 4 Semi Anechoic Chamber
Report No. 32EE0065-HO-01
Date 01/25/2012 01/30/2012 01/30/2012
Temperature/ Humidity 23 deg. C / 30% RH 20 deg. C / 30% RH 23 deg. C / 31% RH
Engineer Hiroshi Kukita Tomohisa Nakagawa Hironobu Ohnishi
Above 10GHz 1- 10GHz Below 1GHz
Mode 11n-20 Tx 2462MHz

Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
49.153	QP	25.1	11.3	7.5	32.2	11.7	40.0	28.3	
399.554	QP	29.7	17.7	10.7	32.0	26.1	46.0	19.9	
2160.195	PK	52.2	26.1	2.1	32.8	47.6	73.9	26.3	
2302.714	PK	53.8	26.3	2.1	32.7	49.5	73.9	24.4	
2381.296	PK	54.7	26.4	2.2	32.6	50.7	73.9	23.2	
2483.500	PK	67.6	26.5	2.2	32.6	63.7	73.9	10.2	
2553.500	PK	50.8	26.6	2.3	32.5	47.2	73.9	26.7	
4924.000	PK	47.3	30.5	3.8	31.9	49.7	73.9	24.2	
7386.000	PK	41.2	35.2	4.6	32.4	48.6	73.9	25.3	
9848.000	PK	41.2	38.5	5.5	32.9	52.3	73.9	21.6	
24620.000	PK	48.9	38.6	-0.9	31.6	55.0	73.9	18.9	
2160.195	AV	45.7	26.1	2.1	32.8	41.1	53.9	12.8	
2302.714	AV	42.4	26.3	2.1	32.7	38.1	53.9	15.8	
2381.296	AV	44.0	26.4	2.2	32.6	40.0	53.9	13.9	
2483.500	AV	51.0	26.5	2.2	32.6	47.1	53.9	6.8	
2553.500	AV	39.8	26.6	2.3	32.5	36.2	53.9	17.7	
4924.000	AV	35.8	30.5	3.8	31.9	38.2	53.9	15.7	
7386.000	AV	30.0	35.2	4.6	32.4	37.4	53.9	16.5	
9848.000	AV	29.9	38.5	5.5	32.9	41.0	53.9	12.9	
24620.000	AV	36.7	38.6	-0.9	31.6	42.8	53.9	11.1	
49.153	QP	38.2	11.3	7.5	32.2	24.8	40.0	15.2	
399.554	QP	29.0	17.7	10.7	32.0	25.4	46.0	20.6	
2160.195	PK	52.3	26.1	2.1	32.8	47.7	73.9	26.2	
2302.714	PK	53.6	26.3	2.1	32.7	49.3	73.9	24.6	
2381.296	PK	54.2	26.4	2.2	32.6	50.2	73.9	23.7	
2483.500	PK	61.0	26.5	2.2	32.6	57.1	73.9	16.8	
2541.042	PK	49.2	26.6	2.3	32.5	45.6	73.9	28.3	
4924.000	PK	51.7	30.5	3.8	31.9	54.1	73.9	19.8	
7386.000	PK	41.4	35.2	4.6	32.4	48.8	73.9	25.1	
9848.000	PK	42.1	38.5	5.5	32.9	53.2	73.9	20.7	
24620.000	PK	48.9	38.6	-0.9	31.6	55.0	73.9	18.9	
2160.195	AV	45.9	26.1	2.1	32.8	41.3	53.9	12.6	
2302.714	AV	43.9	26.3	2.1	32.7	39.6	53.9	14.3	
2381.296	AV	43.6	26.4	2.2	32.6	39.6	53.9	14.3	
2483.500	AV	43.2	26.5	2.2	32.6	39.3	53.9	14.6	
2541.042	AV	37.7	26.6	2.3	32.5	34.1	53.9	19.8	
4924.000	AV	40.3	30.5	3.8	31.9	42.7	53.9	11.2	
7386.000	AV	30.0	35.2	4.6	32.4	37.4	53.9	16.5	
9848.000	AV	30.0	38.5	5.5	32.9	41.1	53.9	12.8	
24620.000	AV	36.6	38.6	-0.9	31.6	42.7	73.9	31.2	

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

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

1st harmonic was not seen so the result was its base noise level.

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.4 and 3 Semi Anechoic Chamber	
Report No.	32EE0065-HO-01	
Date	01/25/2012	01/30/2012
Temperature/ Humidity	23 deg. C / 30% RH	23 deg. C / 31% RH
Engineer	Hiroshi Kukita	Hironobu Ohnishi
	Above 1GHz	Below 1GHz
Mode	11b/g/n-20 Rx 2437MHz	

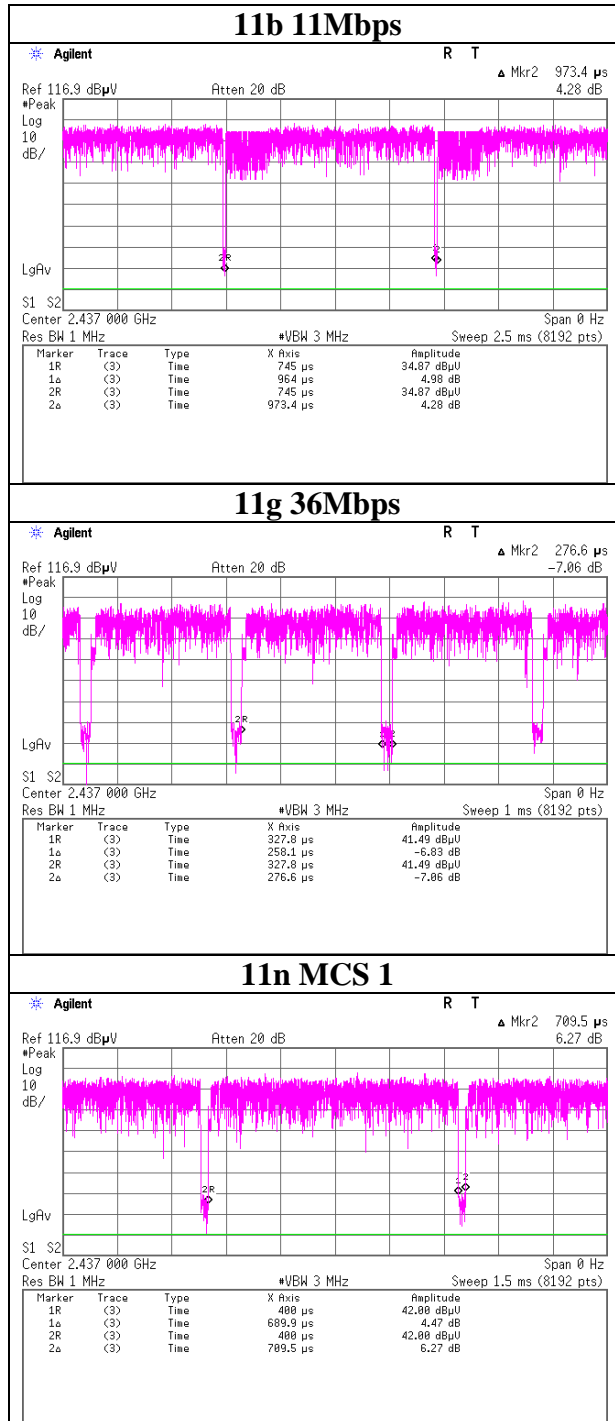
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	54.540	QP	24.3	9.6	7.5	32.2	9.2	40.0	30.8	
Hori	399.554	QP	32.7	17.7	10.7	32.0	29.1	46.0	16.9	
Hori	2437.000	PK	46.2	28.3	2.5	32.2	44.8	73.9	29.1	
Hori	2437.000	AV	41.0	28.3	2.5	32.2	39.6	53.9	14.3	
Vert	54.540	QP	35.4	9.6	7.5	32.2	20.3	40.0	19.7	
Vert	399.554	QP	33.0	17.7	10.7	32.0	29.4	46.0	16.6	
Vert	2437.000	PK	46.0	28.3	2.5	32.2	44.6	73.9	29.3	
Vert	2437.000	AV	38.2	28.3	2.5	32.2	36.8	53.9	17.1	

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).

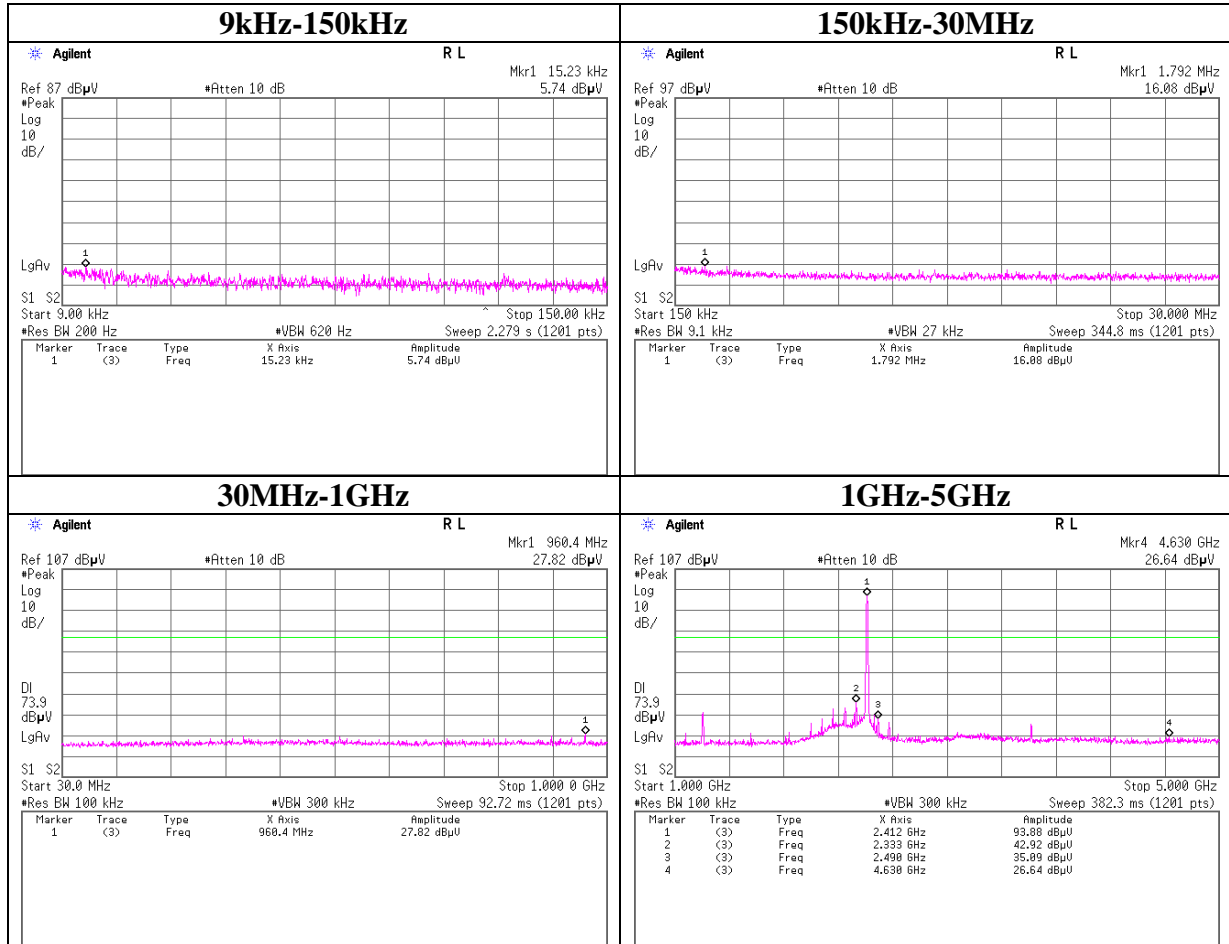
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

