




# RADIO TEST REPORT


**Test Report No.: 32KE0045-SH-04-A**

**Applicant** : RICOH COMPANY, LTD.  
**Type of Equipment** : Wireless LAN Module  
**Model No.** : LBWB1ZZWU6  
**FCC ID** : BBP-WLALT01  
**Test regulation** : FCC Part15 Subpart C: 2012  
**Test result** : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

**Date of test:** July 30 to August 19, 2012

**Tested by:**   
Tatsuya Arai  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**   
Toyokazu Imamura  
Leader of WiSE Japan,  
UL Verification Service

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".



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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

13-EM-F0429

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## **SECTION 1: Customer information**

Company Name : RICOH COMPANY, LTD.  
Address : 810, Shimo-imaizumi, Ebina-shi, Kanagawa, 243-0460 Japan  
Telephone Number : +81-46-249-8490  
Facsimile Number : +81-3-6673-4366  
Contact Person : Yoshiaki Nishikawa

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Wireless LAN Module  
Model Number : LBWB1ZZWU6  
Serial Number : 1  
Rating : DC 3.6V  
Country of Mass-production : China  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : July 30, 2012  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: LBWB1ZZWU6 (referred to as the EUT in this report) is a Wireless LAN Module.

Clock frequency(ies) in the system : 37.4MHz

<Radio part>

Equipment type : Transceiver  
Frequency of operation \*1) : 2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)  
W52: 5180-5240MHz (IEEE 802.11a, 11n-HT20)  
5190-5230MHz (IEEE 802.11n-HT40)  
W53: 5260-5320MHz (IEEE 802.11a, 11n-HT20)  
5270-5310MHz (IEEE 802.11n-HT40)  
W56: 5500-5700MHz (IEEE 802.11a, 11n-HT20)  
5510-5670MHz (except 5600-5650MHz) (IEEE 802.11n-HT40)  
W58: 5745-5825MHz (IEEE 802.11a, 11n-HT20)  
5755-5795MHz (IEEE 802.11n-HT40)  
Bandwidth : 20MHz  
Channel spacing : 5MHz (2.4GHz), 20MHz (5GHz)  
Type of modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11a/g/n)  
Antenna type : Chip dielectric  
Antenna connector type : JSC  
Antenna gain with cable loss : 2.4GHz: -0.5 dBi  
W52/53: -0.3dBi, W56: -1.2dBi, W58: -1.7dBi  
ITU code : D1D, G1D  
Operation temperature range : 0 to +80 deg.C

\*1) Refer to the test report 32KE0045-SH-04-B/C for FCC 15.407.

FCC 15.31 (e) / 212

The host device provides stable voltage (DC3.6V) constantly to the EUT regardless of input voltage. Therefore, the EUT complies with the requirement.

FCC 15.203 / 212

The EUT has a unique coupling/antenna connector. Therefore the equipment complies with the requirement.

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2012,  
final revised on August 13, 2012 and effective September 12, 2012  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,  
and 5725-5850MHz

\* The revision on August 13, 2012 does not affect the test specification applied to the EUT.

### **3.2 Procedures & Results**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	5.1dB Freq.: 0.15300MHz Detector: Quasi-Peak Phase: N Mode: Tx 5745MHz, IEEE 802.11n (20HT)	Complied
6dB Bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(2)	Conducted	N/A	* See data	Complied
Maximum Peak Output Power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(3)	Conducted	N/A		Complied
Out of Band Emission & Restricted Band Edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	3.1dB Freq.: 2483.500MHz Detector: Average Polarization: Horizontal Mode: Tx 2462MHz, IEEE 802.11g	Complied
Power Density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (e)	Conducted	N/A	* See data	Complied

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

These tests were also referred to "Guidance on Measurement for Digital Transmission Systems Section15.247".

### **3.3 Addition to standard**

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-

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

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

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### 3.4 Uncertainty

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

Item	Frequency range	No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
<b>Conducted emission (AC Mains) LISN</b>	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
<b>Radiated emission (Measurement distance: 3m)</b>	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
<b>Radiated emission (Measurement distance: 1m)</b>	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.6 dB	4.3 dB	4.4 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

#### Conducted emission test

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

#### Radiated emission test

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

#### Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB

Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.7dB

Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB

Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB

Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB

Bandwidth measurement uncertainty for this test was: (±) 5.4%

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input checked="" type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

### 3.6 Test setup, Data of EMI & Test instruments

Refer to APPENDIX 3 to 3.

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**SECTION 4: Operation of E.U.T. during testing****4.1 Operating mode**

Test item	Mode	Tested frequency	Power setting *1)	Worst data rate *2)
Conducted emission Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2462MHz	14dBm	6Mbps, PN9
	Transmitting IEEE 802.11n-20: 5G Band	5745MHz	13dBm	MCS0, PN9
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	14dBm	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	14dBm	6Mbps, PN9
	Transmitting IEEE 802.11n-20: 2.4G Band	2412MHz, 2437MHz, 2462MHz	13dBm	MCS0, PN9
	Transmitting IEEE 802.11a	5745MHz, 5785MHz, 5825MHz	13dBm	6Mbps, PN9
	Transmitting IEEE 802.11n-20: 5G Band	5745MHz, 5785MHz, 5825MHz	13dBm	MCS0, PN9
	Transmitting IEEE 802.11n-40: 5G Band	5755MHz, 5795MHz	13dBm	MCS0, PN9
*1) Software: Tera Term ver: 4.71, Wl.exe ver:1.0				
*2) The worst condition was determined based on the test result of Maximum Peak Output Power.				
*3) 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.				

**Justification:** The system was configured in typical fashion (as customer would normally use it) for testing.

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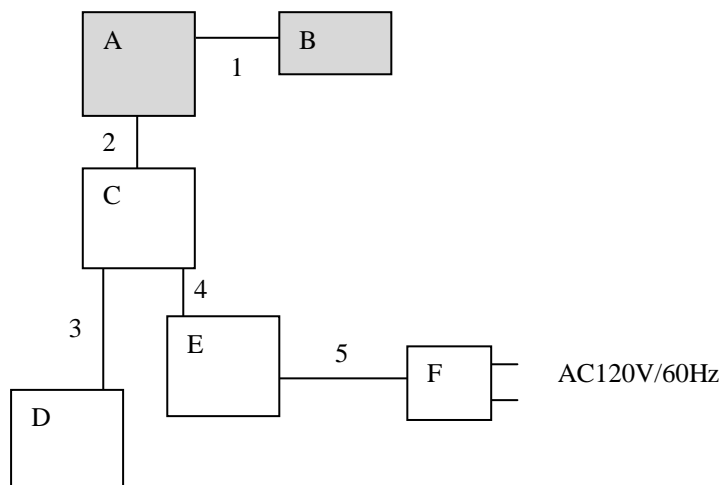
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



## 4.2 Configuration and peripherals



\* Test data was taken under worse case conditions.

### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless LAN Module	LBWB1ZZWU6	1	RICOH	EUT
B	Antenna	ANCM22G44DAA17 9RB4	-	RICOH	EUT
C	Network Board	NETWORK: ALT-1	#59	RICOH	-
D	Power Supply Board	EXCHANGE: NW	#13	RICOH	-
E	Debug Board	SOL_NW: DBG	#44	RICOH	-
F	AC Adapter	US112-3312	807-0357371	BUFFALO	-

### List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna	0.05	Shielded	Shielded	-
2	Flat	0.10	Unshielded	Unshielded	-
3	Flat	0.15	Unshielded	Unshielded	-
4	Flat	0.05	Unshielded	Unshielded	-
5	DC	1.8	Unshielded	Unshielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was 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 LISN. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment. Photographs of the set up are shown in APPENDIX 3.

### **5.3 Test conditions**

Frequency range : 0.15 - 30MHz  
EUT position : Table top

### **5.4 Test procedure**

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via AC adapter within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via AC adapter. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, an average detector. The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ Average  
IF Bandwidth : 9kHz

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1

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## **SECTION 6: Radiated emission**

### **6.1 Operating environment**

Test place : See test data (APPENDIX 1)  
 Temperature : See test data (APPENDIX 1)  
 Humidity : See test data (APPENDIX 1)

### **6.2 Test configuration**

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. The rear of EUT was aligned and flushed with rear of tabletop. Photographs of the set up are shown in APPENDIX 3.

### **6.3 Test conditions**

Frequency range : 30MHz to 40GHz  
 EUT position : Table top

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The radiated emission measurements were made with the following detection of the test instrument.

Frequency	30-1000MHz	1-40GHz		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: *2)	RBW: 100kHz VBW: 300kHz

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

\*2) Refer to VBW Calculation Chart.

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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.

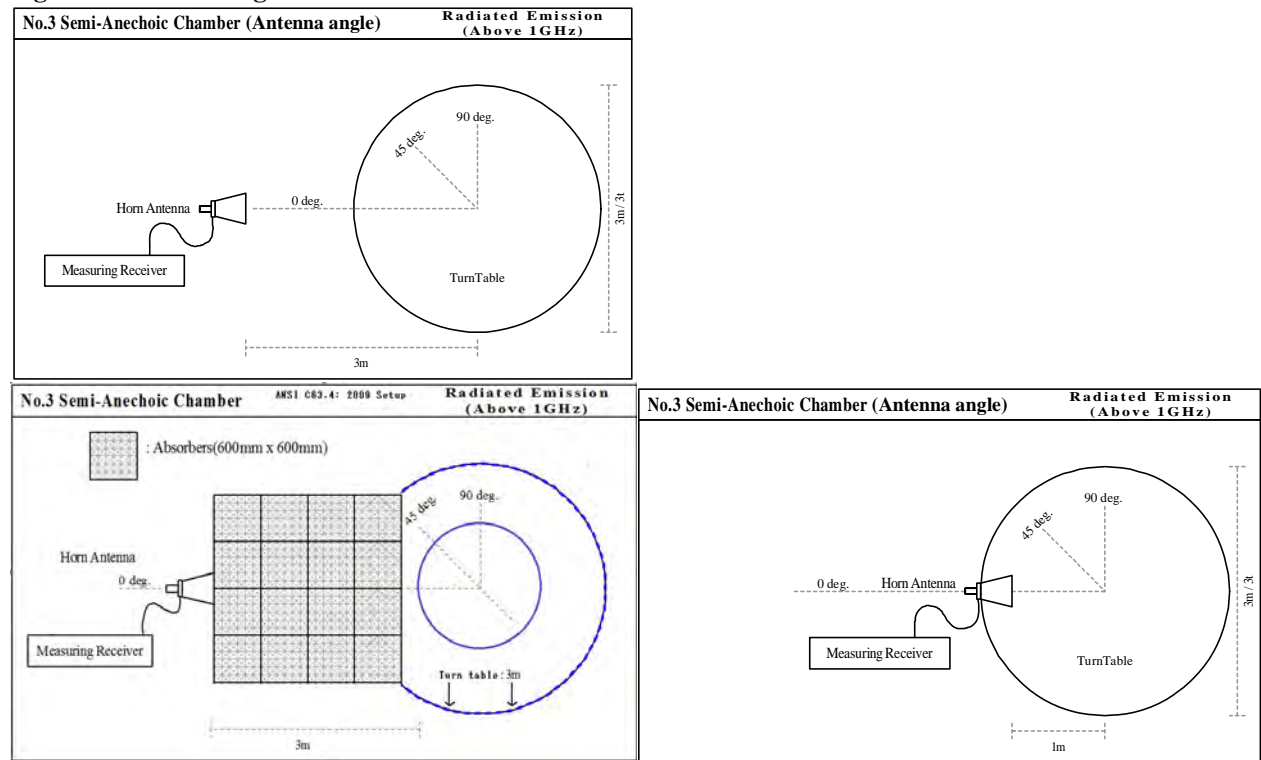
**Combinations of the worst case  
2.4GHz band**

	Antenna polarization	Carrier (Band edge)	Spurious			
			Below 1GHz	1-15GHz	15-18GHz	18-25GHz
Module	Horizontal	Y	X	Z	Z	X
Antenna		X	X	Z	Z	X
Module	Vertical	Z	X	X	X	X
Antenna		Z	X	Z	Z	X

**5GHz band (W58)**

	Antenna polarization	Carrier (Band edge)	Spurious			
			Below 1GHz	1-15GHz	15-18GHz	18-40GHz
Module	Horizontal	X	X	X	Z	X
Antenna		X	X	X	Z	X
Module	Vertical	X	X	X	Z	X
Antenna		Z	X	X	Z	X

**Figure 1. Antenna angle**



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Facsimile : +81 463 50 6401

## 6.5 Band edge

Band edge level at 2390MHz, 2483.5MHz, 5725MHz and 5850MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

## 6.6 Results

Summary of the test results :

Pass

- \* No noise was detected above the 5<sup>th</sup> order harmonics (2.4GHz bands).
- \* No noise was detected above the 3<sup>rd</sup> order harmonics (5GHz bands).

Refer to APPENDIX 1

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## **SECTION 7: Out of band emissions (Antenna port conducted)**

### **Test procedure**

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port. In any 100kHz bandwidth outside the frequency 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. 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=10kHz)

Summary of the test results: Pass  
Refer to APPENDIX 1

## **SECTION 8: 6dB bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 1

## **SECTION 9: Maximum peak output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass  
Refer to APPENDIX 1

## **SECTION 10: Peak power density**

### **Test procedure**

The peak power density was measured with a spectrum analyzer connected to the antenna port.

Instrument used : Spectrum Analyzer \*1)  
RBW / VBW : 30kHz / 100kHz \*2)

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

\*2) The test was not performed at RBW: 3kHz that was stated in the Regulation. However, the measurement value with RBW: 3kHz is less than the value of RBW: 30kHz and the test data met the limit with RBW: 30kHz.

Summary of the test results: Pass  
Refer to APPENDIX 1

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Facsimile : +81 463 50 6401

## **Contents of APPENDIXES**

### **APPENDIX 1: Data of Radio tests**

Conducted emission  
6dB Bandwidth  
Maximum peak output power  
Radiated emission  
Spurious emission (Antenna port conducted)  
Peak power density  
Occupied Bandwidth

### **APPENDIX 2: Test instruments**

Test instruments

### **APPENDIX 3: Photographs of test setup**

Conducted emission  
Radiated emission  
Pre-check of worst position

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# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2012/08/18

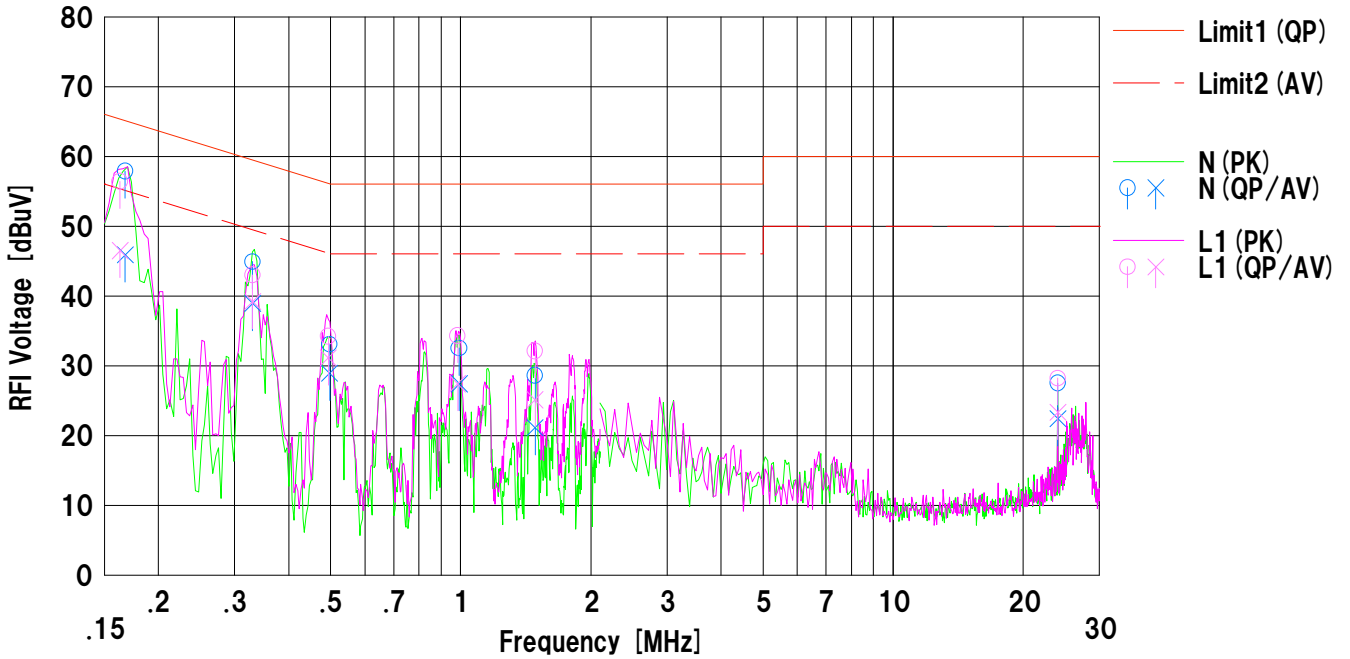
Company : RICOH COMPANY,LTD.  
Kind of EUT : Wireless LAN Module  
Model No. : LBWB1ZZWU6  
Serial No. : 1

Mode : Tx 11g 2462MHz  
Report No. : 32KE0045-SH-04-A  
Power : AC 120V / 60Hz  
Temp./Humi. : 23deg.C. / 60%RH

Remarks : -

Limit1 : FCC 15C (15.207) QP  
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.16760	45.2	33.2	12.7	57.9	45.9	65.0	55.0	7.1	9.1	N	
2	0.33000	32.2	26.2	12.7	44.9	38.9	59.4	49.4	14.5	10.5	N	
3	0.49800	20.4	16.2	12.7	33.1	28.9	56.0	46.0	22.9	17.1	N	
4	0.99192	19.8	14.7	12.7	32.5	27.4	56.0	46.0	23.5	18.6	N	
5	1.48559	15.8	8.3	12.8	28.6	21.1	56.0	46.0	27.4	24.9	N	
6	24.01980	13.8	8.7	13.7	27.5	22.4	60.0	50.0	32.5	27.6	N	
7	0.16300	43.7	33.8	12.7	56.4	46.5	65.3	55.3	8.9	8.8	L1	
8	0.33000	30.3	26.5	12.7	43.0	39.2	59.4	49.4	16.4	10.2	L1	
9	0.49452	21.5	18.4	12.7	34.2	31.1	56.0	46.0	21.8	14.9	L1	
10	0.98402	21.6	14.7	12.7	34.3	27.4	56.0	46.0	21.7	18.6	L1	
11	1.48600	19.3	12.3	12.8	32.1	25.1	56.0	46.0	23.9	20.9	L1	
12	24.01980	14.5	9.6	13.7	28.2	23.3	60.0	50.0	31.8	26.7	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN: SLS-05



# DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2012/08/18

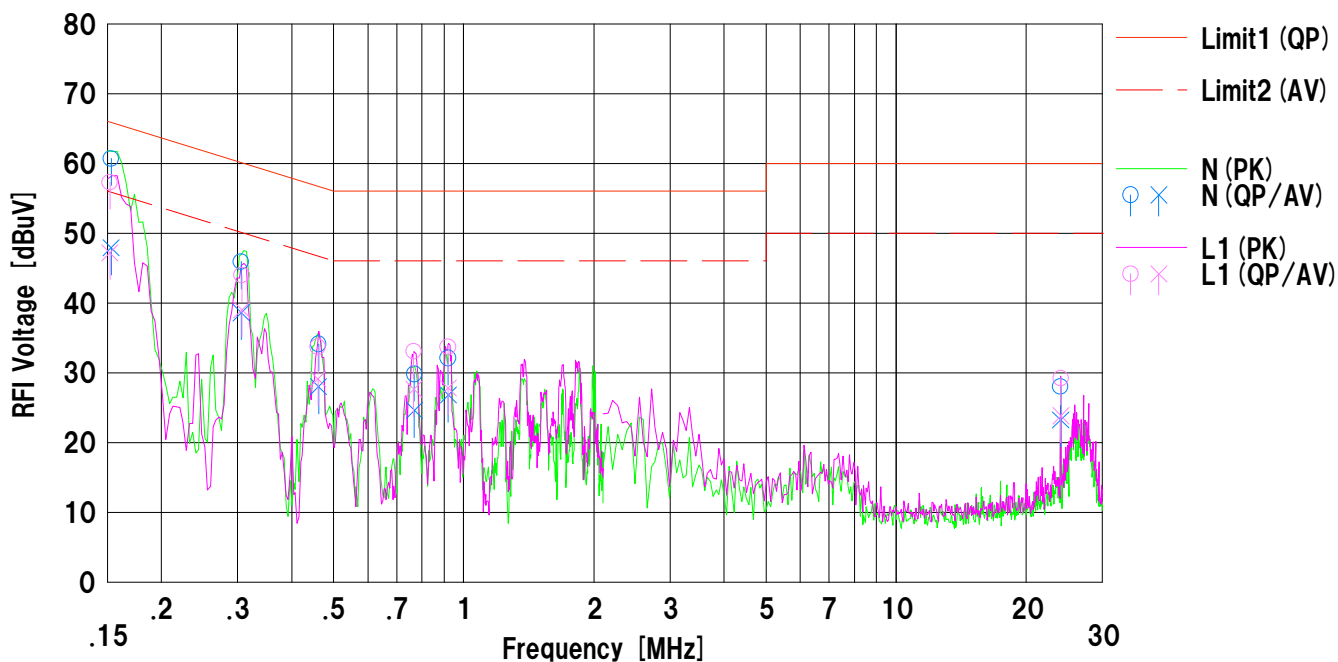
Company : RICOH COMPANY,LTD.  
Kind of EUT : Wireless LAN Module  
Model No. : LBWB1ZZWU6  
Serial No. : 1

Mode : Tx 11n-20HT 5745MHz  
Report No. : 32KE0045-SH-04-A  
Power : AC 120V / 60Hz  
Temp./Humi. : 23deg.C. / 60%RH

Remarks : -

Limit1 : FCC 15C (15.207) QP  
Limit2 : FCC 15C (15.207) AV

Engineer : Tatsuya Arai



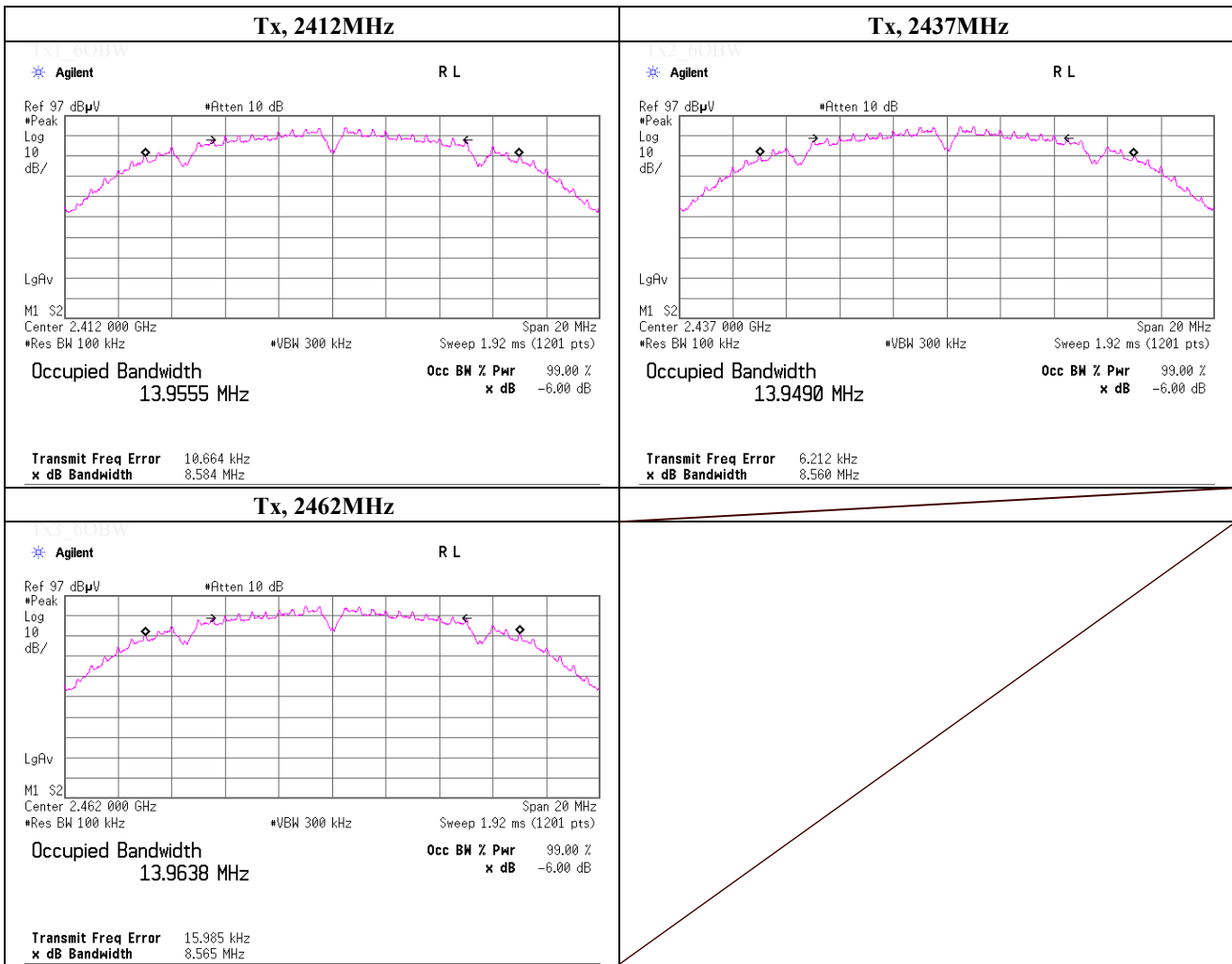
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15300	48.0	35.2	12.7	60.7	47.9	65.8	55.8	5.1	7.9	N	
2	0.30600	33.2	25.9	12.7	45.9	38.6	60.0	50.0	14.1	11.4	N	
3	0.46200	21.4	15.3	12.7	34.1	28.0	56.6	46.6	22.5	18.6	N	
4	0.76900	17.1	11.9	12.7	29.8	24.6	56.0	46.0	26.2	21.4	N	
5	0.92100	19.4	14.1	12.7	32.1	26.8	56.0	46.0	23.9	19.2	N	
6	24.00100	14.3	9.5	13.7	28.0	23.2	60.0	50.0	32.0	26.8	N	
7	0.15200	44.6	34.5	12.7	57.3	47.2	65.8	55.8	8.5	8.6	L1	
8	0.30700	31.3	26.3	12.7	44.0	39.0	60.0	50.0	16.0	11.0	L1	
9	0.46000	21.0	16.4	12.7	33.7	29.1	56.6	46.6	22.9	17.5	L1	
10	0.76600	20.4	14.9	12.7	33.1	27.6	56.0	46.0	22.9	18.4	L1	
11	0.92000	21.0	15.1	12.7	33.7	27.8	56.0	46.0	22.3	18.2	L1	
12	24.01741	15.5	10.1	13.7	29.2	23.8	60.0	50.0	30.8	26.2	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]  
LISN:SLS-05

### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

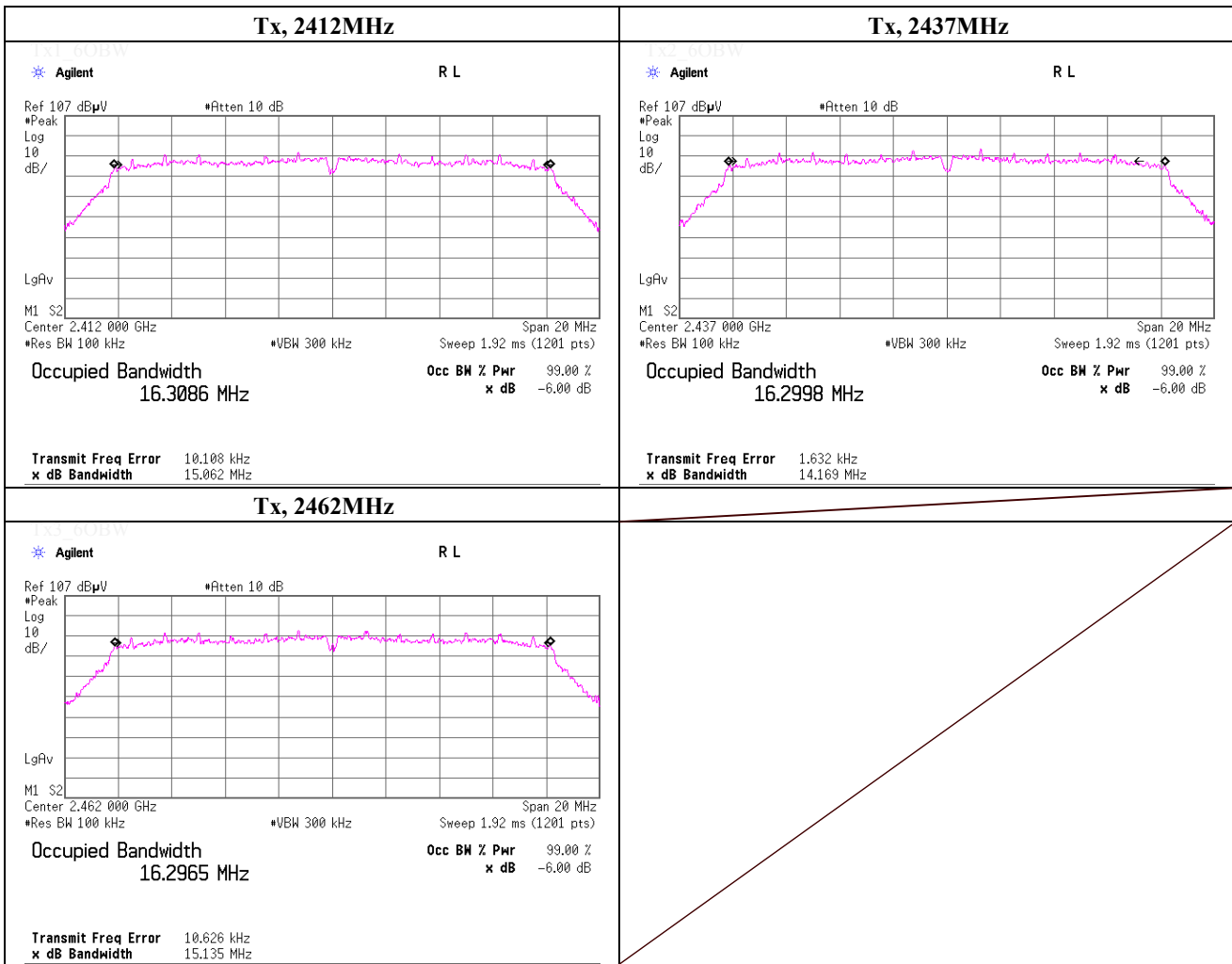
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	8.584	> 0.500
2437.0000	8.560	> 0.500
2462.0000	8.565	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

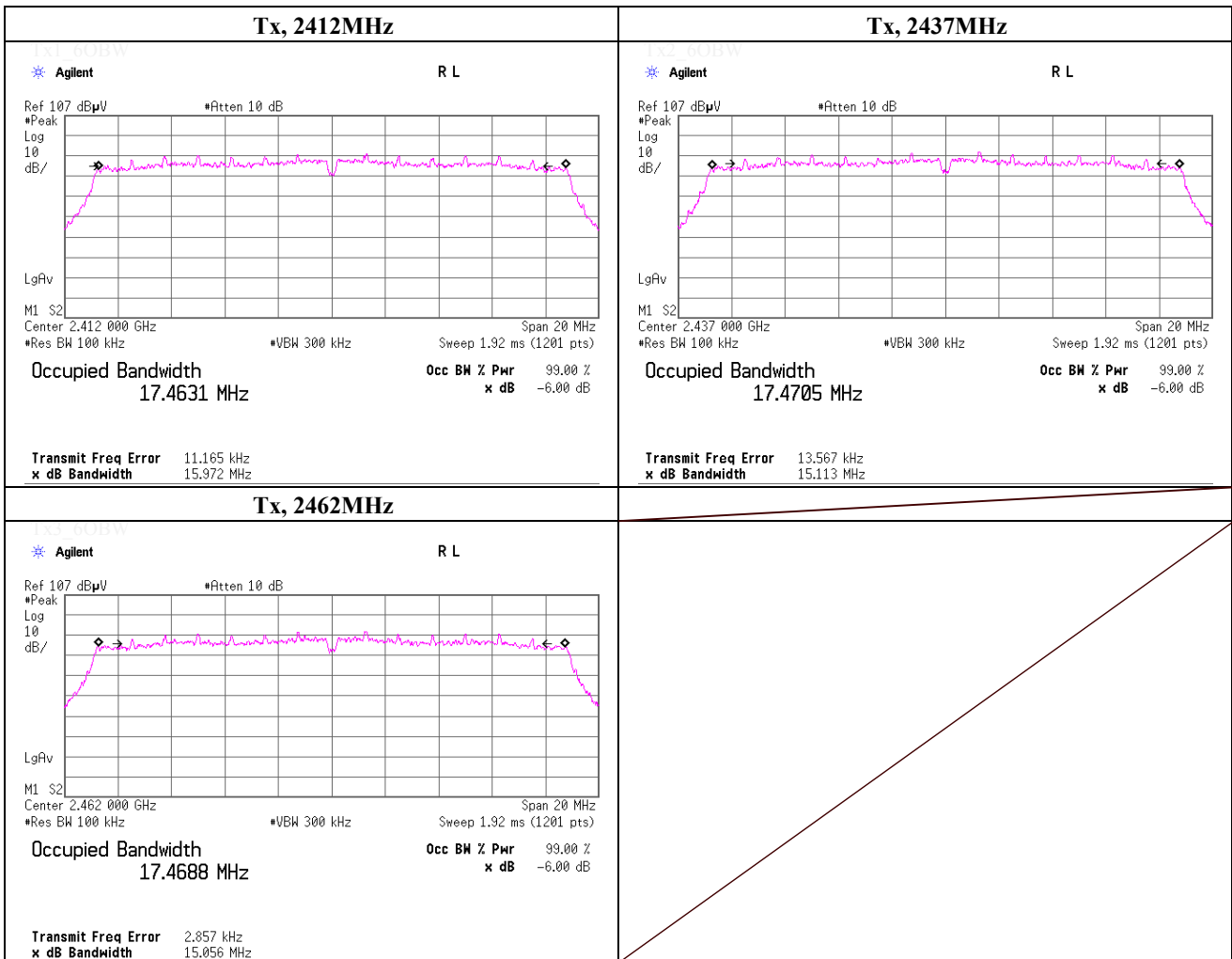
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	15.062	> 0.500
2437.0000	14.169	> 0.500
2462.0000	15.135	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)	

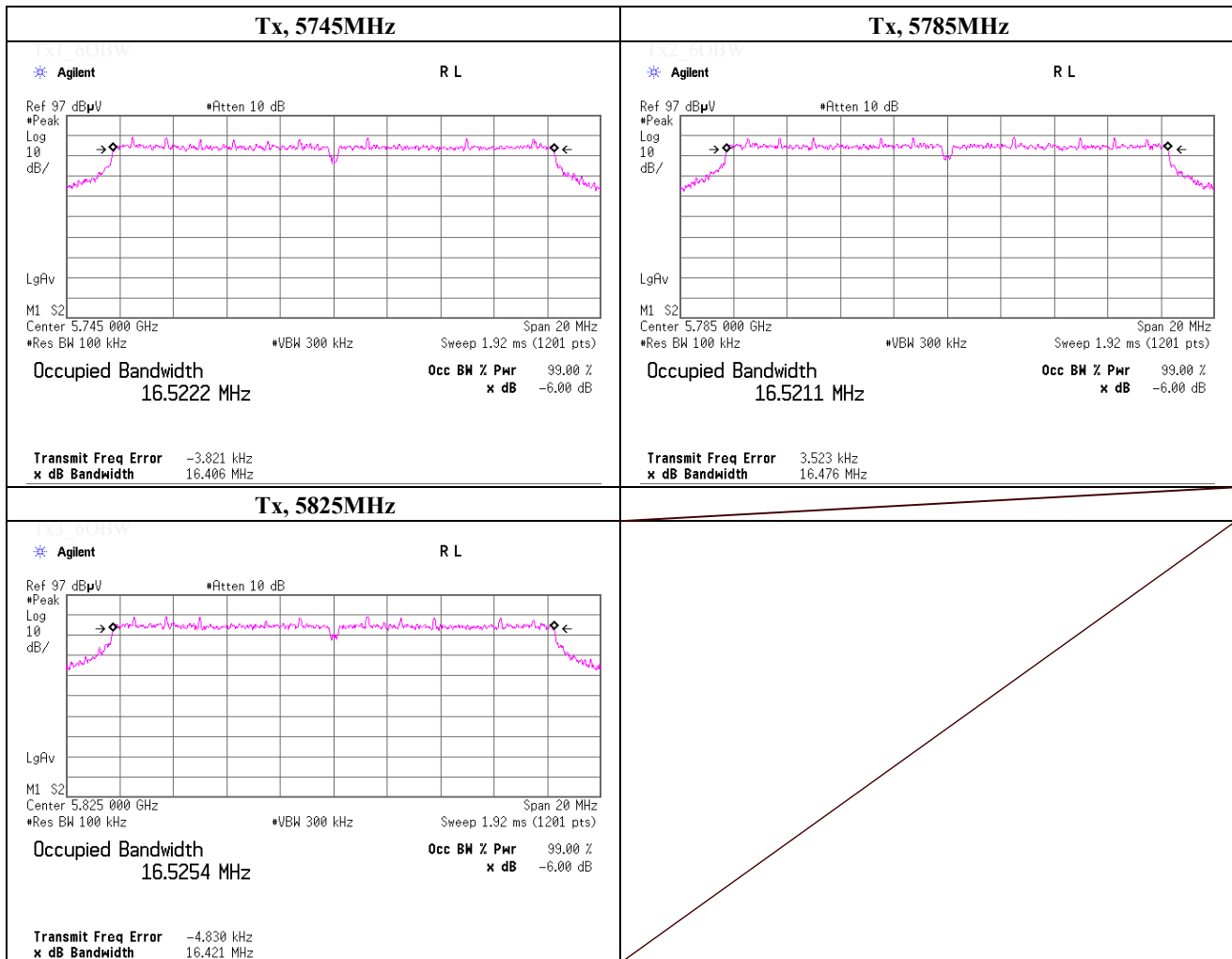
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	15.972	> 0.500
2437.0000	15.113	> 0.500
2462.0000	15.056	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps	

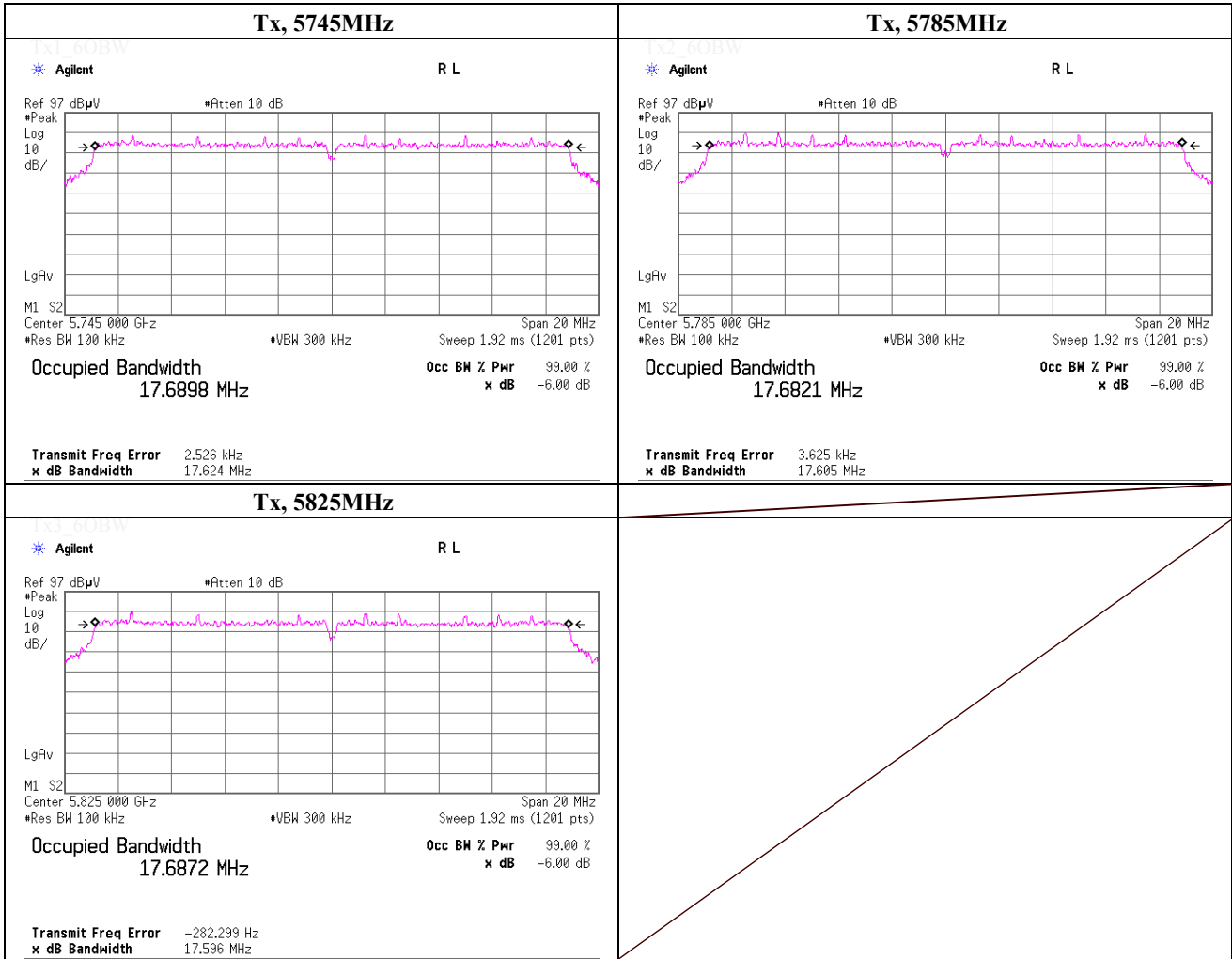
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5745.0000	16.406	> 0.500
5785.0000	16.476	> 0.500
5825.0000	16.421	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)	

