



RADIO TEST REPORT

Test Report No. : 32JE0205-HO-A

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Type of Equipment : GPRS850/1900, EDGE850/1900, WCDMA2,
WCDMA5, LTE4, LTE17 Tablet with 802.11bgn,
BT(EDR, LE)
Model No. : SGH-I497
FCC ID : A3LSGHI497
Test regulation : FCC Part 15 Subpart C: 2012
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: June 4 to 11, 2012

Representative test engineer:

Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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

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SECTION 1: Customer information

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

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

2.1 Identification of E.U.T.

Type of Equipment : GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5, LTE4,
LTE17 Tablet with 802.11bgn, BT(EDR, LE)
Model No. : SGH-I497
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC5.0V(USB Power Supply)
DC3.7V/7000mAh, 25.9Wh
Receipt Date of Sample : June 4, 2012
Modification of EUT : No Modification by the test lab

2.2 Product Description

Radio Specification

Bluetooth

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

Low Energy

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	DSSS
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Type	PIFA
Antenna Gain	-4.8 dBi (MAX)

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GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK , 8PSK
Antenna Type	PIFA
Antenna Gain	GSM850: 824-849MHz: -5.73dBi (MAX) 869-894MHz: -5.83dBi (MAX) PCS: 1850-1910MHz: -5.62dBi (MAX) 1930-1990MHz: -5.51dBi (MAX)

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz Band II: 1850 – 1910MHz [Down Link] Band V: 869 – 894MHz Band II: 1930 – 1990MHz
Type of Modulation	QPSK
Antenna Type	PIFA
Antenna Gain	Band V: 824-849MHz: -5.73dBi (MAX) 869-894MHz: -5.83dBi (MAX) Band II: 1850-1910MHz: -5.62dBi (MAX) 1930-1990MHz: -5.51dBi (MAX)

LTE

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band IV: 1710 – 1755MHz Band X VII: 704 – 716MHz [Down Link] Band IV: 2110 – 2155MHz Band X VII: 734 – 746MHz
Type of Modulation	QPSK, 16QAM
Antenna Type	PIFA
Antenna Gain	Band IV: 1710-1755MHz: -5.57dBi (MAX) 2110-2155MHz: -3.86dBi (MAX) Band X VII: 704-716MHz: -5.95dBi (MAX) 734-746MHz: -4.23dBi (MAX)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on May 17, 2012 and effective June 18, 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 May 17, 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 18.6dB, 0.15071MHz, N AV 24.1dB, 0.15071MHz, N	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	5.4dB 9848.000MHz, AV, Vert.	Complied	Conducted/ Radiated

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

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

3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

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

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	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.

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)

Test operating mode was determined as follows according to “Section 1 of 6 802.11 a/b/g/n testing- Managing Complex Regulatory Approvals - ” of TCB Council Workshop October 2009.

Mode	Remarks*
IEEE 802.11b (11b)	11Mbps, PN9
IEEE 802.11g (11g)	54Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20)	MCS4, 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:

H/W version: REV0.0
S/W version: I497.001

[Power Setting]

11b: 17dBm
11g: 14dBm
11n-20: 13dBm

*The above setting of the 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.

*Details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission	11g Tx*1)	2462MHz
6dB Bandwidth	11b Tx	2412MHz
99% Occupied Bandwidth	11g Tx	2437MHz
Maximum Peak Output Power	11n-20 Tx	2462MHz
Spurious Band Edge (Conducted Emission Band Edge compliance)		
Power Density	11b Tx	2412MHz
Spurious Emission (Conducted)	11g Tx *2)	2437MHz
Spurious Emission (Radiated)		2462MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.		
*2) Since 11g/ 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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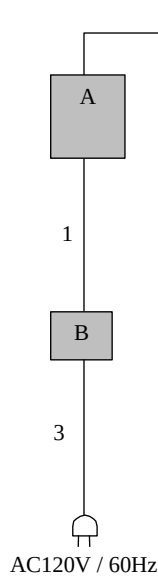
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	GPRS850/1900, EDGE850/1900, WCDMA2, WCDMA5, LTE4, LTE17 Tablet with 802.11bgn, BT(EDR, LE)	SGH-I497	R31C50X3QHR *1) R31C50X3QLM *2)	SAMSUNG	EUT
B	AC Adapter	ETA-P11X	-	SAMSUNG	EUT
C	Ear phone	-	-	SAMSUNG	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.0	Shielded	Shielded	-
2	Ear phone Cable	1.2	Unshielded	Unshielded	-
3	AC Cable	0.9	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.5m 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 Section15.247".

EUT was placed on a urethane platform of nominal size, 1.5m 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 *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 transmitting duty cycle close to 100%. (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-25GHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
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 *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Peak Power Density	20MHz	30kHz	100kHz	667 sec	Peak	Max Hold	Spectrum Analyzer *2) *3)
Conducted Spurious Emission *4)	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) The measurement was performed with Max Hold since the duty cycle was not 100%. *2) PSD Option 1 of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ". *3) 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. *4) 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

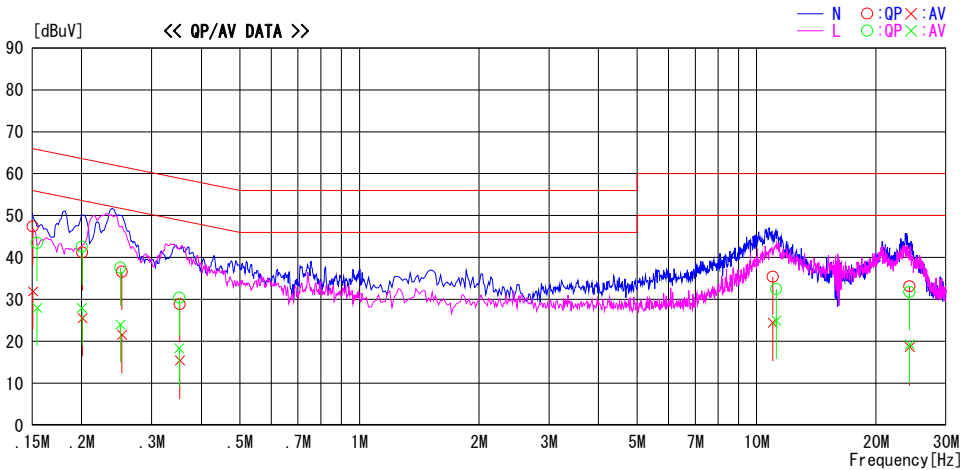
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/06/05

Report No. : 32JE0205-H0
Power : AC 120V / 60Hz
Temp./Humi. : 23 deg. C / 59% RH
Engineer : Keisuke Kawamura

Mode / Remarks : WLAN 11g 54Mbps 2462MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV		QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15071	34.2	18.7	13.2	47.4	31.9	66.0	56.0	18.6	24.1	N	
0.20071	28.0	12.3	13.2	41.2	25.5	63.6	53.6	22.4	28.1	N	
0.25251	23.4	8.3	13.2	36.6	21.5	61.7	51.7	25.1	30.2	N	
0.35341	15.6	2.2	13.2	28.8	15.4	58.9	48.9	30.1	33.5	N	
10.98592	20.8	9.8	14.6	35.4	24.4	60.0	50.0	24.6	25.6	N	
24.28453	17.9	3.4	15.2	33.1	18.6	60.0	50.0	26.9	31.4	N	
0.15435	30.3	14.8	13.2	43.5	28.0	65.8	55.8	22.3	27.8	L	
0.20001	29.4	14.8	13.2	42.6	28.0	63.6	53.6	21.0	25.6	L	
0.25041	24.4	10.8	13.2	37.6	24.0	61.7	51.7	24.1	27.7	L	
0.35221	17.2	5.1	13.2	30.4	18.3	58.9	48.9	28.5	30.6	L	
11.21275	17.9	10.3	14.6	32.5	24.9	60.0	50.0	27.5	25.1	L	
24.28453	16.5	4.0	15.2	31.7	19.2	60.0	50.0	28.3	30.8	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.

6dB Bandwidth

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32JE0205-HO
Date 06/11/2012
Temperature / Humidity 23 deg. C / 54% RH
Engineer Katsunori Okai
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	8.668	>500
2437	8.504	>500
2462	7.628	>500

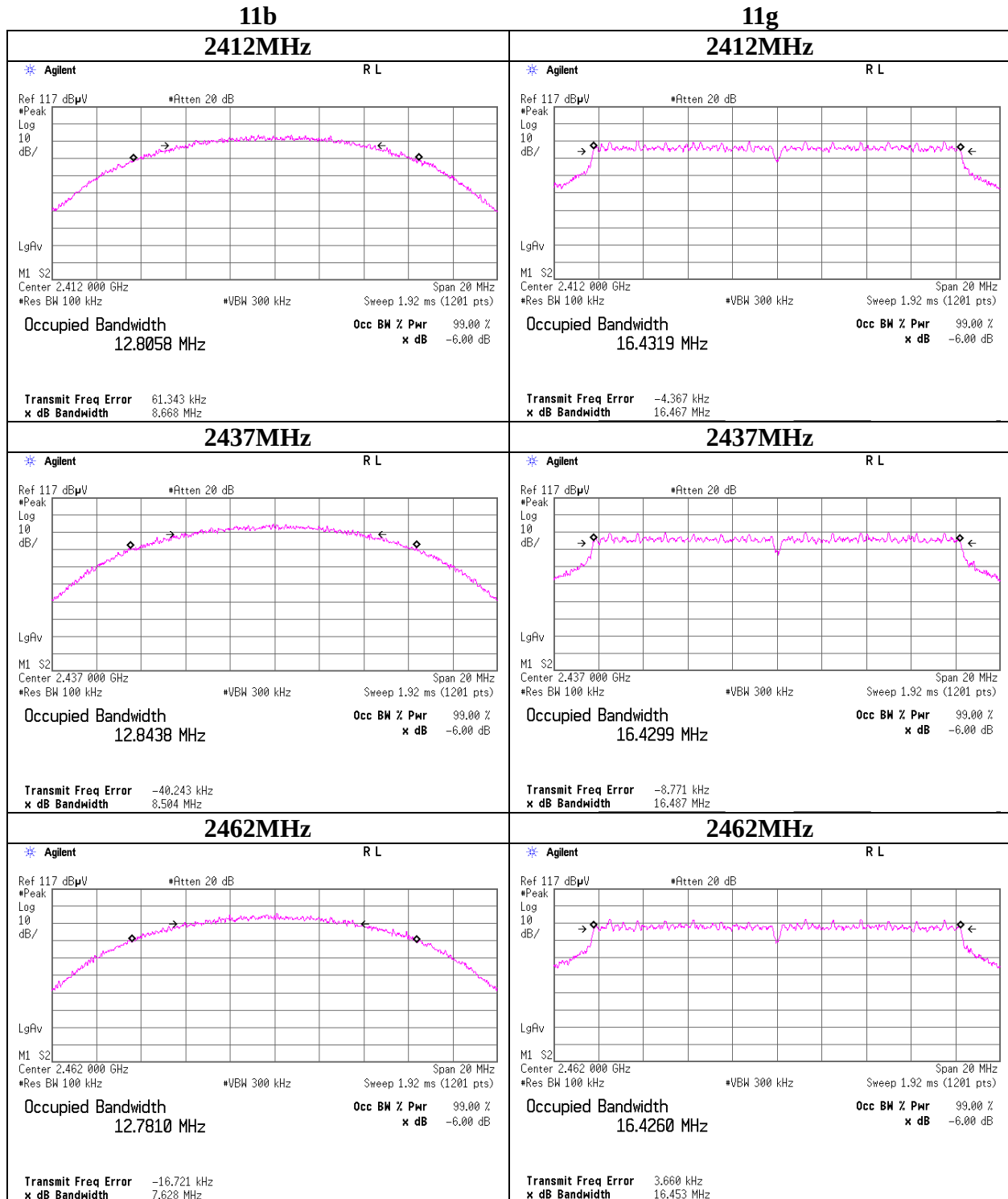
11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	16.467	>500
2437	16.487	>500
2462	16.453	>500

