



Test report No. : 10048647S-K  
Page : 1 of 125  
Issued date : April 21, 2014  
Revised date : May 15, 2014  
FCC ID : AZD229


# RADIO TEST REPORT


**Test Report No.: 10048647S-K**

**Applicant** : Canon Inc.  
**Type of Equipment** : Wireless Module  
**Model No.** : WM229  
**FCC ID** : AZD229  
**Test regulation** : FCC Part15 Subpart C: 2014  
**Test result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
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:** August 14 to 21, 2013

**Tested by:**   
Hikaru Shirasawa  
Engineer  
Consumer Technology Division

**Approved by :**   
Toyokazu Imamura  
Leader  
Consumer Technology Division



- 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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**Shonan EMC Lab.**

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Canon Inc.  
Address : 30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo, 146-8501 Japan  
Telephone Number : +81-3-5482-8070  
Facsimile Number : +81-3-3757-8431  
Contact Person : Hironobu Saida

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

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

Type of Equipment : Wireless Module  
Model No. : WM229  
Serial No. : Refer to 4.1  
Rating : DC3.3V, DC1.8V  
Receipt Date of Sample : August 5, 2013  
Country of Mass-production : Philippines  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: WM229 (referred to as the EUT in this report) is a Wireless Module.

Clock frequency(ies) in the system : 38.4MHz

#### **Radio specification**

Equipment type : Transceiver  
Frequency of operation : 2412-2462MHz (IEEE 802.11b, 11g, 11n(HT20))  
2422-2452MHz (IEEE 802.11n(HT40))  
Bandwidth : 20MHz (IEEE 802.11b, 11g, 11n(HT20)), 40MHz (IEEE 802.11n(HT40))  
Channel spacing : 5MHz  
Type of modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11g/n)  
Antenna type : Monopole type chip  
Antenna connector type : None  
Antenna gain : -3.30 dBi (2442MHz)  
ITU code : D1D, G1D  
Operation temperature range : -20 to +85 deg.C

FCC 15.31 (e) / 212

The Wireless Module has its own regulator.

RF part is constantly provided voltage (DC3.0V and DC1.2V) through the regulator regardless of input voltage.

Therefore, this EUT complies with the requirement.

FCC 15.203 / 212

The antenna is not removable from the EUT. Therefore, the equipment complies with the antenna requirement.

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

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart 2014, final revised on March 6, 2014 and effective April 7, 2014  
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 March 6, 2014 does not affect the test specification applied to the EUT.

### **3.2 Procedures & Results**

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2009	FCC 15.207	-	N/A	12.9dB Freq.: 0.15025MHz Detector: Quasi-Peak Phase: L1 Mode: Tx 2462MHz, IEEE 802.11g Power setting: 12dBm	Complied
6dB bandwidth	ANSI C63.10:2009	FCC 15.247 (a)(2)	Conducted	N/A	* See data	Complied
Maximum peak conducted output power	ANSI C63.10:2009	FCC 15.247 (b)(3)	Conducted	N/A		Complied
Out of band emission & Restricted band edges	ANSI C63.10:2009	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	1.5dB Freq.: 2483.500MHz Polarization: Vertical Detection: Peak Mode: Tx 2462MHz, IEEE 802.11g Power setting: 12dBm	Complied
Power density	ANSI C63.10:2009	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.

\*1) These tests were also referred to KDB 558074 v03 r01 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

### **3.3 Addition to standard**

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied bandwidth (99%)	ANSI C63.4:2009 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 (±)
Conducted emission (AC Mains) LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.5 dB
Radiated emission (Measurement distance: 3m)	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
Radiated emission (Measurement distance: 1m)	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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### 3.5 Test location

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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 test & Test instruments

Refer to APPENDIX 1 to 3.

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

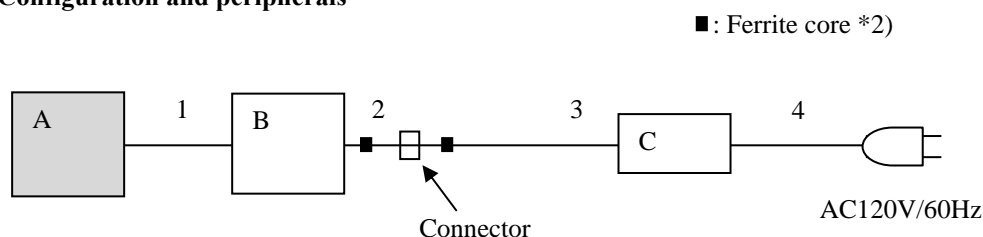
### 4.1 Operating mode

Test item	Mode	Tested frequency	Power setting *1)	Worst data rate *2)
Conducted emission Radiated emission (below 1GHz) *3)	Transmitting IEEE 802.11g	2462MHz	12	6Mbps, PN9
			10	
Other items	Transmitting IEEE 802.11b	2412MHz, 2437MHz, 2462MHz	14 11	1Mbps, PN9
	Transmitting IEEE 802.11g	2412MHz, 2437MHz, 2462MHz	12 10	6Mbps, PN9
	Transmitting IEEE 802.11n (HT20)	2412MHz, 2437MHz, 2462MHz	12 10	MCS2, PN9
	Transmitting IEEE 802.11n (HT40)	2422MHz, 2437MHz, 2452MHz	12 10	MCS3, PN9

\*1) The actual output power differs from the setting value. Software used for the test: RFTTEST ver. 14.0.11.p51  
\*2) The worst condition was determined based on the test result of Maximum Peak Conducted 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.

### 4.2 Configuration and peripherals



\* Test data was taken under worst case conditions.

#### Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Module	WM229	*1)	Canon	EUT
B	Digital Camera	PC1739	431030032132	Canon	-
C	Compact Power Adapter	CA-DC10 N	1214	Canon	-

\*1) 2C9EFCFFE8EE: Conducted emission and Radiated emission, 2C9EFCFFE915: Antenna port conducted test

#### List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	Jig	0.18	Unshielded	Unshielded	-
2	DC	0.15	Unshielded	Unshielded	-
3	DC	1.9	Unshielded	Unshielded	-
4	AC	1.9	Unshielded	Unshielded	-

\*2) The ferrite core was not attached to reduce the noise from the EUT but was used to reduce the noise from Digital Camera. Therefore, that does not affect the emission level of the EUT. Since it was difficult to prepare a cable for Digital Camera to which a ferrite core was not attached, the measurement was performed with the cable with the ferrite core.

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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. 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 host device within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via host device. An overview sweep with peak detection has been performed. The measurements had been performed with a quasi-peak detector and if required, a CISPR average detector. The conducted emission measurements were made with the following detection of the test receiver.

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

### **5.5 Results**

Summary of the test results : Pass  
Refer to APPENDIX 1.

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

### **Test procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port.  
The test was measured based on Method 8.1 Option 1 and 8.2 Option 2 of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX 1.

## **SECTION 7: Maximum peak conducted output power**

### **Test procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.  
The test was measured based on Method 9.1.3 PKPM1 of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Detection type: Peak / Average \*1)

Summary of the test results: Pass  
Refer to APPENDIX 1

\*1) Average detector was used only for Reference data of SAR testing.

## **SECTION 8: 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 9: Peak power density**

### **Test procedure**

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

Instrument used : Spectrum Analyzer  
RBW / VBW : 3kHz / 9.1kHz

The test was measured based on Method 10.2 PKPSD of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass  
Refer to APPENDIX 1.

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## **SECTION 10: Radiated emission**

### **10.1 Operating environment**

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

### **10.2 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. Photographs of the set up are shown in APPENDIX 3.

### **10.3 Test conditions**

Frequency range : 30MHz to 25GHz  
EUT position : Table top

### **10.4 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.

Frequency	30-1000MHz	1-25GHz		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 3MHz Detector: RMS	RBW: 100kHz VBW: 300kHz

\*1) Average Power Measurement was measured based on 12.2.5 of KDB 558074 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

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.

#### **Worst case:**

Antenna polarization	Carrier (Band edge)	Spurious			
		Below 1GHz	Above 1GHz		
			1-2.8GHz	2.8-15GHz	15-25GHz
Horizontal	X	X	X	X	X
Vertical	Y	X	Y	Y	Y

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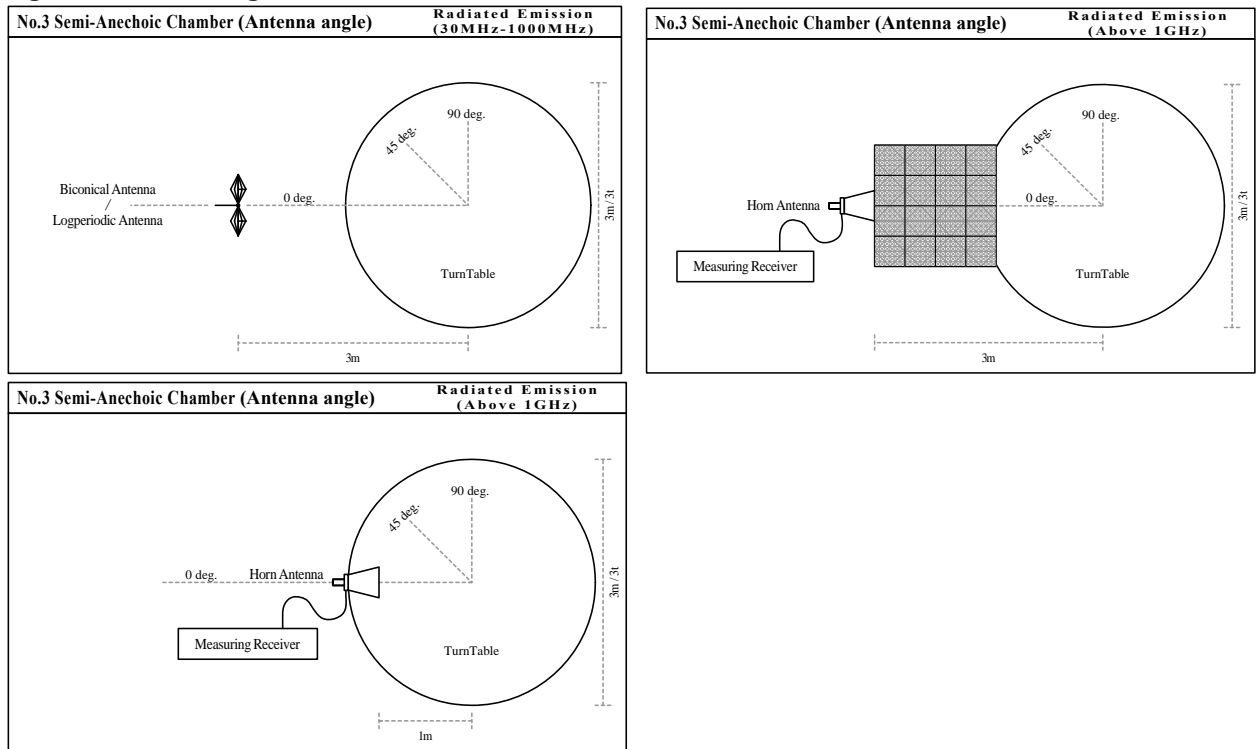
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**Figure 1. Antenna angle**



**10.5 Band edge**

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

**10.6 Results**

Summary of the test results : Pass  
\* No noise was detected above the 5<sup>th</sup> order harmonics.

Refer to APPENDIX 1.

## **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 the worst position

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# DATA OF CONDUCTED EMISSION TEST

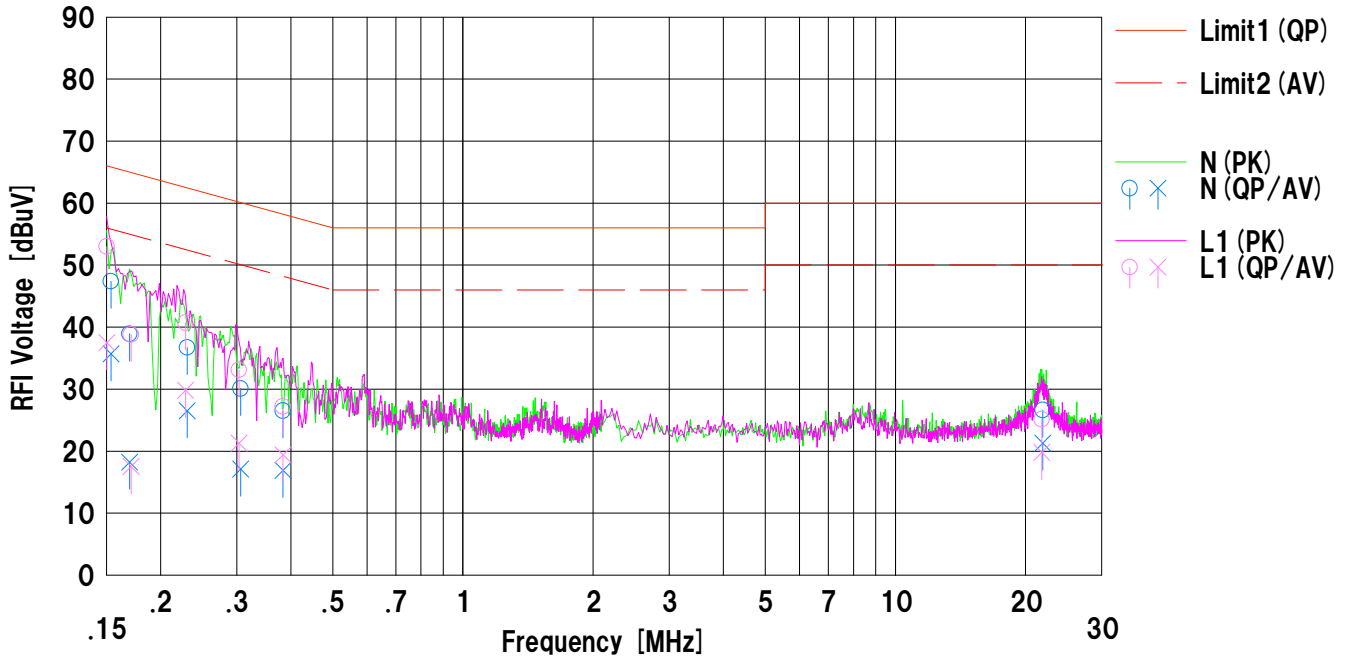
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/08/21

Company : Canon Inc.  
Kind of EUT : Wireless Module  
Model No. : WM229  
Serial No. : 2C9EFCFFE8EE  
Remarks : -

Mode : Tx 11g 2462MHz Power 12  
Report No. : 10048647S  
Power : AC 120V / 60Hz  
Temp./Humi. : 26deg.C. / 46%RH

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

Engineer : Shinichi Takano



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	0.15352	34.7	23.0	12.7	47.4	35.7	65.8	55.8	18.4	20.1	N	
2	0.16955	26.2	5.5	12.7	38.9	18.2	64.9	54.9	26.0	36.7	N	
3	0.23044	24.0	13.8	12.7	36.7	26.5	62.4	52.4	25.7	25.9	N	
4	0.30615	17.4	4.4	12.7	30.1	17.1	60.0	50.0	29.9	32.9	N	
5	0.38389	13.8	4.2	12.7	26.5	16.9	58.1	48.1	31.6	31.2	N	
6	21.92428	13.0	7.7	13.6	26.6	21.3	60.0	50.0	33.4	28.7	N	
7	0.15025	40.3	24.8	12.7	53.0	37.5	65.9	55.9	12.9	18.4	L1	
8	0.17081	26.1	4.8	12.7	38.8	17.5	64.9	54.9	26.1	37.4	L1	
9	0.22848	28.0	17.1	12.7	40.7	29.8	62.5	52.5	21.8	22.7	L1	
10	0.30360	20.4	8.6	12.7	33.1	21.3	60.1	50.1	27.0	28.8	L1	
11	0.38394	14.5	6.7	12.7	27.2	19.4	58.1	48.1	30.9	28.7	L1	
12	21.80941	11.5	6.2	13.6	25.1	19.8	60.0	50.0	34.9	30.2	L1	

# DATA OF CONDUCTED EMISSION TEST

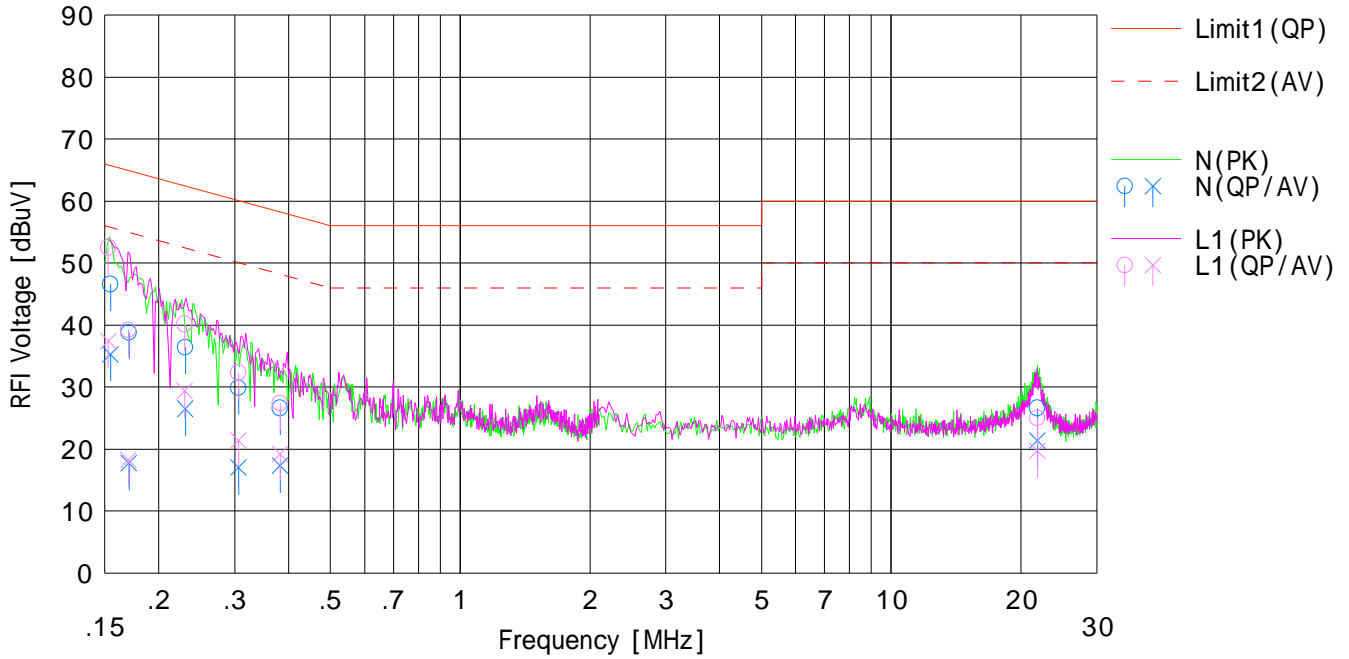
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room  
Date : 2013/08/21

Company : Canon Inc.  
Kind of EUT : Wireless Module  
Model No. : WM229  
Serial No. : 2C9EFCFFE8EE  
Remarks : -

Mode : Tx 11g 2462MHz Power 10  
Report No. : 10048647S  
Power : AC 120V / 60Hz  
Temp./Humi. : 26deg.C. / 46%RH

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

Engineer : Shinichi Takano

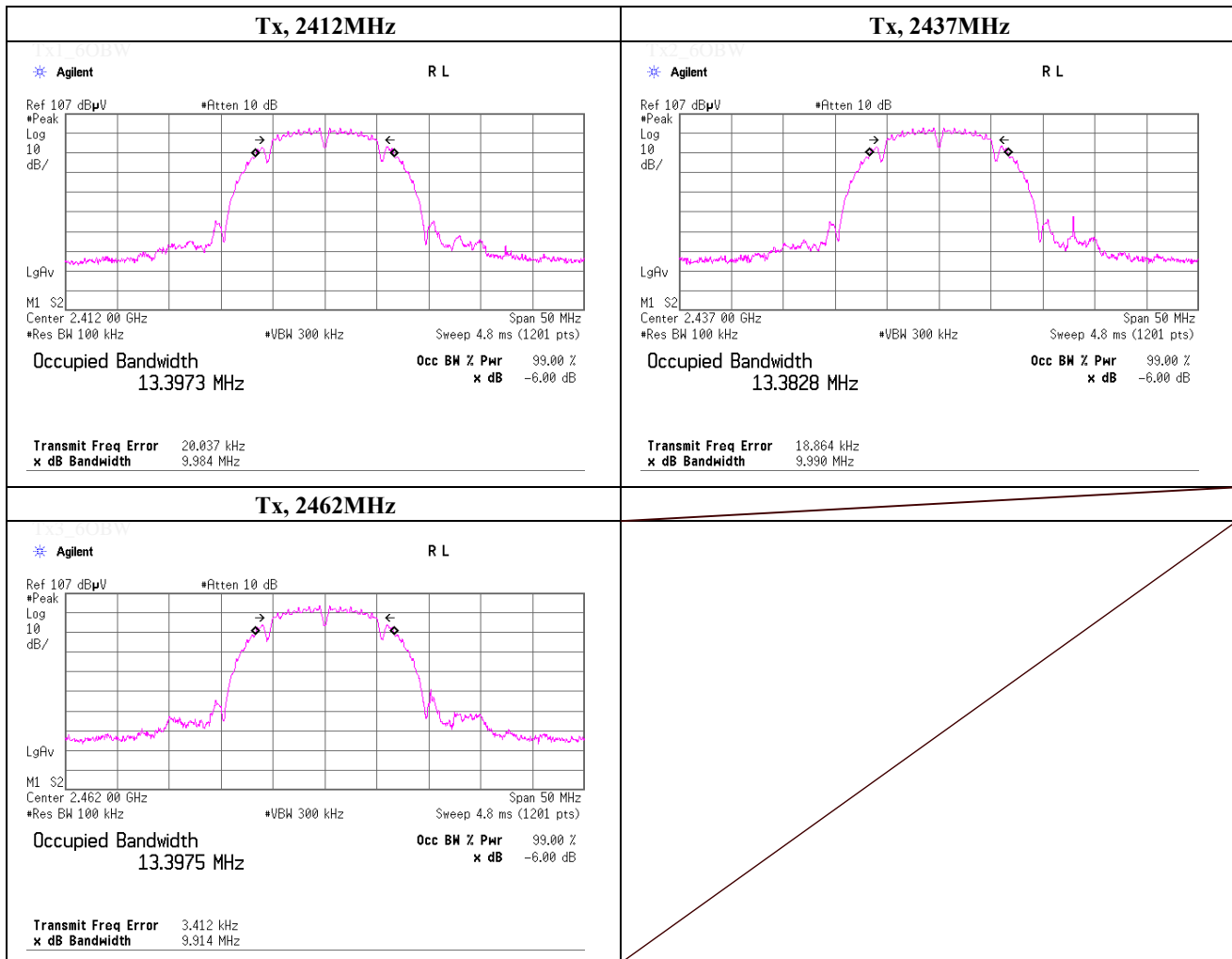


No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15436	33.9	22.6	12.7	46.6	35.3	65.7	55.7	19.1	20.4	N	
2	0.17067	26.1	5.0	12.7	38.8	17.7	64.9	54.9	26.1	37.2	N	
3	0.23074	23.7	13.8	12.7	36.4	26.5	62.4	52.4	26.0	25.9	N	
4	0.30588	17.2	4.3	12.7	29.9	17.0	60.0	50.0	30.1	33.0	N	
5	0.38236	13.9	4.6	12.7	26.6	17.3	58.2	48.2	31.6	30.9	N	
6	21.83573	13.0	7.8	13.6	26.6	21.4	60.0	50.0	33.4	28.6	N	
7	0.15261	39.8	24.7	12.7	52.5	37.4	65.8	55.8	13.3	18.4	L1	
8	0.17017	26.5	5.6	12.7	39.2	18.3	64.9	54.9	25.7	36.6	L1	
9	0.22993	27.5	16.7	12.7	40.2	29.4	62.4	52.4	22.2	23.0	L1	
10	0.30646	19.6	8.7	12.7	32.3	21.4	60.0	50.0	27.7	28.6	L1	
11	0.38257	14.7	6.5	12.7	27.4	19.2	58.2	48.2	30.8	29.0	L1	
12	21.84327	11.4	6.1	13.6	25.0	19.7	60.0	50.0	35.0	30.3	L1	

### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 14, 2013	
Temperature / Humidity	25deg.C , 62%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	9.984	> 0.500
2437.0000	9.990	> 0.500
2462.0000	9.914	> 0.500



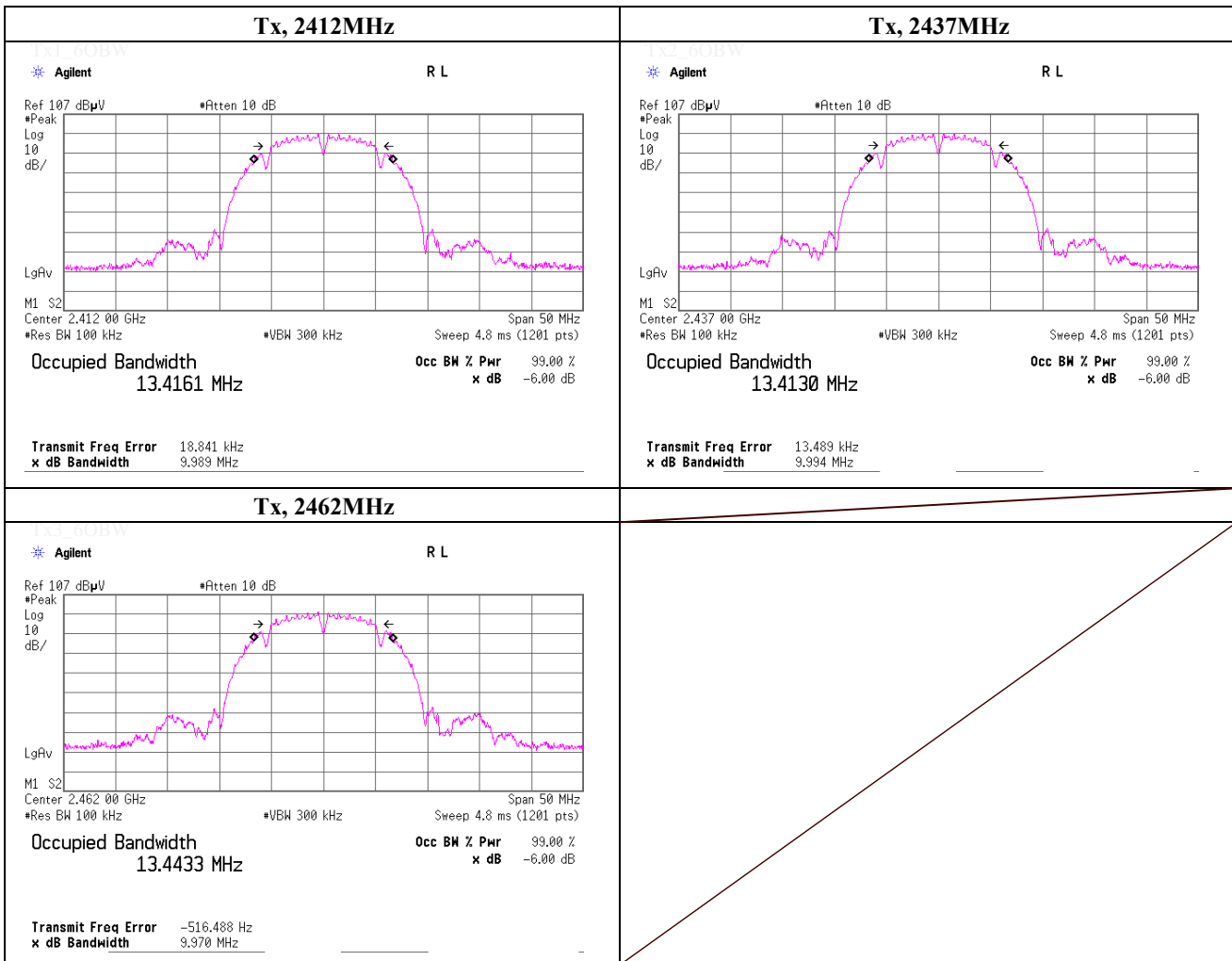
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### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 11	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	9.989	> 0.500
2437.0000	9.994	> 0.500
2462.0000	9.970	> 0.500



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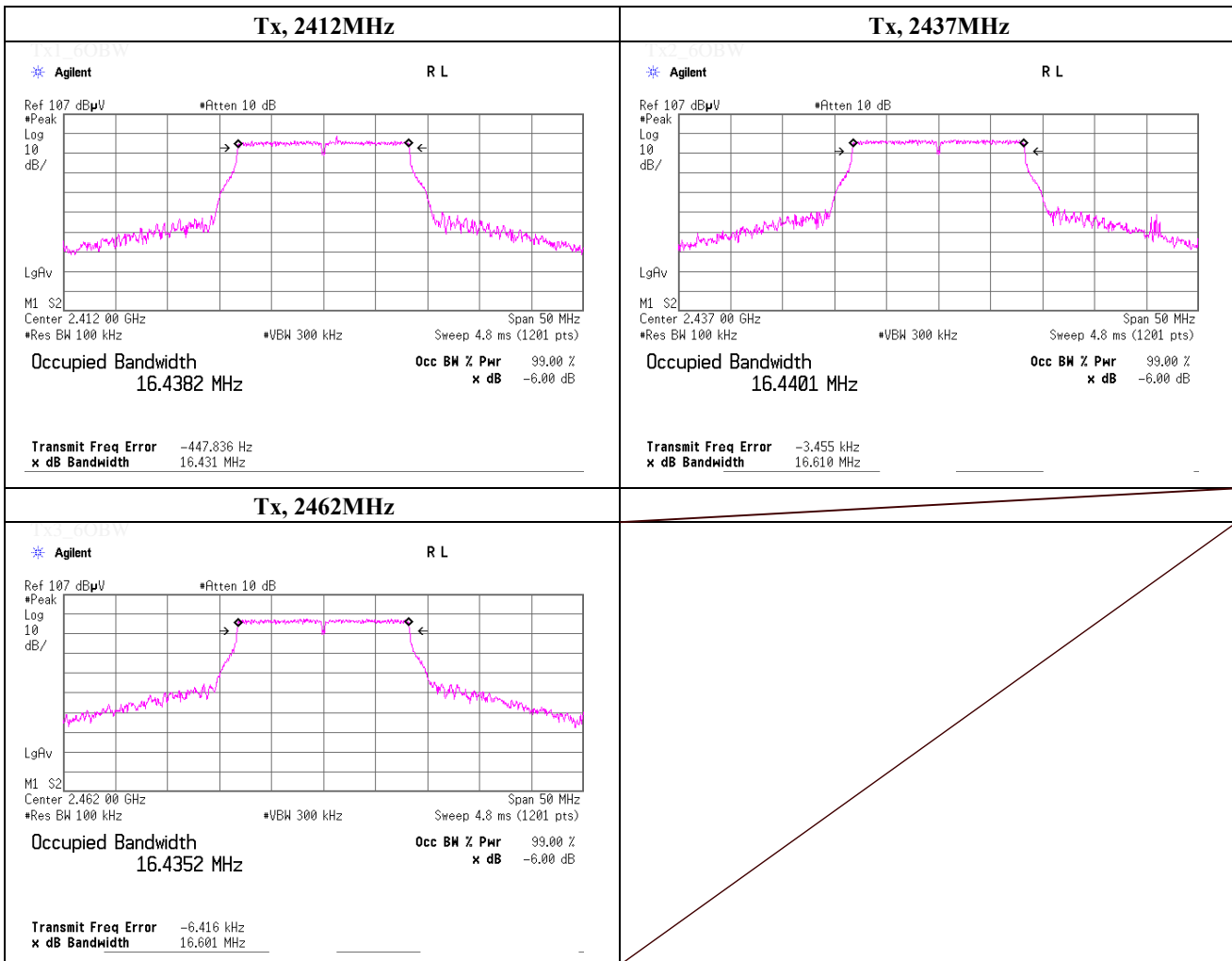
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### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 14, 2013	
Temperature / Humidity	25deg.C , 62%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.431	> 0.500
2437.0000	16.610	> 0.500
2462.0000	16.601	> 0.500

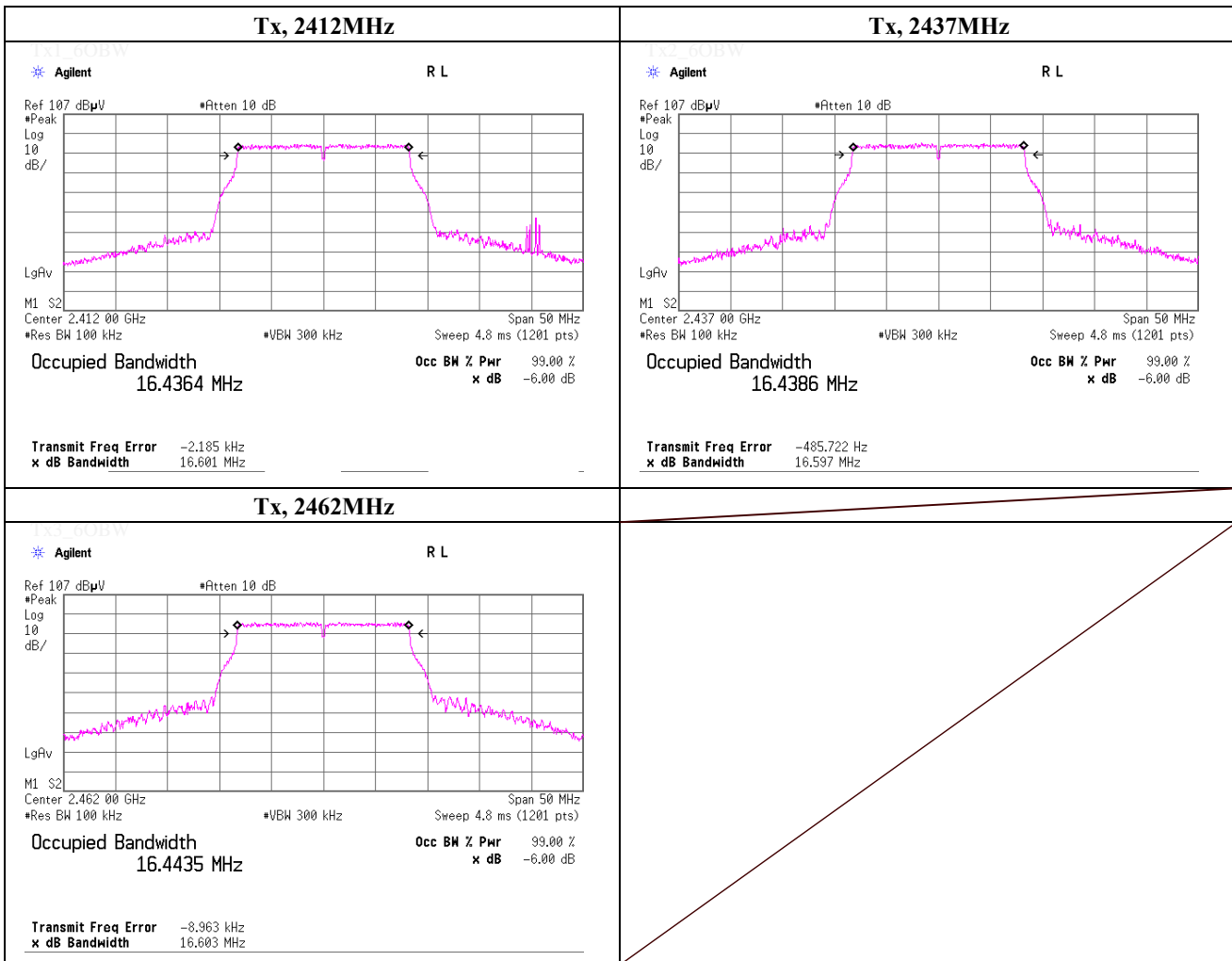


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### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	16.601	> 0.500
2437.0000	16.597	> 0.500
2462.0000	16.603	> 0.500

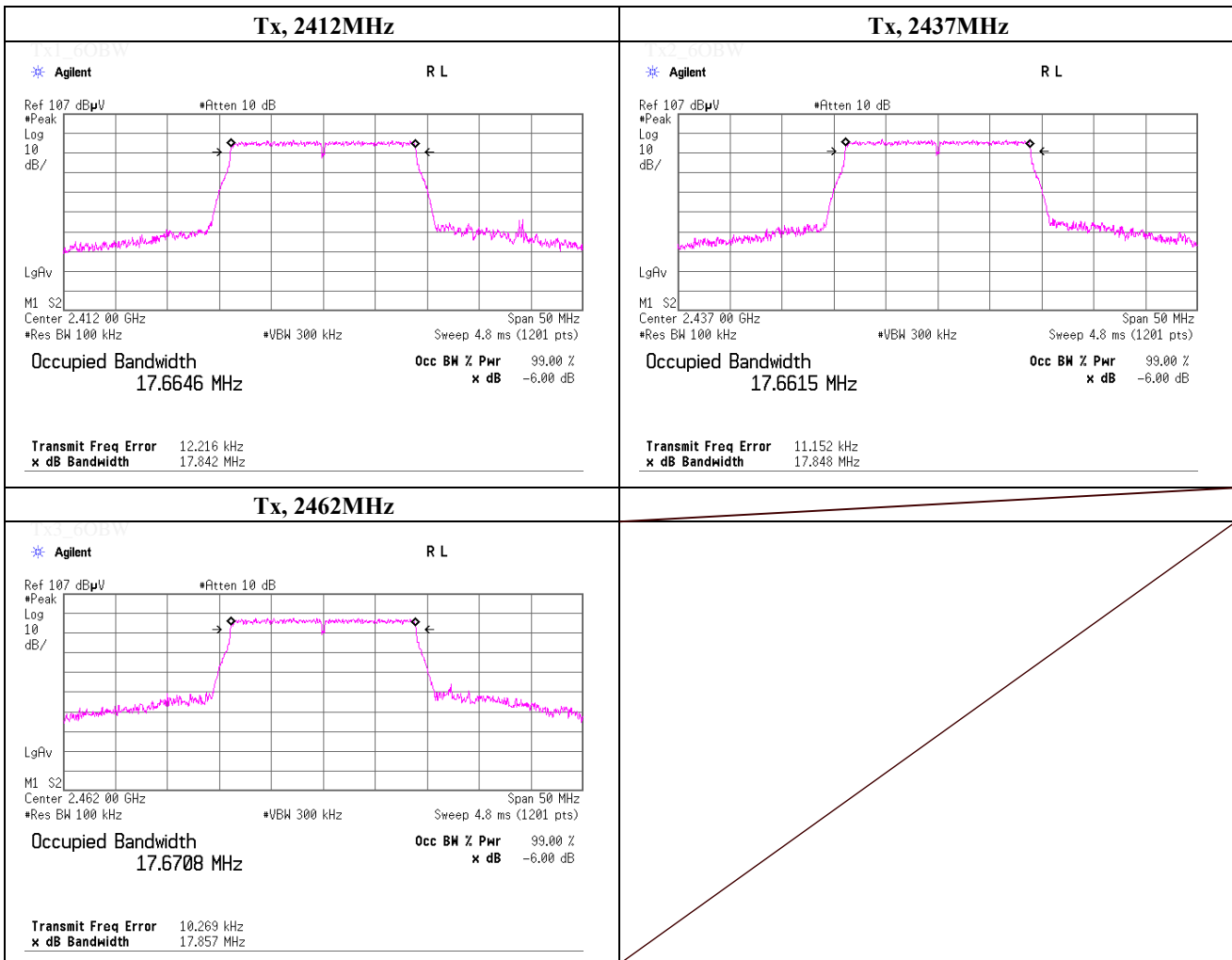


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### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12	

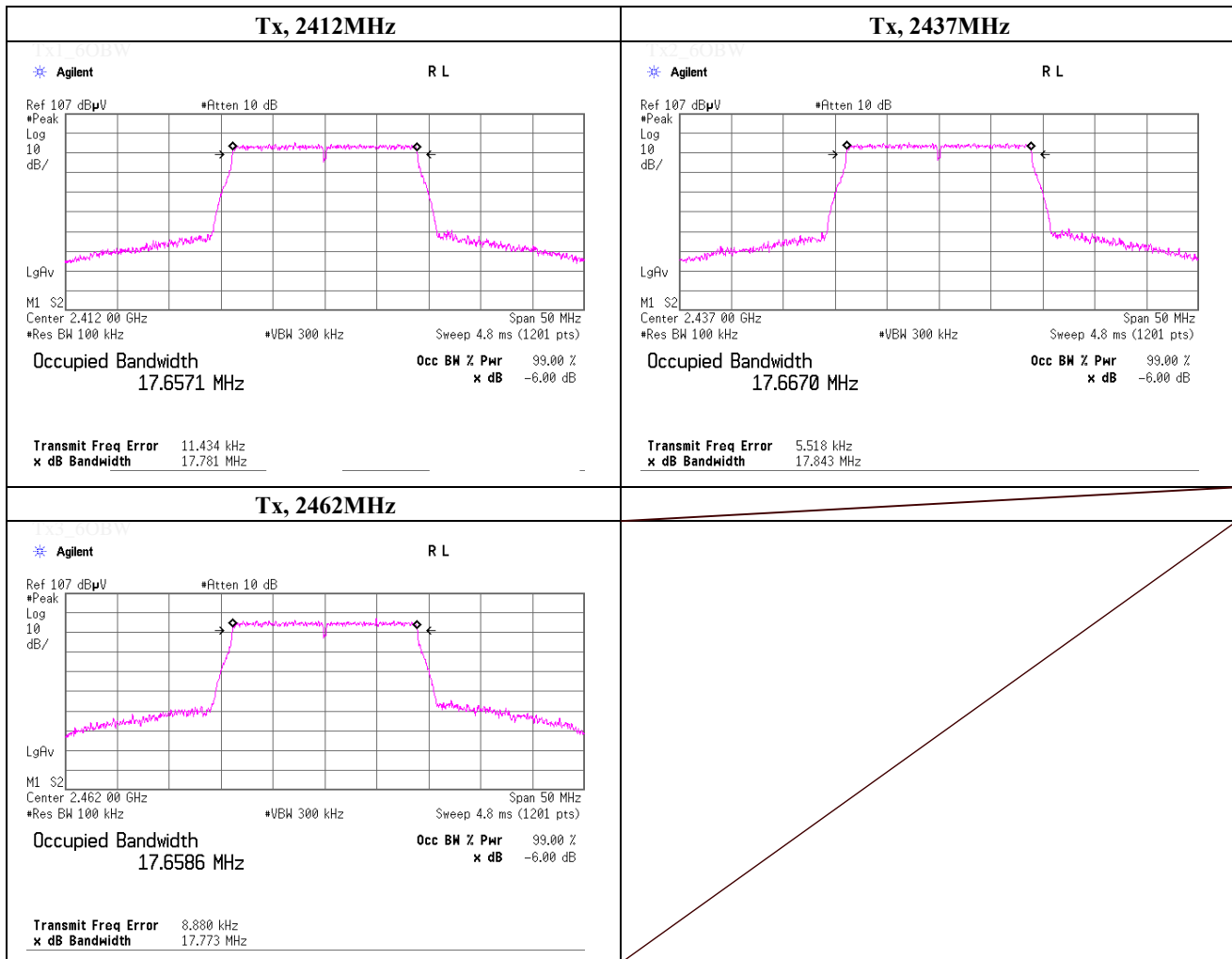
Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.842	> 0.500
2437.0000	17.848	> 0.500
2462.0000	17.857	> 0.500



### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.781	> 0.500
2437.0000	17.843	> 0.500
2462.0000	17.773	> 0.500