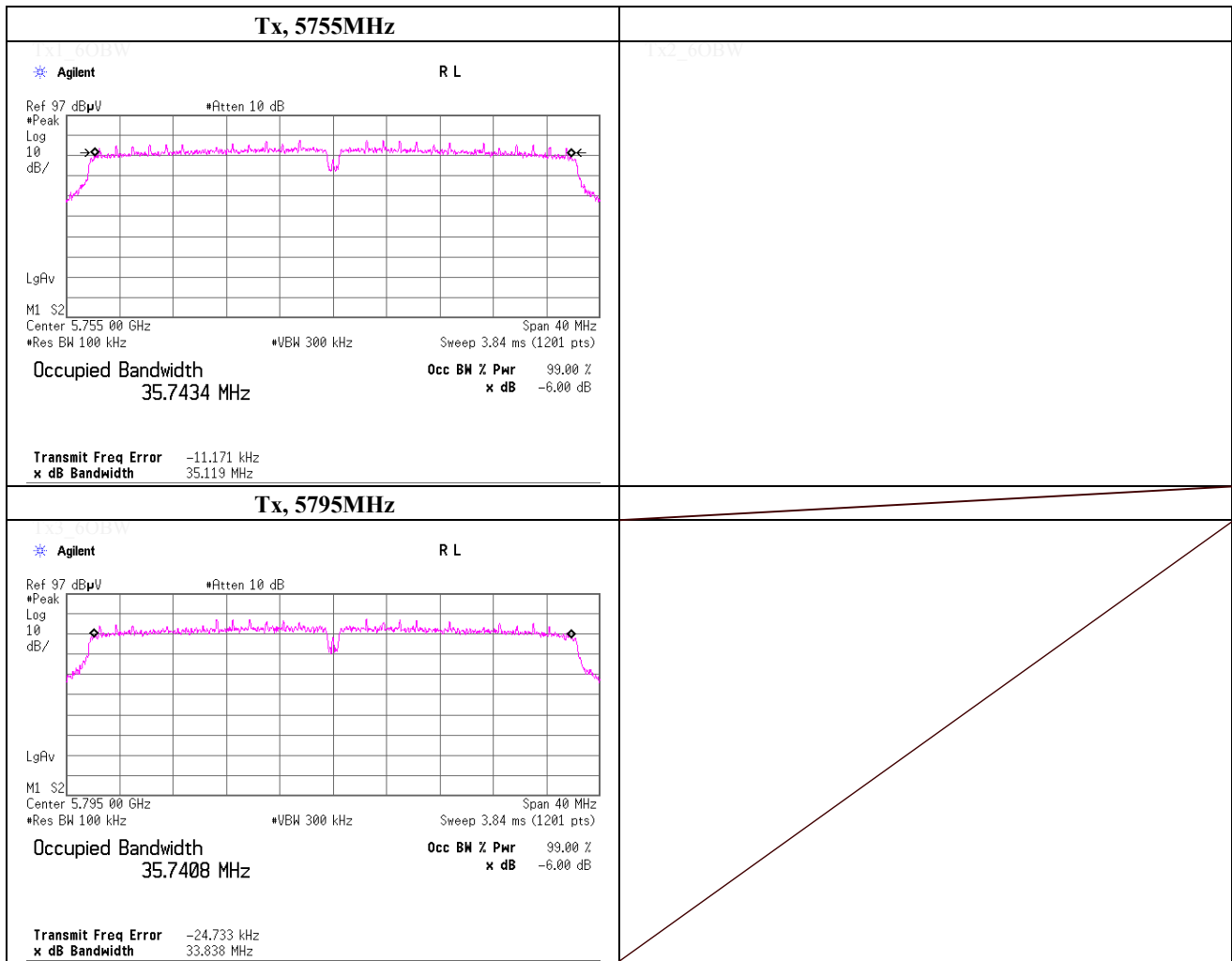
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5745.0000	17.624	> 0.500
5785.0000	17.605	> 0.500
5825.0000	17.596	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5755.0000	35.119	> 0.500
5795.0000	33.838	> 0.500



## Peak Output Power (Conducted)

Test place                      UL Japan, Inc. Shonan EMC Lab.            No.5 Shielded Room  
 Date                              July 30, 2012  
 Temperature / Humidity       26deg.C            , 64%RH  
 Engineer                        Kenichi Adachi  
 Mode                              Tx, IEEE802.11b, PN9,                              worst data mode :            1 Mbps

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	-5.04	0.82	20.15	15.93	39.17	30.00	1000	14.07
Mid	2437.0	-4.61	0.82	20.15	16.36	43.25	30.00	1000	13.64
High	2462.0	-4.56	0.84	20.15	16.43	43.95	30.00	1000	13.57

Sample Calculation:

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

**[Pre check]**

	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
						[dBm]	[mW]	[dBm]	[mW]	
	1	2437.0	-4.61	0.82	20.15	<b>16.36</b>	43.25	30.00	1000	<b>13.64</b>
	2	2437.0	-4.65	0.82	20.15	16.32	42.85	30.00	1000	13.68
	5.5	2437.0	-4.68	0.82	20.15	16.29	42.56	30.00	1000	13.71
	11	2437.0	-4.68	0.82	20.15	16.29	42.56	30.00	1000	13.71

**Worst**



Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401



## Peak Output Power (Conducted)

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : July 30, 2012  
 Temperature / Humidity : 26deg.C , 64%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, IEEE802.11g, PN9, worst data mode : 6 Mbps

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	1.64	0.82	20.15	22.61	182.39	30.00	1000	7.39
Mid	2437.0	2.46	0.82	20.15	23.43	220.29	30.00	1000	6.57
High	2462.0	2.47	0.84	20.15	23.46	221.82	30.00	1000	6.54

Sample Calculation:

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

**[Pre check]**

Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
6	2437.0	2.46	0.82	20.15	<b>23.43</b>	220.29	30.00	1000	<b>6.57</b>
9	2437.0	2.41	0.82	20.15	23.38	217.77	30.00	1000	6.62
12	2437.0	2.21	0.82	20.15	23.18	207.97	30.00	1000	6.82
18	2437.0	2.18	0.82	20.15	23.15	206.54	30.00	1000	6.85
24	2437.0	2.14	0.82	20.15	23.11	204.64	30.00	1000	6.89
36	2437.0	2.10	0.82	20.15	23.07	202.77	30.00	1000	6.93
48	2437.0	2.12	0.82	20.15	23.09	203.70	30.00	1000	6.91
54	2437.0	2.08	0.82	20.15	23.05	201.84	30.00	1000	6.95

**Worst**

Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]

Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Peak Output Power (Conducted)

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
Date : July 30, 2012  
Temperature / Humidity : 26deg.C , 64%RH  
Engineer : Kenichi Adachi  
Mode : Tx, IEEE802.11n (HT20), PN9, worst data mode : 0 (MCS)

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2412.0	1.40	0.82	20.15	22.37	172.58	30.00	1000	7.63
Mid	2437.0	2.01	0.82	20.15	22.98	198.61	30.00	1000	7.02
High	2462.0	1.96	0.84	20.15	22.95	197.24	30.00	1000	7.05

Sample Calculation:

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

**[Pre check]**

Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
0	2437.0	2.01	0.82	20.15	<b>22.98</b>	198.61	30.00	1000	<b>7.02</b>
1	2437.0	1.97	0.82	20.15	22.94	196.79	30.00	1000	7.06
2	2437.0	2.00	0.82	20.15	22.97	198.15	30.00	1000	7.03
3	2437.0	1.90	0.82	20.15	22.87	193.64	30.00	1000	7.13
4	2437.0	1.78	0.82	20.15	22.75	188.36	30.00	1000	7.25
5	2437.0	1.67	0.82	20.15	22.64	183.65	30.00	1000	7.36
6	2437.0	1.65	0.82	20.15	22.62	182.81	30.00	1000	7.38
7	2437.0	1.74	0.82	20.15	22.71	186.64	30.00	1000	7.29

**Worst**

Mode	Freq.	P/M (Peak)	Cable	Atten.	Result		Limit		Margin
(MCS)	[MHz]	Reading	Loss	Loss	[dBm]	[mW]	[dBm]	[mW]	[dB]

Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
Telephone : +81 463 50 6400  
Facsimile : +81 463 50 6401

## Peak Output Power (Conducted)

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : July 30, 2012  
 Temperature / Humidity : 26deg.C , 64%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, IEEE802.11a (W58), PN9, worst data mode : 6 Mbps

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5745.0	2.01	1.36	20.21	23.58	228.03	30.00	1000	6.42
Mid	5785.0	2.27	1.36	20.22	23.85	242.66	30.00	1000	6.15
High	5825.0	2.13	1.36	20.22	23.71	234.96	30.00	1000	6.29

Sample Calculation:

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

**[Pre check]**

(SCC-G11) (SAT20-03)

Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
6	5785.0	2.27	1.36	20.22	<b>23.85</b>	242.66	30.00	1000	<b>6.15</b>
9	5785.0	2.18	1.36	20.22	23.76	237.68	30.00	1000	6.24
12	5785.0	1.78	1.36	20.22	23.36	216.77	30.00	1000	6.64
18	5785.0	1.63	1.36	20.22	23.21	209.41	30.00	1000	6.79
24	5785.0	1.61	1.36	20.22	23.19	208.45	30.00	1000	6.81
36	5785.0	1.60	1.36	20.22	23.18	207.97	30.00	1000	6.82
48	5785.0	1.57	1.36	20.22	23.15	206.54	30.00	1000	6.85
54	5785.0	1.58	1.36	20.22	23.16	207.01	30.00	1000	6.84

**Worst**


Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Peak Output Power (Conducted)

Test place: UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date: July 30, 2012  
 Temperature / Humidity: 26deg.C , 64%RH  
 Engineer: Kenichi Adachi  
 Mode: Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode : 0 (MCS)

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5745.0	2.28	1.36	20.21	23.85	242.66	30.00	1000	6.15
Mid	5785.0	2.19	1.36	20.22	23.77	238.23	30.00	1000	6.23
High	5825.0	2.13	1.36	20.22	23.71	234.96	30.00	1000	6.29

Sample Calculation:

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

[Pre check]

(SCC-G11) (SAT20-03)

Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
0	5785.0	2.19	1.36	20.22	<b>23.77</b>	238.23	30.00	1000	<b>6.23</b>
1	5785.0	1.77	1.36	20.22	23.35	216.27	30.00	1000	6.65
2	5785.0	1.69	1.36	20.22	23.27	212.32	30.00	1000	6.73
3	5785.0	1.74	1.36	20.22	23.32	214.78	30.00	1000	6.68
4	5785.0	1.78	1.36	20.22	23.36	216.77	30.00	1000	6.64
5	5785.0	1.65	1.36	20.22	23.23	210.38	30.00	1000	6.77
6	5785.0	1.67	1.36	20.22	23.25	211.35	30.00	1000	6.75
7	5785.0	1.53	1.36	20.22	23.11	204.64	30.00	1000	6.89

**Worst**

Mode	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]

Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Peak Output Power (Conducted)

Test place : UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date : July 30, 2012  
 Temperature / Humidity : 26deg.C , 64%RH  
 Engineer : Kenichi Adachi  
 Mode : Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode : 0 (MCS)

(\* P/M: Power Meter with power sensor)

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5755.0	2.16	1.35	20.22	23.73	236.05	30.00	1000	6.27
Mid							30.00	1000	
High	5795.0	2.11	1.36	20.22	23.69	233.88	30.00	1000	6.31

Sample Calculation:

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

**[Pre check]**

(SCC-G11) (SAT20-03)

Mode (MCS)	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
0	5755.0	2.16	1.35	20.22	<b>23.73</b>	236.05	30.00	1000	<b>6.27</b>
1	5755.0	1.91	1.35	20.22	23.48	222.84	30.00	1000	6.52
2	5755.0	1.88	1.35	20.22	23.45	221.31	30.00	1000	6.55
3	5755.0	1.96	1.35	20.22	23.53	225.42	30.00	1000	6.47
4	5755.0	2.01	1.35	20.22	23.58	228.03	30.00	1000	6.42
5	5755.0	1.78	1.35	20.22	23.35	216.27	30.00	1000	6.65
6	5755.0	1.99	1.35	20.22	23.56	226.99	30.00	1000	6.44
7	5755.0	1.95	1.35	20.22	23.52	224.91	30.00	1000	6.48

**Worst**

Mode	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
(MCS)	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]

Sample Calculation:

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

**UL Japan, Inc.**  
**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2412   MHz  
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	PK	51.4	27.2	14.2	41.4	51.4	73.9	22.5	100	29	
Hori.	3618.002	PK	50.4	29.5	5.8	41.8	43.9	73.9	30.0	105	261	
Hori.	4824.000	PK	51.4	31.1	6.8	41.2	48.1	73.9	25.8	100	50	
Hori.	7236.001	PK	48.3	36.6	8.5	41.4	52	73.9	21.9	100	0	
Hori.	12060.000	PK	46.2	39.3	10.7	39.4	56.8	73.9	17.1	100	0	
Hori.	2390.000	AV	39.5	27.2	14.2	41.4	39.5	53.9	14.4	100	29	
Hori.	3618.002	AV	43.3	29.5	5.8	41.8	36.8	53.9	17.1	105	261	
Hori.	4824.000	AV	46	31.1	6.8	41.2	42.7	53.9	11.2	100	50	
Hori.	7236.001	AV	35	36.6	8.5	41.4	38.7	53.9	15.2	100	0	
Hori.	12060.000	AV	34.5	39.3	10.7	39.4	45.1	53.9	8.8	100	0	
Vert.	2390.000	PK	51	27.2	14.2	41.4	51	73.9	22.9	100	322	
Vert.	3618.020	PK	50.3	29.5	5.8	41.8	43.8	73.9	30.1	100	146	
Vert.	4824.000	PK	51.2	31.1	6.8	41.2	47.9	73.9	26.0	100	196	
Vert.	7236.001	PK	47.8	36.6	8.5	41.4	51.5	73.9	22.4	100	0	
Vert.	12060.000	PK	45.2	39.3	10.7	39.4	55.8	73.9	18.1	100	0	
Vert.	2390.000	AV	38.8	27.2	14.2	41.4	38.8	53.9	15.1	100	322	
Vert.	3618.020	AV	42.8	29.5	5.8	41.8	36.3	53.9	17.6	100	146	
Vert.	4824.000	AV	46.8	31.1	6.8	41.2	43.5	53.9	10.4	100	196	
Vert.	7236.001	AV	36.4	36.6	8.5	41.4	40.1	53.9	13.8	100	0	
Vert.	12060.000	AV	34.2	39.3	10.7	39.4	44.8	53.9	9.1	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

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	102.4	27.3	14.2	41.4	102.5	-	-	Carrier
Hori.	2400.000	PK	56.9	27.3	14.2	41.4	57.0	82.5	25.5	
Hori.	9648.002	PK	44.6	38.2	9.4	38.9	53.3	82.5	29.2	
Vert.	2412.000	PK	101.9	27.3	14.2	41.4	102.0	-	-	Carrier
Vert.	2400.000	PK	55.8	27.3	14.2	41.4	55.9	82.0	26.1	
Vert.	9648.002	PK	44.7	38.2	9.4	38.9	53.4	82.0	28.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2437   MHz  
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3655.509	PK	50.6	29.6	5.8	41.8	44.2	73.9	29.7	145	67	
Hori.	4874.000	PK	52.7	31.2	6.9	41.1	49.7	73.9	24.2	100	63	
Hori.	7311.000	PK	47.8	36.7	8.6	41.4	51.7	73.9	22.2	100	0	
Hori.	12185.000	PK	46.1	39.3	10.7	39.3	56.8	73.9	17.1	100	0	
Hori.	3655.509	AV	44.1	29.6	5.8	41.8	37.7	53.9	16.2	145	67	
Hori.	4874.000	AV	49.2	31.2	6.9	41.1	46.2	53.9	7.7	100	63	
Hori.	7311.000	AV	36.4	36.7	8.6	41.4	40.3	53.9	13.6	100	0	
Hori.	12185.000	AV	34.8	39.3	10.7	39.3	45.5	53.9	8.4	100	0	
Vert.	3655.500	PK	49.6	29.6	5.8	41.8	43.2	73.9	30.7	102	167	
Vert.	4874.000	PK	54.9	31.2	6.9	41.1	51.9	73.9	22.0	114	195	
Vert.	7311.000	PK	47.7	36.7	8.6	41.4	51.6	73.9	22.3	100	0	
Vert.	12185.000	PK	46.4	39.3	10.7	39.3	57.1	73.9	16.8	100	0	
Vert.	3655.500	AV	42.5	29.6	5.8	41.8	36.1	53.9	17.8	102	167	
Vert.	4874.000	AV	51.4	31.2	6.9	41.1	48.4	53.9	5.5	114	195	
Vert.	7311.000	AV	36.8	36.7	8.6	41.4	40.7	53.9	13.2	100	0	
Vert.	12185.000	AV	35	39.3	10.7	39.3	45.7	53.9	8.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

**20dBc Data Sheet (RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	103.0	27.4	14.2	41.4	103.2	-	-	Carrier
Hori.	9748.002	PK	47.1	38.5	9.5	38.9	56.2	83.2	27.0	
Vert.	2437.000	PK	101.9	27.4	14.2	41.4	102.1	-	-	Carrier
Vert.	9748.002	PK	48.0	38.5	9.5	38.9	57.1	82.1	25.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2462   MHz  
Tx, IEEE802.11b, PN9, worst data mode 1Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	PK	51.8	27.5	14.3	41.4	52.2	73.9	21.7	100	35	
Hori.	2488.740	PK	52.2	27.5	14.3	41.4	52.6	73.9	21.3	100	35	
Hori.	3693.011	PK	50	29.6	5.9	41.8	43.7	73.9	30.2	114	123	
Hori.	4924.000	PK	55	31.3	6.9	41	52.2	73.9	21.7	100	153	
Hori.	7386.000	PK	50.1	36.9	8.7	41.5	54.2	73.9	19.7	100	0	
Hori.	12310.000	PK	46.4	39.4	10.8	39.3	57.3	73.9	16.6	100	0	
Hori.	2483.500	AV	39.5	27.5	14.3	41.4	39.9	53.9	14.0	100	35	
Hori.	2488.740	AV	42.4	27.5	14.3	41.4	42.8	53.9	11.1	100	35	
Hori.	3693.011	AV	42.6	29.6	5.9	41.8	36.3	53.9	17.6	114	123	
Hori.	4924.000	AV	50.5	31.3	6.9	41	47.7	53.9	6.2	100	153	
Hori.	7386.000	AV	40	36.9	8.7	41.5	44.1	53.9	9.8	100	0	
Hori.	12310.000	AV	35.2	39.4	10.8	39.3	46.1	53.9	7.8	100	0	
Vert.	2483.500	PK	51.2	27.5	14.3	41.4	51.6	73.9	22.3	100	315	
Vert.	2488.740	PK	51.9	27.5	14.3	41.4	52.3	73.9	21.6	100	315	
Vert.	3693.009	PK	49.7	29.6	5.9	41.8	43.4	73.9	30.5	100	164	
Vert.	4924.000	PK	53.9	31.3	6.9	41	51.1	73.9	22.8	103	192	
Vert.	7386.000	PK	48.4	36.9	8.7	41.5	52.5	73.9	21.4	100	0	
Vert.	12310.000	PK	45.8	39.4	10.8	39.3	56.7	73.9	17.2	100	0	
Vert.	2483.500	AV	38.5	27.5	14.3	41.4	38.9	53.9	15.0	100	315	
Vert.	2488.740	AV	41.2	27.5	14.3	41.4	41.6	53.9	12.3	100	315	
Vert.	3693.009	AV	42.8	29.6	5.9	41.8	36.5	53.9	17.4	100	164	
Vert.	4924.000	AV	50.3	31.3	6.9	41	47.5	53.9	6.4	103	192	
Vert.	7386.000	AV	36.8	36.9	8.7	41.5	40.9	53.9	13.0	100	0	
Vert.	12310.000	AV	34.7	39.4	10.8	39.3	45.6	53.9	8.3	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

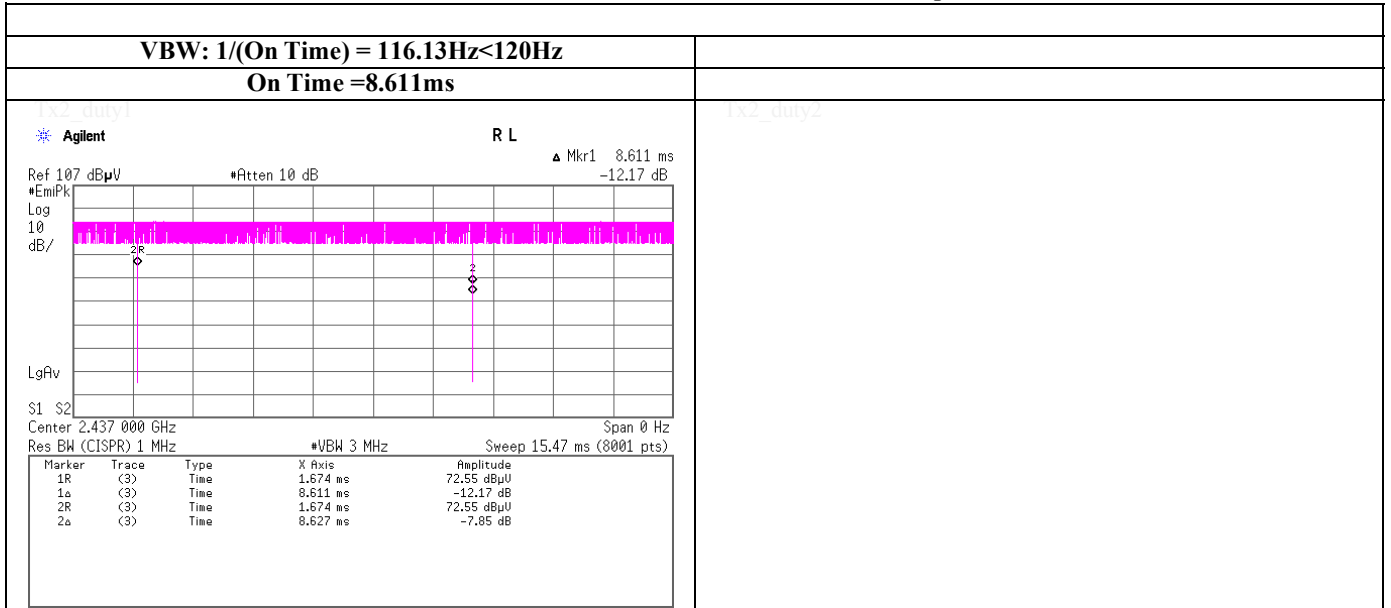
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	103.2	27.4	14.2	41.4	103.4	-	-	Carrier
Hori.	9848.002	PK	49.3	38.7	9.5	38.9	58.6	83.4	24.8	
Vert.	2462.000	PK	101.9	27.4	14.2	41.4	102.1	-	-	Carrier
Vert.	9848.002	PK	48.9	38.7	9.5	38.9	58.2	82.1	23.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)



### VBW Calculation Chart

**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**



**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx,   2412 MHz  
                                  Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	PK	65.5	27.2	14.2	41.4	65.5	73.9	8.4	100	37	
Hori.	3618.033	PK	50.4	29.5	5.8	41.8	43.9	73.9	30.0	107	262	
Hori.	4824.000	PK	52.2	31.1	6.8	41.2	48.9	73.9	25.0	100	48	
Hori.	7236.001	PK	48.3	36.6	8.5	41.4	52	73.9	21.9	100	0	
Hori.	12060.000	PK	45.8	39.3	10.7	39.4	56.4	73.9	17.5	100	0	
Hori.	2390.000	AV	47.3	27.2	14.2	41.4	47.3	53.9	6.6	100	37	
Hori.	3618.033	AV	43.9	29.5	5.8	41.8	37.4	53.9	16.5	107	262	
Hori.	4824.000	AV	41.8	31.1	6.8	41.2	38.5	53.9	15.4	100	48	
Hori.	7236.001	AV	37	36.6	8.5	41.4	40.7	53.9	13.2	100	0	
Hori.	12060.000	AV	34.7	39.3	10.7	39.4	45.3	53.9	8.6	100	0	
Vert.	2390.000	PK	65.3	27.2	14.2	41.4	65.3	73.9	8.6	100	328	
Vert.	3618.000	PK	49.6	29.5	5.8	41.8	43.1	73.9	30.8	100	147	
Vert.	4824.000	PK	53.5	31.1	6.8	41.2	50.2	73.9	23.7	100	196	
Vert.	7236.001	PK	47.6	36.6	8.5	41.4	51.3	73.9	22.6	100	0	
Vert.	12060.000	PK	46.4	39.3	10.7	39.4	57	73.9	16.9	100	0	
Vert.	2390.000	AV	47.1	27.2	14.2	41.4	47.1	53.9	6.8	100	328	
Vert.	3618.000	AV	43.1	29.5	5.8	41.8	36.6	53.9	17.3	100	147	
Vert.	4824.000	AV	42.6	31.1	6.8	41.2	39.3	53.9	14.6	100	196	
Vert.	7236.001	AV	36.6	36.6	8.5	41.4	40.3	53.9	13.6	100	0	
Vert.	12060.000	AV	34.6	39.3	10.7	39.4	45.2	53.9	8.7	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

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	27.3	14.2	41.4	100.6	-	-	Carrier
Hori.	2400.000	PK	64.6	27.3	14.2	41.4	64.7	80.6	15.9	
Hori.	9648.002	PK	40.3	38.2	9.4	38.9	49.0	80.6	31.6	
Vert.	2412.000	PK	99.2	27.3	14.2	41.4	99.3	-	-	Carrier
Vert.	2400.000	PK	63.7	27.3	14.2	41.4	63.8	79.3	15.5	
Vert.	9648.002	PK	40.4	38.2	9.4	38.9	49.1	79.3	30.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                           August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity    20 deg.C , 38%RH                                 25 deg.C , 62%RH                                 25 deg.C , 63%RH  
Engineer                    Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2437   MHz  
Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3655.526	PK	51	29.6	5.8	41.8	44.6	73.9	29.3	146	69	
Hori.	4874.000	PK	51.1	31.2	6.9	41.1	48.1	73.9	25.8	100	319	
Hori.	7311.000	PK	50.9	36.7	8.6	41.4	54.8	73.9	19.1	100	0	
Hori.	12185.000	PK	46.3	39.3	10.7	39.3	57	73.9	16.9	100	0	
Hori.	3655.526	AV	43.4	29.6	5.8	41.8	37	53.9	16.9	146	69	
Hori.	4874.000	AV	41.7	31.2	6.9	41.1	38.7	53.9	15.2	100	319	
Hori.	7311.000	AV	39.2	36.7	8.6	41.4	43.1	53.9	10.8	100	0	
Hori.	12185.000	AV	35.3	39.3	10.7	39.3	46	53.9	7.9	100	0	
Vert.	3655.517	PK	49.9	29.6	5.8	41.8	43.5	73.9	30.4	109	166	
Vert.	4874.000	PK	54.7	31.2	6.9	41.1	51.7	73.9	22.2	113	189	
Vert.	7311.000	PK	48.5	36.7	8.6	41.4	52.4	73.9	21.5	100	0	
Vert.	12185.000	PK	45.5	39.3	10.7	39.3	56.2	73.9	17.7	100	0	
Vert.	3655.517	AV	42.9	29.6	5.8	41.8	36.5	53.9	17.4	109	166	
Vert.	4874.000	AV	43.9	31.2	6.9	41.1	40.9	53.9	13.0	113	189	
Vert.	7311.000	AV	37	36.7	8.6	41.4	40.9	53.9	13.0	100	0	
Vert.	12185.000	AV	35	39.3	10.7	39.3	45.7	53.9	8.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                 20log(3.0m/1.0m)= 9.5dB

**20dBc Data Sheet (RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	101.1	27.4	14.2	41.4	101.3	-	-	Carrier
Hori.	9748.002	PK	40.7	38.5	9.5	38.9	49.8	81.3	31.5	
Vert.	2437.000	PK	100.6	27.4	14.2	41.4	100.8	-	-	Carrier
Vert.	9748.002	PK	41.4	38.5	9.5	38.9	50.5	80.8	30.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012   August 19, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH                                   22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki                                       Tatsuya Arai  
Mode                         Tx, 2462   MHz  
Tx, IEEE802.11g, PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	406.125	QP	43.2	16.4	9	32	36.6	46	9.4	110	330	
Hori.	454.140	QP	48.2	17.1	9.3	32	42.6	46	3.4	100	358	
Hori.	466.567	QP	40.3	17.3	9.3	32	34.9	46	11.1	100	149	
Hori.	2483.500	PK	70.3	27.5	14.3	41.4	70.7	73.9	3.2	100	35	
Hori.	3693.025	PK	50	29.6	5.9	41.8	43.7	73.9	30.2	111	126	
Hori.	4924.000	PK	53.9	31.3	6.9	41	51.1	73.9	22.8	100	155	
Hori.	7386.000	PK	51.3	36.9	8.7	41.5	55.4	73.9	18.5	100	0	
Hori.	12310.000	PK	45.9	39.4	10.8	39.3	56.8	73.9	17.1	100	0	
Hori.	2483.500	AV	50.4	27.5	14.3	41.4	50.8	53.9	3.1	100	35	
Hori.	3693.025	AV	42.5	29.6	5.9	41.8	36.2	53.9	17.7	111	126	
Hori.	4924.000	AV	42.8	31.3	6.9	41	40	53.9	13.9	100	155	
Hori.	7386.000	AV	39.5	36.9	8.7	41.5	43.6	53.9	10.3	100	0	
Hori.	12310.000	AV	34.7	39.4	10.8	39.3	45.6	53.9	8.3	100	0	
Vert.	268.664	QP	44	17.8	8.4	32	38.2	46	7.8	100	354	
Vert.	292.583	QP	41.2	18.8	8.5	32	36.5	46	9.5	100	69	
Vert.	406.125	QP	48.6	16.4	9	32	42	46	4.0	100	196	
Vert.	416.822	QP	47.2	16.6	9.1	32	40.9	46	5.1	108	173	
Vert.	2483.500	PK	69.9	27.5	14.3	41.4	70.3	73.9	3.6	100	313	
Vert.	3693.007	PK	49	29.6	5.9	41.8	42.7	73.9	31.2	100	166	
Vert.	4924.000	PK	53.3	31.3	6.9	41	50.5	73.9	23.4	100	196	
Vert.	7386.000	PK	47.8	36.9	8.7	41.5	51.9	73.9	22.0	100	0	
Vert.	12310.000	PK	45.1	39.4	10.8	39.3	56	73.9	17.9	100	0	
Vert.	2483.500	AV	50.2	27.5	14.3	41.4	50.6	53.9	3.3	100	313	
Vert.	3693.007	AV	42.3	29.6	5.9	41.8	36	53.9	17.9	100	166	
Vert.	4924.000	AV	42.4	31.3	6.9	41	39.6	53.9	14.3	100	196	
Vert.	7386.000	AV	36.9	36.9	8.7	41.5	41	53.9	12.9	100	0	
Vert.	12310.000	AV	34.4	39.4	10.8	39.3	45.3	53.9	8.6	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

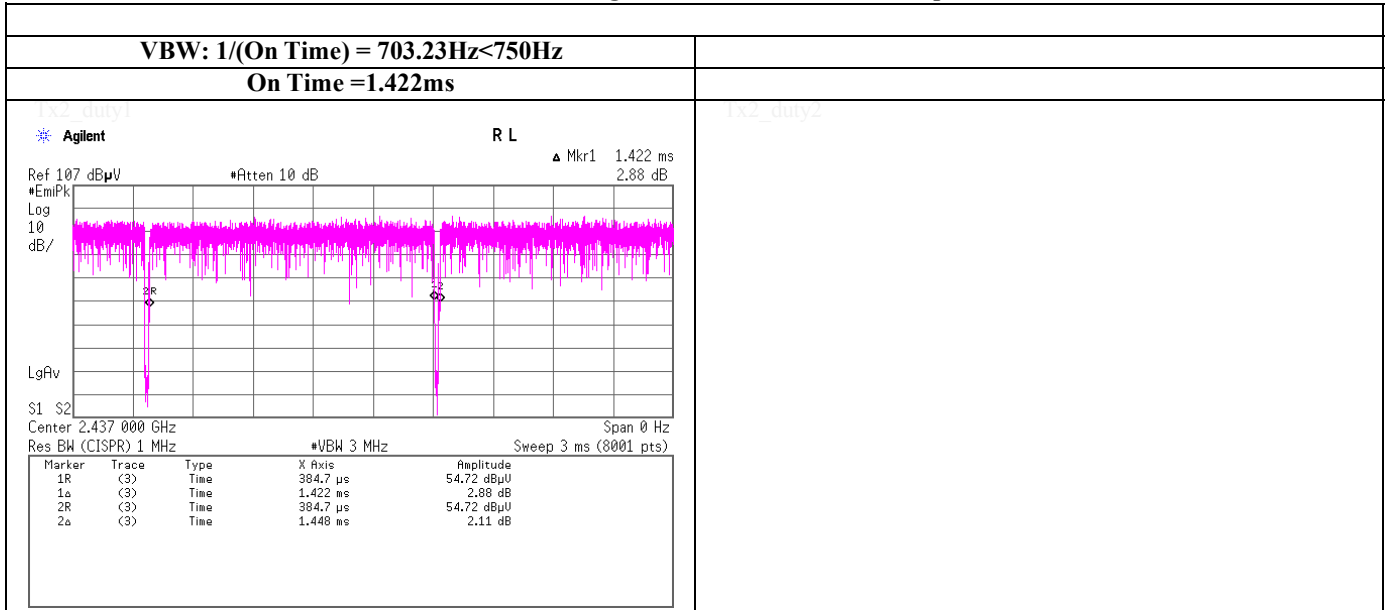
### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	100.7	27.4	14.2	41.4	100.9	-	-	Carrier
Hori.	9848.002	PK	42.2	38.7	9.5	38.9	51.5	80.9	29.4	
Vert.	2462.000	PK	99.6	27.4	14.2	41.4	99.8	-	-	Carrier
Vert.	9848.002	PK	41.3	38.7	9.5	38.9	50.6	79.8	29.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

### VBW Calculation Chart

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**



## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2412   MHz  
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	PK	66.0	27.2	14.2	41.4	66.0	73.9	7.9	100	33	
Hori.	3618.005	PK	49.6	29.5	5.8	41.8	43.1	73.9	30.8	100	253	
Hori.	4824.000	PK	51.3	31.1	6.8	41.2	48.0	73.9	25.9	100	50	
Hori.	7236.001	PK	48.3	36.6	8.5	41.4	52.0	73.9	21.9	100	0	
Hori.	12060.000	PK	45.6	39.3	10.7	39.4	56.2	73.9	17.7	100	0	
Hori.	2390.000	AV	46.6	27.2	14.2	41.4	46.6	53.9	7.3	100	33	
Hori.	3618.005	AV	43.0	29.5	5.8	41.8	36.5	53.9	17.4	100	253	
Hori.	4824.000	AV	40.5	31.1	6.8	41.2	37.2	53.9	16.7	100	50	
Hori.	7236.001	AV	36.7	36.6	8.5	41.4	40.4	53.9	13.5	100	0	
Hori.	12060.000	AV	34.6	39.3	10.7	39.4	45.2	53.9	8.7	100	0	
Vert.	2390.000	PK	64.4	27.2	14.2	41.4	64.4	73.9	9.5	100	333	
Vert.	3618.013	PK	49.9	29.5	5.8	41.8	43.4	73.9	30.5	103	164	
Vert.	4824.000	PK	52.4	31.1	6.8	41.2	49.1	73.9	24.8	100	198	
Vert.	7236.001	PK	47.8	36.6	8.5	41.4	51.5	73.9	22.4	100	0	
Vert.	12060.000	PK	46.0	39.3	10.7	39.4	56.6	73.9	17.3	100	0	
Vert.	2390.000	AV	45.5	27.2	14.2	41.4	45.5	53.9	8.4	100	333	
Vert.	3618.013	AV	42.8	29.5	5.8	41.8	36.3	53.9	17.6	103	164	
Vert.	4824.000	AV	41.6	31.1	6.8	41.2	38.3	53.9	15.6	100	198	
Vert.	7236.001	AV	36.6	36.6	8.5	41.4	40.3	53.9	13.6	100	0	
Vert.	12060.000	AV	34.4	39.3	10.7	39.4	45.0	53.9	8.9	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

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	100.2	27.3	14.2	41.4	100.3	-	-	Carrier
Hori.	2400.000	PK	62.1	27.3	14.2	41.4	62.2	80.3	18.1	
Hori.	9648.002	PK	38.9	38.2	9.4	38.9	47.6	80.3	32.7	
Vert.	2412.000	PK	98.8	27.3	14.2	41.4	98.9	-	-	Carrier
Vert.	2400.000	PK	60.3	27.3	14.2	41.4	60.4	78.9	18.5	
Vert.	9648.002	PK	38.9	38.2	9.4	38.9	47.6	78.9	31.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Shonan EMC Lab.**

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2437   MHz  
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3655.513	PK	50.1	29.6	5.8	41.8	43.7	73.9	30.2	143	69	
Hori.	4874.000	PK	51.1	31.2	6.9	41.1	48.1	73.9	25.8	100	319	
Hori.	7311.000	PK	50.0	36.7	8.6	41.4	53.9	73.9	20.0	100	0	
Hori.	12185.000	PK	45.9	39.3	10.7	39.3	56.6	73.9	17.3	100	0	
Hori.	3655.513	AV	43.5	29.6	5.8	41.8	37.1	53.9	16.8	143	69	
Hori.	4874.000	AV	41.2	31.2	6.9	41.1	38.2	53.9	15.7	100	319	
Hori.	7311.000	AV	38.4	36.7	8.6	41.4	42.3	53.9	11.6	100	0	
Hori.	12185.000	AV	34.7	39.3	10.7	39.3	45.4	53.9	8.5	100	0	
Vert.	3655.511	PK	49.4	29.6	5.8	41.8	43.0	73.9	30.9	102	170	
Vert.	4874.000	PK	52.7	31.2	6.9	41.1	49.7	73.9	24.2	119	188	
Vert.	7311.000	PK	48.8	36.7	8.6	41.4	52.7	73.9	21.2	100	0	
Vert.	12185.000	PK	45.5	39.3	10.7	39.3	56.2	73.9	17.7	100	0	
Vert.	3655.511	AV	42.8	29.6	5.8	41.8	36.4	53.9	17.5	102	170	
Vert.	4874.000	AV	42.7	31.2	6.9	41.1	39.7	53.9	14.2	119	188	
Vert.	7311.000	AV	36.8	36.7	8.6	41.4	40.7	53.9	13.2	100	0	
Vert.	12185.000	AV	34.4	39.3	10.7	39.3	45.1	53.9	8.8	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

**20dBc Data Sheet (RBW 100kHz, VBW 300kHz)**

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2437.000	PK	99.3	27.4	14.2	41.4	99.5	-	-	Carrier
Hori.	9748.002	PK	40.4	38.5	9.5	38.9	49.5	79.5	30.0	
Vert.	2437.000	PK	99.7	27.4	14.2	41.4	99.9	-	-	Carrier
Vert.	9748.002	PK	40.5	38.5	9.5	38.9	49.6	79.9	30.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 4, 2012   August 5, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   25 deg.C , 62%RH                                   25 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Tatsuya Arai   Yasumasa Owaki  
Mode                         Tx, 2462   MHz  
Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	PK	70.1	27.5	14.3	41.4	70.5	73.9	3.4	100	31	
Hori.	3693.018	PK	49.8	29.6	5.9	41.8	43.5	73.9	30.4	109	126	
Hori.	4924.000	PK	52.1	31.3	6.9	41.0	49.3	73.9	24.6	100	156	
Hori.	7386.000	PK	51.0	36.9	8.7	41.5	55.1	73.9	18.8	100	0	
Hori.	12310.000	PK	45.4	39.4	10.8	39.3	56.3	73.9	17.6	100	0	
Hori.	2483.500	AV	48.8	27.5	14.3	41.4	49.2	53.9	4.7	100	31	
Hori.	3693.018	AV	42.9	29.6	5.9	41.8	36.6	53.9	17.3	109	126	
Hori.	4924.000	AV	41.9	31.3	6.9	41.0	39.1	53.9	14.8	100	156	
Hori.	7386.000	AV	38.7	36.9	8.7	41.5	42.8	53.9	11.1	100	0	
Hori.	12310.000	AV	34.6	39.4	10.8	39.3	45.5	53.9	8.4	100	0	
Vert.	2483.500	PK	69.5	27.5	14.3	41.4	69.9	73.9	4.0	100	321	
Vert.	3693.000	PK	51.0	29.6	5.9	41.8	44.7	73.9	29.2	100	164	
Vert.	4924.000	PK	51.7	31.3	6.9	41.0	48.9	73.9	25.0	100	195	
Vert.	7386.000	PK	48.8	36.9	8.7	41.5	52.9	73.9	21.0	100	0	
Vert.	12310.000	PK	45.8	39.4	10.8	39.3	56.7	73.9	17.2	100	0	
Vert.	2483.500	AV	48.3	27.5	14.3	41.4	48.7	53.9	5.2	100	321	
Vert.	3693.000	AV	42.8	29.6	5.9	41.8	36.5	53.9	17.4	100	164	
Vert.	4924.000	AV	41.7	31.3	6.9	41.0	38.9	53.9	15.0	100	195	
Vert.	7386.000	AV	36.9	36.9	8.7	41.5	41.0	53.9	12.9	100	0	
Vert.	12310.000	AV	34.1	39.4	10.8	39.3	45.0	53.9	8.9	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### 20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