11n-20

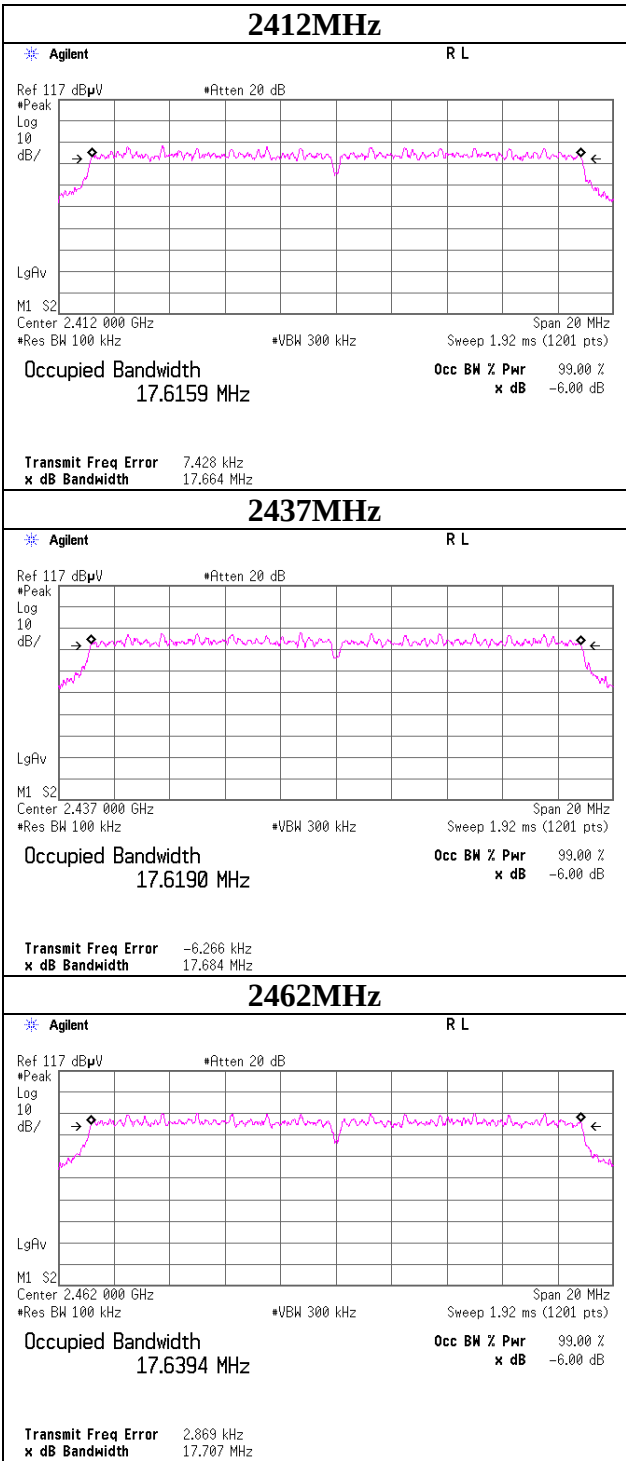
Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	17.664	>500
2437	17.684	>500
2462	17.707	>500

6dB Bandwidth



6dB Bandwidth

11n-20



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 24 deg. C / 60% RH
Engineer Hironobu Ohnishi
Mode 11b Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	5.67	1.33	10.01	17.01	50.23	30.00	1000	12.99
2437	6.18	1.33	10.01	17.52	56.49	30.00	1000	12.48
2462	5.91	1.34	10.01	17.26	53.21	30.00	1000	12.74

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11b

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
1	6.06	
2	6.12	
5.5	6.10	
11	6.18	*

*: Worst Rate

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

Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 24 deg. C / 60% RH
Engineer Hironobu Ohnishi
Mode 11g Tx

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.47	1.33	10.01	21.81	151.71	30.00	1000	8.19
2437	10.75	1.33	10.01	22.09	161.81	30.00	1000	7.91
2462	11.25	1.34	10.01	22.60	181.97	30.00	1000	7.40

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11g

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
6	10.10	
9	10.15	
12	10.20	
18	10.36	
24	10.21	
36	10.63	
48	10.52	
54	10.75	*

*: Worst Rate

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

Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 24 deg. C / 60% RH
Engineer Hironobu Ohnishi
Mode 11n-20 Tx

11n-20

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	9.51	1.33	10.01	20.85	121.62	30.00	1000	9.15
2437	9.08	1.33	10.01	20.42	110.15	30.00	1000	9.58
2462	10.46	1.34	10.01	21.81	151.71	30.00	1000	8.19

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11n-20

2437MHz

Rate	Reading [dBm]	Remark
MCS0	8.90	
MCS1	8.89	
MCS2	9.03	
MCS3	8.96	
MCS4	9.08	*
MCS5	8.76	
MCS6	8.61	
MCS7	8.81	

*: 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	2.32	1.33	10.01	13.66	23.23
6	2437	2.61	1.33	10.01	13.95	24.83
11	2462	2.48	1.34	10.01	13.83	24.15

IEEE802.11g 6Mbps

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	0.04	1.33	10.01	11.38	13.74
6	2437	-0.54	1.33	10.01	10.80	12.02
11	2462	1.42	1.34	10.01	12.77	18.92

IEEE802.11n-20 MCS0

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	-1.82	1.33	10.01	9.52	8.95
6	2437	-2.01	1.33	10.01	9.33	8.57
11	2462	-0.06	1.34	10.01	11.29	13.46

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012 06/05/2012
Temperature/ Humidity 23 deg. C / 62% RH 21 deg. C / 60% RH
Engineer Hiroshi Kukita Hiroshi Kukita
(1-10GHz) (30-1000MHz, 10-26.5GHz)
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	2390.000	PK	54.1	27.4	2.2	32.4	51.3	73.9	22.6	See 20dBc Data Sheet
Hori	2400.000	PK	65.4	27.4	2.2	32.4	62.6	-	-	
Hori	4824.000	PK	42.7	31.7	4.7	31.4	47.7	73.9	26.2	
Hori	7236.000	PK	43.1	36.3	5.6	32.4	52.6	73.9	21.3	
Hori	9648.000	PK	44.5	38.2	6.7	33.0	56.4	73.9	17.5	
Hori	24120.000	PK	46.7	38.0	-1.7	31.0	52.0	73.9	21.9	
Hori	2390.000	AV	38.9	27.4	2.2	32.4	36.1	53.9	17.8	See 20dBc Data Sheet
Hori	2400.000	AV	52.0	27.4	2.2	32.4	49.2	-	-	
Hori	4824.000	AV	29.8	31.7	4.7	31.4	34.8	53.9	19.1	
Hori	7236.000	AV	31.0	36.3	5.6	32.4	40.5	53.9	13.4	
Hori	9648.000	AV	33.0	38.2	6.7	33.0	44.9	53.9	9.0	
Hori	24120.000	AV	34.9	38.0	-1.7	31.0	40.2	53.9	13.7	
Vert	2390.000	PK	53.4	27.4	2.2	32.4	50.6	73.9	23.3	See 20dBc Data Sheet
Vert	2400.000	PK	64.2	27.4	2.2	32.4	61.4	-	-	
Vert	4824.000	PK	41.3	31.7	4.7	31.4	46.3	73.9	27.6	
Vert	7236.000	PK	43.0	36.3	5.6	32.4	52.5	73.9	21.4	
Vert	9648.000	PK	44.8	38.2	6.7	33.0	56.7	73.9	17.2	
Vert	24120.000	PK	46.6	38.0	-1.7	31.0	51.9	73.9	22.0	
Vert	2390.000	AV	38.7	27.4	2.2	32.4	35.9	53.9	18.0	See 20dBc Data Sheet
Vert	2400.000	AV	51.9	27.4	2.2	32.4	49.1	-	-	
Vert	4824.000	AV	30.0	31.7	4.7	31.4	35.0	53.9	18.9	
Vert	7236.000	AV	31.0	36.3	5.6	32.4	40.5	53.9	13.4	
Vert	9648.000	AV	34.7	38.2	6.7	33.0	46.6	53.9	7.3	
Vert	24120.000	AV	34.8	38.0	-1.7	31.0	40.1	53.9	13.8	

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

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

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

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

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	107.2	27.5	2.2	32.4	104.5	-	-	Carrier
Hori	2400.000	PK	54.9	27.4	2.2	32.4	52.1	84.5	32.4	
Vert	2412.000	PK	104.9	27.5	2.2	32.4	102.2	-	-	Carrier
Vert	2400.000	PK	55.1	27.4	2.2	32.4	52.3	82.2	29.9	

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. 32JE0205-HO
Date 06/05/2012
Temperature/ Humidity 21 deg. C / 60% RH
Engineer Hiroshi Kukita
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	4874.000	PK	42.5	31.9	4.7	31.4	47.7	73.9	26.2	
Hori	7311.000	PK	43.0	36.5	5.6	32.5	52.6	73.9	21.3	
Hori	9748.000	PK	42.8	38.3	6.7	33.0	54.8	73.9	19.1	
Hori	24370.000	PK	46.8	38.0	-1.7	30.9	52.2	73.9	21.7	
Hori	4874.000	AV	31.0	31.9	4.7	31.4	36.2	53.9	17.7	
Hori	7311.000	AV	30.3	36.5	5.6	32.5	39.9	53.9	14.0	
Hori	9748.000	AV	32.0	38.3	6.7	33.0	44.0	53.9	9.9	
Hori	24370.000	AV	34.8	38.0	-1.7	30.9	40.2	53.9	13.7	
Vert	4874.000	PK	42.3	31.9	4.7	31.4	47.5	73.9	26.4	
Vert	7311.000	PK	43.1	36.5	5.6	32.5	52.7	73.9	21.2	
Vert	9748.000	PK	44.3	38.3	6.7	33.0	56.3	73.9	17.6	
Vert	24370.000	PK	46.6	38.0	-1.7	30.9	52.0	73.9	21.9	
Vert	4874.000	AV	31.2	31.9	4.7	31.4	36.4	53.9	17.5	
Vert	7311.000	AV	30.4	36.5	5.6	32.5	40.0	53.9	13.9	
Vert	9748.000	AV	34.4	38.3	6.7	33.0	46.4	53.9	7.5	
Vert	24370.000	AV	34.8	38.0	-1.7	30.9	40.2	53.9	13.7	

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

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

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

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	32JE0205-HO	
Date	06/04/2012	06/05/2012
Temperature/ Humidity	23 deg. C / 62% RH	21 deg. C / 60% RH
Engineer	Hiroshi Kukita (1-10GHz)	Hiroshi Kukita (30-1000MHz, 10-26.5GHz)
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	2483.500	PK	51.2	27.7	2.2	32.3	48.8	73.9	25.1	
Hori	2489.756	PK	60.7	27.7	2.2	32.3	58.3	73.9	15.6	
Hori	4924.000	PK	42.0	32.1	4.6	31.4	47.3	73.9	26.6	
Hori	7386.000	PK	43.5	36.6	5.6	32.5	53.2	73.9	20.7	
Hori	9848.000	PK	43.9	38.5	6.7	33.1	56.0	73.9	17.9	
Hori	24620.000	PK	46.9	38.1	-1.7	30.9	52.4	73.9	21.5	
Hori	2483.500	AV	39.2	27.7	2.2	32.3	36.8	53.9	17.1	
Hori	2489.756	AV	37.8	27.7	2.2	32.3	35.4	53.9	18.5	
Hori	4924.000	AV	29.8	32.1	4.6	31.4	35.1	53.9	18.8	
Hori	7386.000	AV	30.8	36.6	5.6	32.5	40.5	53.9	13.4	
Hori	9848.000	AV	33.4	38.5	6.7	33.1	45.5	53.9	8.4	
Hori	24620.000	AV	34.9	38.1	-1.7	30.9	40.4	53.9	13.5	
Vert	2483.500	PK	50.5	27.7	2.2	32.3	48.1	73.9	25.8	
Vert	2489.833	PK	61.8	27.7	2.2	32.3	59.4	73.9	14.5	
Vert	4924.000	PK	42.0	32.1	4.6	31.4	47.3	73.9	26.6	
Vert	7386.000	PK	42.8	36.6	5.6	32.5	52.5	73.9	21.4	
Vert	9848.000	PK	43.9	38.5	6.7	33.1	56.0	73.9	17.9	
Vert	24620.000	PK	46.8	38.1	-1.7	30.9	52.3	73.9	21.6	
Vert	2483.500	AV	38.3	27.7	2.2	32.3	35.9	53.9	18.0	
Vert	2489.833	AV	37.7	27.7	2.2	32.3	35.3	53.9	18.6	
Vert	4924.000	AV	31.7	32.1	4.6	31.4	37.0	53.9	16.9	
Vert	7386.000	AV	30.8	36.6	5.6	32.5	40.5	53.9	13.4	
Vert	9848.000	AV	36.4	38.5	6.7	33.1	48.5	53.9	5.4	
Vert	24620.000	AV	34.8	38.1	-1.7	30.9	40.3	53.9	13.6	

