



RADIO TEST REPORT

Test Report No. : 32DE0235-HO-A

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

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

Date of test: November 21 to 25, 2011

Representative test engineer:

Katsunori Okai

Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda

Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

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

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

13-EM-F0429

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SECTION 1: Customer information

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

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

2.1 Identification of E.U.T.

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

2.2 Product Description

Radio Specification

Bluetooth

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

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

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

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

GSM

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

[Additional model]

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

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

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

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

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

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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 10.8dB, 21.4186MHz, L AV 11.5dB 0.29820MHz, 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	1.0dB 2483.5MHz, AV, Horizontal	Complied	Conducted/ Radiated

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

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

3.3 Addition to standard

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

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

3.4 Uncertainty

EMI

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

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

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

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

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

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

Conducted Emission test

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

Radiated emission test(3m).

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

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

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

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

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

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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)	1Mbps, PN9
IEEE 802.11g (11g)	6Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20): 2.4G Band	MCS 0, PN9
IEEE 802.11a (11a): 5G Band	6Mbps, PN9
IEEE 802.11n SISO 20MHz BW (11n-20): 5G Band	MCS 0, 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:

Software name & version: HW Rev 0.7, SW: M410K.002

[Power Setting]

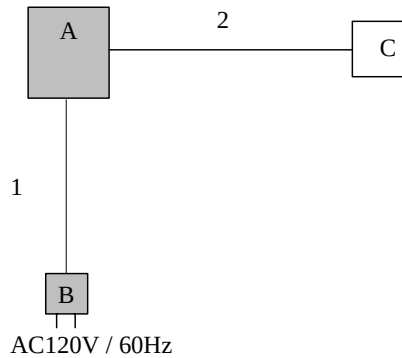
11b: 18dBm
11g: 17dBm
11n-20(2.4GHz): 15dBm
11a: 12dBm
11n-20(5GHz): 11dBm

*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
Maximum Peak Output Power	11g Tx	2437MHz
Spurious Emission (Conducted)	11n-20(2.4GHz) Tx	2462MHz
Spurious Emission (Band Edge Compliance)		
Power Density	11a Tx	5745MHz
99% Occupied Bandwidth	11n-20(5GHz) Tx	5785MHz 5825MHz
Spurious Emission (Radiated)	11b Tx	2412MHz
	11g Tx *2)	2437MHz 2462MHz
	11a Tx *2)	5745MHz 5785MHz 5825MHz
*1) The mode was tested as a representative, because it had the highest power at antenna terminal test and the noise levels at the mode/tested frequencies were equivalent to those of other modes/tested frequencies. *2) Since 11g/11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.		

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

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

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

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

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, 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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Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

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, 1.0m by 0.5m, 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) As both cycle and Off duration were short enough, 10Hz video bandwidth was used. (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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Facsimile : +81 596 24 8124

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, 40MHz	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	18, 20MHz	30kHz	100kHz	600, 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	100kHz	300kHz				
	(Less or equal to 5GHz)						
*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

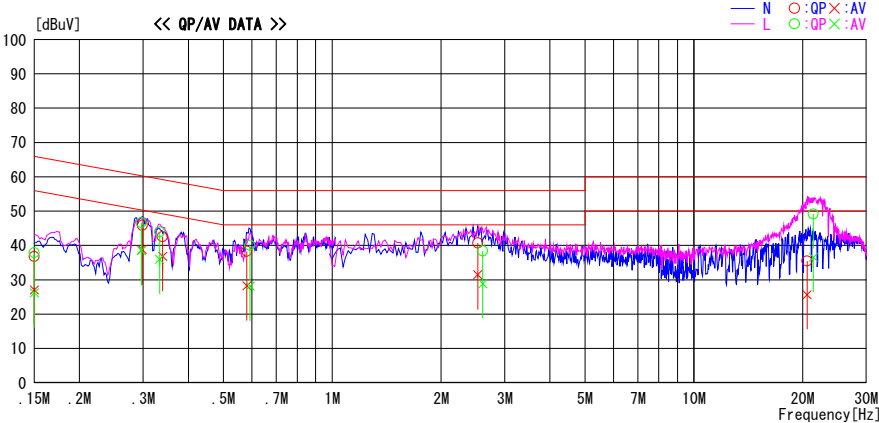
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/11/25

Report No. : 32DE0235-H0
Temp./Humi. : 22deg. C / 30% RH
Engineer : Katsunori Okai

Mode / Remarks : Tx WLAN 11g 2462MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	23.4	13.6	13.4	36.8	27.0	66.0	56.0	29.2	29.0	N	
0.29820	32.5	25.4	13.4	45.9	38.8	60.3	50.3	14.4	11.5	N	
0.33931	29.1	23.4	13.4	42.5	36.8	59.2	49.2	16.7	12.4	N	
0.58064	24.9	14.8	13.4	38.3	28.2	56.0	46.0	17.7	17.8	N	
2.52678	26.9	17.7	13.8	40.7	31.5	56.0	46.0	15.3	14.6	N	
20.56446	18.5	8.7	17.0	35.5	25.7	60.0	50.0	24.5	24.4	N	
0.15000	24.5	12.8	13.4	37.9	26.2	66.0	56.0	28.1	29.8	L	
0.29645	33.3	25.1	13.4	46.7	38.5	60.3	50.3	13.6	11.8	L	
0.33307	30.6	22.6	13.4	44.0	36.0	59.4	49.4	15.4	13.4	L	
0.59179	26.6	14.7	13.4	40.0	28.1	56.0	46.0	16.0	17.9	L	
2.60780	24.6	15.1	13.8	38.4	28.9	56.0	46.0	17.6	17.1	L	
21.41862	32.1	19.4	17.1	49.2	36.5	60.0	50.0	10.8	13.5	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

Report No. 32DE0235-HO
Test place Head Office EMC Lab. shielded room
Semi Anechoic Chamber No.6
Date 11/23/2011 11/24/2011 11/25/2011
Temperature / Humidity 22 deg. C. / 62 % RH 27 deg. C. / 62 % RH 24 deg. C. / 41 % RH
Engineer Tomohisa Nakagawa Tomohisa Nakagawa Tomohisa Nakagawa
Mode Tx

11b

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	8.079	>500
2437	7.587	>500
2462	8.051	>500

11g

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.144	>500
2437	15.325	>500
2462	15.121	>500

11n-20(2.4GHz)

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2412	15.124	>500
2437	14.650	>500
2462	17.086	>500

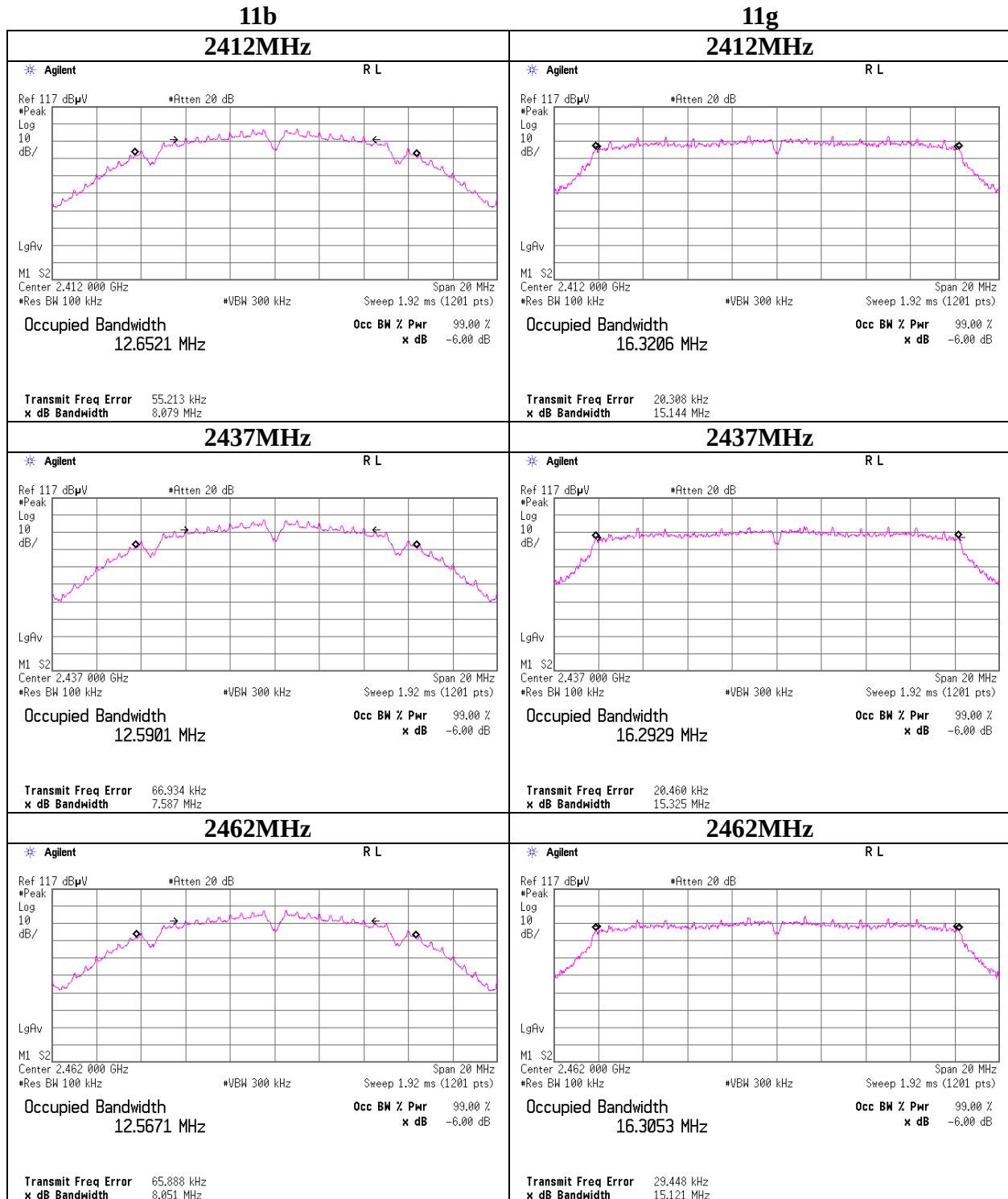
11a

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	15.350	>500
5785	15.228	>500
5825	15.092	>500

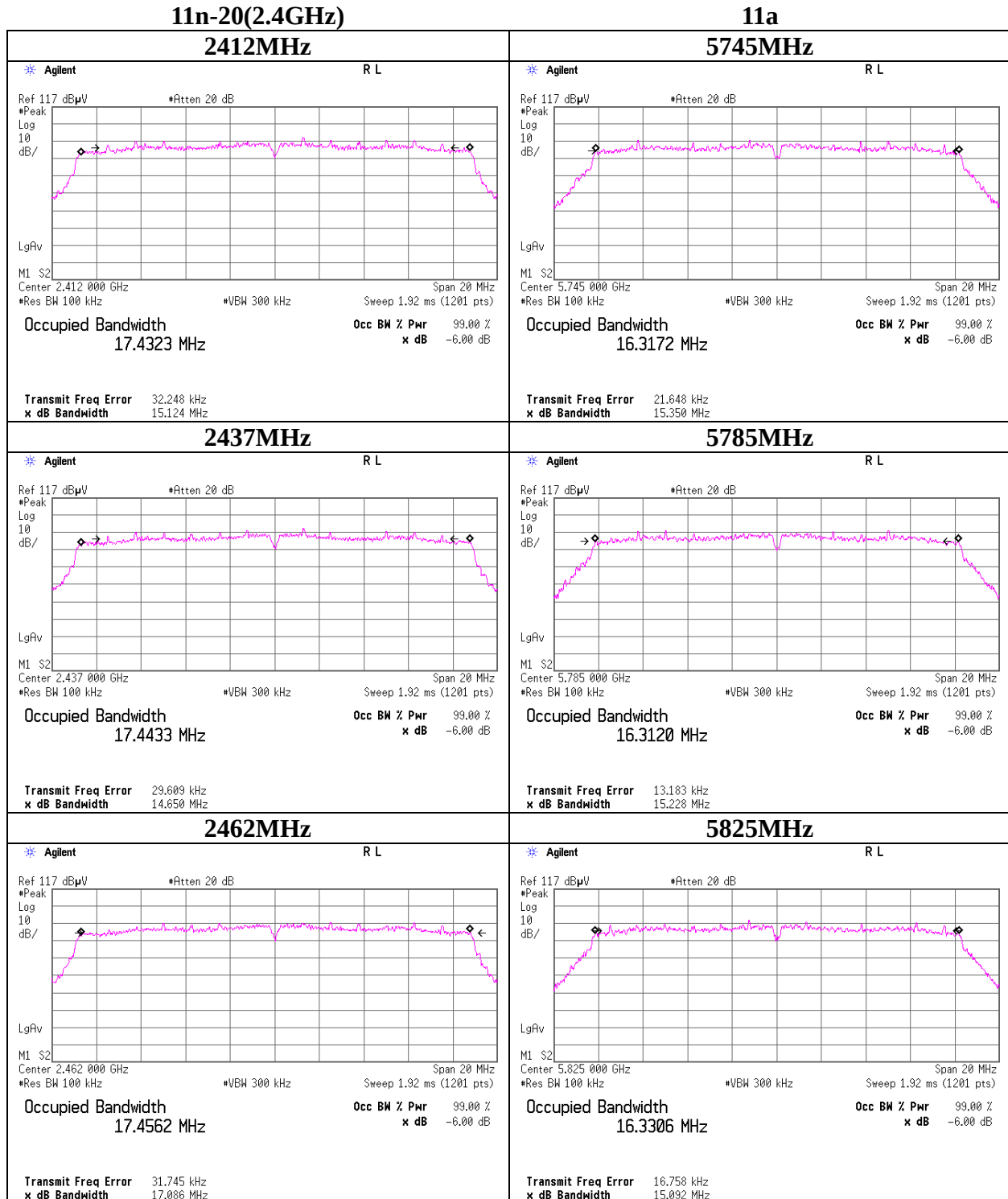
11n-20(5GHz)

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
5745	14.471	>500
5785	14.529	>500
5825	16.111	>500

6dB Bandwidth

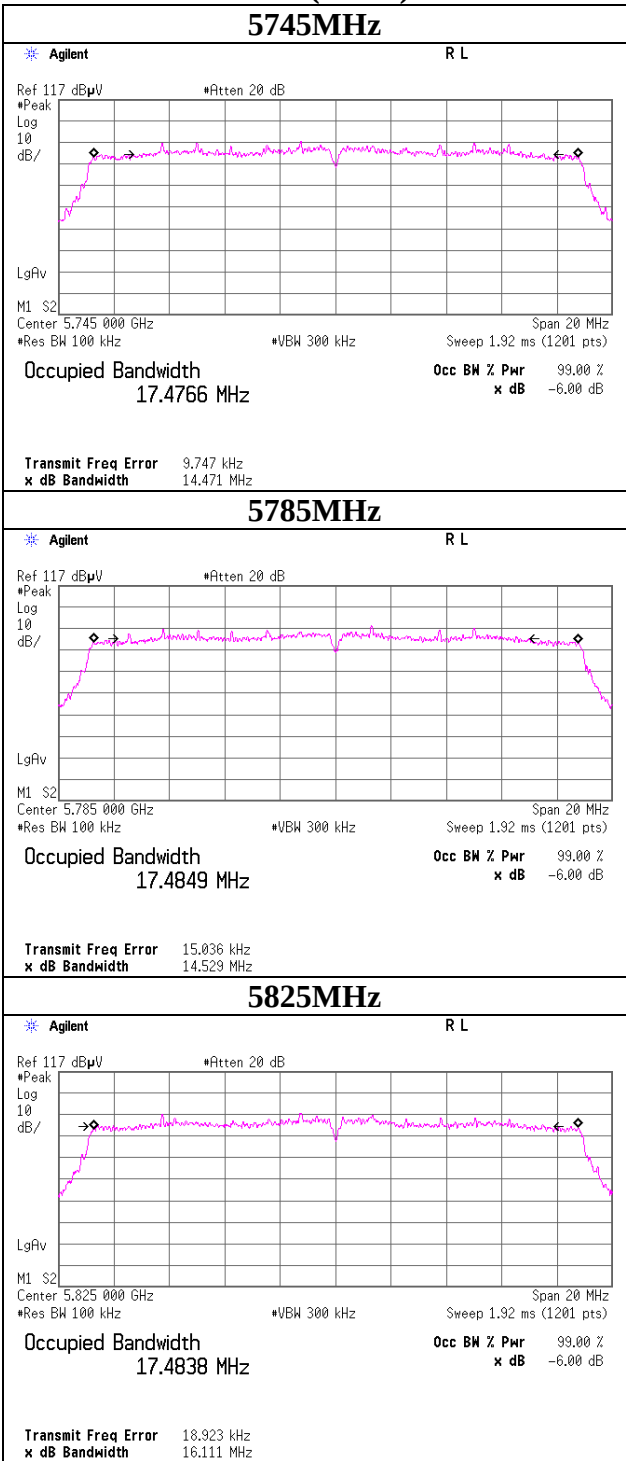


6dB Bandwidth



6dB Bandwidth

11n-20(5GHz)



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 32DE0235-HO
Date 11/22/2011
Temperature/ Humidity 22 deg. C / 40% RH
Engineer Tomohisa Nakagawa
Mode 11b Tx

11b

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	6.70	1.34	9.99	18.03	63.53	30.00	1000	11.97
2437	6.89	1.34	9.99	18.22	66.37	30.00	1000	11.78
2462	6.89	1.34	9.99	18.22	66.37	30.00	1000	11.78

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11b

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
1	6.89	*
2	6.86	
5.5	6.77	
11	6.67	

*: 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. 32DE0235-HO
Date 11/22/2011
Temperature/ Humidity 21 deg.C / 35% RH
Engineer Katsunori Okai
Mode 11g Tx

11g

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	11.37	1.34	9.99	22.70	186.21	30.00	1000	7.30
2437	11.77	1.34	9.99	23.10	204.17	30.00	1000	6.90
2462	12.03	1.34	9.99	23.36	216.77	30.00	1000	6.64

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11g

2437MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	11.77	*
9	11.25	
12	10.95	
18	10.85	
24	10.74	
36	11.41	
48	11.05	
54	11.03	

*: 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.	32DE0235-HO
Date	11/22/2011
Temperature/ Humidity	21 deg.C / 35% RH
Engineer	Katsunori Okai
Mode	11n-20(2.4GHz) Tx

11n-20(2.4GHz)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2412	10.19	1.34	9.99	21.52	141.91	30.00	1000	8.48
2437	10.54	1.34	9.99	21.87	153.82	30.00	1000	8.13
2462	10.88	1.34	9.99	22.21	166.34	30.00	1000	7.79

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11n-20(2.4GHz)

2437MHz

Rate [Mbps]	Reading [dBm]	Remark
MCS0	10.54	*
MCS1	10.11	
MCS2	10.23	
MCS3	10.26	
MCS4	10.05	
MCS5	10.16	
MCS6	10.02	
MCS7	10.08	

*: 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 shielded room
Report No. 32DE0235-HO
Date 11/24/2011
Temperature/ Humidity 22 deg.C / 32% RH
Engineer Takumi Shimada
Mode 11a Tx

11a

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	10.02	1.96	10.03	22.01	158.85	30.00	1000	7.99
5785	10.28	1.97	10.04	22.29	169.43	30.00	1000	7.71
5825	10.27	1.98	10.04	22.29	169.43	30.00	1000	7.71

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11a

5785MHz

Rate	Reading	Remark
[Mbps]	[dBm]	
6	10.28	*
9	10.12	
12	9.86	
18	9.72	
24	9.77	
36	9.68	
48	9.66	
54	9.62	

*: 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 shielded room
Report No. : 32DE0235-HO
Date : 11/24/2011
Temperature/ Humidity : 22 deg.C / 32% RH
Engineer : Takumi Shimada
Mode : 11n-20(5GHz) Tx

11n-20(5GHz)

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
5745	8.92	1.96	10.03	20.91	123.31	30.00	1000	9.09
5785	9.24	1.97	10.04	21.25	133.35	30.00	1000	8.75
5825	9.12	1.98	10.04	21.14	130.02	30.00	1000	8.86

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

11n-20(5GHz)

5785MHz

Rate [Mbps]	Reading [dBm]	Remark
MCS0	9.24	*
MCS1	9.02	
MCS2	8.93	
MCS3	8.77	
MCS4	8.73	
MCS5	8.46	
MCS6	8.47	
MCS7	8.73	

*: 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	4.04	1.34	9.99	15.37	34.43
6	2437	4.11	1.34	9.99	15.44	34.99
11	2462	4.18	1.34	9.99	15.51	35.56

IEEE802.11g 6Mbps

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	2.80	1.34	9.99	14.13	25.88
6	2437	2.64	1.34	9.99	13.97	24.95
11	2462	2.94	1.34	9.99	14.27	26.73

IEEE802.11n-20 MCS0

Ch	Frequency [MHz]	P/M Reading	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
1	2412	0.94	1.34	9.99	12.27	16.87
6	2437	0.98	1.34	9.99	12.31	17.02
11	2462	0.99	1.34	9.99	12.32	17.06

IEEE802.11a 5745-5825MHz band 6Mbps

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
149	5745.0	0.16	1.96	10.03	12.15	16.41
153	5765.0	0.17	1.97	10.03	12.17	16.48
157	5785.0	0.21	1.97	10.04	12.22	16.67
161	5805.0	0.16	1.97	10.04	12.17	16.48
165	5825.0	0.27	1.98	10.04	12.29	16.94

IEEE802.11n-20 5745-5825MHz band MCS3

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
		AVG			[dBm] AVG	[mW] AVG
149	5745.0	-1.09	1.96	10.03	10.90	12.30
153	5765.0	-0.92	1.97	10.03	11.08	12.82
157	5785.0	-0.97	1.97	10.04	11.04	12.71
161	5805.0	-1.10	1.97	10.04	10.91	12.33
165	5825.0	-1.02	1.98	10.04	11.00	12.59

Sample Calculation: Result = Reading + Cable Loss + Attenuator

Radiated Spurious Emission

Test place Head Office EMC Lab. No.1 and 4 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/22/2011 11/23/2011
Temperature/ Humidity 25 deg.C / 29% RH 19 deg.C / 34% RH
Engineer Katsunori Okai Katsunori Okai
(1-10GHz) (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	50.4	28.1	2.2	32.2	48.5	73.9	25.4	
Hori	2399.500	PK	57.5	28.1	2.2	32.2	55.6	-	-	- See 20dBc Data Sheet
Hori	2400.000	PK	56.2	28.1	2.2	32.2	54.3	-	-	- See 20dBc Data Sheet
Hori	4824.000	PK	52.0	31.2	3.8	31.4	55.6	73.9	18.3	
Hori	7236.000	PK	43.0	35.6	4.6	32.4	50.8	73.9	23.1	
Hori	9648.000	PK	43.7	38.3	5.5	33.2	54.3	73.9	19.6	
Hori	24120.000	PK	46.1	40.9	-1.7	31.6	53.7	73.9	20.2	
Hori	2390.000	AV	38.5	28.1	2.2	32.2	36.6	53.9	17.3	
Hori	2399.500	AV	50.2	28.1	2.2	32.2	48.3	-	-	- See 20dBc Data Sheet
Hori	2400.000	AV	47.2	28.1	2.2	32.2	45.3	-	-	- See 20dBc Data Sheet
Hori	4824.000	AV	49.1	31.2	3.8	31.4	52.7	53.9	1.2	
Hori	7236.000	AV	31.3	35.6	4.6	32.4	39.1	53.9	14.8	
Hori	9648.000	AV	32.8	38.3	5.5	33.2	43.4	53.9	10.5	
Hori	24120.000	AV	33.6	40.9	-1.7	31.6	41.2	53.9	12.7	
Vert	2390.000	PK	48.9	28.1	2.2	32.2	47.0	73.9	26.9	
Vert	2399.525	PK	55.1	28.1	2.2	32.2	53.2	-	-	- See 20dBc Data Sheet
Vert	2400.000	PK	55.9	28.1	2.2	32.2	54.0	-	-	- See 20dBc Data Sheet
Vert	4824.000	PK	51.1	31.2	3.8	31.4	54.7	73.9	19.2	
Vert	7236.000	PK	45.1	35.6	4.6	32.4	52.9	73.9	21.0	
Vert	9648.000	PK	43.2	38.3	5.5	33.2	53.8	73.9	20.1	
Vert	24120.000	PK	46.2	40.9	-1.7	31.6	53.8	73.9	20.1	
Vert	2390.000	AV	37.4	28.1	2.2	32.2	35.5	53.9	18.4	
Vert	2399.525	AV	48.4	28.1	2.2	32.2	46.5	-	-	- See 20dBc Data Sheet
Vert	2400.000	AV	46.0	28.1	2.2	32.2	44.1	-	-	- See 20dBc Data Sheet
Vert	4824.000	AV	47.5	31.2	3.8	31.4	51.1	53.9	2.8	
Vert	7236.000	AV	34.7	35.6	4.6	32.4	42.5	53.9	11.4	
Vert	9648.000	AV	34.9	38.3	5.5	33.2	45.5	53.9	8.4	
Vert	24120.000	AV	33.6	40.9	-1.7	31.6	41.2	53.9	12.7	