Burst rate confirmation



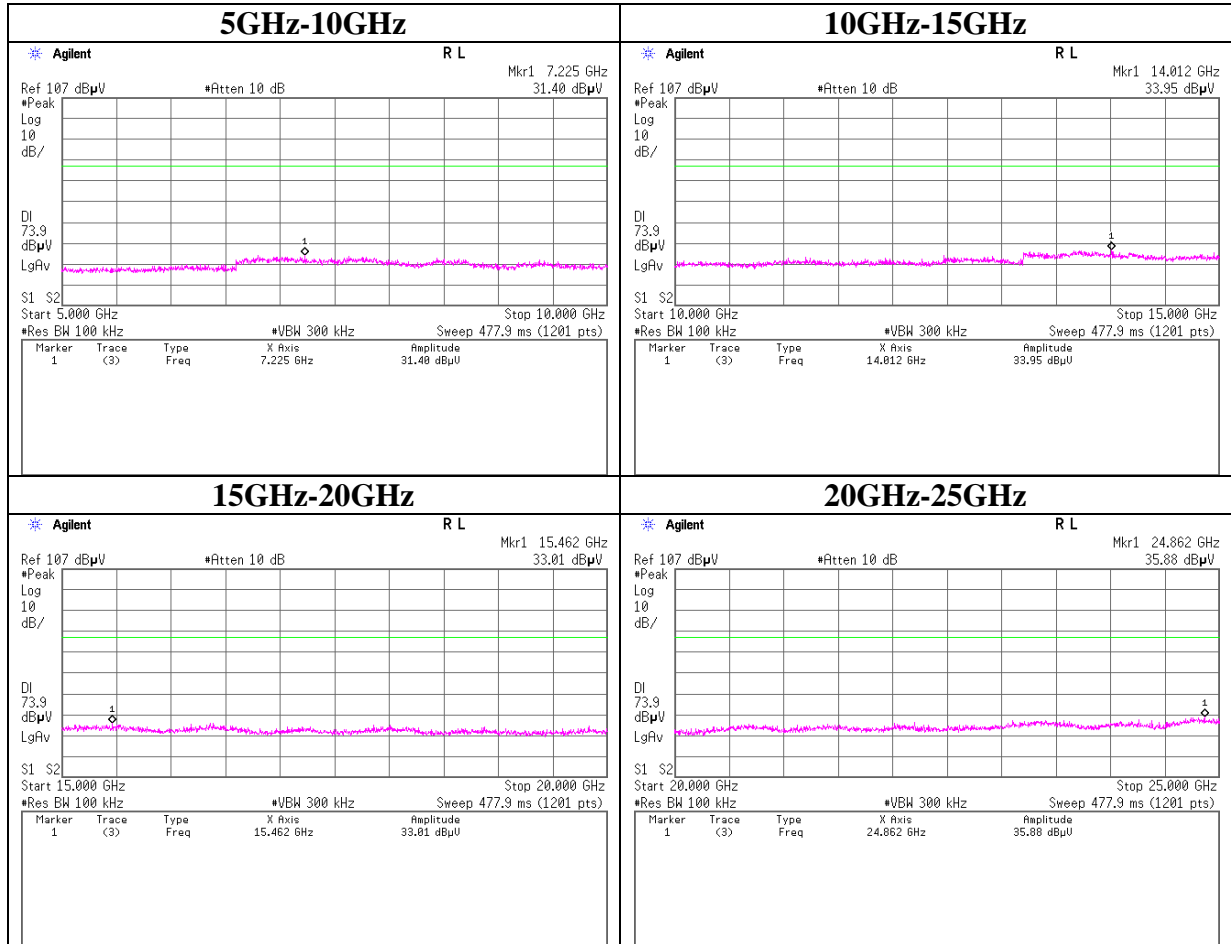
Conducted Spurious Emission

11b Tx 2412MHz



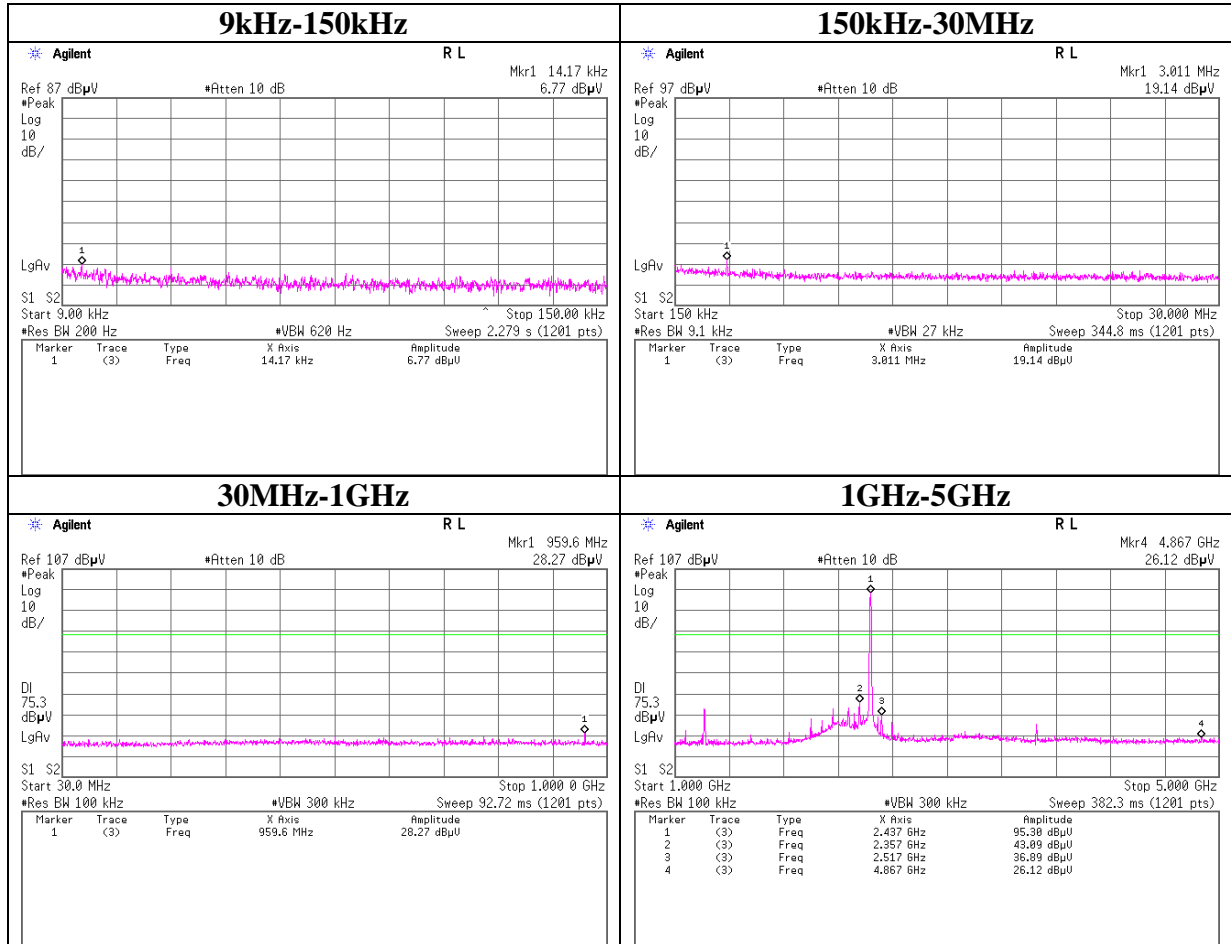
Conducted Spurious Emission

11b Tx 2412MHz



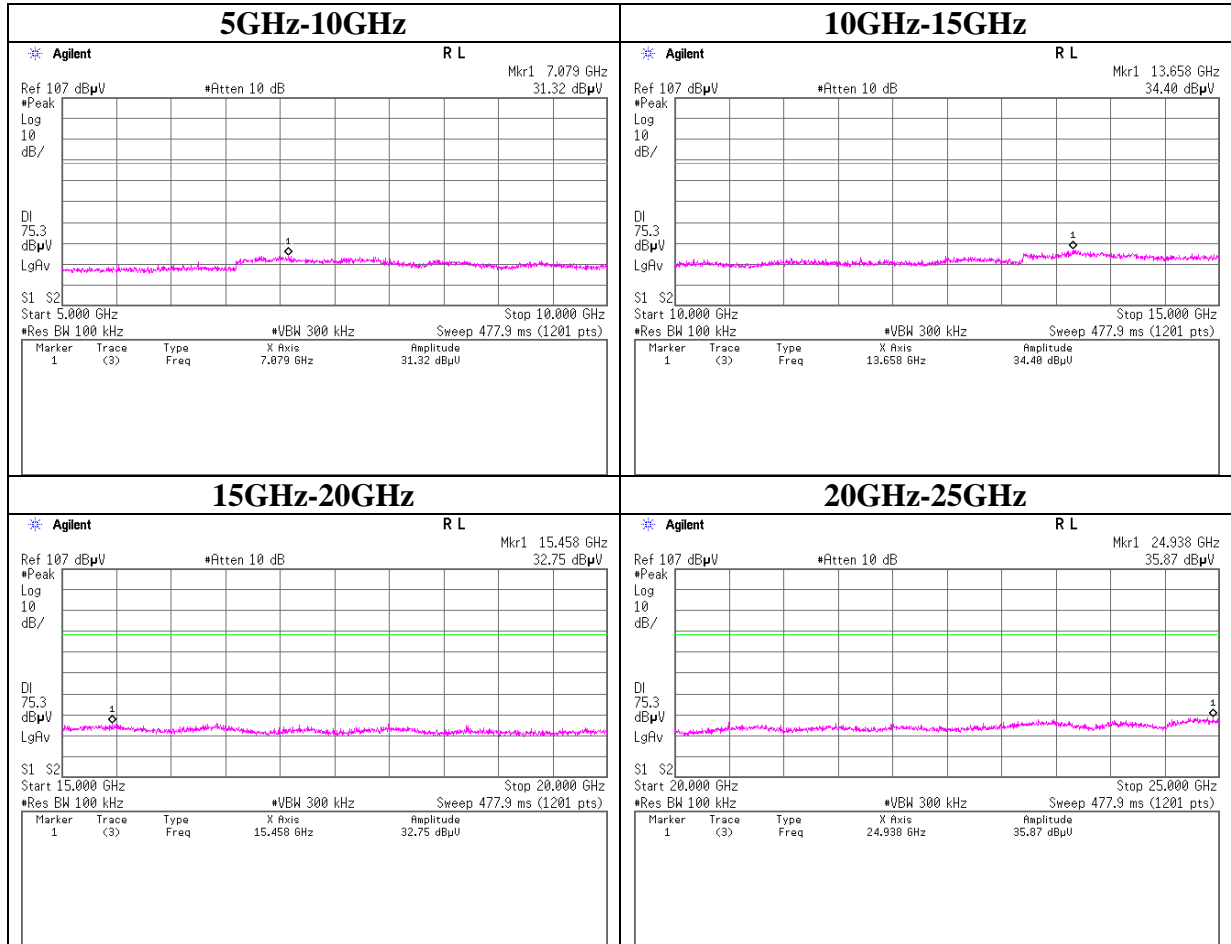
Conducted Spurious Emission

11b Tx 2437MHz



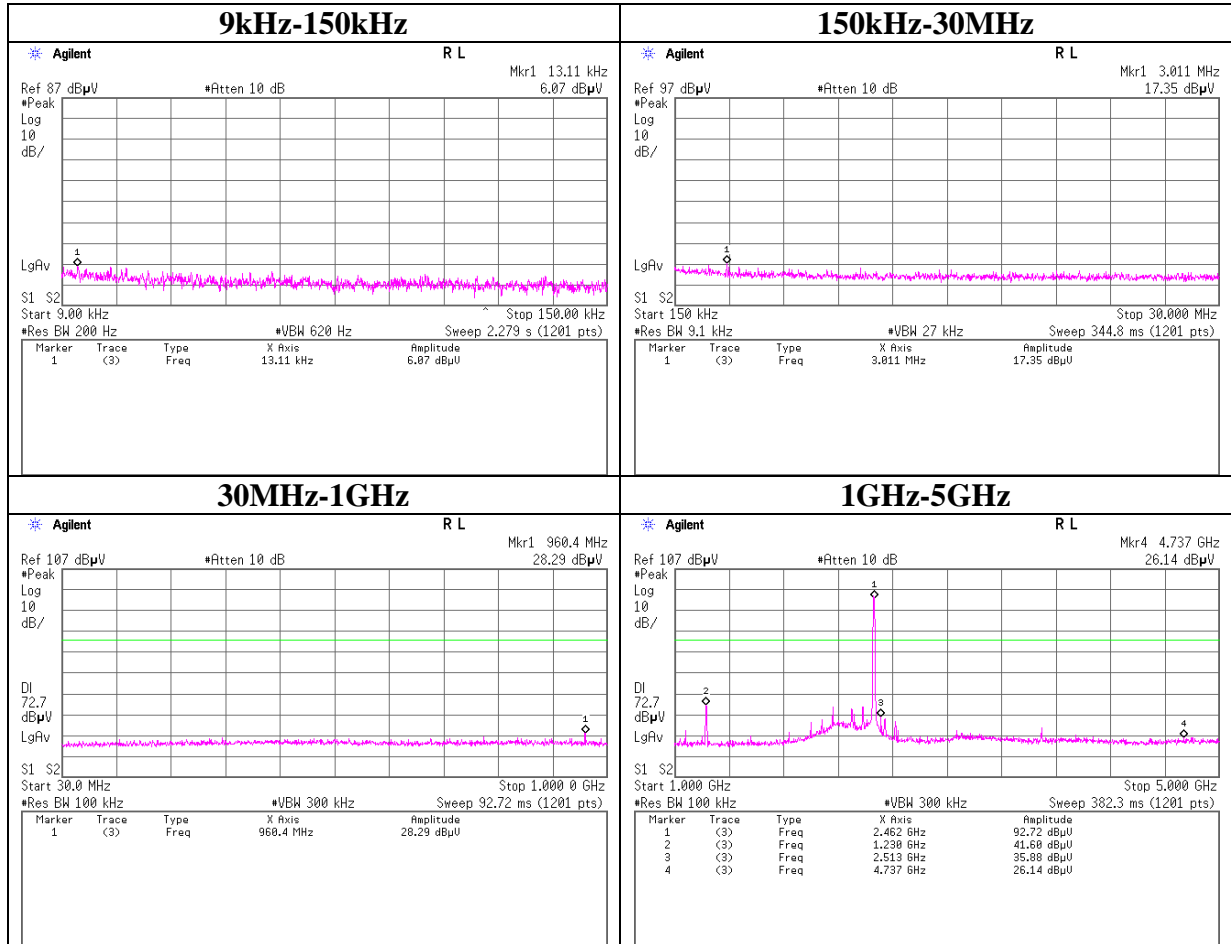
Conducted Spurious Emission

11b Tx 2437MHz