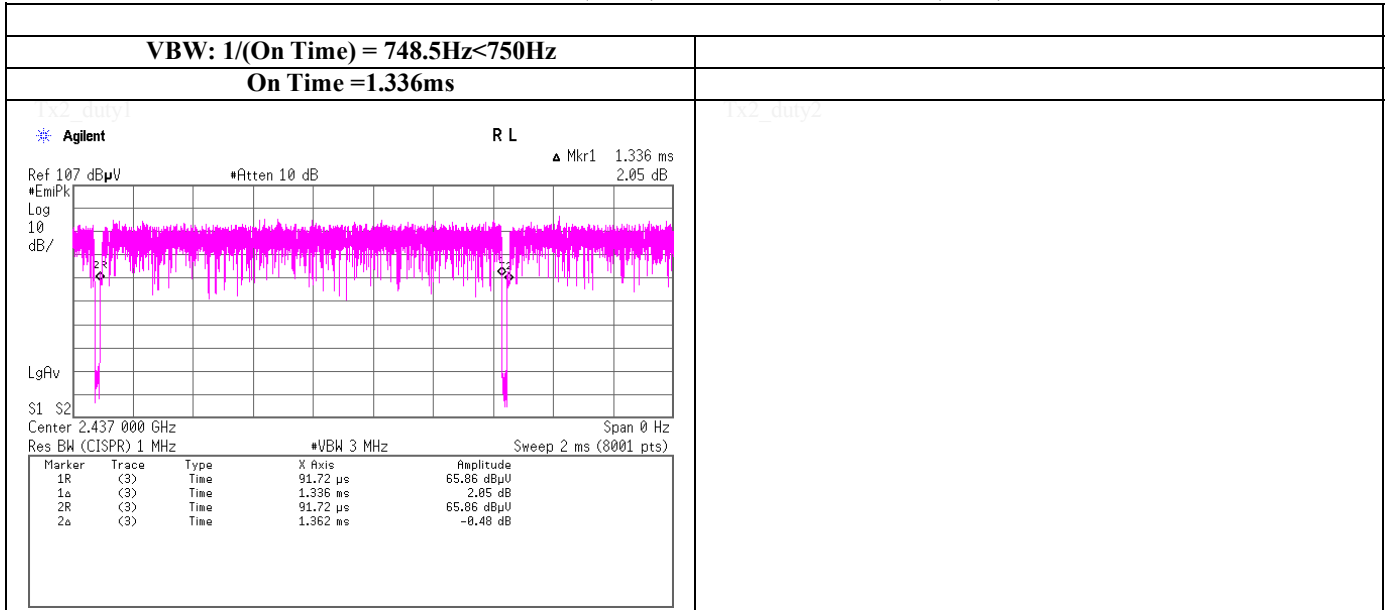
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2462.000	PK	99.5	27.4	14.2	41.4	99.7	-	-	Carrier
Hori.	9848.002	PK	41.8	38.7	9.5	38.9	51.1	79.7	28.6	
Vert.	2462.000	PK	98.8	27.4	14.2	41.4	99.0	-	-	Carrier
Vert.	9848.002	PK	41.3	38.7	9.5	38.9	50.6	79.0	28.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amplifier)



### VBW Calculation Chart

**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)**



## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                 22 deg.C , 63%RH                                 22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima   Wataru Kojima  
Mode                         Tx, 5745   MHz  
Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5725.000	PK	50.7	32.9	16.7	40.2	60.1	73.9	13.8	100	181	
Hori.	7660.040	PK	50.0	37.5	8.5	41.3	54.7	73.9	19.2	128	174	
Hori.	11490.000	PK	41.3	40.6	9.8	39.5	52.2	73.9	21.7	100	0	
Hori.	17235.000	PK	45.2	44.2	2.7	39.5	52.6	73.9	21.3	100	95	
Hori.	5725.000	AV	36.2	32.9	16.7	40.2	45.6	53.9	8.3	100	181	
Hori.	7660.040	AV	45.7	37.5	8.5	41.3	50.4	53.9	3.5	128	174	
Hori.	11490.000	AV	32.8	40.6	9.8	39.5	43.7	53.9	10.2	100	0	
Hori.	17235.000	AV	33.9	44.2	2.7	39.5	41.3	53.9	12.6	100	95	
Vert.	5725.000	PK	53.0	32.9	16.7	40.2	62.4	73.9	11.5	100	219	
Vert.	7660.040	PK	47.2	37.5	8.5	41.3	51.9	73.9	22.0	203	116	
Vert.	11490.000	PK	40.8	40.6	9.8	39.5	51.7	73.9	22.2	100	0	
Vert.	17235.000	PK	42.8	44.2	2.7	39.5	50.2	73.9	23.7	100	98	
Vert.	5725.000	AV	36.6	32.9	16.7	40.2	46.0	53.9	7.9	100	219	
Vert.	7660.040	AV	40.6	37.5	8.5	41.3	45.3	53.9	8.6	203	116	
Vert.	11490.000	AV	34.0	40.6	9.8	39.5	44.9	53.9	9.0	100	0	
Vert.	17235.000	AV	32.1	44.2	2.7	39.5	39.5	53.9	14.4	100	98	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                         20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                           August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity    20 deg.C , 38%RH                                 22 deg.C , 63%RH                                 22 deg.C , 63%RH  
Engineer                    Tatsuya Arai   Wataru Kojima                                       Wataru Kojima  
Mode                         Tx, 5785   MHz  
Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	7713.335	PK	48.2	37.7	8.5	41.3	53.1	73.9	20.8	100	174	
Hori.	11570.000	PK	42.8	40.6	9.8	39.5	53.7	73.9	20.2	100	0	
Hori.	17355.000	PK	47.4	45.1	2.6	39.5	55.6	73.9	18.3	100	107	
Hori.	7713.335	AV	42.8	37.7	8.5	41.3	47.7	53.9	6.2	100	174	
Hori.	11570.000	AV	33.4	40.6	9.8	39.5	44.3	53.9	9.6	100	0	
Hori.	17355.000	AV	35.5	45.1	2.6	39.5	43.7	53.9	10.2	100	107	
Vert.	7713.335	PK	47.0	37.7	8.5	41.3	51.9	73.9	22.0	138	116	
Vert.	11570.000	PK	44.7	40.6	9.8	39.5	55.6	73.9	18.3	100	0	
Vert.	17355.000	PK	44.0	45.1	2.6	39.5	52.2	73.9	21.7	100	53	
Vert.	7713.335	AV	39.0	37.7	8.5	41.3	43.9	53.9	10.0	138	116	
Vert.	11570.000	AV	34.8	40.6	9.8	39.5	45.7	53.9	8.2	100	0	
Vert.	17355.000	AV	33.0	45.1	2.6	39.5	41.2	53.9	12.7	100	53	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                 20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                 22 deg.C , 63%RH                                 22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima   Wataru Kojima  
Mode                         Tx, 5825   MHz  
Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5850.000	PK	53.2	33.0	16.7	40.3	62.6	73.9	11.3	100	28	
Hori.	7766.616	PK	48.8	37.8	8.6	41.2	54.0	73.9	19.9	100	15	
Hori.	11650.000	PK	43.4	40.5	9.8	39.5	54.2	73.9	19.7	100	0	
Hori.	17475.000	PK	48.0	46.1	2.6	39.5	57.2	73.9	16.7	100	107	
Hori.	5850.000	AV	35.4	33.0	16.7	40.3	44.8	53.9	9.1	100	28	
Hori.	7766.616	AV	42.1	37.8	8.6	41.2	47.3	53.9	6.6	100	15	
Hori.	11650.000	AV	33.4	40.5	9.8	39.5	44.2	53.9	9.7	100	0	
Hori.	17475.000	AV	35.9	46.1	2.6	39.5	45.1	53.9	8.8	100	107	
Vert.	5850.000	PK	45.1	33.0	16.7	40.3	54.5	73.9	19.4	100	153	
Vert.	7767.594	PK	46.6	37.8	8.6	41.2	51.8	73.9	22.1	100	76	
Vert.	11650.000	PK	50.5	40.5	9.8	39.5	61.3	73.9	12.6	100	137	
Vert.	17475.000	PK	43.5	46.1	2.6	39.5	52.7	73.9	21.2	100	87	
Vert.	5850.000	AV	35.1	33.0	16.7	40.3	44.5	53.9	9.4	100	153	
Vert.	7767.594	AV	37.3	37.8	8.6	41.2	42.5	53.9	11.4	100	76	
Vert.	11650.000	AV	38.5	40.5	9.8	39.5	49.3	53.9	4.6	100	137	
Vert.	17475.000	AV	32.8	46.1	2.6	39.5	42.0	53.9	11.9	100	87	

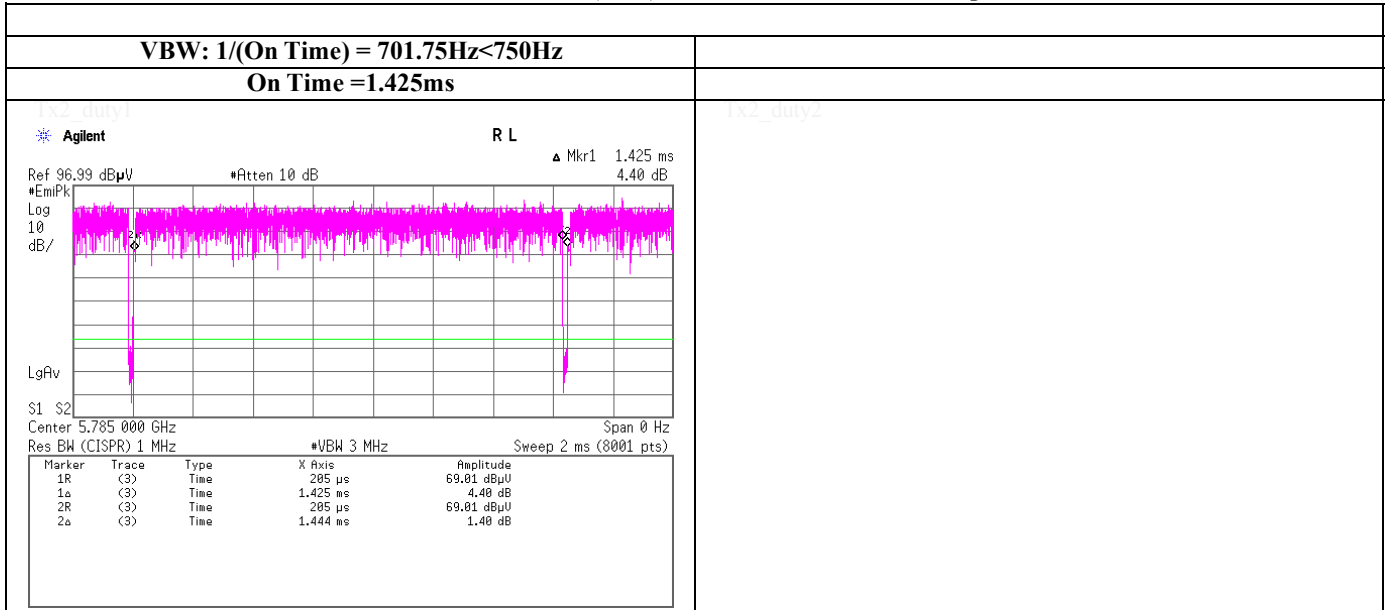
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                         20log(3.0m/1.0m)= 9.5dB

### VBW Calculation Chart

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps



## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012   August 19, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   22 deg.C , 63%RH                                   22 deg.C , 63%RH                                   22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima                                       Wataru Kojima                                       Tatsuya Arai  
Mode                         Tx, 5745   MHz  
Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	406.126	QP	41.1	16.4	9.0	32.0	34.5	46.0	11.5	106	324	
Hori.	454.141	QP	47.7	17.1	9.3	32.0	42.1	46.0	3.9	100	350	
Hori.	466.550	QP	40.7	17.3	9.3	32.0	35.3	46.0	10.7	100	150	
Hori.	5725.000	PK	51.1	32.9	16.7	40.2	60.5	73.9	13.4	100	292	
Hori.	7659.994	PK	50.2	37.5	8.5	41.3	54.9	73.9	19.0	100	51	
Hori.	11490.000	PK	45.8	40.6	9.8	39.5	56.7	73.9	17.2	147	142	
Hori.	17235.000	PK	44.8	44.2	2.7	39.5	52.2	73.9	21.7	100	101	
Hori.	5725.000	AV	38.3	32.9	16.7	40.2	47.7	53.9	6.2	100	292	
Hori.	7659.994	AV	43.4	37.5	8.5	41.3	48.1	53.9	5.8	100	51	
Hori.	11490.000	AV	35.6	40.6	9.8	39.5	46.5	53.9	7.4	147	142	
Hori.	17235.000	AV	33.7	44.2	2.7	39.5	41.1	53.9	12.8	100	101	
Vert.	268.664	QP	44.0	17.9	8.4	32.0	38.3	46.0	7.7	100	357	
Vert.	292.394	QP	41.2	18.8	8.5	32.0	36.5	46.0	9.5	100	58	
Vert.	406.126	QP	48.4	16.4	9.0	32.0	41.8	46.0	4.2	100	207	
Vert.	416.816	QP	47.5	16.6	9.1	32.0	41.2	46.0	4.8	110	170	
Vert.	5725.000	PK	57.9	32.9	16.7	40.2	67.3	73.9	6.6	100	169	
Vert.	7659.994	PK	47.6	37.5	8.5	41.3	52.3	73.9	21.6	133	119	
Vert.	11490.000	PK	43.5	40.6	9.8	39.5	54.4	73.9	19.5	131	132	
Vert.	17235.000	PK	42.4	44.2	2.7	39.5	49.8	73.9	24.1	100	47	
Vert.	5725.000	AV	38.4	32.9	16.7	40.2	47.8	53.9	6.1	100	169	
Vert.	7659.994	AV	39.7	37.5	8.5	41.3	44.4	53.9	9.5	133	119	
Vert.	11490.000	AV	36.1	40.6	9.8	39.5	47.0	53.9	6.9	131	132	
Vert.	17235.000	AV	32.1	44.2	2.7	39.5	39.5	53.9	14.4	100	47	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                 22 deg.C , 63%RH                                 22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima   Wataru Kojima  
Mode                         Tx, 5785   MHz  
Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	7713.023	PK	49.2	37.7	8.5	41.3	54.1	73.9	19.8	100	51	
Hori.	11570.000	PK	48.2	40.6	9.8	39.5	59.1	73.9	14.8	106	137	
Hori.	17355.000	PK	47.3	45.1	2.6	39.5	55.5	73.9	18.4	100	115	
Hori.	7713.023	AV	42.1	37.7	8.5	41.3	47.0	53.9	6.9	100	51	
Hori.	11570.000	AV	36.6	40.6	9.8	39.5	47.5	53.9	6.4	106	137	
Hori.	17355.000	AV	35.7	45.1	2.6	39.5	43.9	53.9	10.0	100	115	
Vert.	7713.023	PK	48.7	37.7	8.5	41.3	53.6	73.9	20.3	145	117	
Vert.	11570.000	PK	49.0	40.6	9.8	39.5	59.9	73.9	14.0	119	138	
Vert.	17355.000	PK	44.2	45.1	2.6	39.5	52.4	73.9	21.5	100	72	
Vert.	7713.023	AV	40.4	37.7	8.5	41.3	45.3	53.9	8.6	145	117	
Vert.	11570.000	AV	37.6	40.6	9.8	39.5	48.5	53.9	5.4	119	138	
Vert.	17355.000	AV	32.8	45.1	2.6	39.5	41.0	53.9	12.9	100	72	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :             15GHz -40GHz :                         20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   22 deg.C , 63%RH                                   22 deg.C , 63%RH  
Engineer                    Tatsuya Arai   Wataru Kojima                                        Wataru Kojima  
Mode                         Tx, 5825    MHz  
Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5850.000	PK	49.3	33.0	16.7	40.3	58.7	73.9	15.2	100	69	
Hori.	7766.616	PK	48.4	37.8	8.6	41.2	53.6	73.9	20.3	100	65	
Hori.	11650.000	PK	50.6	40.5	9.8	39.5	61.4	73.9	12.5	120	137	
Hori.	17475.000	PK	48.5	46.1	2.6	39.5	57.7	73.9	16.2	100	113	
Hori.	5850.000	AV	35.5	33.0	16.7	40.3	44.9	53.9	9.0	100	69	
Hori.	7766.616	AV	42.5	37.8	8.6	41.2	47.7	53.9	6.2	100	65	
Hori.	11650.000	AV	37.8	40.5	9.8	39.5	48.6	53.9	5.3	120	137	
Hori.	17475.000	AV	36.2	46.1	2.6	39.5	45.4	53.9	8.5	100	113	
Vert.	5850.000	PK	51.9	33.0	16.7	40.3	61.3	73.9	12.6	100	329	
Vert.	7767.594	PK	46.8	37.8	8.6	41.2	52.0	73.9	21.9	164	118	
Vert.	11650.000	PK	48.7	40.5	9.8	39.5	59.5	73.9	14.4	120	129	
Vert.	17475.000	PK	42.8	46.1	2.6	39.5	52.0	73.9	21.9	100	89	
Vert.	5850.000	AV	36.6	33.0	16.7	40.3	46.0	53.9	7.9	100	329	
Vert.	7767.594	AV	40.4	37.8	8.6	41.2	45.6	53.9	8.3	164	118	
Vert.	11650.000	AV	38.1	40.5	9.8	39.5	48.9	53.9	5.0	120	129	
Vert.	17475.000	AV	32.7	46.1	2.6	39.5	41.9	53.9	12.0	100	89	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

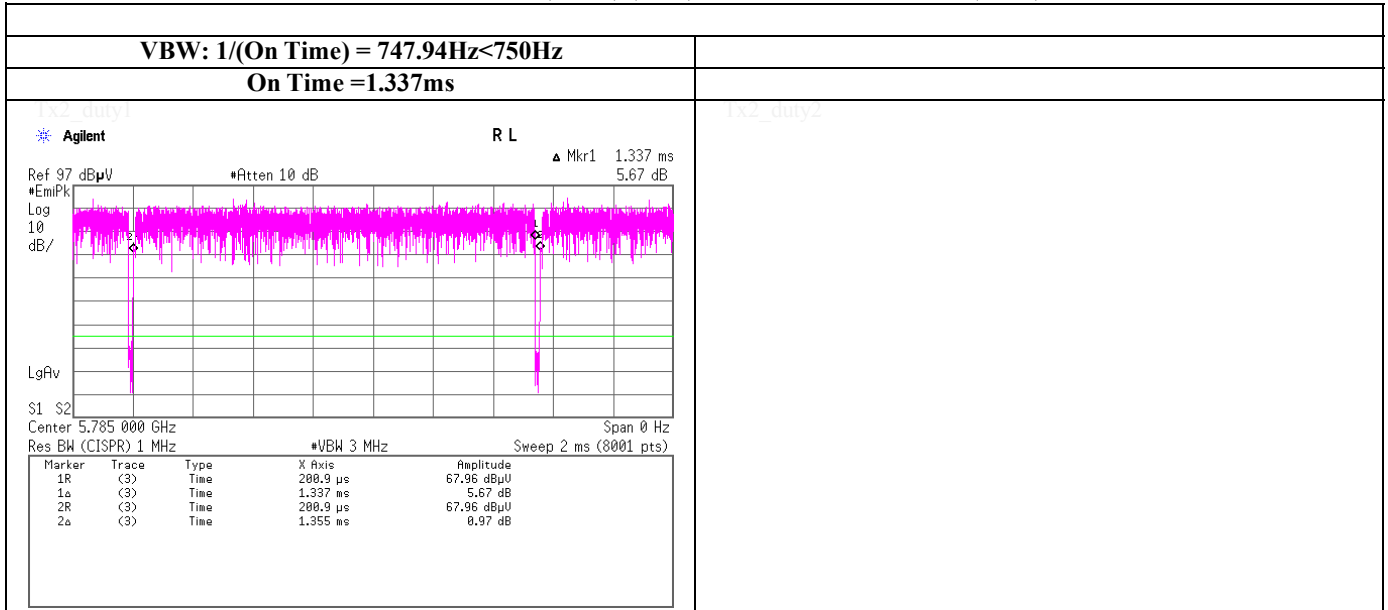
\*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB



### VBW Calculation Chart

**Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)**



## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   22 deg.C , 63%RH                                   22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima                                       Wataru Kojima  
Mode                         Tx, 5755   MHz  
Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5725.000	PK	54.6	32.9	16.7	40.2	64.0	73.9	9.9	100	23	
Hori.	7673.392	PK	50.0	37.5	8.5	41.3	54.7	73.9	19.2	100	69	
Hori.	11510.000	PK	43.9	40.6	9.8	39.5	54.8	73.9	19.1	100	137	
Hori.	17265.000	PK	44.5	44.4	2.7	39.5	52.1	73.9	21.8	100	109	
Hori.	5725.000	AV	38.8	32.9	16.7	40.2	48.2	53.9	5.7	100	23	
Hori.	7673.392	AV	45.5	37.5	8.5	41.3	50.2	53.9	3.7	100	69	
Hori.	11510.000	AV	34.0	40.6	9.8	39.5	44.9	53.9	9.0	100	137	
Hori.	17265.000	AV	34.5	44.4	2.7	39.5	42.1	53.9	11.8	100	109	
Vert.	5725.000	PK	54.0	32.9	16.7	40.2	63.4	73.9	10.5	100	125	
Vert.	7673.392	PK	45.5	37.5	8.5	41.3	50.2	73.9	23.7	100	292	
Vert.	11510.000	PK	47.4	40.6	9.8	39.5	58.3	73.9	15.6	119	137	
Vert.	17265.000	PK	42.9	44.4	2.7	39.5	50.5	73.9	23.4	100	3	
Vert.	5725.000	AV	38.4	32.9	16.7	40.2	47.8	53.9	6.1	100	125	
Vert.	7673.392	AV	37.7	37.5	8.5	41.3	42.4	53.9	11.5	100	292	
Vert.	11510.000	AV	34.9	40.6	9.8	39.5	45.8	53.9	8.1	119	137	
Vert.	17265.000	AV	33.0	44.4	2.7	39.5	40.6	53.9	13.3	100	3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

## Radiated Emission

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         August 3, 2012   August 11, 2012   August 12, 2012  
Temperature / Humidity   20 deg.C , 38%RH                                   22 deg.C , 63%RH                                   22 deg.C , 63%RH  
Engineer                   Tatsuya Arai   Wataru Kojima                                        Wataru Kojima  
Mode                         Tx, 5795   MHz  
Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

(\* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5850.000	PK	45.7	33.0	16.7	40.3	55.1	73.9	18.8	100	286	
Hori.	7726.662	PK	47.8	37.7	8.5	41.3	52.7	73.9	21.2	100	45	
Hori.	11590.000	PK	46.9	40.5	9.8	39.5	57.7	73.9	16.2	100	138	
Hori.	17385.000	PK	47.2	45.4	2.6	39.5	55.7	73.9	18.2	100	108	
Hori.	5850.000	AV	35.7	33.0	16.7	40.3	45.1	53.9	8.8	100	286	
Hori.	7726.662	AV	42.8	37.7	8.5	41.3	47.7	53.9	6.2	100	45	
Hori.	11590.000	AV	36.2	40.5	9.8	39.5	47.0	53.9	6.9	100	138	
Hori.	17385.000	AV	36.3	45.4	2.6	39.5	44.8	53.9	9.1	100	108	
Vert.	5850.000	PK	46.5	33.0	16.7	40.3	55.9	73.9	18.0	100	204	
Vert.	7726.662	PK	46.2	37.7	8.5	41.3	51.1	73.9	22.8	111	143	
Vert.	11590.000	PK	48.1	40.5	9.8	39.5	58.9	73.9	15.0	111	140	
Vert.	17385.000	PK	43.6	45.4	2.6	39.5	52.1	73.9	21.8	100	44	
Vert.	5850.000	AV	35.6	33.0	16.7	40.3	45.0	53.9	8.9	100	204	
Vert.	7726.662	AV	38.1	37.7	8.5	41.3	43.0	53.9	10.9	111	143	
Vert.	11590.000	AV	37.1	40.5	9.8	39.5	47.9	53.9	6.0	111	140	
Vert.	17385.000	AV	33.5	45.4	2.6	39.5	42.0	53.9	11.9	100	44	

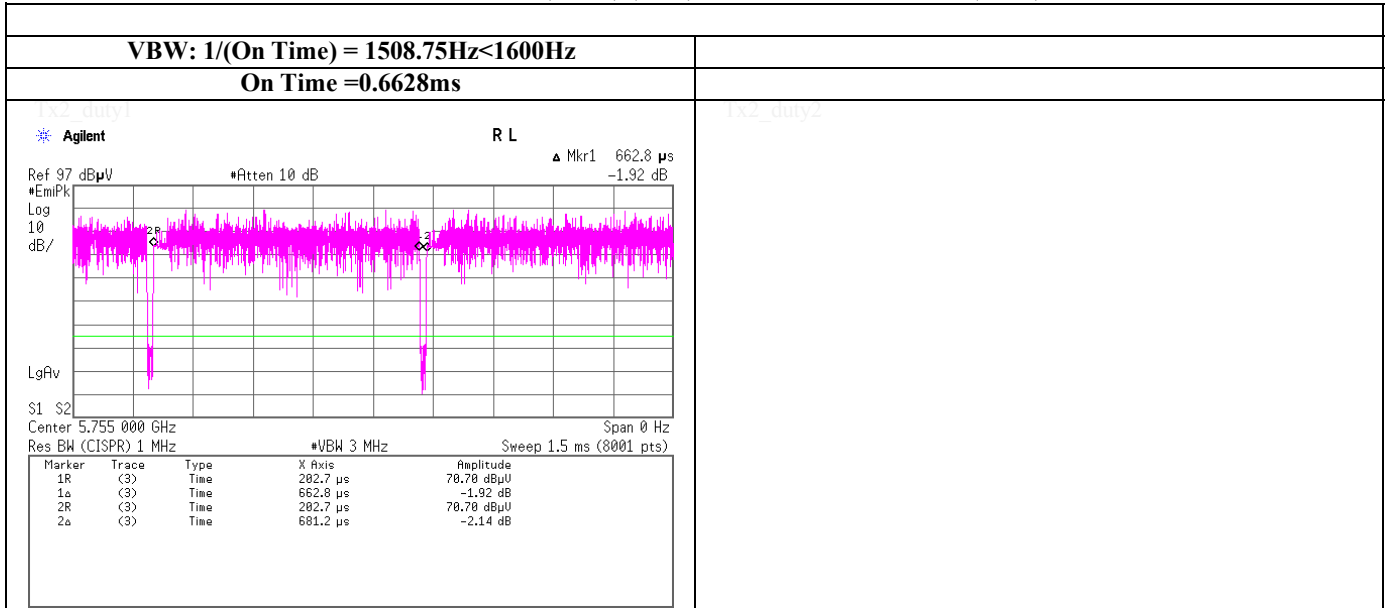
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)

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

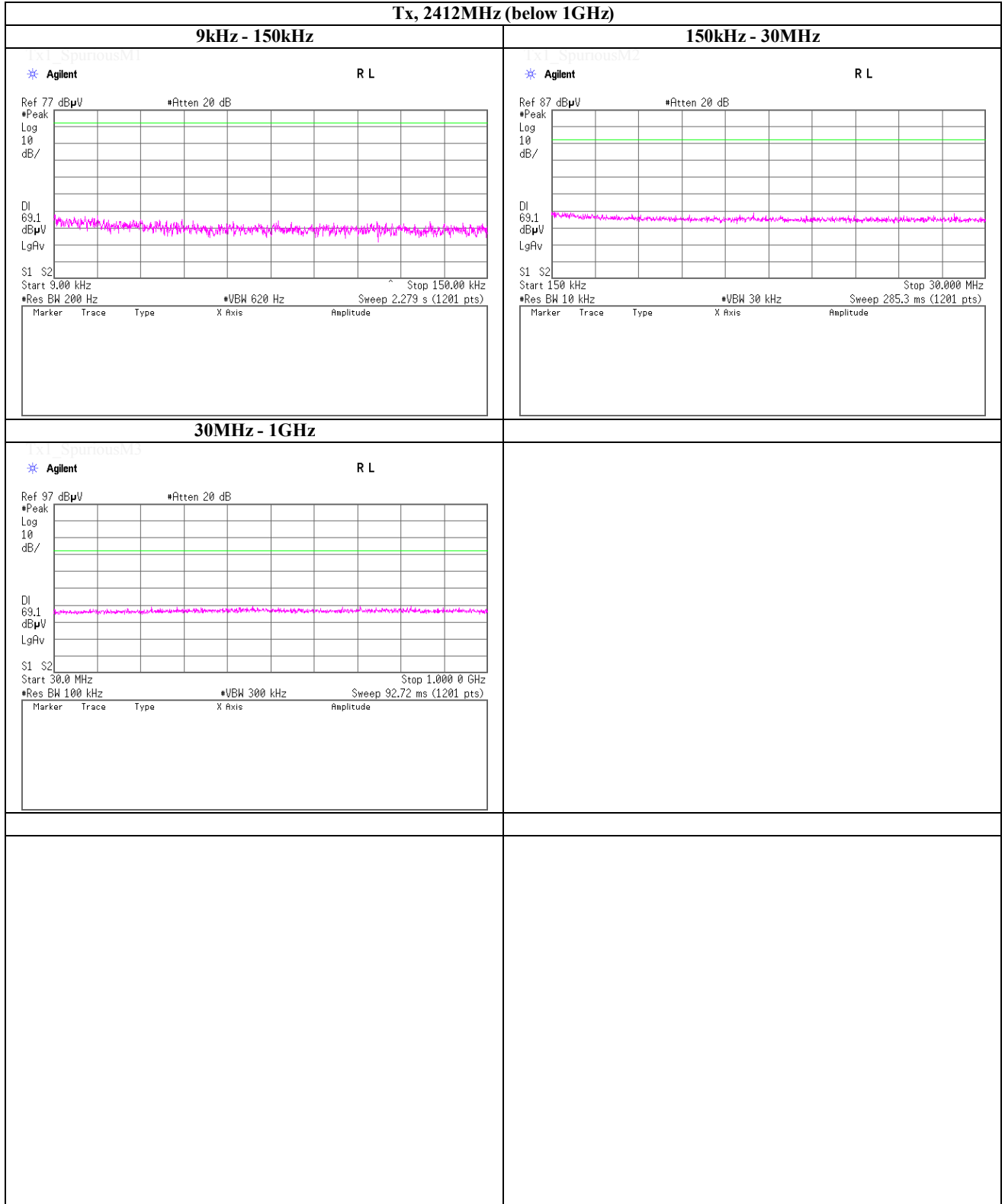
Distance factor :           15GHz -40GHz :                                   20log(3.0m/1.0m)= 9.5dB

### VBW Calculation Chart

**Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)**

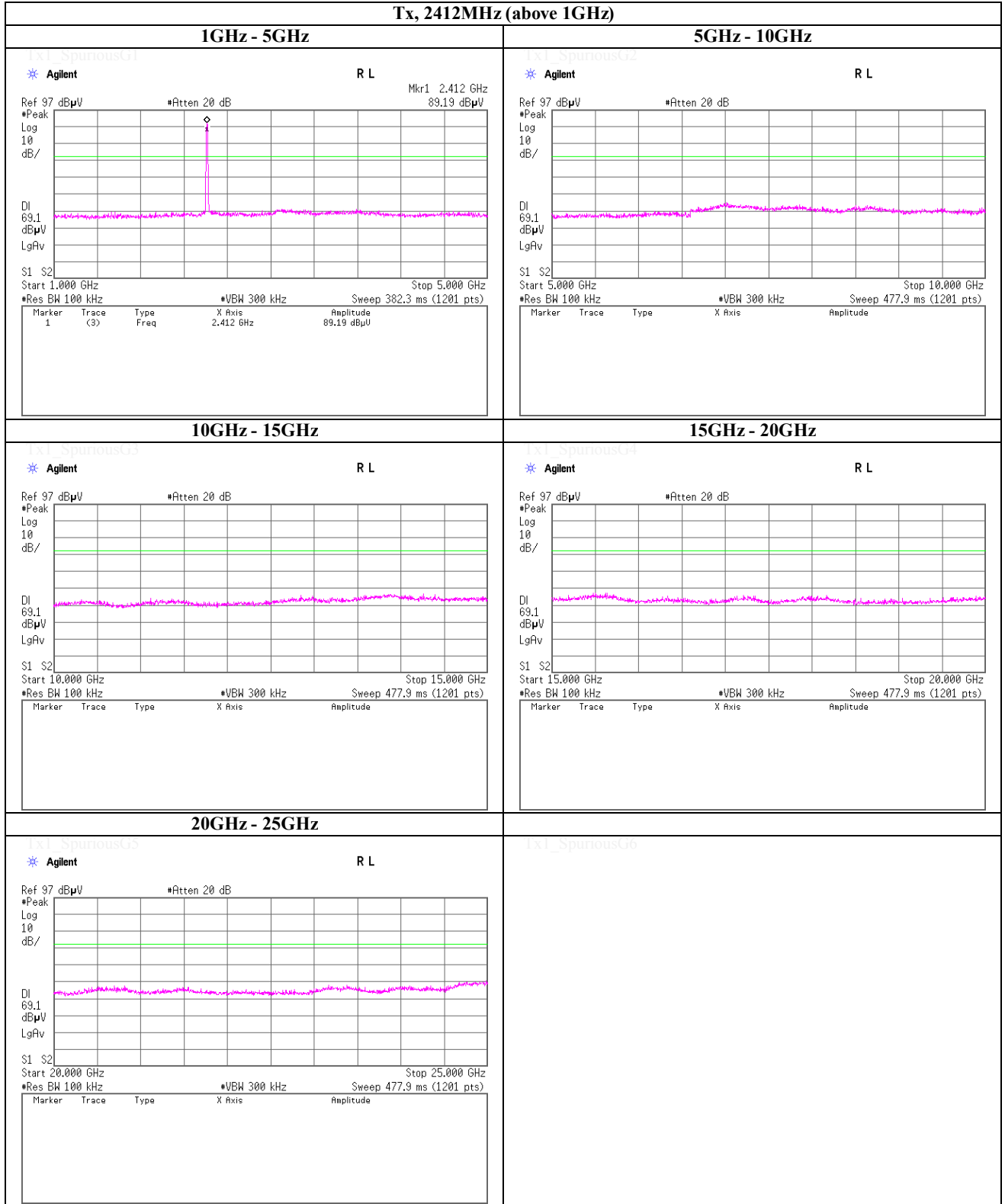


**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**



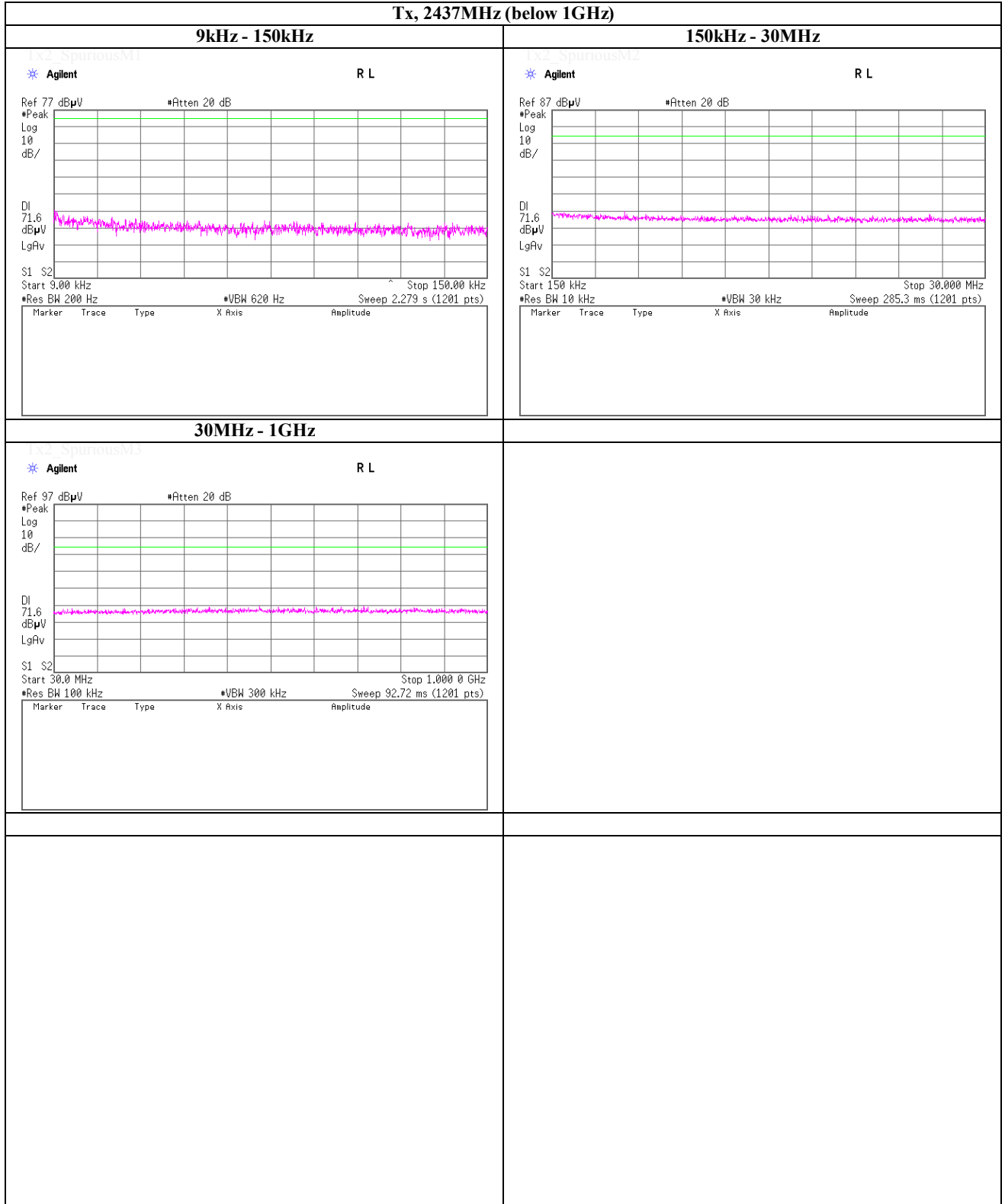
**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**

**Tx, 2412MHz (above 1GHz)**



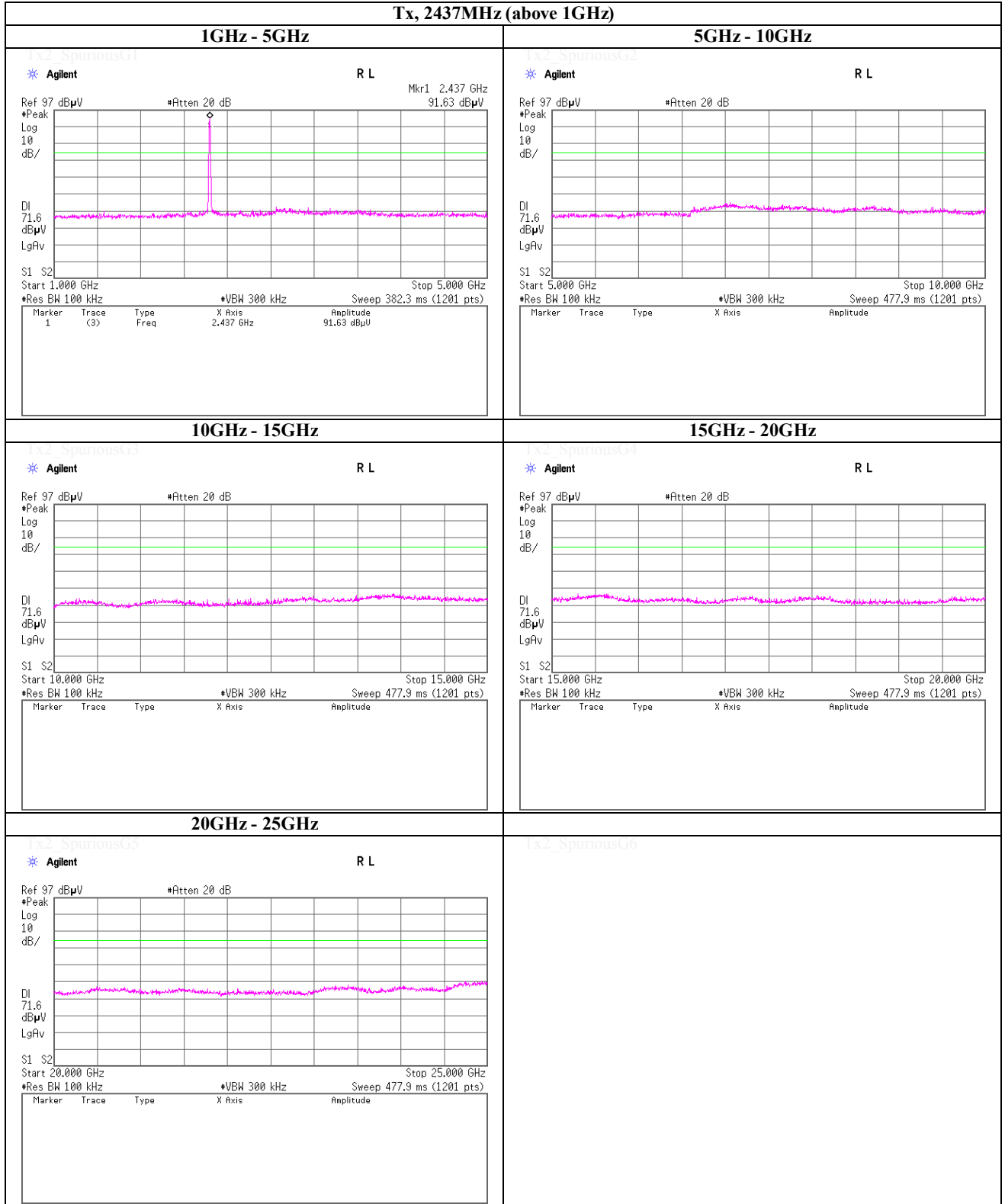
**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**