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	100.5	28.2	2.2	32.2	98.7	-	-	Carrier
Hori	2399.500	PK	51.8	28.1	2.2	32.2	49.9	78.7	28.8	
Hori	2400.000	PK	46.6	28.1	2.2	32.2	44.7	78.7	34.0	
Vert	2412.000	PK	99.7	28.2	2.2	32.2	97.9	-	-	Carrier
Vert	2399.525	PK	49.3	28.1	2.2	32.2	47.4	77.9	30.5	
Vert	2400.000	PK	45.5	28.1	2.2	32.2	43.6	77.9	34.3	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No. 1 and 4 Semi Anechoic Chamber
Report No. : 32DE0235-HO
Date : 11/22/2011 11/23/2011
Temperature/ Humidity : 25 deg.C / 29% RH 19 deg.C / 34% RH
Engineer : Katsunori Okai Katsunori Okai
(1-10GHz) (10-26.5GHz)
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	50.6	31.4	3.8	31.4	54.4	73.9	19.5	
Hori	7311.000	PK	44.2	35.7	4.6	32.5	52.0	73.9	21.9	
Hori	9748.000	PK	44.0	38.4	5.5	33.2	54.7	73.9	19.2	
Hori	24370.000	PK	46.3	40.8	-1.7	31.4	54.0	73.9	19.9	
Hori	4874.000	AV	46.5	31.4	3.8	31.4	50.3	53.9	3.6	
Hori	7311.000	AV	33.7	35.7	4.6	32.5	41.5	53.9	12.4	
Hori	9748.000	AV	34.9	38.4	5.5	33.2	45.6	53.9	8.3	
Hori	24370.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	
Vert	4874.000	PK	49.7	31.4	3.8	31.4	53.5	73.9	20.4	
Vert	7311.000	PK	45.5	35.7	4.6	32.5	53.3	73.9	20.6	
Vert	9748.000	PK	44.1	38.4	5.5	33.2	54.8	73.9	19.1	
Vert	24370.000	PK	46.2	40.8	-1.7	31.4	53.9	73.9	20.0	
Vert	4874.000	AV	45.3	31.4	3.8	31.4	49.1	53.9	4.8	
Vert	7311.000	AV	35.8	35.7	4.6	32.5	43.6	53.9	10.3	
Vert	9748.000	AV	36.5	38.4	5.5	33.2	47.2	53.9	6.7	
Vert	24370.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	

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

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

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

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and 4 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/22/2011 11/23/2011
Temperature/ Humidity 25 deg.C / 29% RH 19 deg.C / 34% RH
Engineer Katsunori Okai Katsunori Okai
(1-10GHz) (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	54.2	28.5	2.2	32.2	52.7	73.9	21.2	
Hori	2537.346	PK	56.1	28.6	2.2	32.2	54.7	73.9	19.2	
Hori	4924.000	PK	49.2	31.5	3.8	31.4	53.1	73.9	20.8	
Hori	7386.000	PK	44.2	35.8	4.6	32.5	52.1	73.9	21.8	
Hori	9848.000	PK	45.2	38.5	5.5	33.3	55.9	73.9	18.0	
Hori	24620.000	PK	45.3	40.7	-1.6	31.3	53.1	73.9	20.8	
Hori	2483.500	AV	43.3	28.5	2.2	32.2	41.8	53.9	12.1	
Hori	2537.346	AV	45.7	28.6	2.2	32.2	44.3	53.9	9.6	
Hori	4924.000	AV	45.4	31.5	3.8	31.4	49.3	53.9	4.6	
Hori	7386.000	AV	34.5	35.8	4.6	32.5	42.4	53.9	11.5	
Hori	9848.000	AV	38.0	38.5	5.5	33.3	48.7	53.9	5.2	
Hori	24620.000	AV	33.9	40.7	-1.6	31.3	41.7	53.9	12.2	
Vert	2483.500	PK	54.5	28.5	2.2	32.2	53.0	73.9	20.9	
Vert	2537.514	PK	54.4	28.6	2.2	32.1	53.1	73.9	20.8	
Vert	4924.000	PK	47.9	31.5	3.8	31.4	51.8	73.9	22.1	
Vert	7386.000	PK	45.5	35.8	4.6	32.5	53.4	73.9	20.5	
Vert	9848.000	PK	45.1	38.5	5.5	33.3	55.8	73.9	18.1	
Vert	24620.000	PK	45.5	40.7	-1.6	31.3	53.3	73.9	20.6	
Vert	2483.500	AV	42.2	28.5	2.2	32.2	40.7	53.9	13.2	
Vert	2537.514	AV	43.7	28.6	2.2	32.1	42.4	53.9	11.5	
Vert	4924.000	AV	42.6	31.5	3.8	31.4	46.5	53.9	7.4	
Vert	7386.000	AV	35.8	35.8	4.6	32.5	43.7	53.9	10.2	
Vert	9848.000	AV	37.8	38.5	5.5	33.3	48.5	53.9	5.4	
Vert	24620.000	AV	33.9	40.7	-1.6	31.3	41.7	53.9	12.2	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and 4 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/22/2011 11/23/2011
Temperature/ Humidity 25 deg.C / 29% RH 19 deg.C / 34% RH
Engineer Katsunori Okai Katsunori Okai
(1-10GHz) (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	65.2	28.1	2.2	32.2	63.3	73.9	10.6	See 20dBc Data Sheet
Hori	2400.000	PK	78.8	28.1	2.2	32.2	76.9	-	-	
Hori	4824.000	PK	49.8	31.2	3.8	31.4	53.4	73.9	20.5	
Hori	7236.000	PK	44.5	35.6	4.6	32.4	52.3	73.9	21.6	
Hori	9648.000	PK	43.3	38.3	5.5	33.2	53.9	73.9	20.0	
Hori	24120.000	PK	45.8	40.9	-1.7	31.6	53.4	73.9	20.5	
Hori	2390.000	AV	44.8	28.1	2.2	32.2	42.9	53.9	11.0	See 20dBc Data Sheet
Hori	2400.000	AV	59.5	28.1	2.2	32.2	57.6	-	-	
Hori	4824.000	AV	38.4	31.2	3.8	31.4	42.0	53.9	11.9	
Hori	7236.000	AV	31.5	35.6	4.6	32.4	39.3	53.9	14.6	
Hori	9648.000	AV	31.4	38.3	5.5	33.2	42.0	53.9	11.9	
Hori	24120.000	AV	33.7	40.9	-1.7	31.6	41.3	53.9	12.6	
Vert	2390.000	PK	64.8	28.1	2.2	32.2	62.9	73.9	11.0	See 20dBc Data Sheet
Vert	2400.000	PK	77.9	28.1	2.2	32.2	76.0	-	-	
Vert	4824.000	PK	49.5	31.2	3.8	31.4	53.1	73.9	20.8	
Vert	7236.000	PK	44.2	35.6	4.6	32.4	52.0	73.9	21.9	
Vert	9648.000	PK	43.1	38.3	5.5	33.2	53.7	73.9	20.2	
Vert	24120.000	PK	46.5	40.9	-1.7	31.6	54.1	73.9	19.8	
Vert	2390.000	AV	42.3	28.1	2.2	32.2	40.4	53.9	13.5	See 20dBc Data Sheet
Vert	2400.000	AV	55.9	28.1	2.2	32.2	54.0	-	-	
Vert	4824.000	AV	36.7	31.2	3.8	31.4	40.3	53.9	13.6	
Vert	7236.000	AV	31.8	35.6	4.6	32.4	39.6	53.9	14.3	
Vert	9648.000	AV	31.5	38.3	5.5	33.2	42.1	53.9	11.8	
Vert	24120.000	AV	33.7	40.9	-1.7	31.6	41.3	53.9	12.6	

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	98.1	28.2	2.2	32.2	96.3	-	-	Carrier
Hori	2400.000	PK	63.8	28.1	2.2	32.2	61.9	76.3	14.4	
Vert	2412.000	PK	97.2	28.2	2.2	32.2	95.4	-	-	Carrier
Vert	2400.000	PK	61.8	28.1	2.2	32.2	59.9	75.4	15.5	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No. 1 and 4 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/22/2011 11/23/2011
Temperature/ Humidity 25 deg.C / 29% RH 19 deg.C / 34% RH
Engineer Katsunori Okai Katsunori Okai
(1-10GHz) (10-26.5GHz)
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	49.7	31.4	3.8	31.4	53.5	73.9	20.4	
Hori	7311.000	PK	44.6	35.7	4.6	32.5	52.4	73.9	21.5	
Hori	9748.000	PK	44.1	38.4	5.5	33.2	54.8	73.9	19.1	
Hori	24370.000	PK	45.6	40.8	-1.7	31.4	53.3	73.9	20.6	
Hori	4874.000	AV	36.9	31.4	3.8	31.4	40.7	53.9	13.2	
Hori	7311.000	AV	31.4	35.7	4.6	32.5	39.2	53.9	14.7	
Hori	9748.000	AV	31.8	38.4	5.5	33.2	42.5	53.9	11.4	
Hori	24370.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	
Vert	4874.000	PK	47.1	31.4	3.8	31.4	50.9	73.9	23.0	
Vert	7311.000	PK	45.3	35.7	4.6	32.5	53.1	73.9	20.8	
Vert	9748.000	PK	44.3	38.4	5.5	33.2	55.0	73.9	18.9	
Vert	24370.000	PK	45.9	40.8	-1.7	31.4	53.6	73.9	20.3	
Vert	4874.000	AV	34.4	31.4	3.8	31.4	38.2	53.9	15.7	
Vert	7311.000	AV	30.6	35.7	4.6	32.5	38.4	53.9	15.5	
Vert	9748.000	AV	31.5	38.4	5.5	33.2	42.2	53.9	11.7	
Vert	24370.000	AV	34.2	40.8	-1.7	31.4	41.9	53.9	12.0	

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

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

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

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No. 1, No.2, and 4 Semi Anechoic Chamber		
Report No.	32DE0235-HO		
Date	11/22/2011	11/23/2011	11/25/2011
Temperature/ Humidity	25 deg.C / 29% RH	19 deg.C / 34% RH	23 deg.C / 35% RH
Engineer	Katsunori Okai (1-10GHz)	Katsunori Okai (10-26.5GHz)	Satofumi Matsuyama (Below 1GHz)
Mode	11g Tx 2462MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	30.028	QP	22.7	18.0	6.7	28.5	18.9	40.0	21.1	
Hori	44.659	QP	22.9	12.8	6.9	28.6	14.0	40.0	26.0	
Hori	80.453	QP	30.2	6.3	7.3	28.5	15.3	40.0	24.7	
Hori	90.376	QP	37.9	7.7	7.4	28.4	24.6	43.5	18.9	
Hori	126.016	QP	22.3	13.2	7.7	28.2	15.0	43.5	28.5	
Hori	819.952	QP	21.6	22.1	11.0	28.0	26.7	46.0	19.3	
Hori	2483.500	PK	72.4	28.5	2.2	32.2	70.9	73.9	3.0	
Hori	2538.122	PK	58.8	28.6	2.2	32.1	57.5	73.9	16.4	
Hori	4924.000	PK	47.1	31.5	3.8	31.4	51.0	73.9	22.9	
Hori	7386.000	PK	45.0	35.8	4.6	32.5	52.9	73.9	21.0	
Hori	9848.000	PK	44.1	38.5	5.5	33.3	54.8	73.9	19.1	
Hori	24620.000	PK	45.4	40.7	-1.6	31.3	53.2	73.9	20.7	
Hori	2483.500	AV	54.4	28.5	2.2	32.2	52.9	53.9	1.0	
Hori	2538.122	AV	46.1	28.6	2.2	32.1	44.8	53.9	9.1	
Hori	4924.000	AV	35.4	31.5	3.8	31.4	39.3	53.9	14.6	
Hori	7386.000	AV	34.0	35.8	4.6	32.5	41.9	53.9	12.0	
Hori	9848.000	AV	33.2	38.5	5.5	33.3	43.9	53.9	10.0	
Hori	24620.000	AV	33.9	40.7	-1.6	31.3	41.7	53.9	12.2	
Vert	30.122	QP	29.5	18.0	6.7	28.5	25.7	40.0	14.3	
Vert	44.703	QP	30.5	12.8	6.9	28.6	21.6	40.0	18.4	
Vert	79.832	QP	35.0	6.2	7.3	28.5	20.0	40.0	20.0	
Vert	89.392	QP	32.4	7.5	7.4	28.4	18.9	43.5	24.6	
Vert	126.324	QP	28.2	13.2	7.7	28.2	20.9	43.5	22.6	
Vert	819.960	QP	21.6	22.1	11.0	28.0	26.7	46.0	19.3	
Vert	2483.500	PK	70.9	28.5	2.2	32.2	69.4	73.9	4.5	
Vert	2537.555	PK	53.6	28.6	2.2	32.1	52.3	73.9	21.6	
Vert	4924.000	PK	46.9	31.5	3.8	31.4	50.8	73.9	23.1	
Vert	7386.000	PK	47.1	35.8	4.6	32.5	55.0	73.9	18.9	
Vert	9848.000	PK	44.1	38.5	5.5	33.3	54.8	73.9	19.1	
Vert	24620.000	PK	45.5	40.7	-1.6	31.3	53.3	73.9	20.6	
Vert	2483.500	AV	53.4	28.5	2.2	32.2	51.9	53.9	2.0	
Vert	2537.555	AV	41.5	28.6	2.2	32.1	40.2	53.9	13.7	
Vert	4924.000	AV	34.0	31.5	3.8	31.4	37.9	53.9	16.0	
Vert	7386.000	AV	35.9	35.8	4.6	32.5	43.8	53.9	10.1	
Vert	9848.000	AV	32.4	38.5	5.5	33.3	43.1	53.9	10.8	
Vert	24620.000	AV	33.9	40.7	-1.6	31.3	41.7	53.9	12.2	

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/22/2011
Temperature/ Humidity 25 deg.C / 29% RH
Engineer Katsunori Okai
(1-10GHz)
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	2390.000	PK	62.7	28.1	2.2	32.2	60.8	73.9	13.1	
Hori	2400.000	PK	73.8	28.1	2.2	32.2	71.9	-	-	See 20dBc Data Sheet
Hori	2390.000	AV	42.5	28.1	2.2	32.2	40.6	53.9	13.3	
Hori	2400.000	AV	53.4	28.1	2.2	32.2	51.5	-	-	See 20dBc Data Sheet
Vert	2390.000	PK	62.3	28.1	2.2	32.2	60.4	73.9	13.5	
Vert	2400.000	PK	72.9	28.1	2.2	32.2	71.0	-	-	See 20dBc Data Sheet
Vert	2390.000	AV	42.3	28.1	2.2	32.2	40.4	53.9	13.5	
Vert	2400.000	AV	52.7	28.1	2.2	32.2	50.8	-	-	See 20dBc Data Sheet

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

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

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2412.000	PK	96.5	28.2	2.2	32.2	94.7	-	-	Carrier
Hori	2400.000	PK	56.3	28.1	2.2	32.2	54.4	74.7	20.3	
Vert	2412.000	PK	95.6	28.2	2.2	32.2	93.8	-	-	Carrier
Vert	2400.000	PK	58.1	28.1	2.2	32.2	56.2	73.8	17.6	

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No. : 32DE0235-HO
Date : 11/22/2011
Temperature/ Humidity : 25 deg.C / 29% RH
Engineer : Katsunori Okai
(1-10GHz)
Mode : 11n-20 Tx 2462MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	70.9	28.5	2.2	32.2	69.4	73.9	4.5	
Hori	2540.751	PK	55.4	28.6	2.3	32.1	54.2	73.9	19.7	
Hori	2483.500	AV	50.0	28.5	2.2	32.2	48.5	53.9	5.4	
Hori	2540.751	AV	45.2	28.6	2.3	32.1	44.0	53.9	9.9	
Vert	2483.500	PK	68.8	28.5	2.2	32.2	67.3	73.9	6.6	
Vert	2540.753	PK	56.3	28.6	2.3	32.1	55.1	73.9	18.8	
Vert	2483.500	AV	47.3	28.5	2.2	32.2	45.8	53.9	8.1	
Vert	2540.753	AV	43.7	28.6	2.3	32.1	42.5	53.9	11.4	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
 26.5GHz-40GHz $20\log(3.0\text{m}/0.5\text{m})=15.6\text{dB}$

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32DE0235-HO	
Date	11/24/2011	11/25/2011
Temperature/ Humidity	22 deg.C./ 42% RH	23 deg.C / 35% RH
Engineer	Katsunori Okai	Satofumi Matsuyama
	(1-18GHz)	(18-40GHz)
Mode	11a 5745MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5594.088	PK	44.8	32.0	3.5	32.0	48.3	73.9	25.6	
Hori	5725.000	PK	52.9	32.2	3.5	32.0	56.6	73.9	17.3	
Hori	11490.000	PK	42.8	39.2	-2.4	32.9	46.7	73.9	27.2	
Hori	17235.000	PK	43.6	41.7	-1.2	32.5	51.6	73.9	22.3	
Hori	22980.000	PK	44.3	40.9	-1.8	32.0	51.4	73.9	22.5	
Hori	28725.000	PK	35.3	43.5	-0.5	24.8	53.5	73.9	20.4	
Hori	5594.088	AV	32.9	32.0	3.5	32.0	36.4	53.9	17.5	
Hori	5725.000	AV	34.3	32.2	3.5	32.0	38.0	53.9	15.9	
Hori	11490.000	AV	30.1	39.2	-2.4	32.9	34.0	53.9	19.9	
Hori	17235.000	AV	31.1	41.7	-1.2	32.5	39.1	53.9	14.8	
Hori	22980.000	AV	32.7	40.9	-1.8	32.0	39.8	53.9	14.1	
Hori	28725.000	AV	23.8	43.5	-0.5	24.8	42.0	53.9	11.9	
Vert	5594.034	PK	42.1	32.0	3.5	32.0	45.6	73.9	28.3	
Vert	5725.000	PK	50.6	32.2	3.5	32.0	54.3	73.9	19.6	
Vert	11490.000	PK	42.6	39.2	-2.4	32.9	46.5	73.9	27.4	
Vert	17235.000	PK	43.7	41.7	-1.2	32.5	51.7	73.9	22.2	
Vert	22980.000	PK	45.1	40.9	-1.8	32.0	52.2	73.9	21.7	
Vert	28725.000	PK	35.4	43.5	-0.5	24.8	53.6	73.9	20.3	
Vert	5594.034	AV	30.3	32.0	3.5	32.0	33.8	53.9	20.1	
Vert	5725.000	AV	31.8	32.2	3.5	32.0	35.5	53.9	18.4	
Vert	11490.000	AV	30.1	39.2	-2.4	32.9	34.0	53.9	19.9	
Vert	17235.000	AV	31.1	41.7	-1.2	32.5	39.1	53.9	14.8	
Vert	22980.000	AV	32.7	40.9	-1.8	32.0	39.8	53.9	14.1	
Vert	28725.000	AV	23.8	43.5	-0.5	24.8	42.0	53.9	11.9	

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).

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32DE0235-HO	
Date	11/24/2011	11/25/2011
Temperature/ Humidity	22 deg.C./ 42% RH	23 deg.C / 35% RH
Engineer	Katsunori Okai	Satofumi Matsuyama
	(1-18GHz)	(18-40GHz)
Mode	11a 5785MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5636.833	PK	43.8	32.1	3.5	32.0	47.4	73.9	26.5	
Hori	11570.000	PK	42.8	39.1	-2.2	32.9	46.8	73.9	27.1	
Hori	17355.000	PK	43.4	42.7	-1.1	32.5	52.5	73.9	21.4	
Hori	23140.000	PK	44.5	40.8	-1.8	32.0	51.5	73.9	22.4	
Hori	28925.000	PK	35.7	43.6	-0.4	24.8	54.1	73.9	19.8	
Hori	5636.833	AV	35.2	32.1	3.5	32.0	38.8	53.9	15.1	
Hori	11570.000	AV	30.0	39.1	-2.2	32.9	34.0	53.9	19.9	
Hori	17355.000	AV	30.7	42.7	-1.1	32.5	39.8	53.9	14.1	
Hori	23140.000	AV	32.7	40.8	-1.8	32.0	39.7	53.9	14.2	
Hori	28925.000	AV	23.7	43.6	-0.4	24.8	42.1	53.9	11.8	
Vert	5636.845	PK	42.7	32.1	3.5	32.0	46.3	73.9	27.6	
Vert	11570.000	PK	42.8	39.1	-2.2	32.9	46.8	73.9	27.1	
Vert	17355.000	PK	43.6	42.7	-1.1	32.5	52.7	73.9	21.2	
Vert	23140.000	PK	44.8	40.8	-1.8	32.0	51.8	73.9	22.1	
Vert	28925.000	PK	35.4	43.6	-0.4	24.8	53.8	73.9	20.1	
Vert	5636.845	AV	32.3	32.1	3.5	32.0	35.9	53.9	18.0	
Vert	11570.000	AV	30.0	39.1	-2.2	32.9	34.0	53.9	19.9	
Vert	17355.000	AV	30.7	42.7	-1.1	32.5	39.8	53.9	14.1	
Vert	23140.000	AV	32.7	40.8	-1.8	32.0	39.7	53.9	14.2	
Vert	28925.000	AV	23.7	43.6	-0.4	24.8	42.1	53.9	11.8	

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).