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 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012 06/05/2012
Temperature/ Humidity 23 deg. C / 62% RH 21 deg. C / 60% RH
Engineer Hiroshi Kukita Hiroshi Kukita
(1-10GHz) (30-1000MHz, 10-26.5GHz)
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	2390.000	PK	62.4	27.4	2.2	32.4	59.6	73.9	14.3	See 20dBc Data Sheet
Hori	2400.000	PK	78.5	27.4	2.2	32.4	75.7	-	-	
Hori	4824.000	PK	41.4	31.7	4.7	31.4	46.4	73.9	27.5	
Hori	7236.000	PK	41.7	36.3	5.6	32.4	51.2	73.9	22.7	
Hori	9648.000	PK	44.7	38.2	6.7	33.0	56.6	73.9	17.3	
Hori	24120.000	PK	46.7	38.0	-1.7	31.0	52.0	73.9	21.9	
Hori	2390.000	AV	41.3	27.4	2.2	32.4	38.5	53.9	15.4	See 20dBc Data Sheet
Hori	2400.000	AV	55.0	27.4	2.2	32.4	52.2	-	-	
Hori	4824.000	AV	29.6	31.7	4.7	31.4	34.6	53.9	19.3	
Hori	7236.000	AV	30.8	36.3	5.6	32.4	40.3	53.9	13.6	
Hori	9648.000	AV	33.7	38.2	6.7	33.0	45.6	53.9	8.3	
Hori	24120.000	AV	34.7	38.0	-1.7	31.0	40.0	53.9	13.9	
Vert	2390.000	PK	63.5	27.4	2.2	32.4	60.7	73.9	13.2	See 20dBc Data Sheet
Vert	2400.000	PK	79.2	27.4	2.2	32.4	76.4	-	-	
Vert	4824.000	PK	41.0	31.7	4.7	31.4	46.0	73.9	27.9	
Vert	7236.000	PK	42.5	36.3	5.6	32.4	52.0	73.9	21.9	
Vert	9648.000	PK	43.9	38.2	6.7	33.0	55.8	73.9	18.1	
Vert	24120.000	PK	46.9	38.0	-1.7	31.0	52.2	73.9	21.7	
Vert	2390.000	AV	41.9	27.4	2.2	32.4	39.1	53.9	14.8	See 20dBc Data Sheet
Vert	2400.000	AV	54.8	27.4	2.2	32.4	52.0	-	-	
Vert	4824.000	AV	29.6	31.7	4.7	31.4	34.6	53.9	19.3	
Vert	7236.000	AV	30.8	36.3	5.6	32.4	40.3	53.9	13.6	
Vert	9648.000	AV	32.0	38.2	6.7	33.0	43.9	53.9	10.0	
Vert	24120.000	AV	34.7	38.0	-1.7	31.0	40.0	53.9	13.9	

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

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

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

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

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	102.5	27.5	2.2	32.4	99.8	-	-	Carrier
Hori	2400.000	PK	64.9	27.4	2.2	32.4	62.1	79.8	17.7	
Vert	2412.000	PK	100.2	27.5	2.2	32.4	97.5	-	-	Carrier
Vert	2400.000	PK	64.2	27.4	2.2	32.4	61.4	77.5	16.1	

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. 32JE0205-HO
Date 06/05/2012
Temperature/ Humidity 21 deg. C / 60% RH
Engineer Hiroshi Kukita
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	4874.000	PK	42.2	31.9	4.7	31.4	47.4	73.9	26.5	
Hori	7311.000	PK	42.2	36.5	5.6	32.5	51.8	73.9	22.1	
Hori	9748.000	PK	42.8	38.3	6.7	33.0	54.8	73.9	19.1	
Hori	24370.000	PK	46.7	38.0	-1.7	30.9	52.1	73.9	21.8	
Hori	4874.000	AV	29.5	31.9	4.7	31.4	34.7	53.9	19.2	
Hori	7311.000	AV	30.8	36.5	5.6	32.5	40.4	53.9	13.5	
Hori	9748.000	AV	33.1	38.3	6.7	33.0	45.1	53.9	8.8	
Hori	24370.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	
Vert	4874.000	PK	41.0	31.9	4.7	31.4	46.2	73.9	27.7	
Vert	7311.000	PK	42.6	36.5	5.6	32.5	52.2	73.9	21.7	
Vert	9748.000	PK	43.8	38.3	6.7	33.0	55.8	73.9	18.1	
Vert	24370.000	PK	46.9	38.0	-1.7	30.9	52.3	73.9	21.6	
Vert	4874.000	AV	31.0	31.9	4.7	31.4	36.2	53.9	17.7	
Vert	7311.000	AV	32.4	36.5	5.6	32.5	42.0	53.9	11.9	
Vert	9748.000	AV	34.9	38.3	6.7	33.0	46.9	53.9	7.0	
Vert	24370.000	AV	34.7	38.0	-1.7	30.9	40.1	53.9	13.8	

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

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

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012 06/05/2012
Temperature/ Humidity 23 deg. C / 62% RH 21 deg. C / 60% RH
Engineer Hiroshi Kukita Hiroshi Kukita
(1-10GHz) (30-1000MHz, 10-26.5GHz)
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	36.618	QP	29.3	16.2	7.2	32.2	20.5	40.0	19.5	
Hori	67.750	QP	37.7	6.9	7.7	32.2	20.1	40.0	19.9	
Hori	90.080	QP	34.2	8.4	8.0	32.2	18.4	43.5	25.1	
Hori	118.650	QP	23.0	12.8	8.4	32.3	11.9	43.5	31.6	
Hori	158.249	QP	23.1	15.3	8.8	32.2	15.0	43.5	28.5	
Hori	209.502	QP	25.0	17.0	9.2	32.2	19.0	43.5	24.5	
Hori	2483.500	PK	67.3	27.7	2.2	32.3	64.9	73.9	9.0	
Hori	4924.000	PK	40.5	32.1	4.6	31.4	45.8	73.9	28.1	
Hori	7386.000	PK	41.7	36.6	5.6	32.5	51.4	73.9	22.5	
Hori	9848.000	PK	43.8	38.5	6.7	33.1	55.9	73.9	18.0	
Hori	24620.000	PK	46.6	38.1	-1.7	30.9	52.1	73.9	21.8	
Hori	2483.500	AV	45.4	27.7	2.2	32.3	43.0	53.9	10.9	
Hori	4924.000	AV	29.4	32.1	4.6	31.4	34.7	53.9	19.2	
Hori	7386.000	AV	30.8	36.6	5.6	32.5	40.5	53.9	13.4	
Hori	9848.000	AV	33.0	38.5	6.7	33.1	45.1	53.9	8.8	
Hori	24620.000	AV	34.7	38.1	-1.7	30.9	40.2	53.9	13.7	
Vert	36.880	QP	40.3	16.1	7.2	32.2	31.4	40.0	8.6	
Vert	67.280	QP	36.8	7.0	7.7	32.2	19.3	40.0	20.7	
Vert	90.300	QP	39.3	8.5	8.0	32.2	23.6	43.5	19.9	
Vert	111.460	QP	30.8	11.8	8.3	32.3	18.6	43.5	24.9	
Vert	161.132	QP	30.4	15.4	8.8	32.2	22.4	43.5	21.1	
Vert	209.502	QP	28.5	17.0	9.2	32.2	22.5	43.5	21.0	
Vert	2483.500	PK	62.2	27.7	2.2	32.3	59.8	73.9	14.1	
Vert	4924.000	PK	40.4	32.1	4.6	31.4	45.7	73.9	28.2	
Vert	7386.000	PK	41.3	36.6	5.6	32.5	51.0	73.9	22.9	
Vert	9848.000	PK	44.0	38.5	6.7	33.1	56.1	73.9	17.8	
Vert	24620.000	PK	46.8	38.1	-1.7	30.9	52.3	73.9	21.6	
Vert	2483.500	AV	42.7	27.7	2.2	32.3	40.3	53.9	13.6	
Vert	4924.000	AV	29.4	32.1	4.6	31.4	34.7	53.9	19.2	
Vert	7386.000	AV	30.7	36.6	5.6	32.5	40.4	53.9	13.5	
Vert	9848.000	AV	34.3	38.5	6.7	33.1	46.4	53.9	7.5	
Vert	24620.000	AV	34.8	38.1	-1.7	30.9	40.3	53.9	13.6	

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 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012 06/05/2012
Temperature/ Humidity 23 deg. C / 62% RH 21 deg. C / 60% RH
Engineer Hiroshi Kukita Hiroshi Kukita
(1-10GHz) (30-1000MHz, 10-26.5GHz)
Mode 11n-20 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	2390.000	PK	62.9	27.4	2.2	32.4	60.1	73.9	13.8	
Hori	2400.000	PK	77.9	27.4	2.2	32.4	75.1	-	-	See 20dBc Data Sheet
Hori	2390.000	AV	40.3	27.4	2.2	32.4	37.5	53.9	16.4	
Hori	2400.000	AV	56.0	27.4	2.2	32.4	53.2	-	-	See 20dBc Data Sheet
Vert	2390.000	PK	61.4	27.4	2.2	32.4	58.6	73.9	15.3	
Vert	2400.000	PK	78.2	27.4	2.2	32.4	75.4	-	-	See 20dBc Data Sheet
Vert	2390.000	AV	41.0	27.4	2.2	32.4	38.2	53.9	15.7	
Vert	2400.000	AV	55.7	27.4	2.2	32.4	52.9	-	-	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).

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	100.3	27.5	2.2	32.4	97.6	-	-	Carrier
Hori	2400.000	PK	61.5	27.4	2.2	32.4	58.7	77.6	18.9	
Vert	2412.000	PK	100.6	27.5	2.2	32.4	97.9	-	-	Carrier
Vert	2400.000	PK	64.3	27.4	2.2	32.4	61.5	77.9	16.4	

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

Radiated Spurious Emission

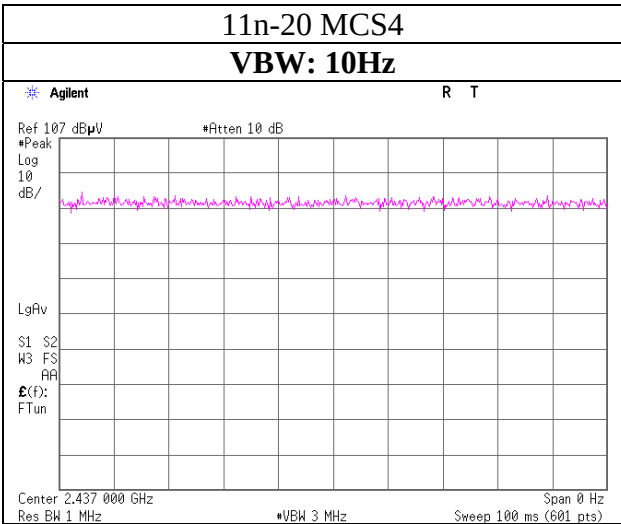
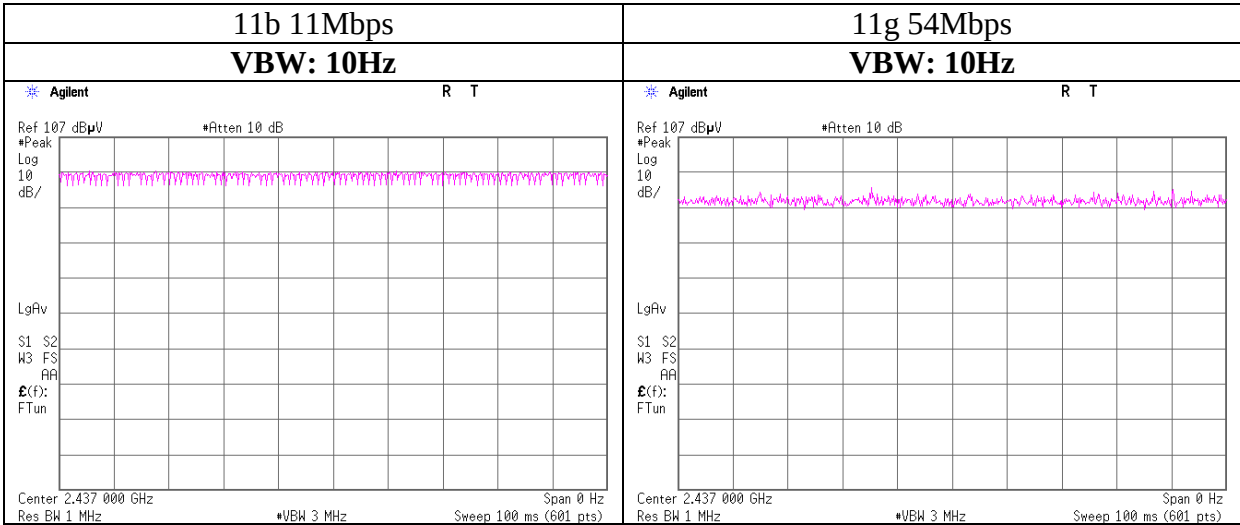
Test place Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No. 32JE0205-HO
Date 06/04/2012
Temperature/ Humidity 23 deg. C / 62% RH
Engineer Hiroshi Kukita
(1-10GHz)
Mode 11n-20 2462MHz

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	65.0	27.7	2.2	32.3	62.6	73.9	11.3	
Hori	2483.500	AV	44.0	27.7	2.2	32.3	41.6	53.9	12.3	
Vert	2483.500	PK	63.8	27.7	2.2	32.3	61.4	73.9	12.5	
Vert	2483.500	AV	42.4	27.7	2.2	32.3	40.0	53.9	13.9	