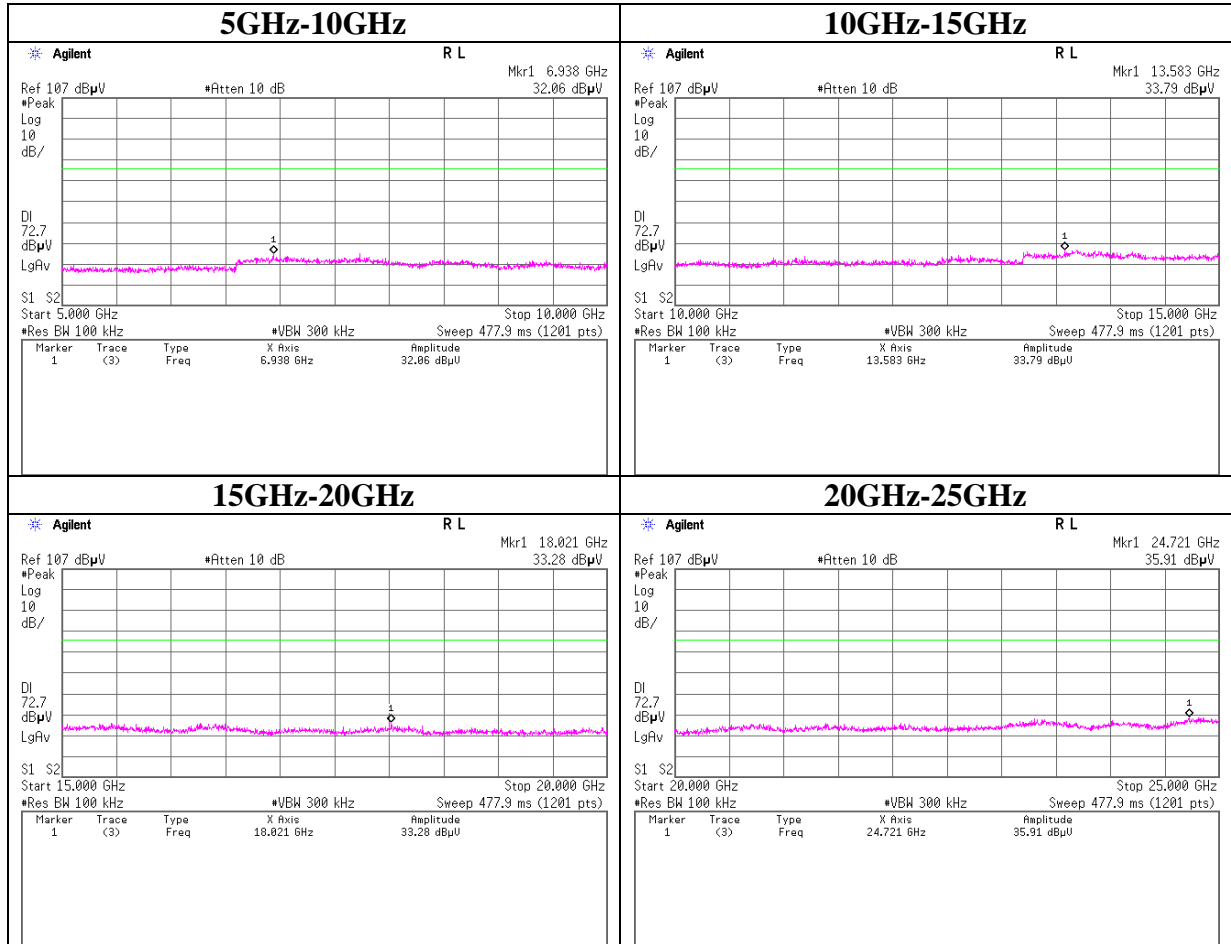
Conducted Spurious Emission

11b Tx 2462MHz



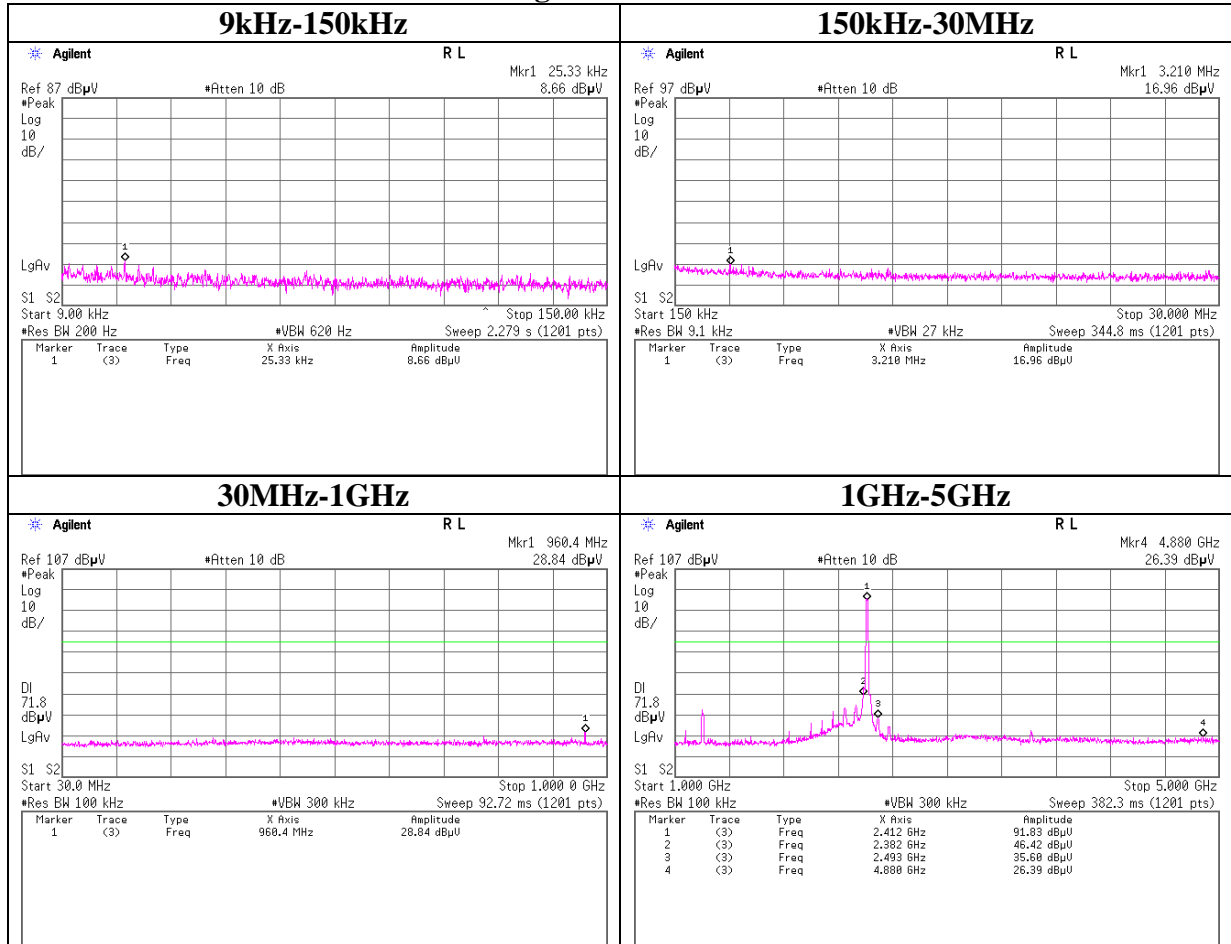
Conducted Spurious Emission

11b Tx 2462MHz



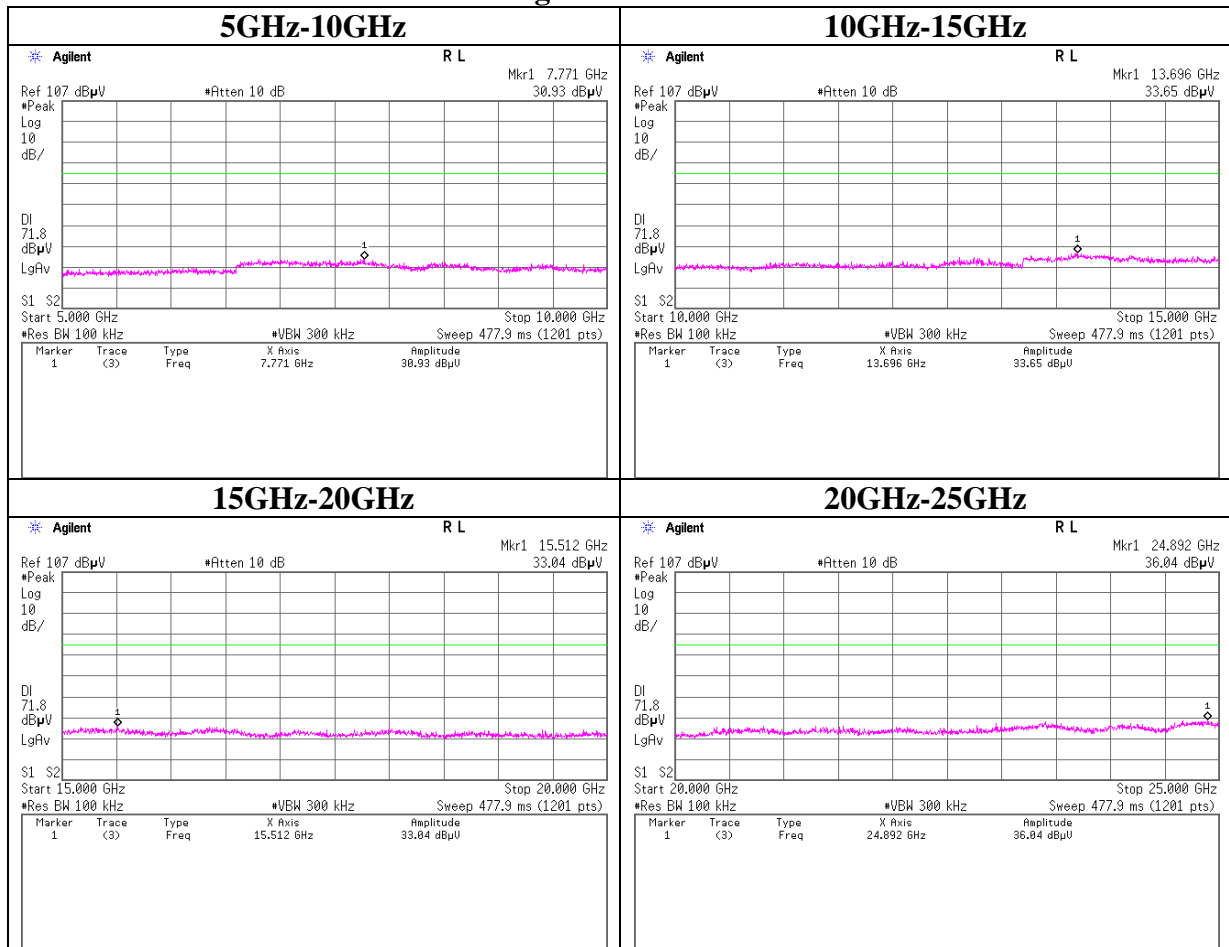
Conducted Spurious Emission

11g Tx 2412MHz



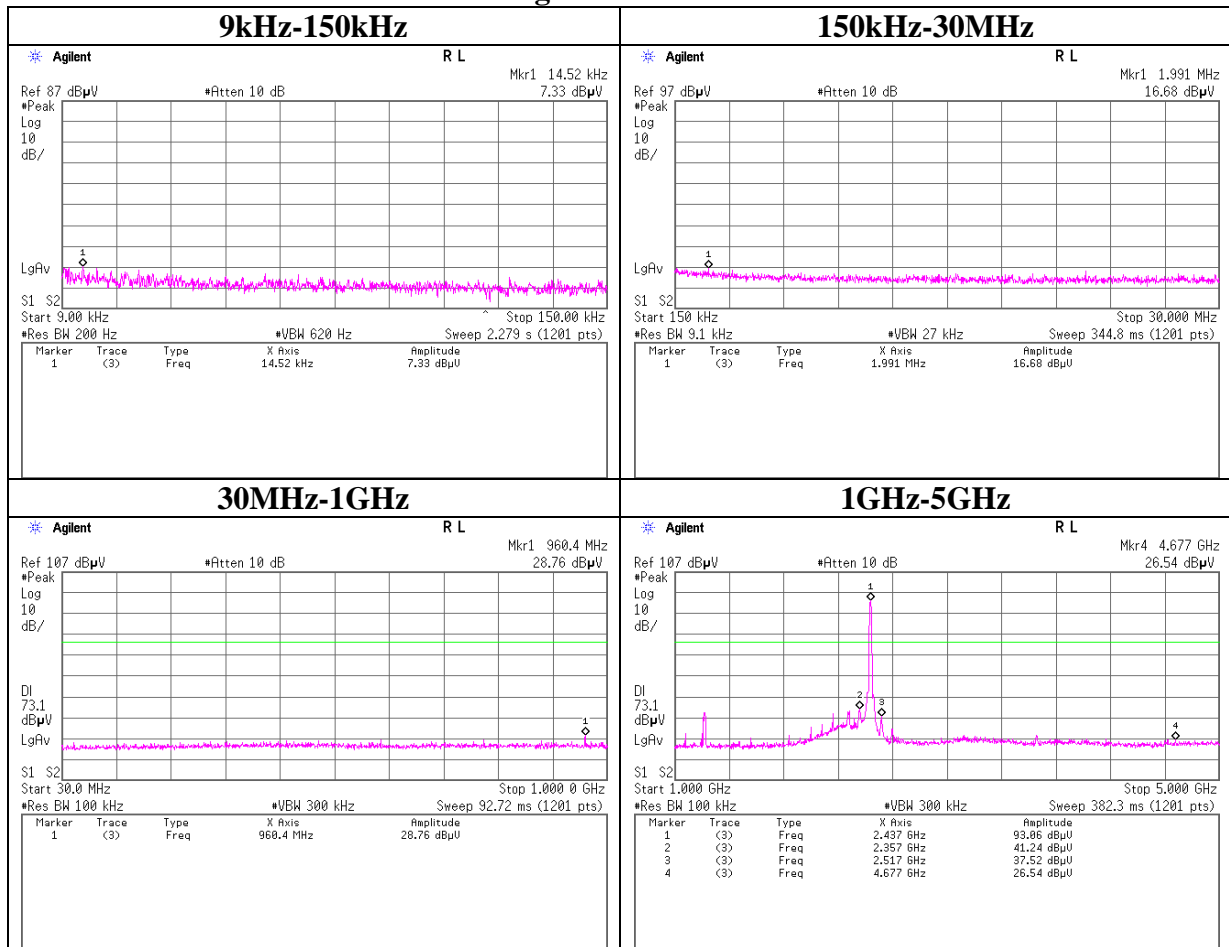
Conducted Spurious Emission

11g Tx 2412MHz



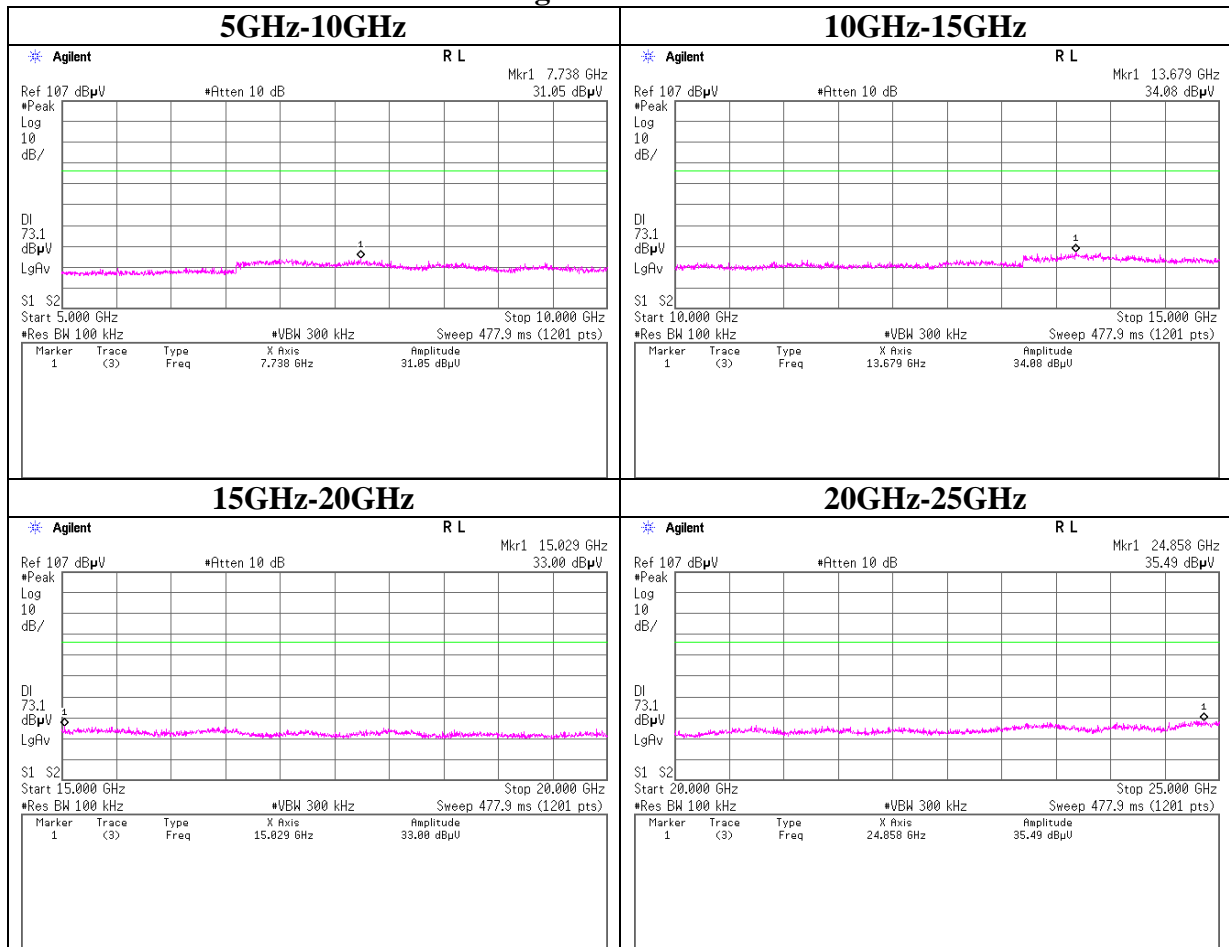
Conducted Spurious Emission