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

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	32DE0235-HO	
Date	11/24/2011	11/25/2011
Temperature/ Humidity	22 deg.C./ 42% RH	23 deg.C / 35% RH
Engineer	Katsunori Okai	Satofumi Matsuyama
	(1-18GHz)	(18-40GHz)
Mode	11a Tx 5825MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5850.000	PK	53.5	32.4	3.6	32.0	57.5	73.9	16.4	
Hori	5875.000	PK	40.5	32.4	3.6	32.0	44.5	73.9	29.4	
Hori	5973.831	PK	44.5	32.6	3.6	32.0	48.7	73.9	25.2	
Hori	11650.000	PK	41.8	39.2	-2.2	32.9	45.9	73.9	28.0	
Hori	17475.000	PK	44.2	43.6	-1.1	32.4	54.3	73.9	19.6	
Hori	23300.000	PK	45.3	40.7	-1.8	31.9	52.3	73.9	21.6	
Hori	29125.000	PK	33.6	43.6	-0.4	24.8	52.0	73.9	21.9	
Hori	5850.000	AV	30.2	32.4	3.6	32.0	34.2	53.9	19.7	
Hori	5875.000	AV	28.5	32.4	3.6	32.0	32.5	53.9	21.4	
Hori	5973.831	AV	33.8	32.6	3.6	32.0	38.0	53.9	15.9	
Hori	11650.000	AV	29.9	39.2	-2.2	32.9	34.0	53.9	19.9	
Hori	17475.000	AV	31.1	43.6	-1.1	32.4	41.2	53.9	12.7	
Hori	23300.000	AV	32.6	40.7	-1.8	31.9	39.6	53.9	14.3	
Hori	29125.000	AV	23.0	43.6	-0.4	24.8	41.4	53.9	12.5	
Vert	5850.000	PK	48.8	32.4	3.6	32.0	52.8	73.9	21.1	
Vert	5875.000	PK	40.4	32.4	3.6	32.0	44.4	73.9	29.5	
Vert	5973.831	PK	43.5	32.6	3.6	32.0	47.7	73.9	26.2	
Vert	11650.000	PK	42.0	39.2	-2.2	32.9	46.1	73.9	27.8	
Vert	17475.000	PK	43.2	43.6	-1.1	32.4	53.3	73.9	20.6	
Vert	23300.000	PK	45.0	40.7	-1.8	31.9	52.0	73.9	21.9	
Vert	29125.000	PK	33.9	43.6	-0.4	24.8	52.3	73.9	21.6	
Vert	5850.000	AV	29.2	32.4	3.6	32.0	33.2	53.9	20.7	
Vert	5875.000	AV	28.2	32.4	3.6	32.0	32.2	53.9	21.7	
Vert	5973.831	AV	33.3	32.6	3.6	32.0	37.5	53.9	16.4	
Vert	11650.000	AV	29.9	39.2	-2.2	32.9	34.0	53.9	19.9	
Vert	17475.000	AV	31.1	43.6	-1.1	32.4	41.2	53.9	12.7	
Vert	23300.000	AV	32.6	40.7	-1.8	31.9	39.6	53.9	14.3	
Vert	29125.000	AV	23.0	43.6	-0.4	24.8	41.4	53.9	12.5	

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

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

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

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 32DE0235-HO
Date : 11/24/2011
Temperature/ Humidity : 22 deg.C / 42% RH
Engineer : Katsunori Okai
(1-18GHz)
Mode : 11n-20 5745MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5594.233	PK	43.4	32.0	3.5	32.0	46.9	73.9	27.0	
Hori	5725.000	PK	52.8	32.2	3.5	32.0	56.5	73.9	17.4	
Hori	5594.233	AV	32.9	32.0	3.5	32.0	36.4	53.9	17.5	
Hori	5725.000	AV	33.7	32.2	3.5	32.0	37.4	53.9	16.5	
Vert	5595.002	PK	40.6	32.0	3.5	32.0	44.1	73.9	29.8	
Vert	5725.000	PK	48.8	32.2	3.5	32.0	52.5	73.9	21.4	
Vert	5595.002	AV	30.1	32.0	3.5	32.0	33.6	53.9	20.3	
Vert	5725.000	AV	30.8	32.2	3.5	32.0	34.5	53.9	19.4	

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 $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$
 26.5GHz-40GHz $20\log(3.0\text{m}/0.5\text{m})=15.6\text{dB}$

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 32DE0235-HO
Date 11/24/2011
Temperature/ Humidity 22 deg.C./ 42% RH
Engineer Katsunori Okai
(1-18GHz)
Mode 11n-20 Tx 5825MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5850.000	PK	52.9	32.4	3.6	32.0	56.9	73.9	17.0	
Hori	5875.000	PK	40.5	32.4	3.6	32.0	44.5	73.9	29.4	
Hori	5977.555	PK	45.5	32.6	3.6	32.0	49.7	73.9	24.2	
Hori	5850.000	AV	29.7	32.4	3.6	32.0	33.7	53.9	20.2	
Hori	5875.000	AV	28.4	32.4	3.6	32.0	32.4	53.9	21.5	
Hori	5977.555	AV	33.5	32.6	3.6	32.0	37.7	53.9	16.2	
Vert	5850.000	PK	50.4	32.4	3.6	32.0	54.4	73.9	19.5	
Vert	5875.000	PK	40.2	32.4	3.6	32.0	44.2	73.9	29.7	
Vert	5973.009	PK	43.5	32.6	3.6	32.0	47.7	73.9	26.2	
Vert	5850.000	AV	29.2	32.4	3.6	32.0	33.2	53.9	20.7	
Vert	5875.000	AV	28.2	32.4	3.6	32.0	32.2	53.9	21.7	
Vert	5973.009	AV	33.1	32.6	3.6	32.0	37.3	53.9	16.6	

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

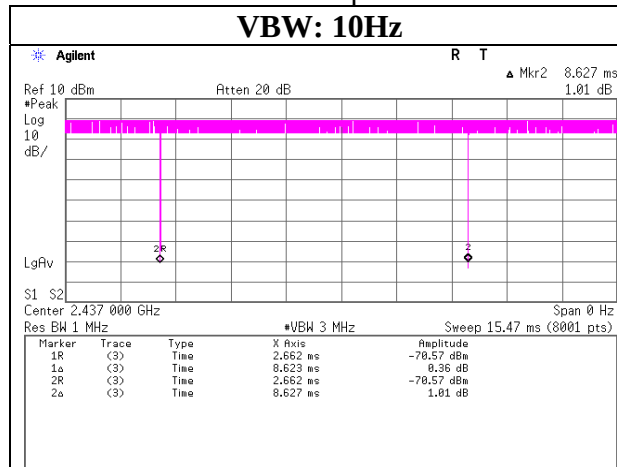
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