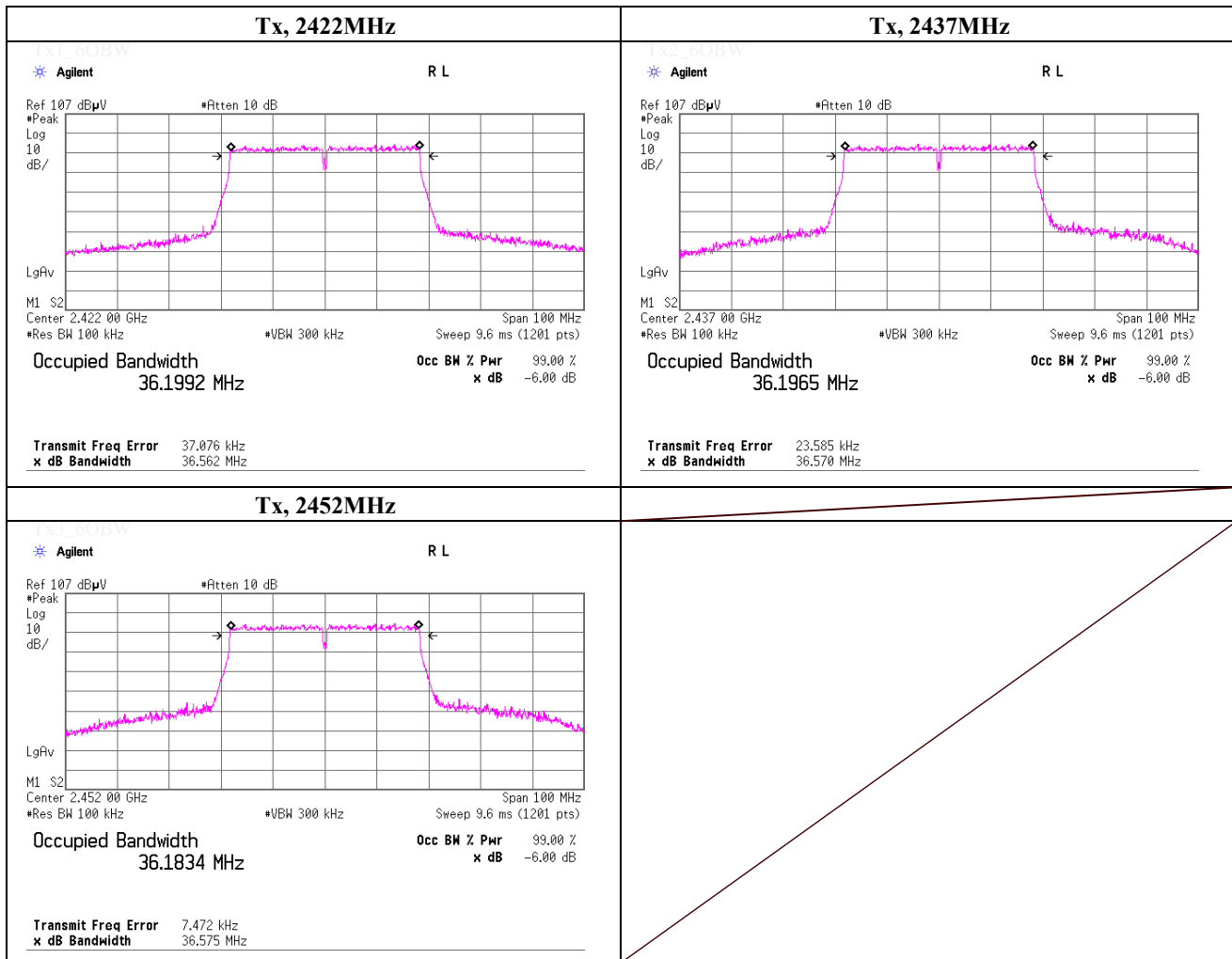


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### -6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2422.0000	36.562	> 0.500
2437.0000	36.570	> 0.500
2452.0000	36.575	> 0.500



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## Maximum Conducted Output Power (Reference data)

(AVGPM)

Test place                    UL Japan, Inc. Shonan EMC Lab.      No.5 Shielded Room  
 Date                            Augsut 14, 2013  
 Temperature / Humidity    25deg.C      , 62%RH  
 Engineer                    Hikaru Shirasawa  
 Mode                         Tx, IEEE802.11g, PN9, power setting 12                    worst data mode :                    6 Mbps

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
Low	2412.0	0.68	0.50	9.98	0.00	11.16	13.06
Mid	2437.0	1.20	0.50	9.98	0.00	11.68	14.72
High	2462.0	1.90	0.50	9.98	0.00	12.38	17.30

Sample Calculation:

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

E.I.R.P = Result + Antenna Gain

**[Pre check]**

Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
6	2437.0	1.20	0.50	9.98	0.00	<b>11.68</b>	14.72
9	2437.0	1.05	0.50	9.98	0.00	11.53	14.22
12	2437.0	0.98	0.50	9.98	0.00	11.46	14.00
18	2437.0	1.06	0.50	9.98	0.00	11.54	14.26
24	2437.0	0.90	0.50	9.98	0.00	11.38	13.74
36	2437.0	1.18	0.50	9.98	0.00	11.66	14.66
48	2437.0	0.93	0.50	9.98	0.00	11.41	13.84
54	2437.0	0.89	0.50	9.98	0.00	11.37	13.71

Sample Calculation:

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

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**Maximum Conducted Output Power (Reference data)**

(AVGPM)

Test place                   UL Japan, Inc. Shonan EMC Lab.      No.5 Shielded Room  
Date                            August 15, 2013  
Temperature / Humidity      25deg.C      , 65%RH  
Engineer                     Hikaru Shirasawa  
Mode                         Tx, IEEE802.11n (HT20), PN9, power setting 12                   worst data mode :                   1 (MCS)

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
Low	2412.0	0.87	0.50	9.98	0.00	11.35	13.65
Mid	2437.0	1.26	0.50	9.98	0.00	11.74	14.93
High	2462.0	1.99	0.50	9.98	0.00	12.47	17.66

Sample Calculation:

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

E.I.R.P = Result + Antenna Gain

**[Pre check]**

Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
0	2437.0	1.30	0.50	9.98	0.00	11.78	15.07
1	2437.0	1.33	0.50	9.98	0.00	<b>11.81</b>	15.17
2	2437.0	1.26	0.50	9.98	0.00	11.74	14.93
3	2437.0	1.31	0.50	9.98	0.00	11.79	15.10
4	2437.0	1.26	0.50	9.98	0.00	11.74	14.93
5	2437.0	1.32	0.50	9.98	0.00	11.80	15.14
6	2437.0	1.16	0.50	9.98	0.00	11.64	14.59
7	2437.0	1.28	0.50	9.98	0.00	11.76	15.00

Sample Calculation:

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

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## Maximum Conducted Output Power (Reference data)

(AVGPM)

Test place                   UL Japan, Inc. Shonan EMC Lab.       No.5 Shielded Room  
 Date                         August 15, 2013  
 Temperature / Humidity   25deg.C       , 65%RH  
 Engineer                  Hikaru Shirasawa  
 Mode                        Tx, IEEE802.11n (HT20), PN9, power setting 10                   worst data mode :           1 (MCS)

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
Low	2412.0	-0.96	0.50	9.98	0.00	9.52	8.95
Mid	2437.0	-0.46	0.50	9.98	0.00	10.02	10.05
High	2462.0	0.34	0.50	9.98	0.00	10.82	12.08

Sample Calculation:

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

E.I.R.P = Result + Antenna Gain

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## Maximum Conducted Output Power (Reference data)

(AVGPM)

Test place                    UL Japan, Inc. Shonan EMC Lab.      No.5 Shielded Room  
 Date                            Augsut 15, 2013  
 Temperature / Humidity    25deg.C      , 65%RH  
 Engineer                    Hikaru Shirasawa  
 Mode                         Tx, IEEE802.11n (HT40), PN9, power setting 12                    worst data mode :                    1 (MCS)

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
Low	2422.0	0.09	0.50	9.98	0.00	10.57	11.40
Mid	2437.0	0.52	0.50	9.98	0.00	11.00	12.59
High	2452.0	0.77	0.50	9.98	0.00	11.25	13.34

Sample Calculation:

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

E.I.R.P = Result + Antenna Gain

### [Pre check]

Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
0	2437.0	0.52	0.50	9.98	0.00	11.00	12.59
1	2437.0	0.60	0.50	9.98	0.00	<b>11.08</b>	12.82
2	2437.0	0.55	0.50	9.98	0.00	11.03	12.68
3	2437.0	0.52	0.50	9.98	0.00	11.00	12.59
4	2437.0	0.50	0.50	9.98	0.00	10.98	12.53
5	2437.0	0.51	0.50	9.98	0.00	10.99	12.56
6	2437.0	0.57	0.50	9.98	0.00	11.05	12.74
7	2437.0	0.50	0.50	9.98	0.00	10.98	12.53

Sample Calculation:

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

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**Maximum Conducted Output Power (Reference data)**

(AVGPM)

Test place                   UL Japan, Inc. Shonan EMC Lab.      No.5 Shielded Room  
 Date                            August 15, 2013  
 Temperature / Humidity    25deg.C      , 65%RH  
 Engineer                    Hikaru Shirasawa  
 Mode                         Tx, IEEE802.11n (HT40), PN9, power setting 10                   worst data mode :                   1 (MCS)

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result	
						[dBm]	[mW]
Low	2422.0	-1.74	0.50	9.98	0.00	8.74	7.48
Mid	2437.0	-1.48	0.50	9.98	0.00	9.00	7.94
High	2452.0	-1.32	0.50	9.98	0.00	9.16	8.24

Sample Calculation:

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

E.I.R.P = Result + Antenna Gain

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2412 MHz  
                              Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14

(\* 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	47.4	27.6	24.9	41.1	58.8	73.9	15.1	100	108	
Hori.	4824.000	PK	48.5	31.2	7.5	41.2	46.0	73.9	27.9	100	64	
Hori.	7236.000	PK	48.3	36.1	9.0	41.0	52.4	73.9	21.5	100	167	
Hori.	9648.000	PK	45.6	38.1	10.2	38.9	55.0	73.9	18.9	100	0	
Hori.	12060.000	PK	46.9	39.0	11.5	39.1	58.3	73.9	15.6	100	359	
Hori.	2390.000	AV	34.1	27.6	24.9	41.1	45.5	53.9	8.4	100	108	
Hori.	4824.000	AV	37.3	31.2	7.5	41.2	34.8	53.9	19.1	100	64	
Hori.	7236.000	AV	36.4	36.1	9.0	41.0	40.5	53.9	13.4	100	167	
Hori.	9648.000	AV	32.6	38.1	10.2	38.9	42.0	53.9	11.9	100	0	
Hori.	12060.000	AV	34.2	39.0	11.5	39.1	45.6	53.9	8.3	100	359	
Vert.	2390.000	PK	48.0	27.6	24.9	41.1	59.4	73.9	14.5	100	170	
Vert.	4824.000	PK	49.2	31.2	7.5	41.2	46.7	73.9	27.2	100	0	
Vert.	7236.000	PK	47.4	36.1	9.0	41.0	51.5	73.9	22.4	100	183	
Vert.	9648.000	PK	45.4	38.1	10.2	38.9	54.8	73.9	19.1	100	359	
Vert.	12060.000	PK	46.6	39.0	11.5	39.1	58.0	73.9	15.9	100	0	
Vert.	2390.000	AV	34.0	27.6	24.9	41.1	45.4	53.9	8.5	100	170	
Vert.	4824.000	AV	40.5	31.2	7.5	41.2	38.0	53.9	15.9	100	0	
Vert.	7236.000	AV	35.6	36.1	9.0	41.0	39.7	53.9	14.2	100	183	
Vert.	9648.000	AV	33.2	38.1	10.2	38.9	42.6	53.9	11.3	100	359	
Vert.	12060.000	AV	34.1	39.0	11.5	39.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	76.6	27.6	24.9	41.1	88.0	-	-	
Hori.	2399.080	PK	41.3	27.6	24.9	41.1	52.7	68.0	15.3	
Hori.	2400.000	PK	37.9	27.6	24.9	41.1	49.3	68.0	18.7	
Vert.	2412.000	PK	72.3	27.6	24.9	41.1	83.7	-	-	
Vert.	2399.080	PK	38.1	27.6	24.9	41.1	49.5	63.7	14.2	
Vert.	2400.000	PK	38.9	27.6	24.9	41.1	50.3	63.7	13.4	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2437 MHz  
                              Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14

(\* 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.	4874.000	PK	48.2	31.3	7.5	41.2	45.8	73.9	28.1	100	228	
Hori.	7311.000	PK	47.1	36.1	9.0	41.1	51.1	73.9	22.8	100	159	
Hori.	9748.000	PK	44.6	38.1	10.1	38.8	54.0	73.9	19.9	100	359	
Hori.	12185.000	PK	45.5	38.9	11.4	39.1	56.7	73.9	17.2	100	0	
Hori.	4874.000	AV	37.2	31.3	7.5	41.2	34.8	53.9	19.1	100	228	
Hori.	7311.000	AV	35.3	36.1	9.0	41.1	39.3	53.9	14.6	100	159	
Hori.	9748.000	AV	32.3	38.1	10.1	38.8	41.7	53.9	12.2	100	359	
Hori.	12185.000	AV	32.1	38.9	11.4	39.1	43.3	53.9	10.6	100	0	
Vert.	4874.000	PK	49.1	31.3	7.5	41.2	46.7	73.9	27.2	100	308	
Vert.	7311.000	PK	46.2	36.1	9.0	41.1	50.2	73.9	23.7	100	196	
Vert.	9748.000	PK	46.6	38.1	10.1	38.8	56.0	73.9	17.9	136	173	
Vert.	12185.000	PK	46.0	38.9	11.4	39.1	57.2	73.9	16.7	100	359	
Vert.	4874.000	AV	40.4	31.3	7.5	41.2	38.0	53.9	15.9	100	308	
Vert.	7311.000	AV	34.8	36.1	9.0	41.1	38.8	53.9	15.1	100	196	
Vert.	9748.000	AV	35.5	38.1	10.1	38.8	44.9	53.9	<b>9.0</b>	136	173	
Vert.	12185.000	AV	32.4	38.9	11.4	39.1	43.6	53.9	10.3	100	359	

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

Distance factor : 15GHz -40GHz :  $20\log(3.0m/1.0m) = 9.5dB$ **UL Japan, Inc.****Shonan EMC Lab.**

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2462 MHz  
                               Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14

(\* 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	58.9	27.6	25.0	41.0	70.5	73.9	<b>3.4</b>	100	111	
Hori.	4924.000	PK	48.7	31.4	7.5	41.1	46.5	73.9	27.4	100	28	
Hori.	7386.000	PK	49.5	36.2	9.0	41.1	53.6	73.9	20.3	100	159	
Hori.	9848.000	PK	44.9	38.1	10.0	38.8	54.2	73.9	19.7	100	49	
Hori.	12310.000	PK	44.6	38.9	11.3	39.1	55.7	73.9	18.2	100	0	
Hori.	2483.500	AV	34.1	27.6	25.0	41.0	45.7	53.9	8.2	100	111	
Hori.	4924.000	AV	39.1	31.4	7.5	41.1	36.9	53.9	17.0	100	28	
Hori.	7386.000	AV	35.5	36.2	9.0	41.1	39.6	53.9	14.3	100	159	
Hori.	9848.000	AV	33.4	38.1	10.0	38.8	42.7	53.9	11.2	100	49	
Hori.	12310.000	AV	31.6	38.9	11.3	39.1	42.7	53.9	11.2	100	0	
Vert.	2483.500	PK	58.6	27.6	25.0	41.0	70.2	73.9	3.7	100	185	
Vert.	4924.000	PK	49.6	31.4	7.5	41.1	47.4	73.9	26.5	100	355	
Vert.	7386.000	PK	46.7	36.2	9.0	41.1	50.8	73.9	23.1	100	189	
Vert.	9848.000	PK	44.0	38.1	10.0	38.8	53.3	73.9	20.6	153	17	
Vert.	12310.000	PK	44.5	38.9	11.3	39.1	55.6	73.9	18.3	100	359	
Vert.	2483.500	AV	34.4	27.6	25.0	41.0	46.0	53.9	7.9	100	185	
Vert.	4924.000	AV	41.0	31.4	7.5	41.1	38.8	53.9	15.1	100	355	
Vert.	7386.000	AV	35.0	36.2	9.0	41.1	39.1	53.9	14.8	100	189	
Vert.	9848.000	AV	33.3	38.1	10.0	38.8	42.6	53.9	11.3	153	17	
Vert.	12310.000	AV	31.2	38.9	11.3	39.1	42.3	53.9	11.6	100	359	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0m/1.0m) = 9.5dB$

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                    26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2412 MHz  
                               Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 11

(\* 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	46.6	27.6	24.9	41.1	58.0	73.9	15.9	100	108	
Hori.	4824.000	PK	47.7	31.2	7.5	41.2	45.2	73.9	28.7	100	64	
Hori.	7236.000	PK	47.9	36.1	9.0	41.0	52.0	73.9	21.9	100	167	
Hori.	9648.000	PK	45.2	38.1	10.2	38.9	54.6	73.9	19.3	100	0	
Hori.	12060.000	PK	46.9	39.0	11.5	39.1	58.3	73.9	15.6	100	359	
Hori.	2390.000	AV	33.6	27.6	24.9	41.1	45.0	53.9	8.9	100	108	
Hori.	4824.000	AV	34.9	31.2	7.5	41.2	32.4	53.9	21.5	100	64	
Hori.	7236.000	AV	35.4	36.1	9.0	41.0	39.5	53.9	14.4	100	167	
Hori.	9648.000	AV	32.1	38.1	10.2	38.9	41.5	53.9	12.4	100	0	
Hori.	12060.000	AV	33.6	39.0	11.5	39.1	45.0	53.9	8.9	100	359	
Vert.	2390.000	PK	47.1	27.6	24.9	41.1	58.5	73.9	15.4	100	170	
Vert.	4824.000	PK	47.7	31.2	7.5	41.2	45.2	73.9	28.7	100	0	
Vert.	7236.000	PK	48.5	36.1	9.0	41.0	52.6	73.9	21.3	100	183	
Vert.	9648.000	PK	45.6	38.1	10.2	38.9	55.0	73.9	18.9	100	359	
Vert.	12060.000	PK	46.7	39.0	11.5	39.1	58.1	73.9	15.8	100	0	
Vert.	2390.000	AV	33.2	27.6	24.9	41.1	44.6	53.9	9.3	100	170	
Vert.	4824.000	AV	37.0	31.2	7.5	41.2	34.5	53.9	19.4	100	0	
Vert.	7236.000	AV	35.5	36.1	9.0	41.0	39.6	53.9	14.3	100	183	
Vert.	9648.000	AV	32.7	38.1	10.2	38.9	42.1	53.9	11.8	100	359	
Vert.	12060.000	AV	34.1	39.0	11.5	39.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	75.7	27.6	24.9	41.1	87.1	-	-	
Hori.	2399.080	PK	40.4	27.6	24.9	41.1	51.8	67.1	15.3	
Hori.	2400.000	PK	36.9	27.6	24.9	41.1	48.3	67.1	18.8	
Vert.	2412.000	PK	70.8	27.6	24.9	41.1	82.2	-	-	
Vert.	2399.080	PK	36.8	27.6	24.9	41.1	48.2	62.2	14.0	
Vert.	2400.000	PK	37.7	27.6	24.9	41.1	49.1	62.2	13.1	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
Date                    August 18, 2013                    August 19, 2013  
Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
Mode                    Tx,                    2437 MHz  
                             Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 11

(\* 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.	4874.000	PK	46.3	31.3	7.5	41.2	43.9	73.9	30.0	100	228	
Hori.	7311.000	PK	47.0	36.1	9.0	41.1	51.0	73.9	22.9	100	159	
Hori.	9748.000	PK	44.3	38.1	10.1	38.8	53.7	73.9	20.2	100	359	
Hori.	12185.000	PK	45.2	38.9	11.4	39.1	56.4	73.9	17.5	100	0	
Hori.	4874.000	AV	34.1	31.3	7.5	41.2	31.7	53.9	22.2	100	228	
Hori.	7311.000	AV	34.8	36.1	9.0	41.1	38.8	53.9	15.1	100	159	
Hori.	9748.000	AV	32.3	38.1	10.1	38.8	41.7	53.9	12.2	100	359	
Hori.	12185.000	AV	32.3	38.9	11.4	39.1	43.5	53.9	<b>10.4</b>	100	0	
Vert.	4874.000	PK	47.3	31.3	7.5	41.2	44.9	73.9	29.0	100	308	
Vert.	7311.000	PK	46.1	36.1	9.0	41.1	50.1	73.9	23.8	100	196	
Vert.	9748.000	PK	44.6	38.1	10.1	38.8	54.0	73.9	19.9	136	173	
Vert.	12185.000	PK	44.2	38.9	11.4	39.1	55.4	73.9	18.5	100	359	
Vert.	4874.000	AV	36.2	31.3	7.5	41.2	33.8	53.9	20.1	100	308	
Vert.	7311.000	AV	34.4	36.1	9.0	41.1	38.4	53.9	15.5	100	196	
Vert.	9748.000	AV	32.1	38.1	10.1	38.8	41.5	53.9	12.4	136	173	
Vert.	12185.000	AV	32.0	38.9	11.4	39.1	43.2	53.9	10.7	100	359	

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

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

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer                Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2462 MHz  
                               Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 11

(\* 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	57.7	27.6	25.0	41.0	69.3	73.9	4.6	100	111	
Hori.	4924.000	PK	47.1	31.4	7.5	41.1	44.9	73.9	29.0	100	28	
Hori.	7386.000	PK	45.8	36.2	9.0	41.1	49.9	73.9	24.0	100	159	
Hori.	9848.000	PK	43.9	38.1	10.0	38.8	53.2	73.9	20.7	100	49	
Hori.	12310.000	PK	44.1	38.9	11.3	39.1	55.2	73.9	18.7	100	0	
Hori.	2483.500	AV	33.9	27.6	25.0	41.0	45.5	53.9	8.4	100	111	
Hori.	4924.000	AV	36.4	31.4	7.5	41.1	34.2	53.9	19.7	100	28	
Hori.	7386.000	AV	34.4	36.2	9.0	41.1	38.5	53.9	15.4	100	159	
Hori.	9848.000	AV	31.6	38.1	10.0	38.8	40.9	53.9	13.0	100	49	
Hori.	12310.000	AV	31.4	38.9	11.3	39.1	42.5	53.9	11.4	100	0	
Vert.	2483.500	PK	57.6	27.6	25.0	41.0	69.2	73.9	4.7	100	185	
Vert.	4924.000	PK	46.5	31.4	7.5	41.1	44.3	73.9	29.6	112	189	
Vert.	7386.000	PK	46.7	36.2	9.0	41.1	50.8	73.9	23.1	100	189	
Vert.	9848.000	PK	44.6	38.1	10.0	38.8	53.9	73.9	20.0	100	17	
Vert.	12310.000	PK	44.9	38.9	11.3	39.1	56.0	73.9	17.9	100	359	
Vert.	2483.500	AV	33.9	27.6	25.0	41.0	45.5	53.9	8.4	100	185	
Vert.	4924.000	AV	34.9	31.4	7.5	41.1	32.7	53.9	21.2	112	189	
Vert.	7386.000	AV	34.5	36.2	9.0	41.1	38.6	53.9	15.3	100	189	
Vert.	9848.000	AV	32.2	38.1	10.0	38.8	41.5	53.9	12.4	100	17	
Vert.	12310.000	AV	31.7	38.9	11.3	39.1	42.8	53.9	11.1	100	359	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2412 MHz  
                              Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12