11g Tx 2437MHz



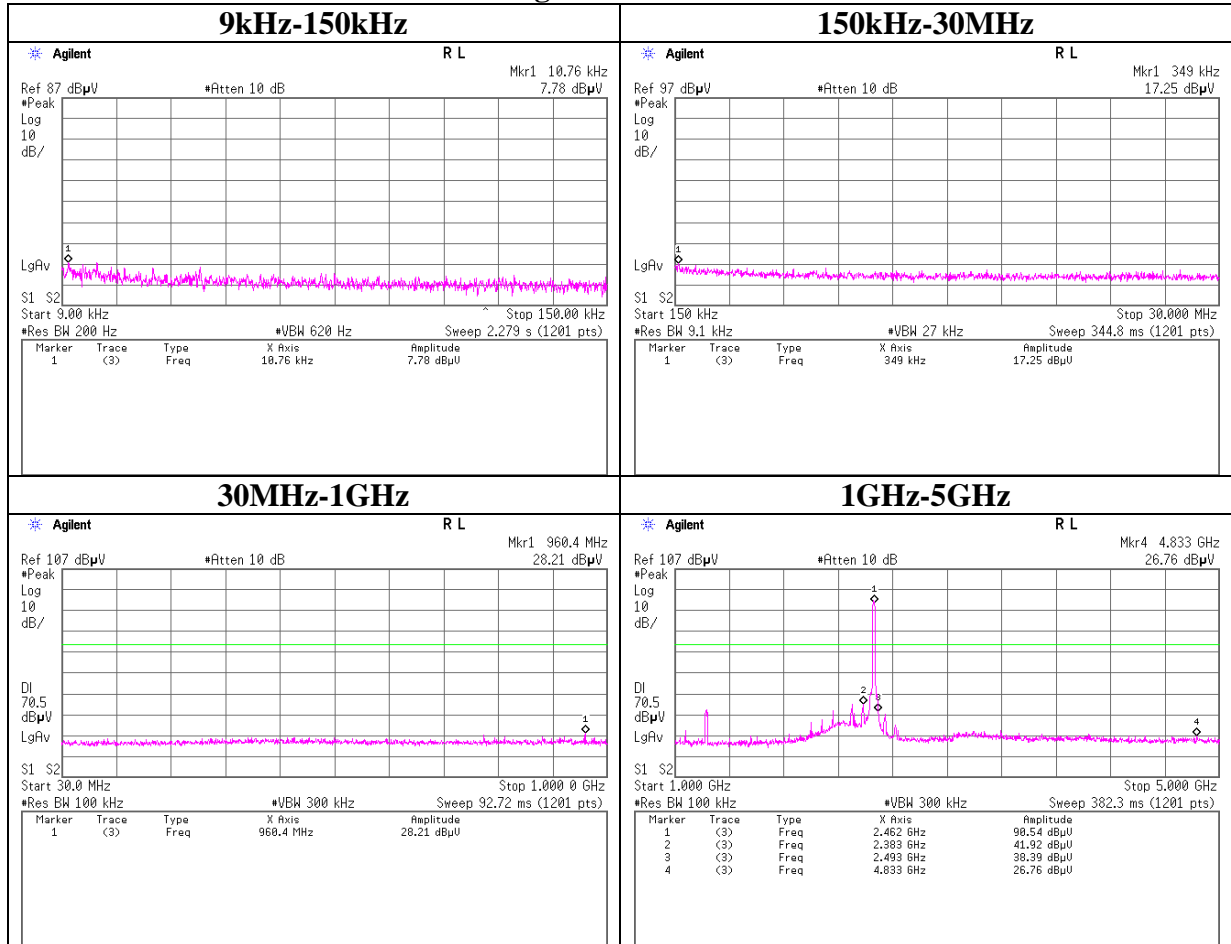
Conducted Spurious Emission

11g Tx 2437MHz



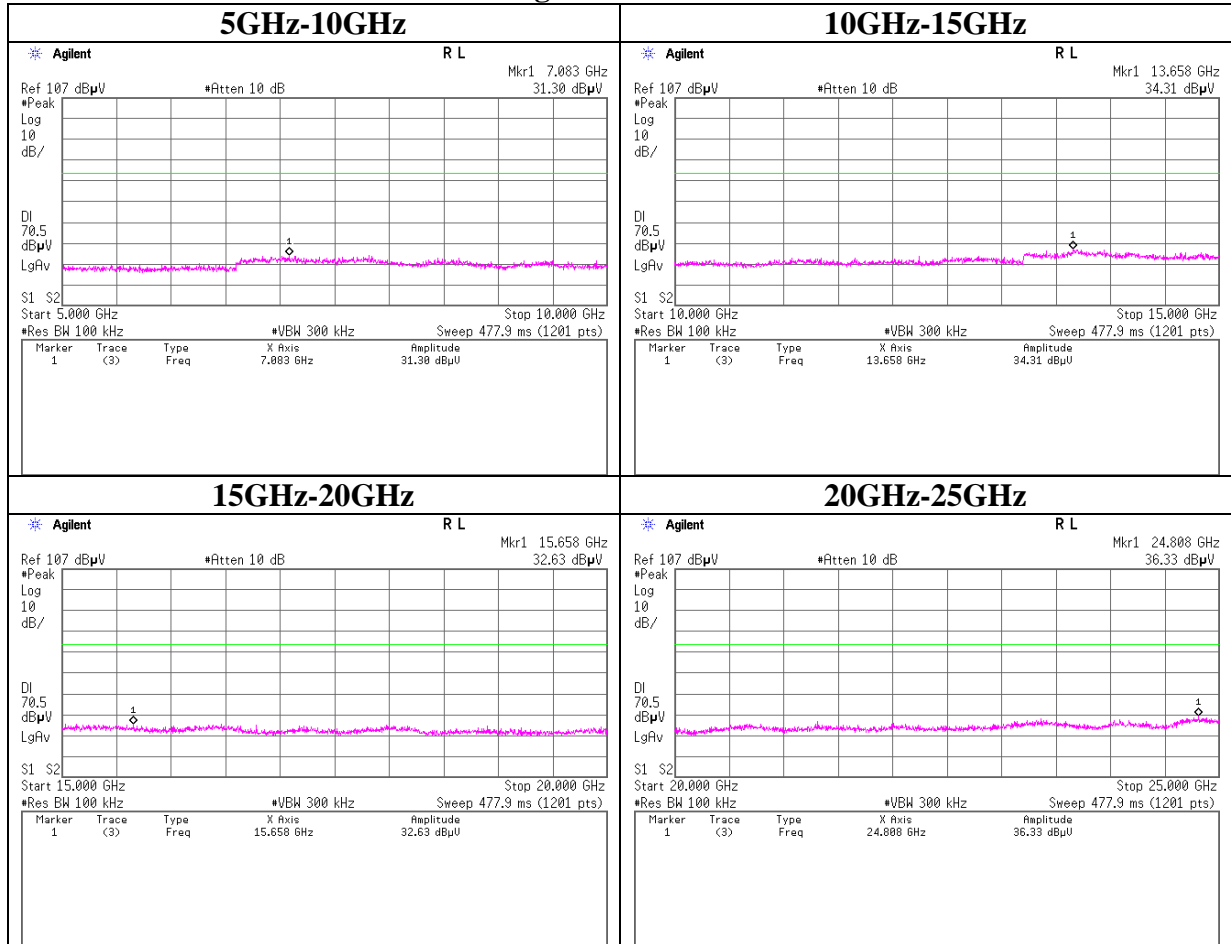
Conducted Spurious Emission

11g Tx 2462MHz



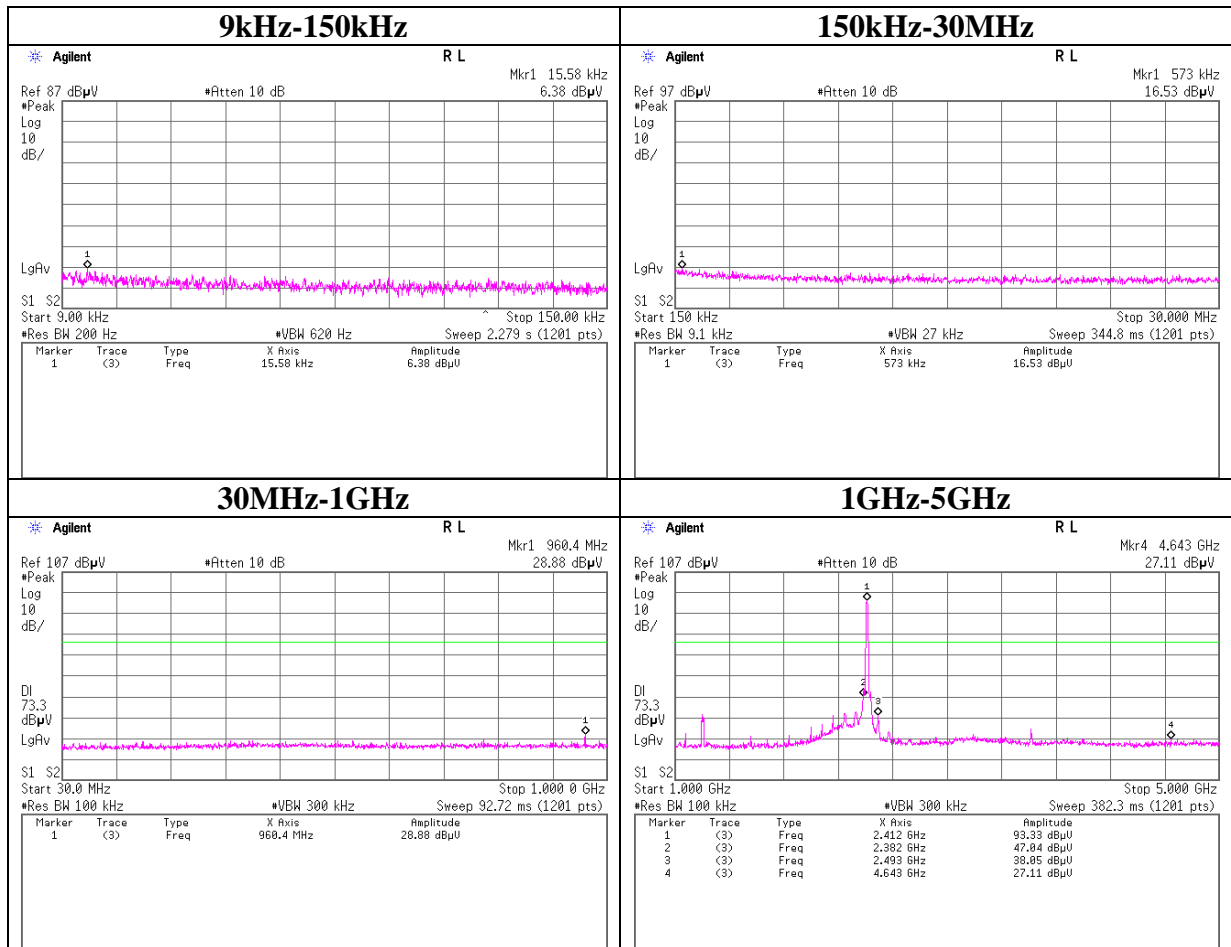
Conducted Spurious Emission

11g Tx 2462MHz



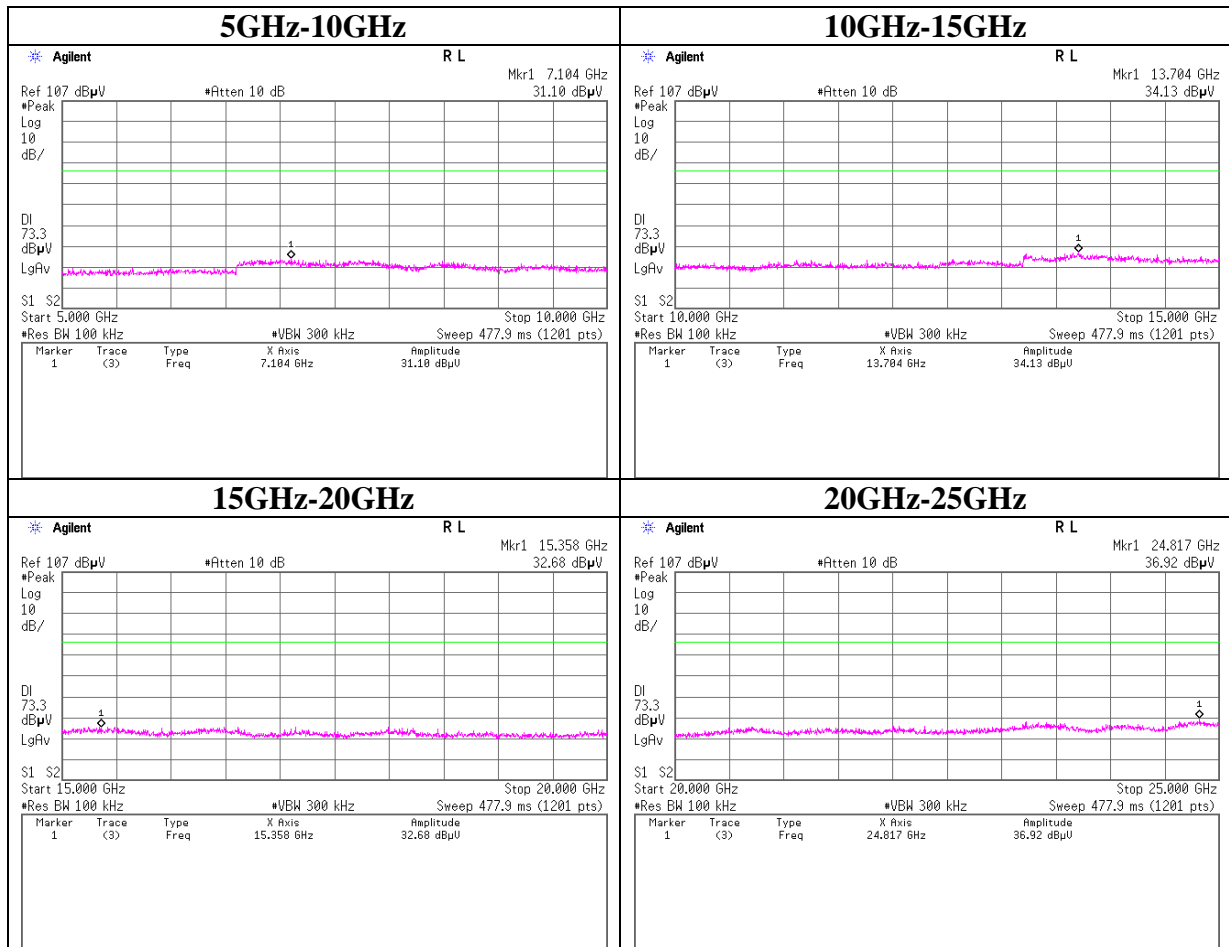
Conducted Spurious Emission

11n-20 Tx 2412MHz