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

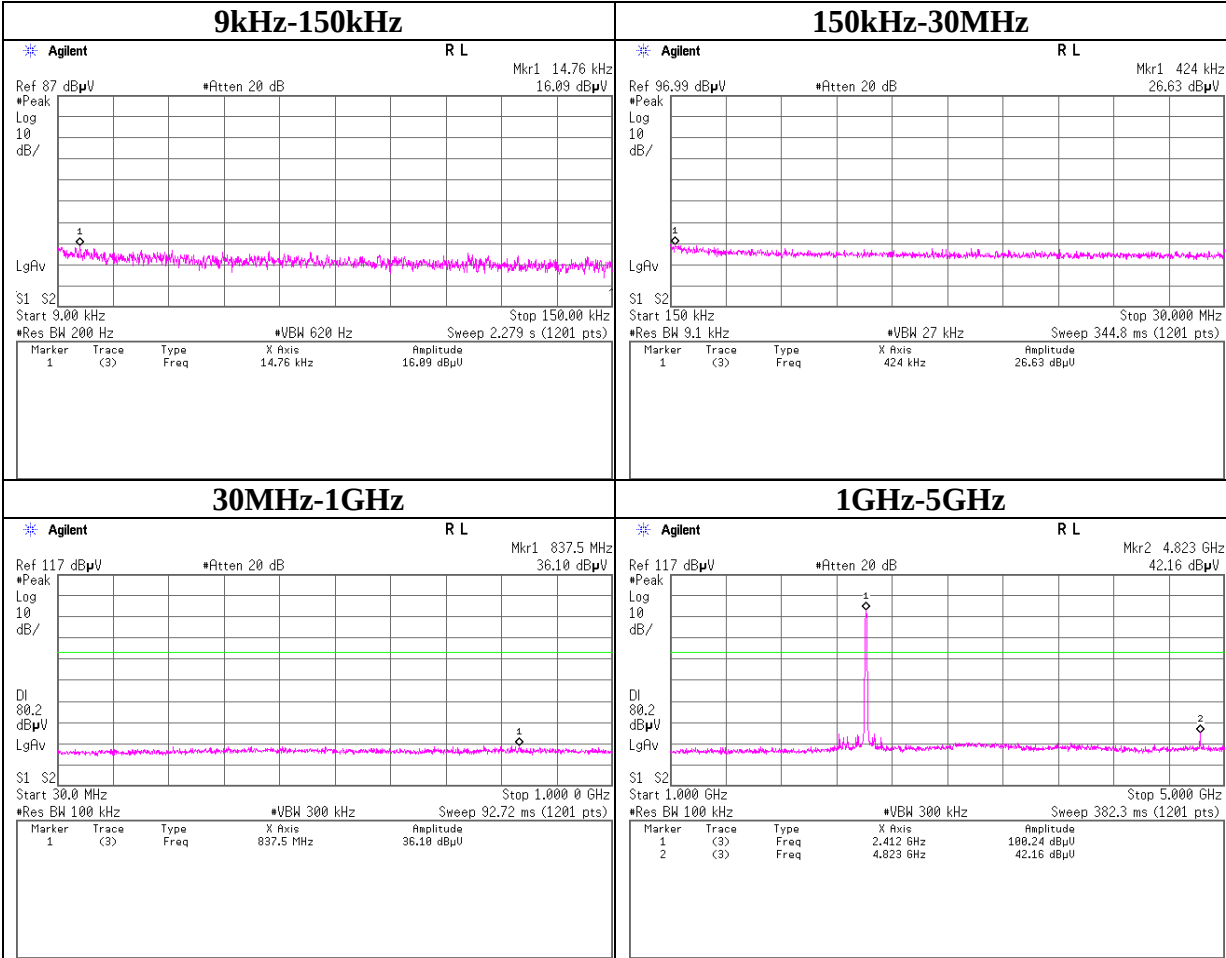
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