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

VBW (AV) Calculation

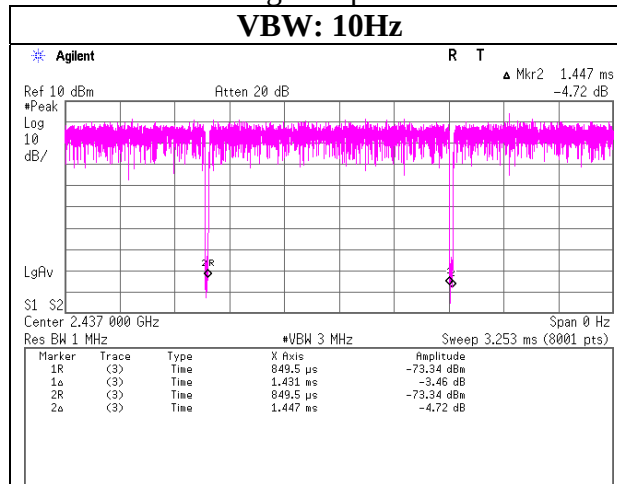
11b 1Mbps

VBW: 10Hz



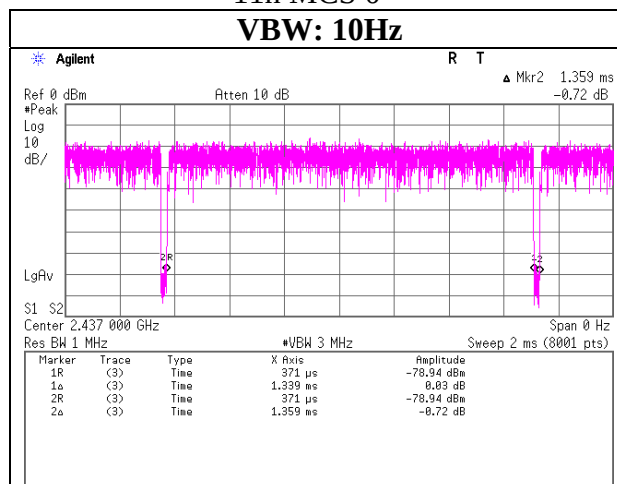
11g 6Mbps

VBW: 10Hz



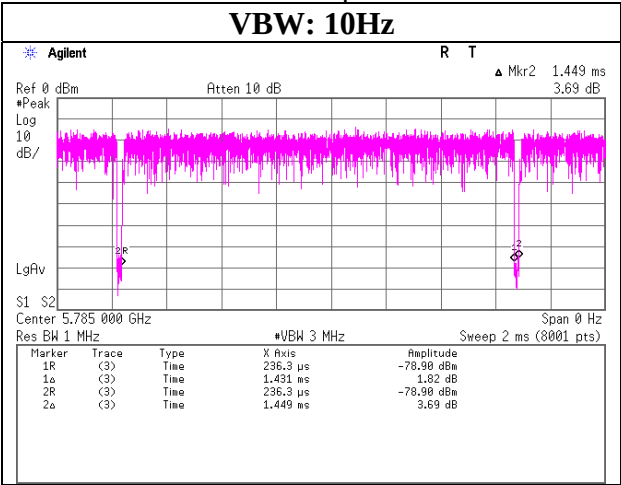
11n MCS 0

VBW: 10Hz

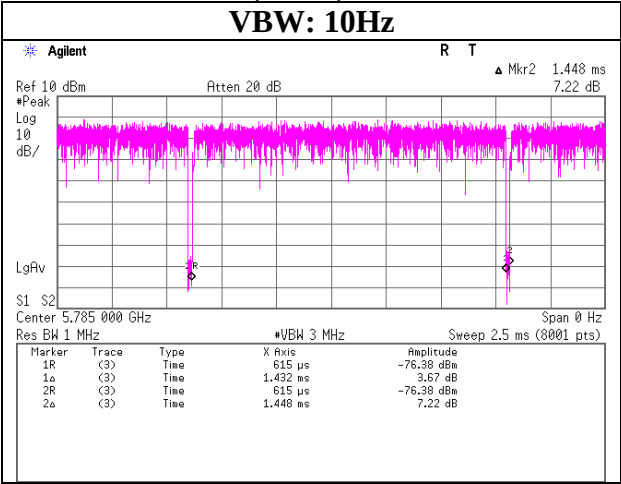


VBW (AV) Calculation

11a 6Mbps

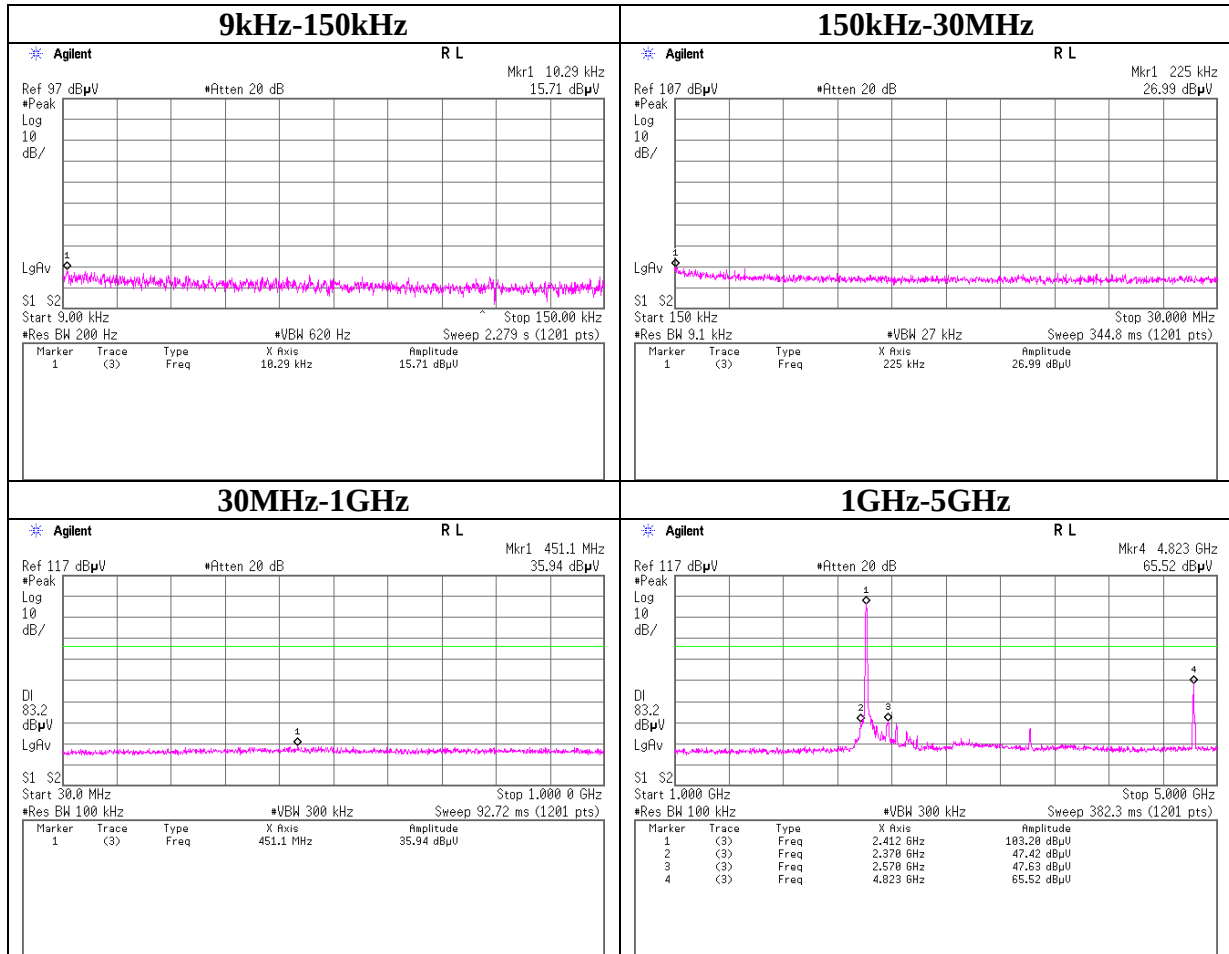


11n-20(5GHz) MCS0



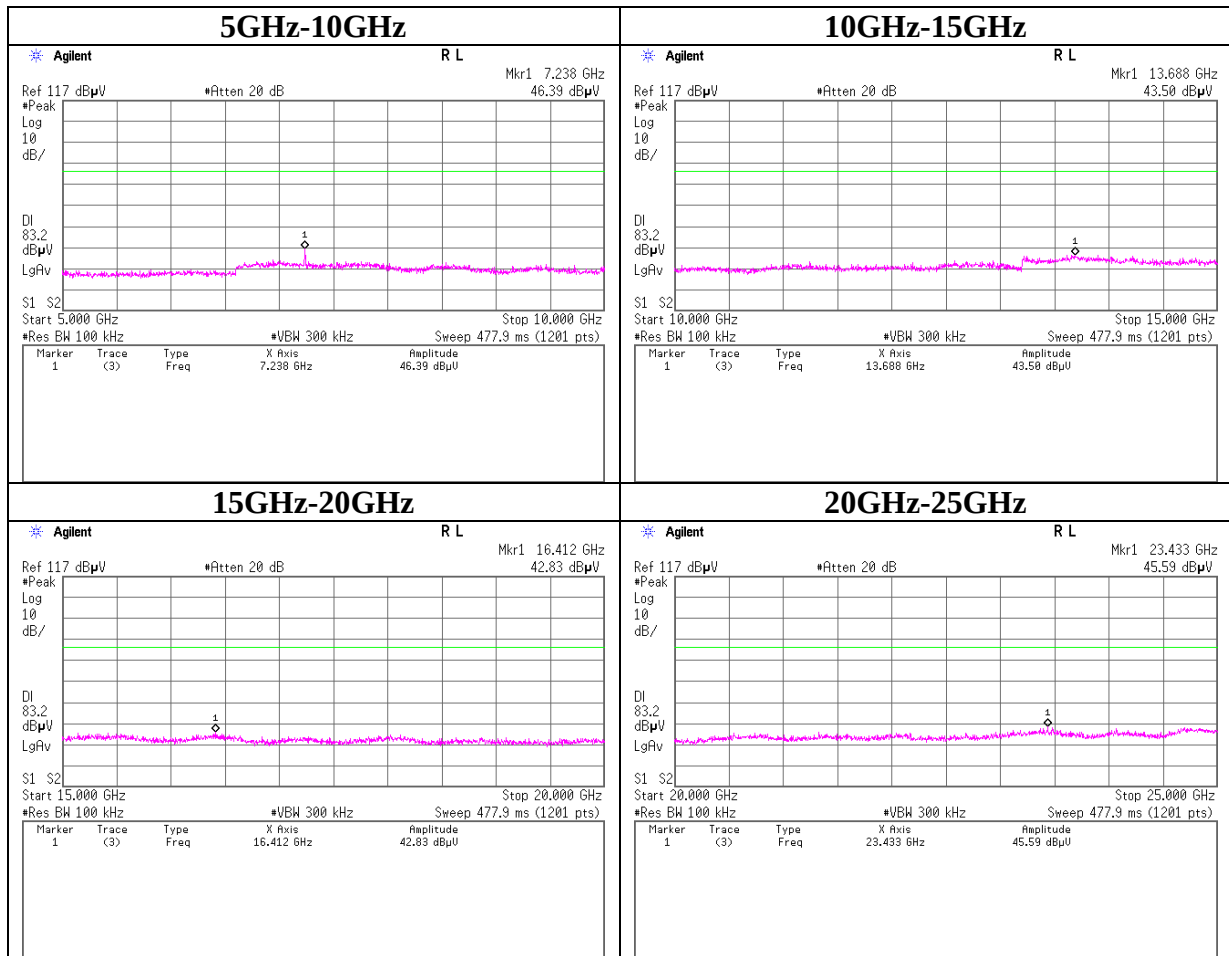
Conducted Spurious Emission

11b Tx 2412MHz



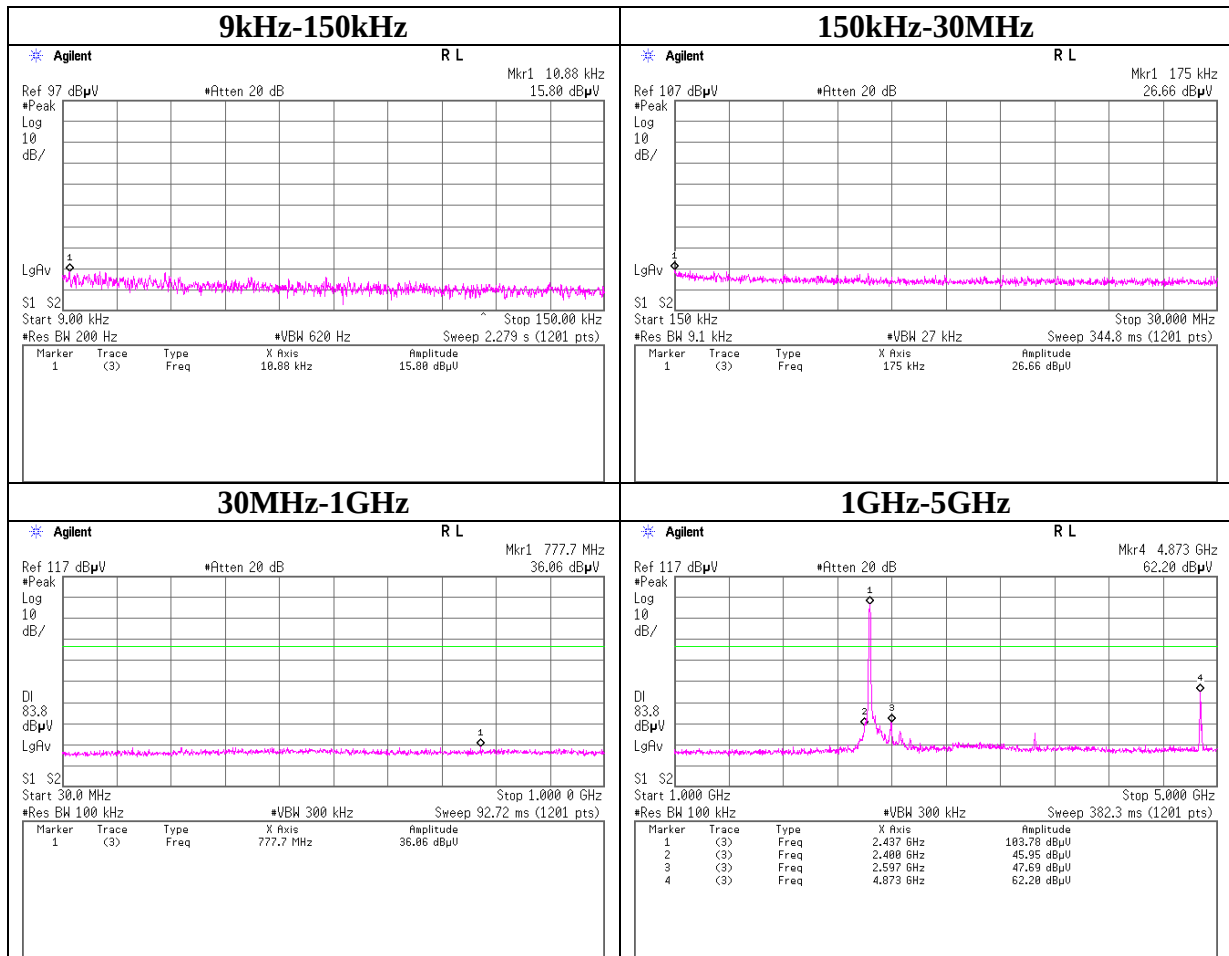
Conducted Spurious Emission

11b Tx 2412MHz



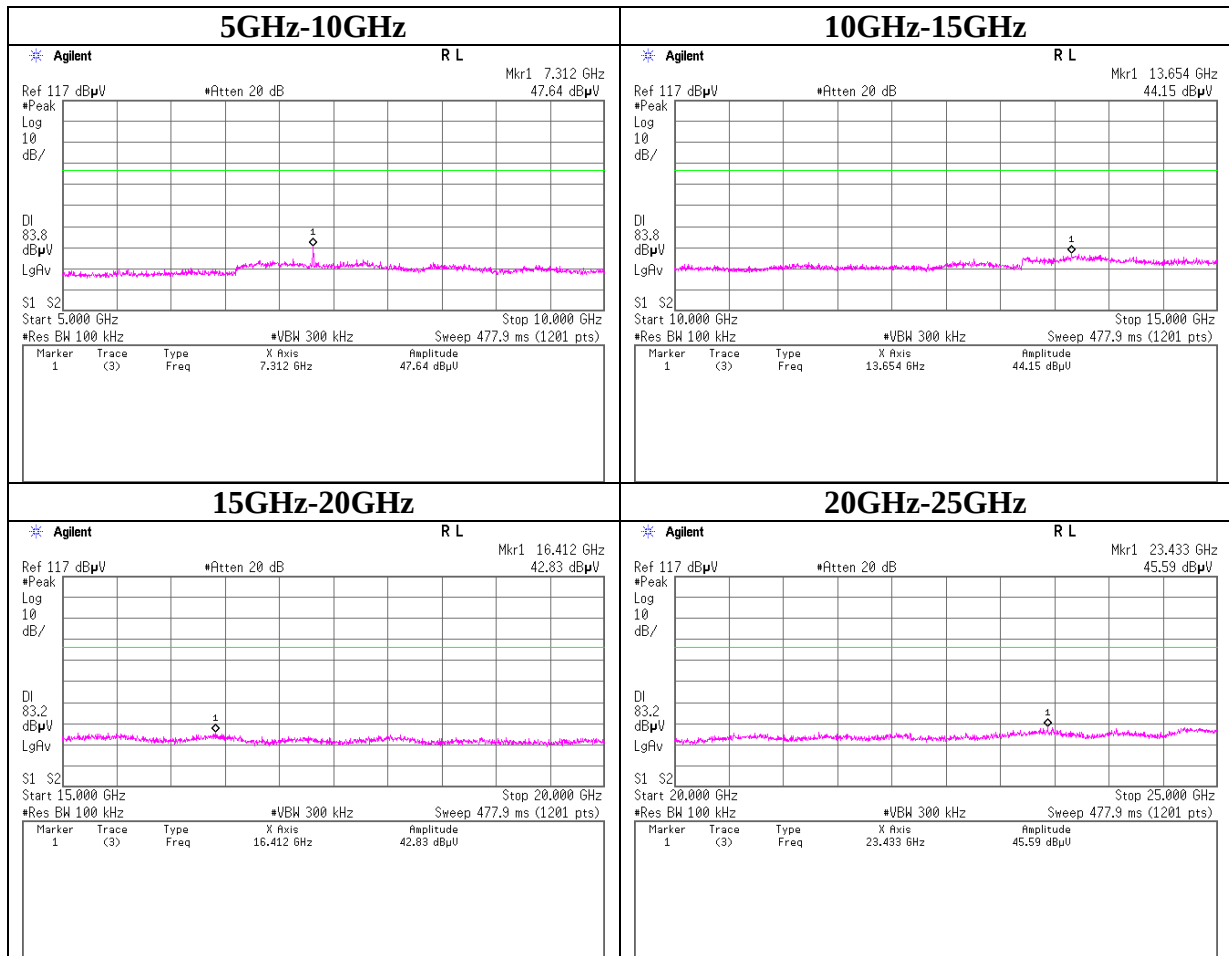
Conducted Spurious Emission

11b Tx 2437MHz



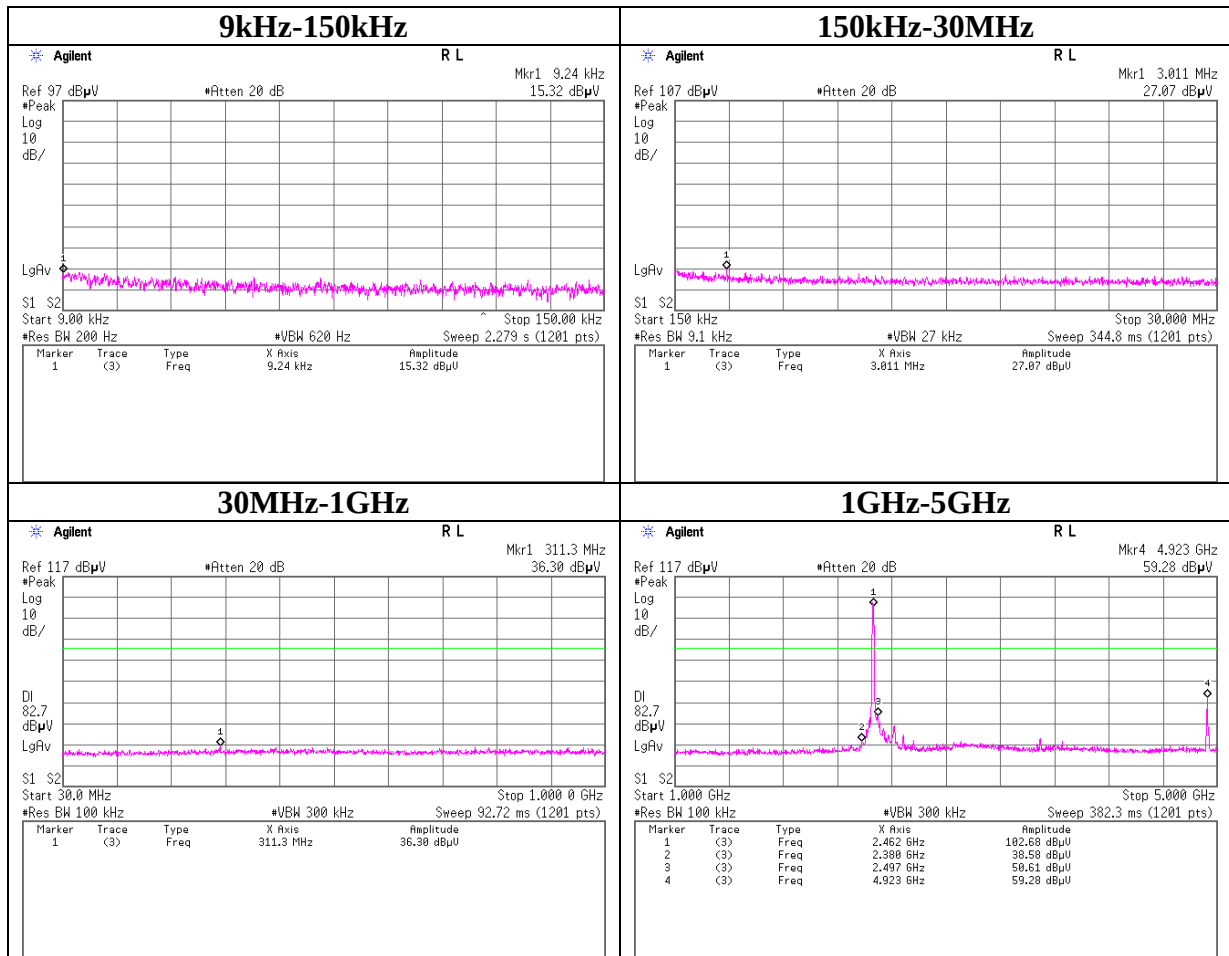
Conducted Spurious Emission

11b Tx 2437MHz



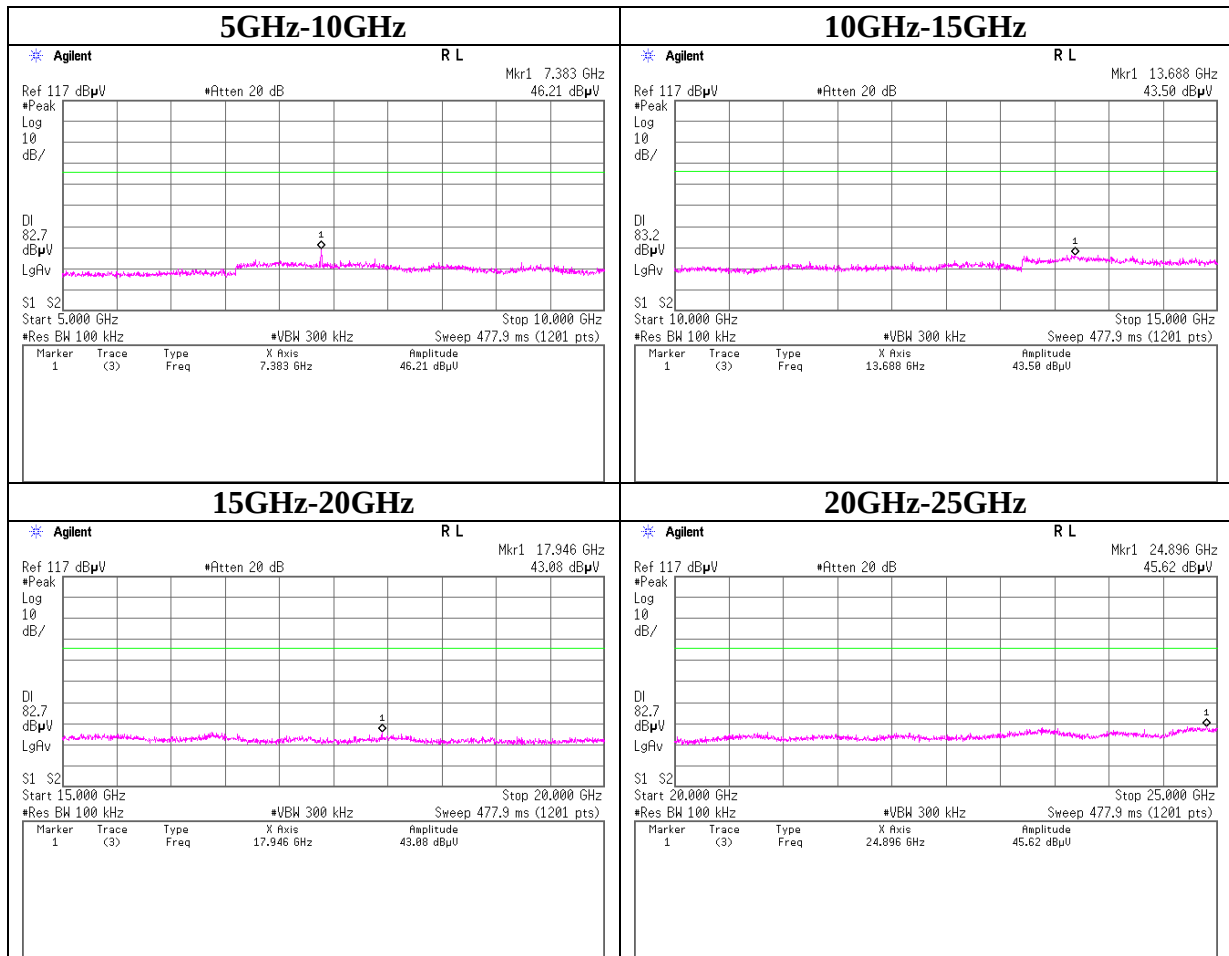
Conducted Spurious Emission

11b Tx 2462MHz



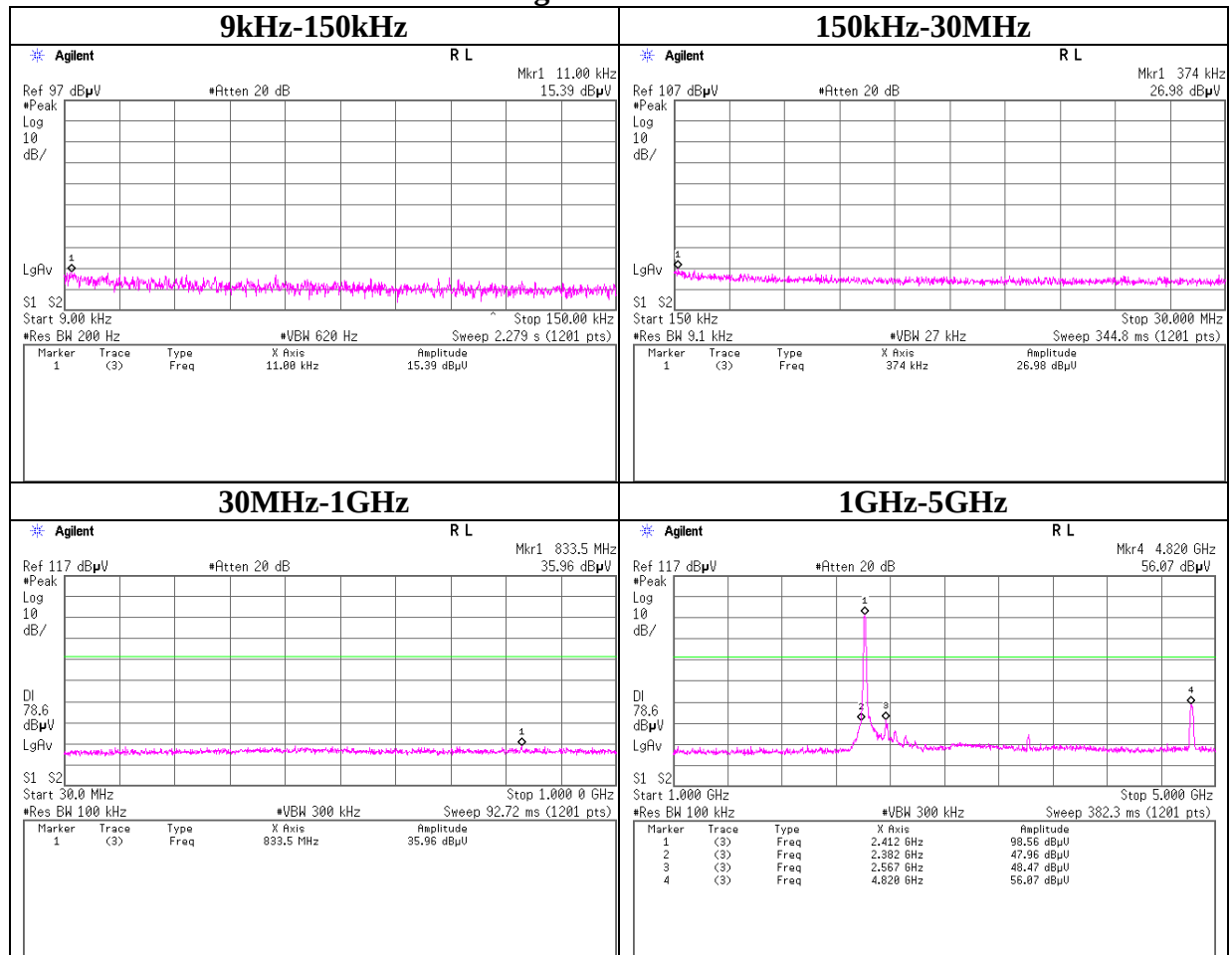
Conducted Spurious Emission