**Tx, 2437MHz (below 1GHz)**



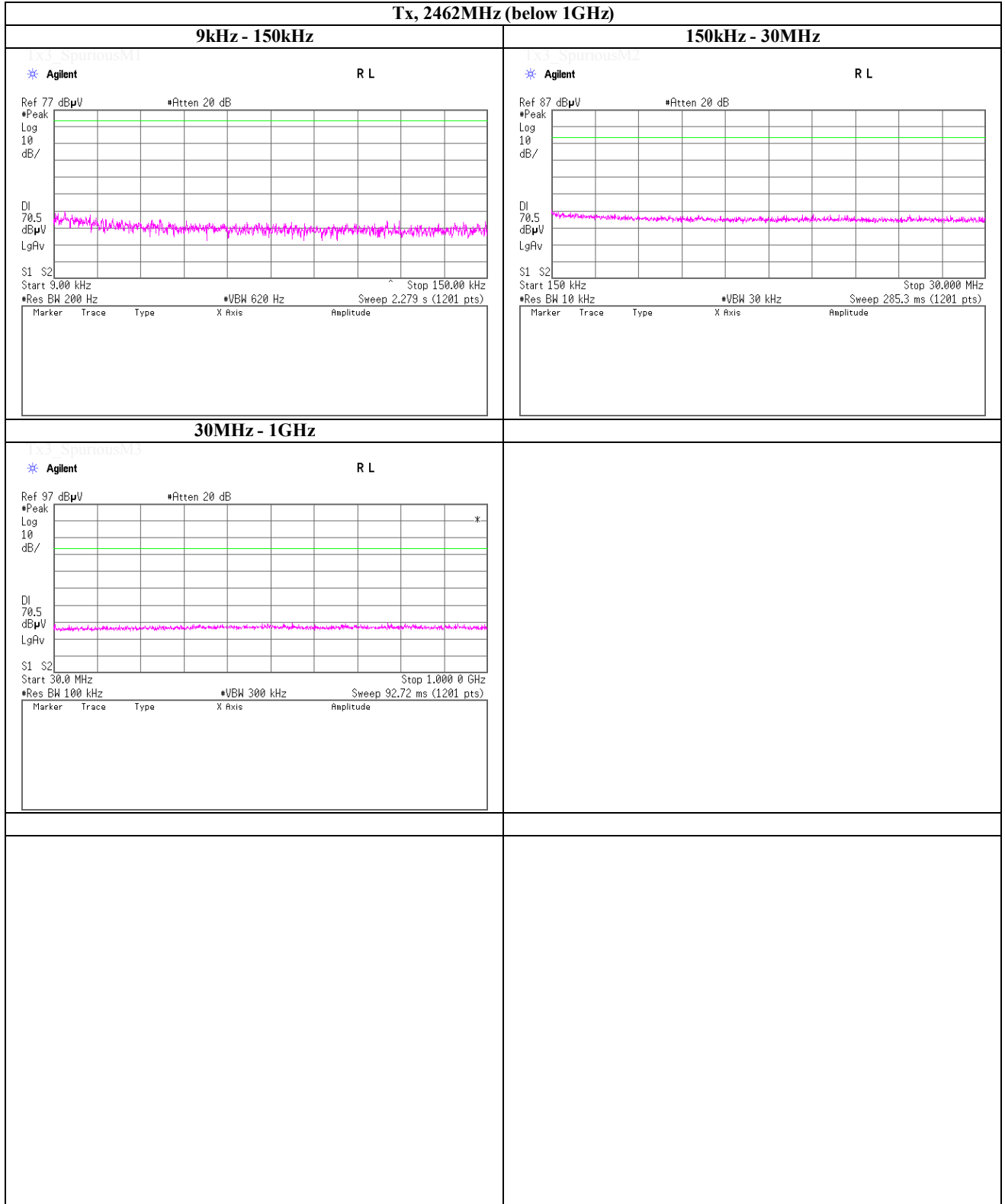
**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**

**Tx, 2437MHz (above 1GHz)**

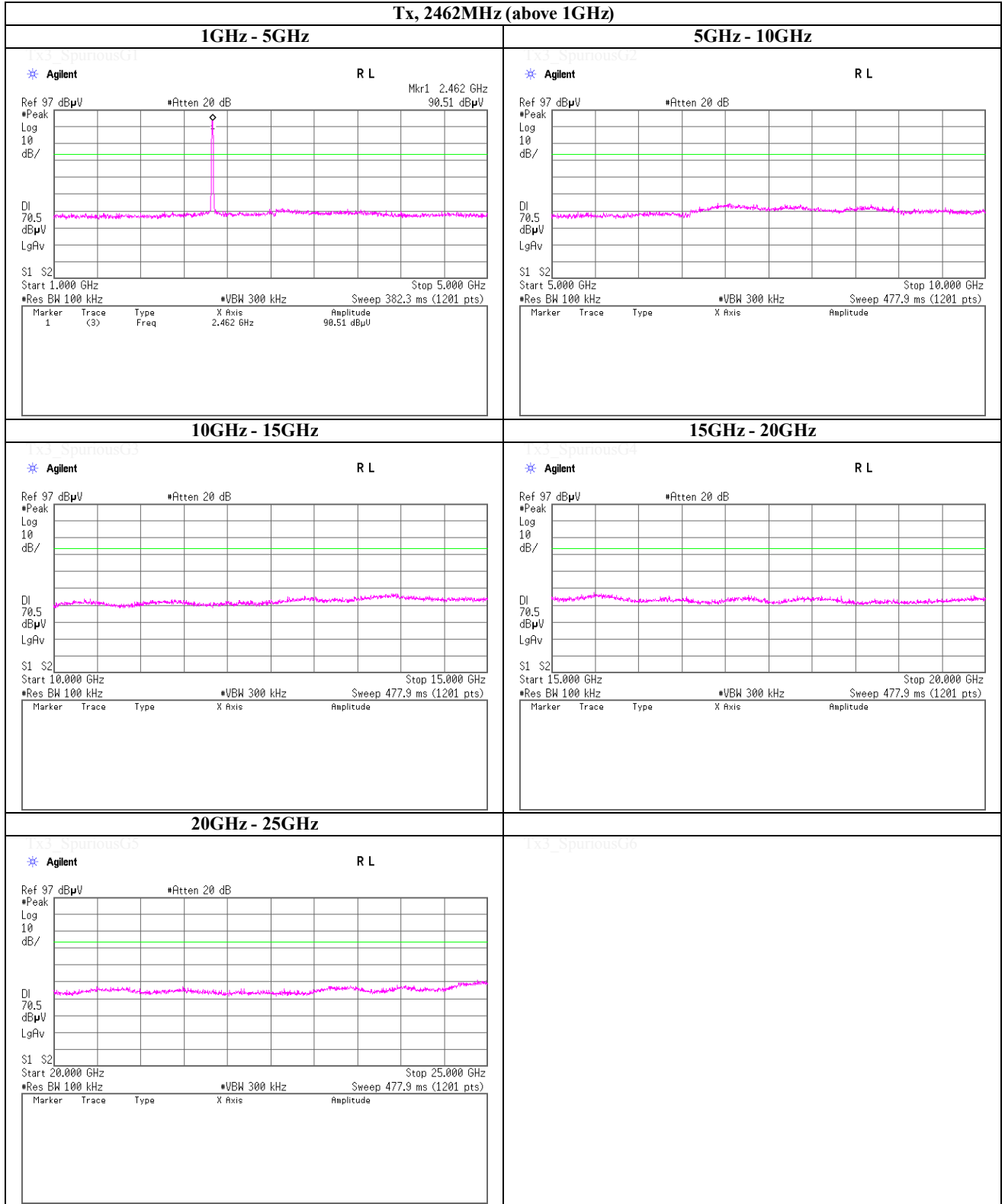




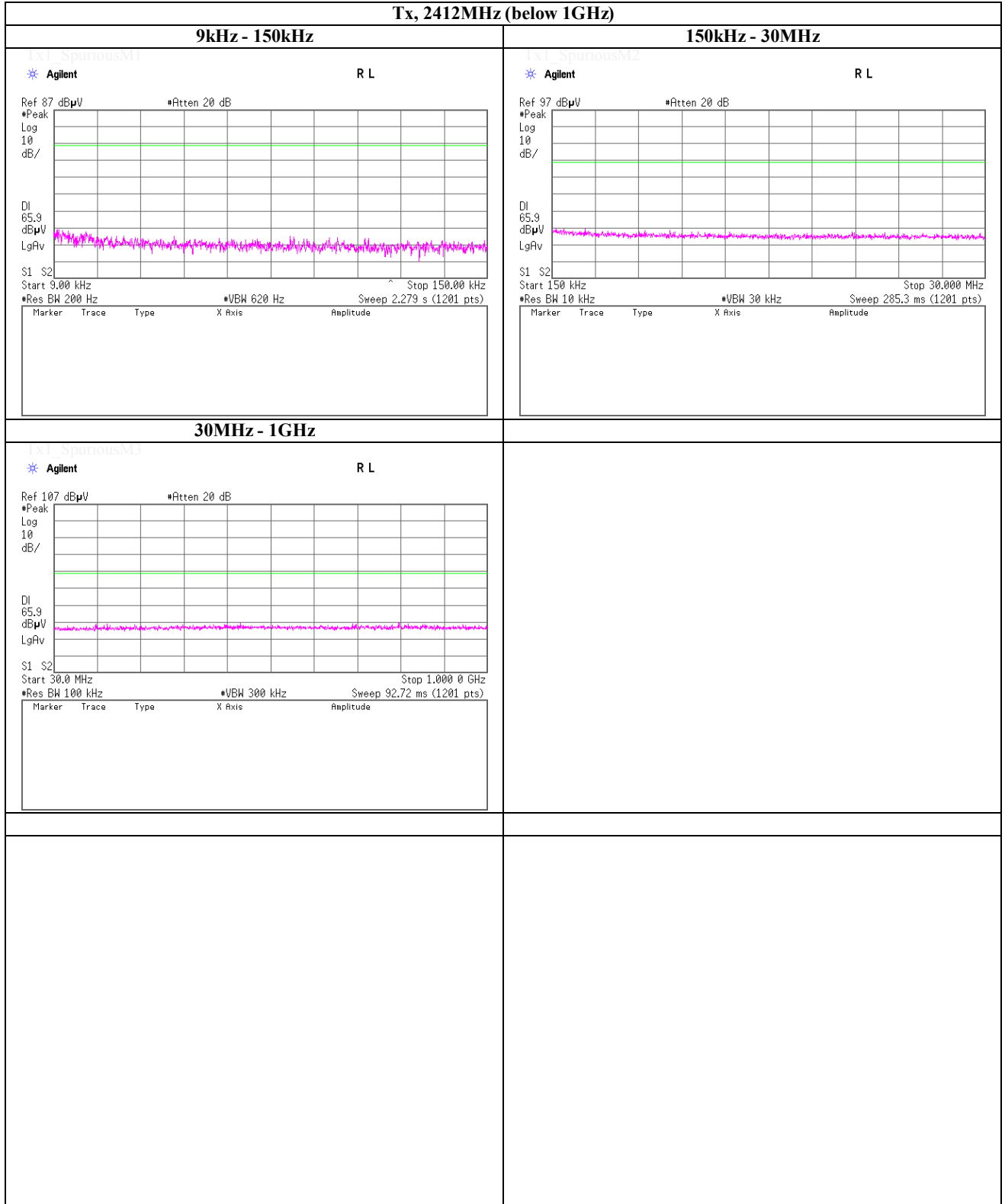
**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**



**Spurious emission (Conducted)**  
**Tx, IEEE802.11b, PN9, worst data mode 1Mbps**

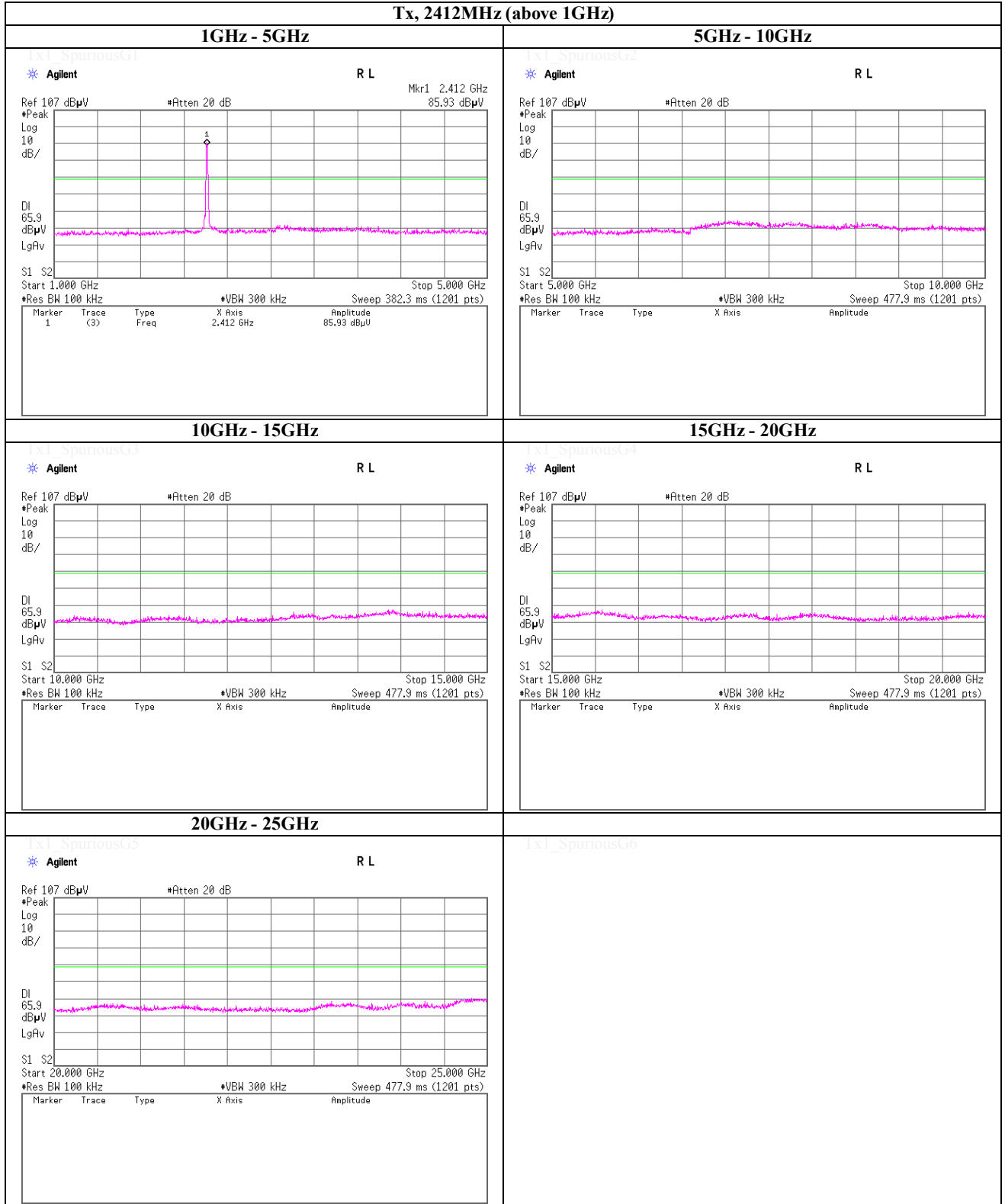


**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**

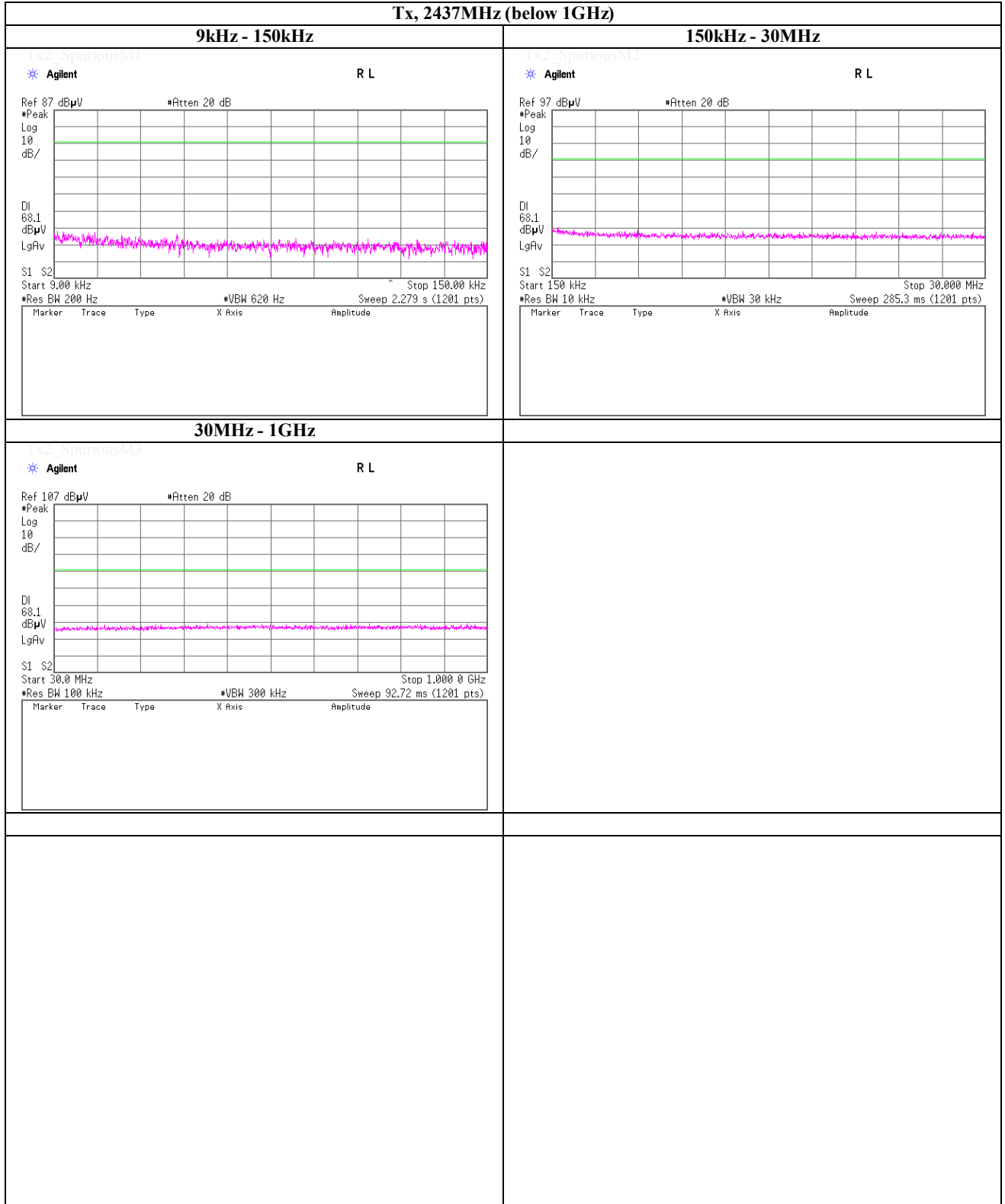


**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**

**Tx, 2412MHz (above 1GHz)**

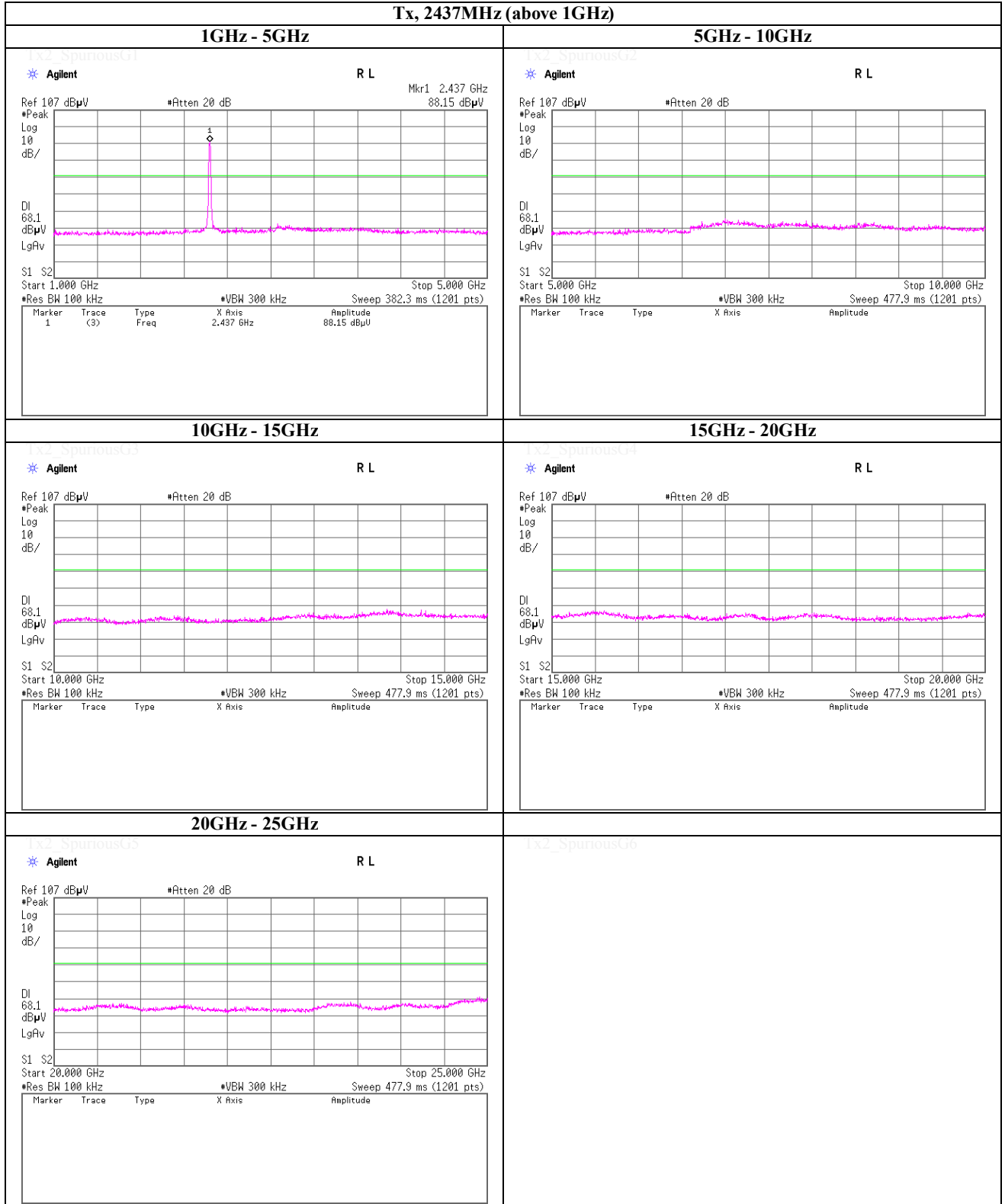


**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**

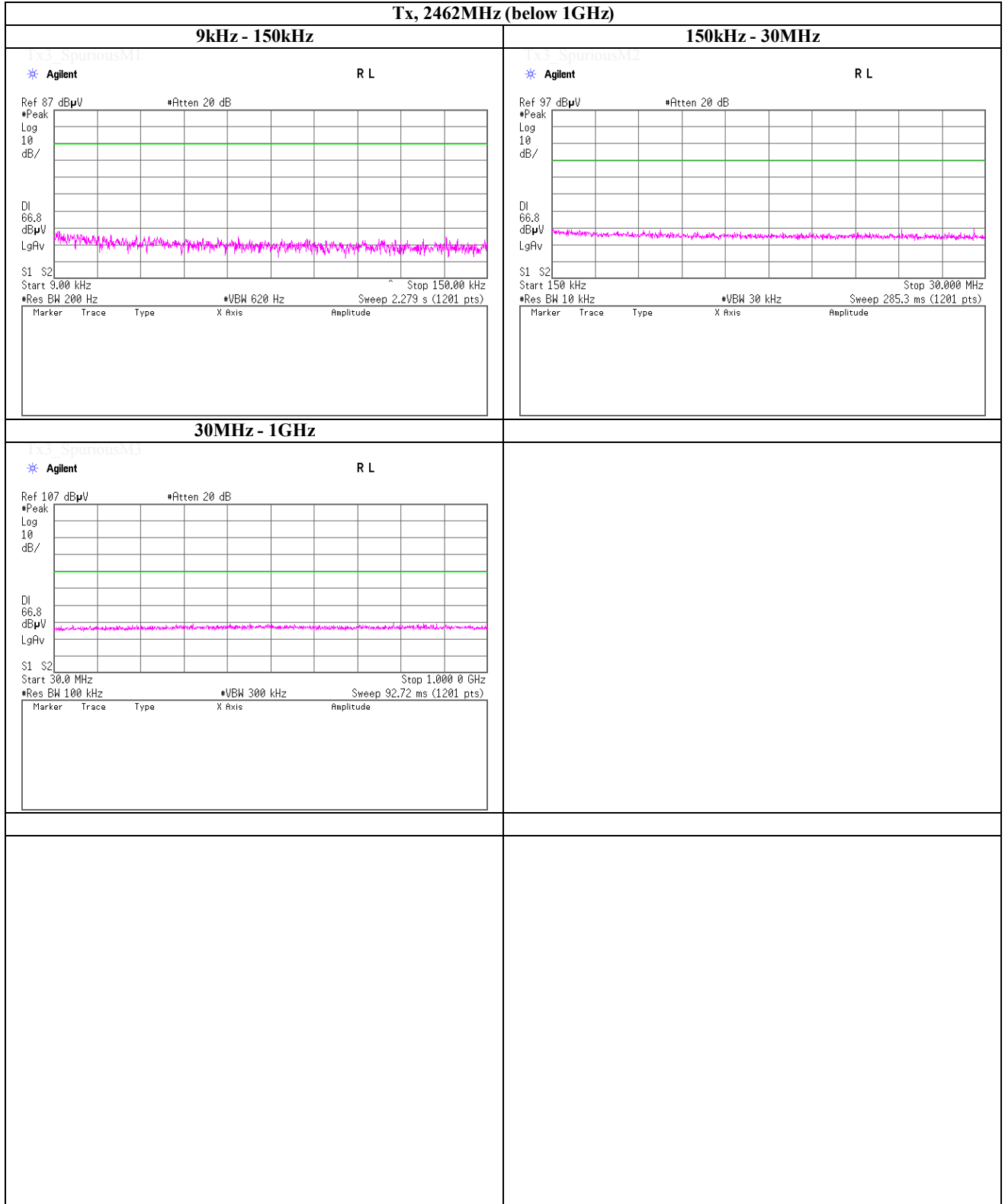


**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**

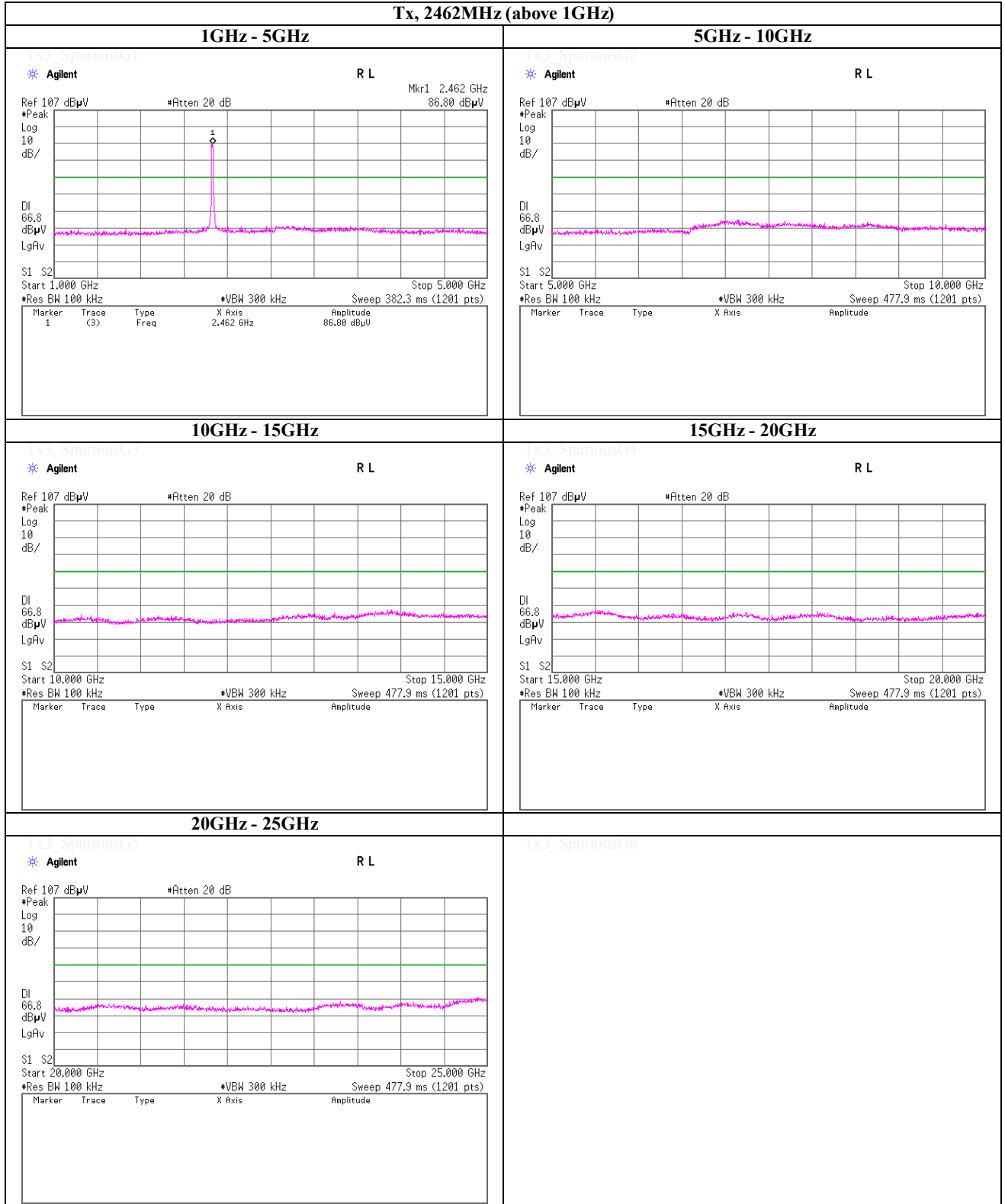
**Tx, 2437MHz (above 1GHz)**



**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**



**Spurious emission (Conducted)**  
**Tx, IEEE802.11g, PN9, worst data mode 6Mbps**

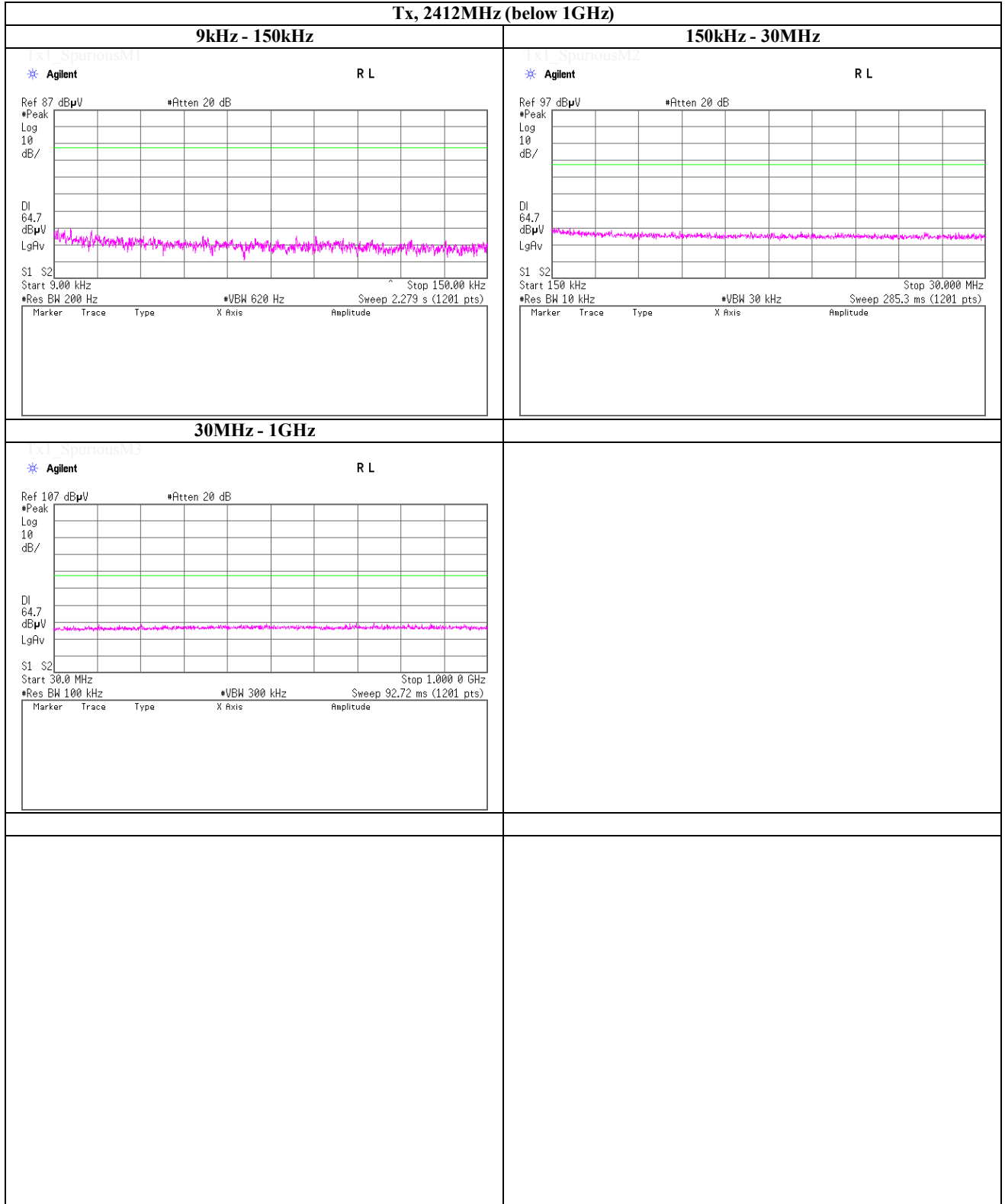




### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

Tx, 2412MHz (below 1GHz)



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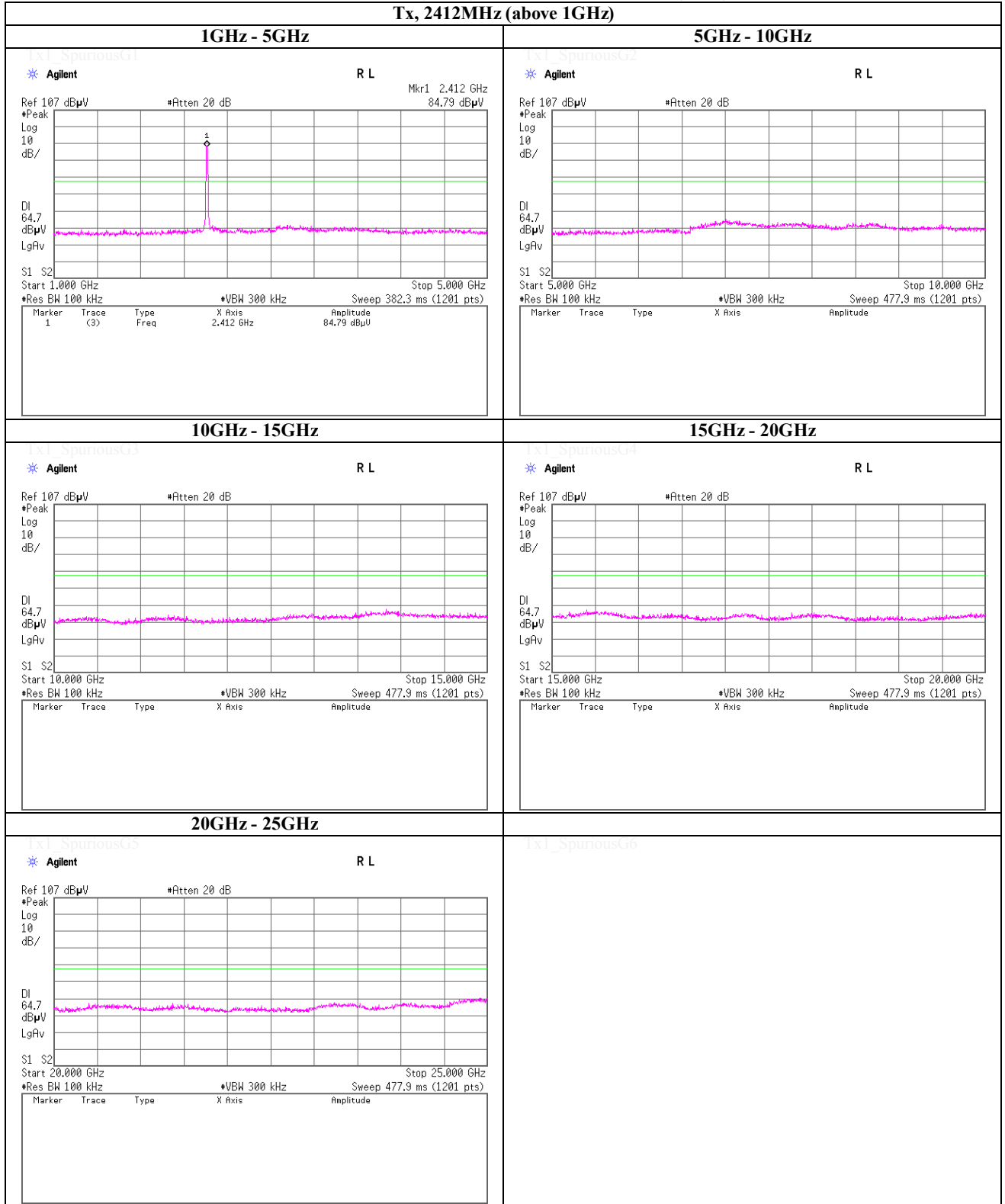
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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Facsimile : +81 463 50 6401

**Spurious emission (Conducted)**  
 Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

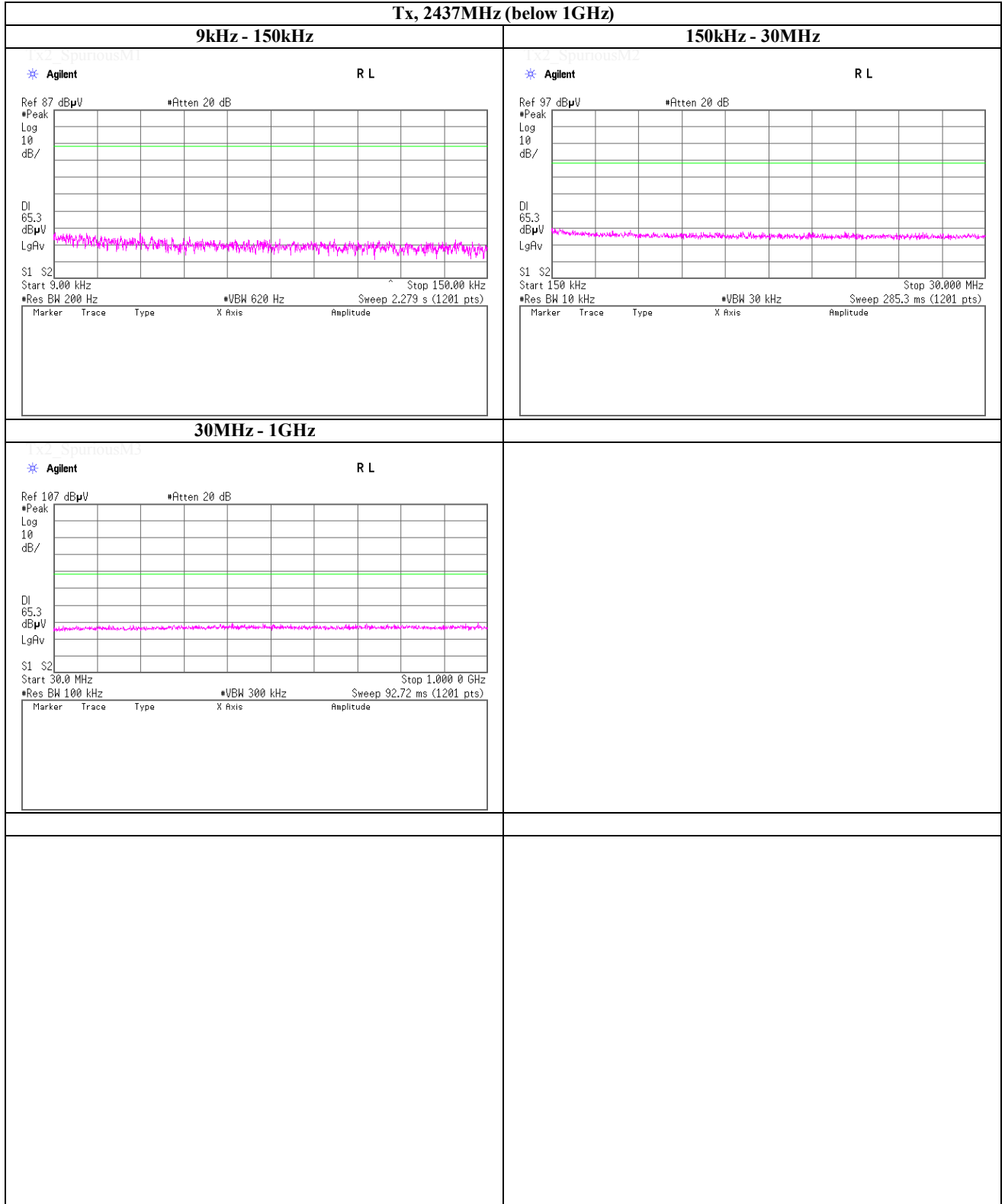
**Tx, 2412MHz (above 1GHz)**



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

Tx, 2437MHz (below 1GHz)