VBW (AV) Calculation



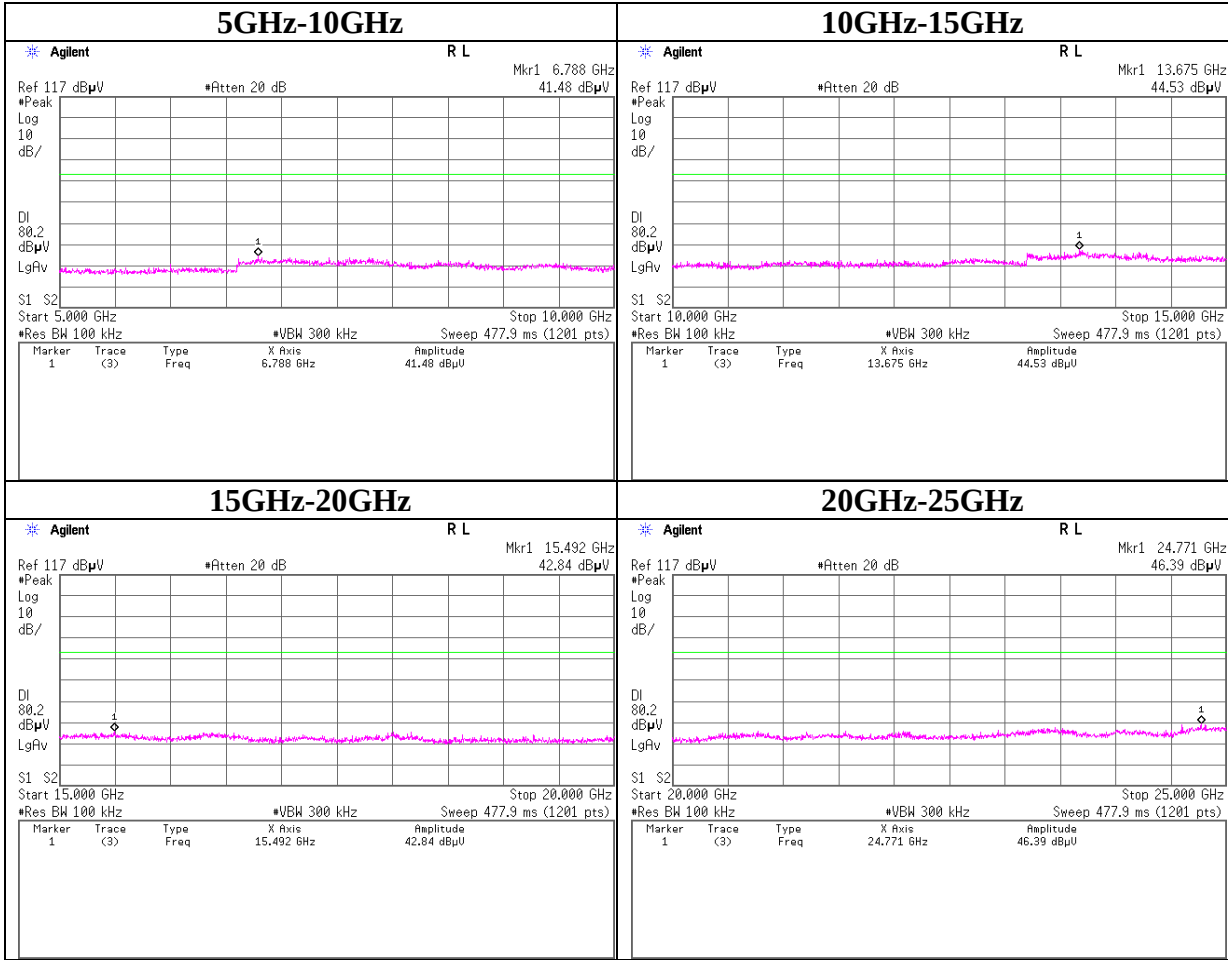
Conducted Spurious Emission

11b Tx 2412MHz



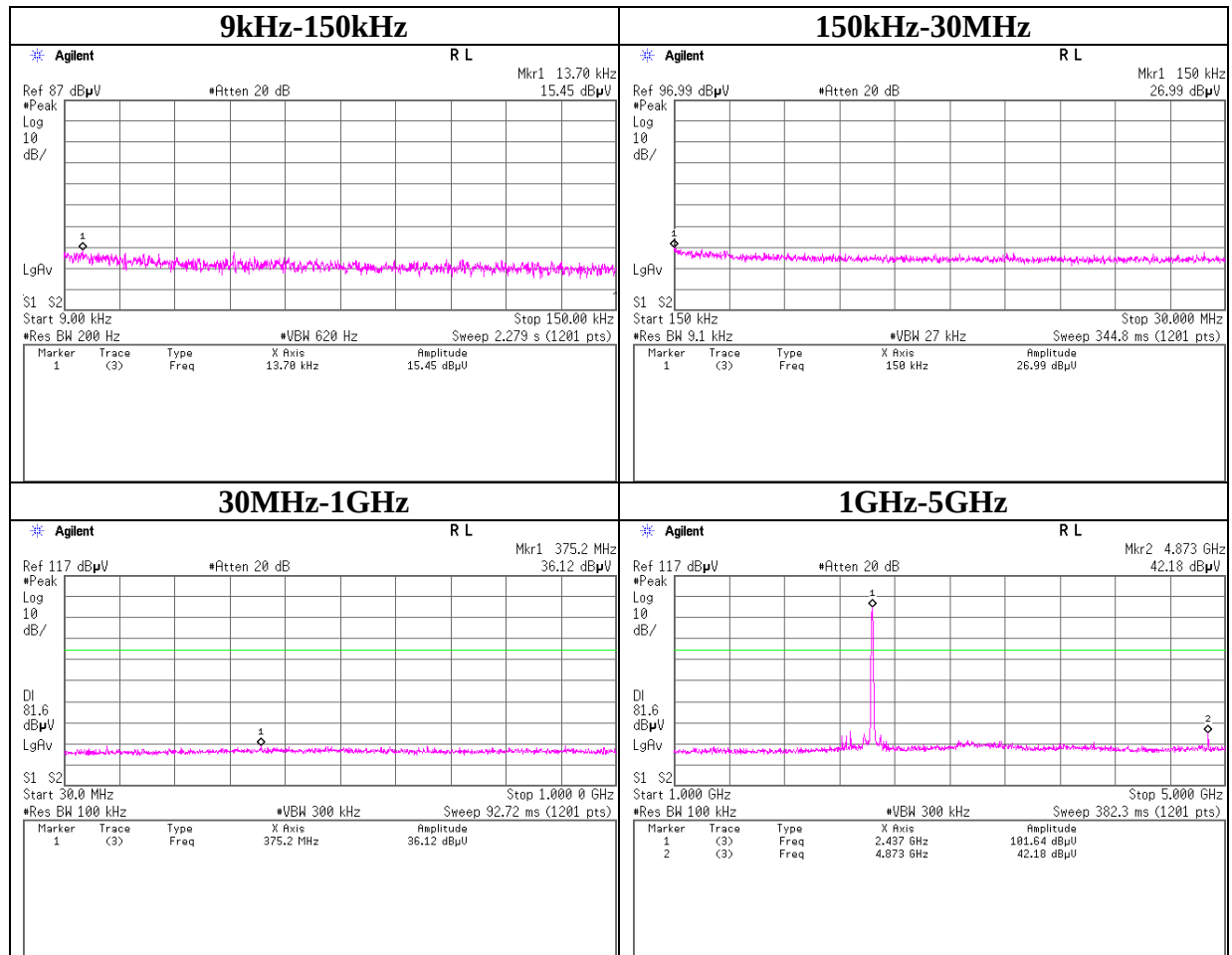
Conducted Spurious Emission

11b Tx 2412MHz



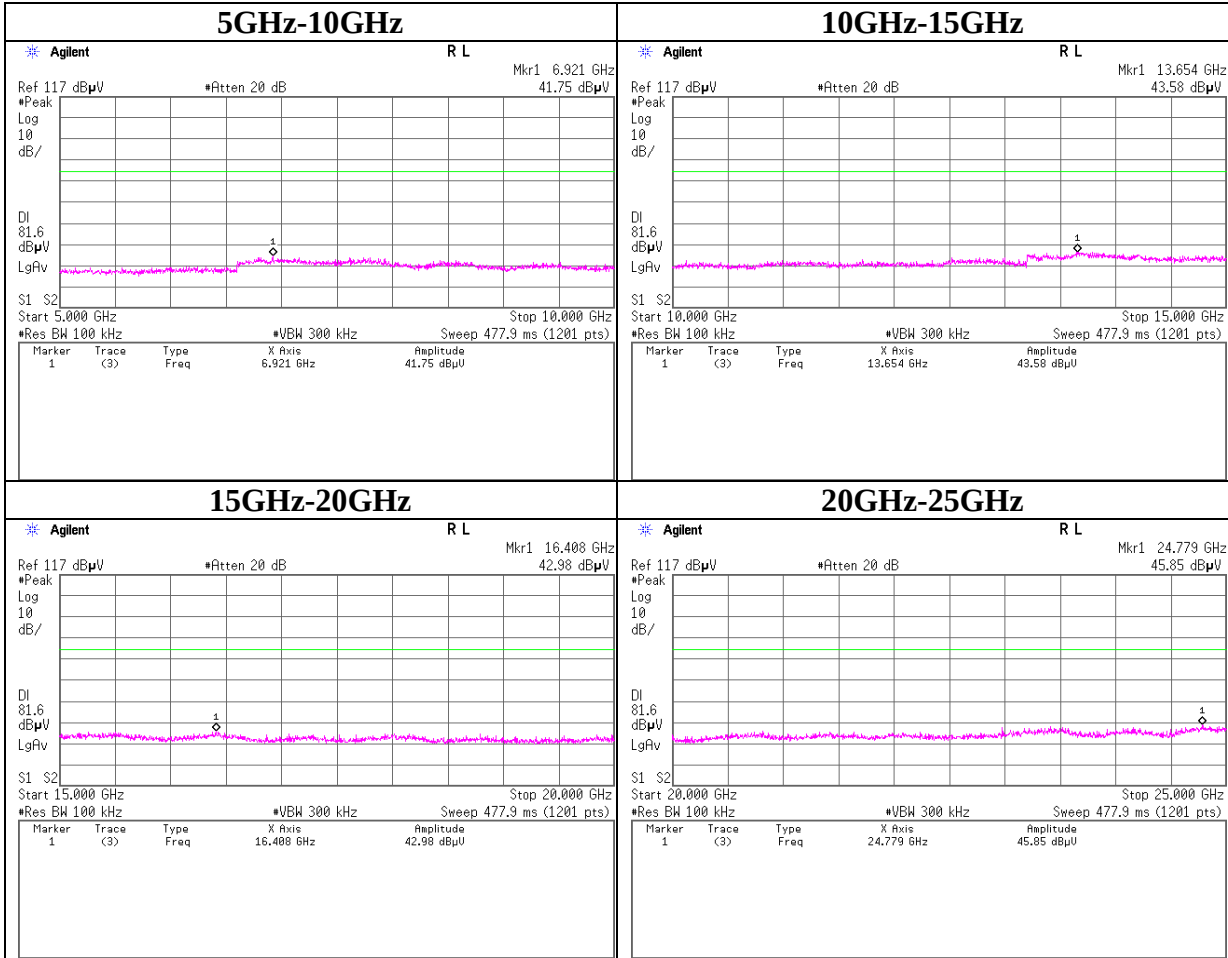
Conducted Spurious Emission

11b Tx 2437MHz



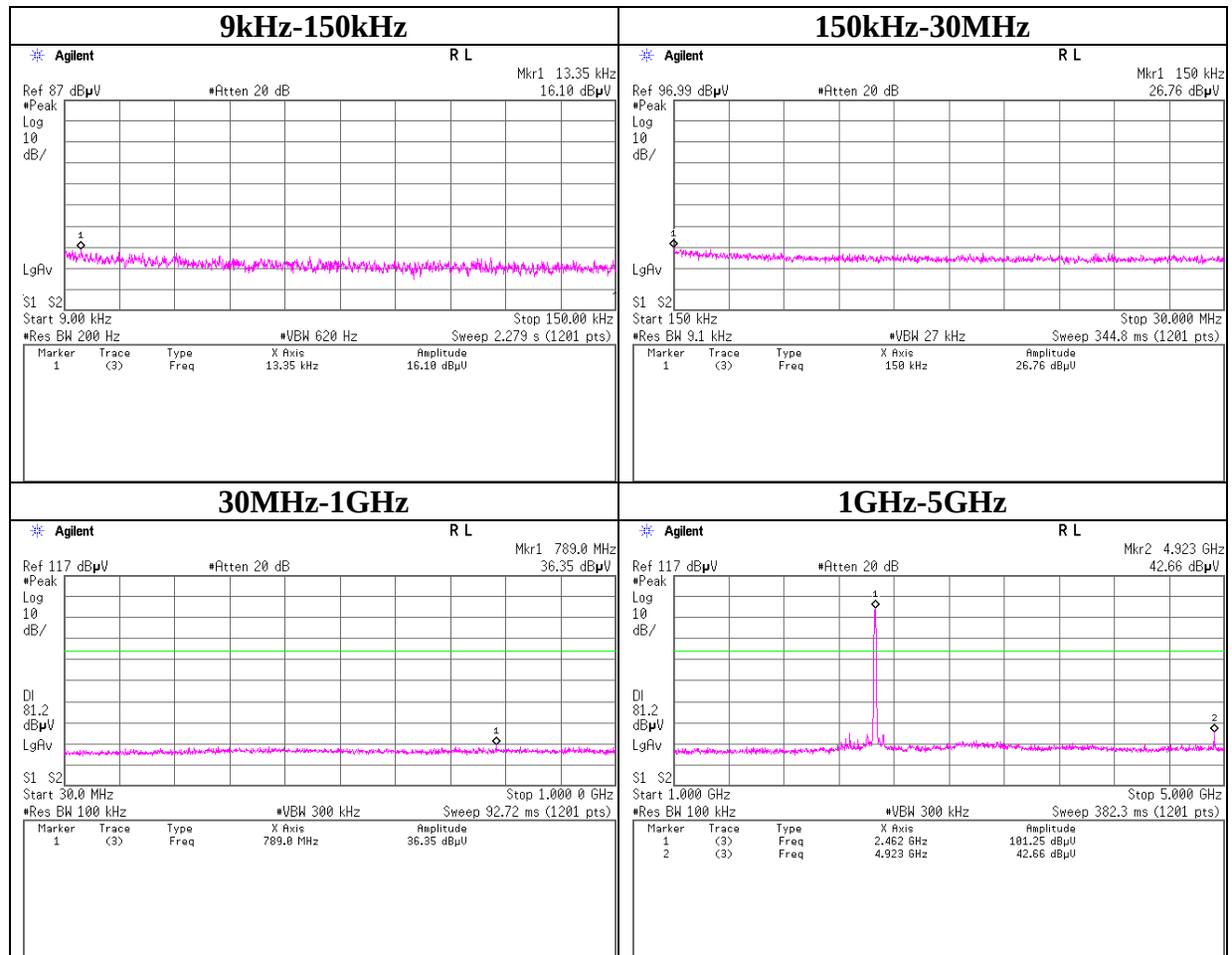
Conducted Spurious Emission

11b Tx 2437MHz



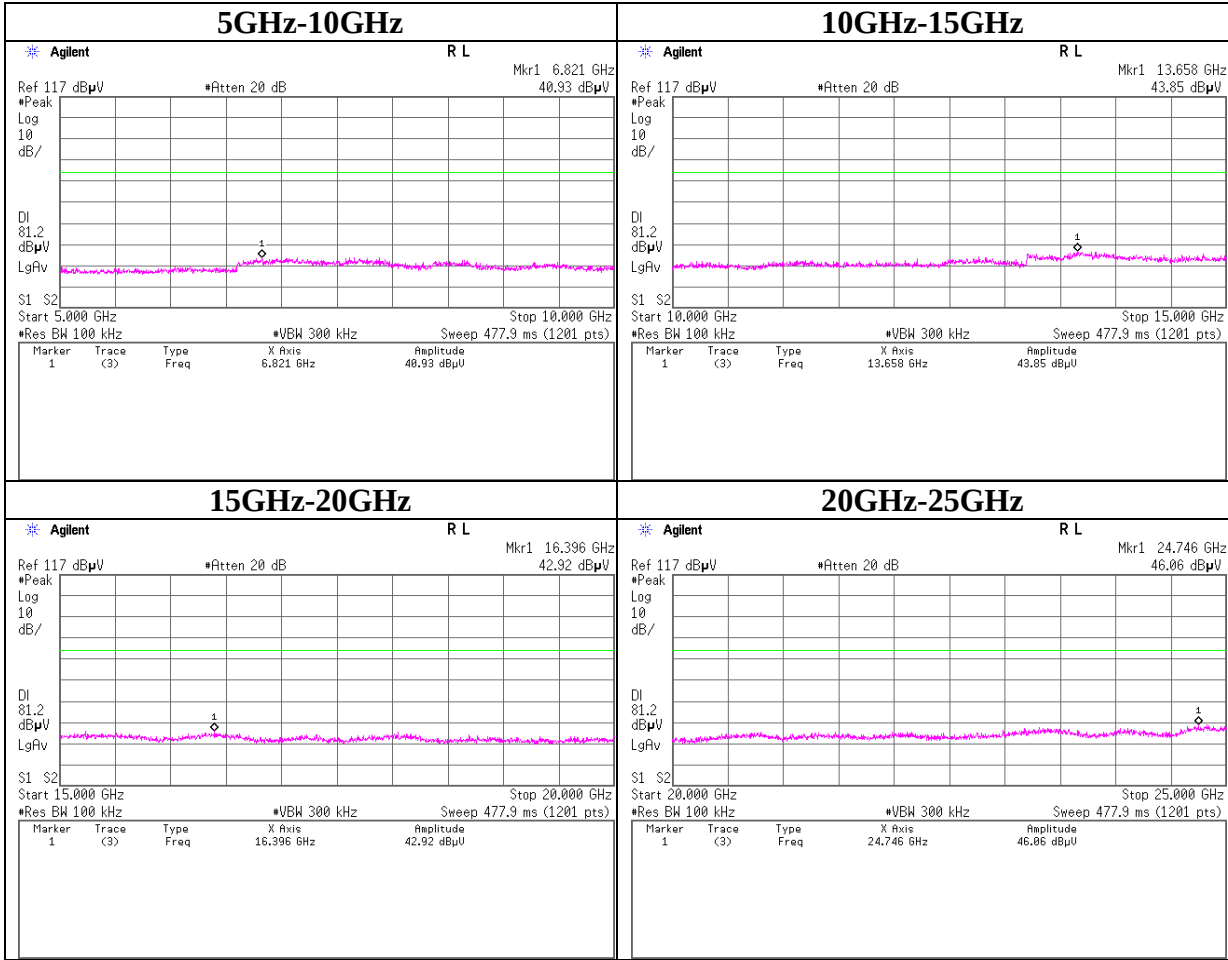
Conducted Spurious Emission

11b Tx 2462MHz



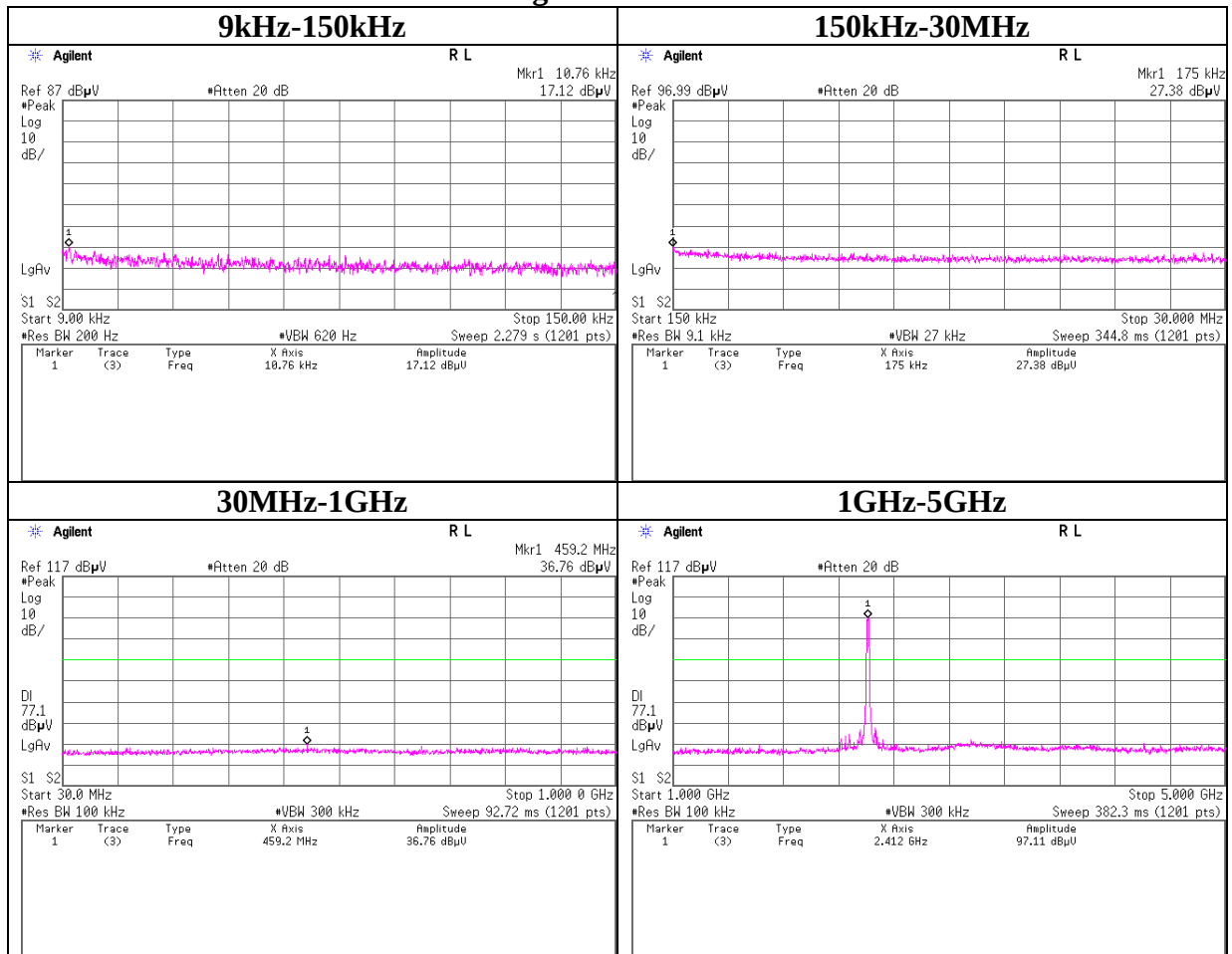
Conducted Spurious Emission