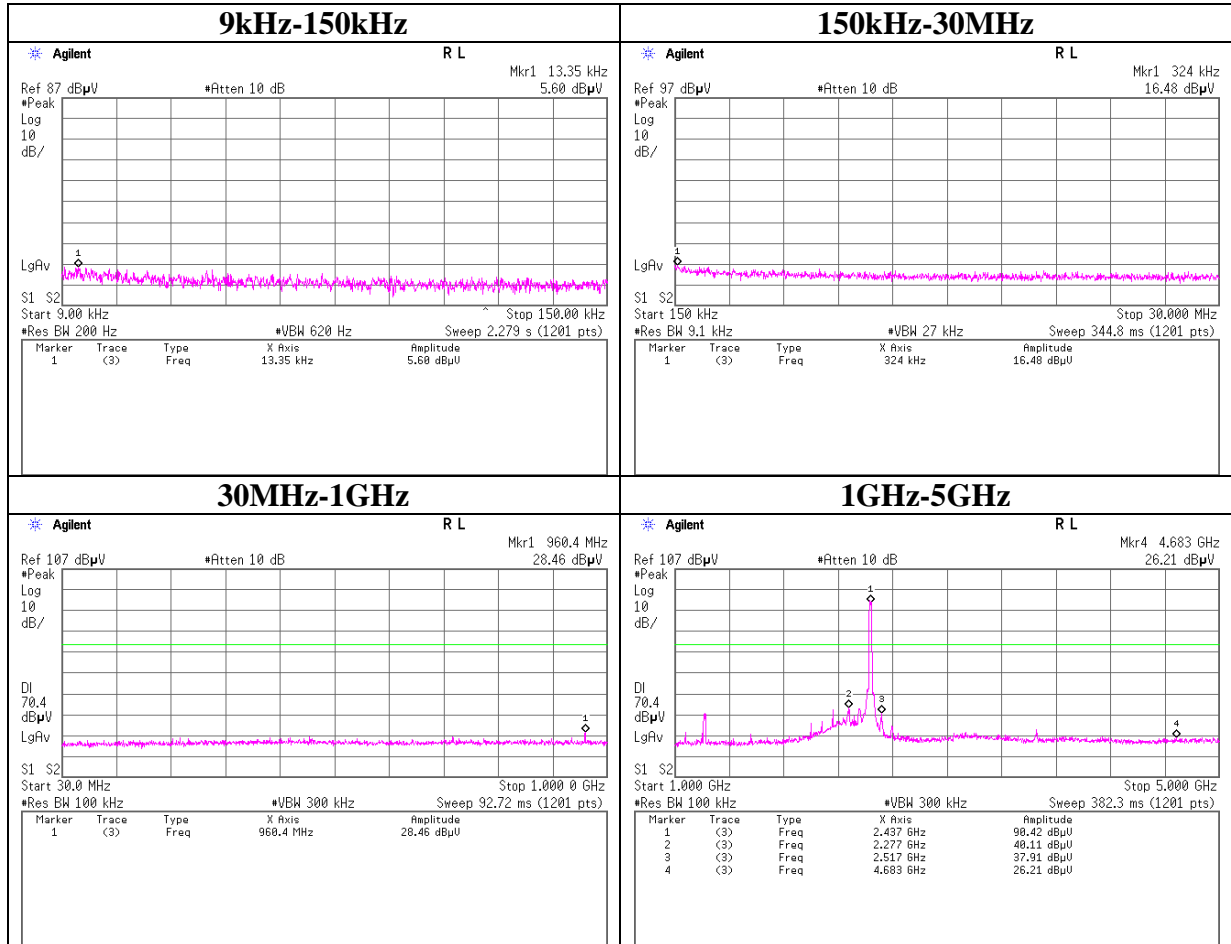
Conducted Spurious Emission

11n-20 Tx 2412MHz



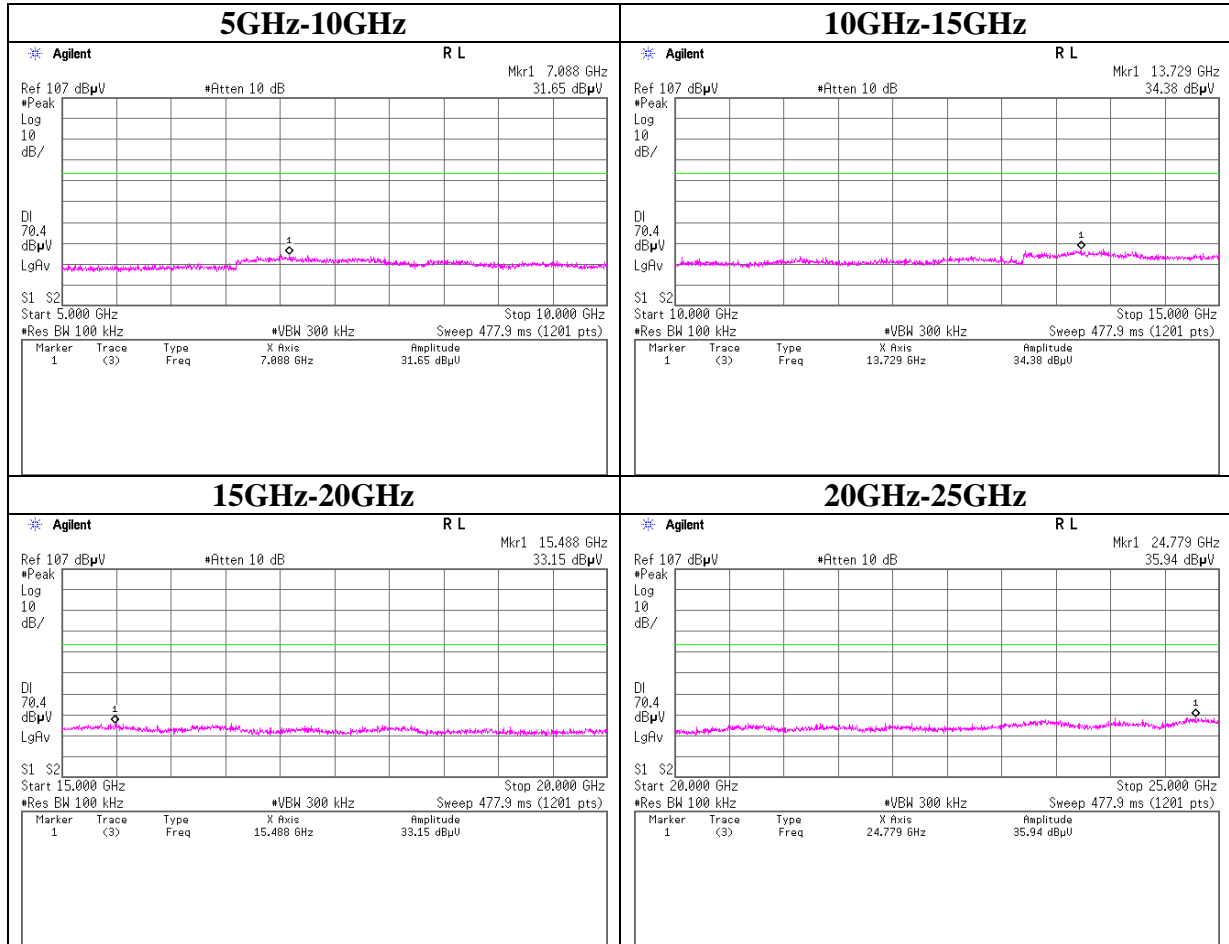
Conducted Spurious Emission

11n-20 Tx 2437MHz



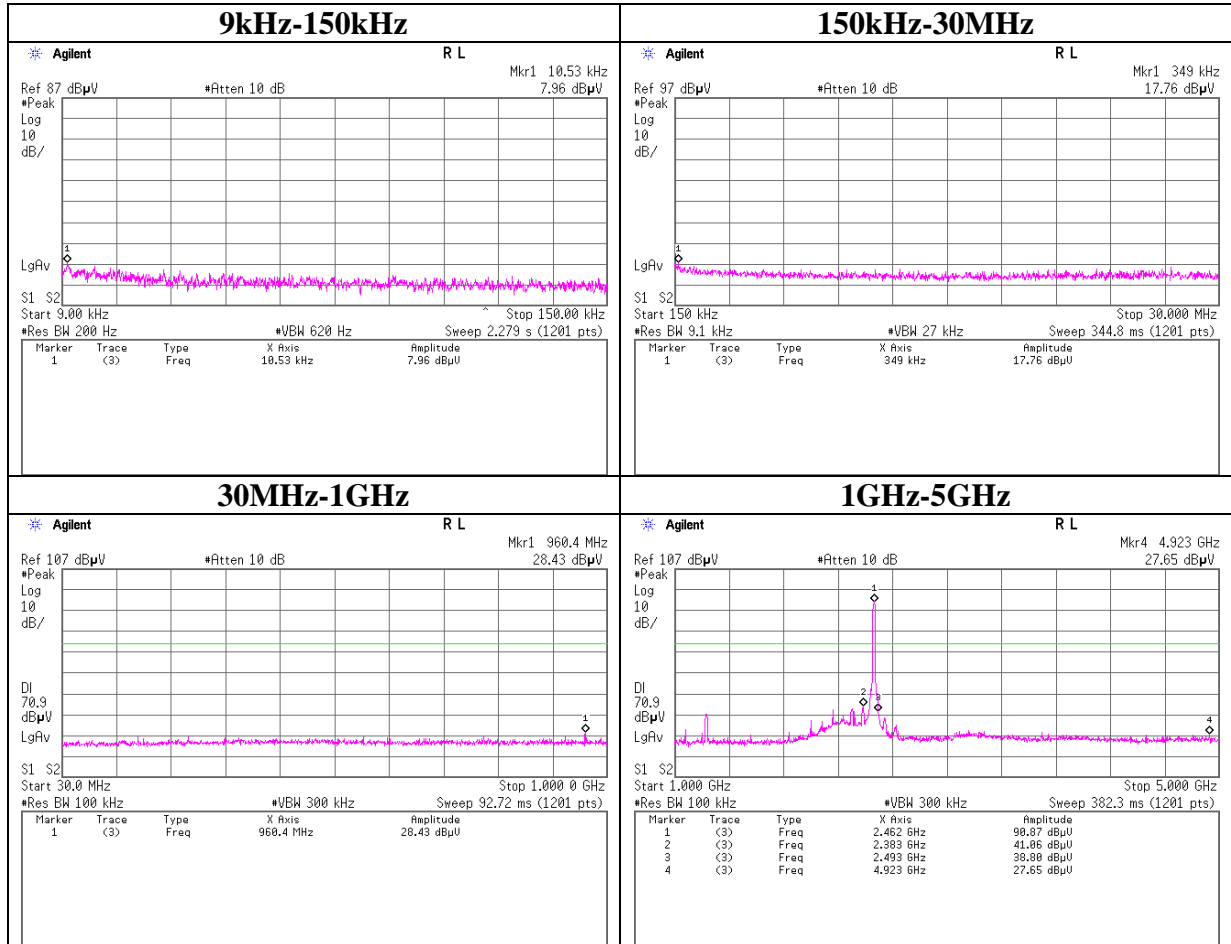
Conducted Spurious Emission

11n-20 Tx 2437MHz



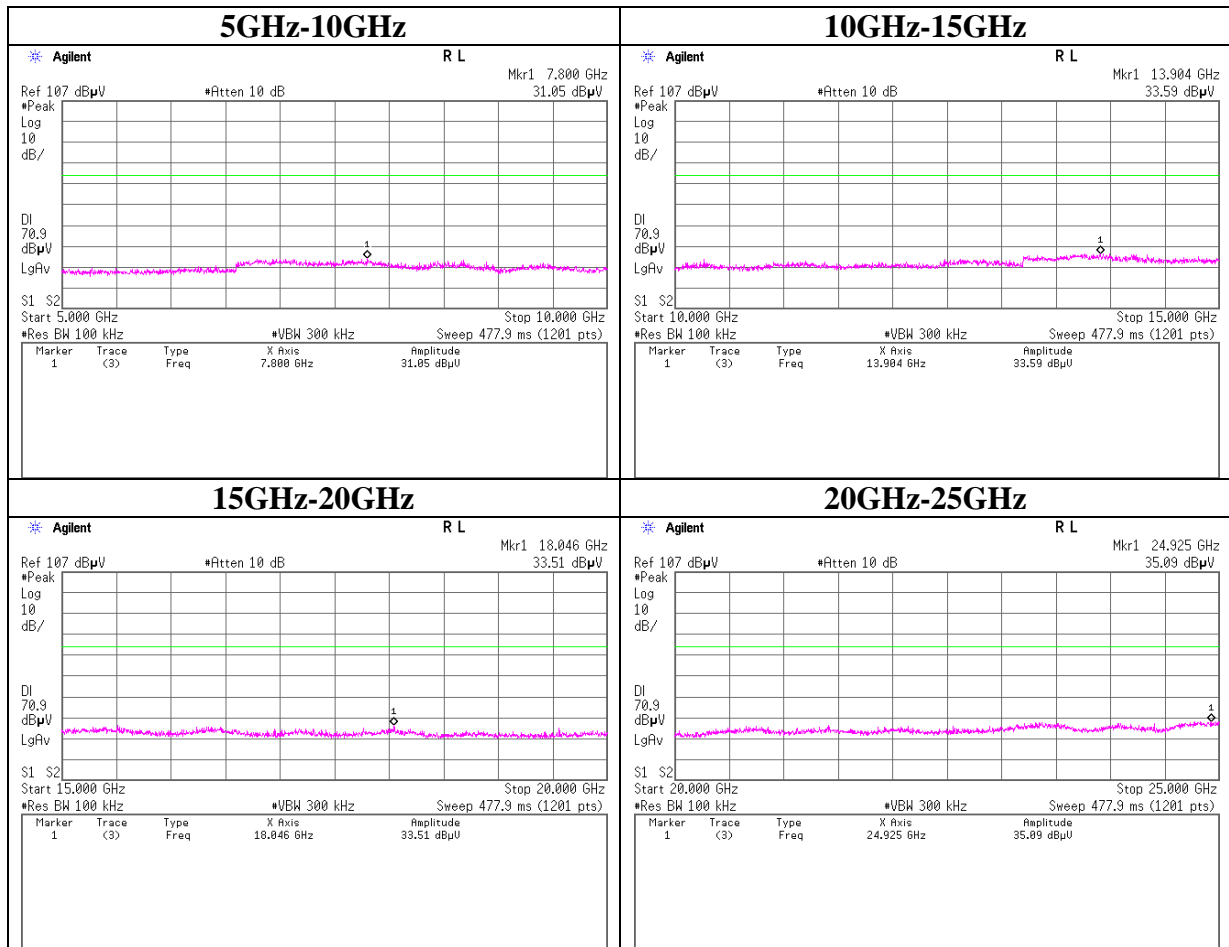
Conducted Spurious Emission

11n-20 Tx 2462MHz



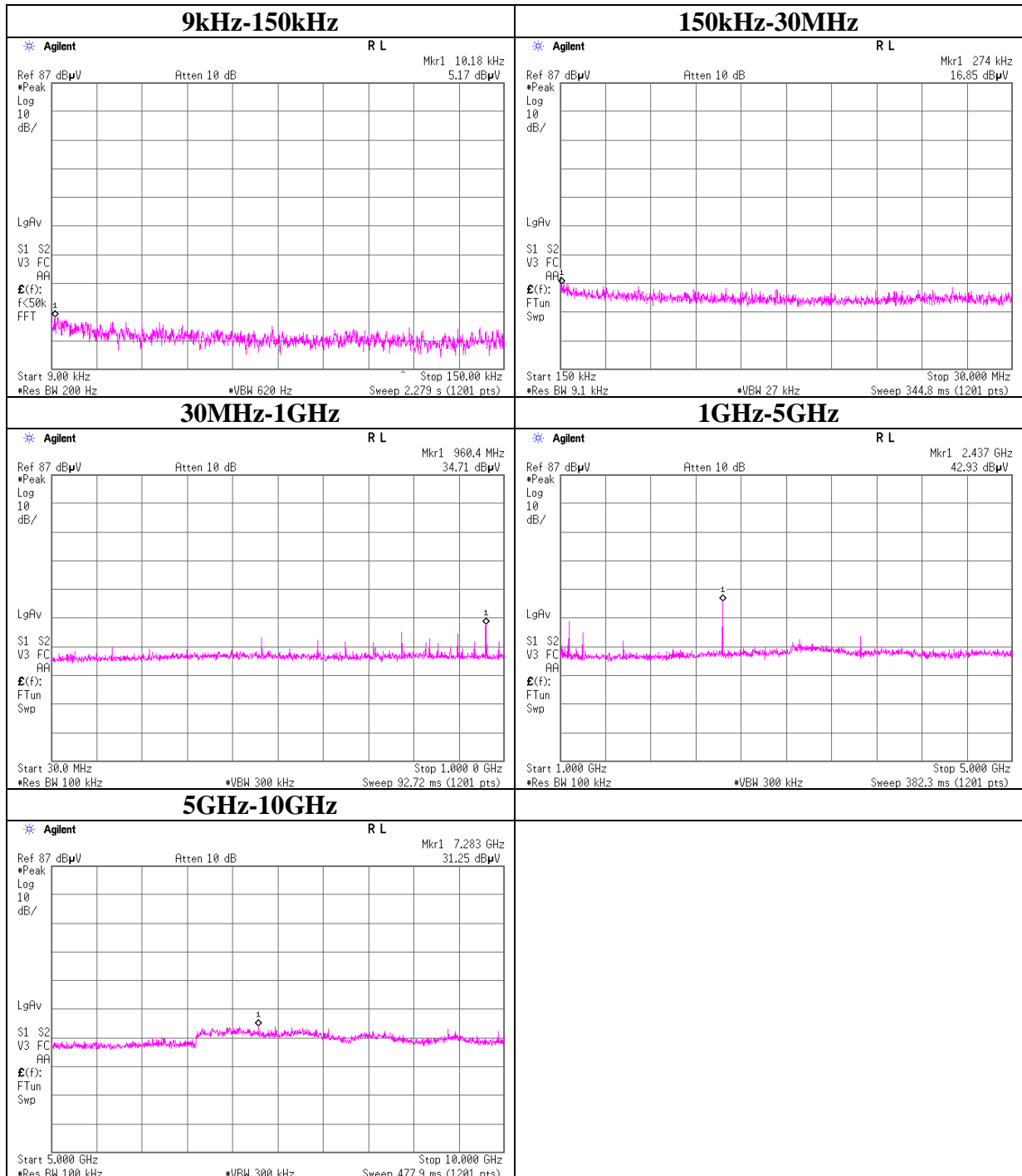