(\* 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	49.9	27.6	24.9	41.1	61.3	73.9	12.6	100	118	
Hori.	4824.000	PK	46.9	31.2	7.5	41.2	44.4	73.9	29.5	100	10	
Hori.	7236.000	PK	48.4	36.1	9.0	41.0	52.5	73.9	21.4	100	163	
Hori.	9648.000	PK	45.2	38.1	10.2	38.9	54.6	73.9	19.3	100	0	
Hori.	12060.000	PK	46.7	39.0	11.5	39.1	58.1	73.9	15.8	100	359	
Hori.	2390.000	AV	35.0	27.6	24.9	41.1	46.4	53.9	7.5	100	118	
Hori.	4824.000	AV	33.9	31.2	7.5	41.2	31.4	53.9	22.5	100	10	
Hori.	7236.000	AV	35.6	36.1	9.0	41.0	39.7	53.9	14.2	100	163	
Hori.	9648.000	AV	32.2	38.1	10.2	38.9	41.6	53.9	12.3	100	0	
Hori.	12060.000	AV	34.1	39.0	11.5	39.1	45.5	53.9	8.4	100	359	
Vert.	2390.000	PK	49.4	27.6	24.9	41.1	60.8	73.9	13.1	100	177	
Vert.	4824.000	PK	46.1	31.2	7.5	41.2	43.6	73.9	30.3	100	297	
Vert.	7236.000	PK	48.0	36.1	9.0	41.0	52.1	73.9	21.8	100	308	
Vert.	9648.000	PK	45.2	38.1	10.2	38.9	54.6	73.9	19.3	100	359	
Vert.	12060.000	PK	48.3	39.0	11.5	39.1	59.7	73.9	14.2	100	0	
Vert.	2390.000	AV	34.4	27.6	24.9	41.1	45.8	53.9	8.1	100	177	
Vert.	4824.000	AV	34.3	31.2	7.5	41.2	31.8	53.9	22.1	100	297	
Vert.	7236.000	AV	35.6	36.1	9.0	41.0	39.7	53.9	14.2	100	308	
Vert.	9648.000	AV	32.6	38.1	10.2	38.9	42.0	53.9	11.9	100	359	
Vert.	12060.000	AV	34.2	39.0	11.5	39.1	45.6	53.9	8.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0m/1.0m) = 9.5dB$

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	73.8	27.6	24.9	41.1	85.2	-	-	
Hori.	2400.000	PK	42.9	27.6	24.9	41.1	54.3	65.2	10.9	
Vert.	2412.000	PK	72.4	27.6	24.9	41.1	83.8	-	-	
Vert.	2400.000	PK	41.2	27.6	24.9	41.1	52.6	63.8	11.2	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2437 MHz  
                              Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12

(\* 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.	4874.000	PK	47.0	31.3	7.5	41.2	44.6	73.9	29.3	100	0	
Hori.	7311.000	PK	47.8	36.1	9.0	41.1	51.8	73.9	22.1	100	359	
Hori.	9748.000	PK	45.8	38.1	10.1	38.8	55.2	73.9	18.7	100	0	
Hori.	12185.000	PK	44.2	38.9	11.4	39.1	55.4	73.9	18.5	100	359	
Hori.	4874.000	AV	34.1	31.3	7.5	41.2	31.7	53.9	22.2	100	0	
Hori.	7311.000	AV	35.3	36.1	9.0	41.1	39.3	53.9	14.6	100	359	
Hori.	9748.000	AV	32.5	38.1	10.1	38.8	41.9	53.9	12.0	100	0	
Hori.	12185.000	AV	34.3	38.9	11.4	39.1	45.5	53.9	<b>8.4</b>	100	359	
Vert.	4874.000	PK	46.4	31.3	7.5	41.2	44.0	73.9	29.9	100	0	
Vert.	7311.000	PK	47.9	36.1	9.0	41.1	51.9	73.9	22.0	100	359	
Vert.	9748.000	PK	44.9	38.1	10.1	38.8	54.3	73.9	19.6	100	359	
Vert.	12185.000	PK	46.9	38.9	11.4	39.1	58.1	73.9	15.8	100	0	
Vert.	4874.000	AV	34.1	31.3	7.5	41.2	31.7	53.9	22.2	100	0	
Vert.	7311.000	AV	35.0	36.1	9.0	41.1	39.0	53.9	14.9	100	359	
Vert.	9748.000	AV	32.1	38.1	10.1	38.8	41.5	53.9	12.4	100	359	
Vert.	12185.000	AV	33.9	38.9	11.4	39.1	45.1	53.9	8.8	100	0	

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

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

## Radiated Emission

Test place                    No.3 Semi Anechoic Chamber  
 Date                            August 18, 2013                    August 19, 2013                    August 20, 2013  
 Temperature / Humidity    24 deg.C, 62 %RH                26 deg.C, 64 %RH                24 deg.C, 66 %RH  
 Engineer                      Takahiro Suzuki                    Hikaru Shirasawa                    Shinichi Takano  
 Mode                            Tx,                            2462 MHz  
                                      Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12

(\* 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.	240.004	QP	48.4	16.9	8.2	32.0	41.5	46.0	4.5	209	276	
Hori.	335.997	QP	50.0	14.8	8.7	31.9	41.6	46.0	4.4	100	84	
Hori.	2483.500	PK	57.7	27.6	25.0	41.0	69.3	73.9	4.6	100	74	
Hori.	4924.000	PK	46.6	31.4	7.5	41.1	44.4	73.9	29.5	100	0	
Hori.	7386.000	PK	47.3	36.2	9.0	41.1	51.4	73.9	22.5	100	164	
Hori.	9848.000	PK	44.4	38.1	10.0	38.8	53.7	73.9	20.2	100	0	
Hori.	12310.000	PK	44.8	38.9	11.3	39.1	55.9	73.9	18.0	100	359	
Hori.	2483.500	AV	35.6	27.6	25.0	41.0	47.2	53.9	6.7	100	74	
Hori.	4924.000	AV	33.8	31.4	7.5	41.1	31.6	53.9	22.3	100	0	
Hori.	7386.000	AV	34.7	36.2	9.0	41.1	38.8	53.9	15.1	100	164	
Hori.	9848.000	AV	31.8	38.1	10.0	38.8	41.1	53.9	12.8	100	0	
Hori.	12310.000	AV	31.6	38.9	11.3	39.1	42.7	53.9	11.2	100	359	
Vert.	47.997	QP	51.8	11.5	6.7	32.2	37.8	40.0	2.2	100	175	
Vert.	239.996	QP	45.2	16.9	8.2	32.0	38.3	46.0	7.7	100	28	
Vert.	335.999	QP	47.9	14.8	8.7	31.9	39.5	46.0	6.5	165	202	
Vert.	2483.500	PK	60.8	27.6	25.0	41.0	72.4	73.9	1.5	100	173	
Vert.	4924.000	PK	47.4	31.4	7.5	41.1	45.2	73.9	28.7	100	181	
Vert.	7386.000	PK	47.8	36.2	9.0	41.1	51.9	73.9	22.0	100	359	
Vert.	9848.000	PK	43.9	38.1	10.0	38.8	53.2	73.9	20.7	100	359	
Vert.	12310.000	PK	44.7	38.9	11.3	39.1	55.8	73.9	18.1	100	0	
Vert.	2483.500	AV	35.2	27.6	25.0	41.0	46.8	53.9	7.1	100	173	
Vert.	4924.000	AV	35.0	31.4	7.5	41.1	32.8	53.9	21.1	100	181	
Vert.	7386.000	AV	34.4	36.2	9.0	41.1	38.5	53.9	15.4	100	359	
Vert.	9848.000	AV	31.3	38.1	10.0	38.8	40.6	53.9	13.3	100	359	
Vert.	12310.000	AV	31.5	38.9	11.3	39.1	42.6	53.9	11.3	100	0	

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

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2412 MHz  
                              Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10

(\* 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	49.4	27.6	24.9	41.1	60.8	73.9	13.1	100	118	
Hori.	4824.000	PK	46.6	31.2	7.5	41.2	44.1	73.9	29.8	100	10	
Hori.	7236.000	PK	48.6	36.1	9.0	41.0	52.7	73.9	21.2	100	163	
Hori.	9648.000	PK	45.9	38.1	10.2	38.9	55.3	73.9	18.6	100	0	
Hori.	12060.000	PK	46.6	39.0	11.5	39.1	58.0	73.9	15.9	100	359	
Hori.	2390.000	AV	34.7	27.6	24.9	41.1	46.1	53.9	7.8	100	118	
Hori.	4824.000	AV	34.0	31.2	7.5	41.2	31.5	53.9	22.4	100	10	
Hori.	7236.000	AV	35.4	36.1	9.0	41.0	39.5	53.9	14.4	100	163	
Hori.	9648.000	AV	32.6	38.1	10.2	38.9	42.0	53.9	11.9	100	0	
Hori.	12060.000	AV	34.1	39.0	11.5	39.1	45.5	53.9	8.4	100	359	
Vert.	2390.000	PK	48.8	27.6	24.9	41.1	60.2	73.9	13.7	100	177	
Vert.	4824.000	PK	46.8	31.2	7.5	41.2	44.3	73.9	29.6	100	297	
Vert.	7236.000	PK	48.5	36.1	9.0	41.0	52.6	73.9	21.3	100	308	
Vert.	9648.000	PK	44.9	38.1	10.2	38.9	54.3	73.9	19.6	100	359	
Vert.	12060.000	PK	46.7	39.0	11.5	39.1	58.1	73.9	15.8	100	0	
Vert.	2390.000	AV	33.8	27.6	24.9	41.1	45.2	53.9	8.7	100	177	
Vert.	4824.000	AV	34.0	31.2	7.5	41.2	31.5	53.9	22.4	100	297	
Vert.	7236.000	AV	35.4	36.1	9.0	41.0	39.5	53.9	14.4	100	308	
Vert.	9648.000	AV	32.2	38.1	10.2	38.9	41.6	53.9	12.3	100	359	
Vert.	12060.000	AV	33.9	39.0	11.5	39.1	45.3	53.9	8.6	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	73.0	27.6	24.9	41.1	84.4	-	-	
Hori.	2400.000	PK	42.3	27.6	24.9	41.1	53.7	64.4	10.7	
Vert.	2412.000	PK	71.7	27.6	24.9	41.1	83.1	-	-	
Vert.	2400.000	PK	40.8	27.6	24.9	41.1	52.2	63.1	10.9	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2437 MHz  
                              Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10

(\* 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.	4874.000	PK	47.0	31.3	7.5	41.2	44.6	73.9	29.3	100	0	
Hori.	7311.000	PK	48.0	36.1	9.0	41.1	52.0	73.9	21.9	100	359	
Hori.	9748.000	PK	45.2	38.1	10.1	38.8	54.6	73.9	19.3	100	0	
Hori.	12185.000	PK	45.3	38.9	11.4	39.1	56.5	73.9	17.4	100	359	
Hori.	4874.000	AV	33.8	31.3	7.5	41.2	31.4	53.9	22.5	100	0	
Hori.	7311.000	AV	34.6	36.1	9.0	41.1	38.6	53.9	15.3	100	359	
Hori.	9748.000	AV	31.8	38.1	10.1	38.8	41.2	53.9	12.7	100	0	
Hori.	12185.000	AV	32.3	38.9	11.4	39.1	43.5	53.9	10.4	100	359	
Vert.	4874.000	PK	47.1	31.3	7.5	41.2	44.7	73.9	29.2	100	0	
Vert.	7311.000	PK	47.5	36.1	9.0	41.1	51.5	73.9	22.4	100	359	
Vert.	9748.000	PK	45.1	38.1	10.1	38.8	54.5	73.9	19.4	100	359	
Vert.	12185.000	PK	45.5	38.9	11.4	39.1	56.7	73.9	17.2	100	0	
Vert.	4874.000	AV	34.1	31.3	7.5	41.2	31.7	53.9	22.2	100	0	
Vert.	7311.000	AV	34.7	36.1	9.0	41.1	38.7	53.9	15.2	100	359	
Vert.	9748.000	AV	32.2	38.1	10.1	38.8	41.6	53.9	12.3	100	359	
Vert.	12185.000	AV	32.5	38.9	11.4	39.1	43.7	53.9	<b>10.2</b>	100	0	

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

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

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013                    August 20, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                    26 deg.C, 64 %RH                    24 deg.C, 66 %RH  
 Engineer                Takahiro Suzuki                    Hikaru Shirasawa                    Shinichi Takano  
 Mode                    Tx,                    2462 MHz  
                               Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10

(\* 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.	240.002	QP	48.0	16.9	8.2	32.0	41.1	46.0	4.9	211	280	
Hori.	335.998	QP	50.1	14.8	8.7	31.9	41.7	46.0	4.3	100	91	
Hori.	2483.500	PK	57.0	27.6	25.0	41.0	68.6	73.9	5.3	100	74	
Hori.	4924.000	PK	47.1	31.4	7.5	41.1	44.9	73.9	29.0	100	0	
Hori.	7386.000	PK	46.2	36.2	9.0	41.1	50.3	73.9	23.6	100	164	
Hori.	9848.000	PK	44.5	38.1	10.0	38.8	53.8	73.9	20.1	100	0	
Hori.	12310.000	PK	45.0	38.9	11.3	39.1	56.1	73.9	17.8	100	359	
Hori.	2483.500	AV	34.8	27.6	25.0	41.0	46.4	53.9	7.5	100	74	
Hori.	4924.000	AV	33.7	31.4	7.5	41.1	31.5	53.9	22.4	100	0	
Hori.	7386.000	AV	34.1	36.2	9.0	41.1	38.2	53.9	15.7	100	164	
Hori.	9848.000	AV	31.2	38.1	10.0	38.8	40.5	53.9	13.4	100	0	
Hori.	12310.000	AV	31.4	38.9	11.3	39.1	42.5	53.9	11.4	100	359	
Vert.	47.995	QP	51.5	11.5	6.7	32.2	37.5	40.0	2.5	100	164	
Vert.	239.994	QP	45.4	16.9	8.2	32.0	38.5	46.0	7.5	100	20	
Vert.	336.009	QP	47.6	14.8	8.7	31.9	39.2	46.0	6.8	171	200	
Vert.	2483.500	PK	59.8	27.6	25.0	41.0	71.4	73.9	2.5	100	173	
Vert.	4924.000	PK	47.8	31.4	7.5	41.1	45.6	73.9	28.3	100	181	
Vert.	7386.000	PK	47.6	36.2	9.0	41.1	51.7	73.9	22.2	100	359	
Vert.	9848.000	PK	44.5	38.1	10.0	38.8	53.8	73.9	20.1	100	359	
Vert.	12310.000	PK	44.4	38.9	11.3	39.1	55.5	73.9	18.4	100	0	
Vert.	2483.500	AV	34.7	27.6	25.0	41.0	46.3	53.9	7.6	100	173	
Vert.	4924.000	AV	34.1	31.4	7.5	41.1	31.9	53.9	22.0	100	181	
Vert.	7386.000	AV	34.3	36.2	9.0	41.1	38.4	53.9	15.5	100	359	
Vert.	9848.000	AV	31.2	38.1	10.0	38.8	40.5	53.9	13.4	100	359	
Vert.	12310.000	AV	31.5	38.9	11.3	39.1	42.6	53.9	11.3	100	0	

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

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer                Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2412 MHz  
                              Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12

(\* 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	53.3	27.6	24.9	41.1	64.7	73.9	9.2	100	120	
Hori.	4824.000	PK	47.7	31.2	7.5	41.2	45.2	73.9	28.7	100	0	
Hori.	7236.000	PK	48.2	36.1	9.0	41.0	52.3	73.9	21.6	100	359	
Hori.	9648.000	PK	45.6	38.1	10.2	38.9	55.0	73.9	18.9	100	0	
Hori.	12060.000	PK	46.8	39.0	11.5	39.1	58.2	73.9	15.7	100	359	
Hori.	2390.000	AV	35.6	27.6	24.9	41.1	47.0	53.9	<b>6.9</b>	100	120	
Hori.	4824.000	AV	33.7	31.2	7.5	41.2	31.2	53.9	22.7	100	0	
Hori.	7236.000	AV	35.5	36.1	9.0	41.0	39.6	53.9	14.3	100	359	
Hori.	9648.000	AV	32.7	38.1	10.2	38.9	42.1	53.9	11.8	100	0	
Hori.	12060.000	AV	34.3	39.0	11.5	39.1	45.7	53.9	8.2	100	359	
Vert.	2390.000	PK	49.9	27.6	24.9	41.1	61.3	73.9	12.6	100	170	
Vert.	4824.000	PK	46.8	31.2	7.5	41.2	44.3	73.9	29.6	100	359	
Vert.	7236.000	PK	48.0	36.1	9.0	41.0	52.1	73.9	21.8	100	0	
Vert.	9648.000	PK	44.9	38.1	10.2	38.9	54.3	73.9	19.6	100	359	
Vert.	12060.000	PK	47.2	39.0	11.5	39.1	58.6	73.9	15.3	100	0	
Vert.	2390.000	AV	34.8	27.6	24.9	41.1	46.2	53.9	7.7	100	170	
Vert.	4824.000	AV	34.2	31.2	7.5	41.2	31.7	53.9	22.2	100	359	
Vert.	7236.000	AV	35.4	36.1	9.0	41.0	39.5	53.9	14.4	100	0	
Vert.	9648.000	AV	32.5	38.1	10.2	38.9	41.9	53.9	12.0	100	359	
Vert.	12060.000	AV	34.2	39.0	11.5	39.1	45.6	53.9	8.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	73.9	27.6	24.9	41.1	85.3	-	-	
Hori.	2400.000	PK	44.6	27.6	24.9	41.1	56.0	65.3	9.3	
Vert.	2412.000	PK	72.3	27.6	24.9	41.1	83.7	-	-	
Vert.	2400.000	PK	40.8	27.6	24.9	41.1	52.2	63.7	11.5	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
Date                    August 18, 2013                    August 19, 2013  
Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
Mode                    Tx,                    2437 MHz  
                             Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12

(\* 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.	4874.000	PK	46.6	31.3	7.5	41.2	44.2	73.9	29.7	100	0	
Hori.	7311.000	PK	47.7	36.1	9.0	41.1	51.7	73.9	22.2	100	359	
Hori.	9748.000	PK	45.3	38.1	10.1	38.8	54.7	73.9	19.2	100	0	
Hori.	12185.000	PK	45.4	38.9	11.4	39.1	56.6	73.9	17.3	100	359	
Hori.	4874.000	AV	33.8	31.3	7.5	41.2	31.4	53.9	22.5	100	0	
Hori.	7311.000	AV	33.8	36.1	9.0	41.1	37.8	53.9	16.1	100	359	
Hori.	9748.000	AV	32.4	38.1	10.1	38.8	41.8	53.9	12.1	100	0	
Hori.	12185.000	AV	32.7	38.9	11.4	39.1	43.9	53.9	<b>10.0</b>	100	359	
Vert.	4874.000	PK	46.9	31.3	7.5	41.2	44.5	73.9	29.4	100	0	
Vert.	7311.000	PK	47.9	36.1	9.0	41.1	51.9	73.9	22.0	100	359	
Vert.	9748.000	PK	45.5	38.1	10.1	38.8	54.9	73.9	19.0	100	359	
Vert.	12185.000	PK	45.7	38.9	11.4	39.1	56.9	73.9	17.0	100	0	
Vert.	4874.000	AV	34.0	31.3	7.5	41.2	31.6	53.9	22.3	100	0	
Vert.	7311.000	AV	34.8	36.1	9.0	41.1	38.8	53.9	15.1	100	359	
Vert.	9748.000	AV	32.0	38.1	10.1	38.8	41.4	53.9	12.5	100	359	
Vert.	12185.000	AV	32.6	38.9	11.4	39.1	43.8	53.9	10.1	100	0	

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

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

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2462 MHz  
                              Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12

(\* 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	58.4	27.6	25.0	41.0	70.0	73.9	<b>3.9</b>	100	119	
Hori.	4924.000	PK	46.8	31.4	7.5	41.1	44.6	73.9	29.3	100	0	
Hori.	7386.000	PK	47.5	36.2	9.0	41.1	51.6	73.9	22.3	100	359	
Hori.	9848.000	PK	44.4	38.1	10.0	38.8	53.7	73.9	20.2	100	0	
Hori.	12310.000	PK	44.7	38.9	11.3	39.1	55.8	73.9	18.1	100	359	
Hori.	2483.500	AV	35.3	27.6	25.0	41.0	46.9	53.9	7.0	100	119	
Hori.	4924.000	AV	34.2	31.4	7.5	41.1	32.0	53.9	21.9	100	0	
Hori.	7386.000	AV	34.5	36.2	9.0	41.1	38.6	53.9	15.3	100	359	
Hori.	9848.000	AV	31.3	38.1	10.0	38.8	40.6	53.9	13.3	100	0	
Hori.	12310.000	AV	31.6	38.9	11.3	39.1	42.7	53.9	11.2	100	359	
Vert.	2483.500	PK	53.0	27.6	25.0	41.0	64.6	73.9	9.3	100	174	
Vert.	4924.000	PK	46.5	31.4	7.5	41.1	44.3	73.9	29.6	100	0	
Vert.	7386.000	PK	47.8	36.2	9.0	41.1	51.9	73.9	22.0	100	359	
Vert.	9848.000	PK	45.0	38.1	10.0	38.8	54.3	73.9	19.6	100	359	
Vert.	12310.000	PK	46.1	38.9	11.3	39.1	57.2	73.9	16.7	100	0	
Vert.	2483.500	AV	34.9	27.6	25.0	41.0	46.5	53.9	7.4	100	174	
Vert.	4924.000	AV	34.6	31.4	7.5	41.1	32.4	53.9	21.5	100	0	
Vert.	7386.000	AV	34.9	36.2	9.0	41.1	39.0	53.9	14.9	100	359	
Vert.	9848.000	AV	31.9	38.1	10.0	38.8	41.2	53.9	12.7	100	359	
Vert.	12310.000	AV	33.1	38.9	11.3	39.1	44.2	53.9	9.7	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
Date                    August 18, 2013                    August 19, 2013  
Temperature / Humidity    24 deg.C, 62 %RH                26 deg.C, 64 %RH  
Engineer                Takahiro Suzuki                    Hikaru Shirasawa  
Mode                    Tx,                    2412 MHz  
                              Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10