11b Tx 2462MHz



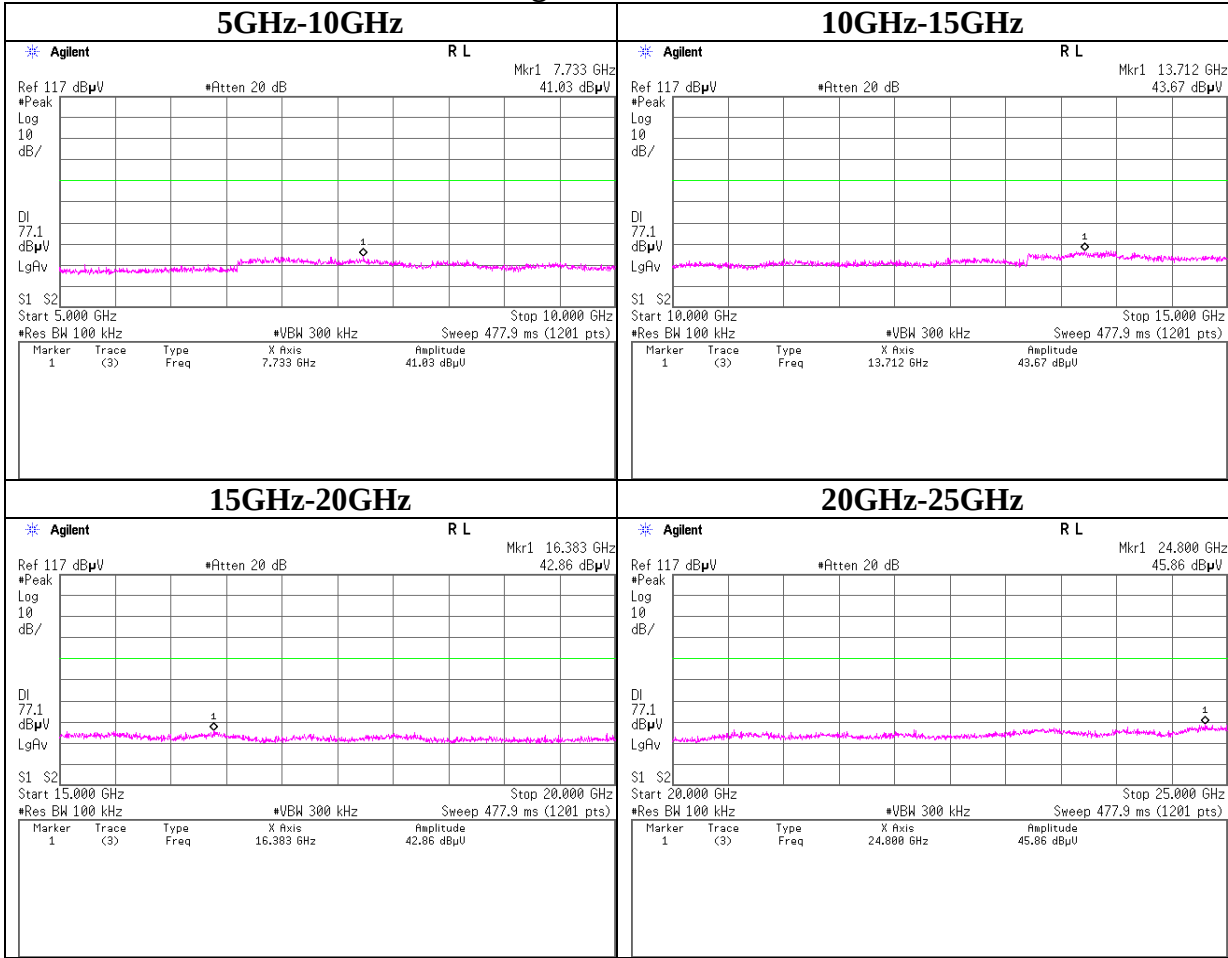
Conducted Spurious Emission

11g Tx 2412MHz



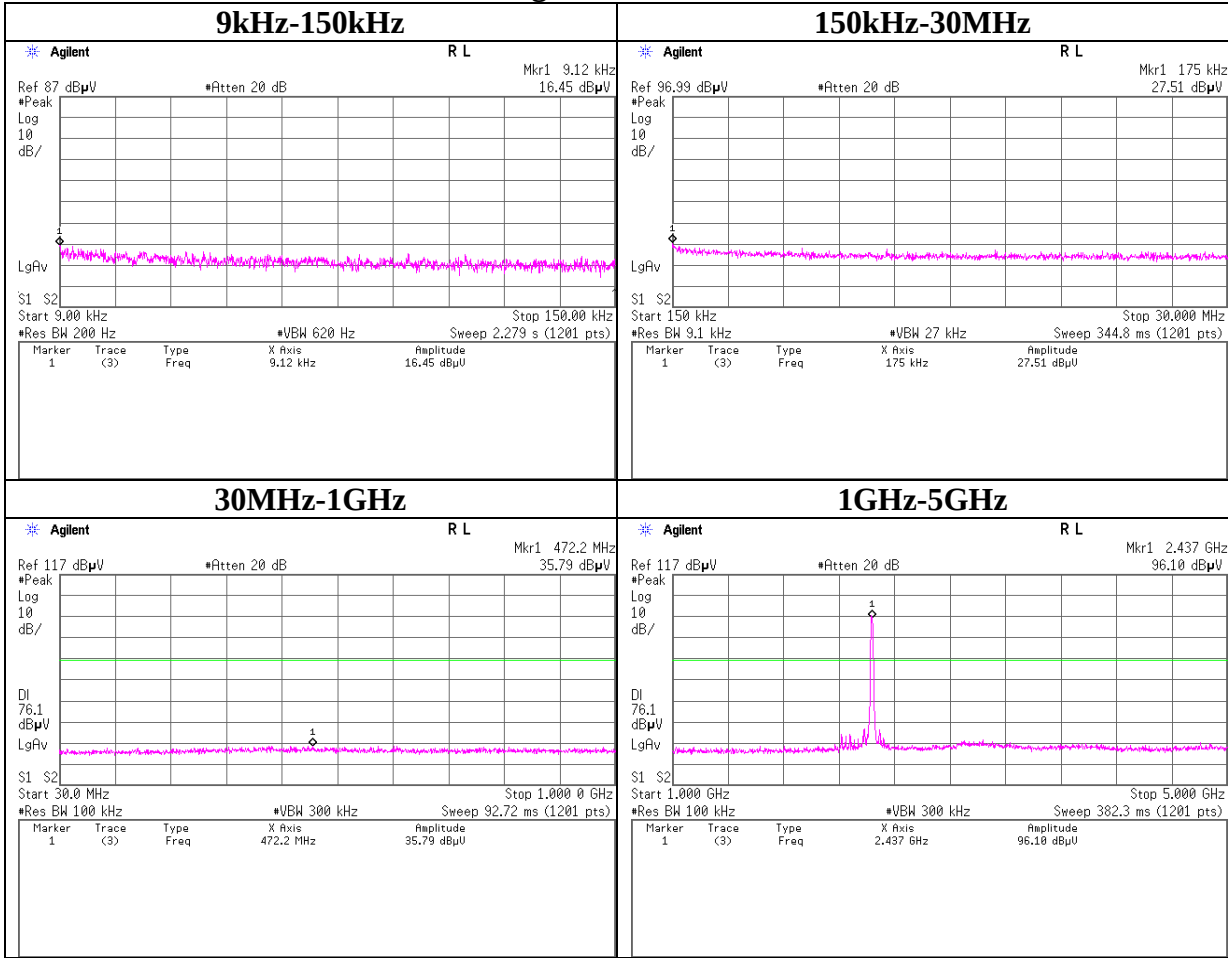
Conducted Spurious Emission

11g Tx 2412MHz



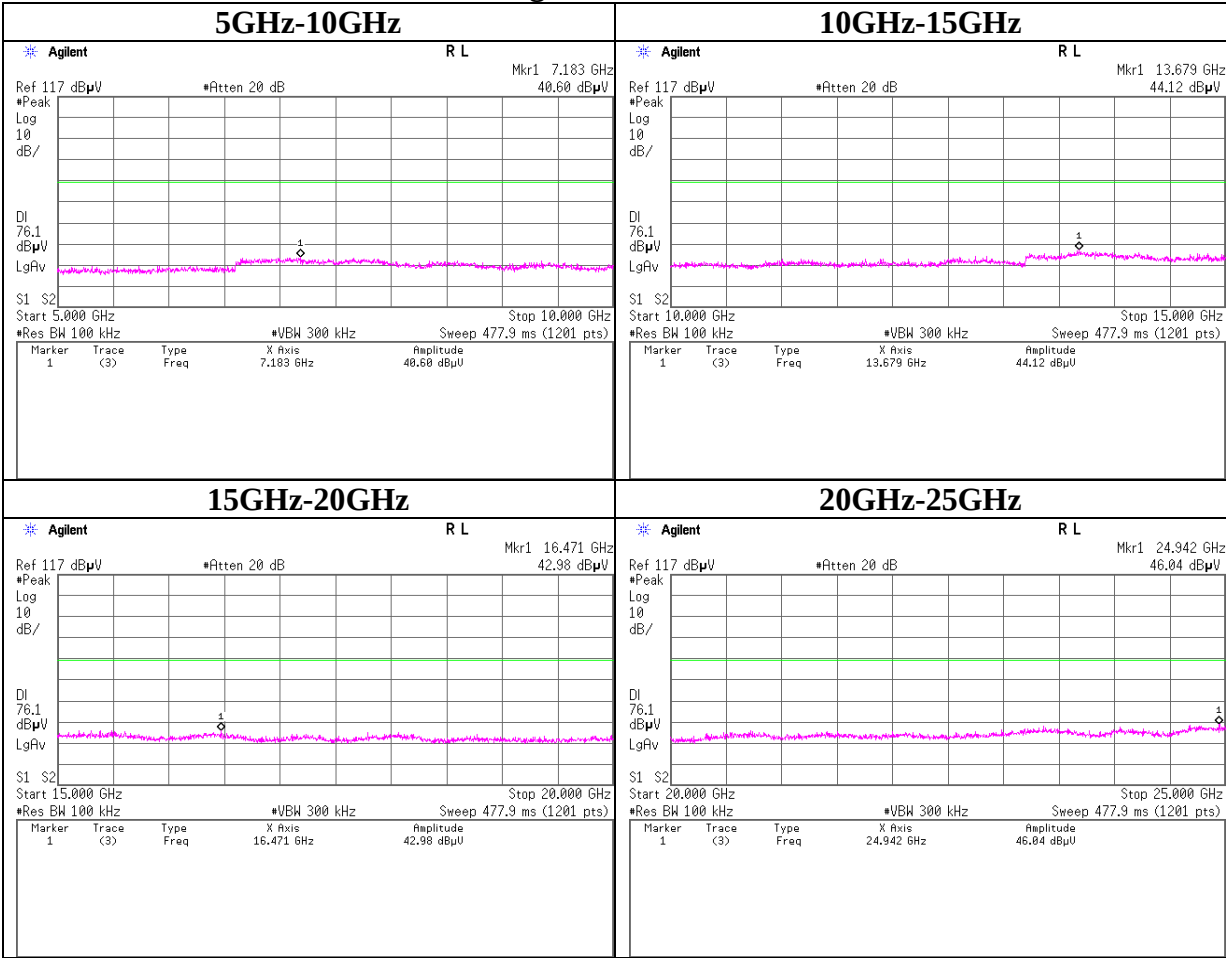
Conducted Spurious Emission

11g Tx 2437MHz



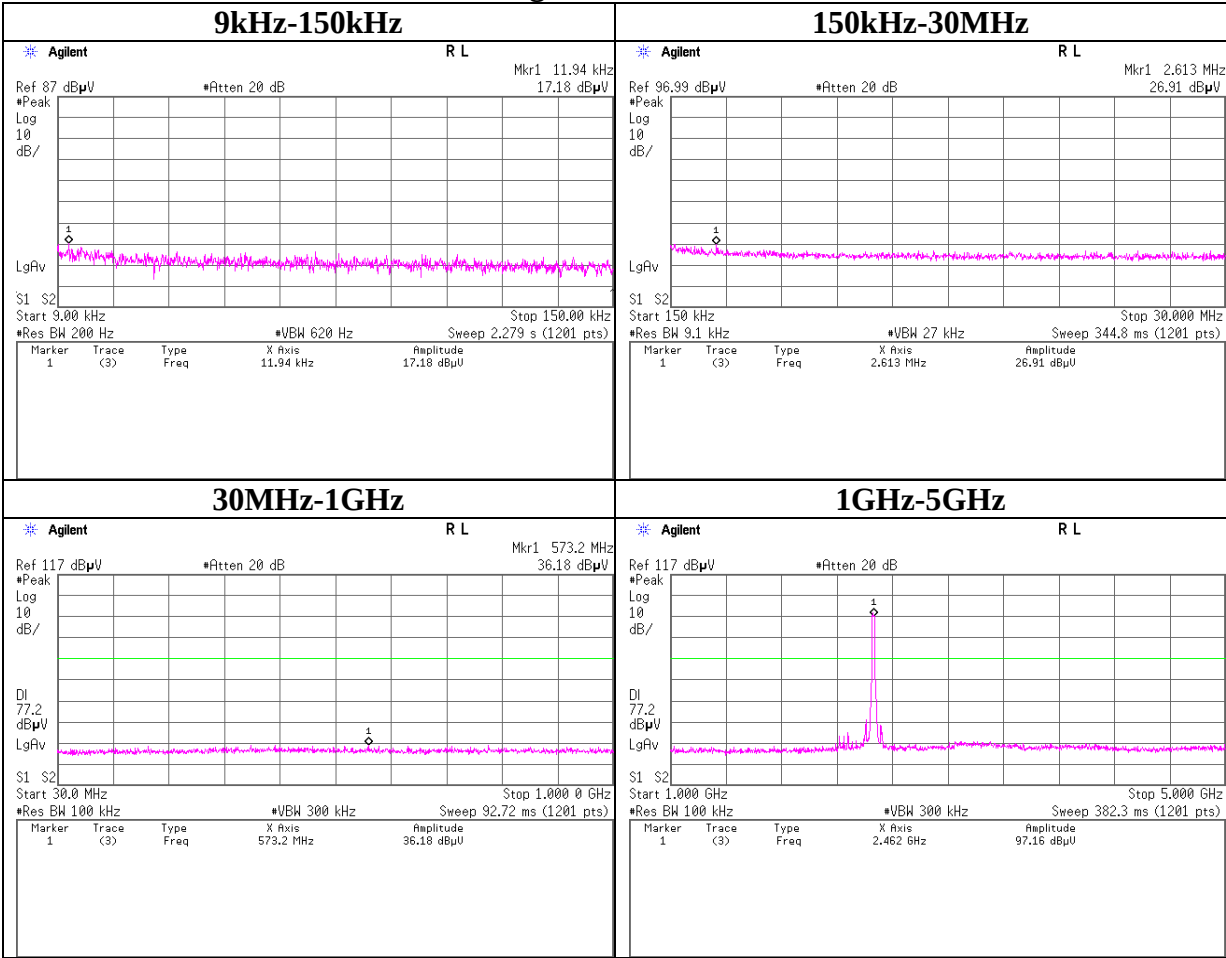
Conducted Spurious Emission

11g Tx 2437MHz



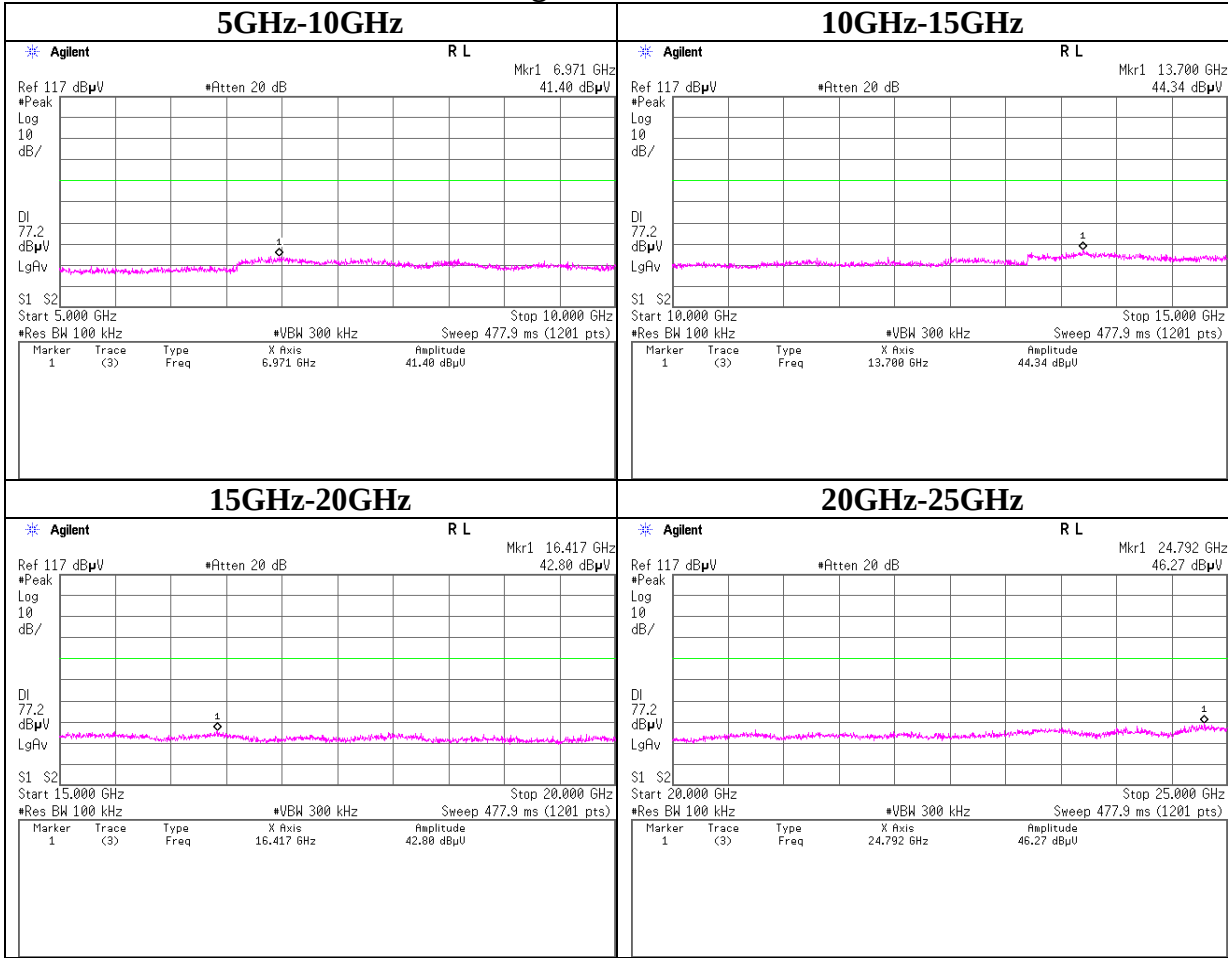
Conducted Spurious Emission

11g Tx 2462MHz



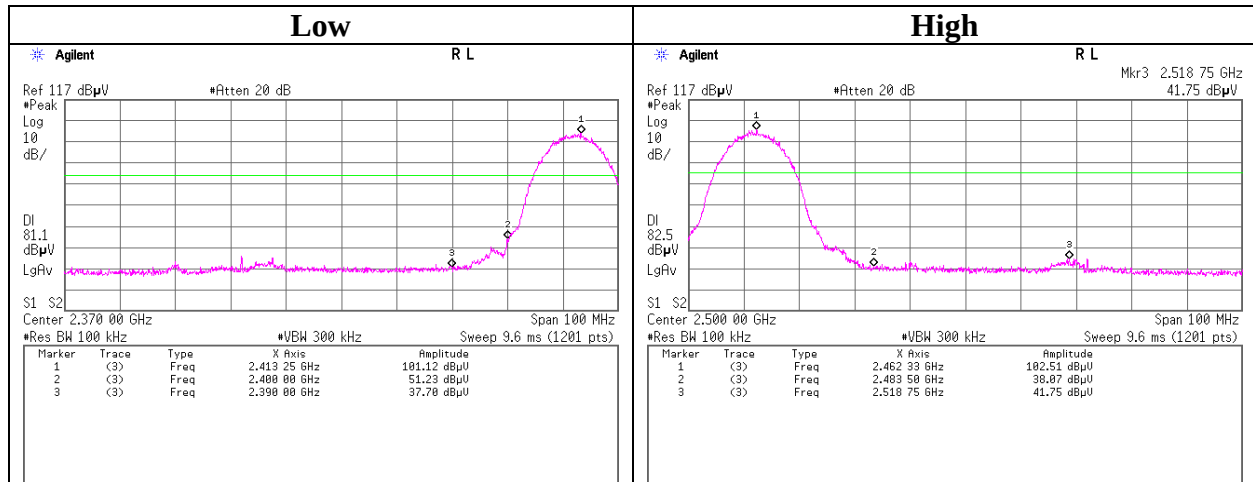