11b Tx 2462MHz



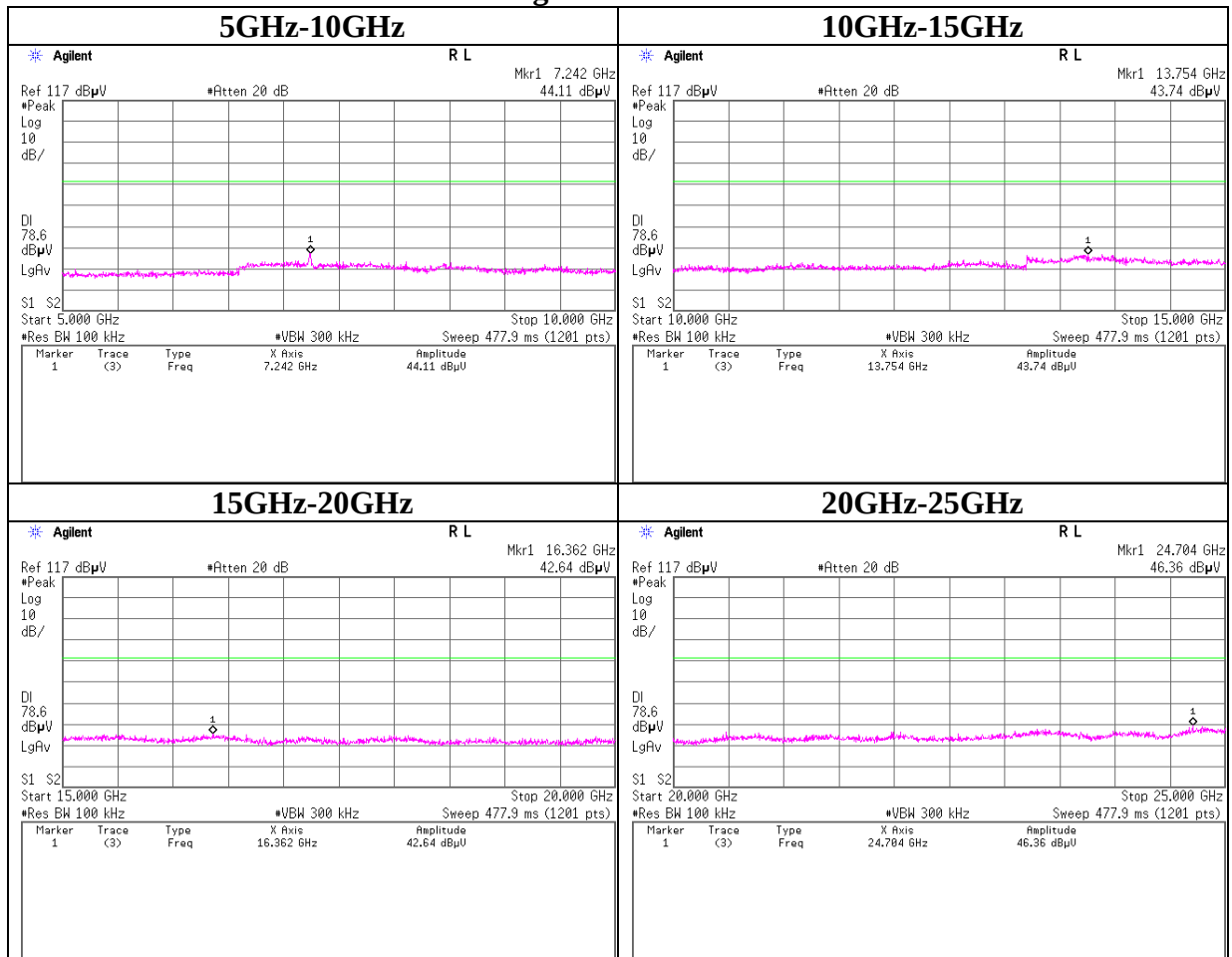
Conducted Spurious Emission

11g Tx 2412MHz



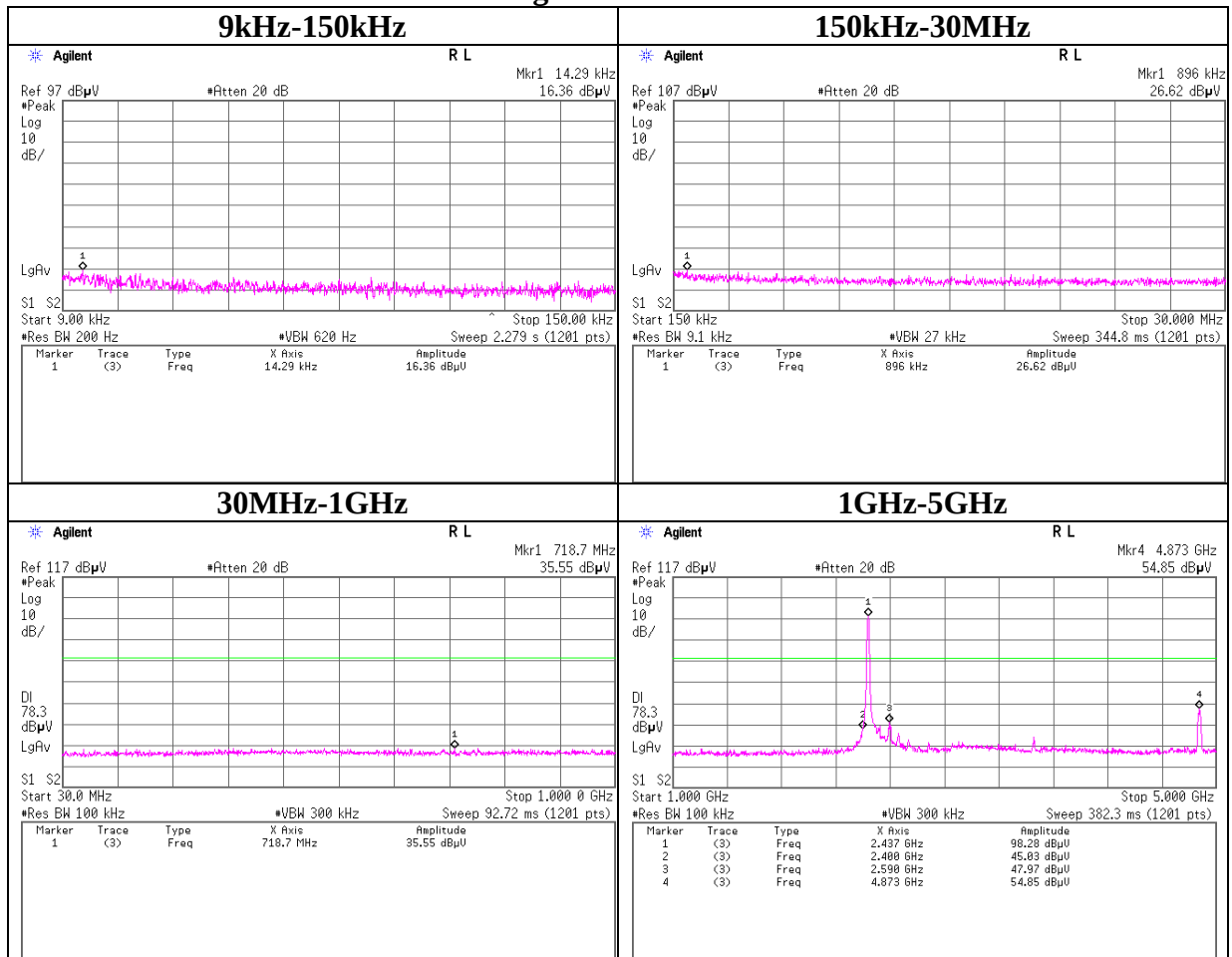
Conducted Spurious Emission

11g Tx 2412MHz



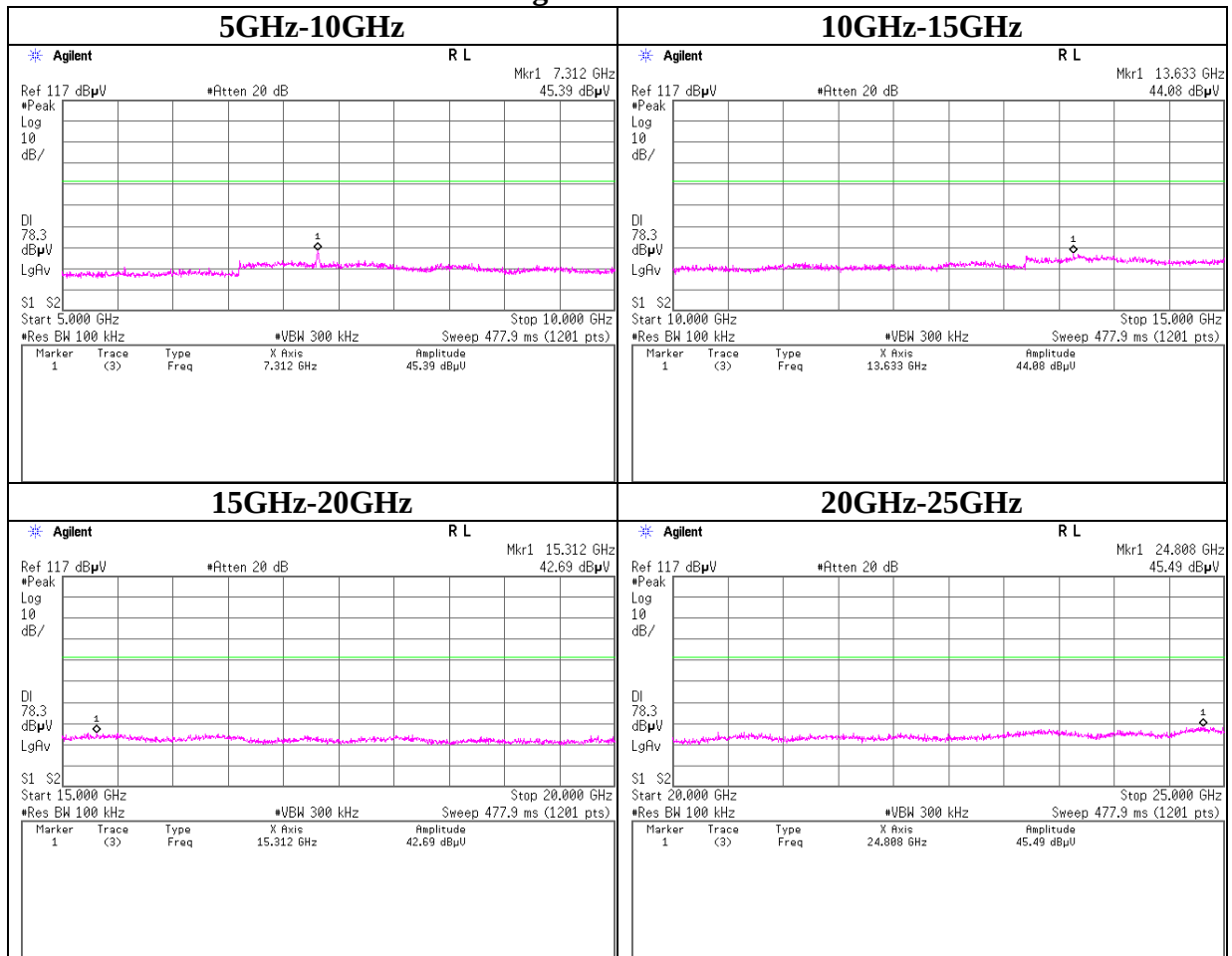
Conducted Spurious Emission

11g Tx 2437MHz



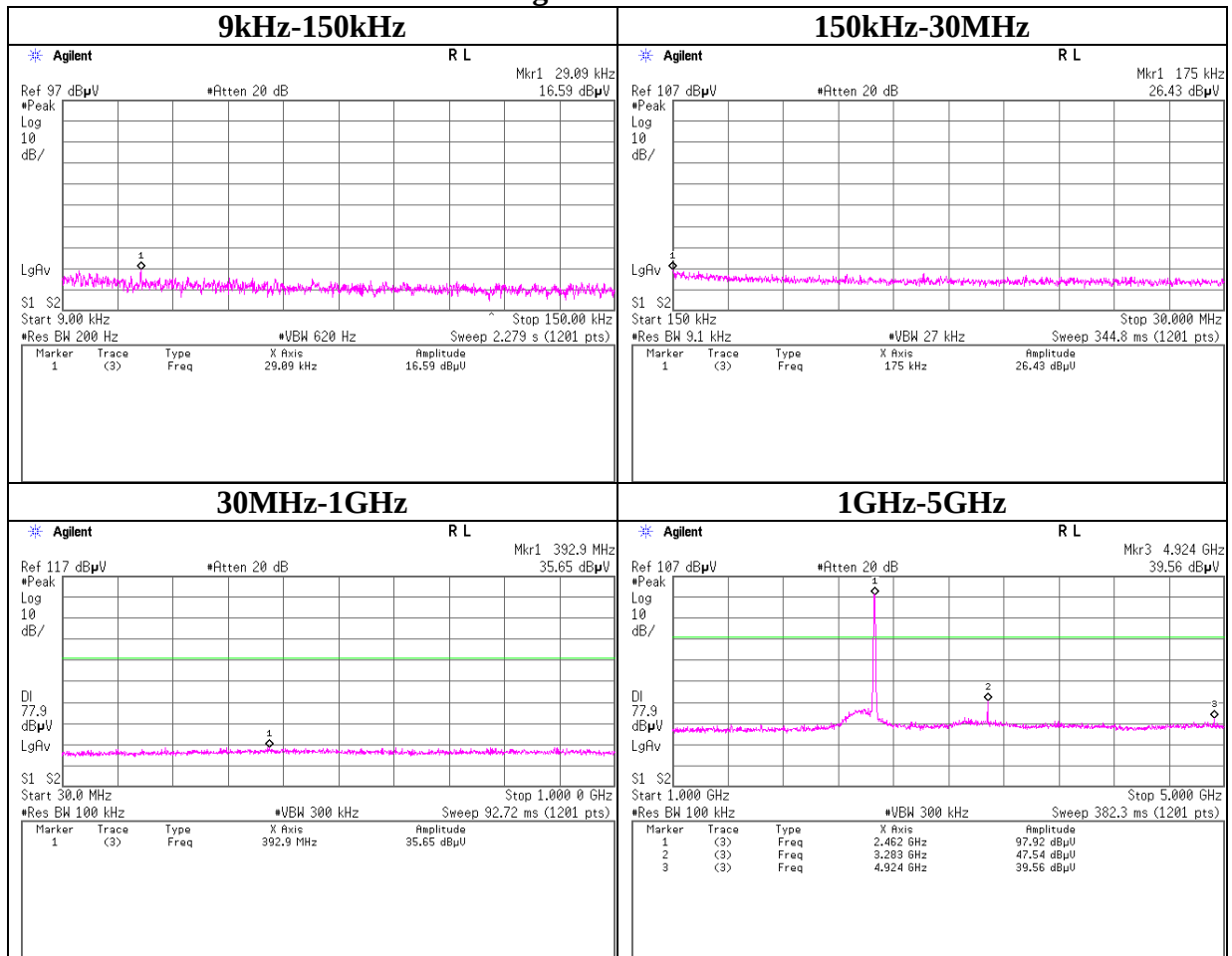
Conducted Spurious Emission

11g Tx 2437MHz



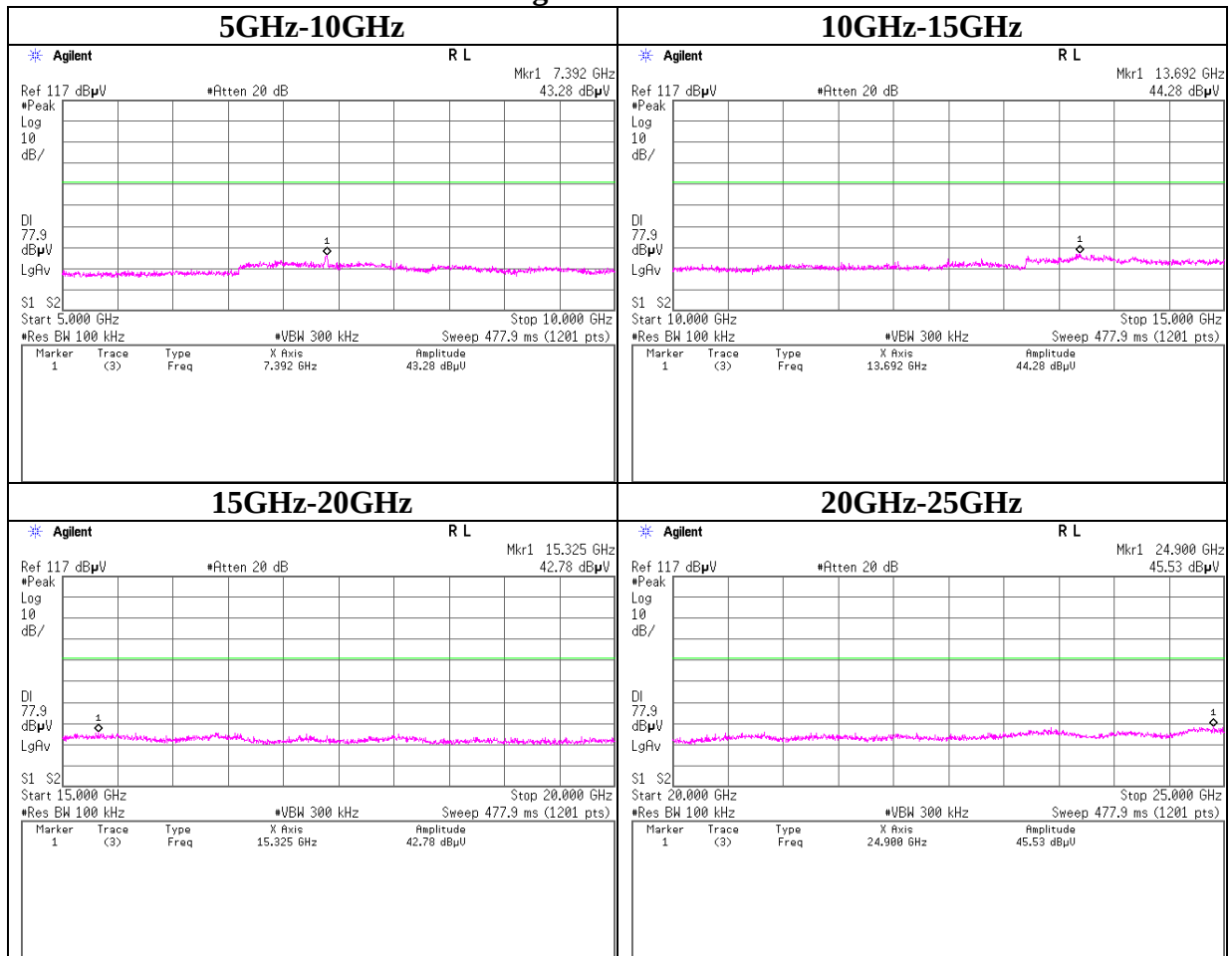
Conducted Spurious Emission

11g Tx 2462MHz



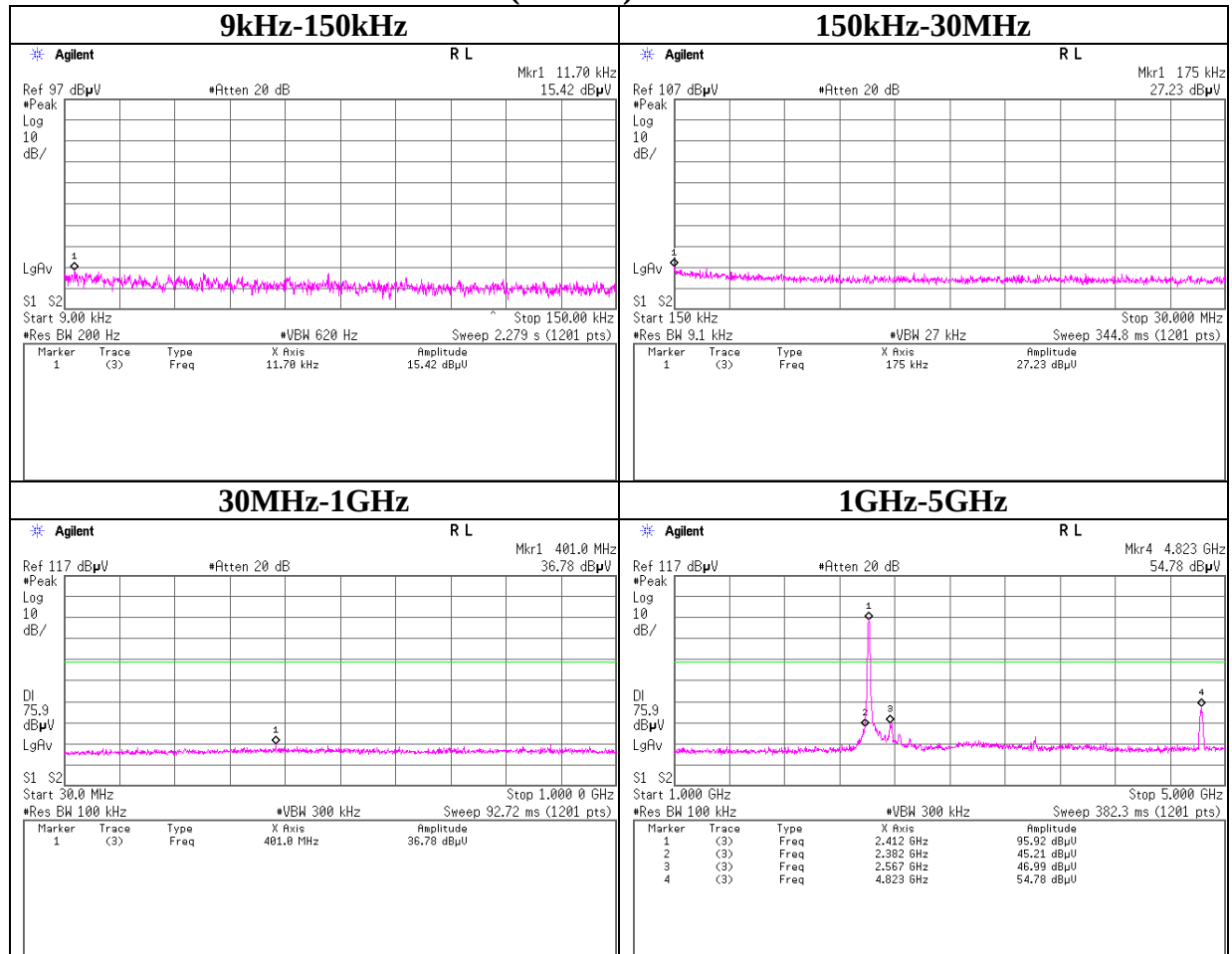
Conducted Spurious Emission

11g Tx 2462MHz



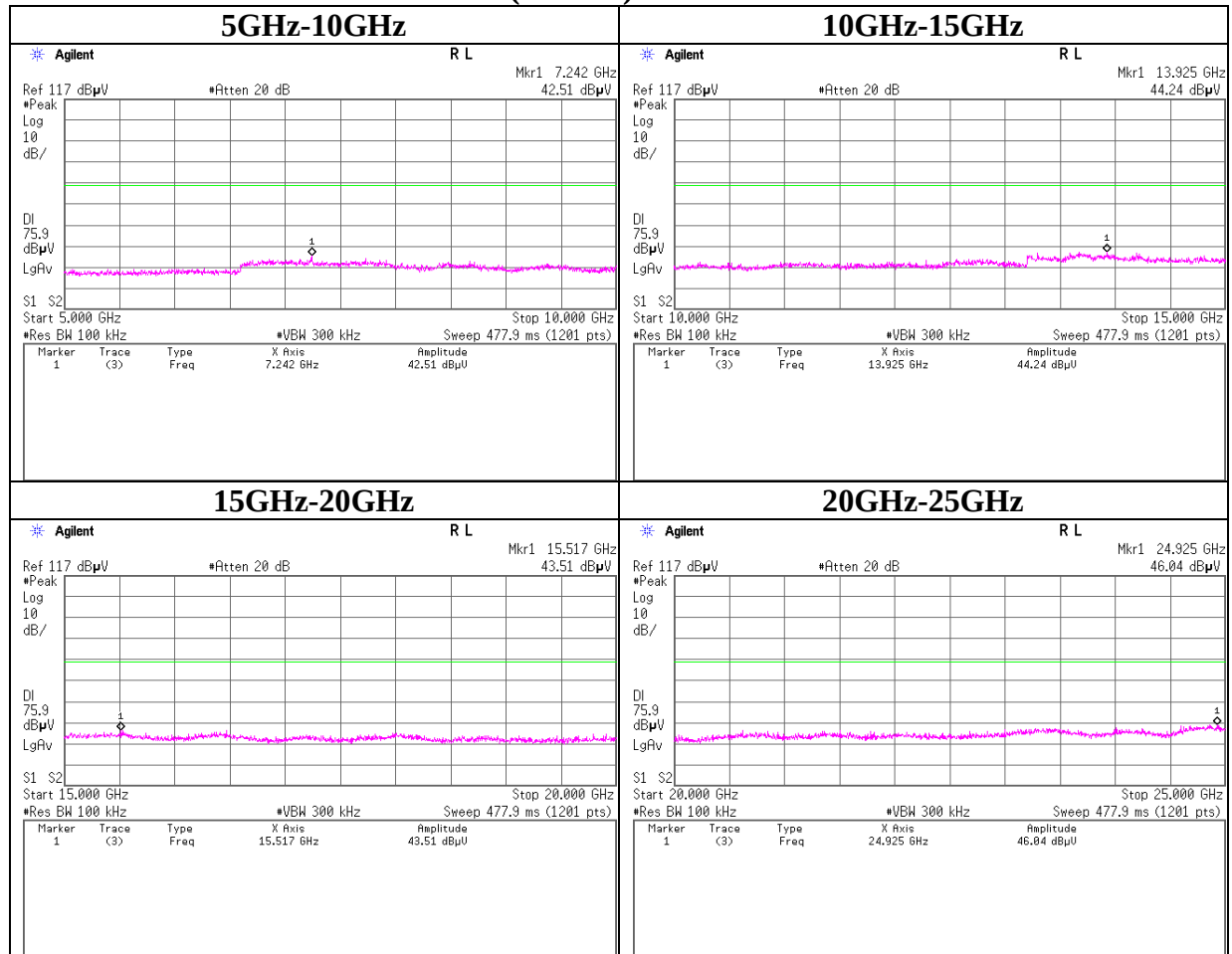
Conducted Spurious Emission

11n-20(2.4GHz) Tx 2412MHz



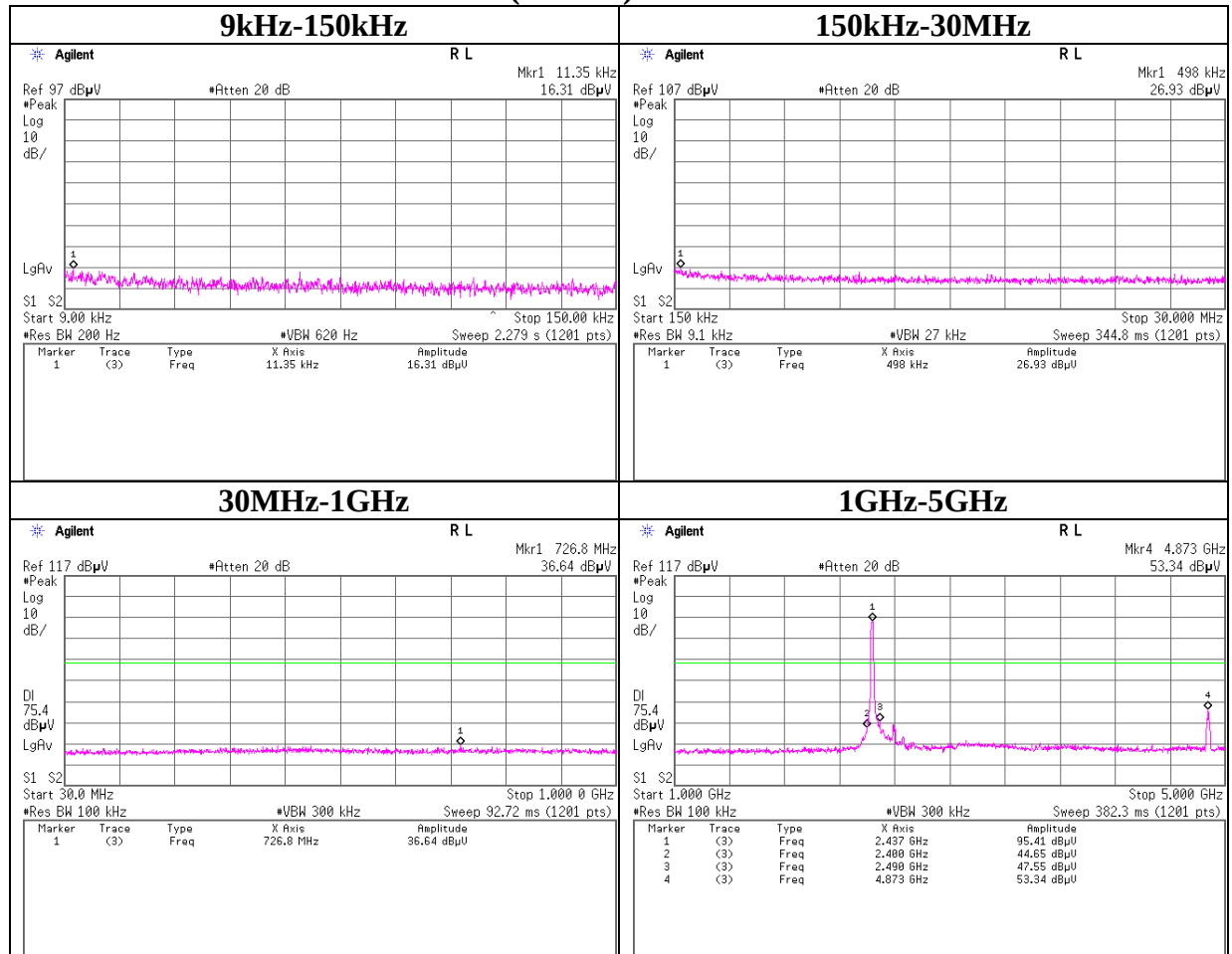
Conducted Spurious Emission

11n-20(2.4GHz) Tx 2412MHz



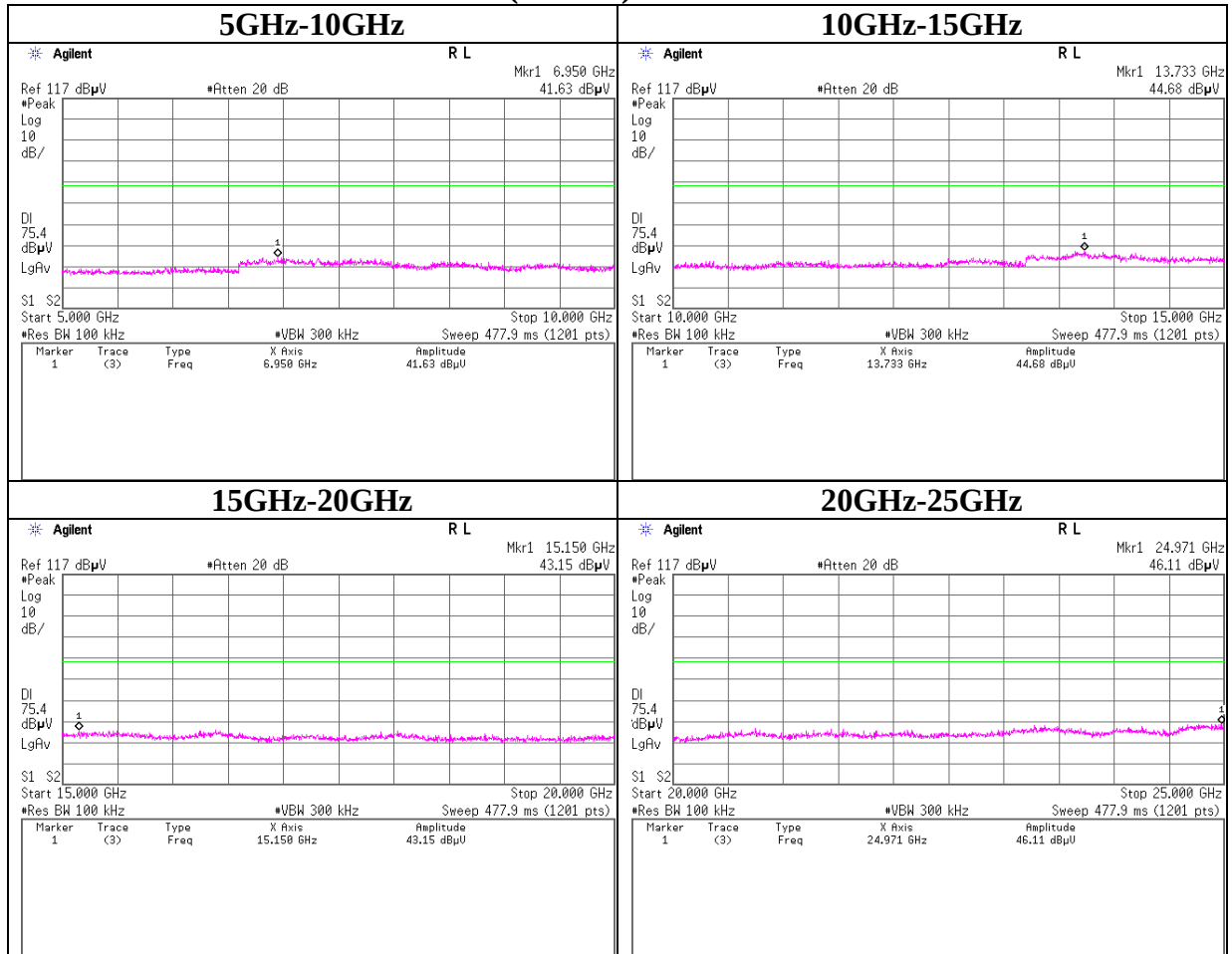
Conducted Spurious Emission

11n-20(2.4GHz) Tx 2437MHz



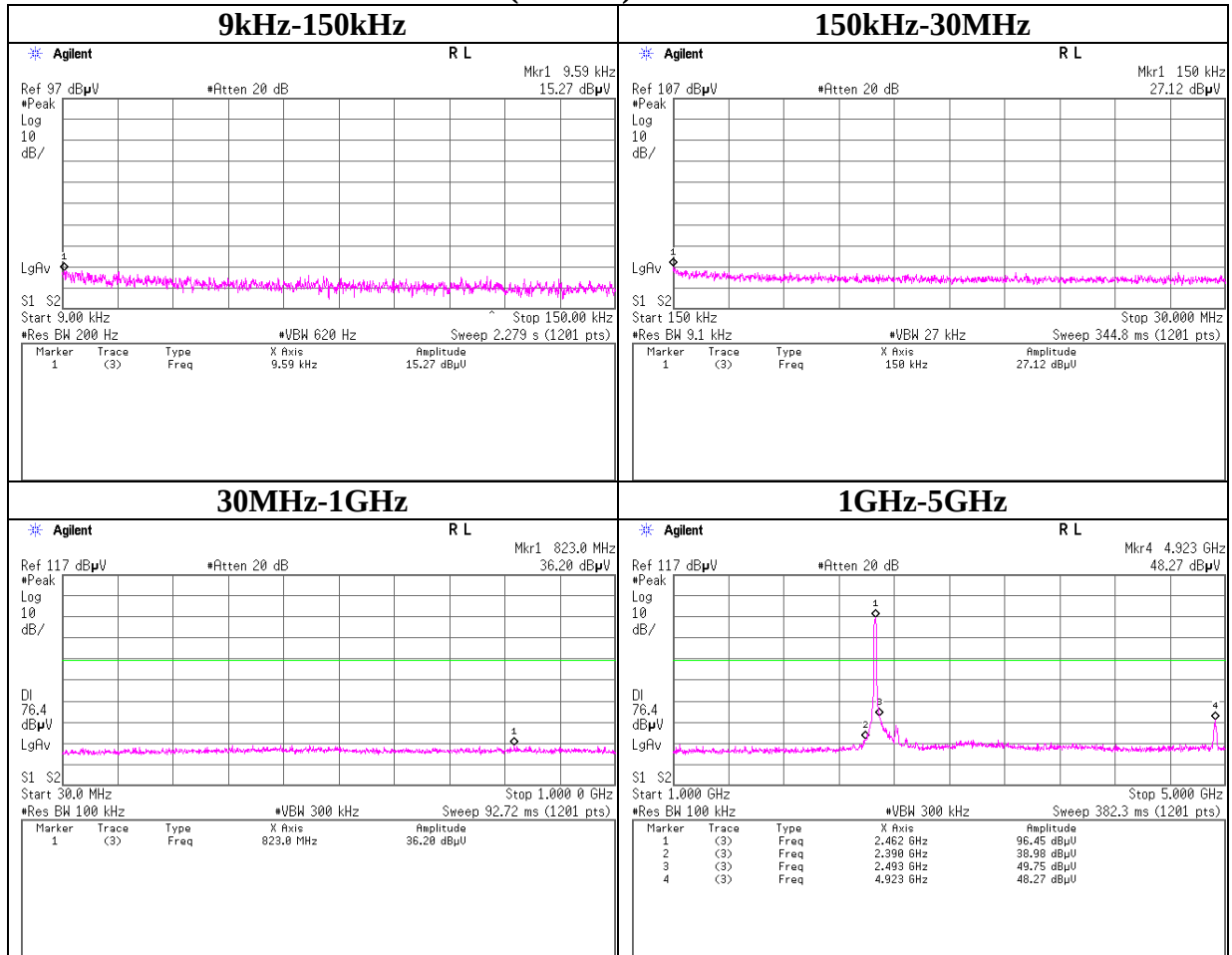
Conducted Spurious Emission