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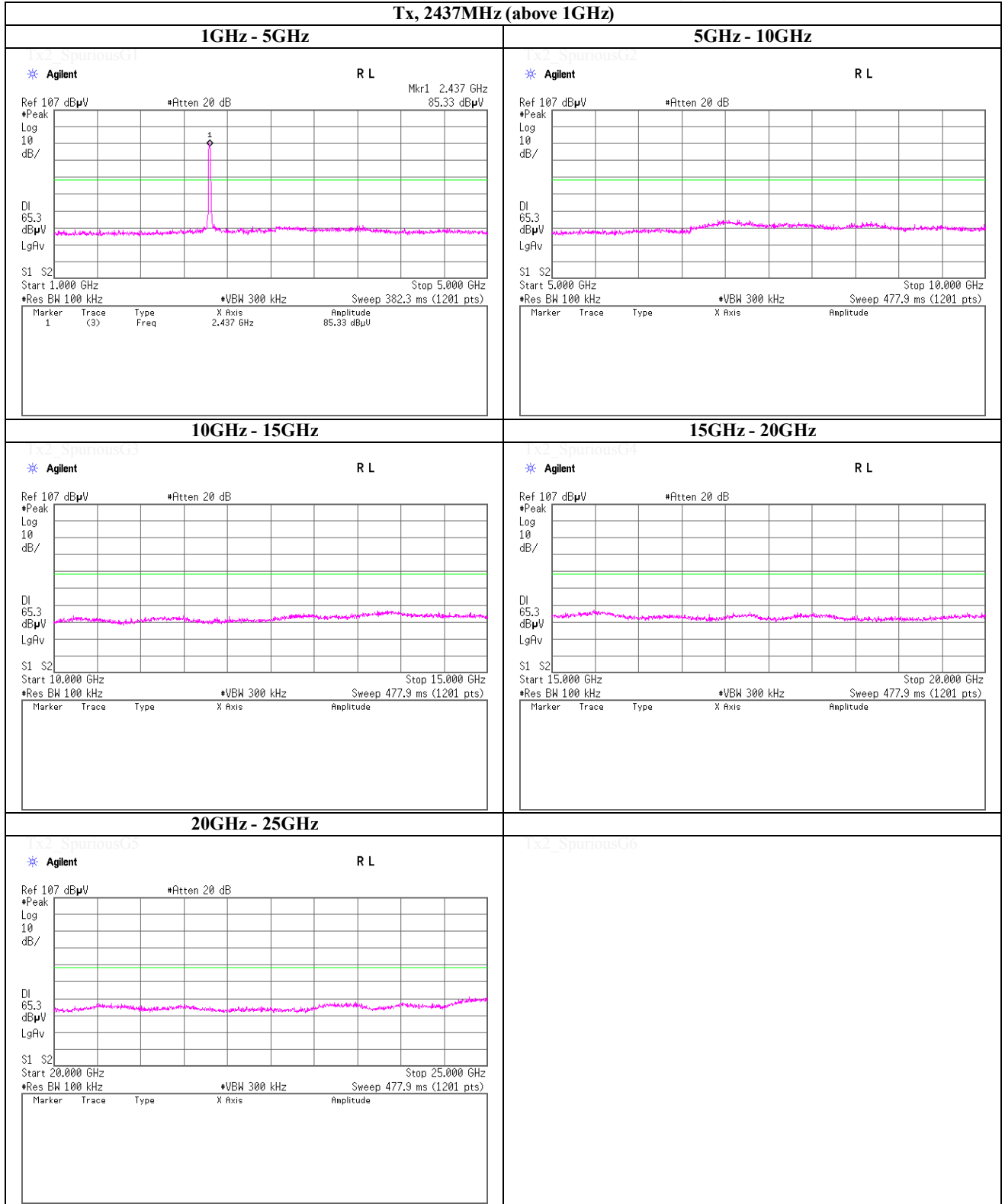
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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**Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)**

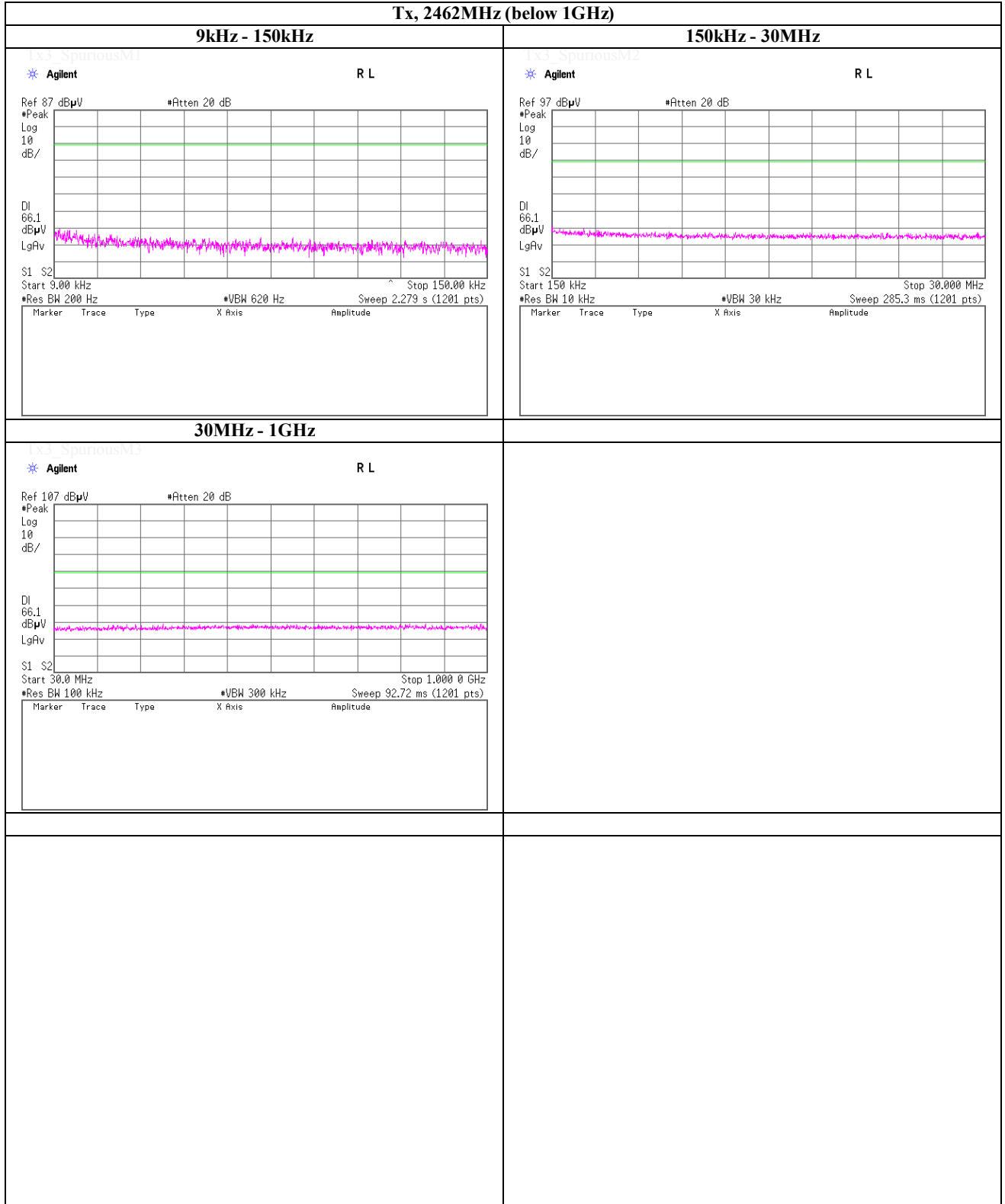
**Tx, 2437MHz (above 1GHz)**



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)

Tx, 2462MHz (below 1GHz)



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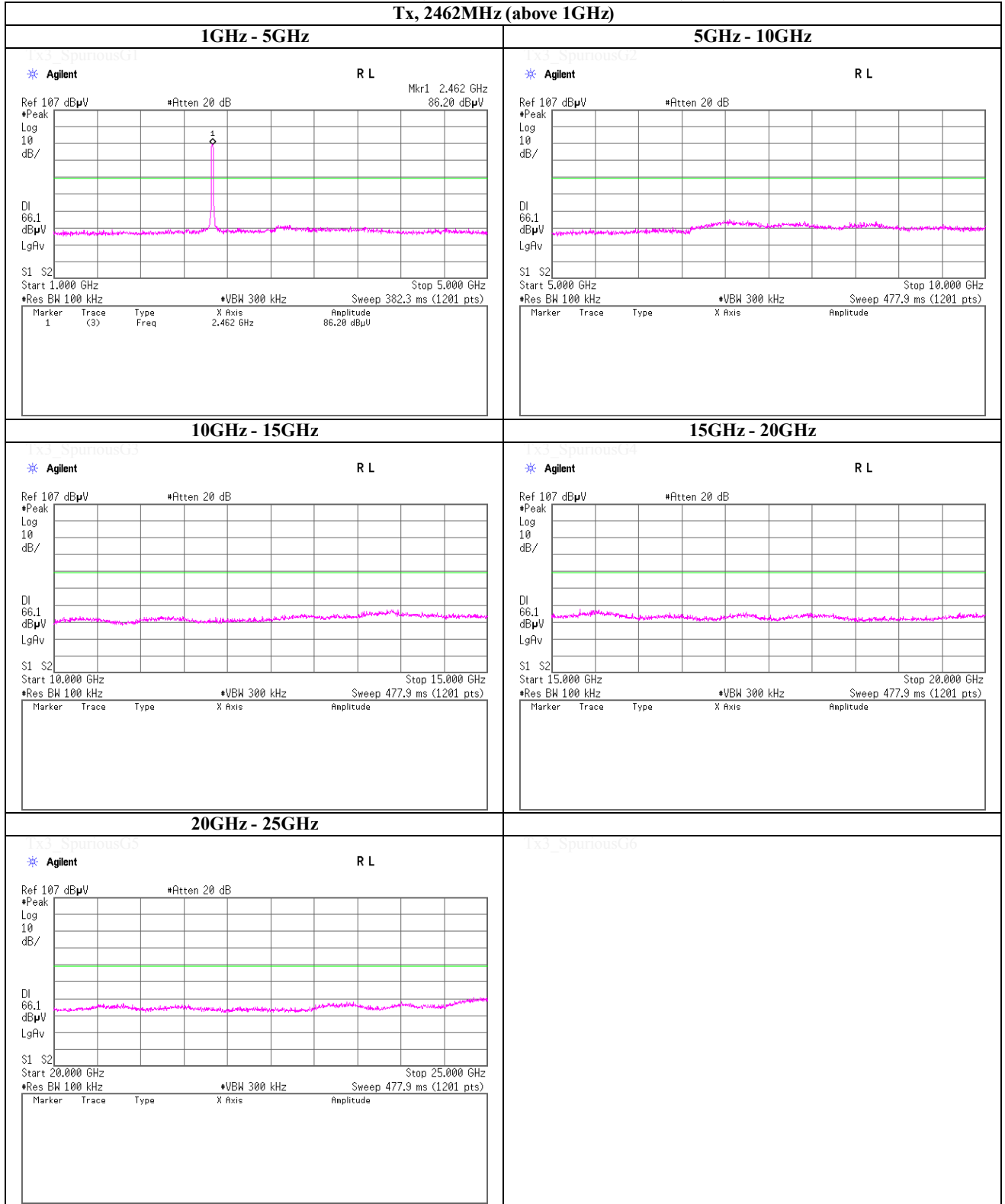
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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**Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)**

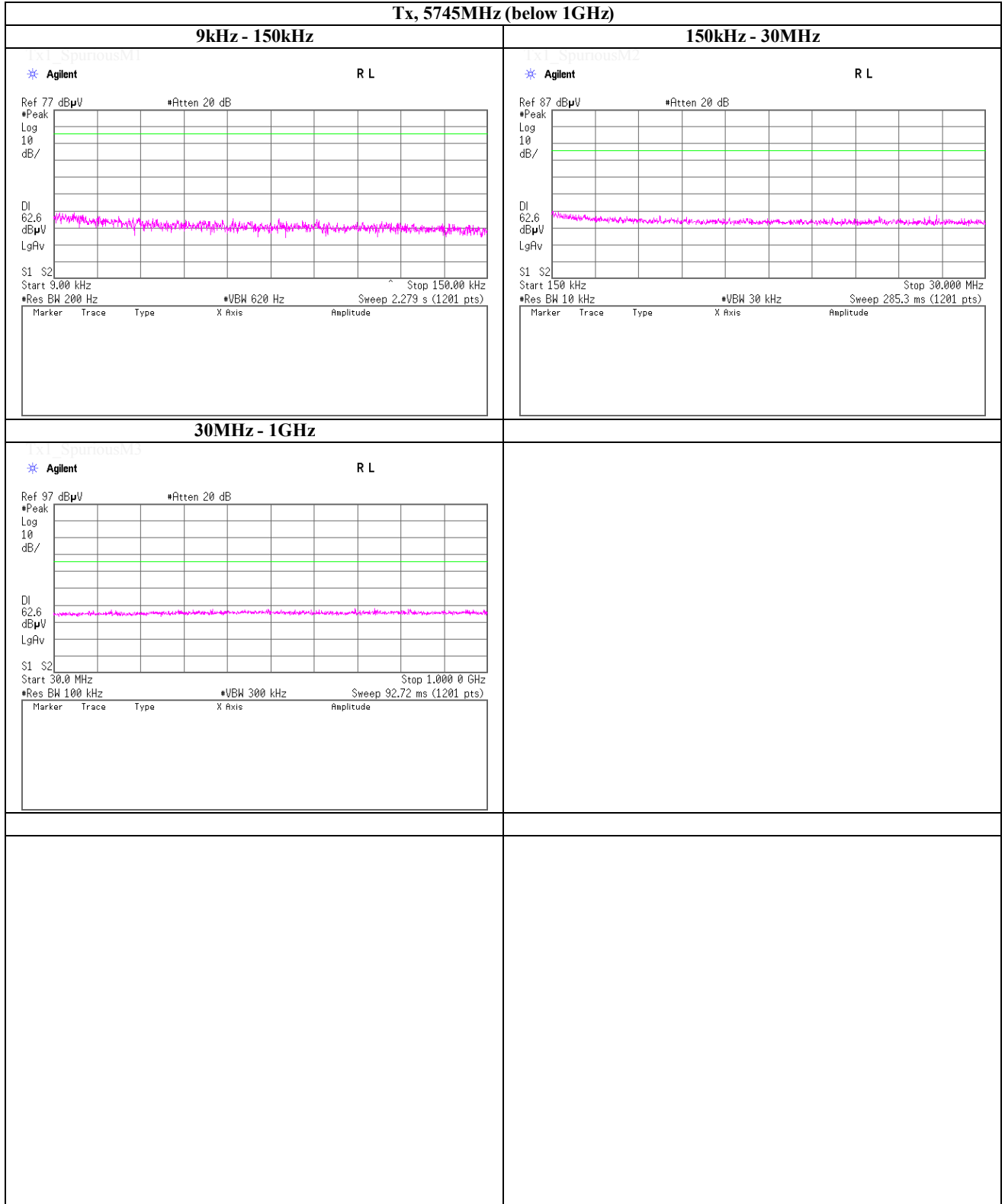
**Tx, 2462MHz (above 1GHz)**



### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5745MHz (below 1GHz)



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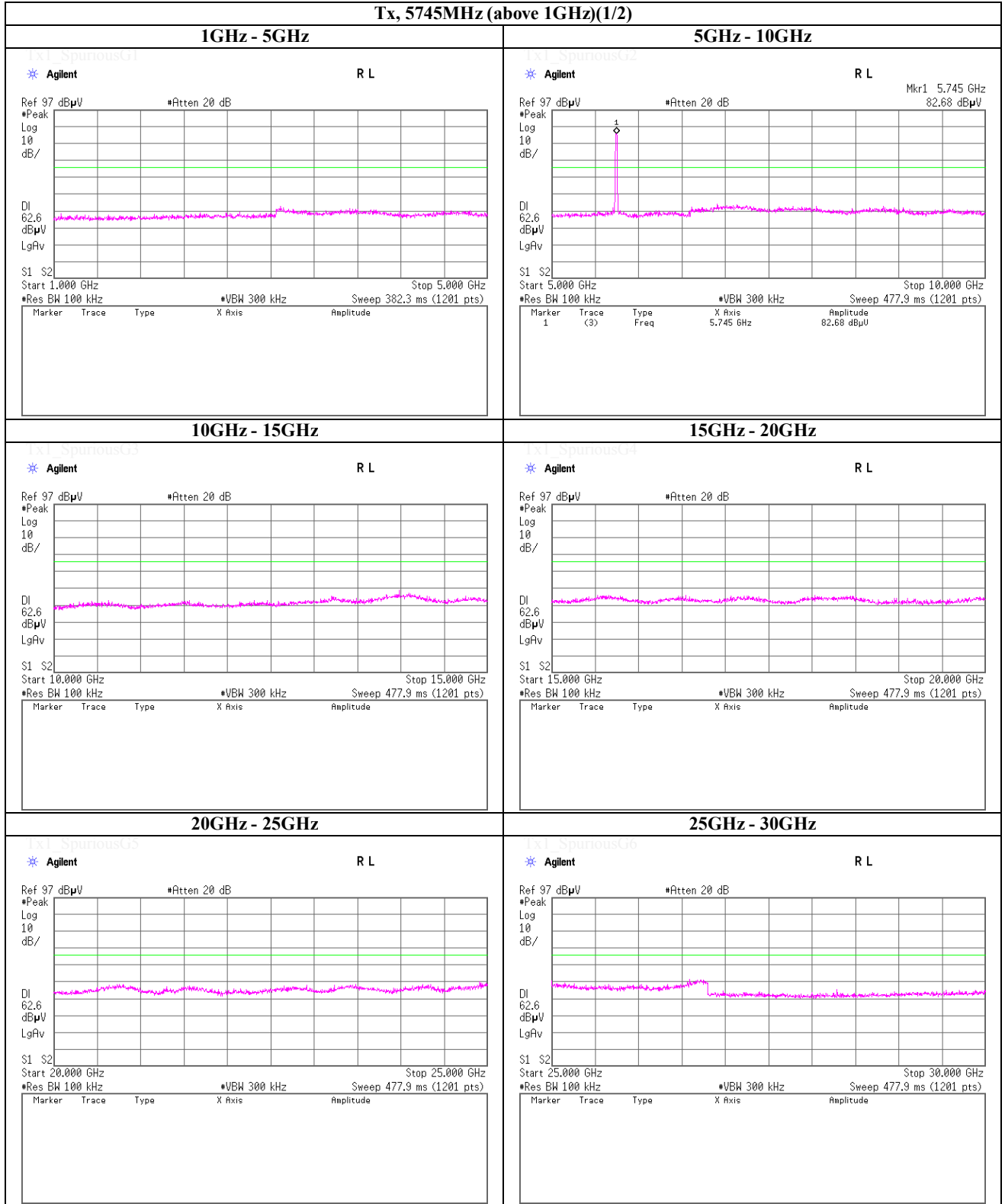
Telephone : +81 463 50 6400

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### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5745MHz (above 1GHz)(1/2)



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Telephone : +81 463 50 6400

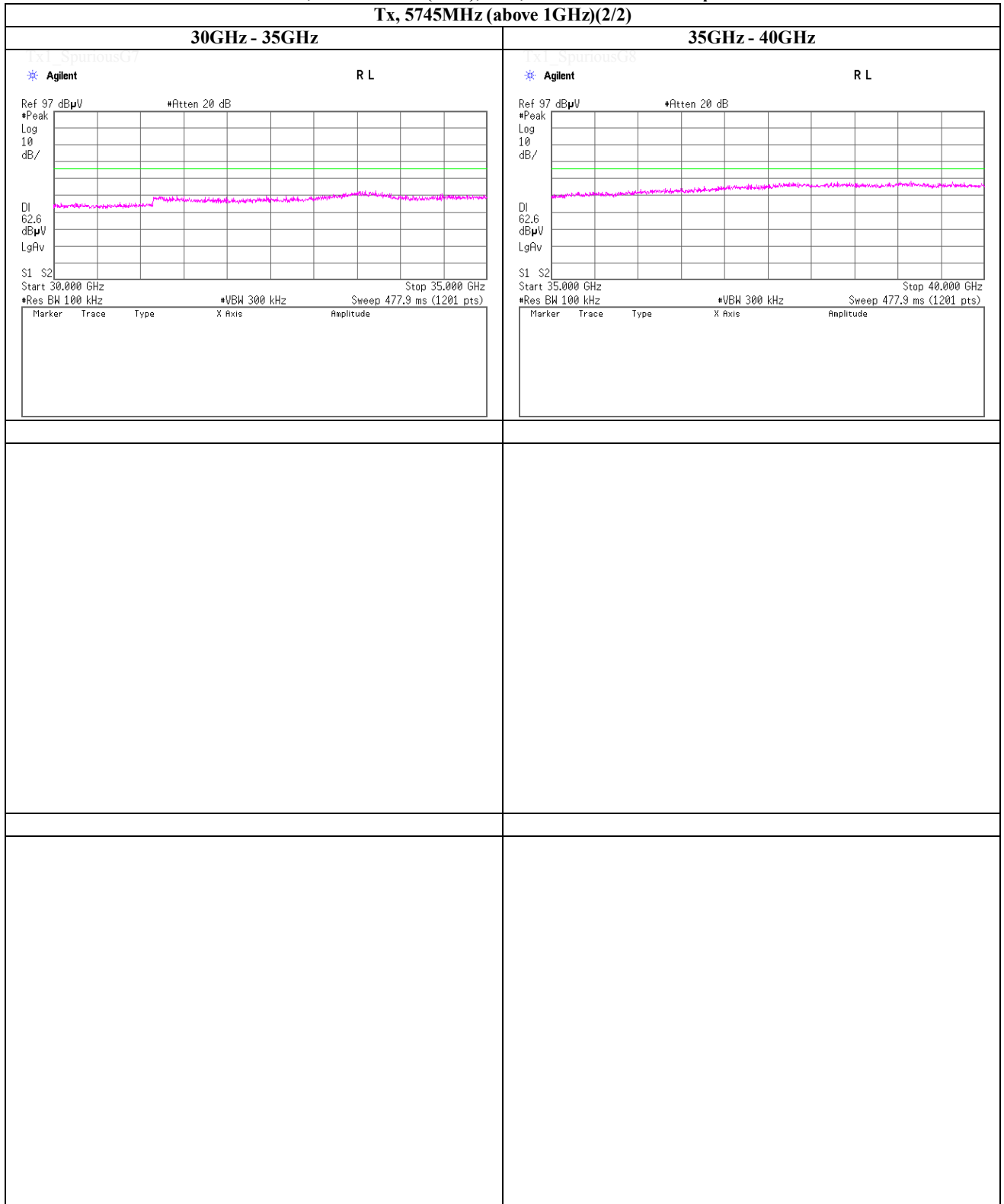
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### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5745MHz (above 1GHz)(2/2)



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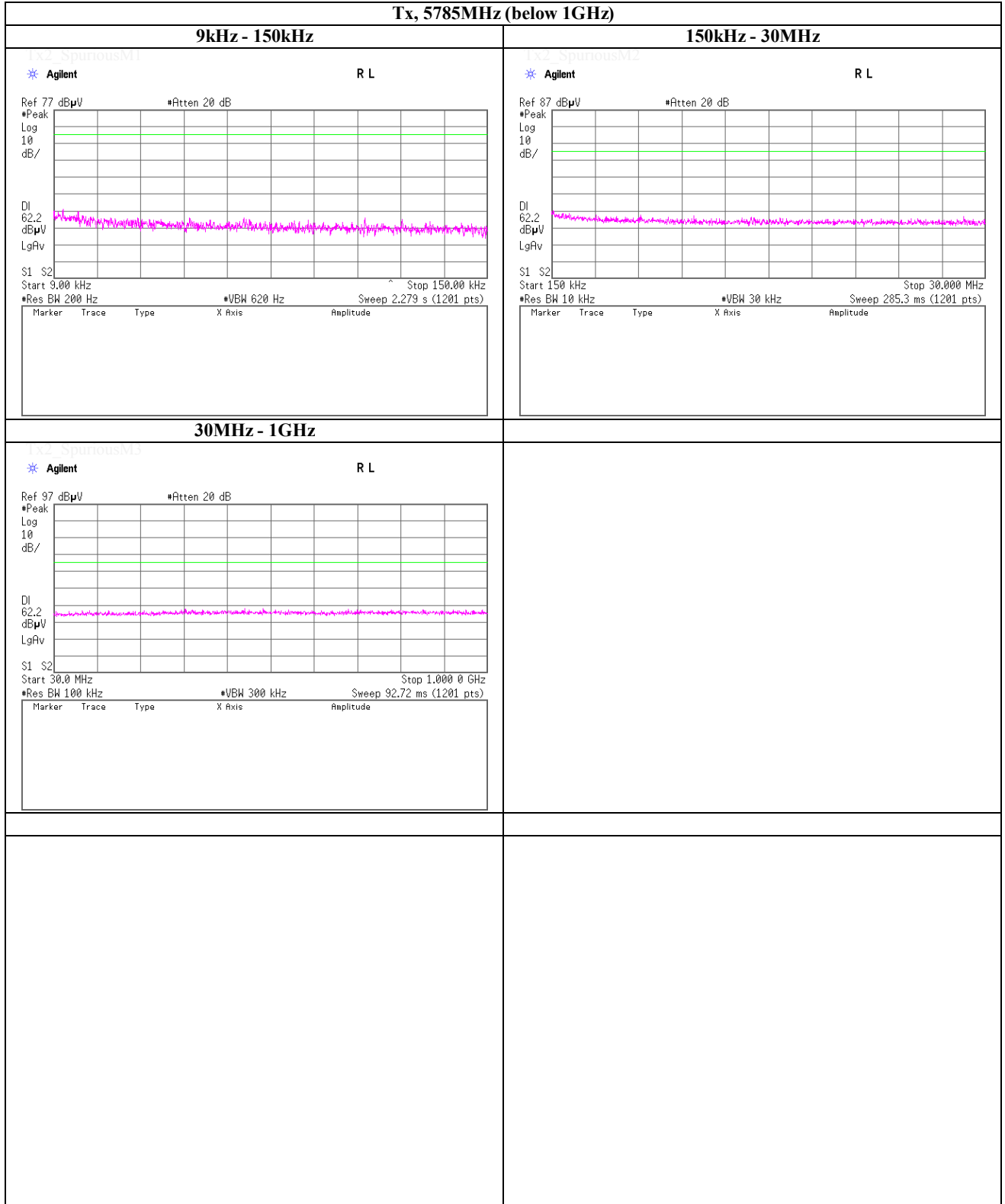
Telephone : +81 463 50 6400

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### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5785MHz (below 1GHz)



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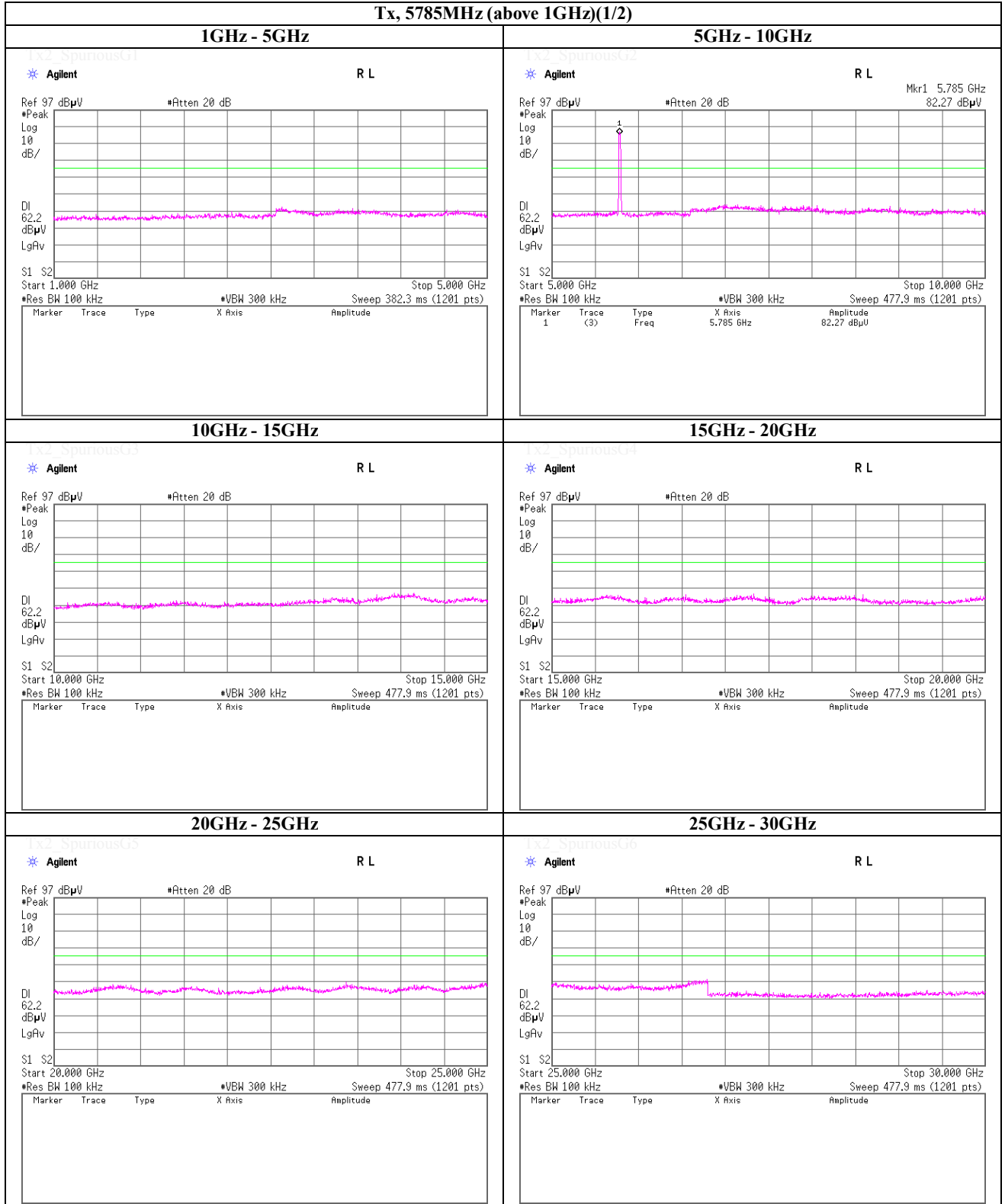
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5785MHz (above 1GHz)(1/2)



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**Shonan EMC Lab.**

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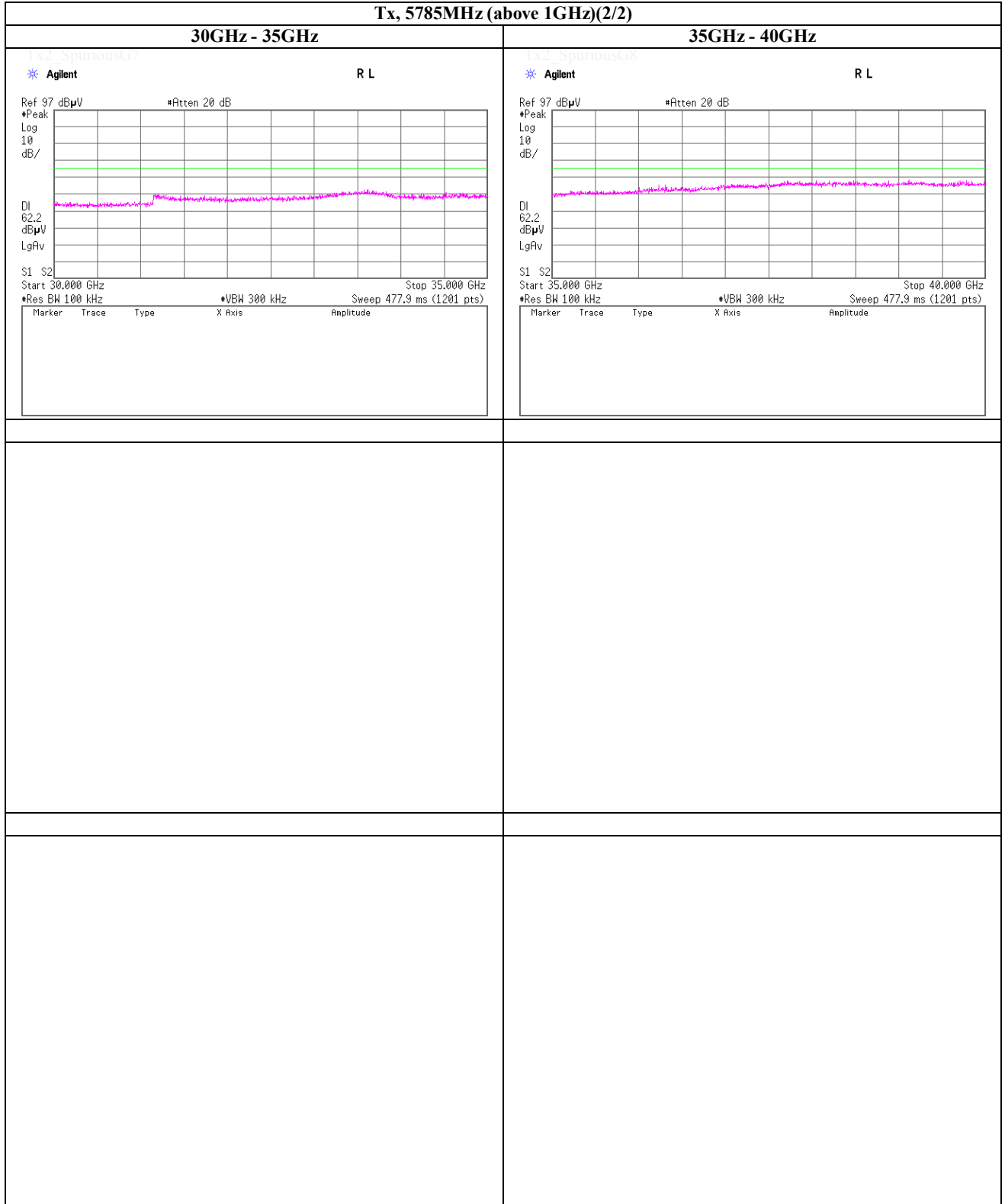
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5785MHz (above 1GHz)(2/2)



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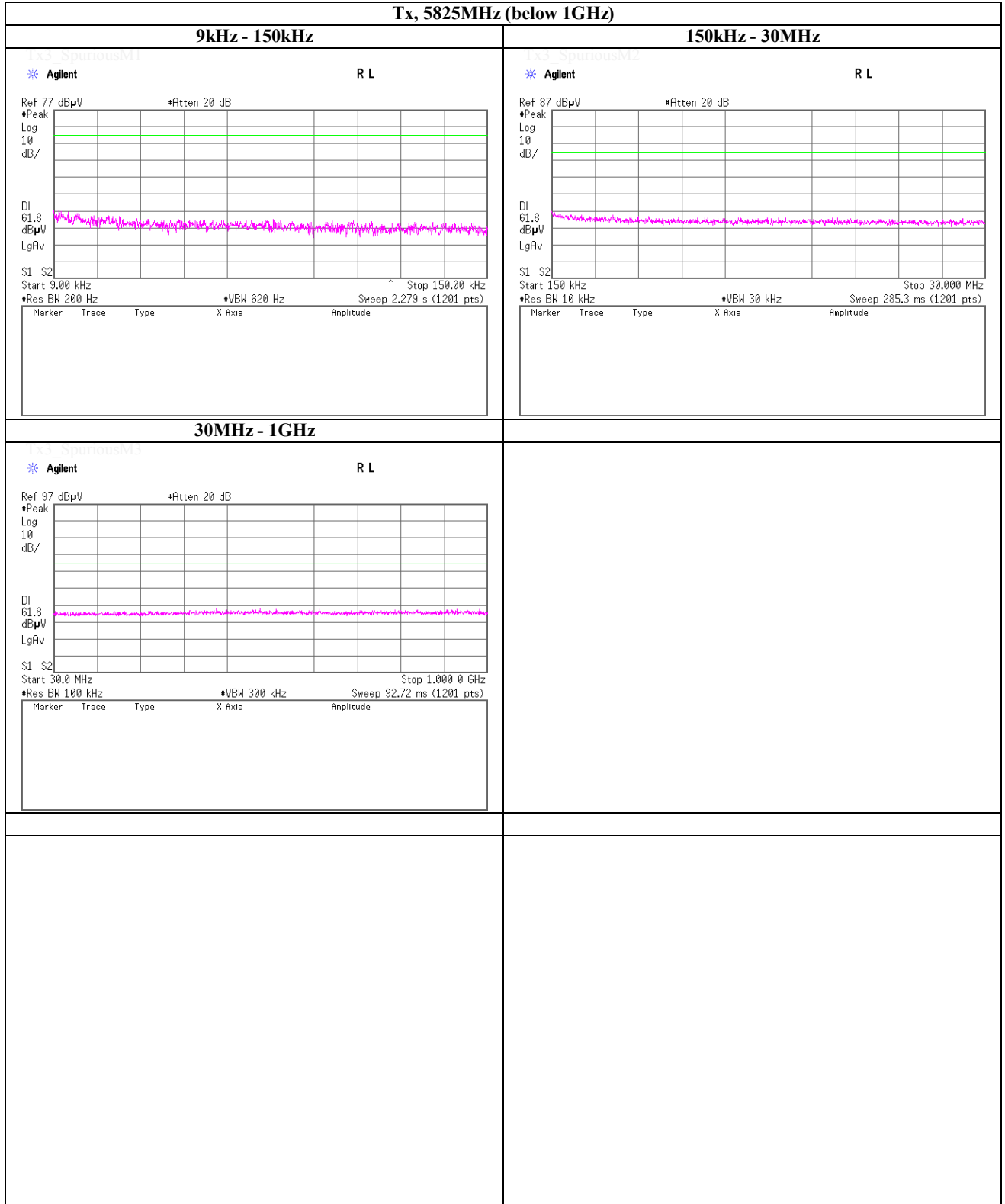
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

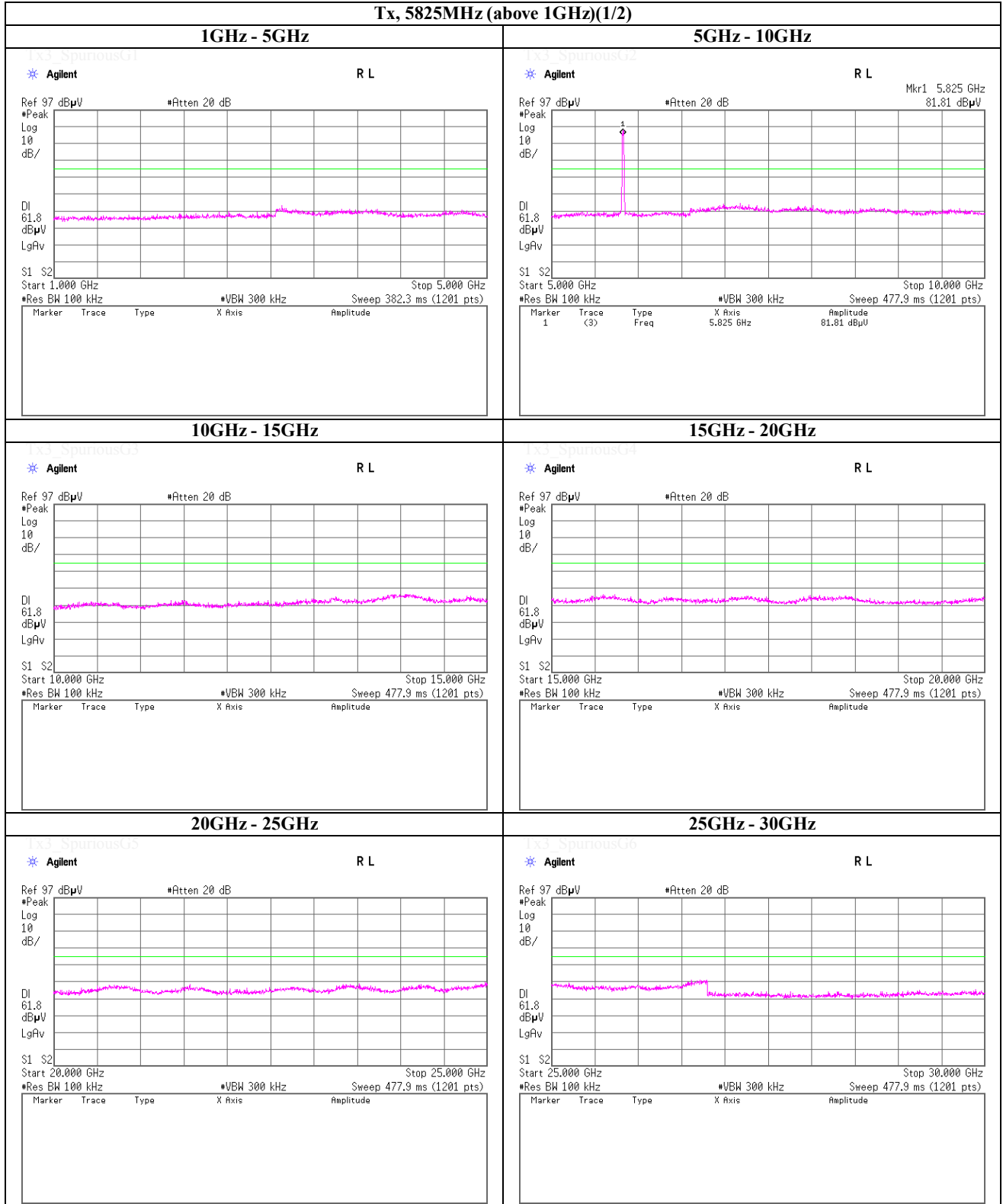
Tx, 5825MHz (below 1GHz)



### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5825MHz (above 1GHz)(1/2)



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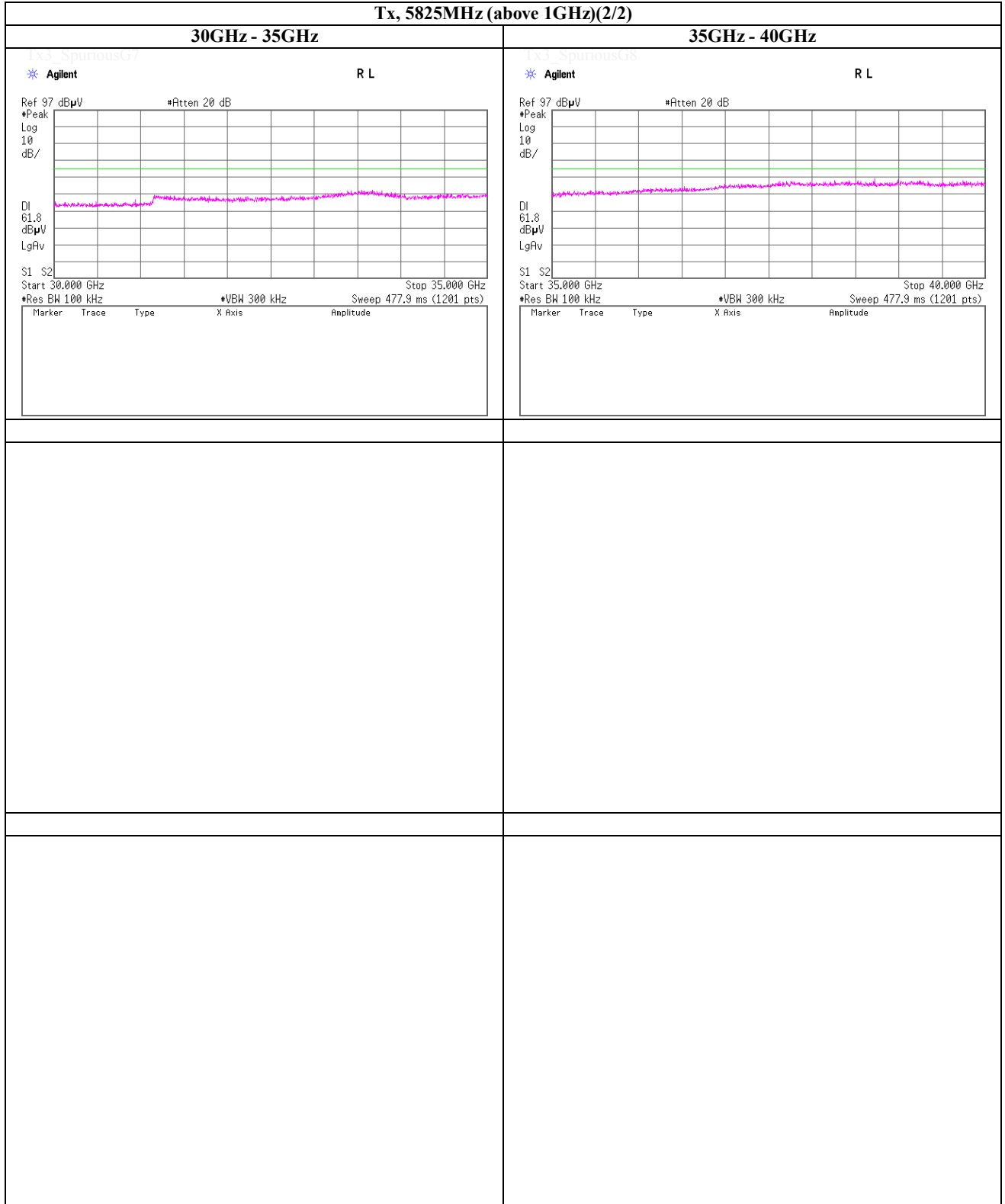
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### Spurious emission (Conducted)

Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps

Tx, 5825MHz (above 1GHz)(2/2)



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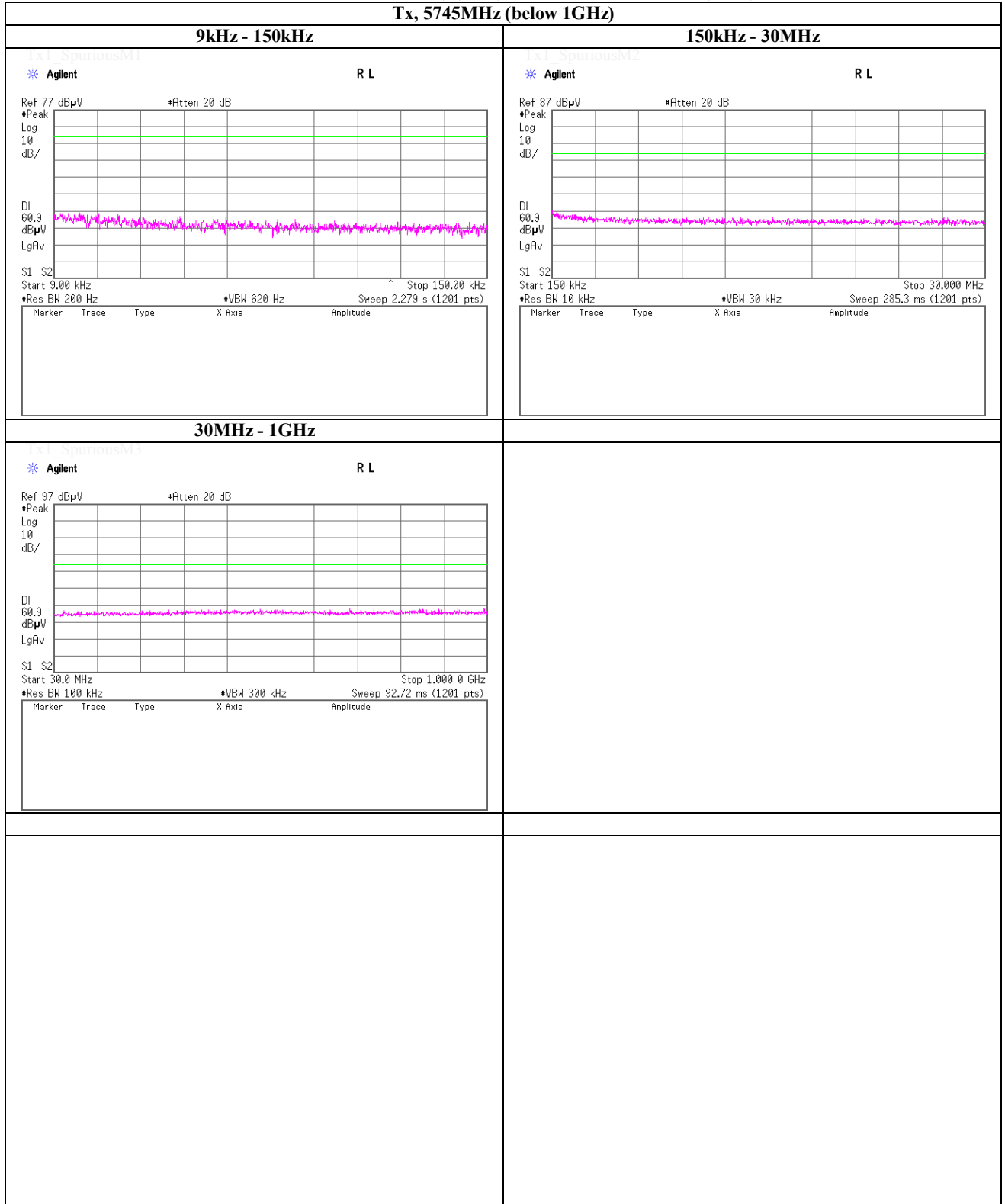
Telephone : +81 463 50 6400

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### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5745MHz (below 1GHz)



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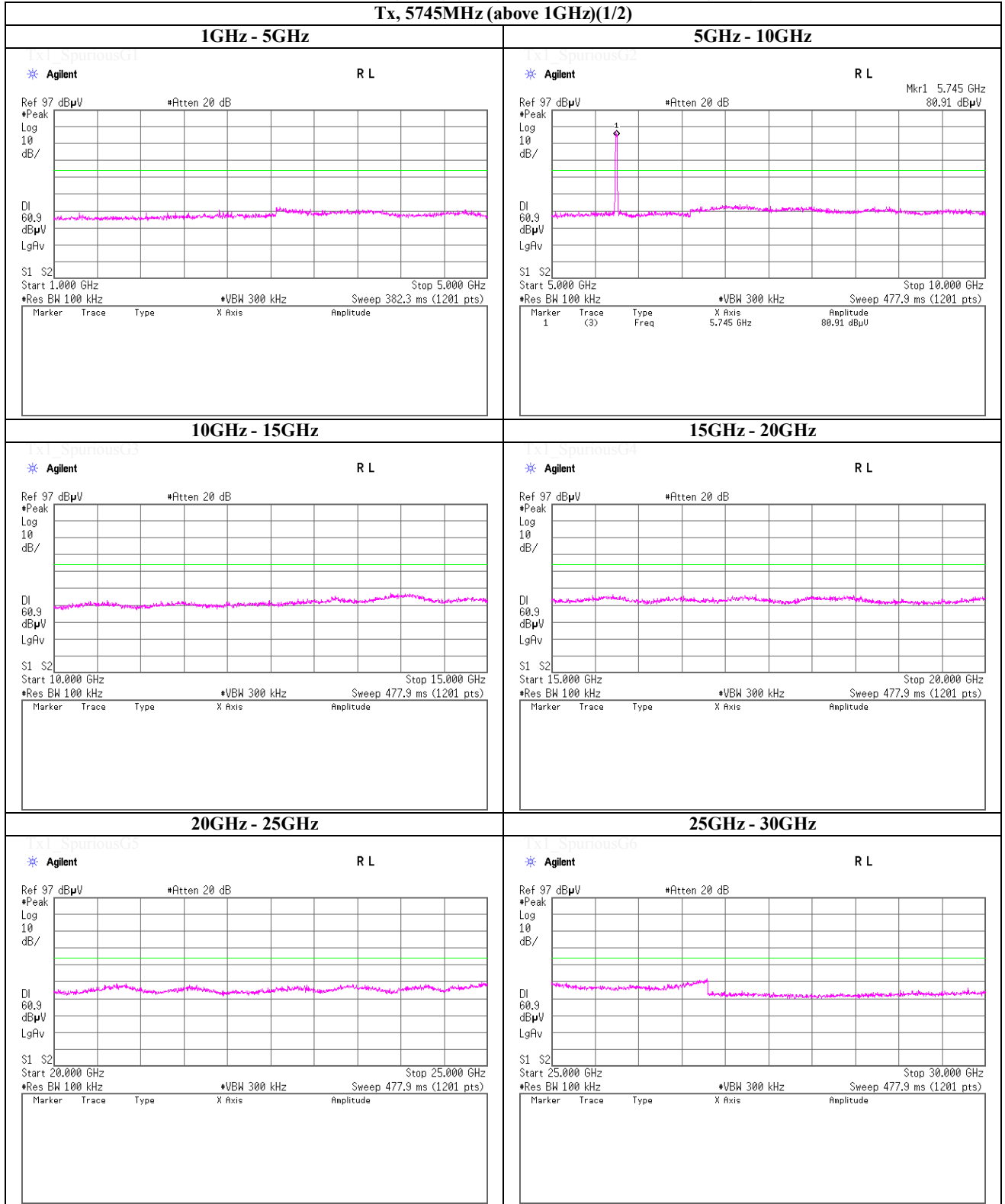
Facsimile : +81 463 50 6401



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

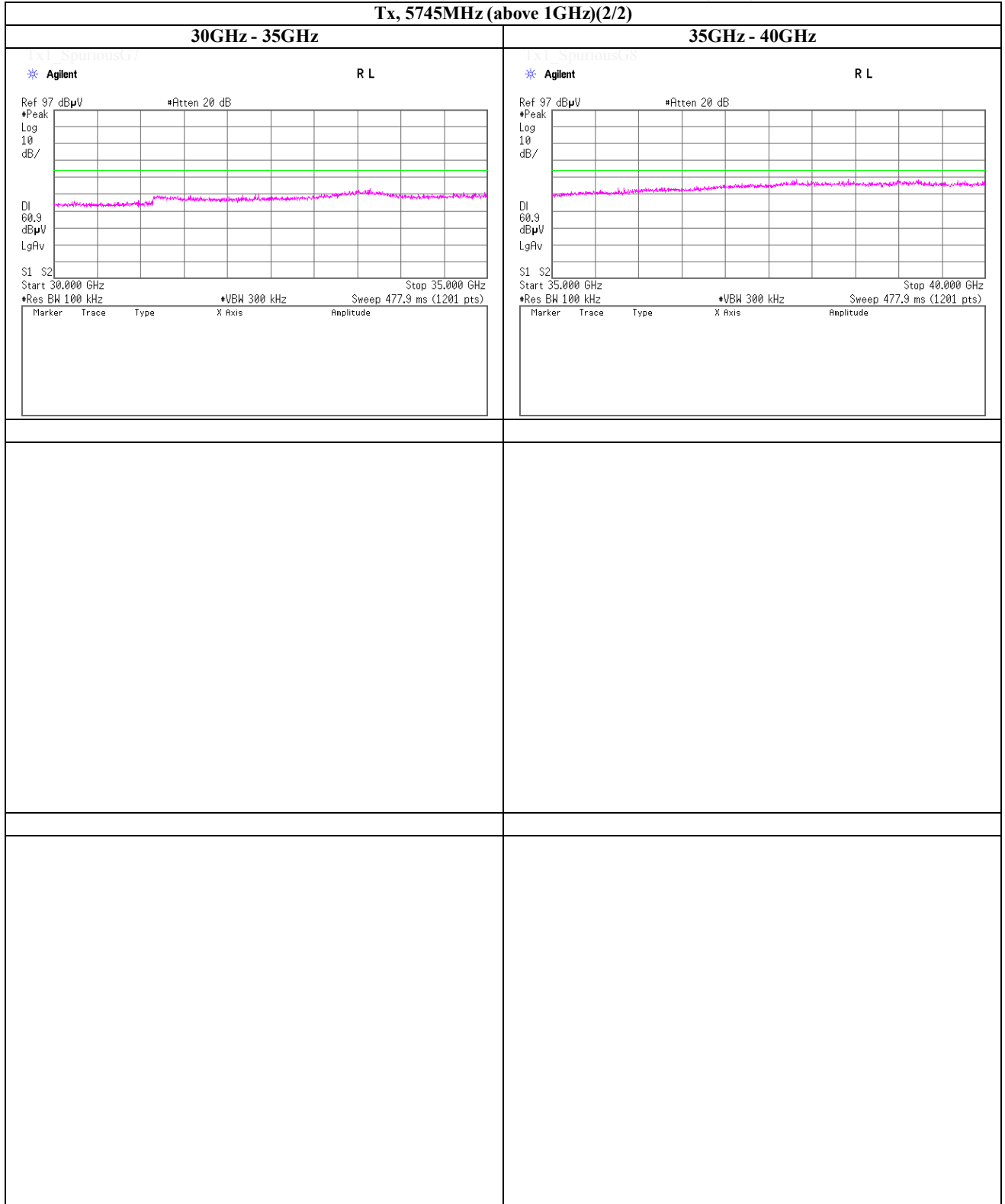
Tx, 5745MHz (above 1GHz)(1/2)



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

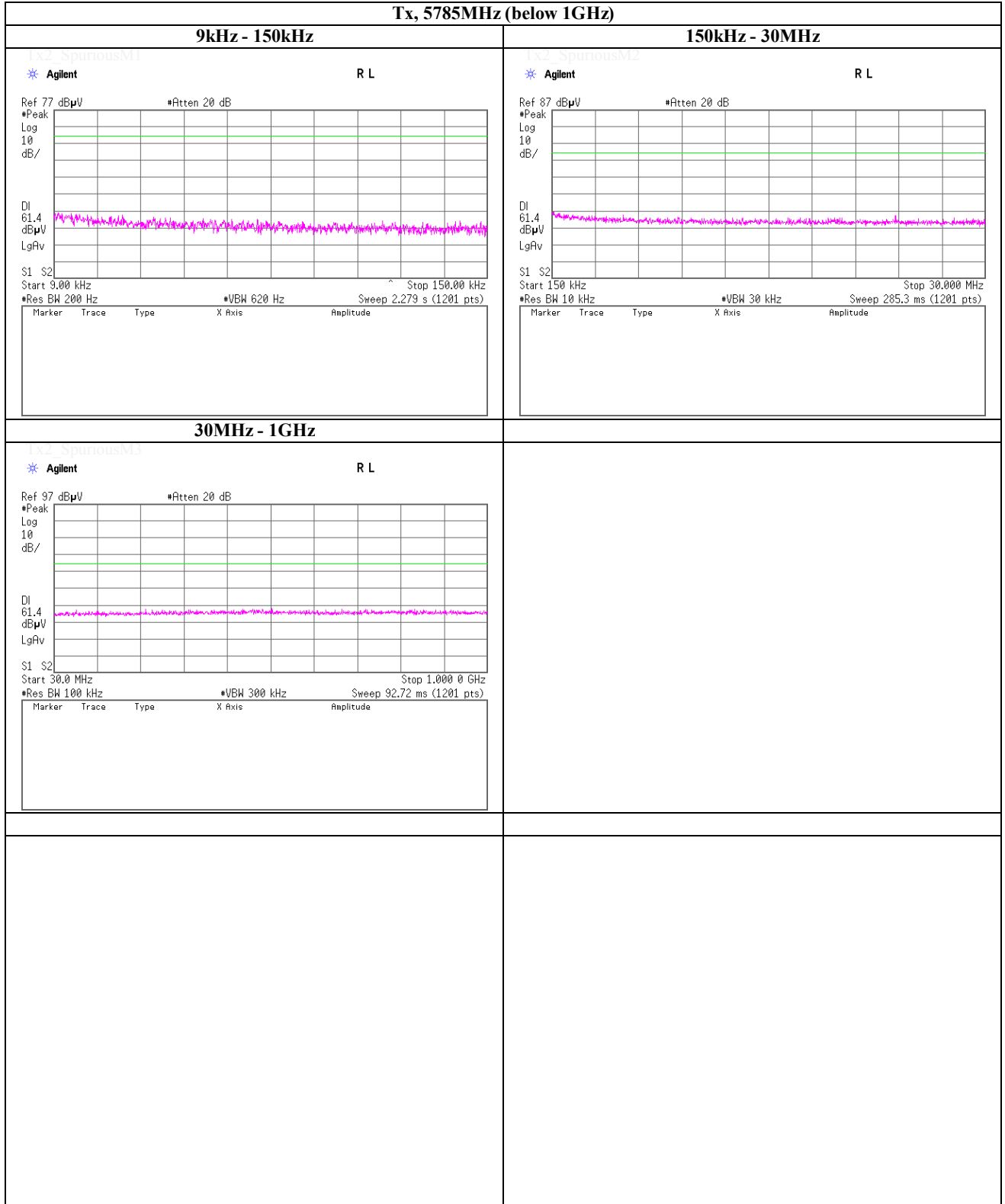
Tx, 5745MHz (above 1GHz)(2/2)



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5785MHz (below 1GHz)



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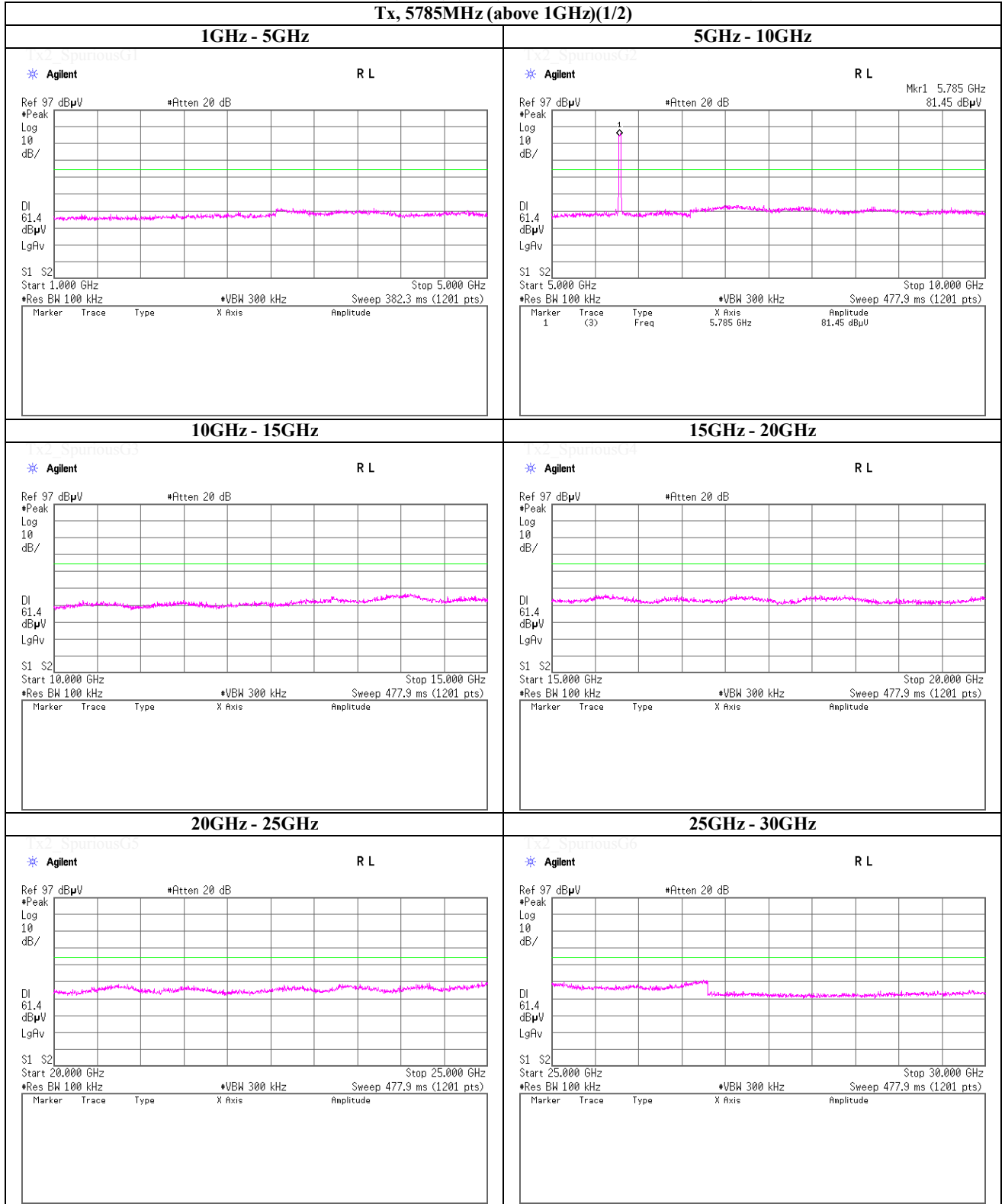
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5785MHz (above 1GHz)(1/2)



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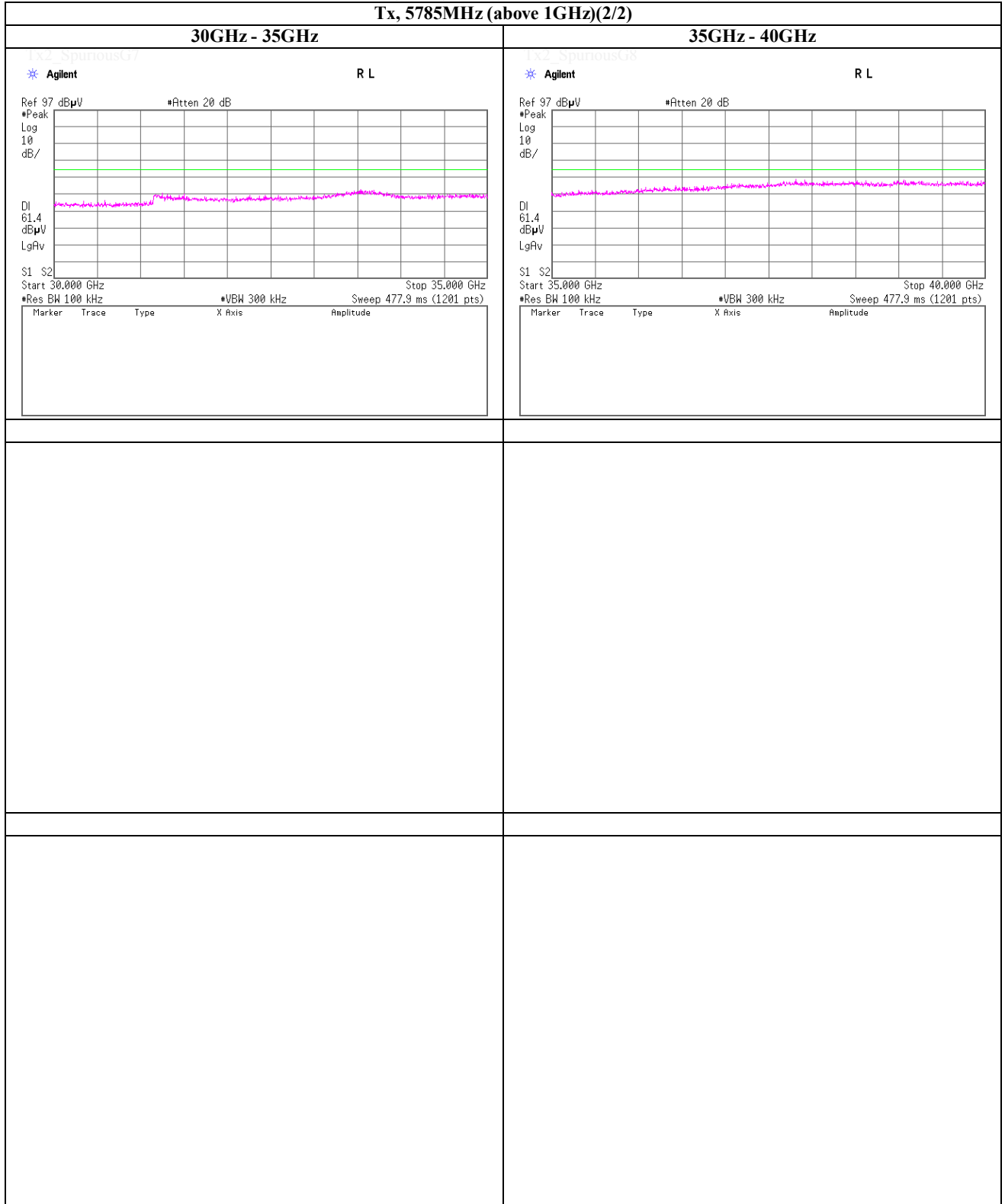
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5785MHz (above 1GHz)(2/2)



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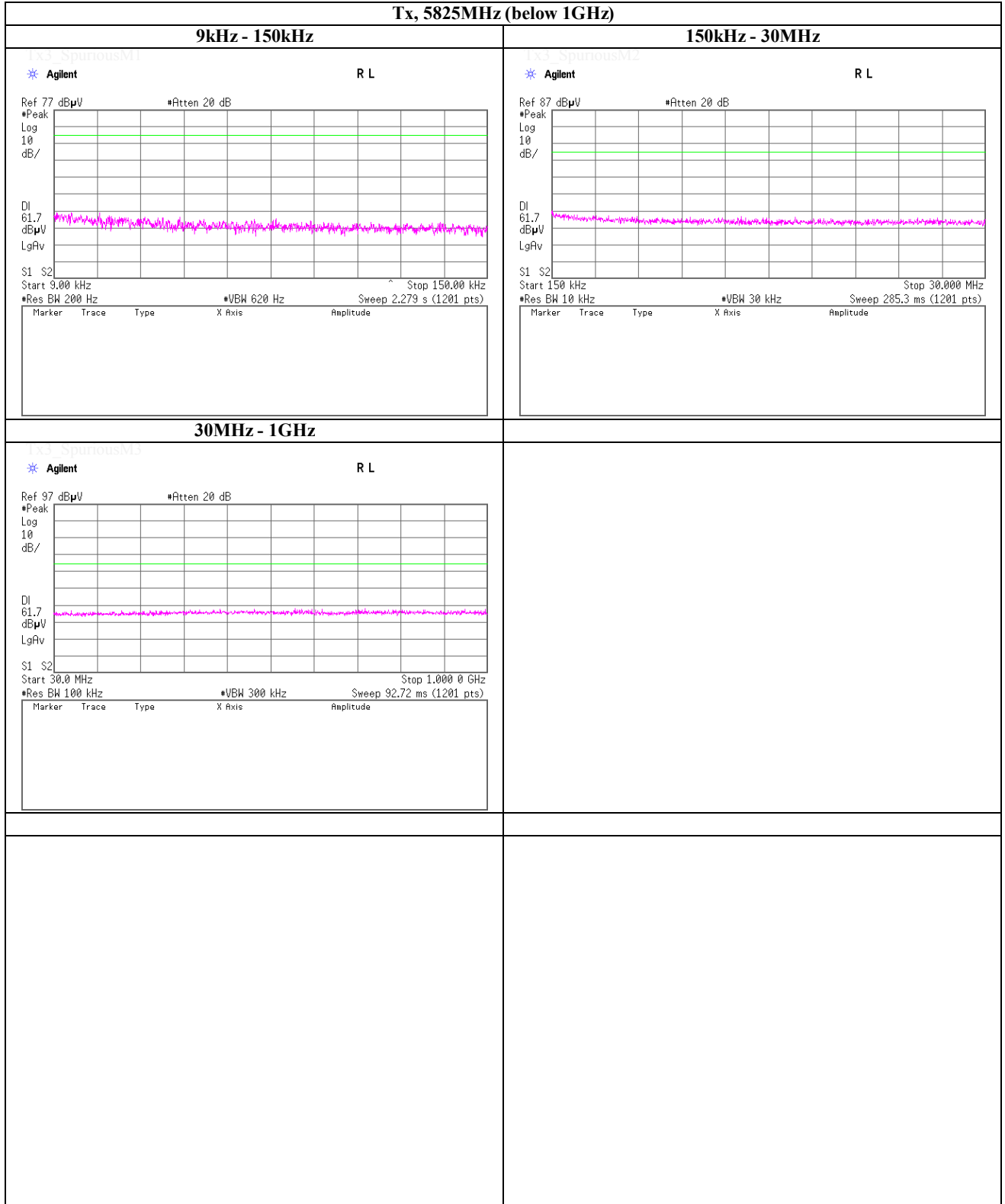
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5825MHz (below 1GHz)



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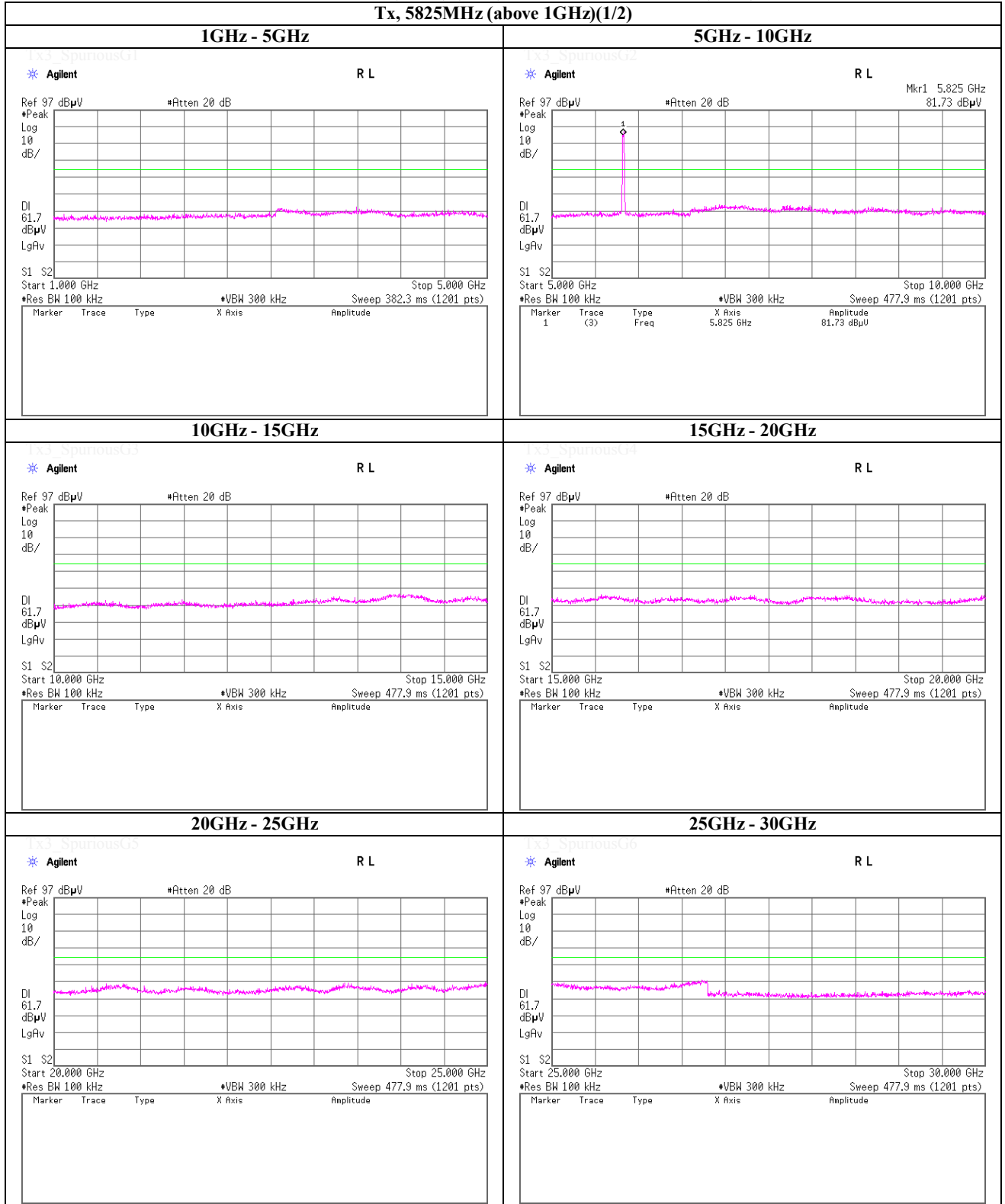
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

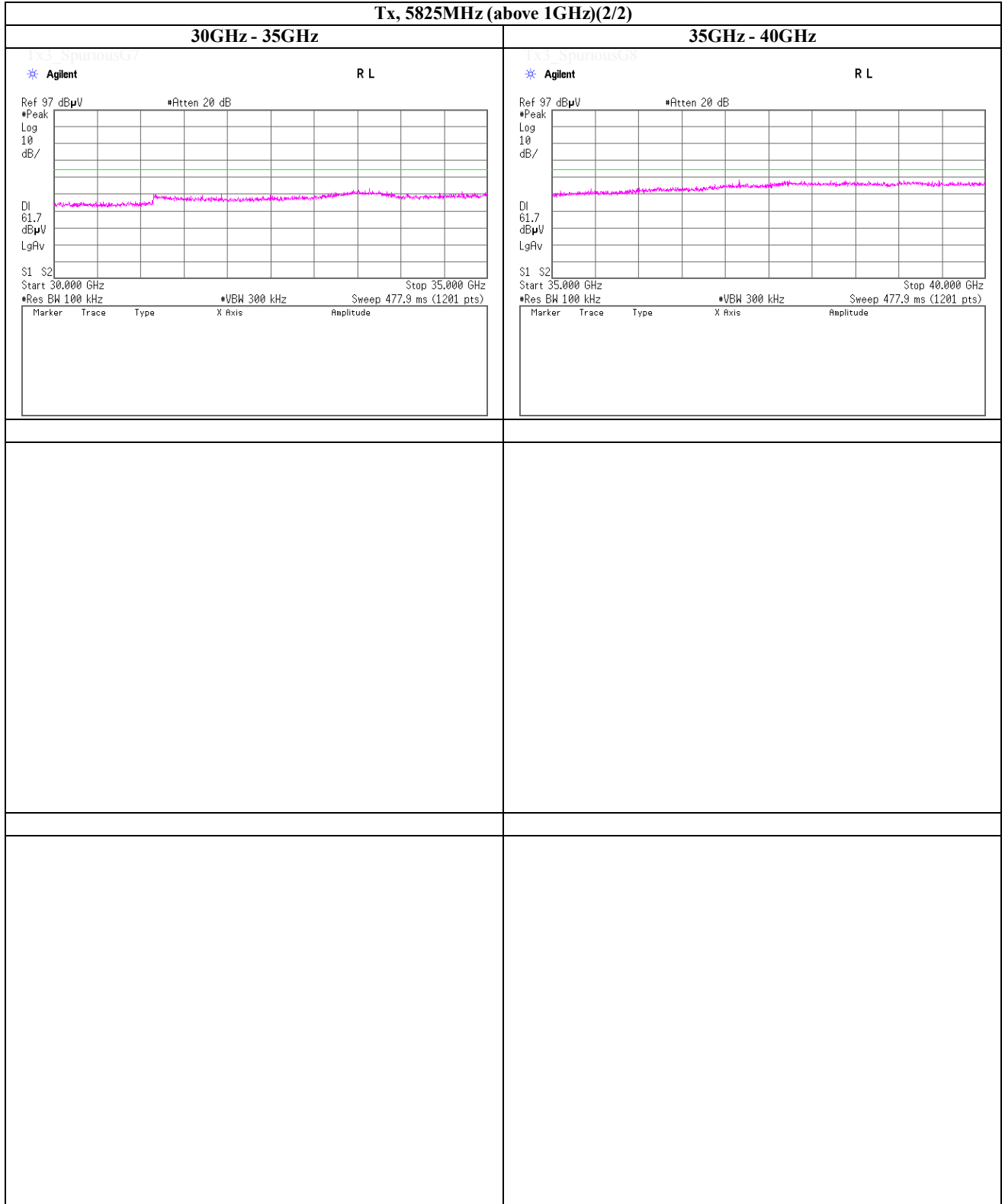
Tx, 5825MHz (above 1GHz)(1/2)



### Spurious emission (Conducted)

Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)

Tx, 5825MHz (above 1GHz)(2/2)

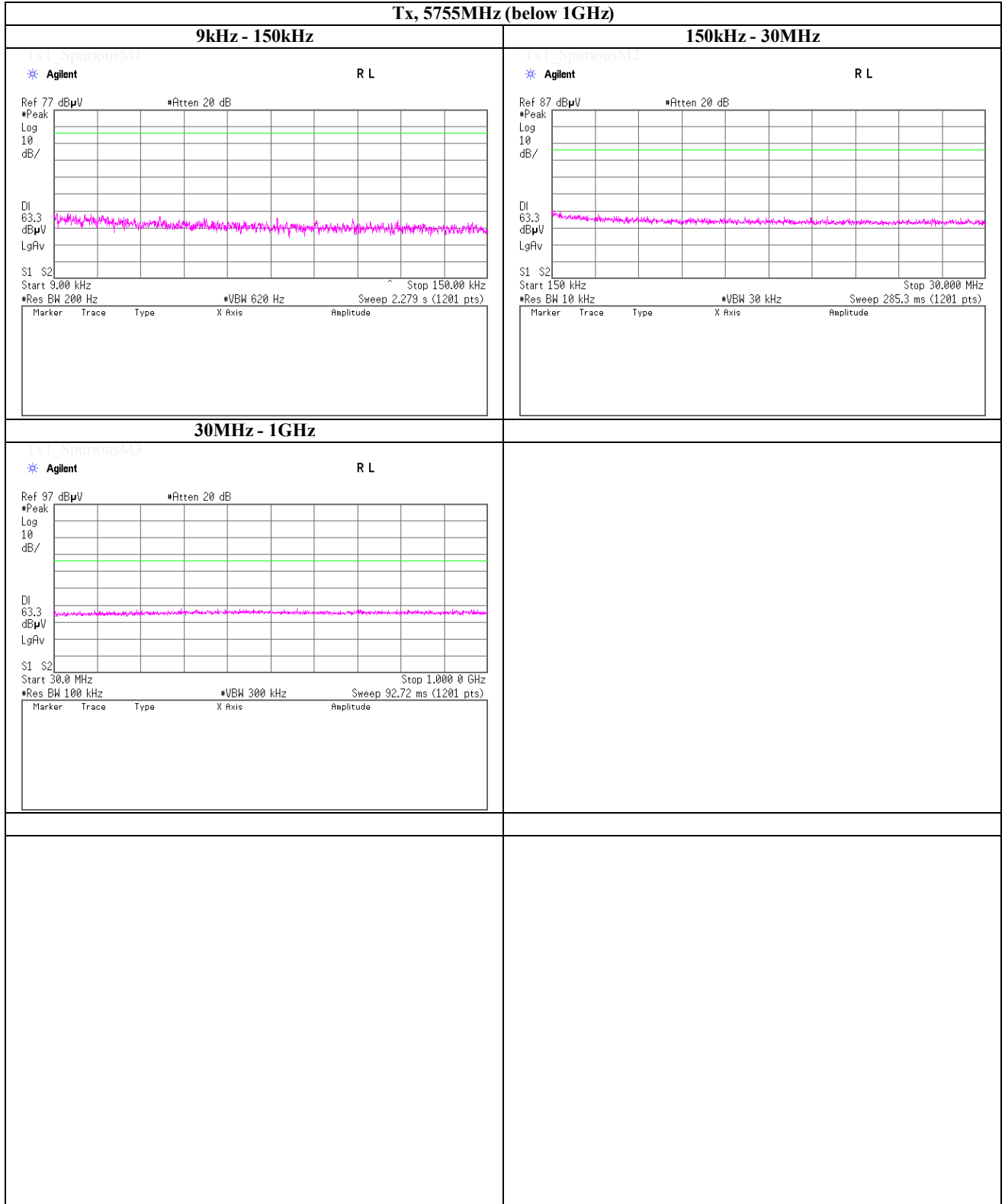




### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5755MHz (below 1GHz)