Conducted Spurious Emission

11n-20 Tx 2462MHz



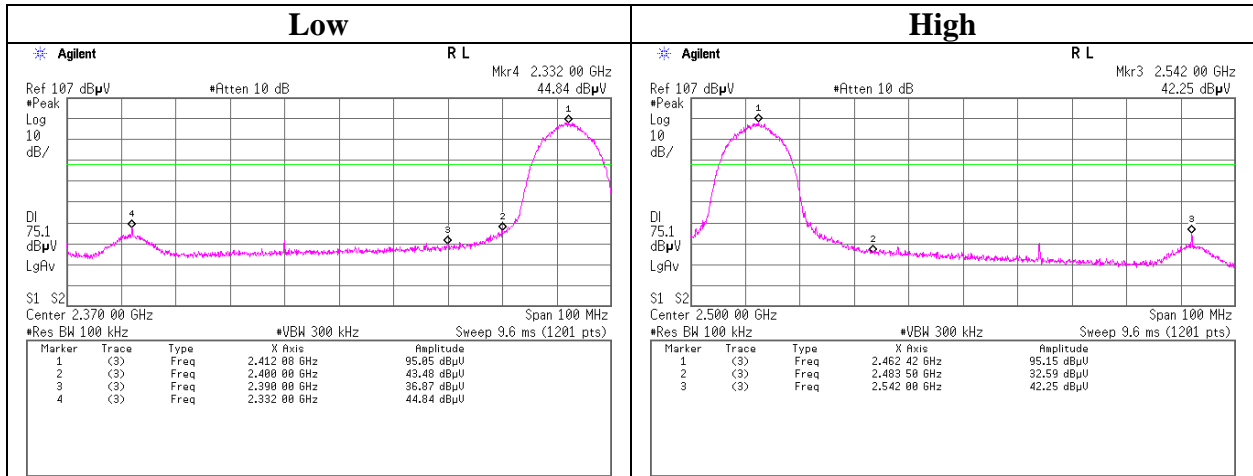
Conducted Spurious Emission

11b Rx 2412MHz

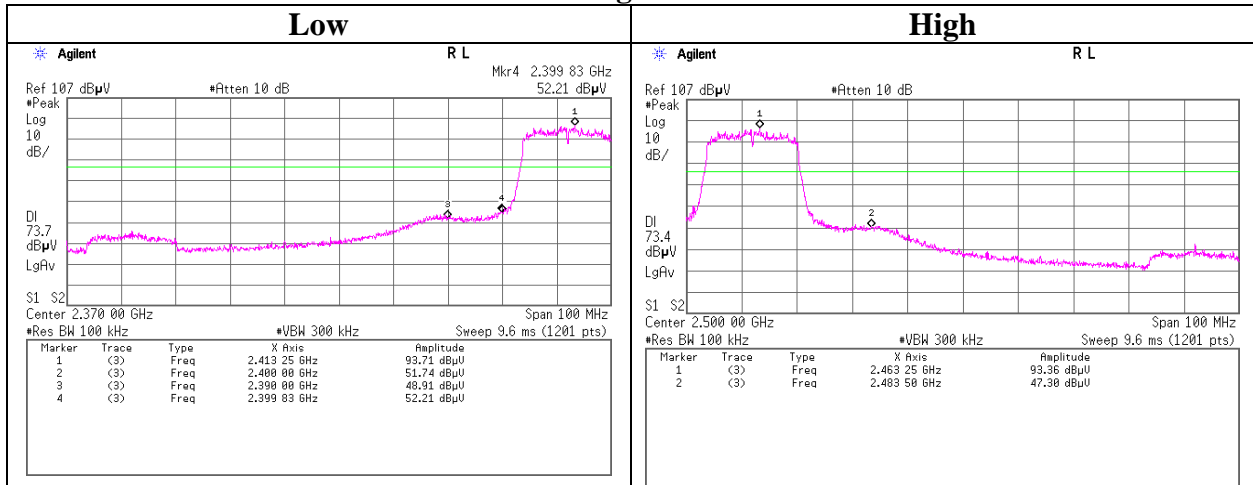


Conducted Emission Band Edge compliance

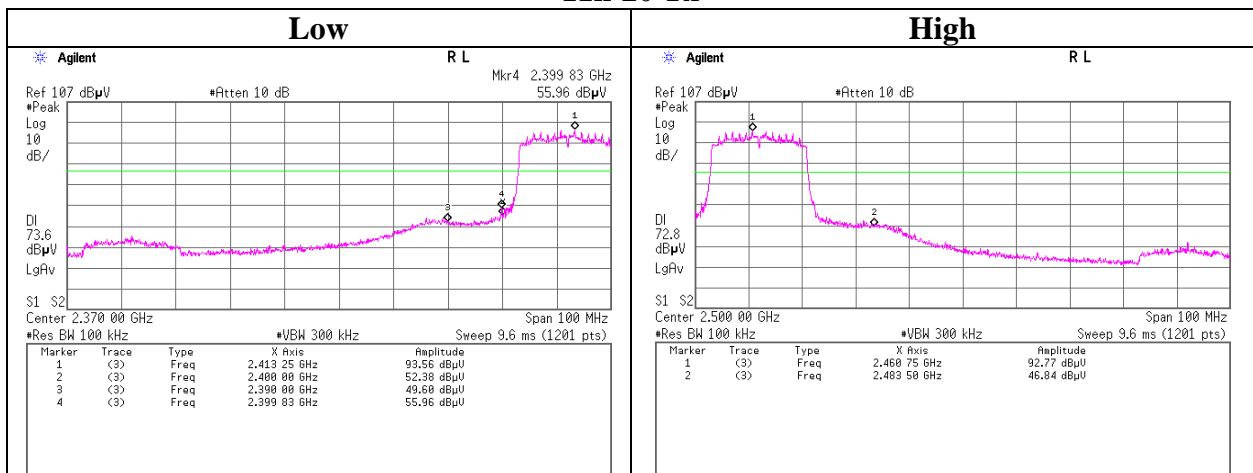
11b Tx



11g Tx



11n-20 Tx



Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32EE0065-HO-01
Date 01/23/2012
Temperature/ Humidity 22 deg.C / 46% RH
Engineer Takumi Shimada
Mode 11b/g/n-20 Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-15.90	1.63	9.96	-4.31	8.00	12.31
2437.00	-16.12	1.63	9.96	-4.53	8.00	12.53
2462.00	-16.31	1.64	9.96	-4.71	8.00	12.71

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-16.39	1.63	9.96	-4.80	8.00	12.80
2437.00	-16.50	1.63	9.96	-4.91	8.00	12.91
2462.00	-16.78	1.64	9.96	-5.18	8.00	13.18