(\* 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	52.7	27.6	24.9	41.1	64.1	73.9	9.8	100	120	
Hori.	4824.000	PK	48.1	31.2	7.5	41.2	45.6	73.9	28.3	100	0	
Hori.	7236.000	PK	48.3	36.1	9.0	41.0	52.4	73.9	21.5	100	359	
Hori.	9648.000	PK	45.1	38.1	10.2	38.9	54.5	73.9	19.4	100	0	
Hori.	12060.000	PK	47.9	39.0	11.5	39.1	59.3	73.9	14.6	100	359	
Hori.	2390.000	AV	34.8	27.6	24.9	41.1	46.2	53.9	7.7	100	120	
Hori.	4824.000	AV	33.7	31.2	7.5	41.2	31.2	53.9	22.7	100	0	
Hori.	7236.000	AV	35.2	36.1	9.0	41.0	39.3	53.9	14.6	100	359	
Hori.	9648.000	AV	32.3	38.1	10.2	38.9	41.7	53.9	12.2	100	0	
Hori.	12060.000	AV	34.3	39.0	11.5	39.1	45.7	53.9	8.2	100	359	
Vert.	2390.000	PK	49.2	27.6	24.9	41.1	60.6	73.9	13.3	100	170	
Vert.	4824.000	PK	46.8	31.2	7.5	41.2	44.3	73.9	29.6	100	359	
Vert.	7236.000	PK	48.4	36.1	9.0	41.0	52.5	73.9	21.4	100	0	
Vert.	9648.000	PK	45.2	38.1	10.2	38.9	54.6	73.9	19.3	100	359	
Vert.	12060.000	PK	47.1	39.0	11.5	39.1	58.5	73.9	15.4	100	0	
Vert.	2390.000	AV	34.2	27.6	24.9	41.1	45.6	53.9	8.3	100	170	
Vert.	4824.000	AV	33.9	31.2	7.5	41.2	31.4	53.9	22.5	100	359	
Vert.	7236.000	AV	35.3	36.1	9.0	41.0	39.4	53.9	14.5	100	0	
Vert.	9648.000	AV	32.4	38.1	10.2	38.9	41.8	53.9	12.1	100	359	
Vert.	12060.000	AV	34.1	39.0	11.5	39.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	73.0	27.6	24.9	41.1	84.4	-	-	
Hori.	2400.000	PK	43.9	27.6	24.9	41.1	55.3	64.4	9.1	
Vert.	2412.000	PK	71.8	27.6	24.9	41.1	83.2	-	-	
Vert.	2400.000	PK	40.0	27.6	24.9	41.1	51.4	63.2	11.8	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2437 MHz  
                              Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10

(\* 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.	4874.000	PK	47.1	31.3	7.5	41.2	44.7	73.9	29.2	100	0	
Hori.	7311.000	PK	48.4	36.1	9.0	41.1	52.4	73.9	21.5	100	359	
Hori.	9748.000	PK	44.7	38.1	10.1	38.8	54.1	73.9	19.8	100	0	
Hori.	12185.000	PK	45.7	38.9	11.4	39.1	56.9	73.9	17.0	100	359	
Hori.	4874.000	AV	33.7	31.3	7.5	41.2	31.3	53.9	22.6	100	0	
Hori.	7311.000	AV	34.4	36.1	9.0	41.1	38.4	53.9	15.5	100	359	
Hori.	9748.000	AV	31.8	38.1	10.1	38.8	41.2	53.9	12.7	100	0	
Hori.	12185.000	AV	32.4	38.9	11.4	39.1	43.6	53.9	10.3	100	359	
Vert.	4874.000	PK	45.6	31.3	7.5	41.2	43.2	73.9	30.7	100	0	
Vert.	7311.000	PK	47.6	36.1	9.0	41.1	51.6	73.9	22.3	100	359	
Vert.	9748.000	PK	45.1	38.1	10.1	38.8	54.5	73.9	19.4	100	359	
Vert.	12185.000	PK	45.6	38.9	11.4	39.1	56.8	73.9	17.1	100	0	
Vert.	4874.000	AV	32.6	31.3	7.5	41.2	30.2	53.9	23.7	100	0	
Vert.	7311.000	AV	34.6	36.1	9.0	41.1	38.6	53.9	15.3	100	359	
Vert.	9748.000	AV	32.1	38.1	10.1	38.8	41.5	53.9	12.4	100	359	
Vert.	12185.000	AV	32.9	38.9	11.4	39.1	44.1	53.9	<b>9.8</b>	100	0	

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

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



## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                26 deg.C, 64 %RH  
 Engineer              Takahiro Suzuki                    Hikaru Shirasawa  
 Mode                    Tx,                    2462 MHz  
                              Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10

(\* 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	57.6	27.6	25.0	41.0	69.2	73.9	4.7	100	119	
Hori.	4924.000	PK	47.0	31.4	7.5	41.1	44.8	73.9	29.1	100	0	
Hori.	7386.000	PK	48.2	36.2	9.0	41.1	52.3	73.9	21.6	100	359	
Hori.	9848.000	PK	45.0	38.1	10.0	38.8	54.3	73.9	19.6	100	0	
Hori.	12310.000	PK	45.2	38.9	11.3	39.1	56.3	73.9	17.6	100	359	
Hori.	2483.500	AV	34.7	27.6	25.0	41.0	46.3	53.9	7.6	100	119	
Hori.	4924.000	AV	32.6	31.4	7.5	41.1	30.4	53.9	23.5	100	0	
Hori.	7386.000	AV	34.4	36.2	9.0	41.1	38.5	53.9	15.4	100	359	
Hori.	9848.000	AV	30.4	38.1	10.0	38.8	39.7	53.9	14.2	100	0	
Hori.	12310.000	AV	31.8	38.9	11.3	39.1	42.9	53.9	11.0	100	359	
Vert.	2483.500	PK	52.2	27.6	25.0	41.0	63.8	73.9	10.1	100	174	
Vert.	4924.000	PK	47.3	31.4	7.5	41.1	45.1	73.9	28.8	100	0	
Vert.	7386.000	PK	48.0	36.2	9.0	41.1	52.1	73.9	21.8	100	359	
Vert.	9848.000	PK	44.8	38.1	10.0	38.8	54.1	73.9	19.8	100	359	
Vert.	12310.000	PK	45.1	38.9	11.3	39.1	56.2	73.9	17.7	100	0	
Vert.	2483.500	AV	33.9	27.6	25.0	41.0	45.5	53.9	8.4	100	174	
Vert.	4924.000	AV	34.4	31.4	7.5	41.1	32.2	53.9	21.7	100	0	
Vert.	7386.000	AV	34.3	36.2	9.0	41.1	38.4	53.9	15.5	100	359	
Vert.	9848.000	AV	31.4	38.1	10.0	38.8	40.7	53.9	13.2	100	359	
Vert.	12310.000	AV	31.7	38.9	11.3	39.1	42.8	53.9	11.1	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                25 deg.C, 58 %RH  
 Engineer              Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2422 MHz  
                              Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12

(\* 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	48.9	27.6	24.9	41.1	60.3	73.9	13.6	137	125	
Hori.	4844.000	PK	47.1	31.3	7.5	41.2	44.7	73.9	29.2	100	0	
Hori.	6458.696	PK	47.2	34.6	8.3	40.7	49.4	73.9	24.5	100	145	
Hori.	7266.000	PK	46.8	36.1	9.1	41.0	51.0	73.9	22.9	100	0	
Hori.	9688.000	PK	44.6	38.1	10.1	38.9	53.9	73.9	20.0	100	0	
Hori.	12110.000	PK	45.0	39.0	11.5	39.1	56.4	73.9	17.5	100	0	
Hori.	2390.000	AV	35.2	27.6	24.9	41.1	46.6	53.9	7.3	137	125	
Hori.	4844.000	AV	36.1	31.3	7.5	41.2	33.7	53.9	20.2	100	0	
Hori.	6458.696	AV	38.0	34.6	8.3	40.7	40.2	53.9	13.7	100	145	
Hori.	7266.000	AV	37.4	36.1	9.1	41.0	41.6	53.9	12.3	100	0	
Hori.	9688.000	AV	34.7	38.1	10.1	38.9	44.0	53.9	9.9	100	0	
Hori.	12110.000	AV	35.2	39.0	11.5	39.1	46.6	53.9	7.3	100	0	
Vert.	2390.000	PK	48.9	27.6	24.9	41.1	60.3	73.9	13.6	100	166	
Vert.	4844.000	PK	45.7	31.3	7.5	41.2	43.3	73.9	30.6	100	0	
Vert.	6458.683	PK	47.7	34.6	8.3	40.7	49.9	73.9	24.0	100	68	
Vert.	7266.000	PK	47.5	36.1	9.1	41.0	51.7	73.9	22.2	100	0	
Vert.	9688.000	PK	44.3	38.1	10.1	38.9	53.6	73.9	20.3	100	0	
Vert.	12110.000	PK	45.3	39.0	11.5	39.1	56.7	73.9	17.2	100	0	
Vert.	2390.000	AV	35.0	27.6	24.9	41.1	46.4	53.9	7.5	100	166	
Vert.	4844.000	AV	36.1	31.3	7.5	41.2	33.7	53.9	20.2	100	0	
Vert.	6458.683	AV	38.2	34.6	8.3	40.7	40.4	53.9	13.5	100	68	
Vert.	7266.000	AV	37.3	36.1	9.1	41.0	41.5	53.9	12.4	100	0	
Vert.	9688.000	AV	34.7	38.1	10.1	38.9	44.0	53.9	9.9	100	0	
Vert.	12110.000	AV	35.3	39.0	11.5	39.1	46.7	53.9	7.2	100	0	

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

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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	69.4	27.6	24.9	41.1	80.8	-	-	
Hori.	2400.000	PK	40.0	27.6	24.9	41.1	51.4	60.8	9.4	
Vert.	2422.000	PK	68.2	27.6	24.9	41.1	79.6	-	-	
Vert.	2400.000	PK	38.4	27.6	24.9	41.1	49.8	59.6	9.8	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                25 deg.C, 58 %RH  
 Engineer              Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2437 MHz  
                              Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12

(\* 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.	4874.000	PK	46.2	31.3	7.5	41.2	43.8	73.9	30.1	100	0	
Hori.	6498.775	PK	47.5	34.8	8.3	40.7	49.9	73.9	24.0	100	150	
Hori.	7311.000	PK	46.3	36.1	9.0	41.1	50.3	73.9	23.6	100	0	
Hori.	9748.000	PK	44.7	38.1	10.1	38.8	54.1	73.9	19.8	100	0	
Hori.	12185.000	PK	45.0	38.9	11.4	39.1	56.2	73.9	17.7	100	0	
Hori.	4874.000	AV	36.1	31.3	7.5	41.2	33.7	53.9	20.2	100	0	
Hori.	6498.775	AV	38.6	34.8	8.3	40.7	41.0	53.9	12.9	100	150	
Hori.	7311.000	AV	36.6	36.1	9.0	41.1	40.6	53.9	13.3	100	0	
Hori.	9748.000	AV	34.2	38.1	10.1	38.8	43.6	53.9	10.3	100	0	
Hori.	12185.000	AV	34.6	38.9	11.4	39.1	45.8	53.9	<b>8.1</b>	100	0	
Vert.	4874.000	PK	46.5	31.3	7.5	41.2	44.1	73.9	29.8	100	0	
Vert.	6498.789	PK	47.1	34.8	8.3	40.7	49.5	73.9	24.4	100	70	
Vert.	7311.000	PK	46.0	36.1	9.0	41.1	50.0	73.9	23.9	100	0	
Vert.	9748.000	PK	44.3	38.1	10.1	38.8	53.7	73.9	20.2	100	0	
Vert.	12185.000	PK	44.8	38.9	11.4	39.1	56.0	73.9	17.9	100	0	
Vert.	4874.000	AV	36.4	31.3	7.5	41.2	34.0	53.9	19.9	100	0	
Vert.	6498.789	AV	38.2	34.8	8.3	40.7	40.6	53.9	13.3	100	70	
Vert.	7311.000	AV	36.5	36.1	9.0	41.1	40.5	53.9	13.4	100	0	
Vert.	9748.000	AV	34.1	38.1	10.1	38.8	43.5	53.9	10.4	100	0	
Vert.	12185.000	AV	34.6	38.9	11.4	39.1	45.8	53.9	<b>8.1</b>	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                25 deg.C, 58 %RH  
 Engineer              Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2452 MHz  
                              Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12

(\* 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	53.3	27.6	25.0	41.0	64.9	73.9	9.0	100	128	
Hori.	4904.000	PK	47.5	31.4	7.5	41.1	45.3	73.9	28.6	100	0	
Hori.	6538.657	PK	47.5	34.8	8.4	40.8	49.9	73.9	24.0	100	151	
Hori.	7356.000	PK	46.0	36.2	8.9	41.1	50.0	73.9	23.9	100	0	
Hori.	9808.000	PK	43.7	38.1	10.1	38.8	53.1	73.9	20.8	100	0	
Hori.	12260.000	PK	44.6	38.9	11.3	39.1	55.7	73.9	18.2	100	0	
Hori.	2483.500	AV	35.2	27.6	25.0	41.0	46.8	53.9	7.1	100	128	
Hori.	4904.000	AV	36.5	31.4	7.5	41.1	34.3	53.9	19.6	100	0	
Hori.	6538.657	AV	38.7	34.8	8.4	40.8	41.1	53.9	12.8	100	151	
Hori.	7356.000	AV	36.9	36.2	8.9	41.1	40.9	53.9	13.0	100	0	
Hori.	9808.000	AV	33.7	38.1	10.1	38.8	43.1	53.9	10.8	100	0	
Hori.	12260.000	AV	34.0	38.9	11.3	39.1	45.1	53.9	8.8	100	0	
Vert.	2483.500	PK	51.6	27.6	25.0	41.0	63.2	73.9	10.7	100	178	
Vert.	4904.000	PK	46.7	31.4	7.5	41.1	44.5	73.9	29.4	100	0	
Vert.	6538.711	PK	47.6	34.8	8.4	40.8	50.0	73.9	23.9	100	68	
Vert.	7356.000	PK	46.6	36.2	8.9	41.1	50.6	73.9	23.3	100	0	
Vert.	9808.000	PK	43.8	38.1	10.1	38.8	53.2	73.9	20.7	100	0	
Vert.	12260.000	PK	44.2	38.9	11.3	39.1	55.3	73.9	18.6	100	0	
Vert.	2483.500	AV	34.7	27.6	25.0	41.0	46.3	53.9	7.6	100	178	
Vert.	4904.000	AV	36.4	31.4	7.5	41.1	34.2	53.9	19.7	100	0	
Vert.	6538.711	AV	37.7	34.8	8.4	40.8	40.1	53.9	13.8	100	68	
Vert.	7356.000	AV	36.8	36.2	8.9	41.1	40.8	53.9	13.1	100	0	
Vert.	9808.000	AV	33.9	38.1	10.1	38.8	43.3	53.9	10.6	100	0	
Vert.	12260.000	AV	34.1	38.9	11.3	39.1	45.2	53.9	8.7	100	0	

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

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity    24 deg.C, 62 %RH                    25 deg.C, 58 %RH  
 Engineer                Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2422 MHz  
                               Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10

(\* 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	47.1	27.6	24.9	41.1	58.5	73.9	15.4	137	125	
Hori.	4844.000	PK	47.0	31.3	7.5	41.2	44.6	73.9	29.3	100	0	
Hori.	6458.718	PK	47.3	34.6	8.3	40.7	49.5	73.9	24.4	100	147	
Hori.	7266.000	PK	47.7	36.1	9.1	41.0	51.9	73.9	22.0	100	0	
Hori.	9688.000	PK	44.3	38.1	10.1	38.9	53.6	73.9	20.3	100	0	
Hori.	12110.000	PK	45.2	39.0	11.5	39.1	56.6	73.9	17.3	100	0	
Hori.	2390.000	AV	34.1	27.6	24.9	41.1	45.5	53.9	8.4	137	125	
Hori.	4844.000	AV	36.2	31.3	7.5	41.2	33.8	53.9	20.1	100	0	
Hori.	6458.718	AV	38.3	34.6	8.3	40.7	40.5	53.9	13.4	100	147	
Hori.	7266.000	AV	37.4	36.1	9.1	41.0	41.6	53.9	12.3	100	0	
Hori.	9688.000	AV	34.6	38.1	10.1	38.9	43.9	53.9	10.0	100	0	
Hori.	12110.000	AV	35.0	39.0	11.5	39.1	46.4	53.9	7.5	100	0	
Vert.	2390.000	PK	47.8	27.6	24.9	41.1	59.2	73.9	14.7	100	166	
Vert.	4844.000	PK	47.5	31.3	7.5	41.2	45.1	73.9	28.8	100	0	
Vert.	6458.735	PK	47.1	34.6	8.3	40.7	49.3	73.9	24.6	100	76	
Vert.	7266.000	PK	48.3	36.1	9.1	41.0	52.5	73.9	21.4	100	0	
Vert.	9688.000	PK	43.2	38.1	10.1	38.9	52.5	73.9	21.4	100	0	
Vert.	12110.000	PK	45.5	39.0	11.5	39.1	56.9	73.9	17.0	100	0	
Vert.	2390.000	AV	33.8	27.6	24.9	41.1	45.2	53.9	8.7	100	166	
Vert.	4844.000	AV	36.1	31.3	7.5	41.2	33.7	53.9	20.2	100	0	
Vert.	6458.735	AV	38.8	34.6	8.3	40.7	41.0	53.9	12.9	100	76	
Vert.	7266.000	AV	37.2	36.1	9.1	41.0	41.4	53.9	12.5	100	0	
Vert.	9688.000	AV	34.7	38.1	10.1	38.9	44.0	53.9	9.9	100	0	
Vert.	12110.000	AV	35.1	39.0	11.5	39.1	46.5	53.9	7.4	100	0	

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

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.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2422.000	PK	68.2	27.6	24.9	41.1	79.6	-	-	
Hori.	2400.000	PK	38.9	27.6	24.9	41.1	50.3	59.6	9.3	
Vert.	2422.000	PK	67.1	27.6	24.9	41.1	78.5	-	-	
Vert.	2400.000	PK	37.6	27.6	24.9	41.1	49.0	58.5	9.5	

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

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity    24 deg.C, 62 %RH                25 deg.C, 58 %RH  
 Engineer                Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2437 MHz  
                               Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10

(\* 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.	4874.000	PK	46.5	31.3	7.5	41.2	44.1	73.9	29.8	100	0	
Hori.	6498.736	PK	47.2	34.8	8.3	40.7	49.6	73.9	24.3	100	147	
Hori.	7311.000	PK	46.7	36.1	9.0	41.1	50.7	73.9	23.2	100	0	
Hori.	9748.000	PK	44.3	38.1	10.1	38.8	53.7	73.9	20.2	100	0	
Hori.	12185.000	PK	45.5	38.9	11.4	39.1	56.7	73.9	17.2	100	0	
Hori.	4874.000	AV	36.0	31.3	7.5	41.2	33.6	53.9	20.3	100	0	
Hori.	6498.736	AV	38.4	34.8	8.3	40.7	40.8	53.9	13.1	100	147	
Hori.	7311.000	AV	36.4	36.1	9.0	41.1	40.4	53.9	13.5	100	0	
Hori.	9748.000	AV	34.1	38.1	10.1	38.8	43.5	53.9	10.4	100	0	
Hori.	12185.000	AV	34.5	38.9	11.4	39.1	45.7	53.9	<b>8.2</b>	100	0	
Vert.	4874.000	PK	46.1	31.3	7.5	41.2	43.7	73.9	30.2	100	0	
Vert.	6498.741	PK	47.5	34.8	8.3	40.7	49.9	73.9	24.0	100	72	
Vert.	7311.000	PK	46.3	36.1	9.0	41.1	50.3	73.9	23.6	100	0	
Vert.	9748.000	PK	44.8	38.1	10.1	38.8	54.2	73.9	19.7	100	0	
Vert.	12185.000	PK	45.8	38.9	11.4	39.1	57.0	73.9	16.9	100	0	
Vert.	4874.000	AV	36.1	31.3	7.5	41.2	33.7	53.9	20.2	100	0	
Vert.	6498.741	AV	38.0	34.8	8.3	40.7	40.4	53.9	13.5	100	72	
Vert.	7311.000	AV	36.4	36.1	9.0	41.1	40.4	53.9	13.5	100	0	
Vert.	9748.000	AV	34.2	38.1	10.1	38.8	43.6	53.9	10.3	100	0	
Vert.	12185.000	AV	34.3	38.9	11.4	39.1	45.5	53.9	8.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amplifier)  
 Distance factor : 15GHz -40GHz :  $20\log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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## Radiated Emission

Test place            No.3 Semi Anechoic Chamber  
 Date                    August 18, 2013                    August 19, 2013  
 Temperature / Humidity 24 deg.C, 62 %RH                25 deg.C, 58 %RH  
 Engineer              Takahiro Suzuki                    Shinichi Takano  
 Mode                    Tx,                    2452 MHz  
                              Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10

(\* 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	51.1	27.6	25.0	41.0	62.7	73.9	11.2	100	128	
Hori.	4904.000	PK	47.9	31.4	7.5	41.1	45.7	73.9	28.2	100	0	
Hori.	6538.702	PK	47.1	34.8	8.4	40.8	49.5	73.9	24.4	100	154	
Hori.	7356.000	PK	46.6	36.2	8.9	41.1	50.6	73.9	23.3	100	0	
Hori.	9808.000	PK	43.8	38.1	10.1	38.8	53.2	73.9	20.7	100	0	
Hori.	12260.000	PK	45.1	38.9	11.3	39.1	56.2	73.9	17.7	100	0	
Hori.	2483.500	AV	33.9	27.6	25.0	41.0	45.5	53.9	<b>8.4</b>	100	128	
Hori.	4904.000	AV	36.6	31.4	7.5	41.1	34.4	53.9	19.5	100	0	
Hori.	6538.702	AV	38.4	34.8	8.4	40.8	40.8	53.9	13.1	100	154	
Hori.	7356.000	AV	36.7	36.2	8.9	41.1	40.7	53.9	13.2	100	0	
Hori.	9808.000	AV	33.7	38.1	10.1	38.8	43.1	53.9	10.8	100	0	
Hori.	12260.000	AV	34.0	38.9	11.3	39.1	45.1	53.9	8.8	100	0	
Vert.	2483.500	PK	50.8	27.6	25.0	41.0	62.4	73.9	11.5	100	178	
Vert.	4904.000	PK	48.2	31.4	7.5	41.1	46.0	73.9	27.9	100	0	
Vert.	6538.723	PK	47.4	34.8	8.4	40.8	49.8	73.9	24.1	100	64	
Vert.	7356.000	PK	46.3	36.2	8.9	41.1	50.3	73.9	23.6	100	0	
Vert.	9808.000	PK	44.5	38.1	10.1	38.8	53.9	73.9	20.0	100	0	
Vert.	12260.000	PK	45.8	38.9	11.3	39.1	56.9	73.9	17.0	100	0	
Vert.	2483.500	AV	33.6	27.6	25.0	41.0	45.2	53.9	8.7	100	178	
Vert.	4904.000	AV	36.5	31.4	7.5	41.1	34.3	53.9	19.6	100	0	
Vert.	6538.723	AV	37.5	34.8	8.4	40.8	39.9	53.9	14.0	100	64	
Vert.	7356.000	AV	36.6	36.2	8.9	41.1	40.6	53.9	13.3	100	0	
Vert.	9808.000	AV	33.9	38.1	10.1	38.8	43.3	53.9	10.6	100	0	
Vert.	12260.000	AV	33.9	38.9	11.3	39.1	45.0	53.9	8.9	100	0	