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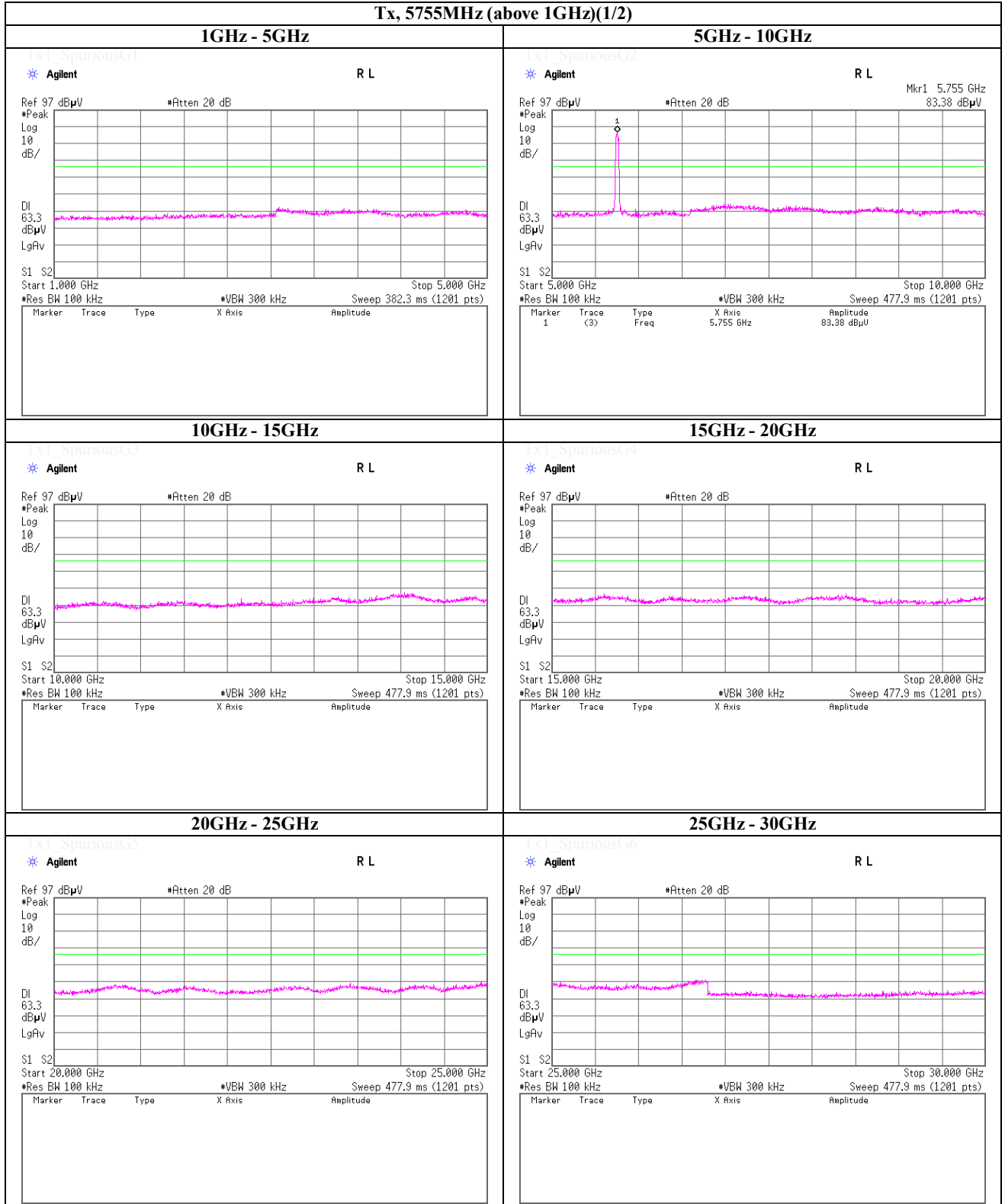
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5755MHz (above 1GHz)(1/2)



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**Shonan EMC Lab.**

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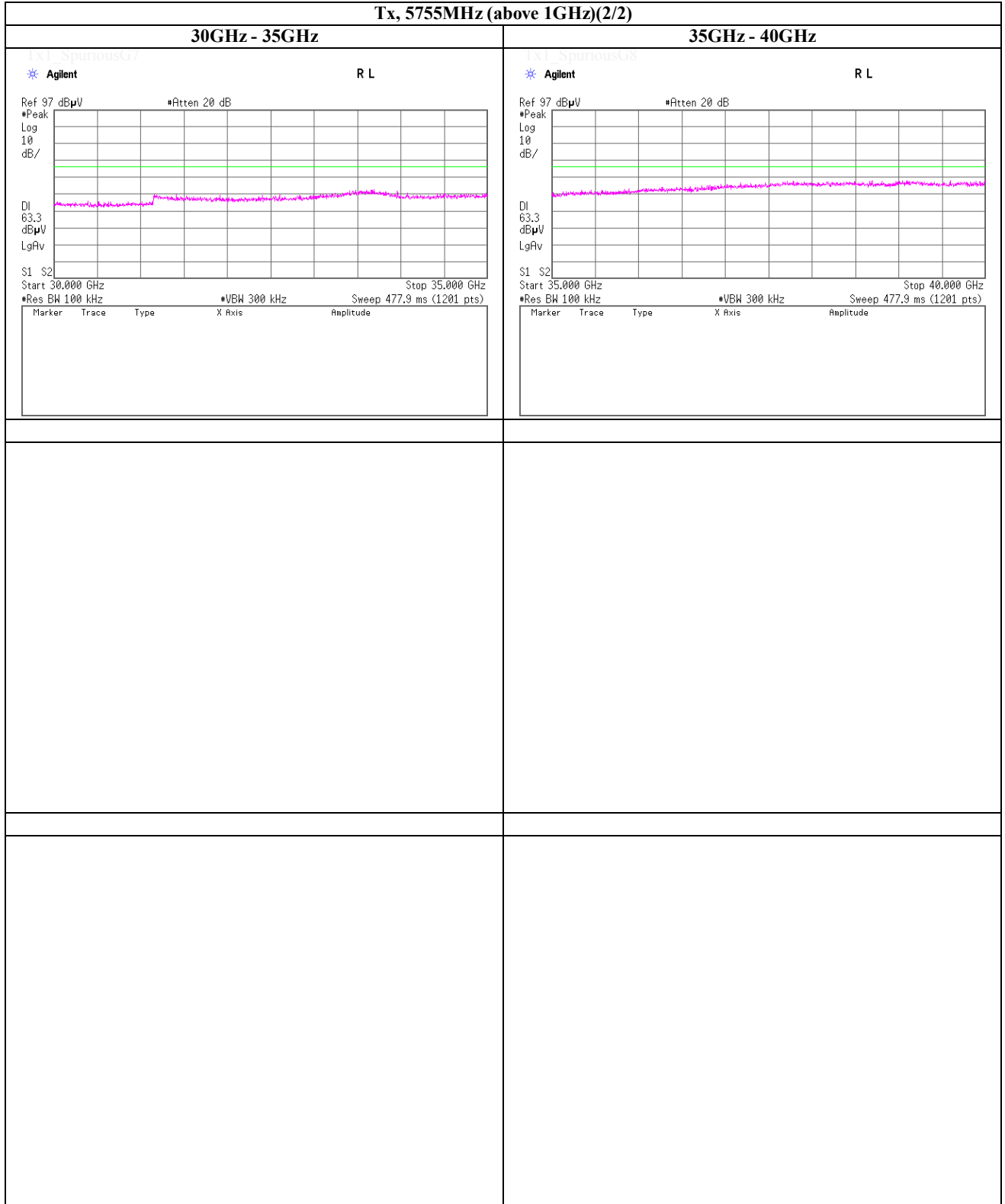
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5755MHz (above 1GHz)(2/2)



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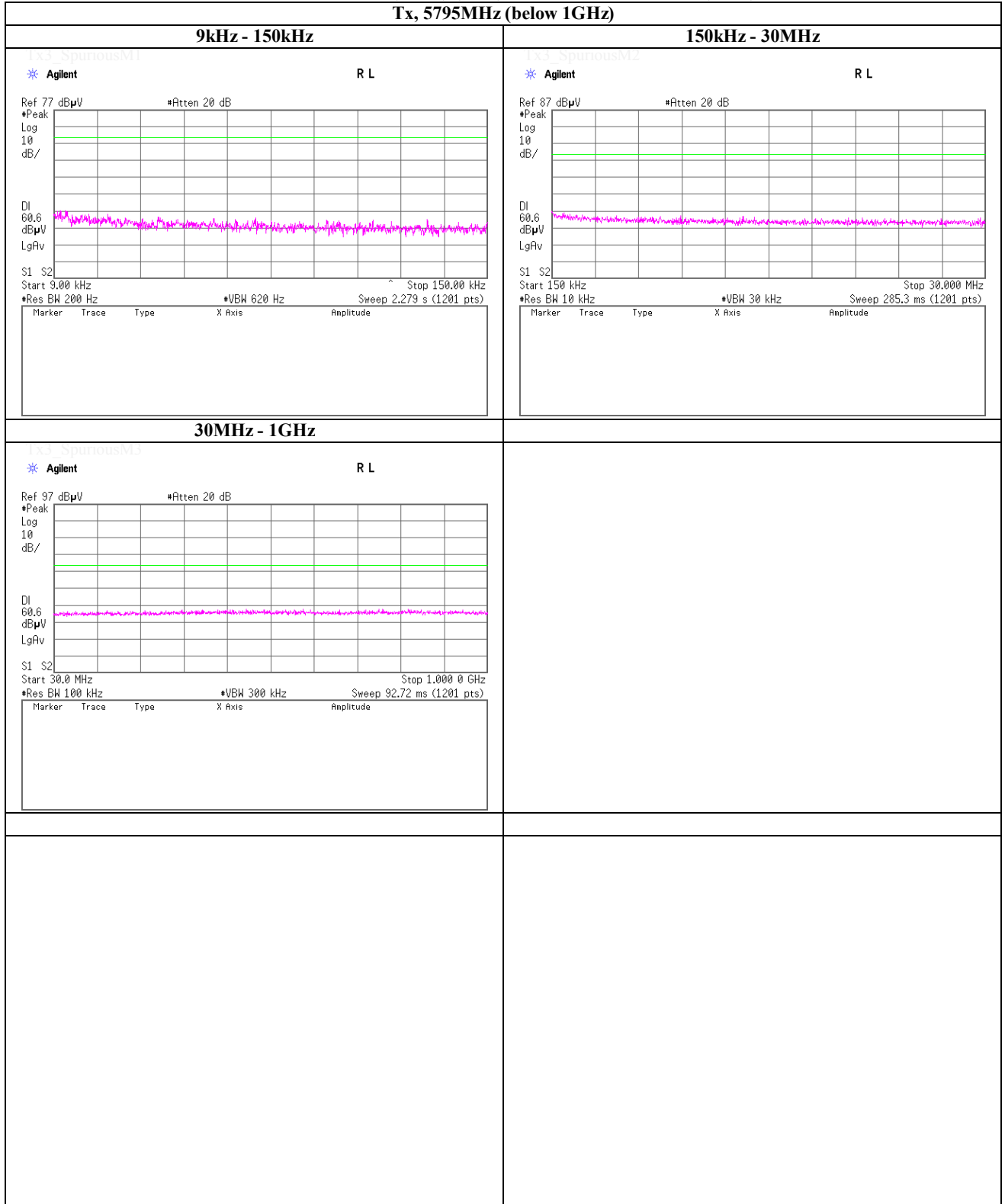
Telephone : +81 463 50 6400

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### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5795MHz (below 1GHz)



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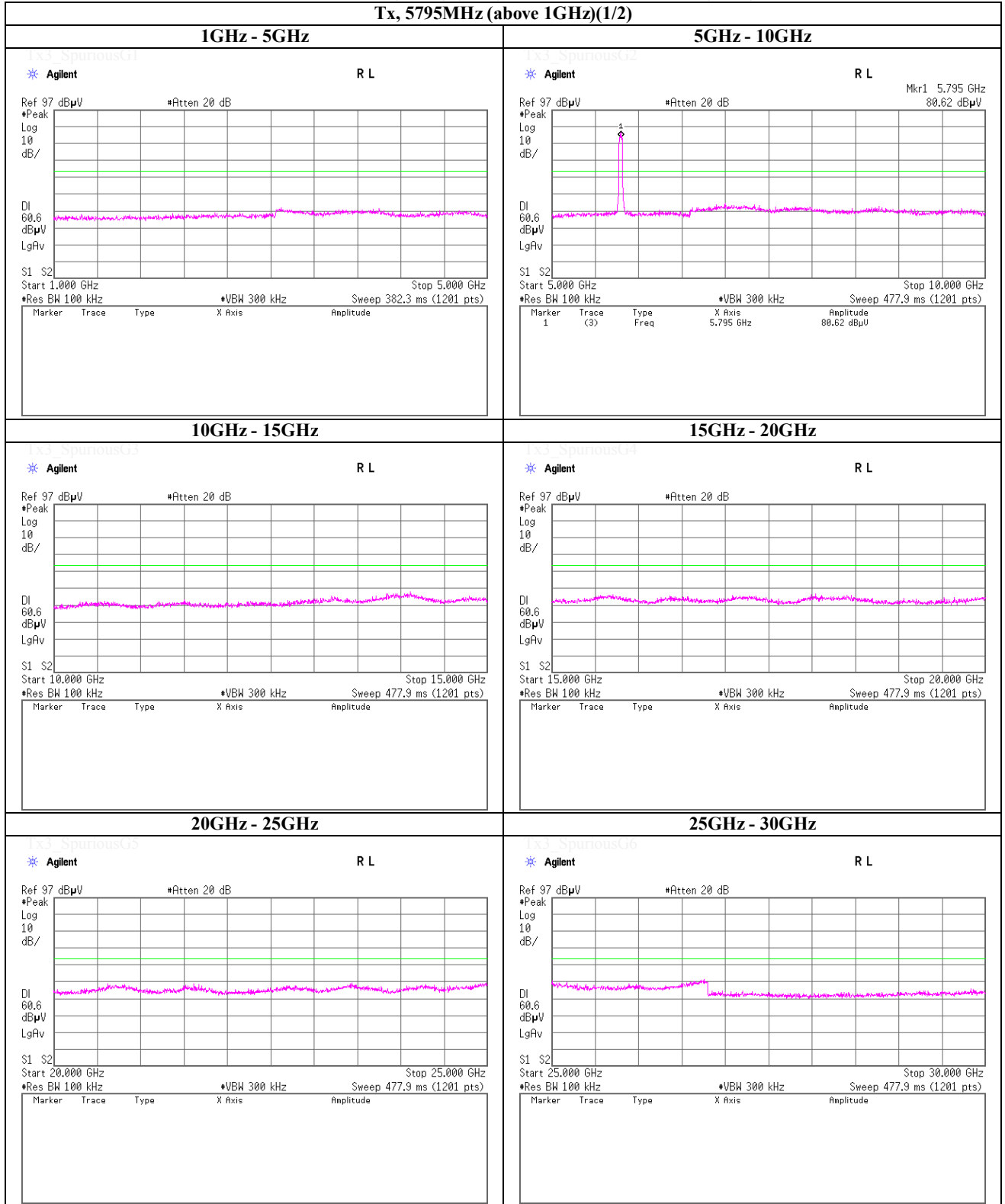
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5795MHz (above 1GHz)(1/2)



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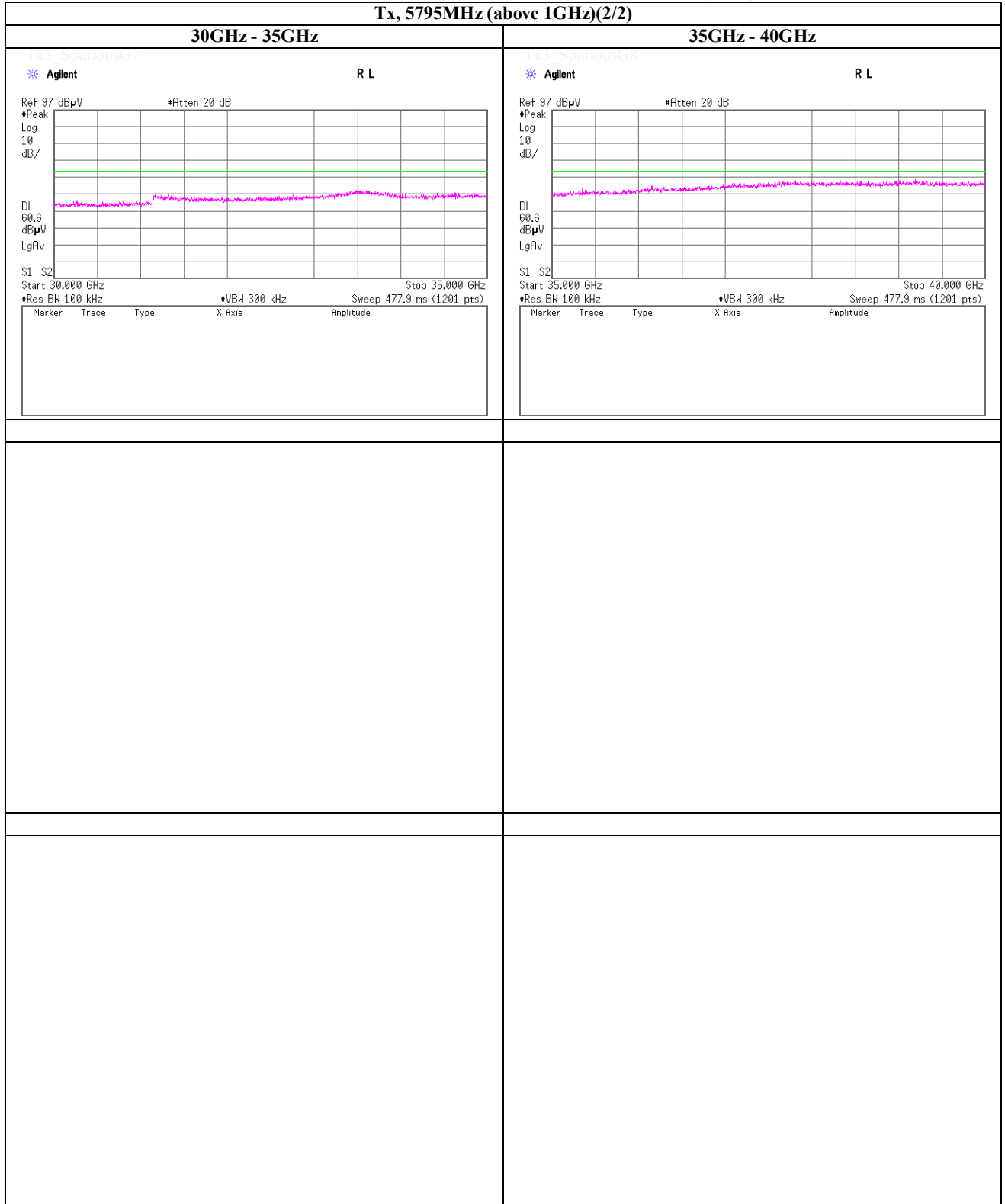
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### Spurious emission (Conducted)

Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)

Tx, 5795MHz (above 1GHz)(2/2)



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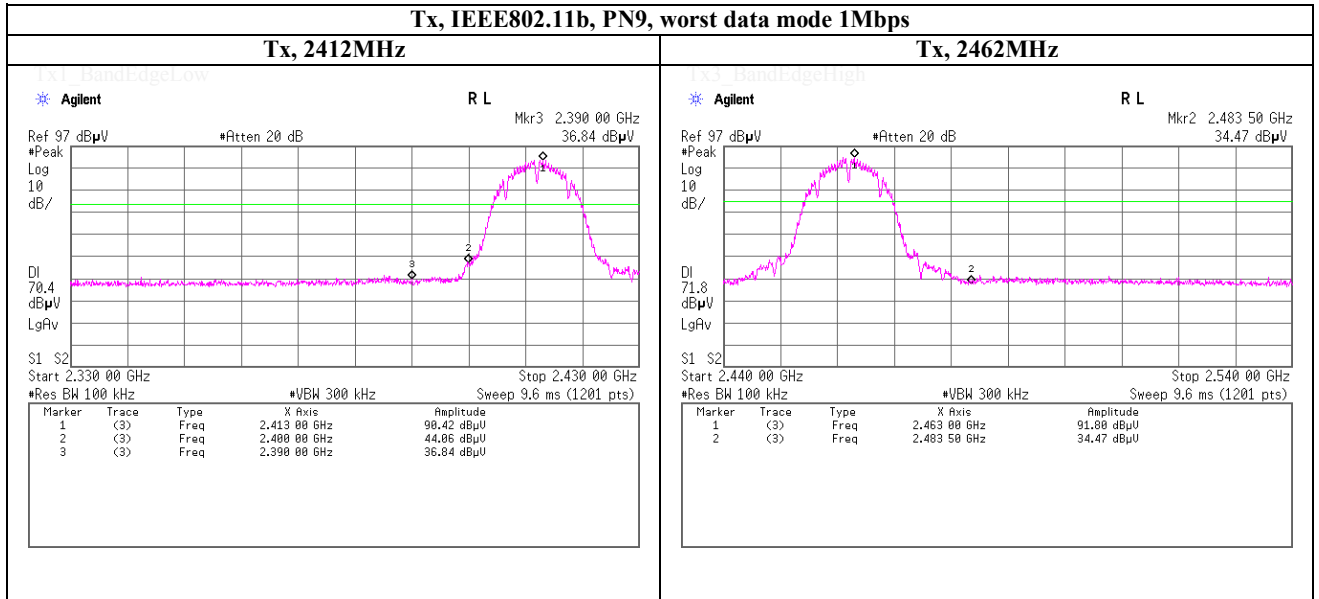
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## Spurious emission (Conducted)

### Band Edge compliance



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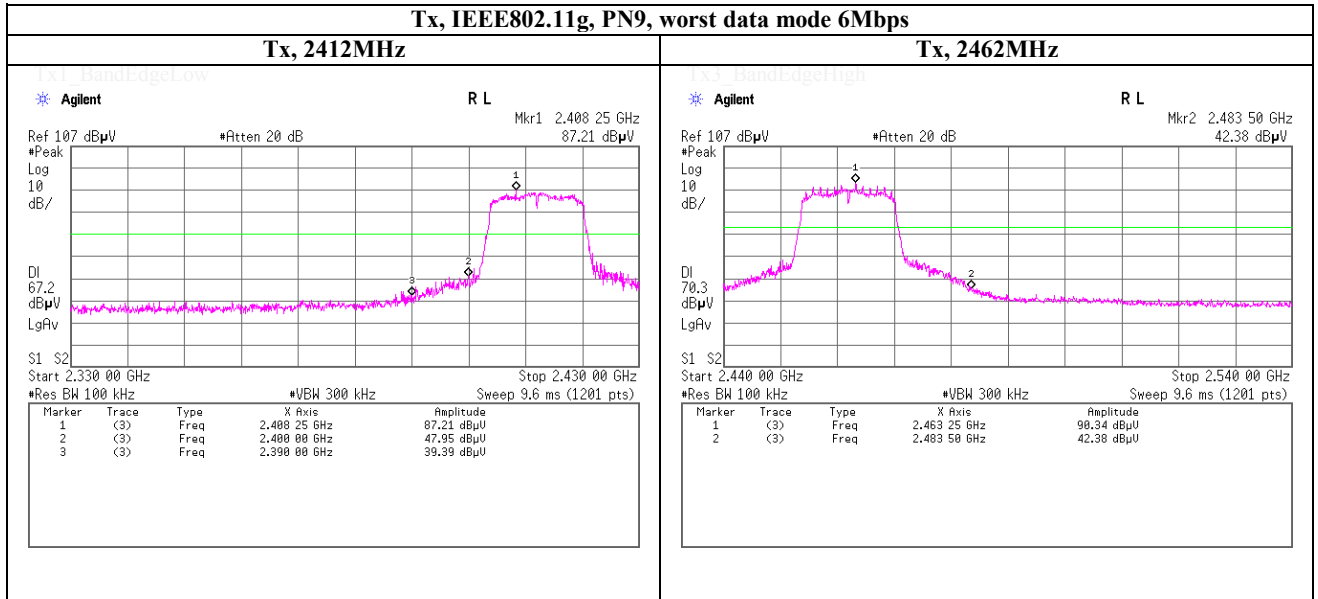
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## Spurious emission (Conducted)

### Band Edge compliance



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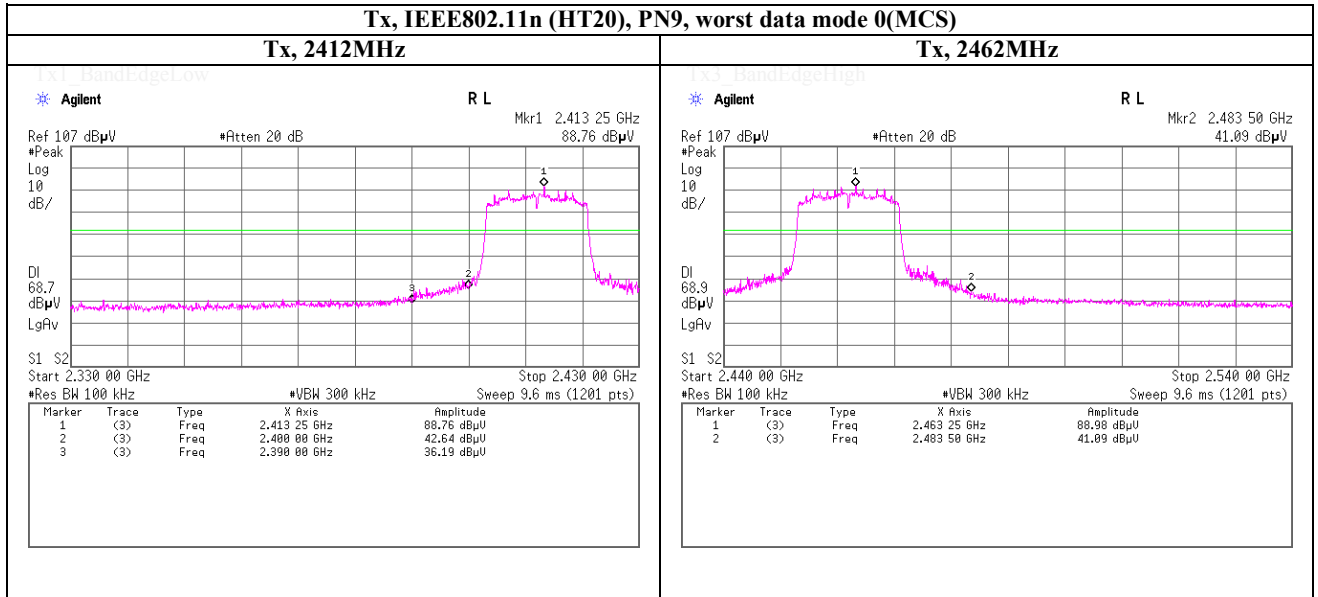
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



## Spurious emission (Conducted)

### Band Edge compliance



**UL Japan, Inc.**

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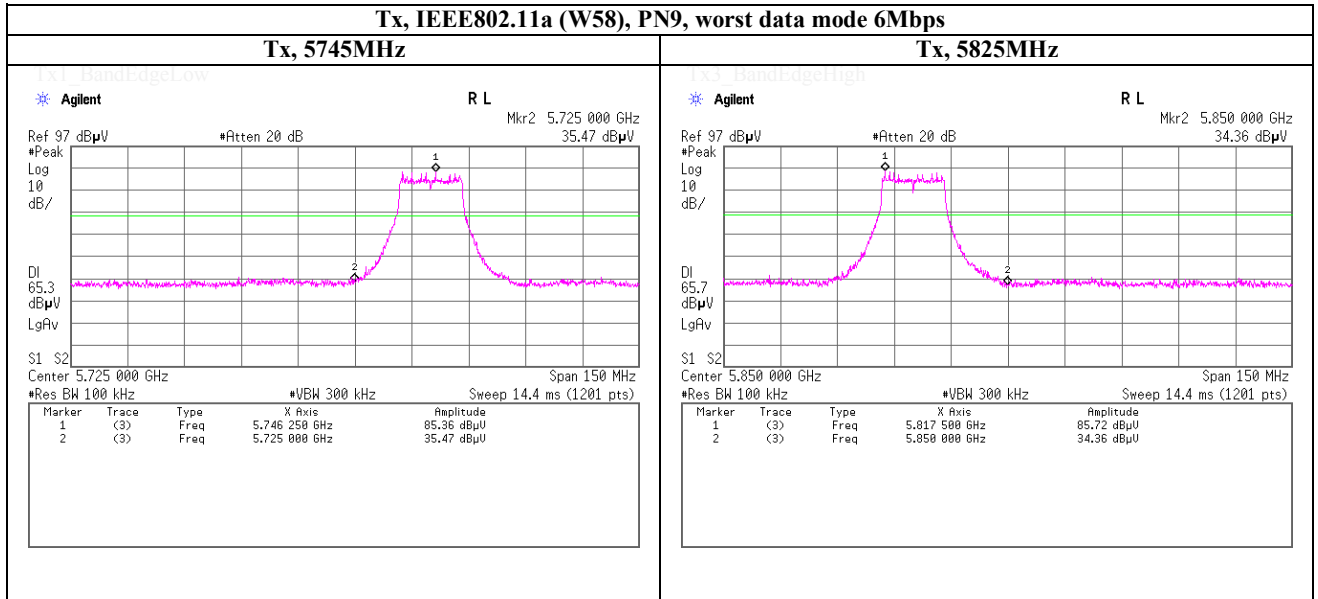
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Spurious emission (Conducted)

### Band Edge compliance



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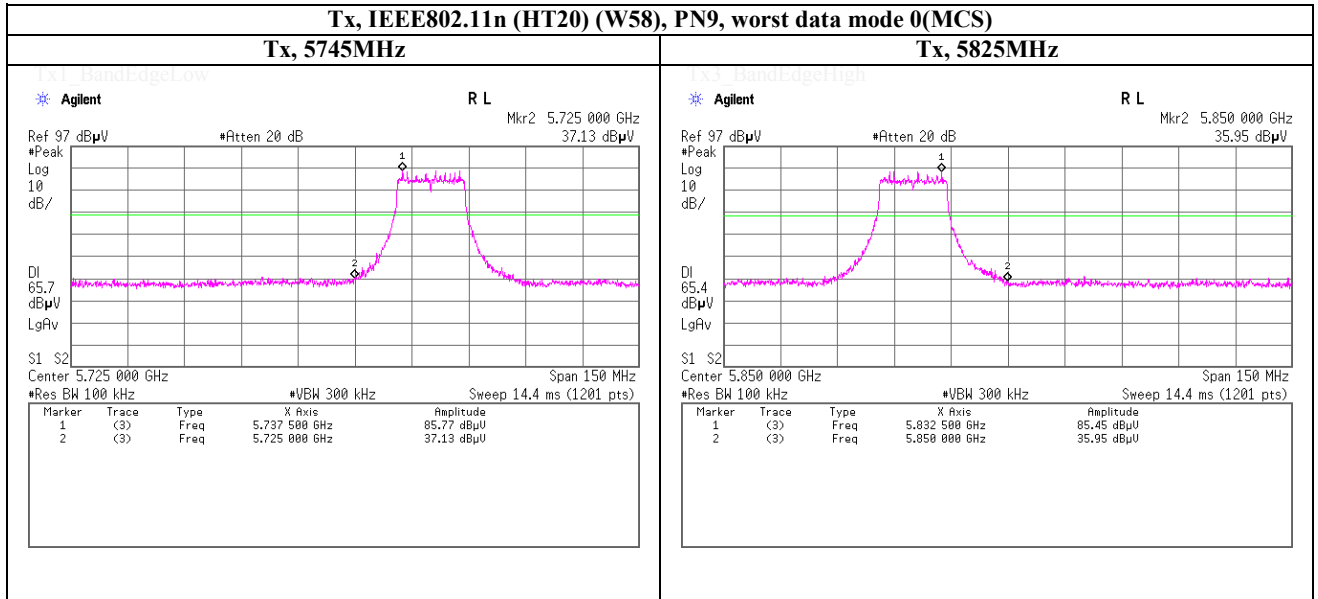
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

## Spurious emission (Conducted)

### Band Edge compliance



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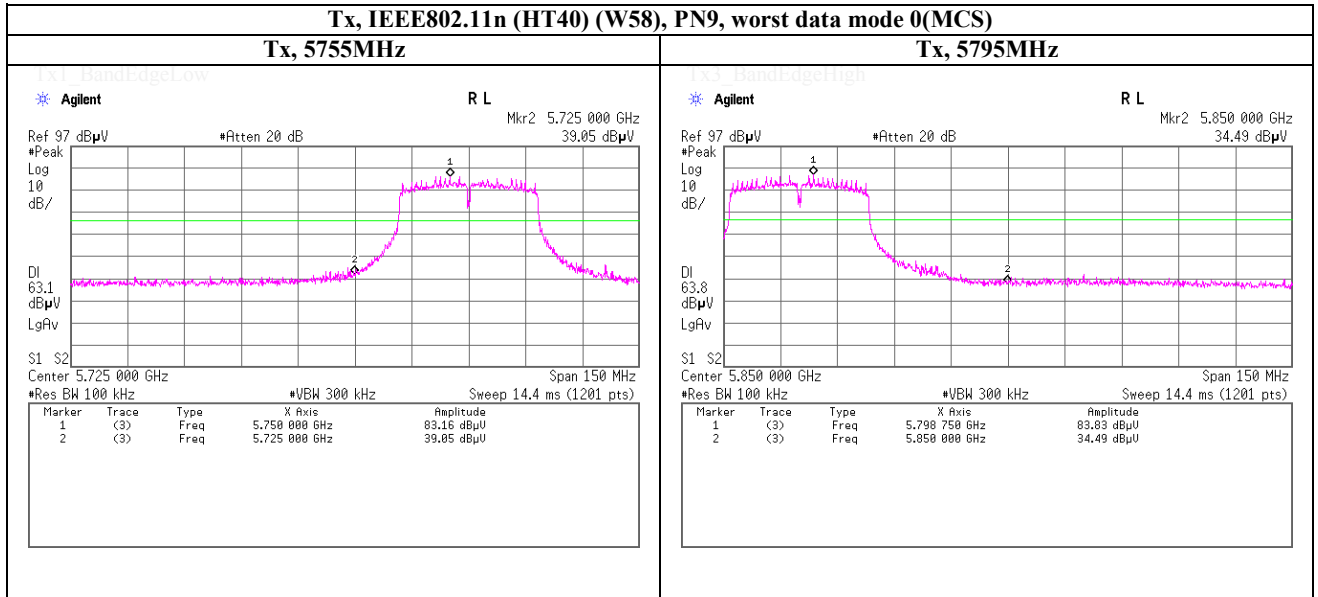
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

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## Spurious emission (Conducted)

### Band Edge compliace



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Telephone : +81 463 50 6400

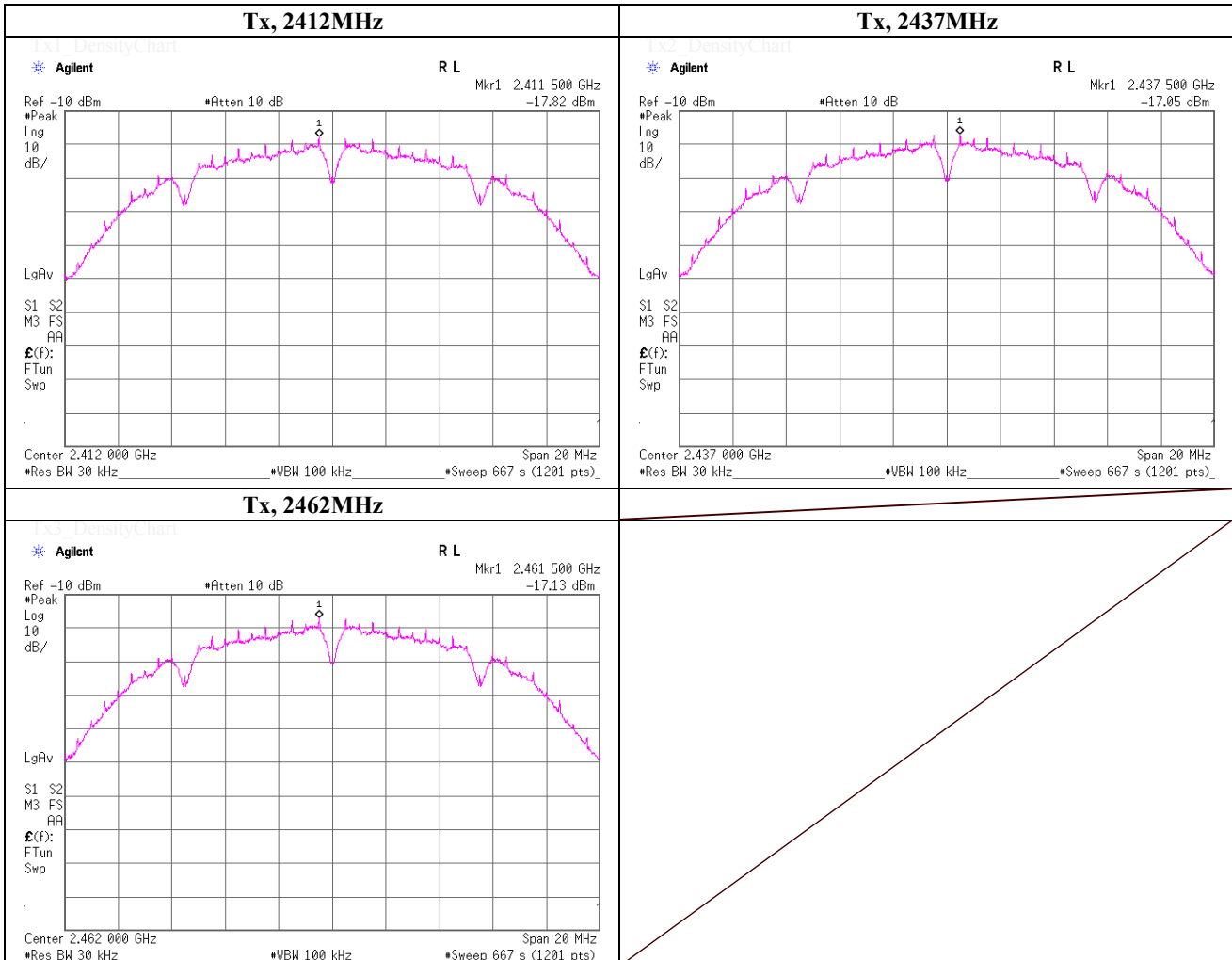
Facsimile : +81 463 50 6401

## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.50	-17.82	0.82	20.15	3.15	8.00	4.85
2437.0000	2437.50	-17.05	0.82	20.15	3.92	8.00	4.08
2462.0000	2461.50	-17.13	0.84	20.15	3.86	8.00	4.14

Sample Calculation:  
 Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss



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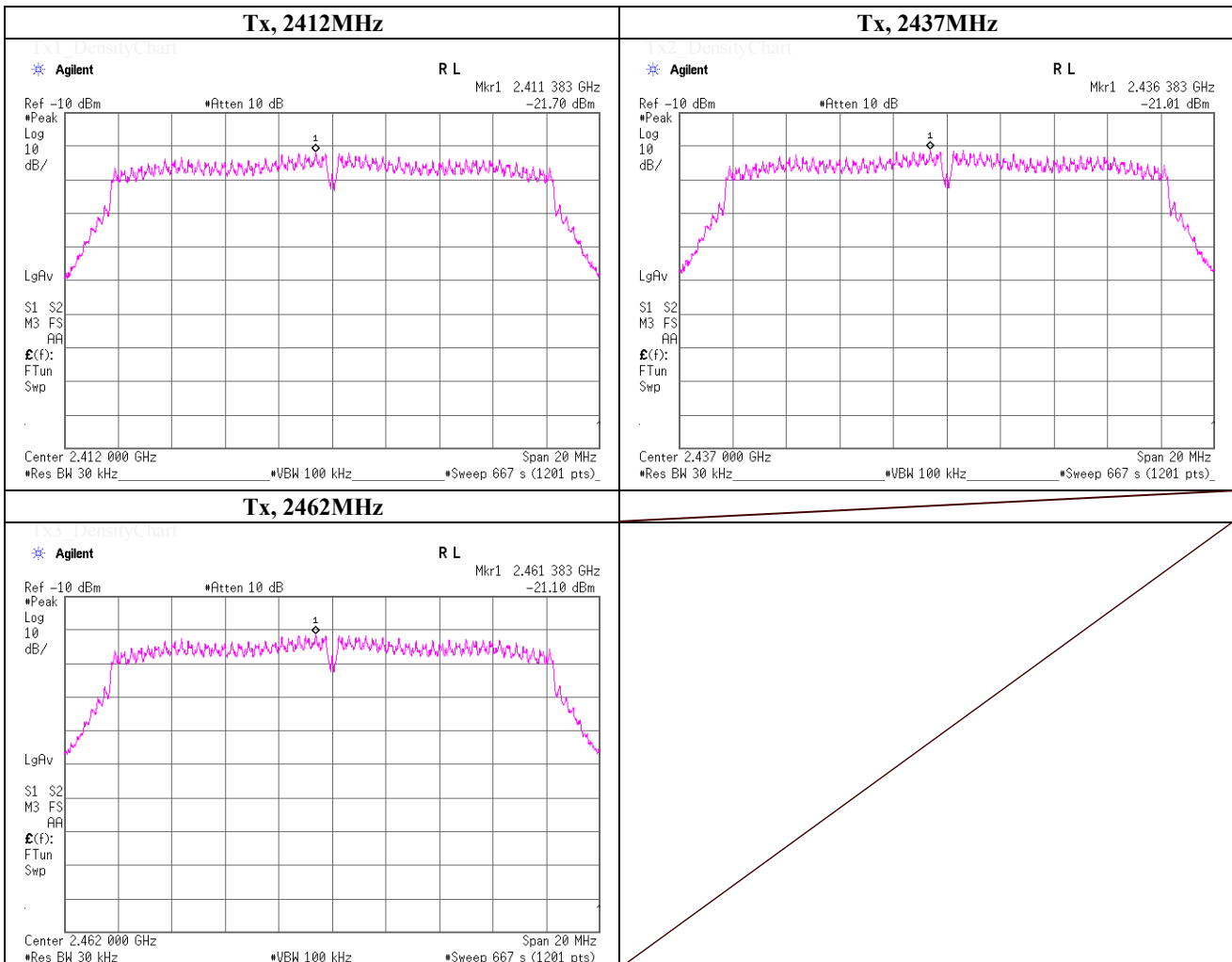
## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.38	-21.70	0.82	20.15	-0.73	8.00	8.73
2437.0000	2436.38	-21.01	0.82	20.15	-0.04	8.00	8.04
2462.0000	2461.38	-21.10	0.84	20.15	-0.11	8.00	8.11