11n-20(2.4GHz) Tx 2437MHz



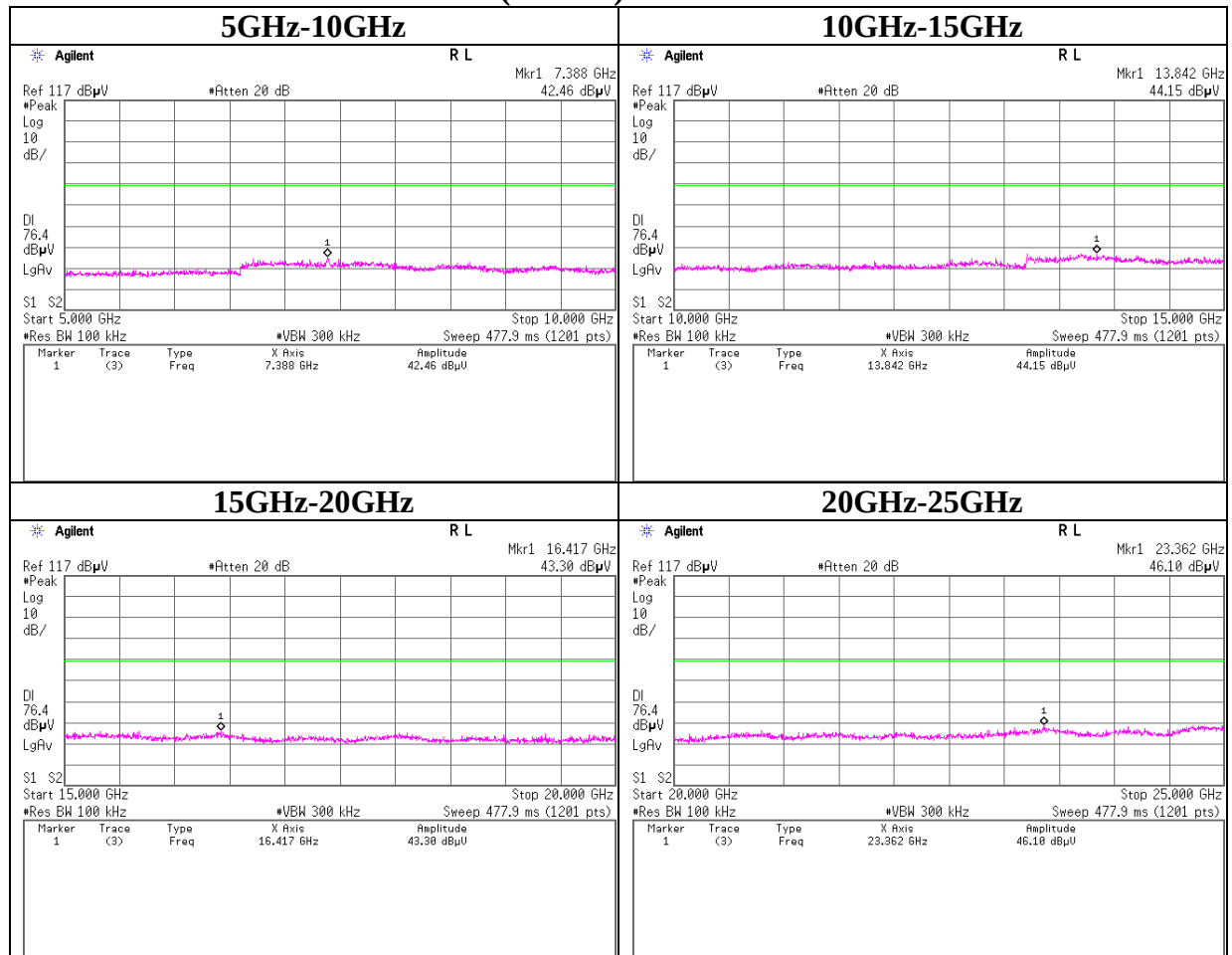
Conducted Spurious Emission

11n-20(2.4GHz) Tx 2462MHz



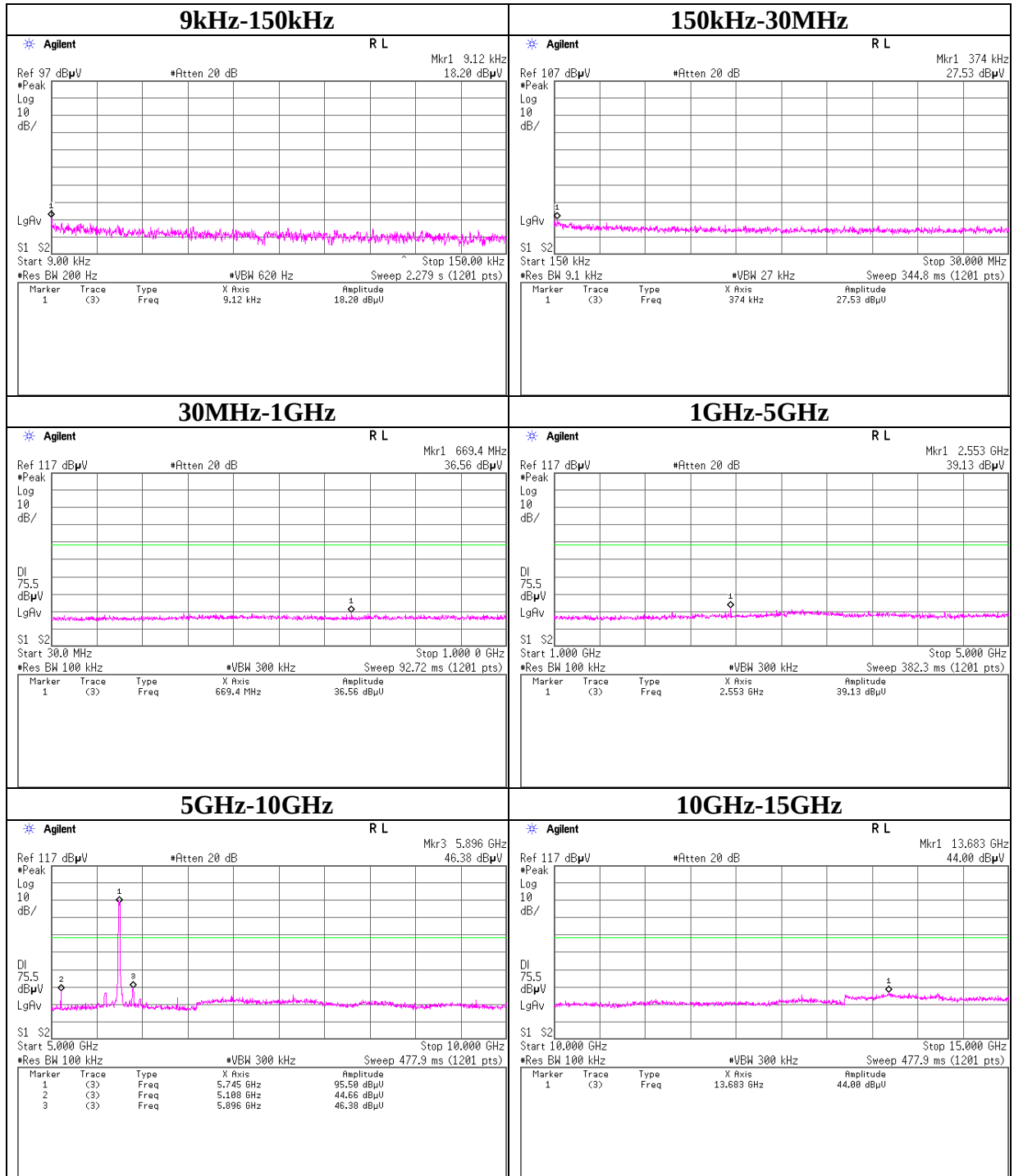
Conducted Spurious Emission

11-20(2.4GHz) Tx 2462MHz



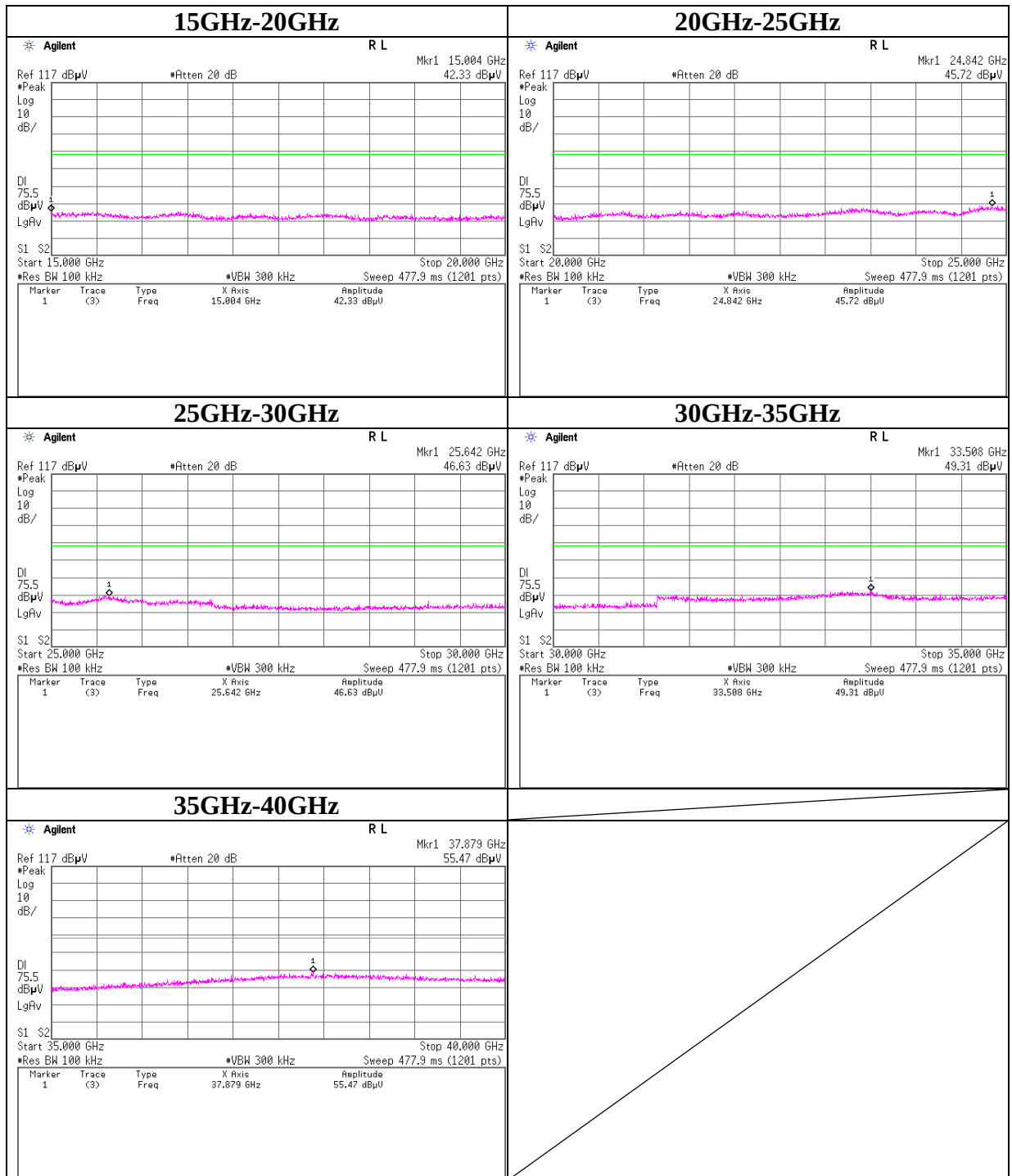
Conducted Spurious Emission

11a Tx 5745MHz



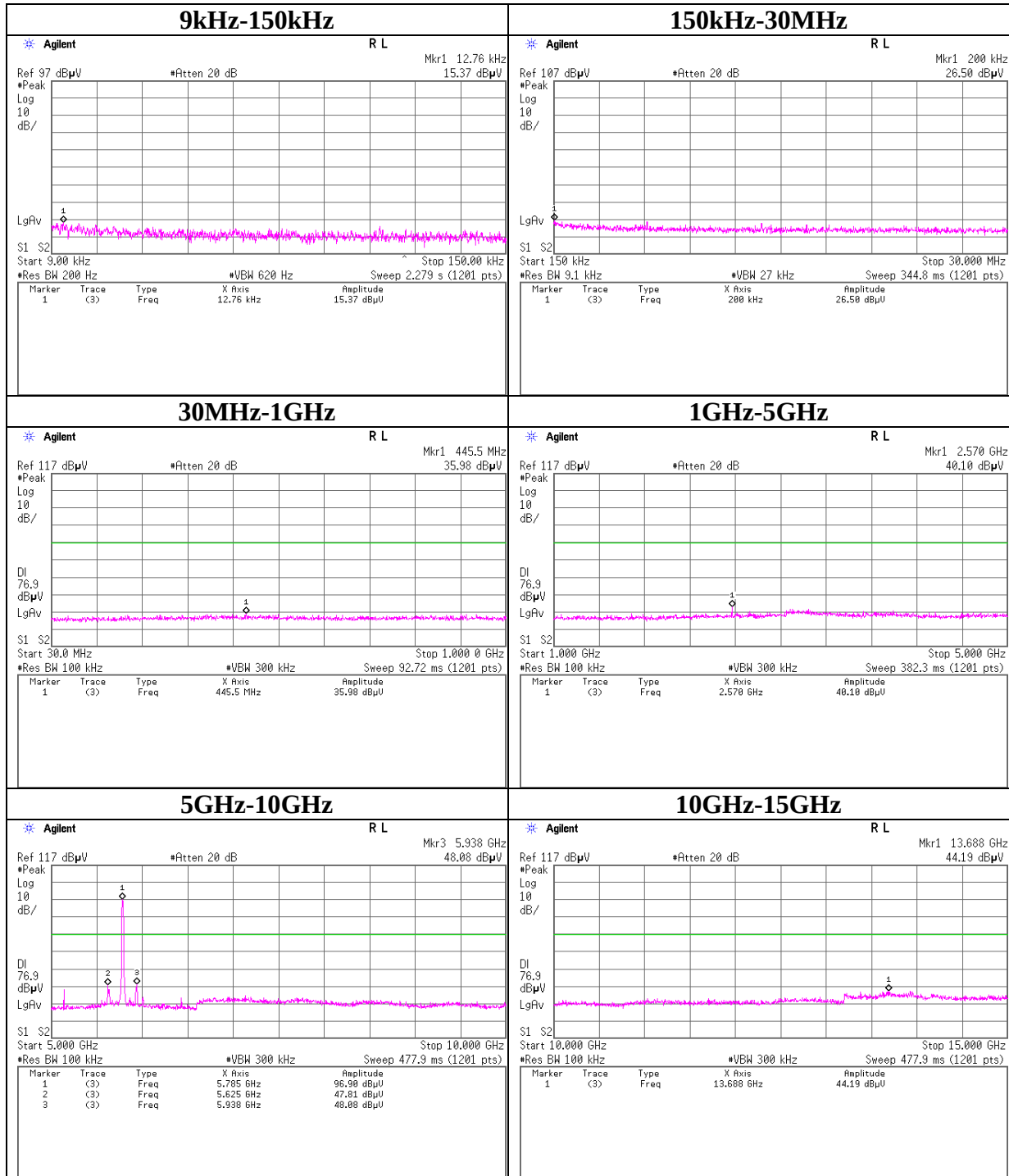
Conducted Spurious Emission

11a Tx 5745MHz



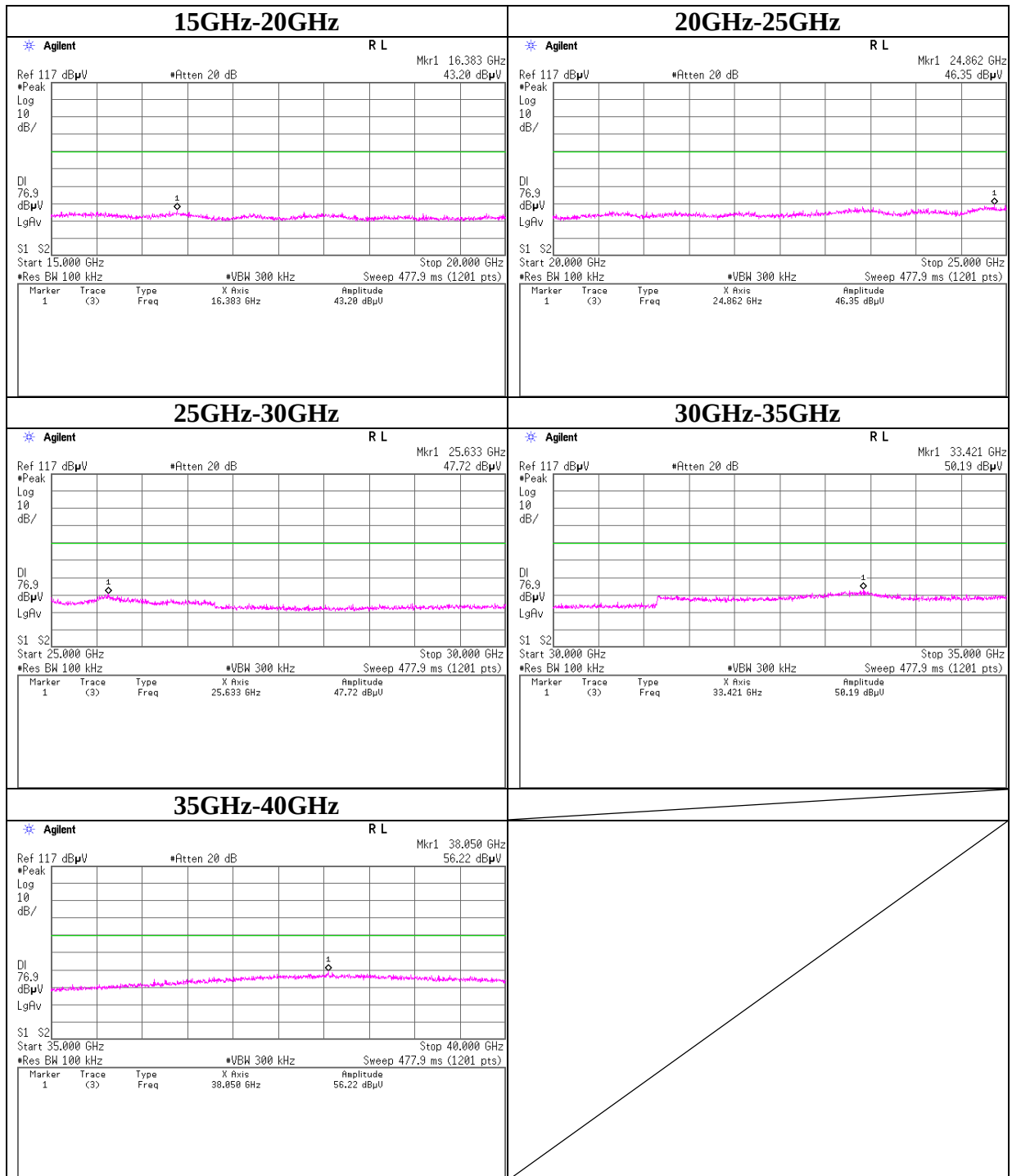
Conducted Spurious Emission

11a Tx 5785MHz



Conducted Spurious Emission

11a Tx 5785MHz



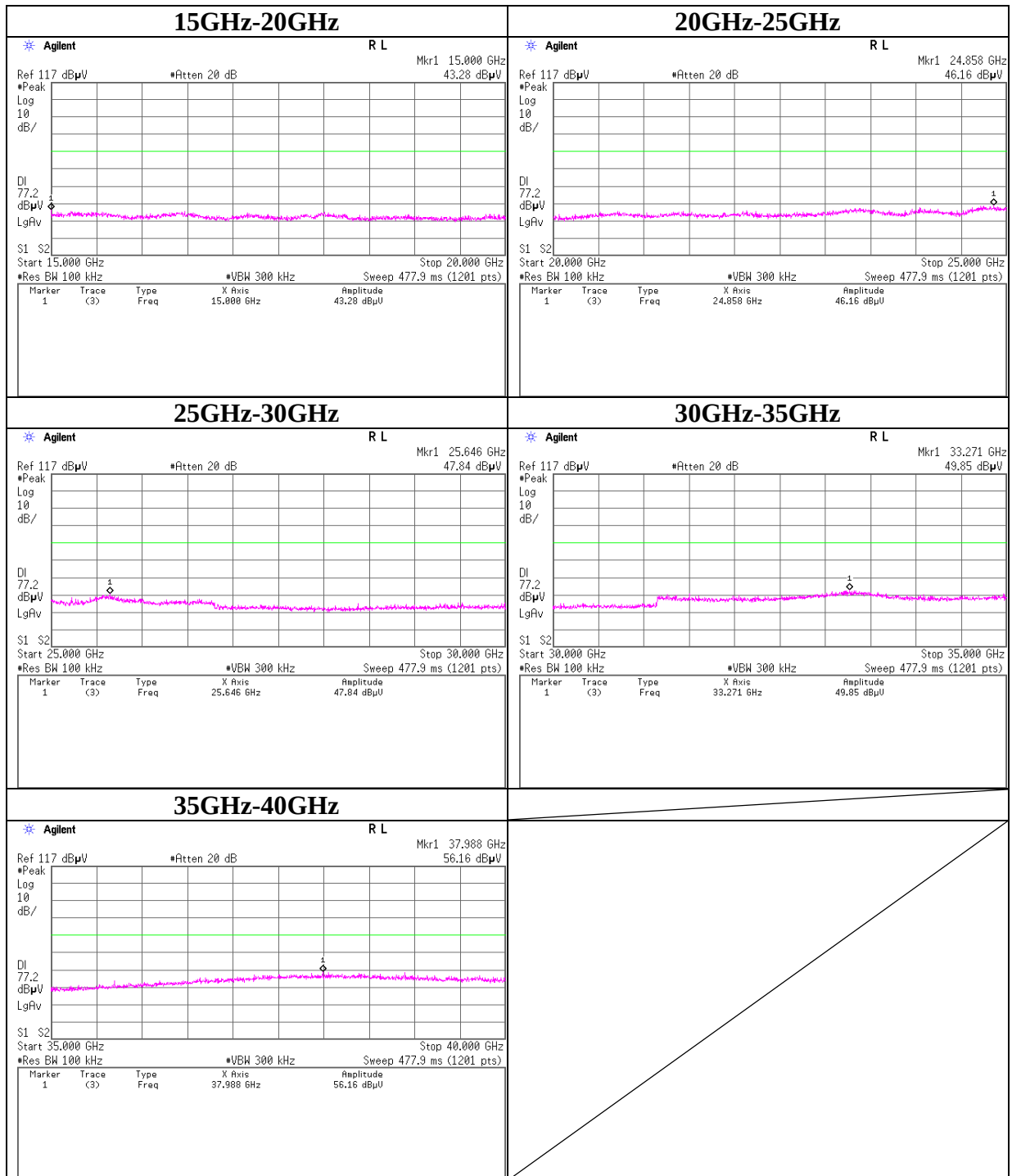
Conducted Spurious Emission

11a Tx 5825MHz



Conducted Spurious Emission

11a Tx 5825MHz



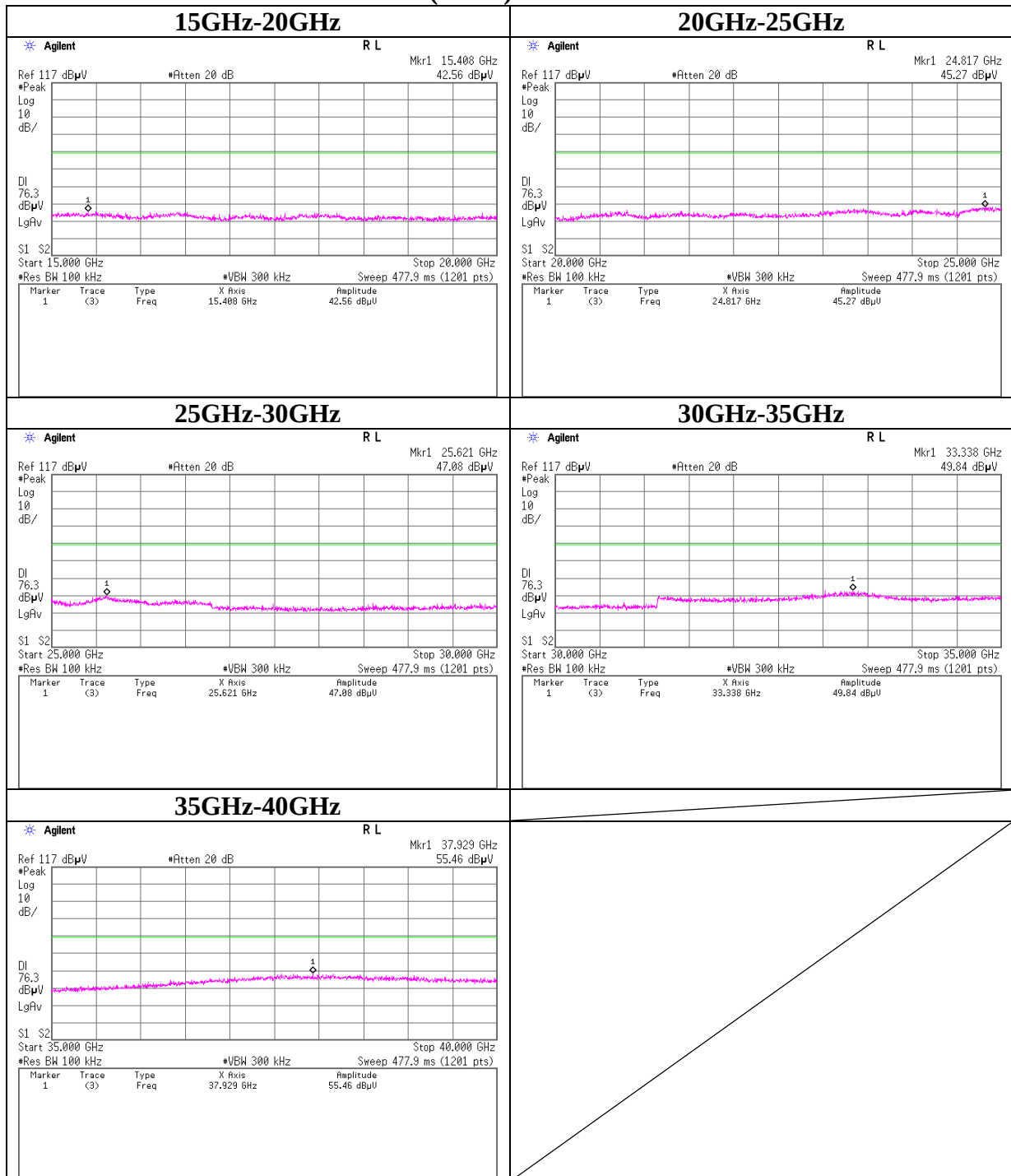
Conducted Spurious Emission

11n-20(5GHz) Tx 5745MHz



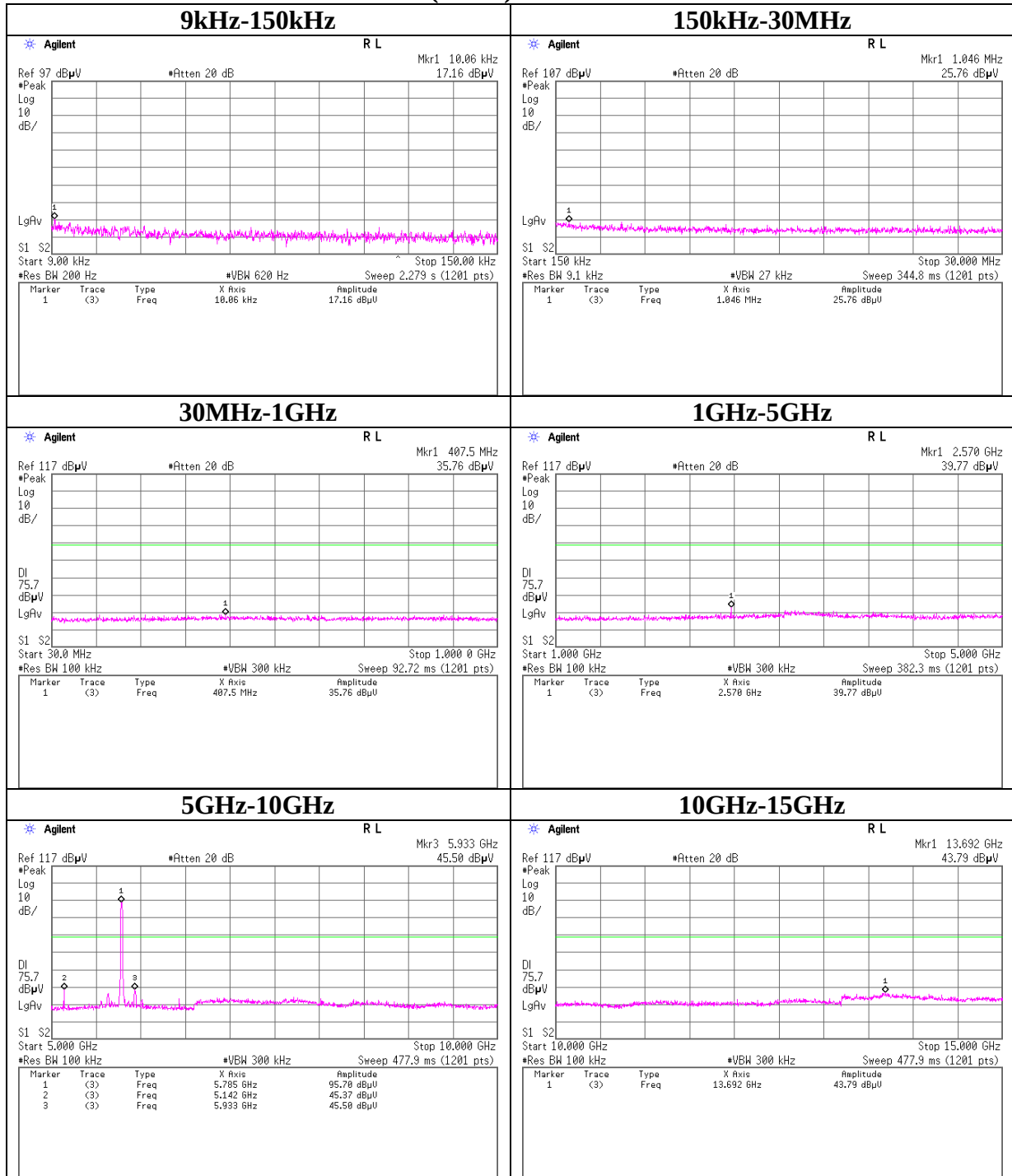
Conducted Spurious Emission

11n-20(5GHz) Tx 5745MHz



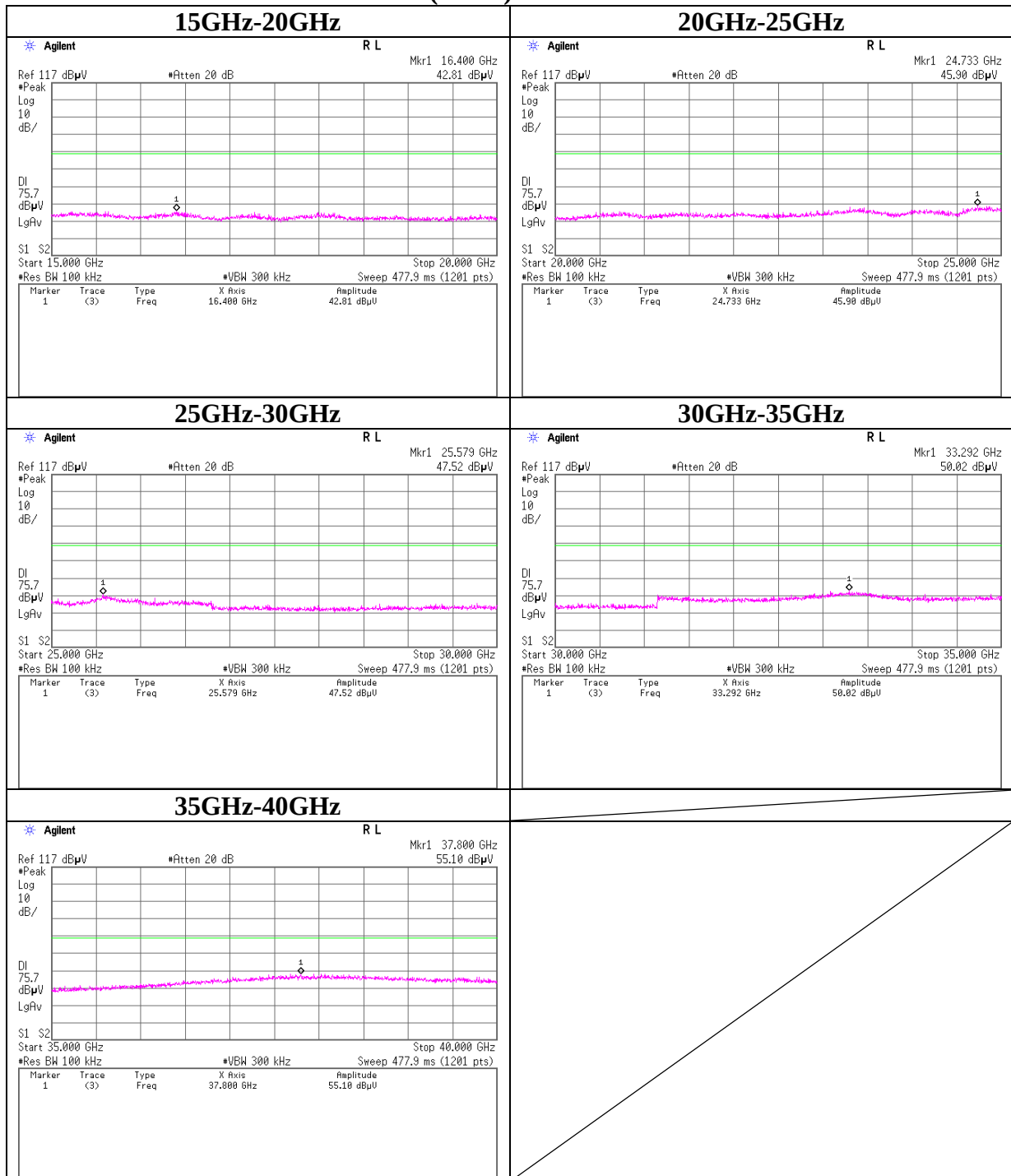