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

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

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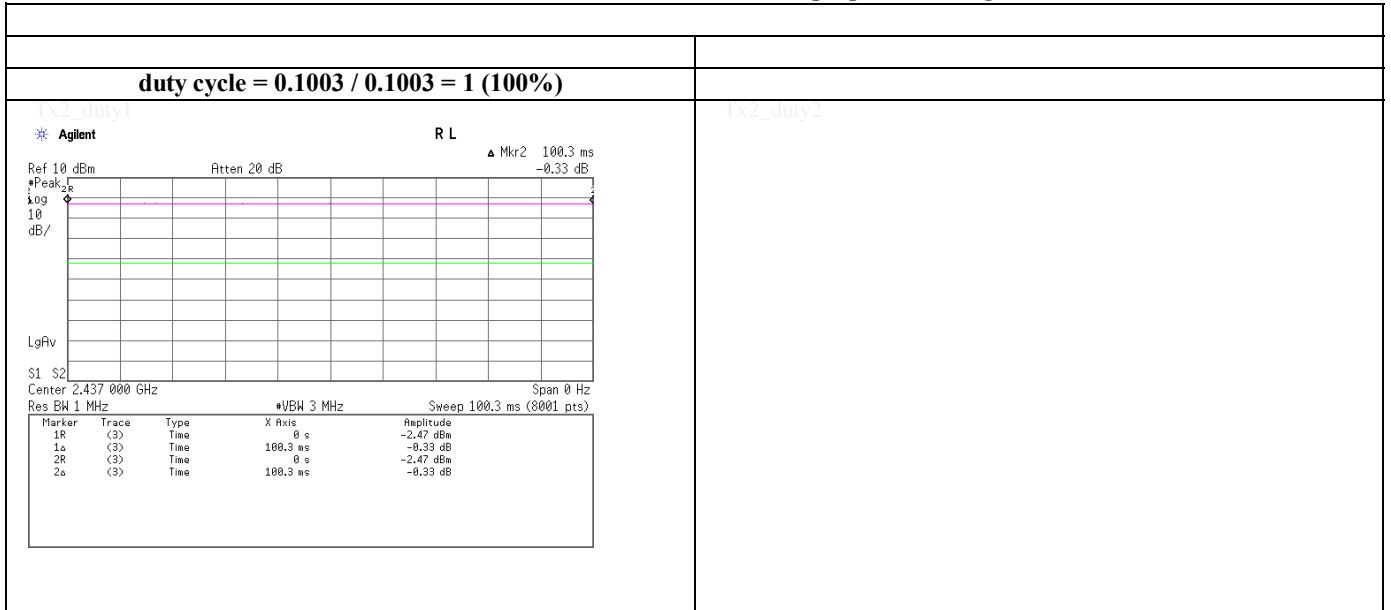
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## Burst rate confirmation

**Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14**



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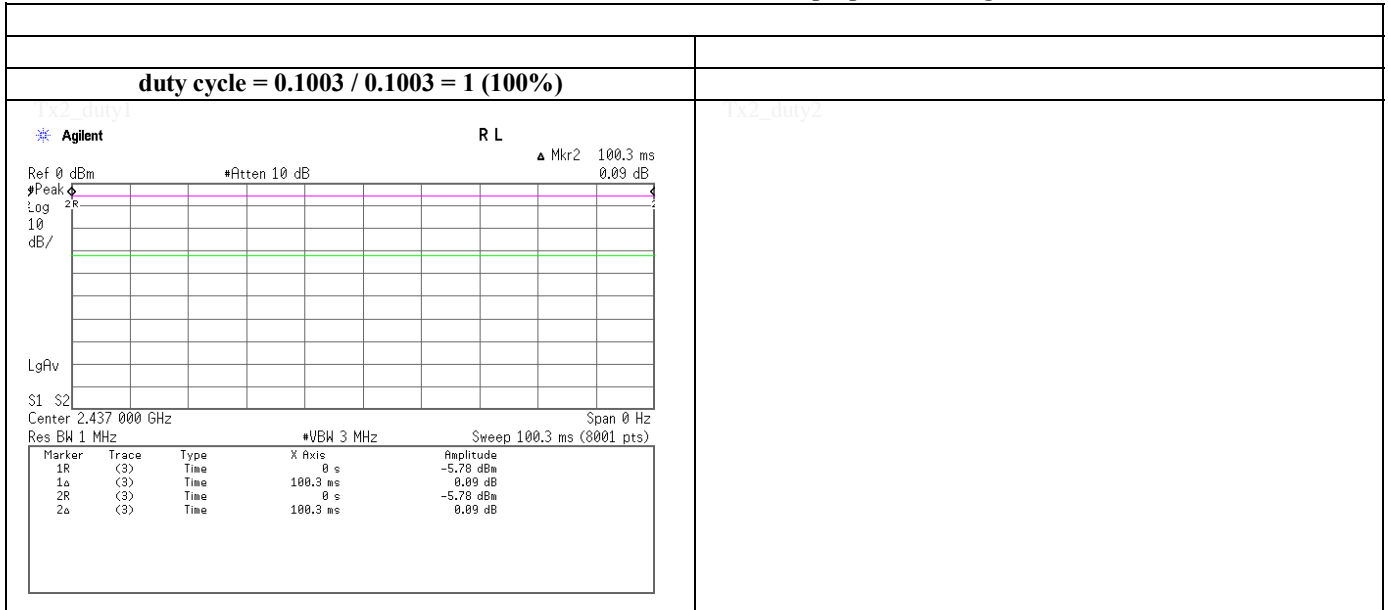
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## Burst rate confirmation

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



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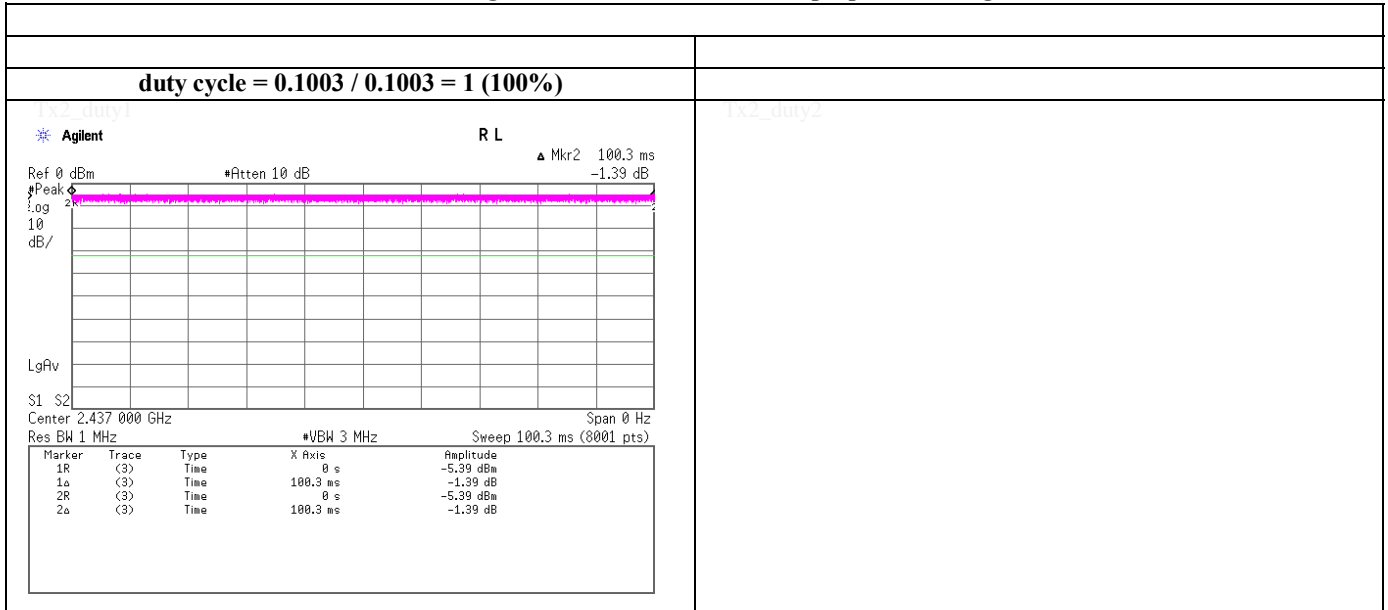
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## Burst rate confirmation

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12**



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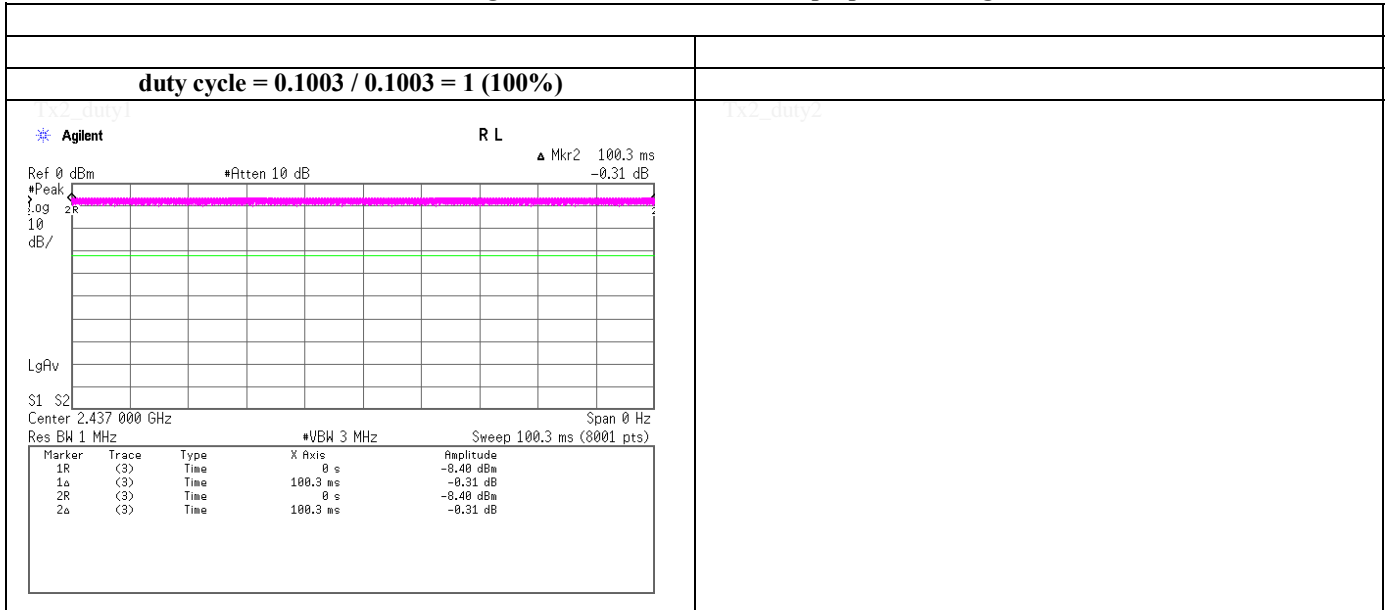
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## Burst rate confirmation

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10**



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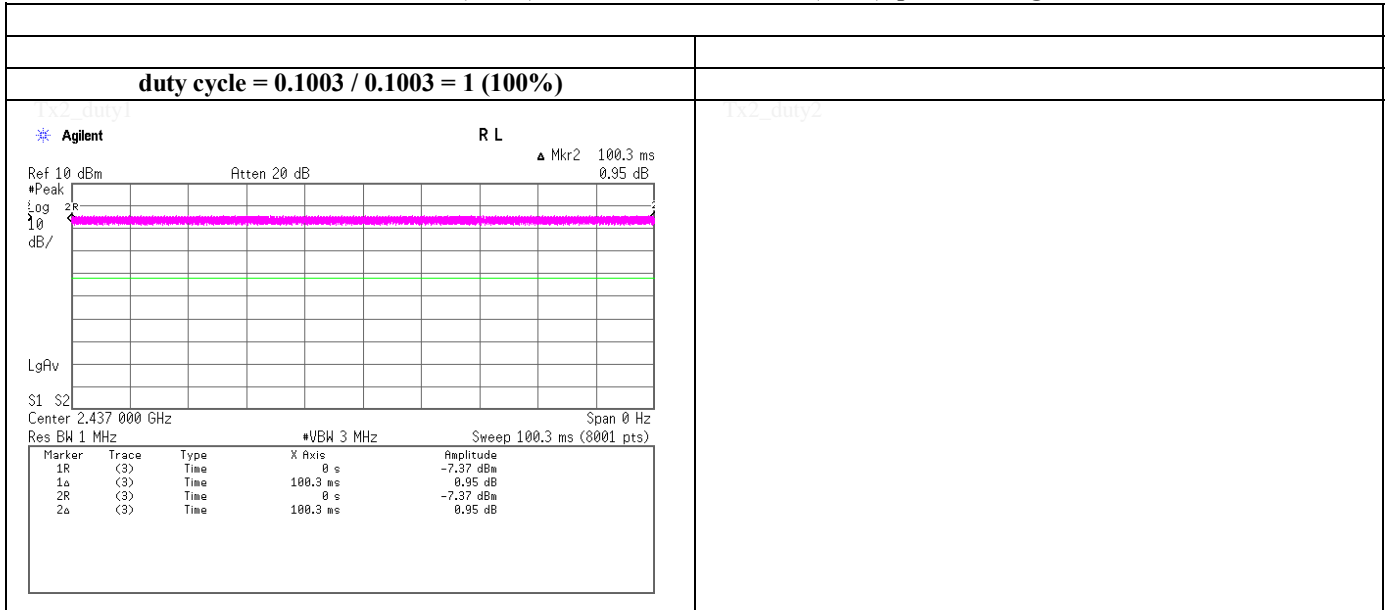
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## Burst rate confirmation

**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12**



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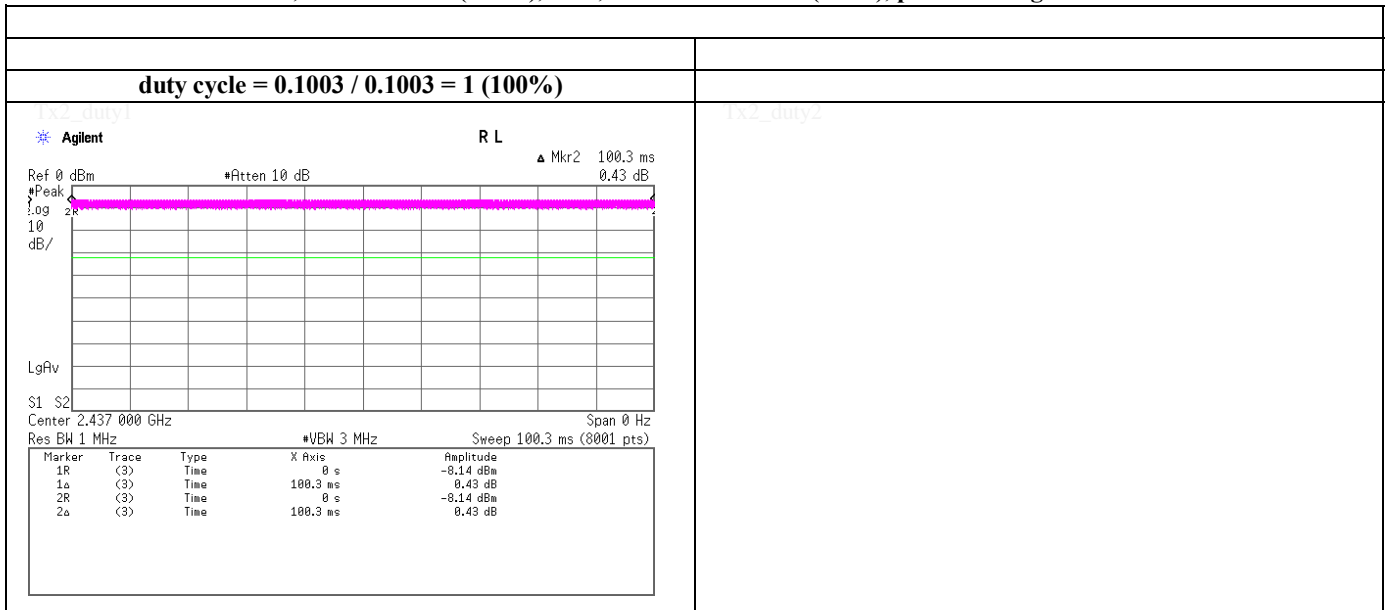
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## Burst rate confirmation

**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10**



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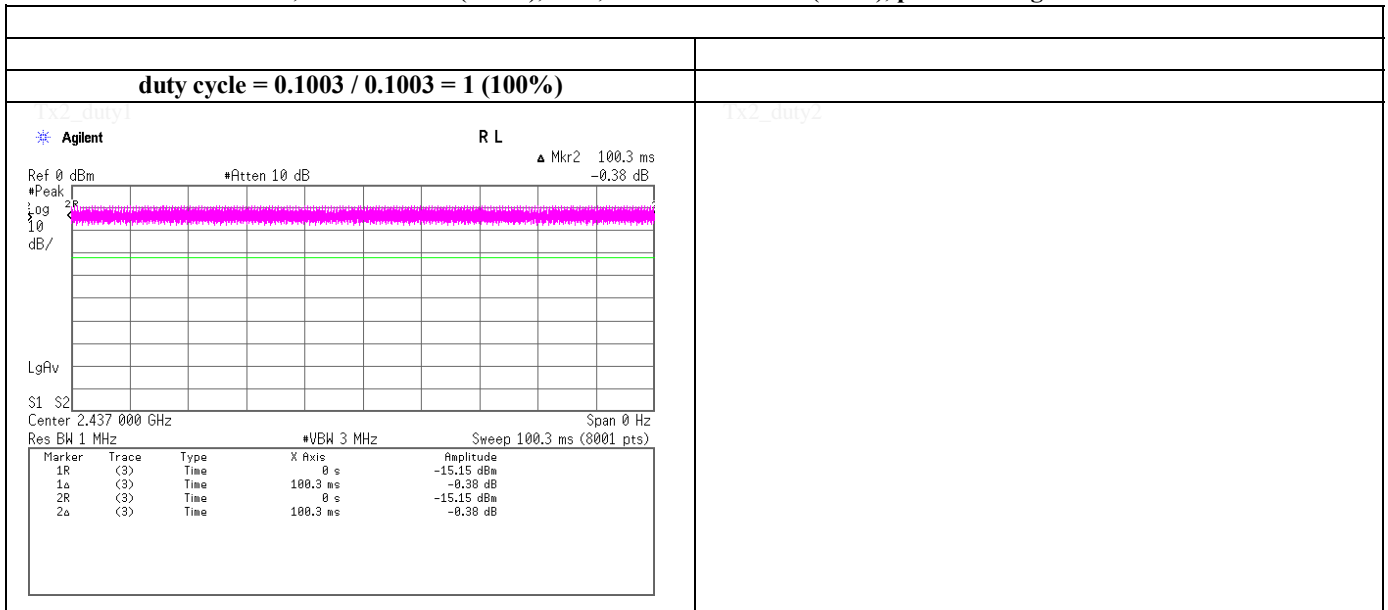
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## Burst rate confirmation

**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12**



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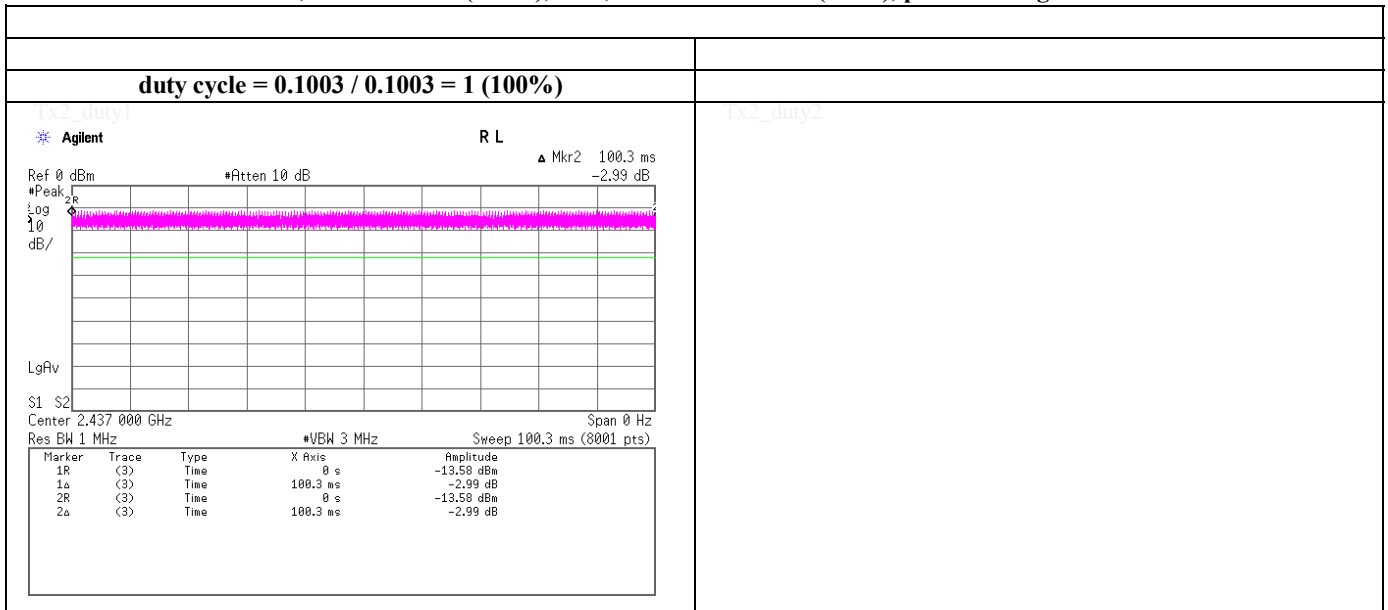
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## Burst rate confirmation