Sample Calculation:

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



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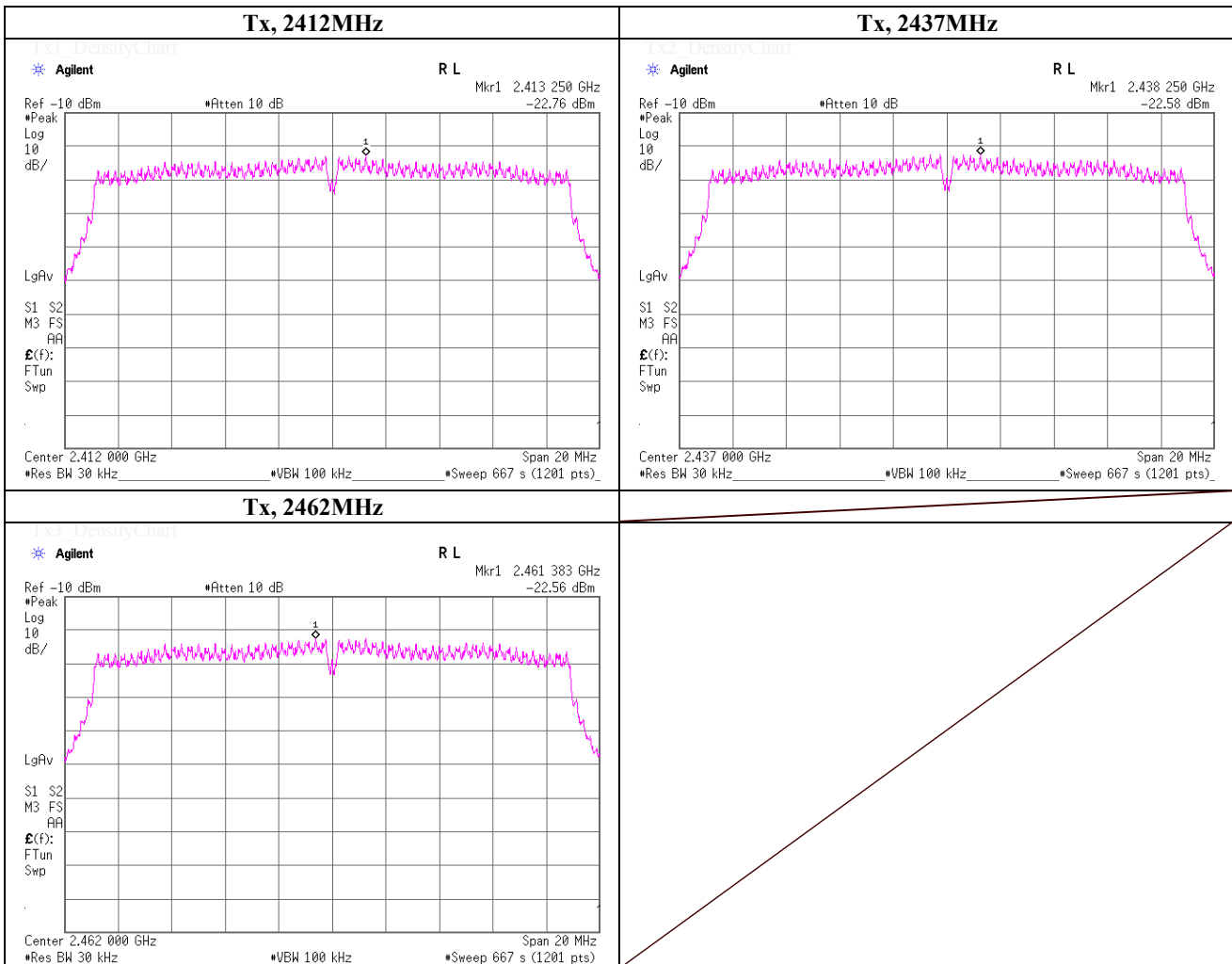
## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	July 31, 2012	
Temperature / Humidity	26deg.C , 54%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 0(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2413.25	-22.76	0.82	20.15	-1.79	8.00	9.79
2437.0000	2438.25	-22.58	0.82	20.15	-1.61	8.00	9.61
2462.0000	2461.38	-22.56	0.84	20.15	-1.57	8.00	9.57

Sample Calculation:

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



**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
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 Facsimile : +81 463 50 6401

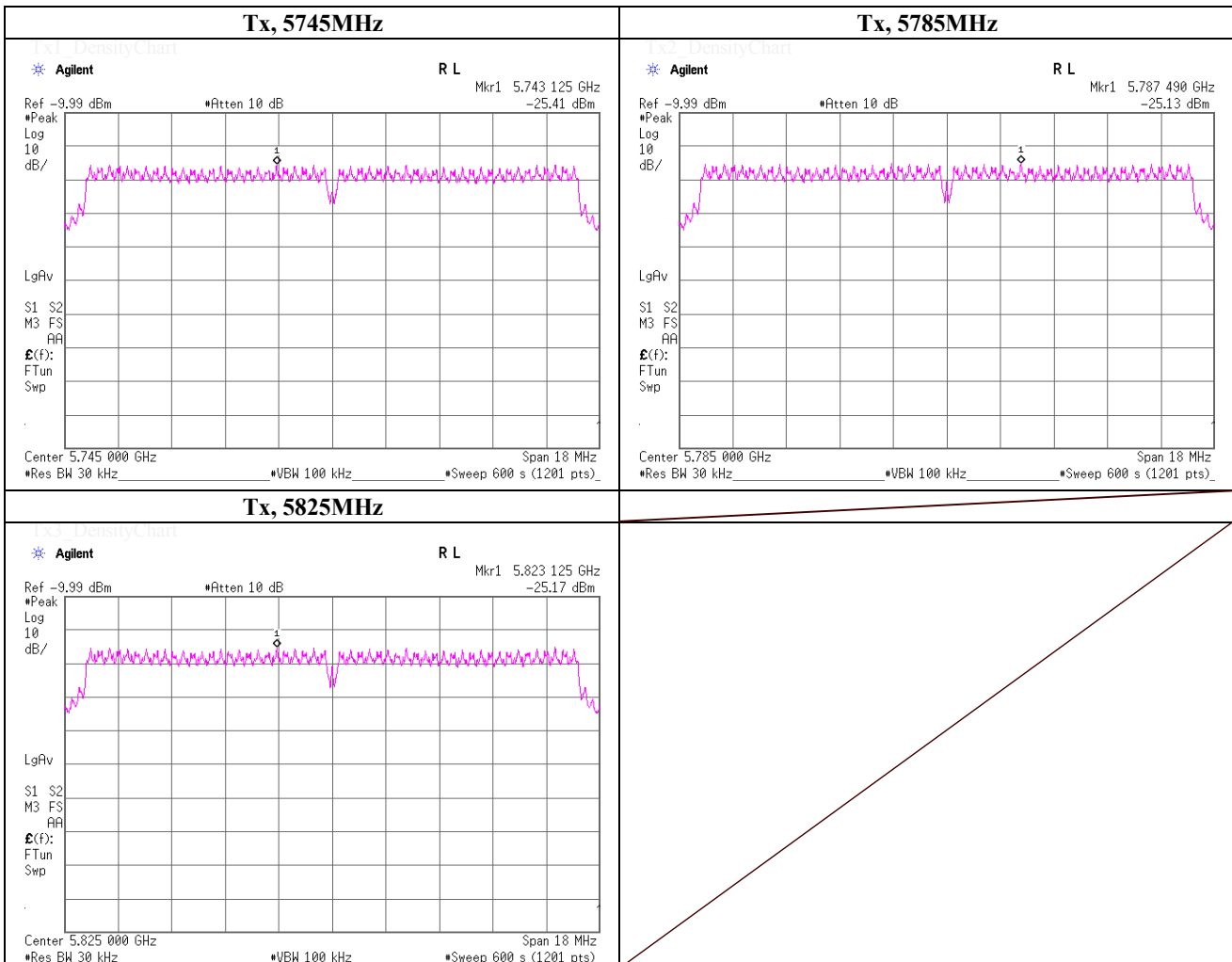
## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11a (W58), PN9, worst data mode 6Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.0000	5743.13	-25.41	2.79	19.95	-2.67	8.00	10.67
5785.0000	5787.49	-25.13	2.81	19.95	-2.37	8.00	10.37
5825.0000	5823.13	-25.17	2.82	19.95	-2.40	8.00	10.40

Sample Calculation:

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



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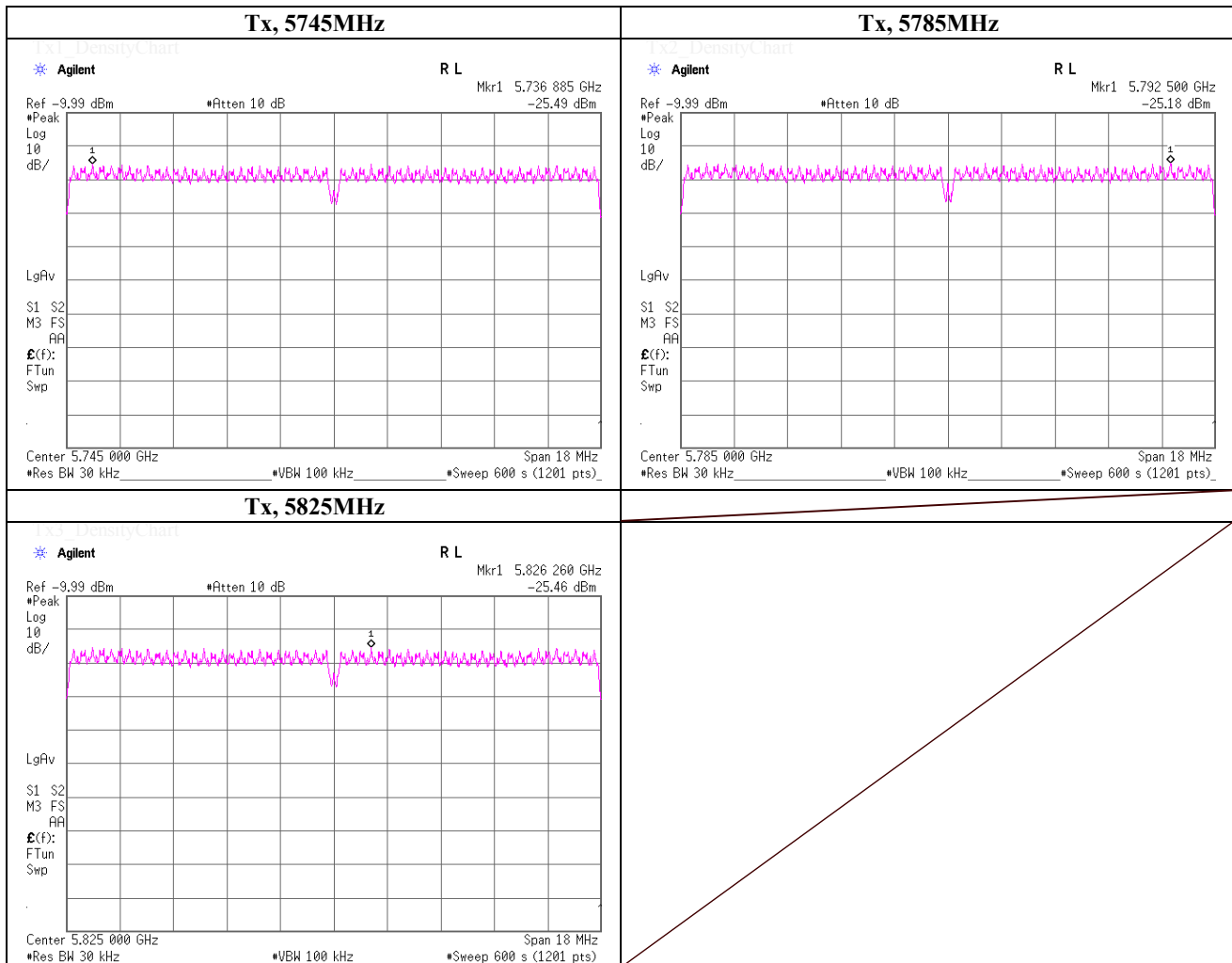
## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT20) (W58), PN9, worst data mode 0(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.0000	5736.89	-25.49	2.79	19.95	-2.75	8.00	10.75
5785.0000	5792.50	-25.18	2.81	19.95	-2.42	8.00	10.42
5825.0000	5826.26	-25.46	2.82	19.95	-2.69	8.00	10.69

Sample Calculation:

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



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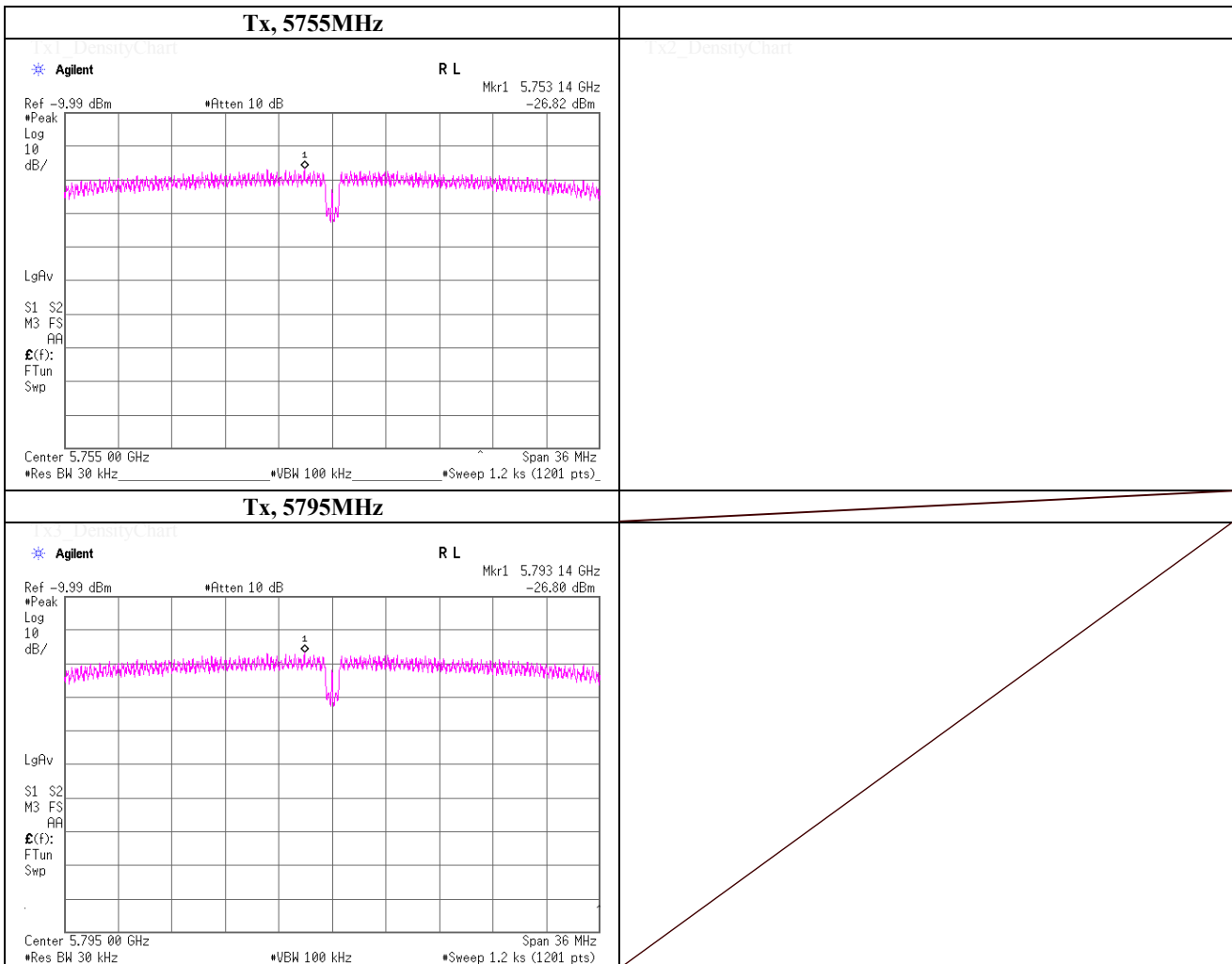
## Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Shielded Room
Date	August 2, 2012	
Temperature / Humidity	26deg.C , 50%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n (HT40) (W58), PN9, worst data mode 0(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5755.0000	5753.14	-26.82	2.80	19.95	-4.07	8.00	12.07
					-	8.00	-
5795.0000	5793.14	-26.80	2.81	19.95	-4.04	8.00	12.04

Sample Calculation:

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



**UL Japan, Inc.**

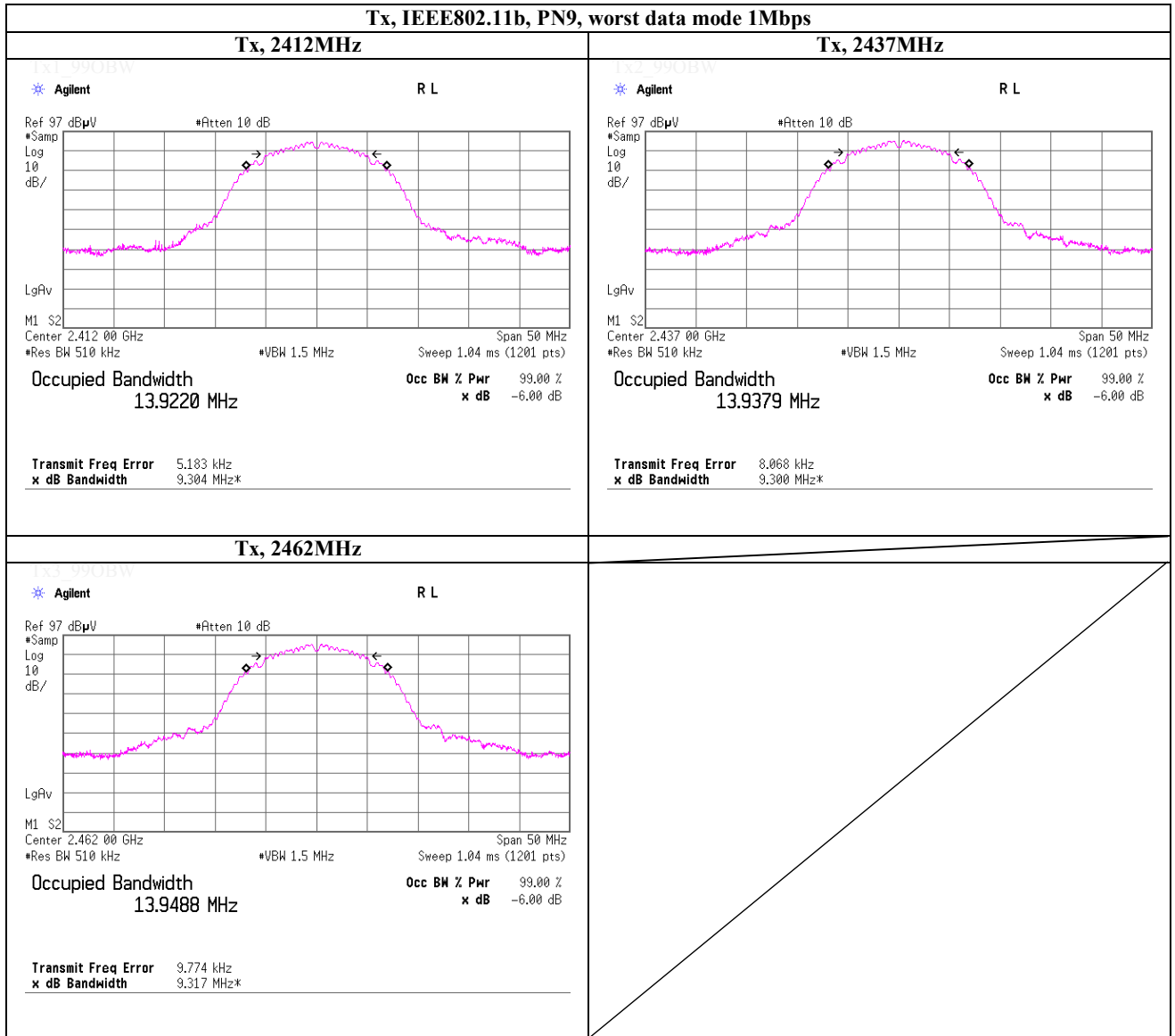
**Shonan EMC Lab.**

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## 99% Occupied Bandwidth



**UL Japan, Inc.**

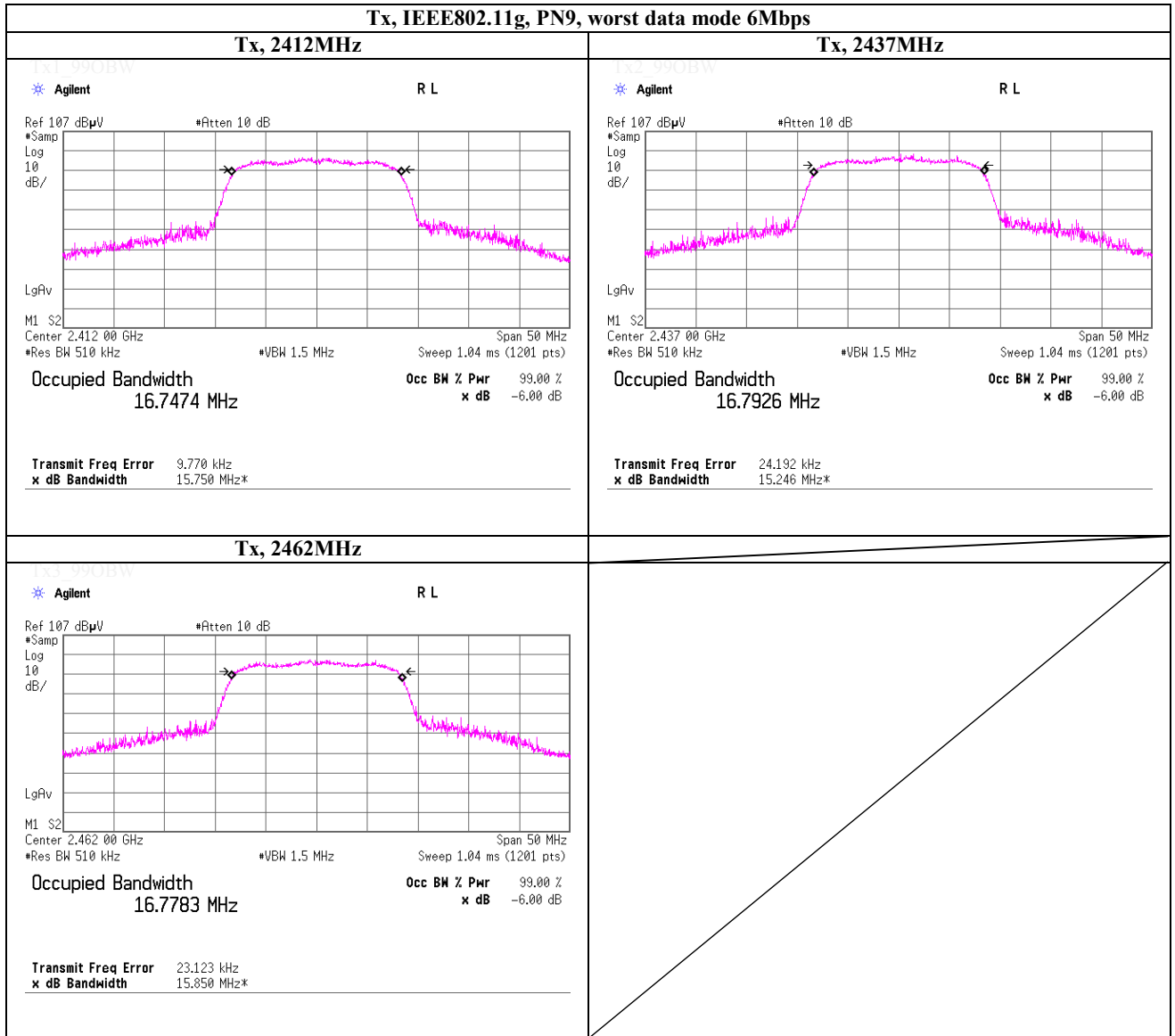
**Shonan EMC Lab.**

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## 99% Occupied Bandwidth



**UL Japan, Inc.**

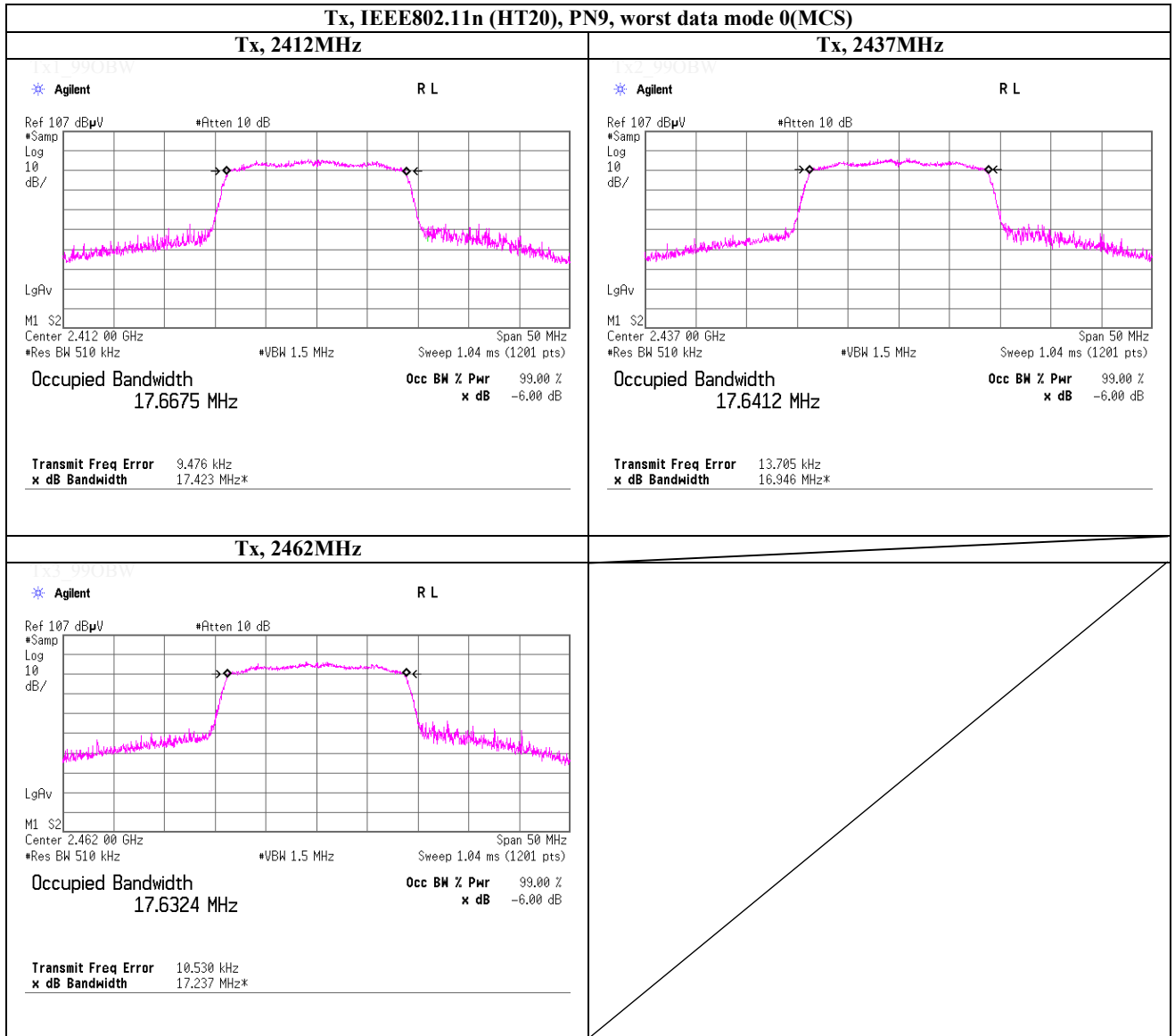
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## 99% Occupied Bandwidth



**UL Japan, Inc.**

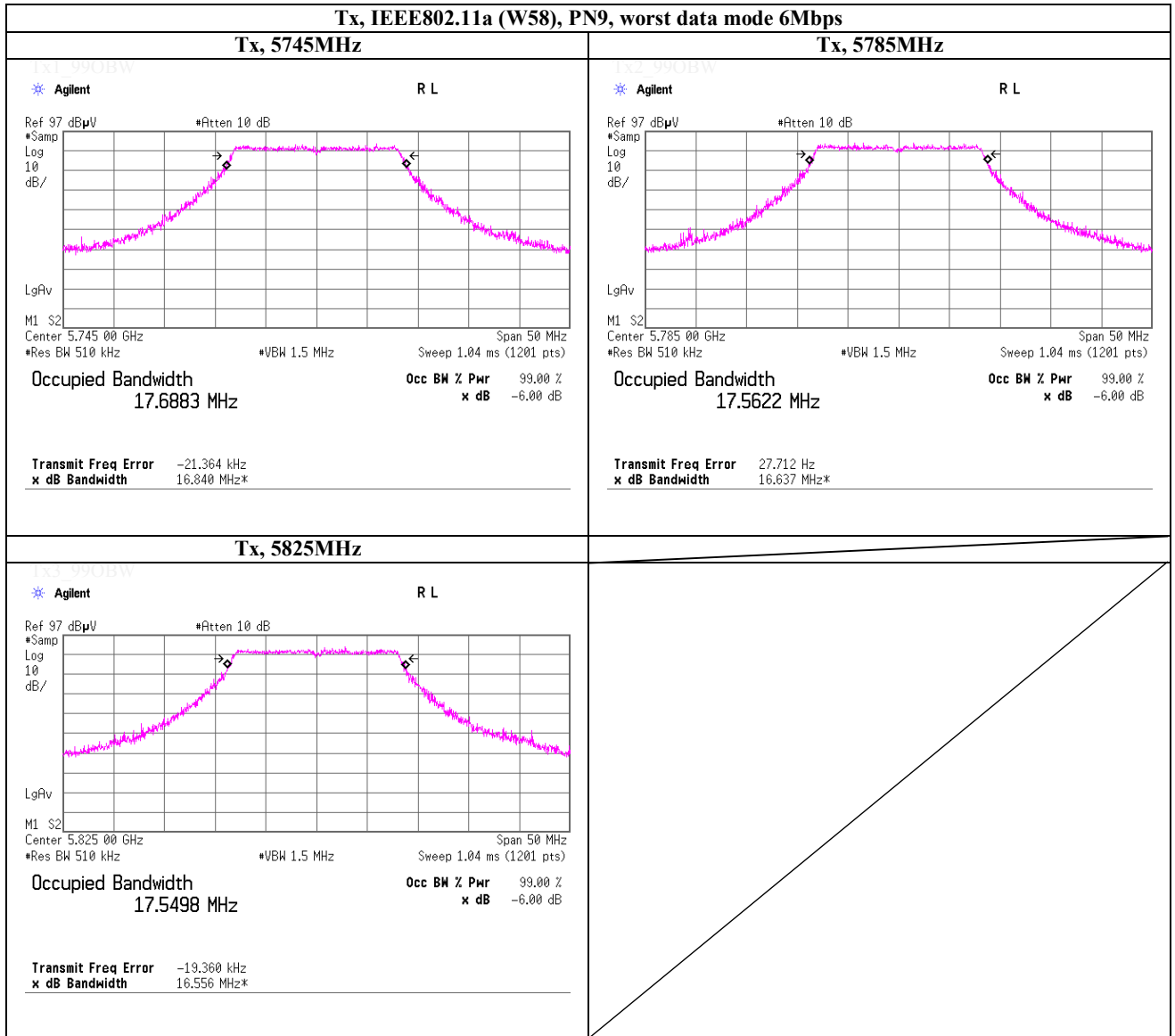
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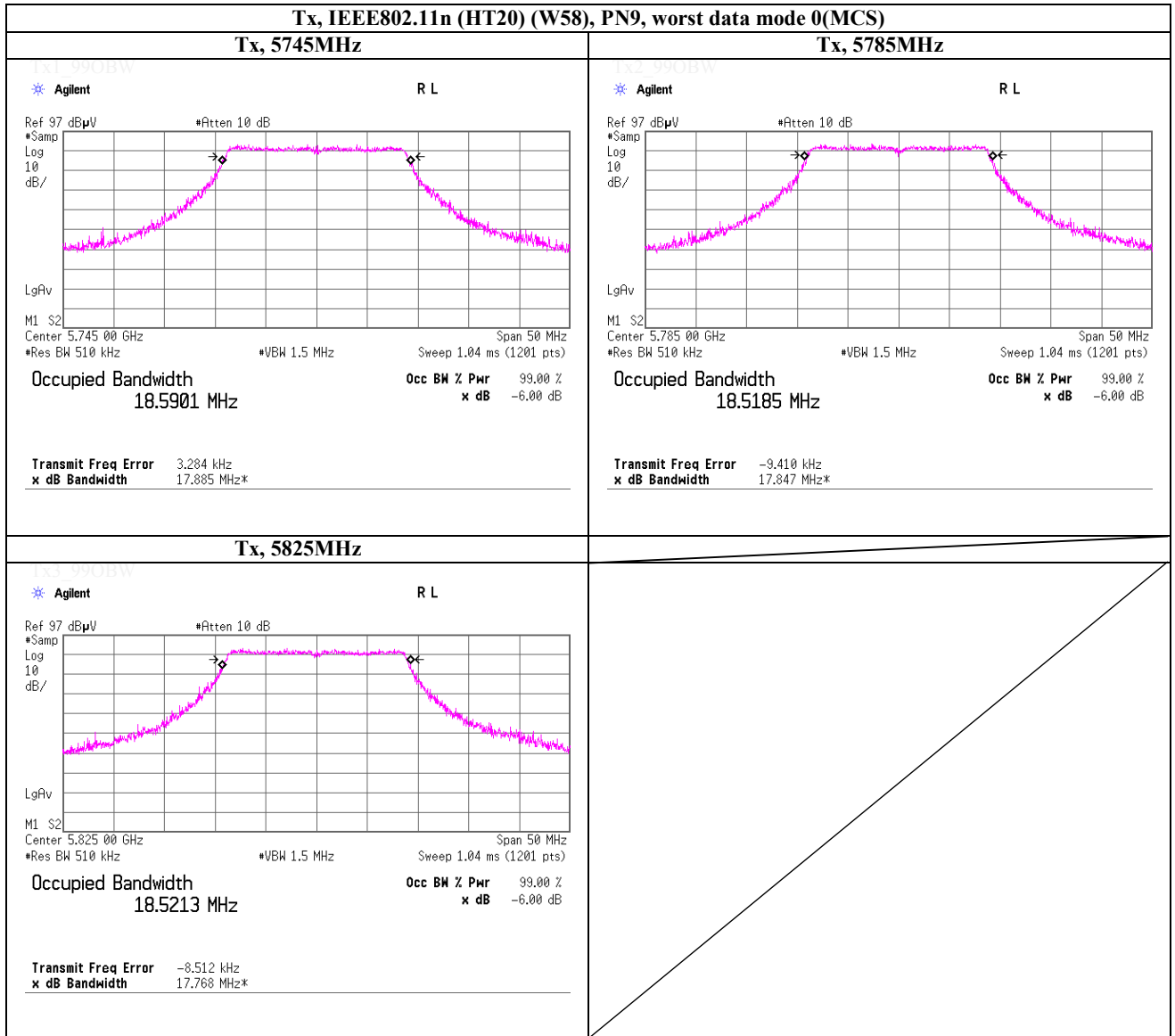
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## 99% Occupied Bandwidth



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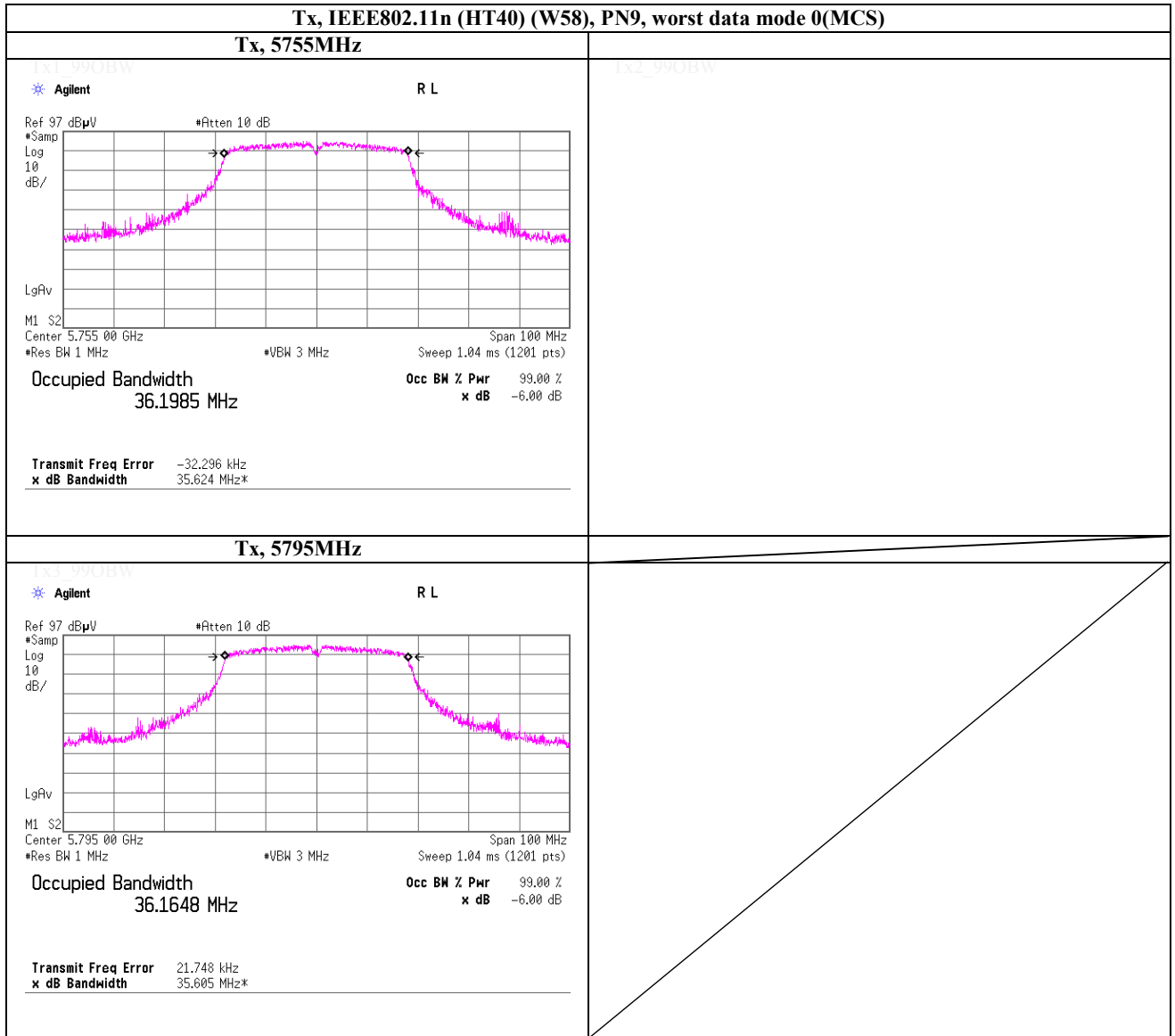
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## APPENDIX 2 Test Instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT,RE	2012/02/16 * 12
SAT20-03	Attenuator	Agilent	8493C-020	74891	AT	2012/03/12 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	AT	2012/03/12 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2012/03/16 * 12
SAT20-06	Attenuator	Weinschel Corp.	54A-20	31506	AT	2012/04/06 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2012/03/12 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	AT	2012/03/26 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2011/08/28 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2012/06/14 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SHA-RS01	Horn Antenna	Schwarzbeck	BBHA9120D	770	RE	2011/08/11 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE	2011/12/05 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2012/03/30 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2012/03/12 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2012/03/12 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12

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

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

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

Test Item :

RE: Radiated emission,

AT: Antenna terminal conducted test

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### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-C9/C10/S RSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271( RF Selector)	CE	2012/04/10 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE(EUT)	2012/02/23 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2012/03/26 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	CE	2012/06/14 * 12
SJM-10	Measure	PROMART	SEN1935	-	CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	CE	-

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

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

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

Test Item :

CE: Conducted emission