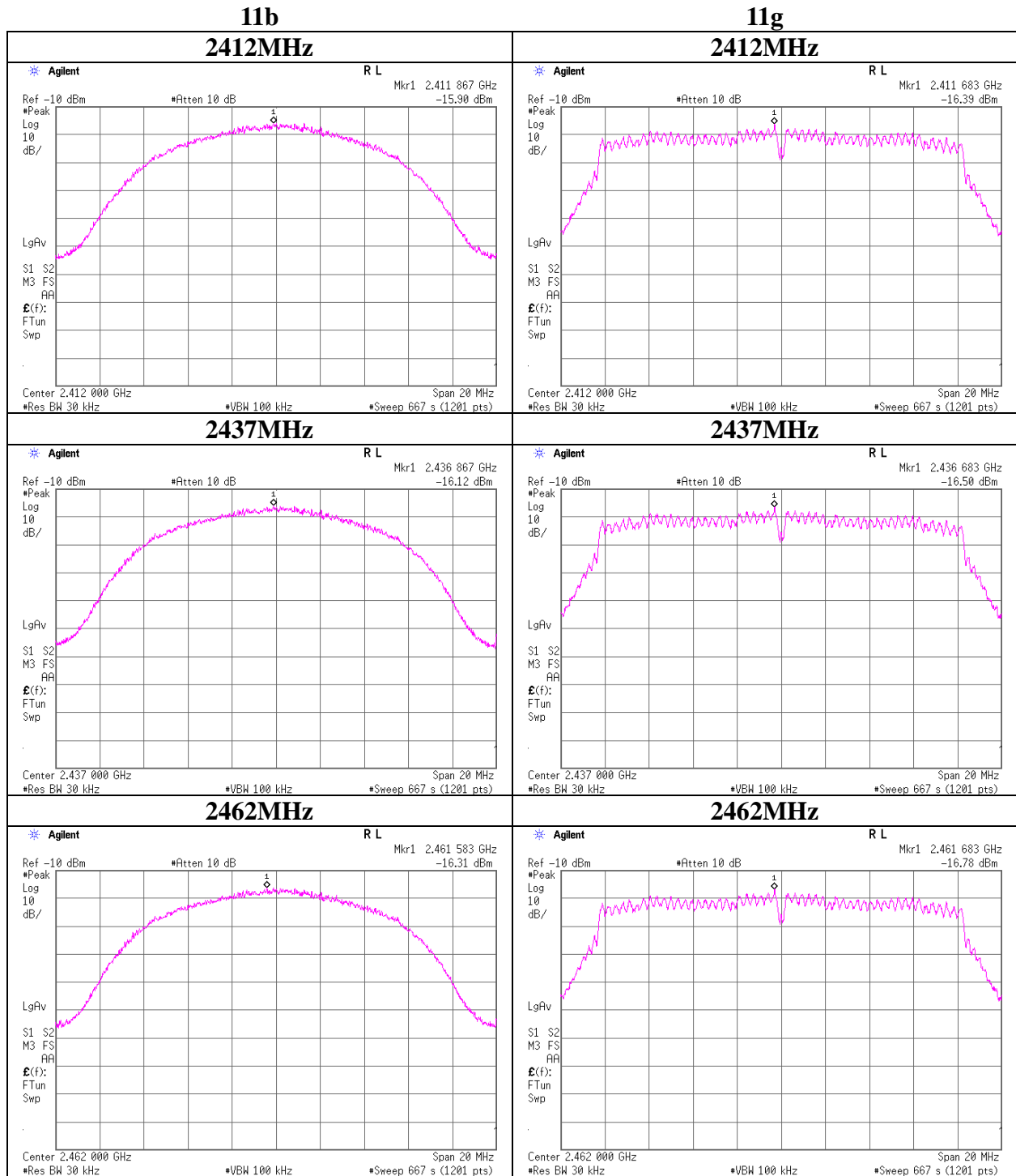
11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.00	-17.64	1.63	9.96	-6.05	8.00	14.05
2437.00	-17.62	1.63	9.96	-6.03	8.00	14.03
2462.00	-17.89	1.64	9.96	-6.29	8.00	14.29

Sample Calculation:

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

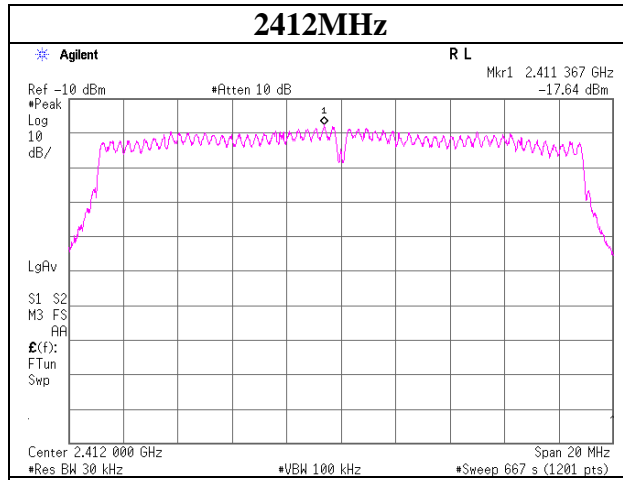
Power Density



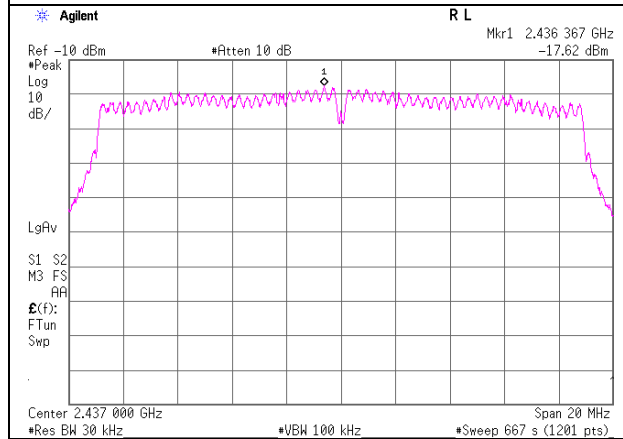
Power Density

11n-20

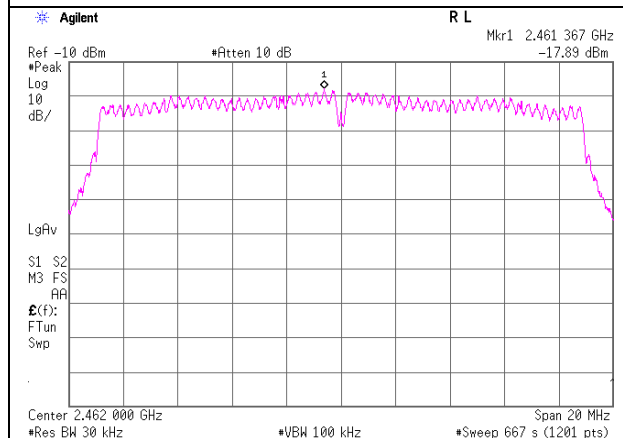
2412MHz



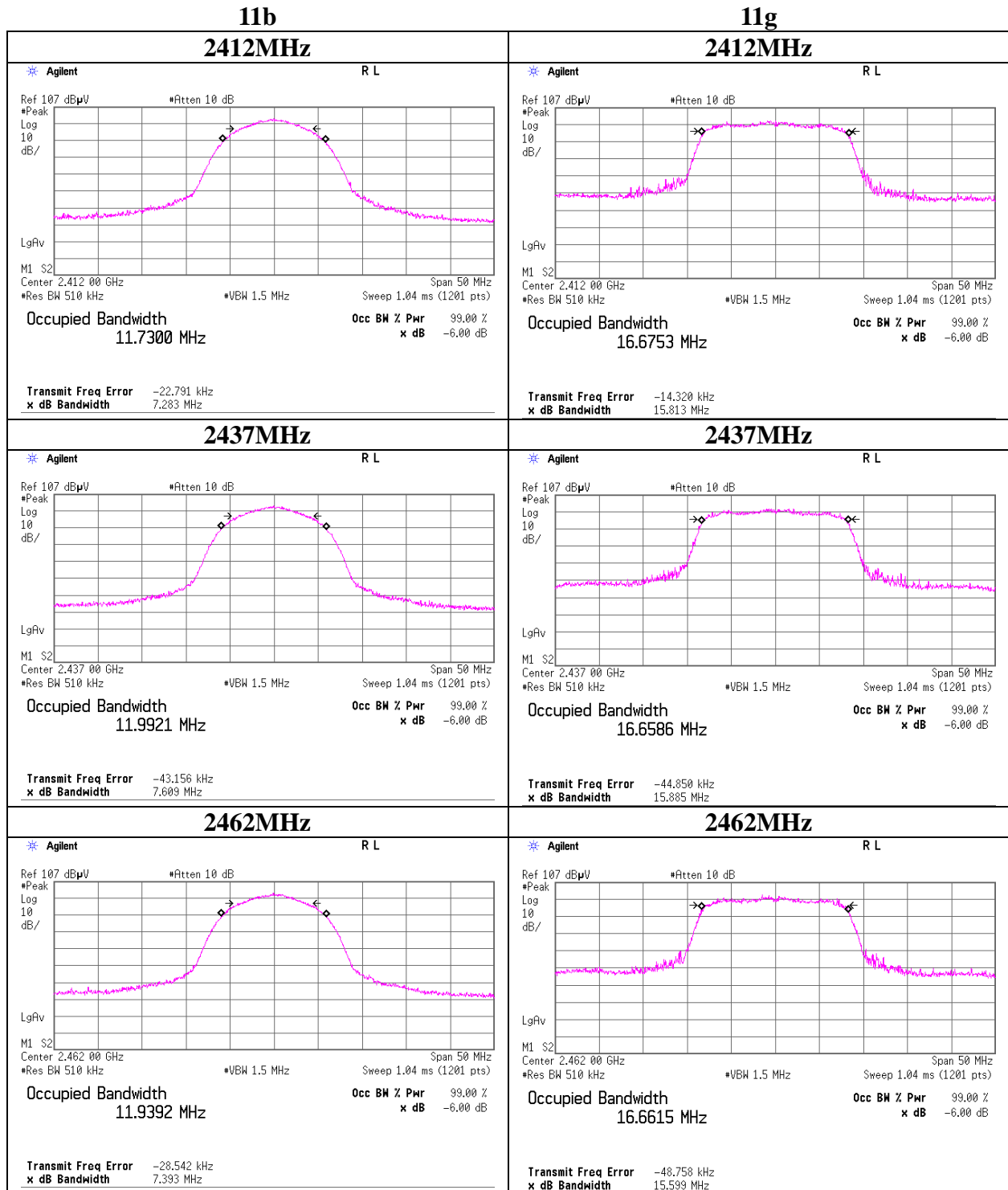
2437MHz



2462MHz



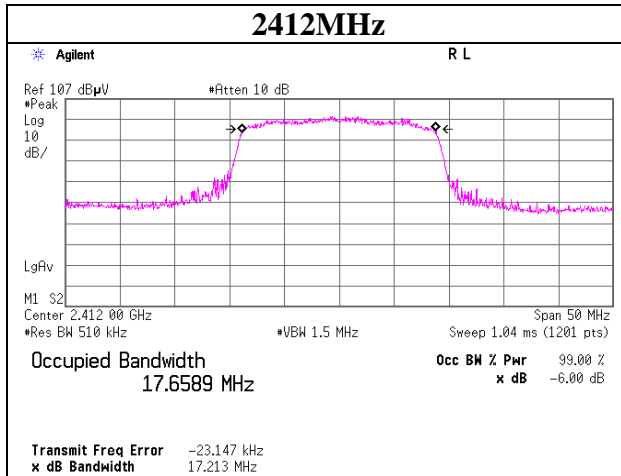
99% Occupied Bandwidth



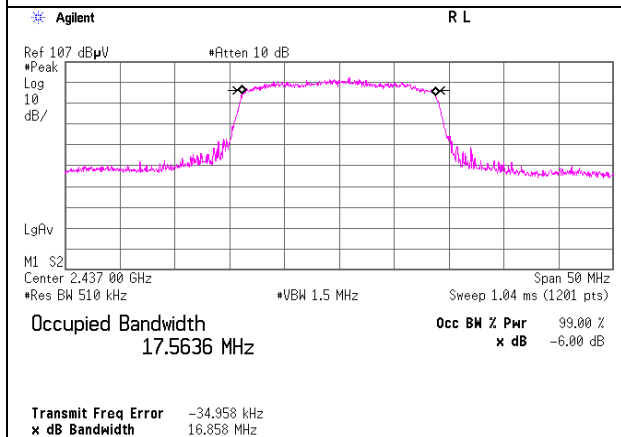
99% Occupied Bandwidth

11n-20

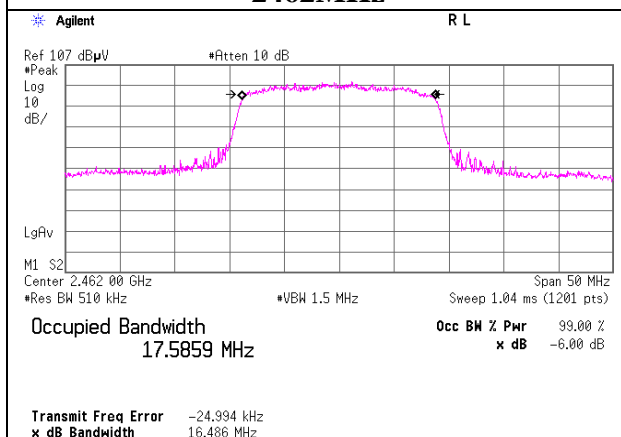
2412MHz



2437MHz



2462MHz



APPENDIX 2: Test instruments

EMI test equipment [1/2]

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2011/02/15 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2011/09/13 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2011/09/13 * 12
MAT-24	Attenuator(10dB)(above 1 GHz)	Agilent	8493C	71389	AT	2011/06/23 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 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	2011/03/10 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2011/06/17 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2011/06/30 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2011/10/15 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2011/10/15 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2011/07/15 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2011/11/02 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12

EMI test equipment [2/2]

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE/CE	
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2011/11/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2011/08/11 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2011/02/22 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2011/07/15 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 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