**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10**



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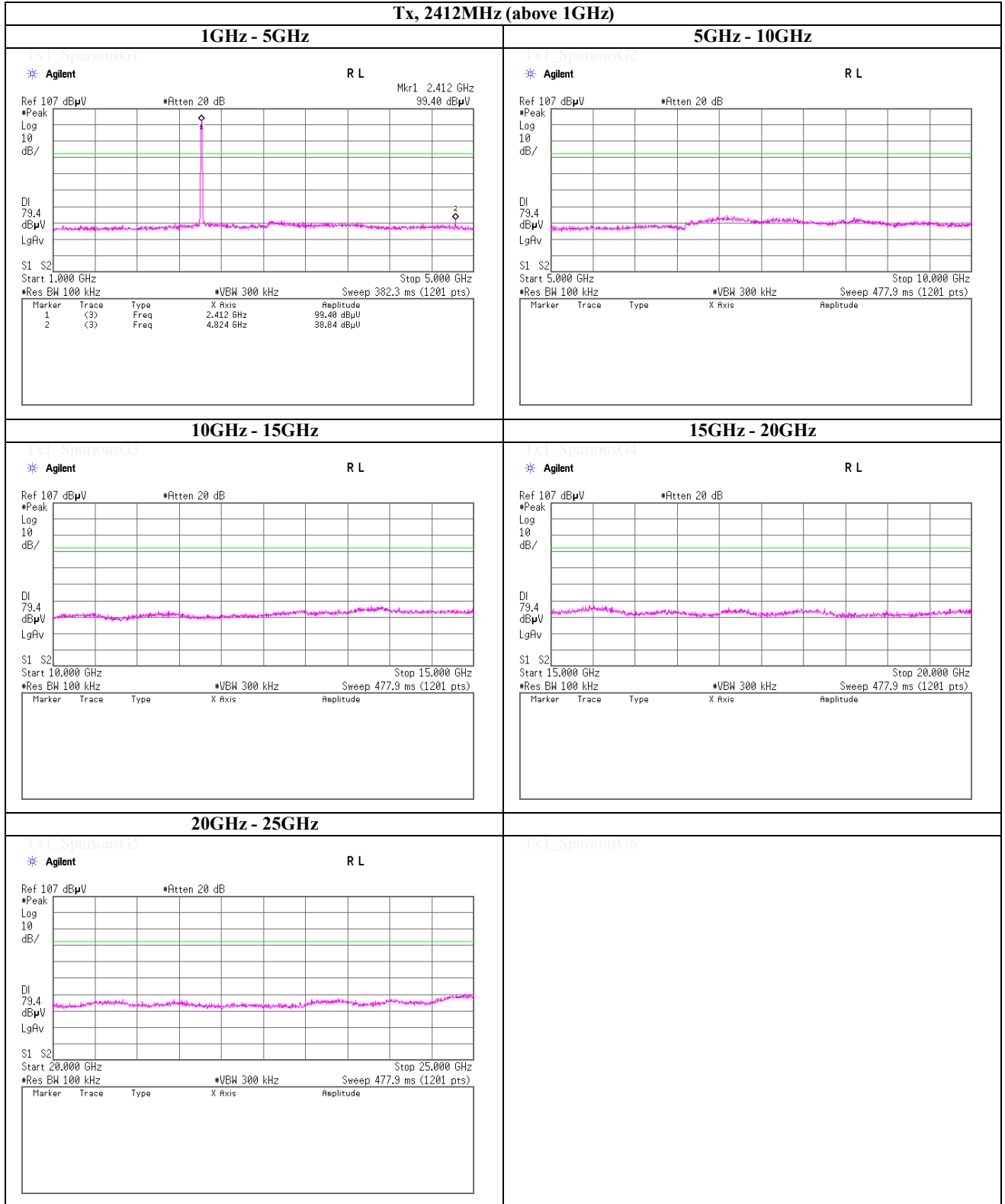
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14**

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



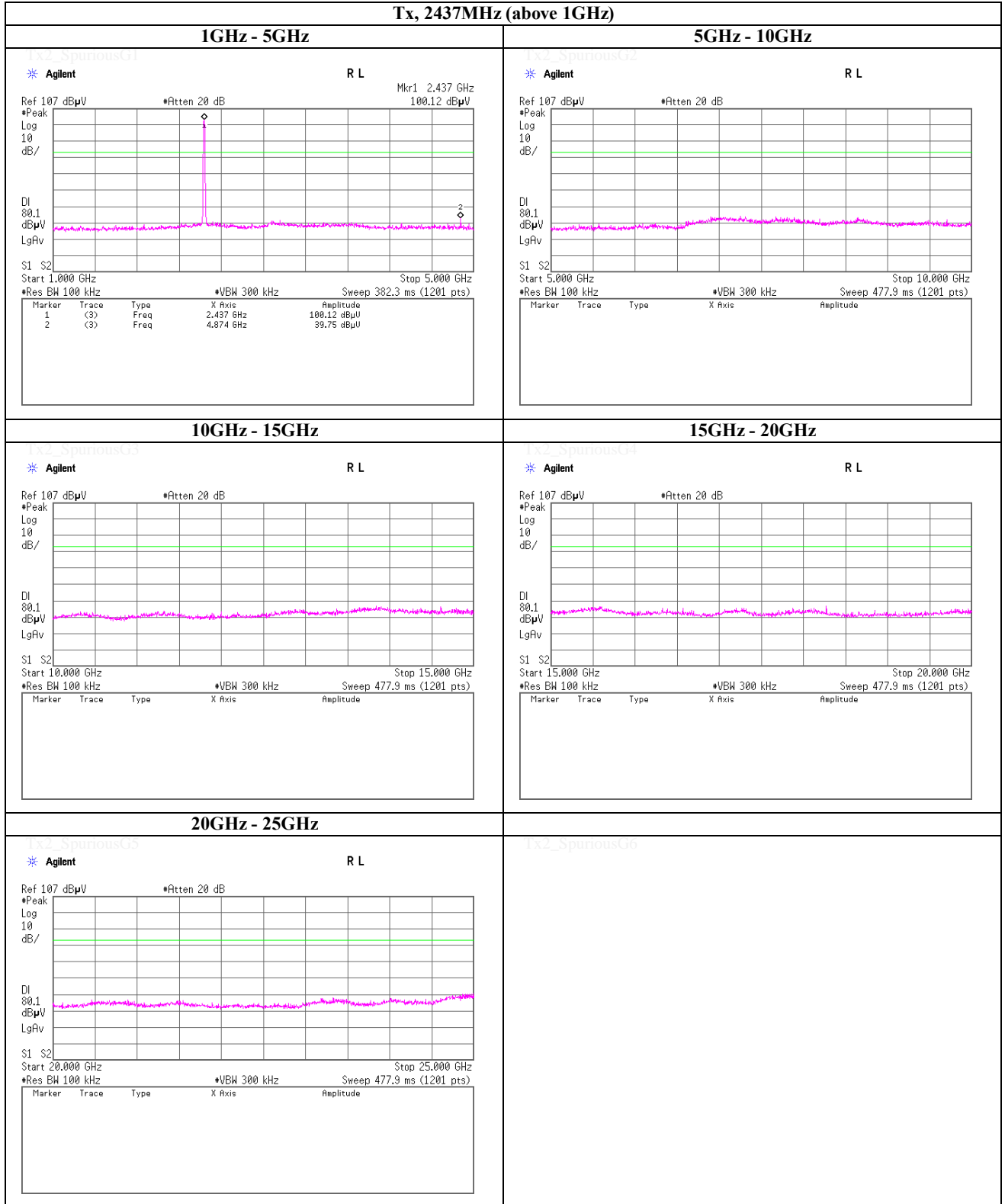
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14**

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



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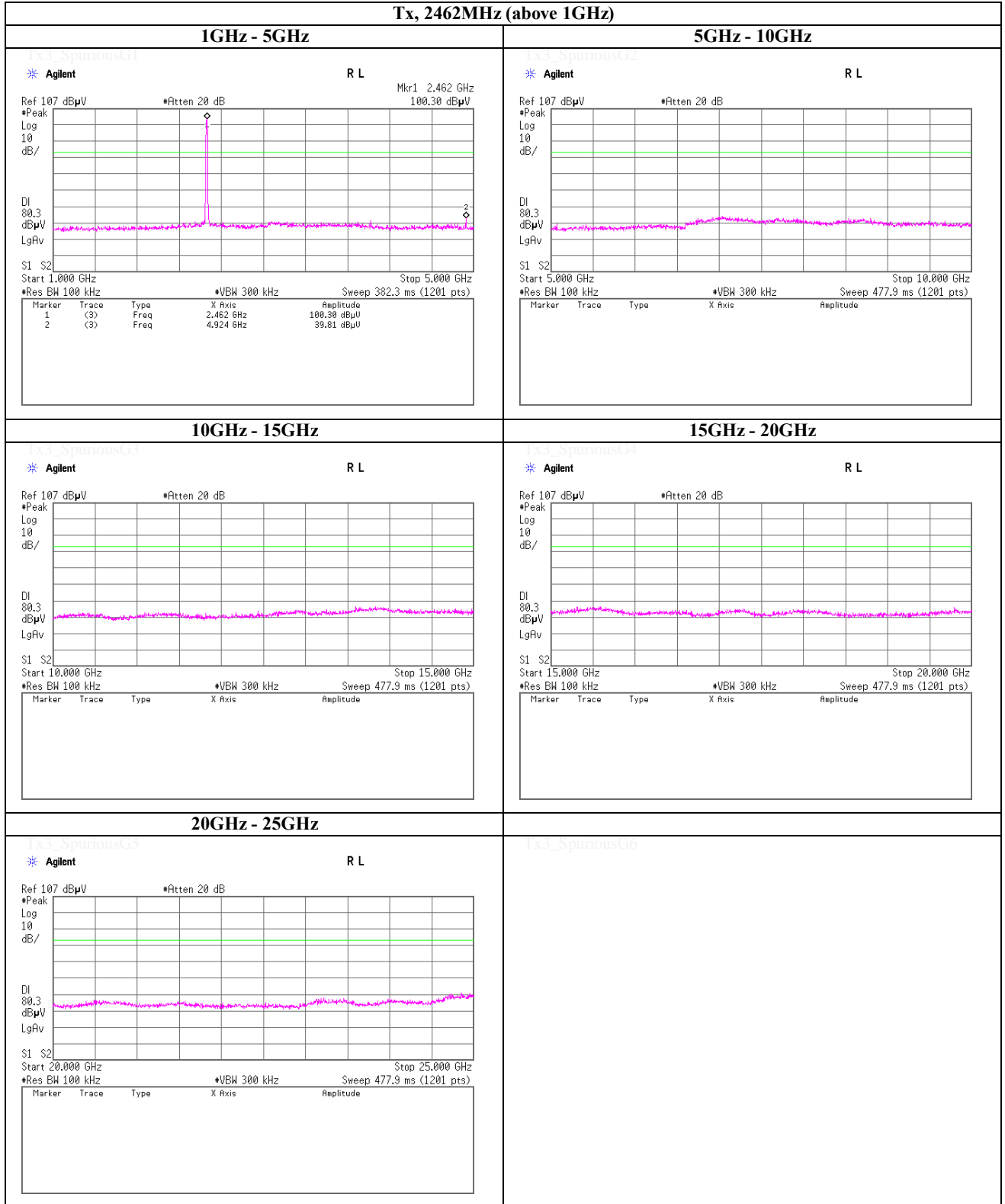
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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14**

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



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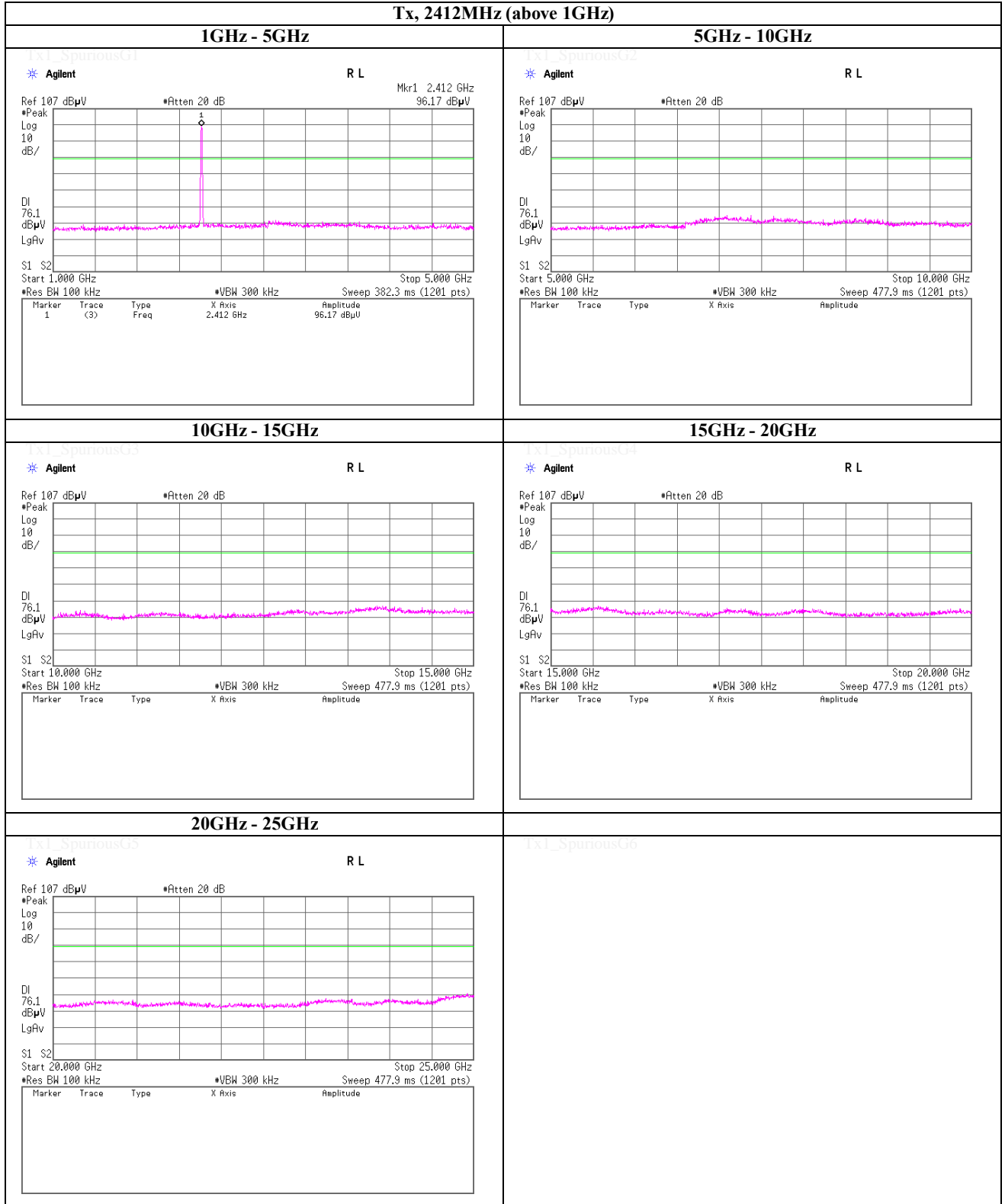
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**(Reference chart) Spurious emission (Conducted)**

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

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



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**Shonan EMC Lab.**

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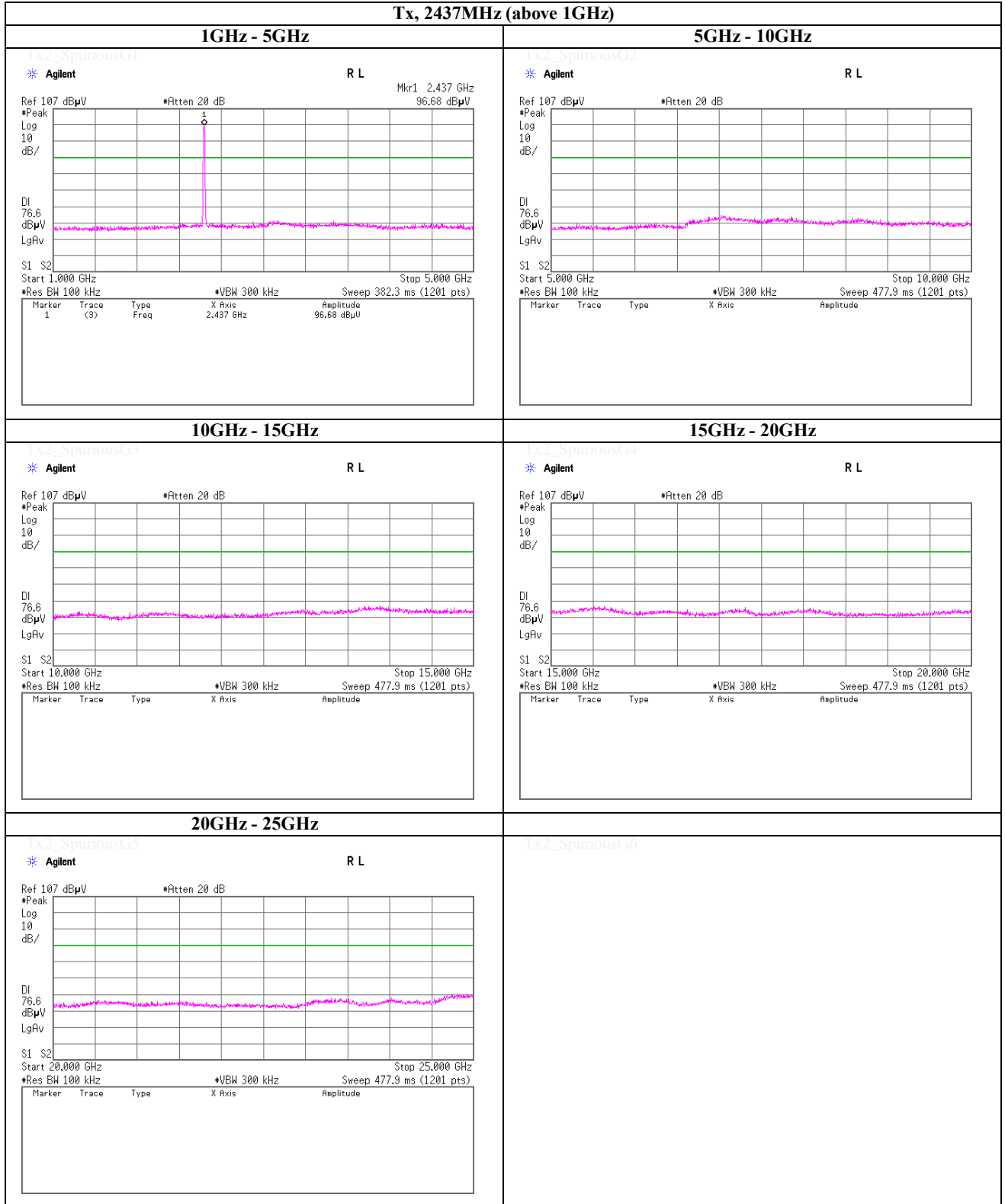
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

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

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



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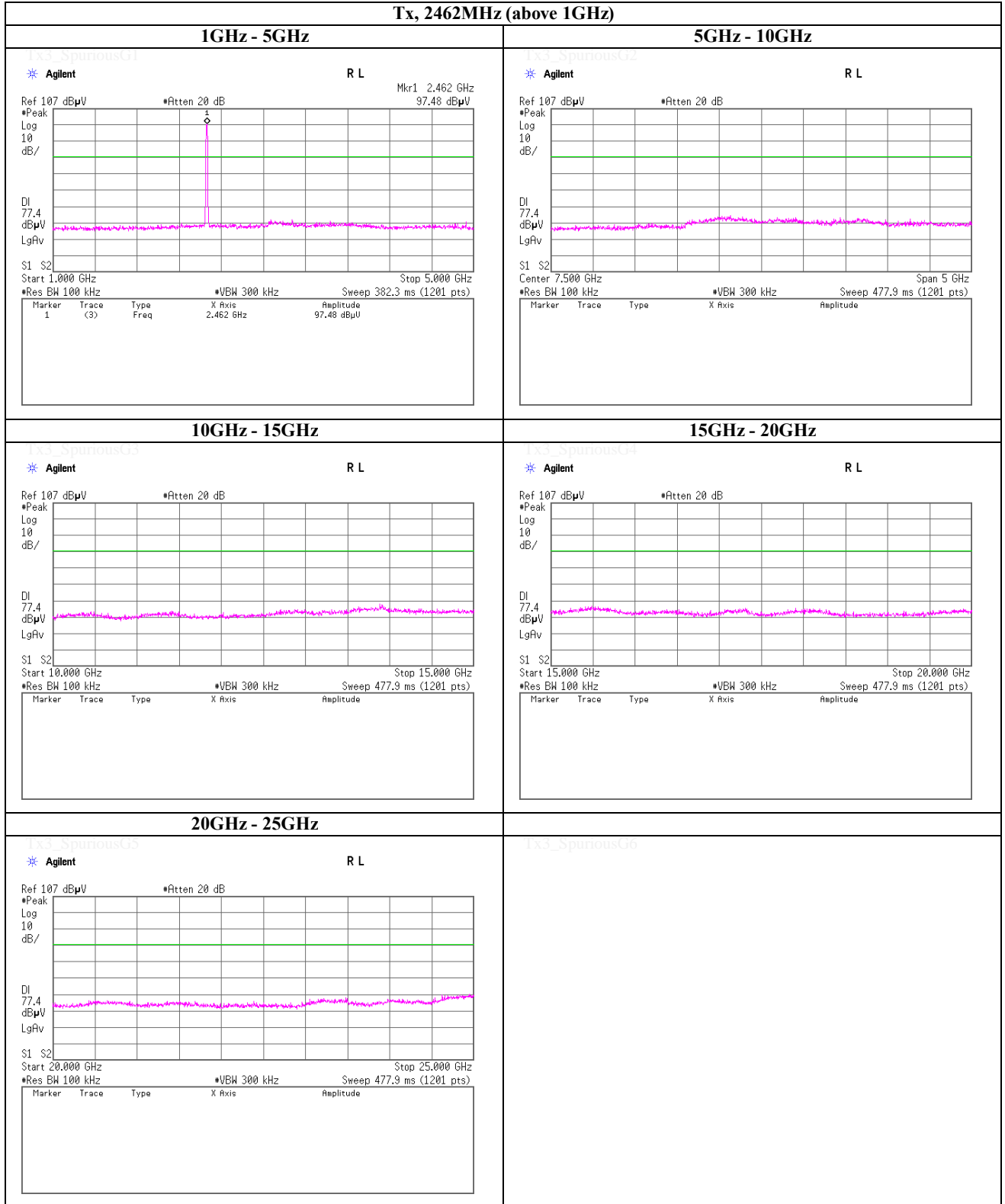
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