Conducted Spurious Emission

11g Tx 2462MHz

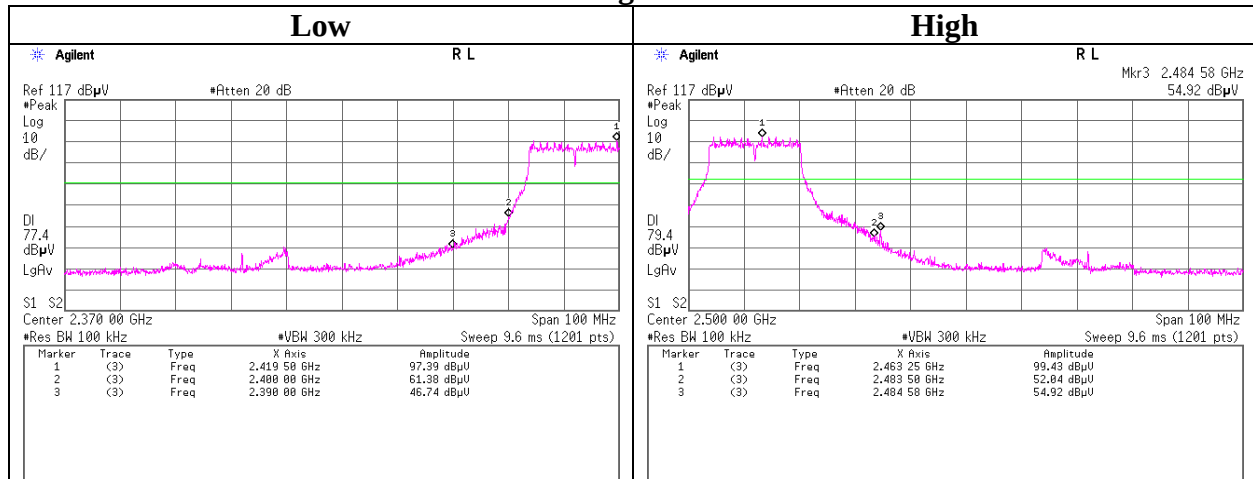


Conducted Emission Band Edge compliance

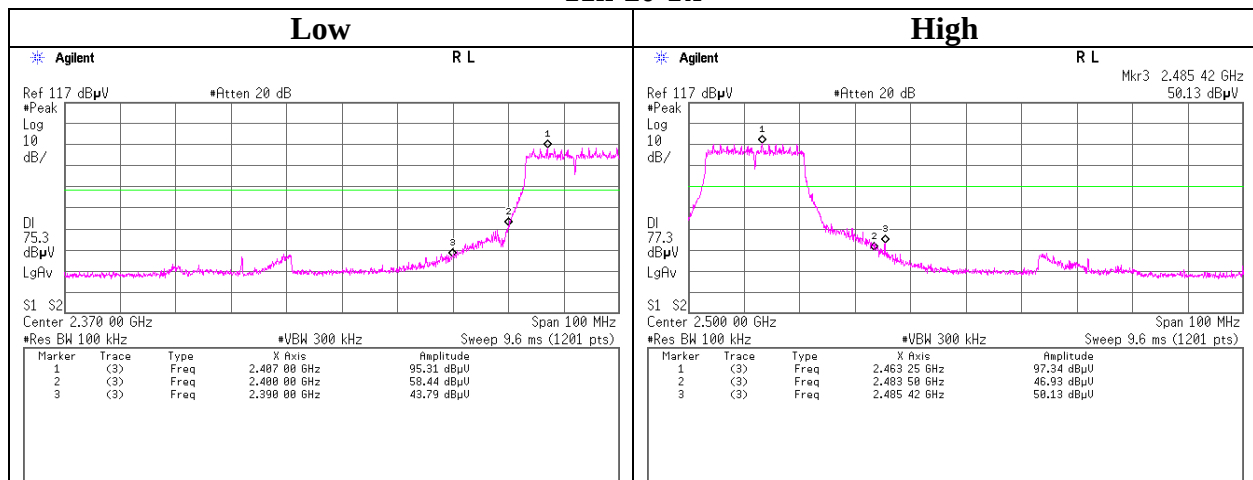
11b Tx



11g Tx



11n-20 Tx



Power Density

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32JE0205-HO
Date 06/11/2012
Temperature / Humidity 23 deg. C / 54% RH
Engineer Katsunori Okai
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-9.07	0.72	10.01	1.66	8.00	6.34
2437.00	-8.10	0.72	10.01	2.63	8.00	5.37
2462.00	-7.59	0.73	10.01	3.15	8.00	4.85