Conducted Spurious Emission

11n-20(5GHz) Tx 5785MHz



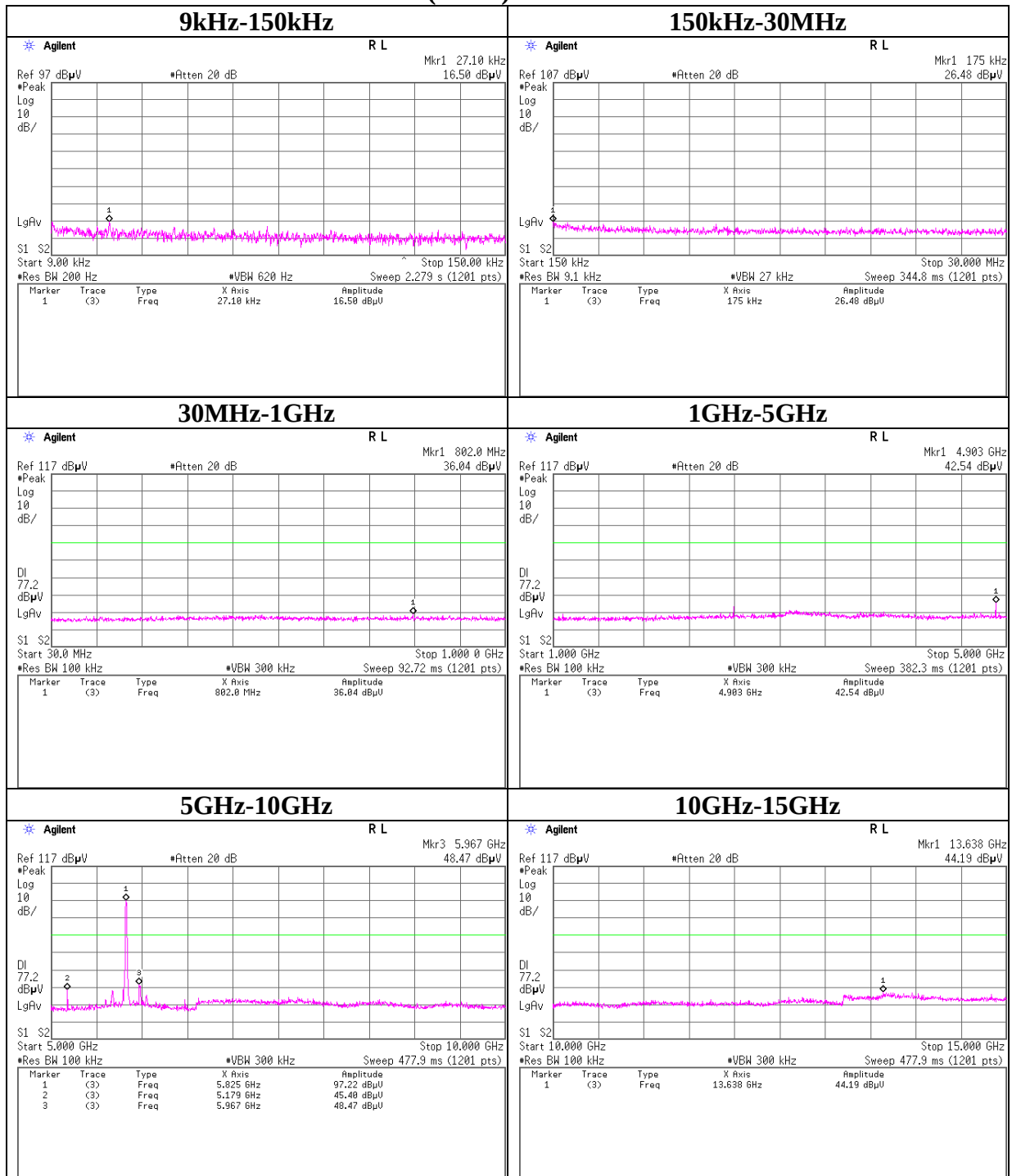
Conducted Spurious Emission

11n-20(5GHz) Tx 5785MHz



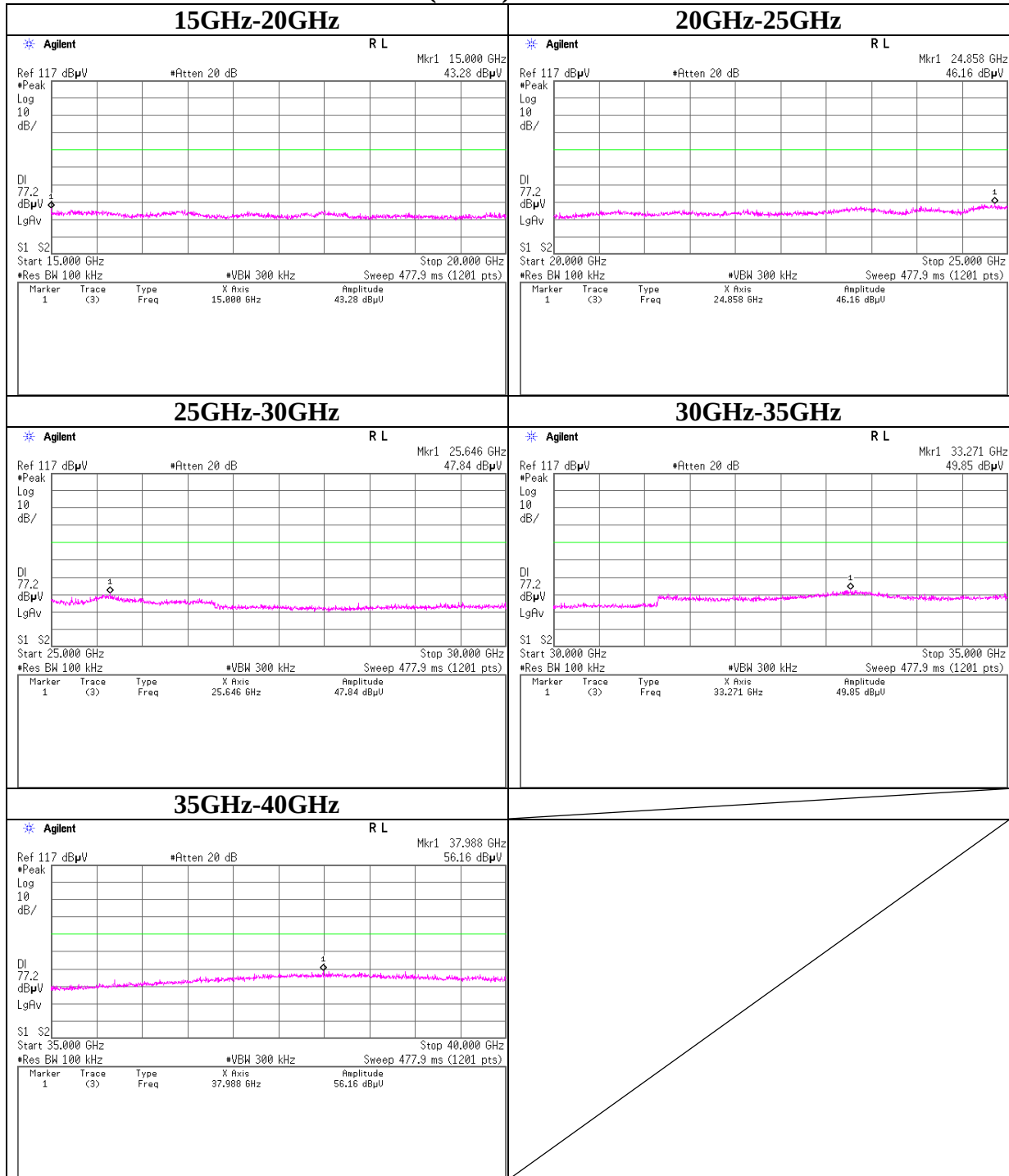
Conducted Spurious Emission

11n-20(5GHz) Tx 5825MHz



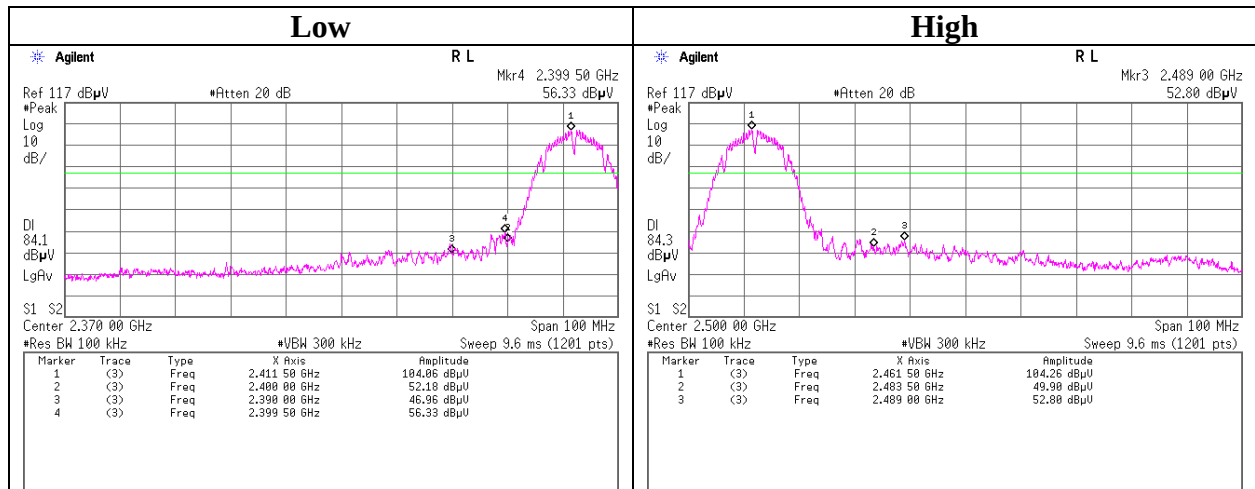
Conducted Spurious Emission

11n-20(5GHz) Tx 5825MHz

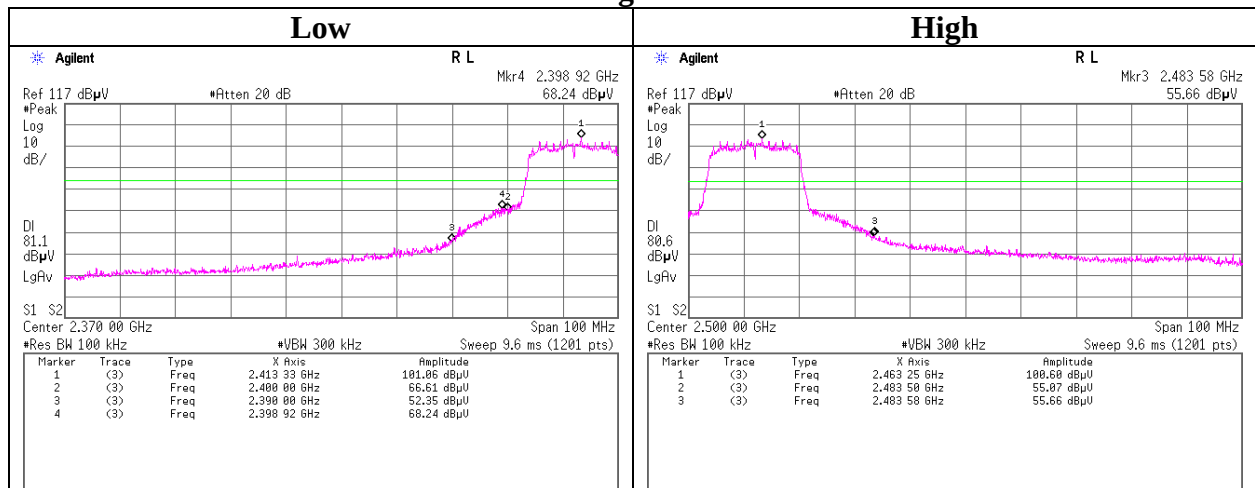


Conducted Emission Band Edge compliance

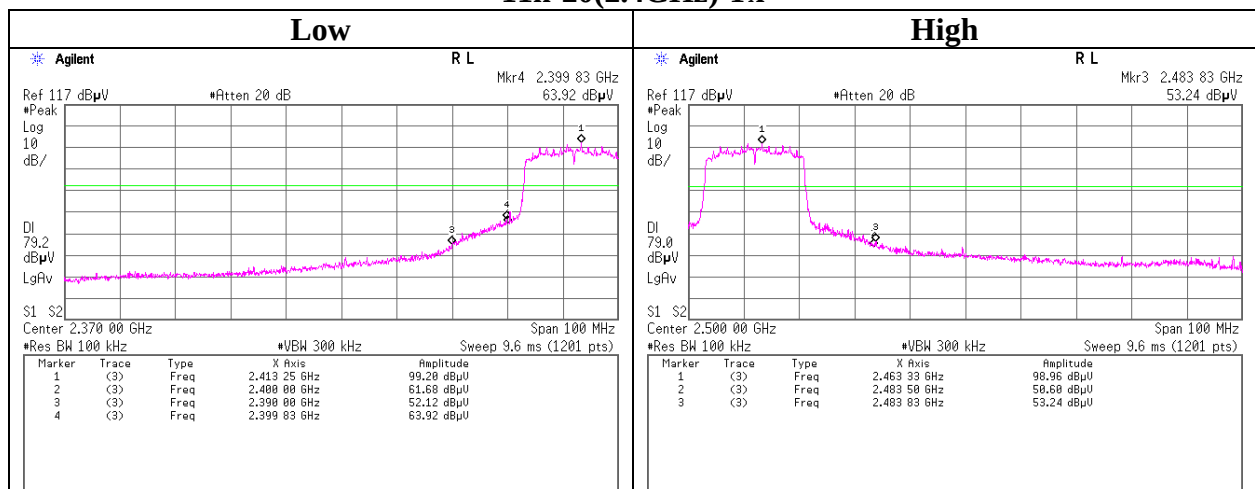
11b Tx



11g Tx

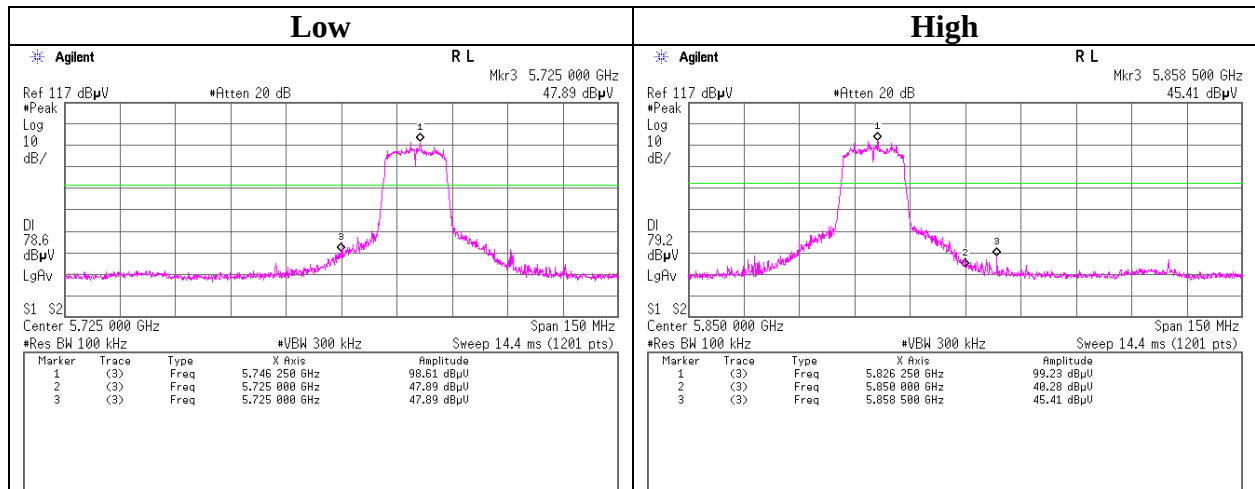


11n-20(2.4GHz) Tx

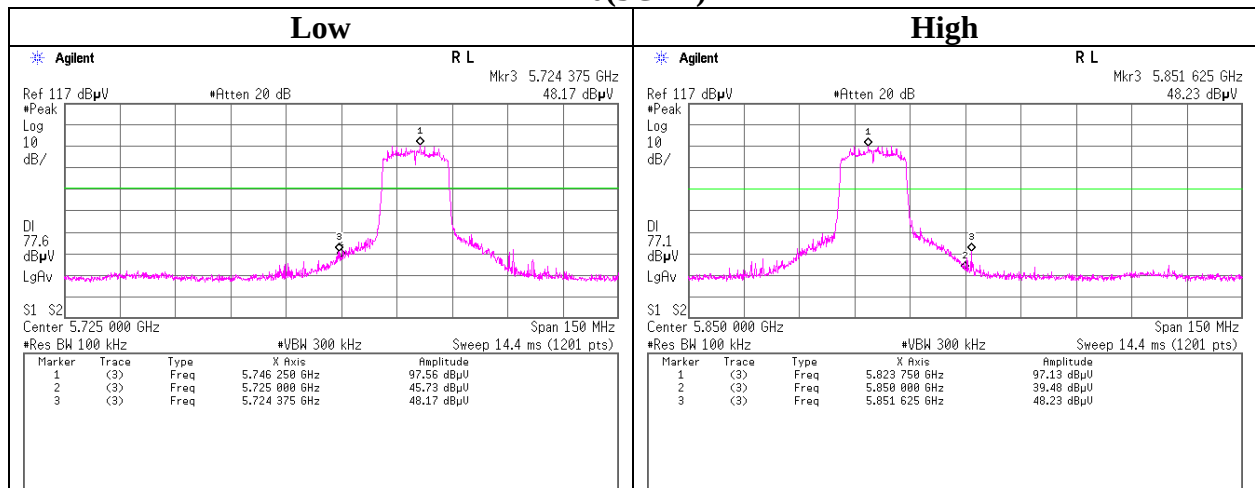


Conducted Emission Band Edge compliance

11a Tx



11n-20(5GHz) Tx



Power Density

Report No. 32CE0235-HO
Test place Head Office EMC Lab. shielded room
Semi Anechoic Chamber No.6 No.6
Date 11/23/2011 11/25/2011
Temperature / Humidity 22 deg. C. / 62 % RH 24 deg. C. / 41 % RH
Engineer Tomohisa Nakagawa Tomohisa Nakagawa
Mode Tx

11b

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-4.60	0.00	9.99	5.39	8.00	2.61
2437.00	-4.57	0.00	9.99	5.42	8.00	2.58
2462.00	-4.32	0.00	9.99	5.67	8.00	2.33

11g

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-10.16	0.00	9.99	-0.17	8.00	8.17
2437.00	-9.81	0.00	9.99	0.18	8.00	7.82
2462.00	-10.20	0.00	9.99	-0.21	8.00	8.21

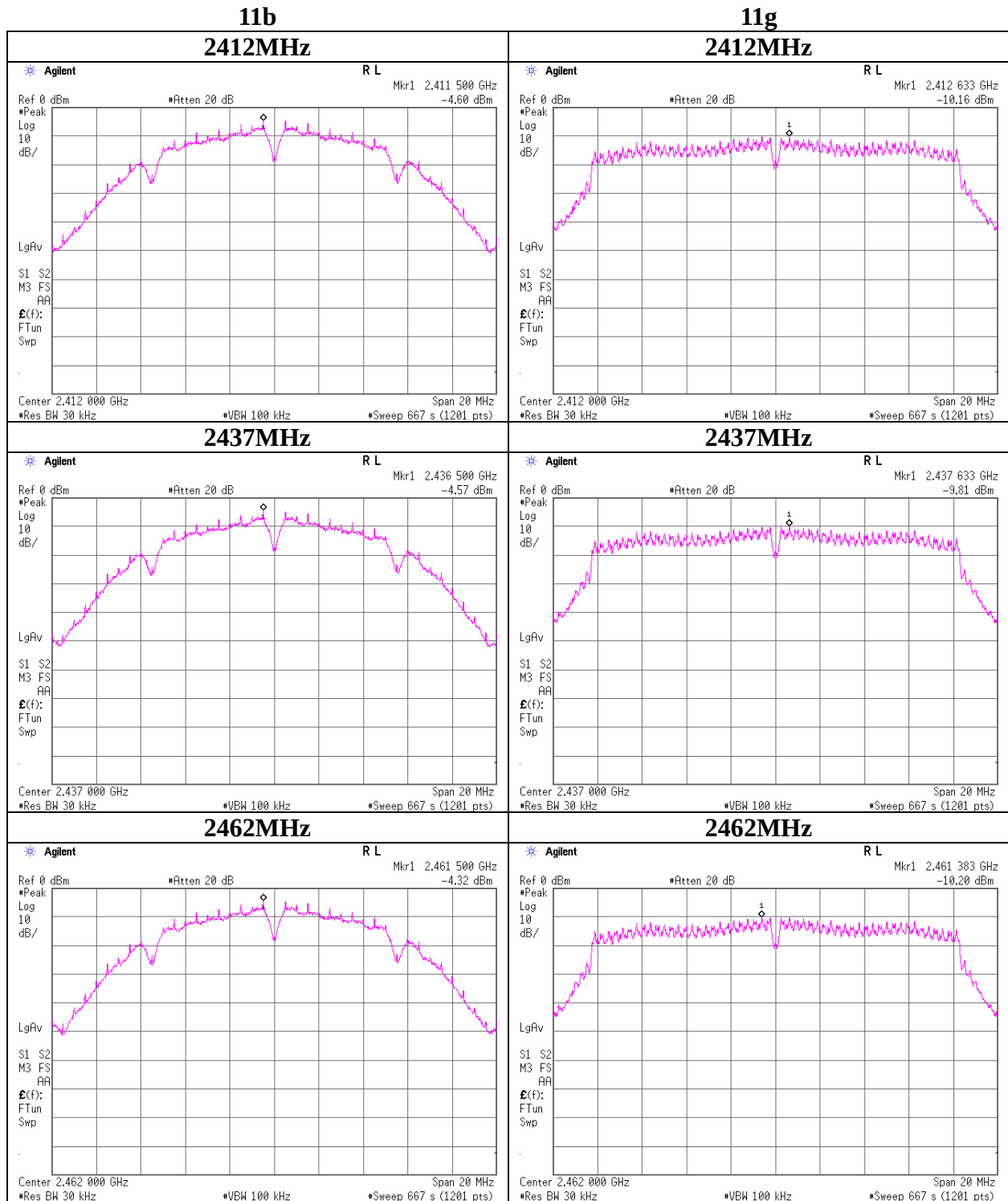
11n-20(2.4GHz)

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2412.00	-11.83	0.00	9.99	-1.84	8.00	9.84
2437.00	-11.98	0.00	9.99	-1.99	8.00	9.99
2462.00	-11.76	0.00	9.99	-1.77	8.00	9.77

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

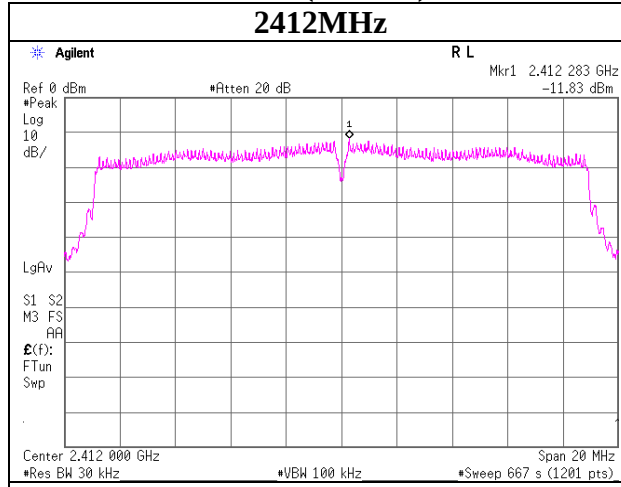
Power Density



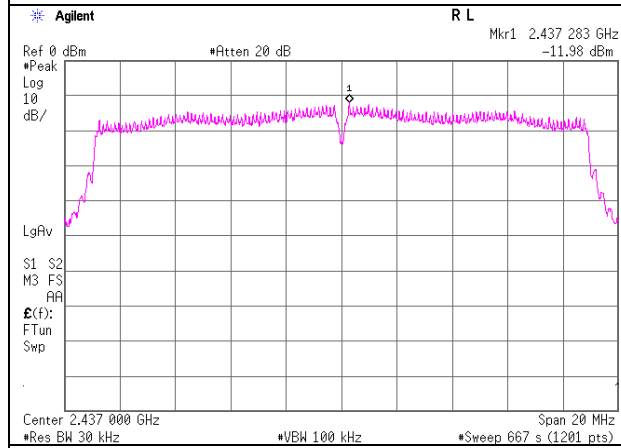
Power Density

11n-20(2.4GHz)

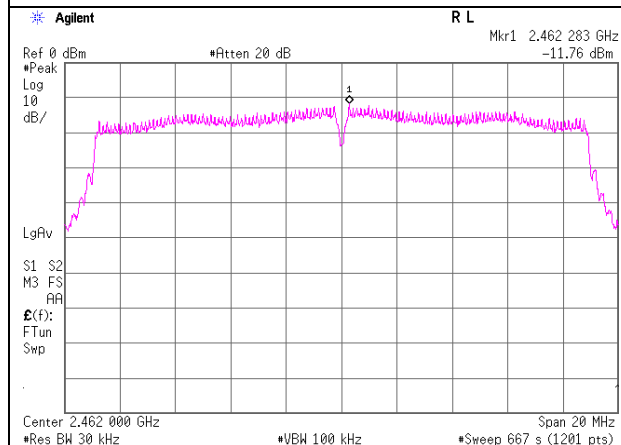
2412MHz



2437MHz



2462MHz



Power Density

Report No. 32CE0235-HO
Test place Head Office EMC Lab. shielded room
Semi Anechoic Chamber No.6
Date 11/24/2011
Temperature / Humidity 27 deg. C. / 67 % RH
Engineer Tomohisa Nakagawa

Mode Tx

11a

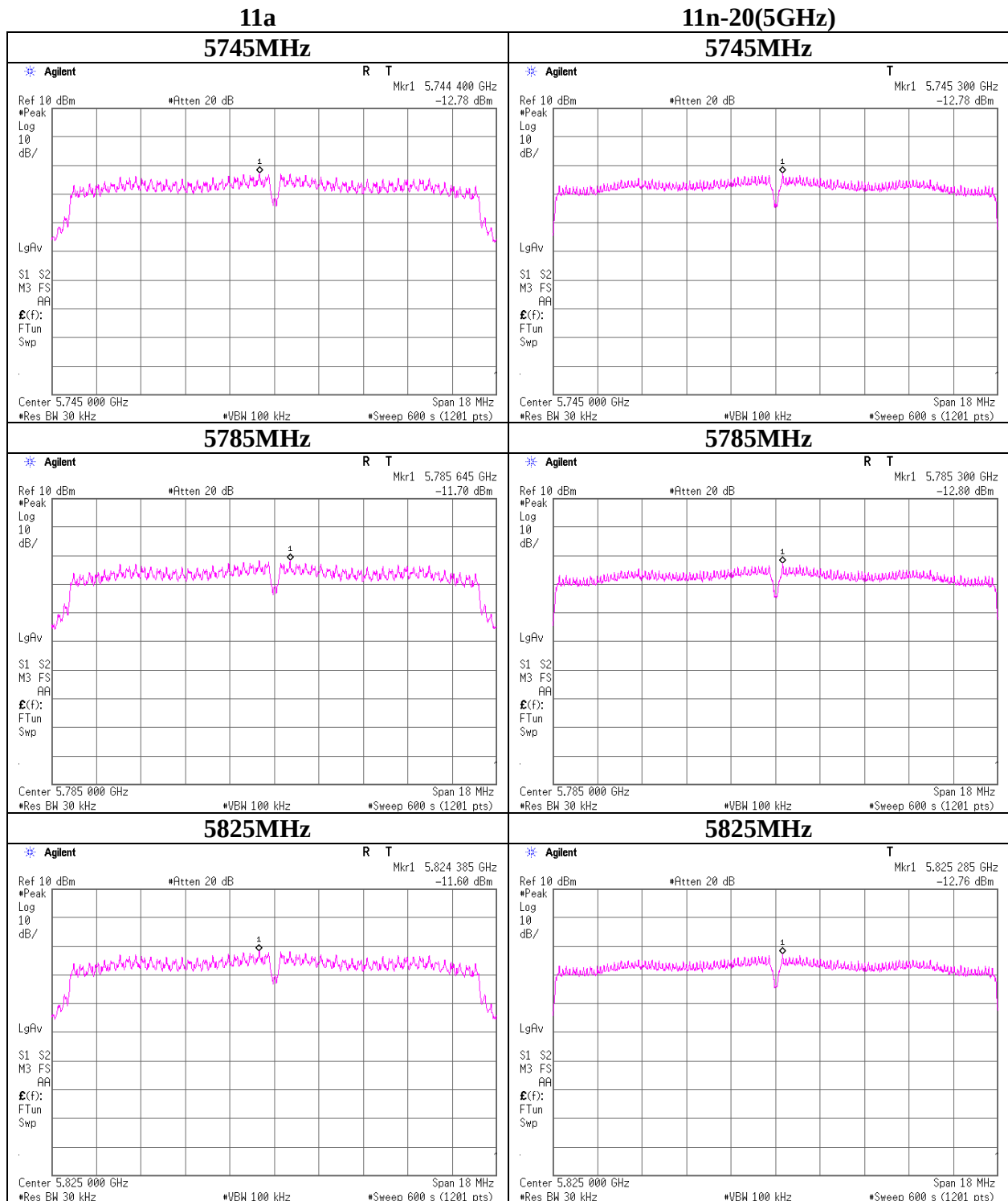
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5745.00	-12.78	0.00	10.07	-2.71	0.54	8.00	10.71
5785.00	-11.70	0.00	10.07	-1.63	0.69	8.00	9.63
5825.00	-11.60	0.00	10.07	-1.53	0.70	8.00	9.53

11n-20(5GHz)

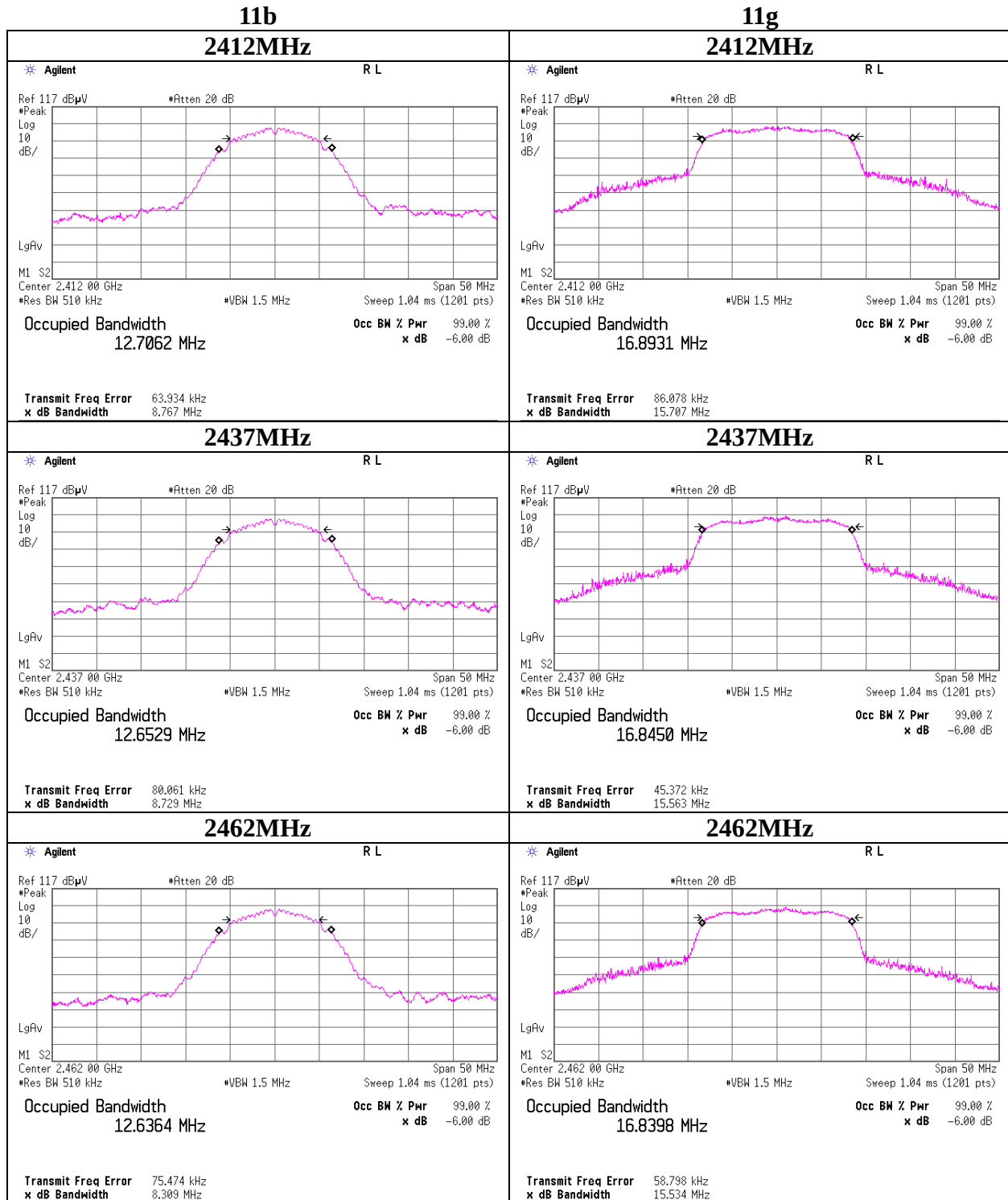
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit [dBm]	Margin [dB]
				[dBm]	[mW]		
5745.00	-12.78	0.00	10.07	-2.71	0.54	8.00	10.71
5785.00	-12.80	0.00	10.07	-2.73	0.53	8.00	10.73
5825.00	-12.76	0.00	10.07	-2.69	0.54	8.00	10.69

Sample Calculation:
Result = Reading + Cable Loss + Attenuator

Power Density

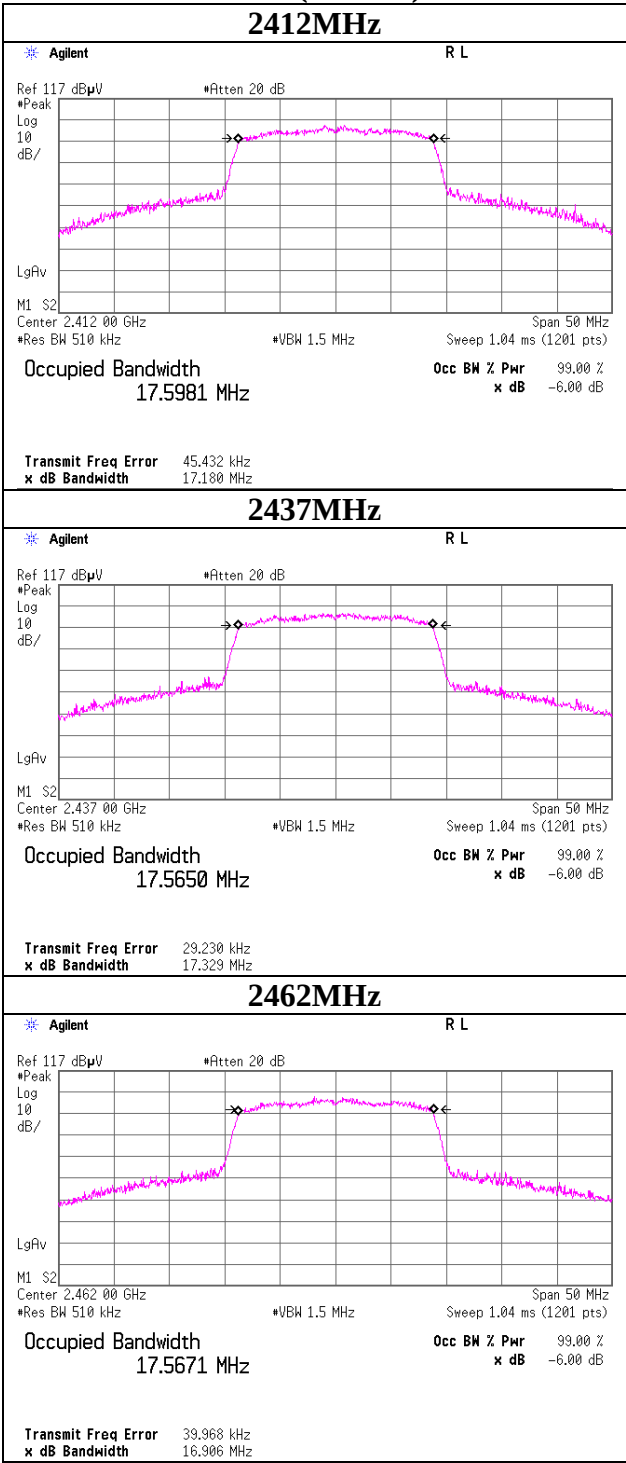


99% Occupied Bandwidth

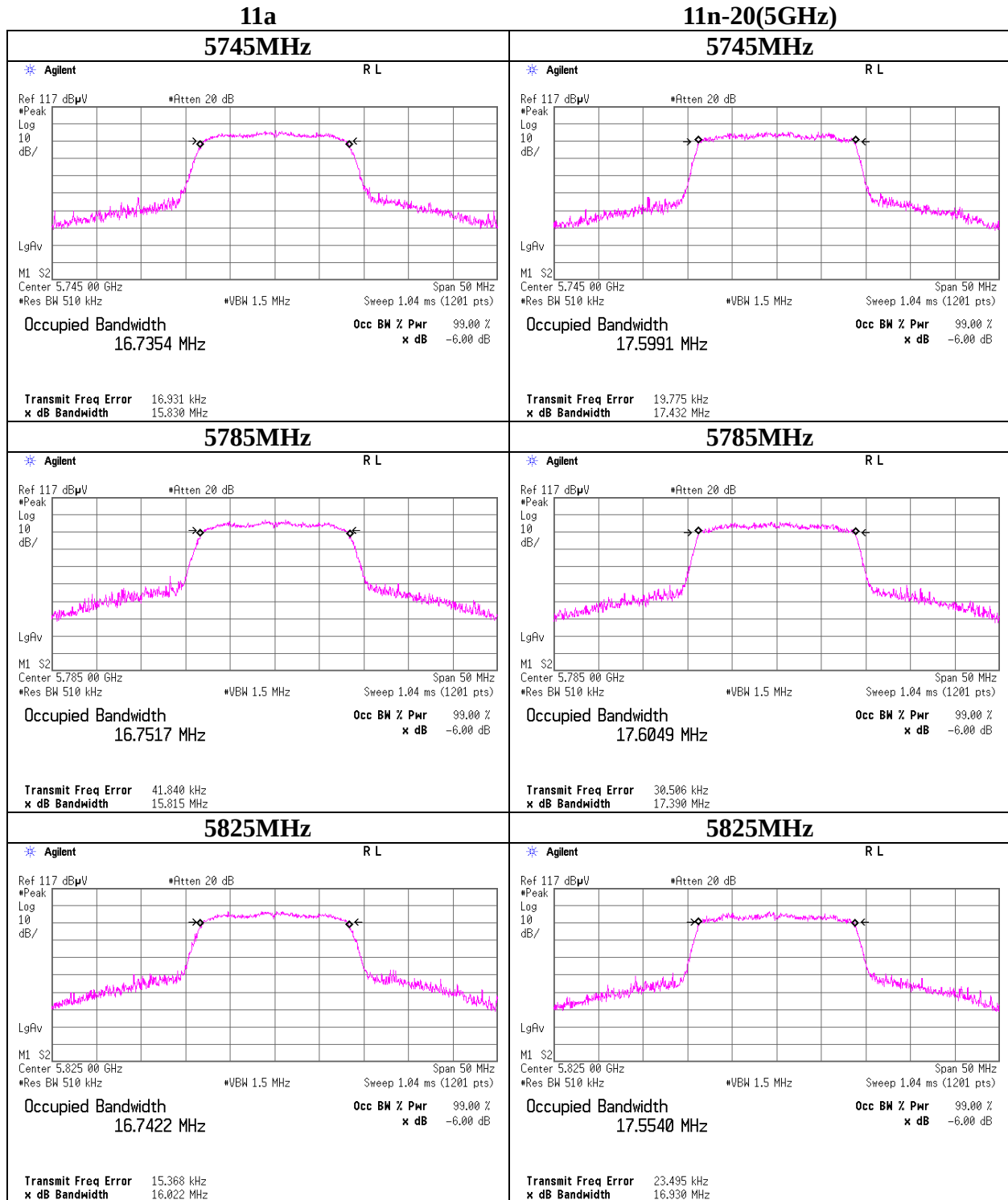


99%Occupied Bandwidth

11n-20(2.4GHz)



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2011/02/23 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	US44302652	RE	2011/06/30 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2011/02/23 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2011/02/15 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2011/08/09 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2011/03/14 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2011/08/09 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2011/07/10 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2011/06/19 * 12
MHA-01	Horn Antenna 18-26.5GHz	EMCO	3160-09	1266	RE	2011/06/20 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2011/06/21 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2010/12/03 * 12
MHF-16	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	RE	2011/09/08 * 12
MHA-04	Horn Antenna 26.5-40GHz	EMCO	3160-10	1140	RE	2011/10/22 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2011/01/16 * 12
MCC-55	Microwave Cable	Suhner	SUCOFLEX101	2874(1m) / 2877(5m)	RE	2011/03/03 * 12

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2011/06/15 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2011/04/15 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2011/11/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	CE	2011/10/19 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE	2011/02/20 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2011/07/04 * 12

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

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

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

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