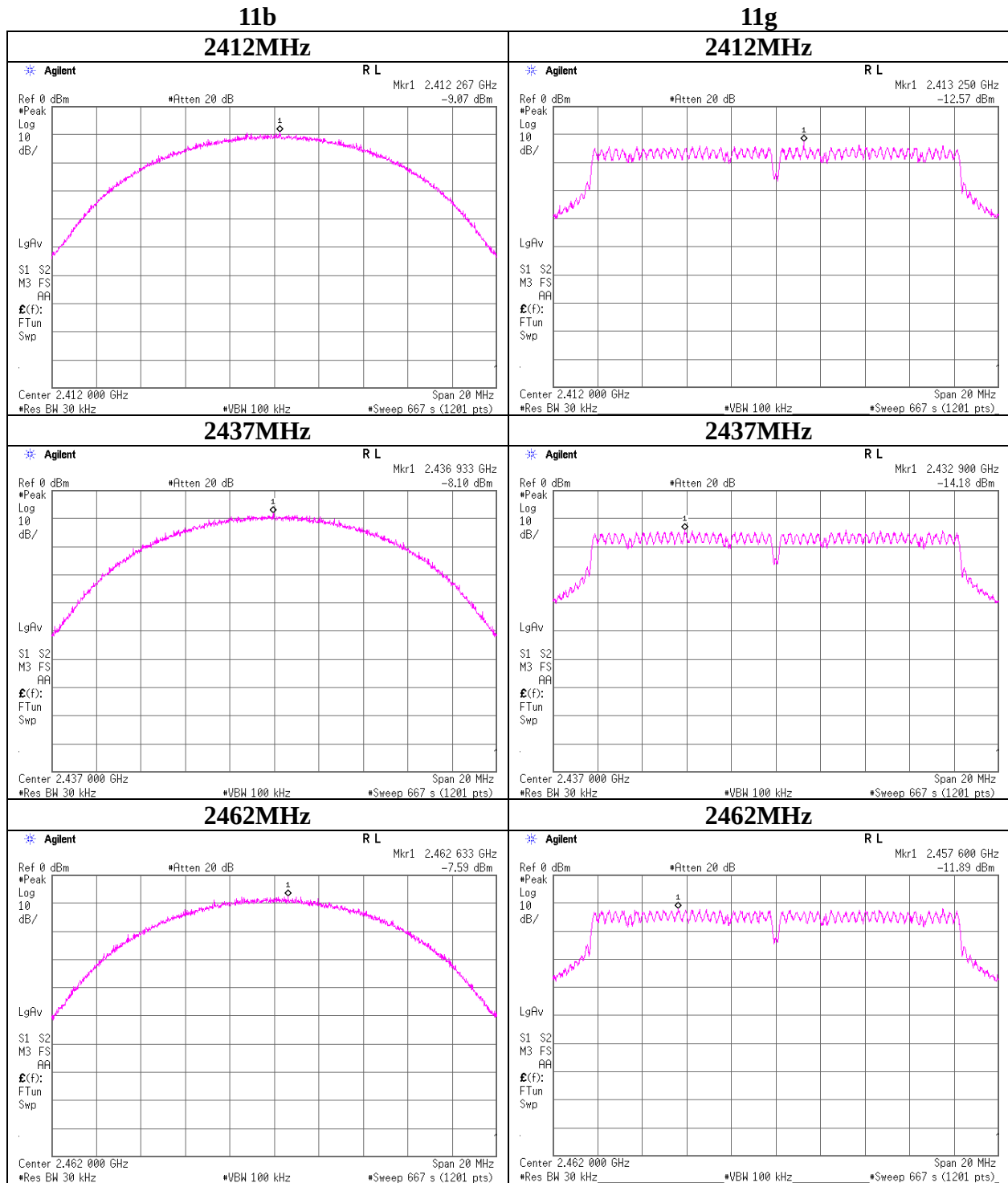
11g

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-12.57	0.72	10.01	-1.84	8.00	9.84
2437.00	-14.18	0.72	10.01	-3.45	8.00	11.45
2462.00	-11.89	0.73	10.01	-1.15	8.00	9.15

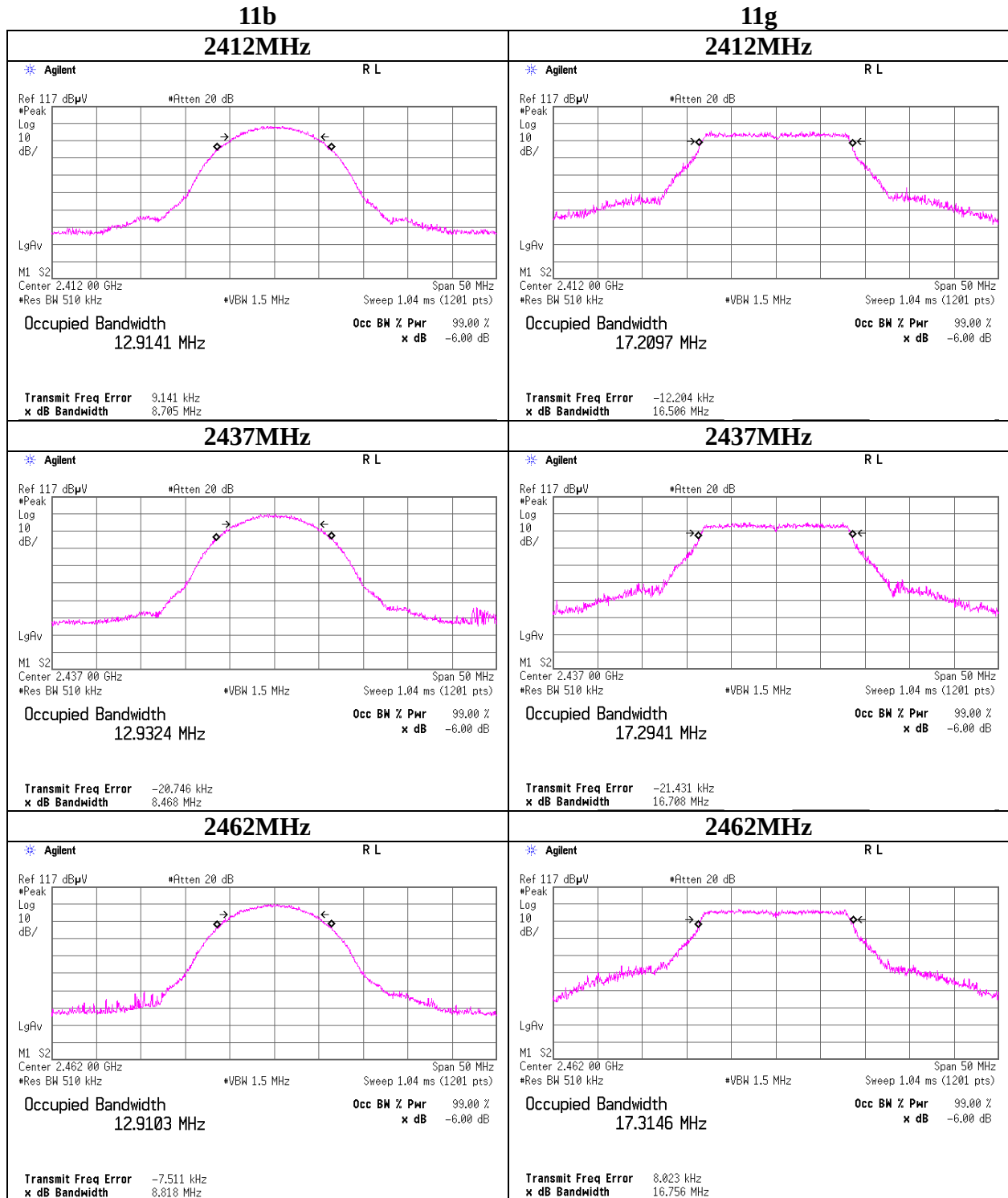
Sample Calculation:

Result = Reading + Cable Loss + Attenuator

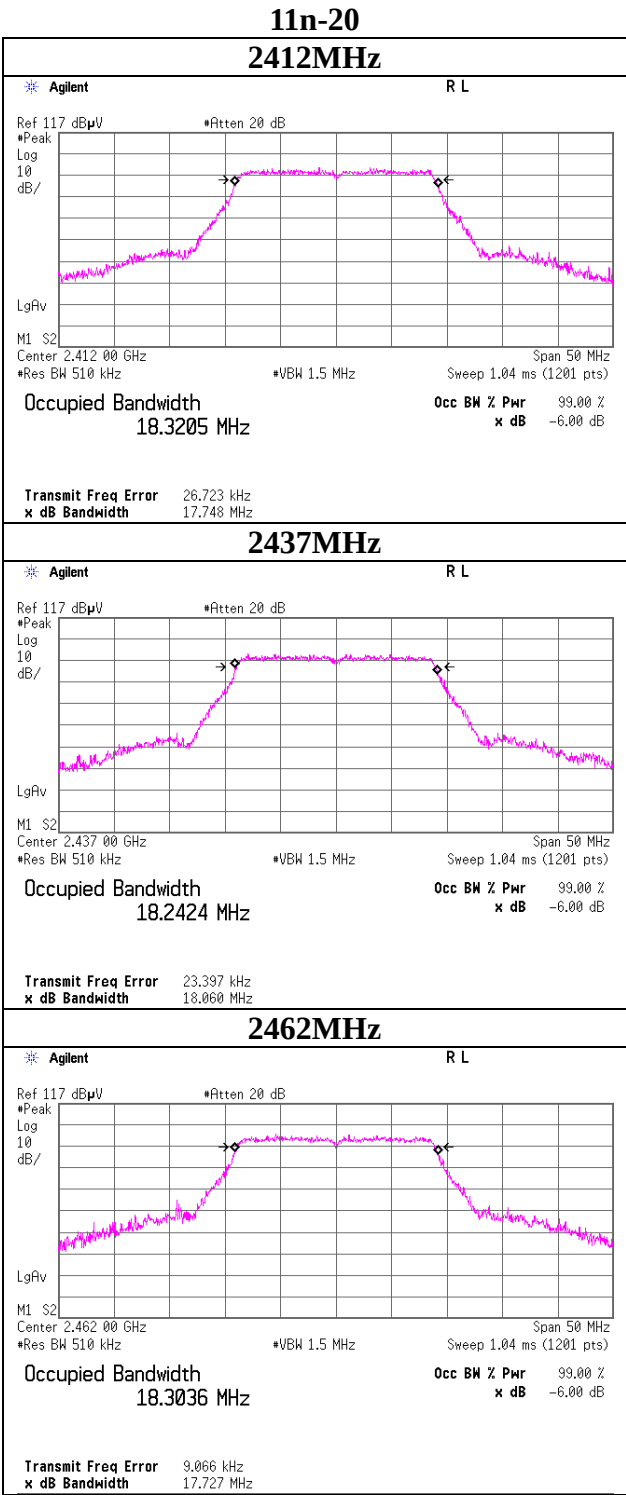
Power Density



99% Occupied Bandwidth



99%Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2011/09/12 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2011/09/12 * 12
MAT-25	Attenuator(10dB)(above 1GHz)	Agilent	8493C	71642	AT	2011/06/23 * 12
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	CE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	CE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	CE/RE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	CE	2011/06/30 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	CE	2012/04/03 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2012/02/09 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2012/02/16 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2012/02/03 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2011/09/30 * 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	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2012/04/06 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2012/05/25 * 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-19	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	602	RE	2011/09/07 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2011/12/08 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2011/08/11 * 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	2012/03/16 * 12

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

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

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

Test Item: CE: Conducted Emission

RE: Radiated Emission

AT: Antenna Terminal Conducted test

UL Japan, Inc.

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