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

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

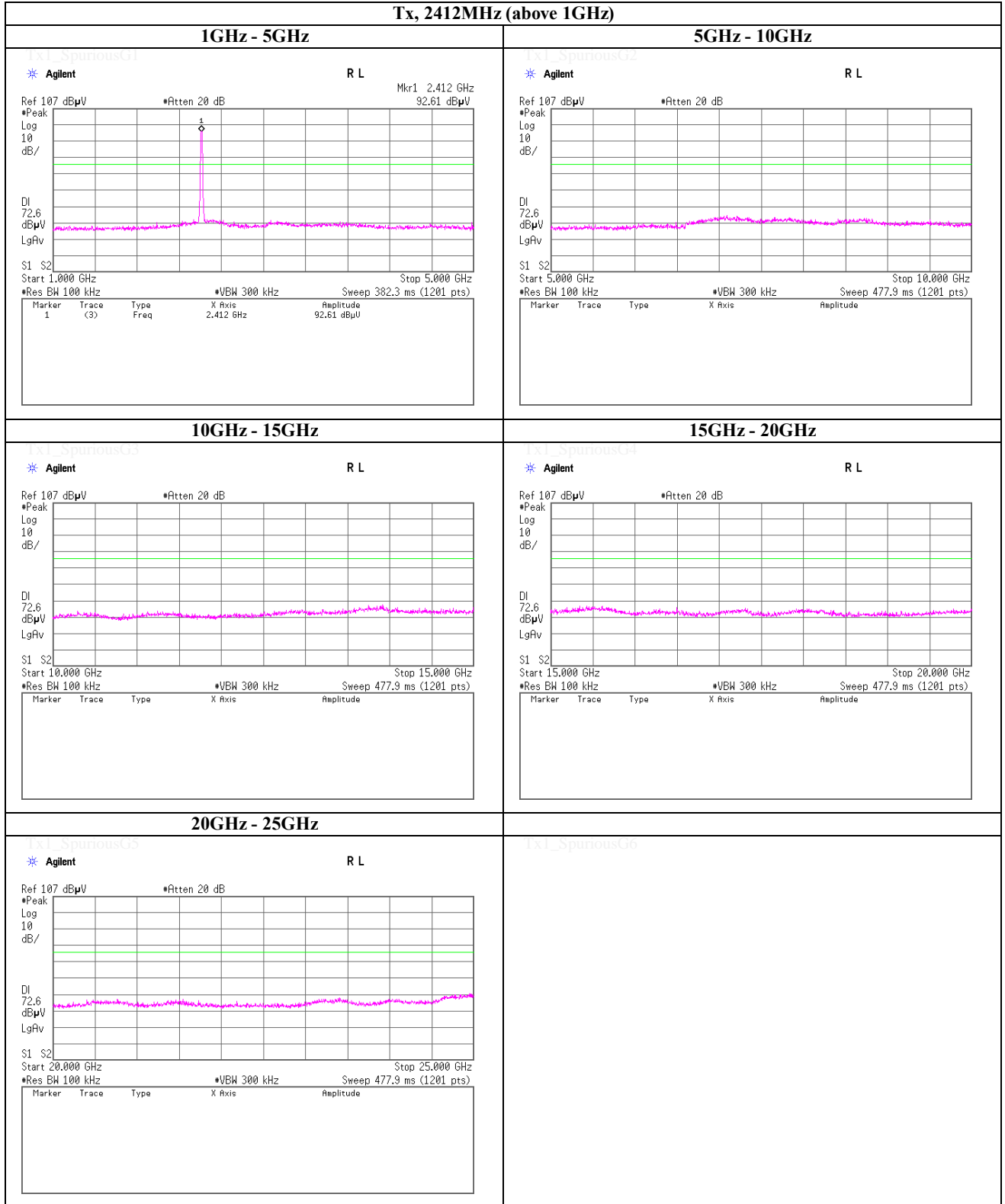


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 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12**

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



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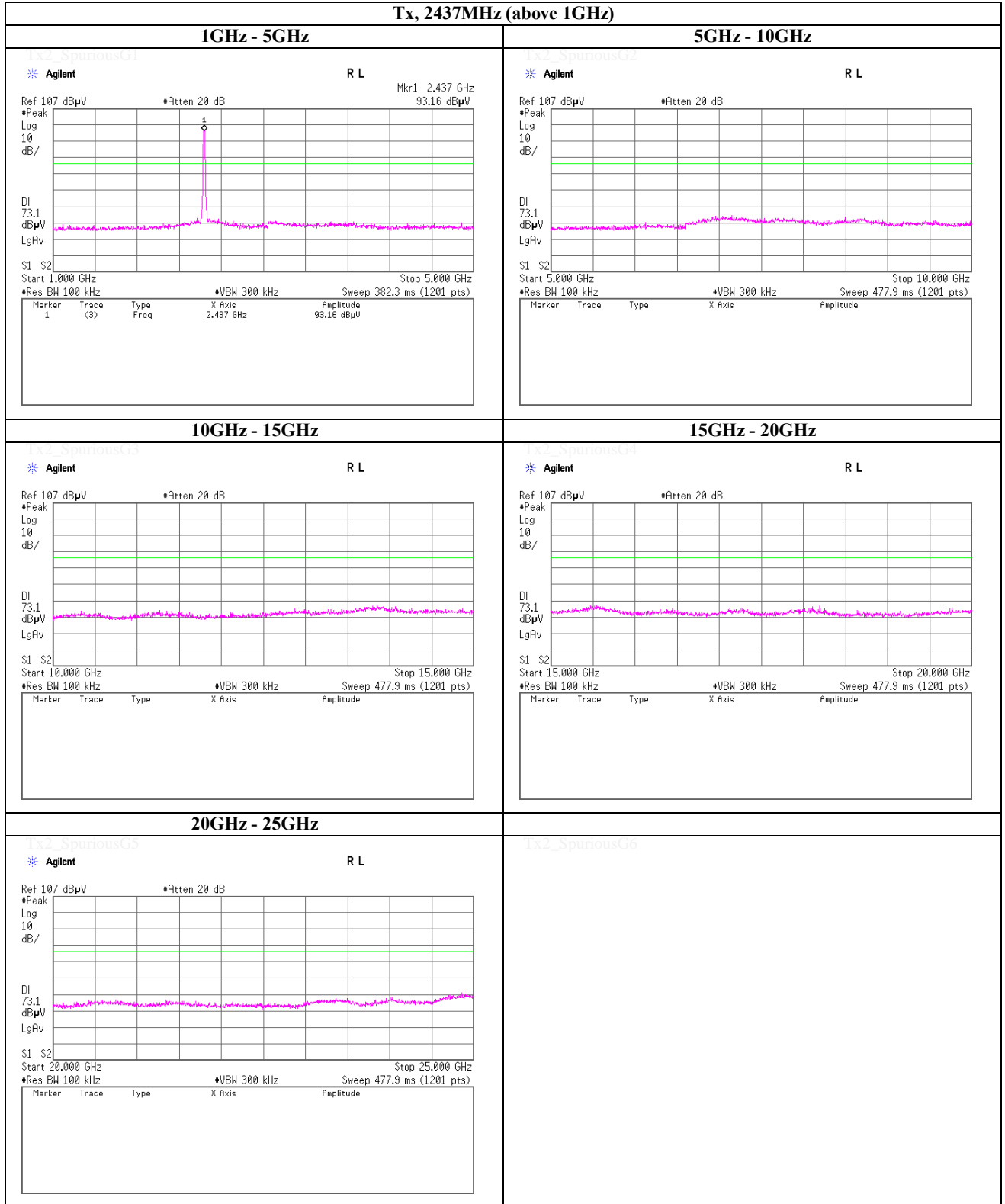
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12**

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



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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12**

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



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**Shonan EMC Lab.**

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Telephone : +81 463 50 6400

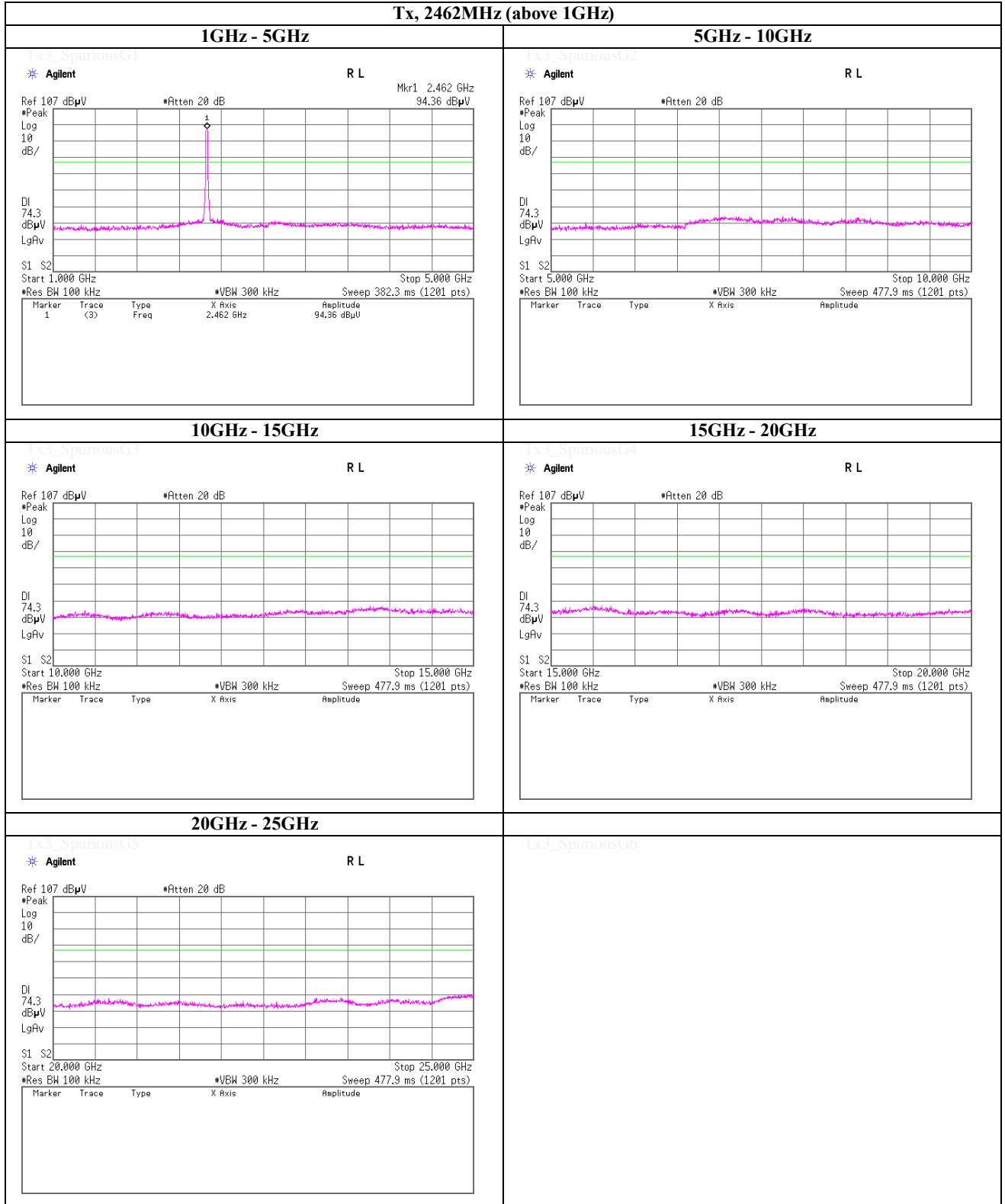
Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12**

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

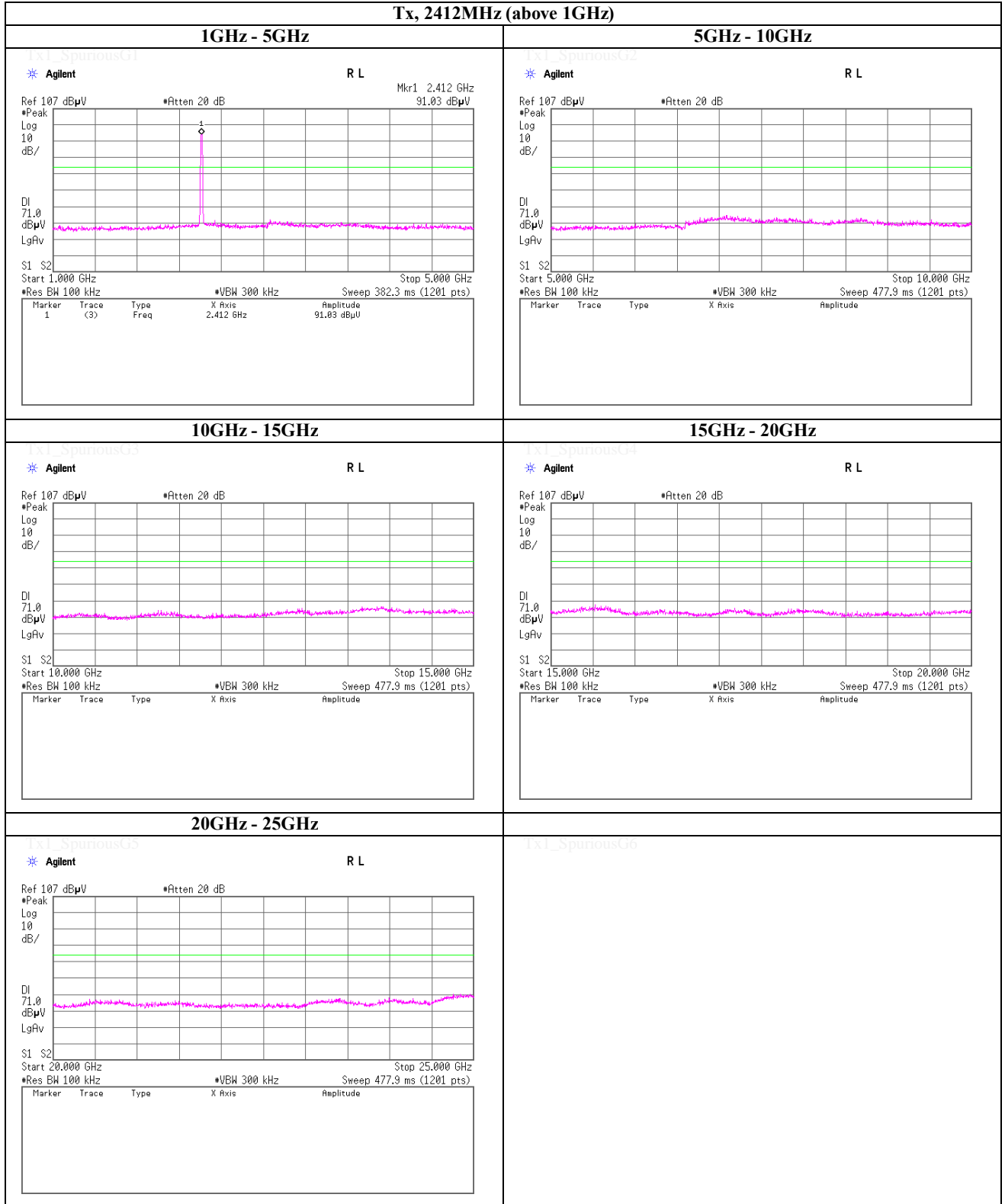


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10**

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



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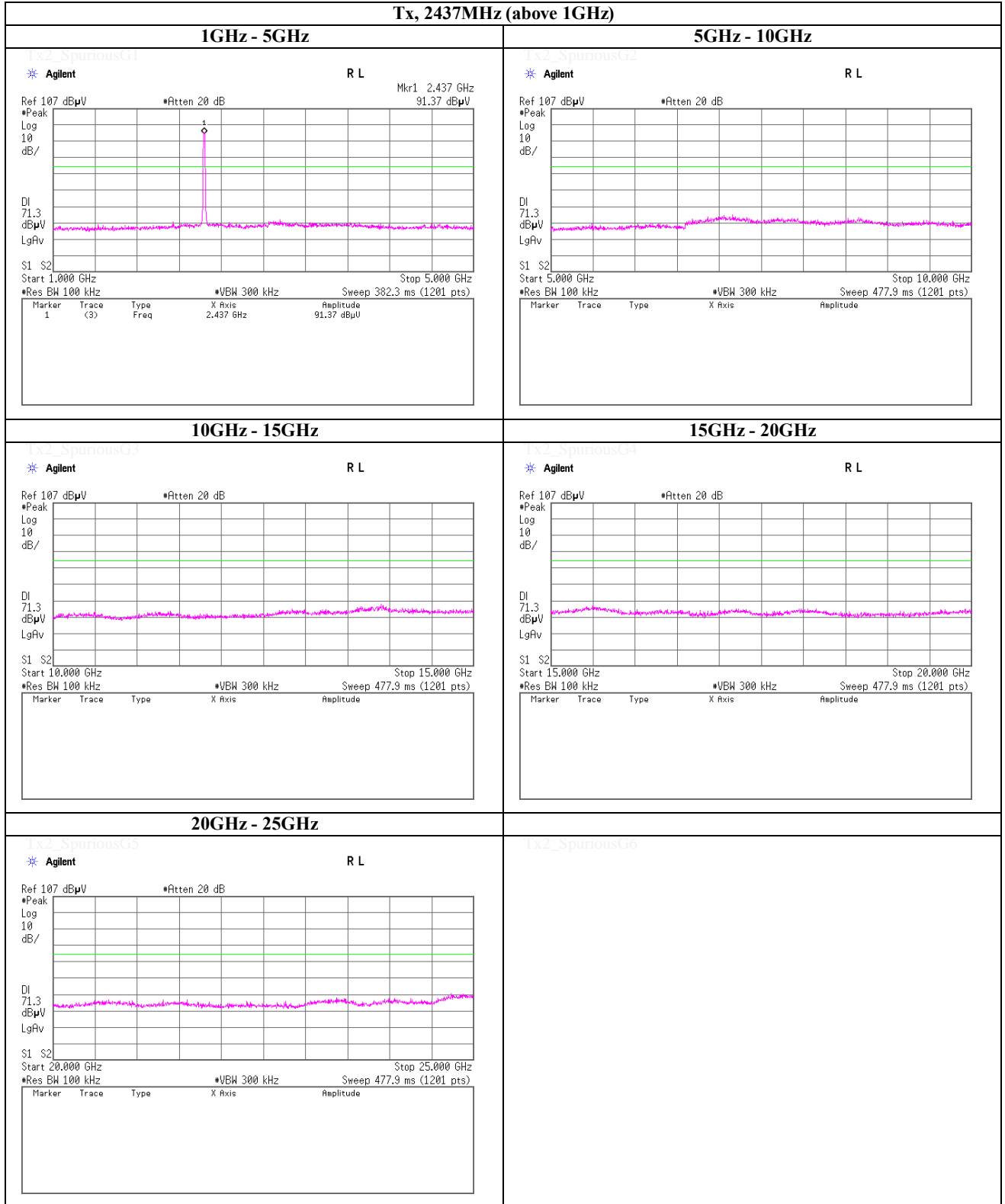
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10**

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



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**Shonan EMC Lab.**

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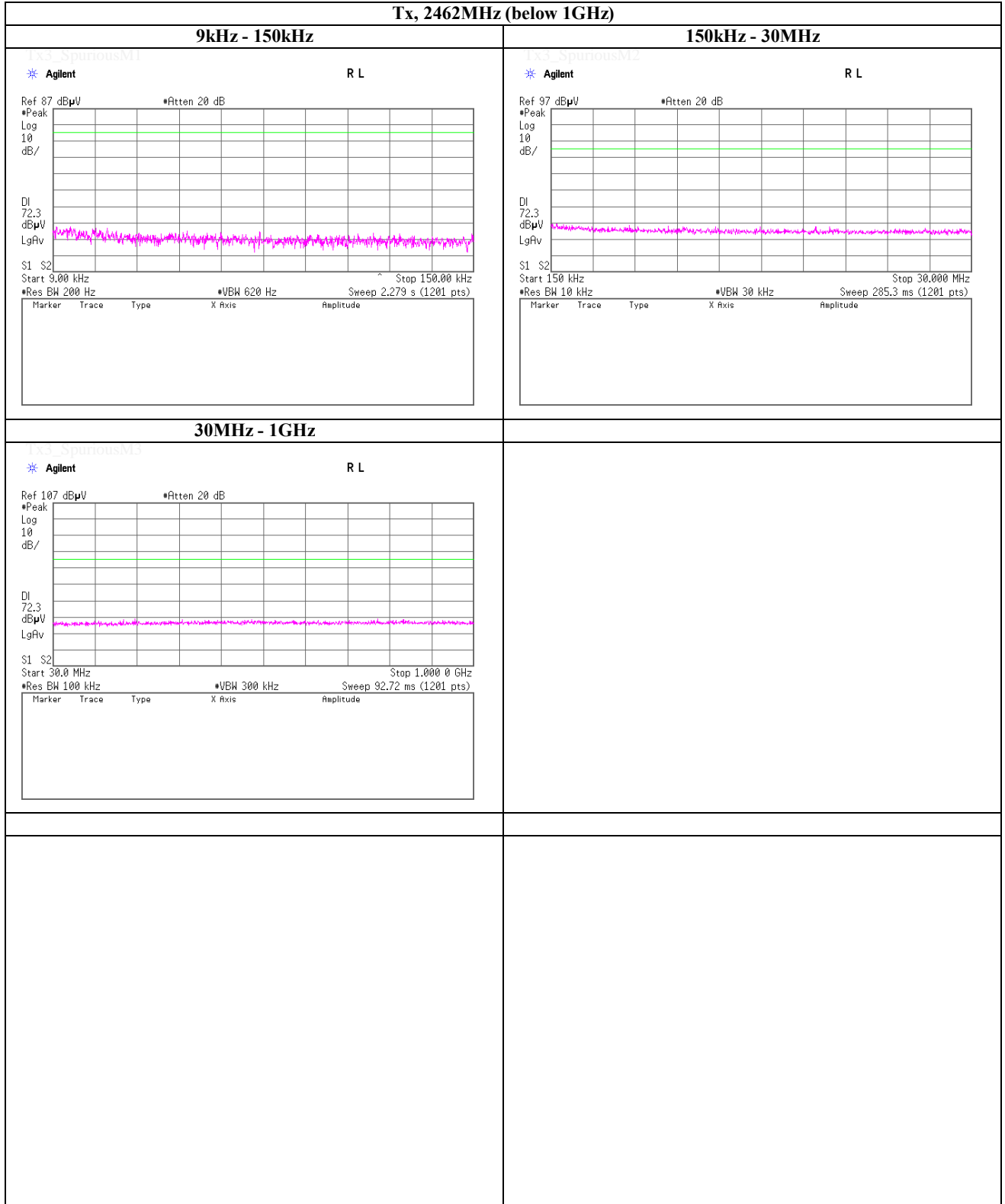
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10**

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



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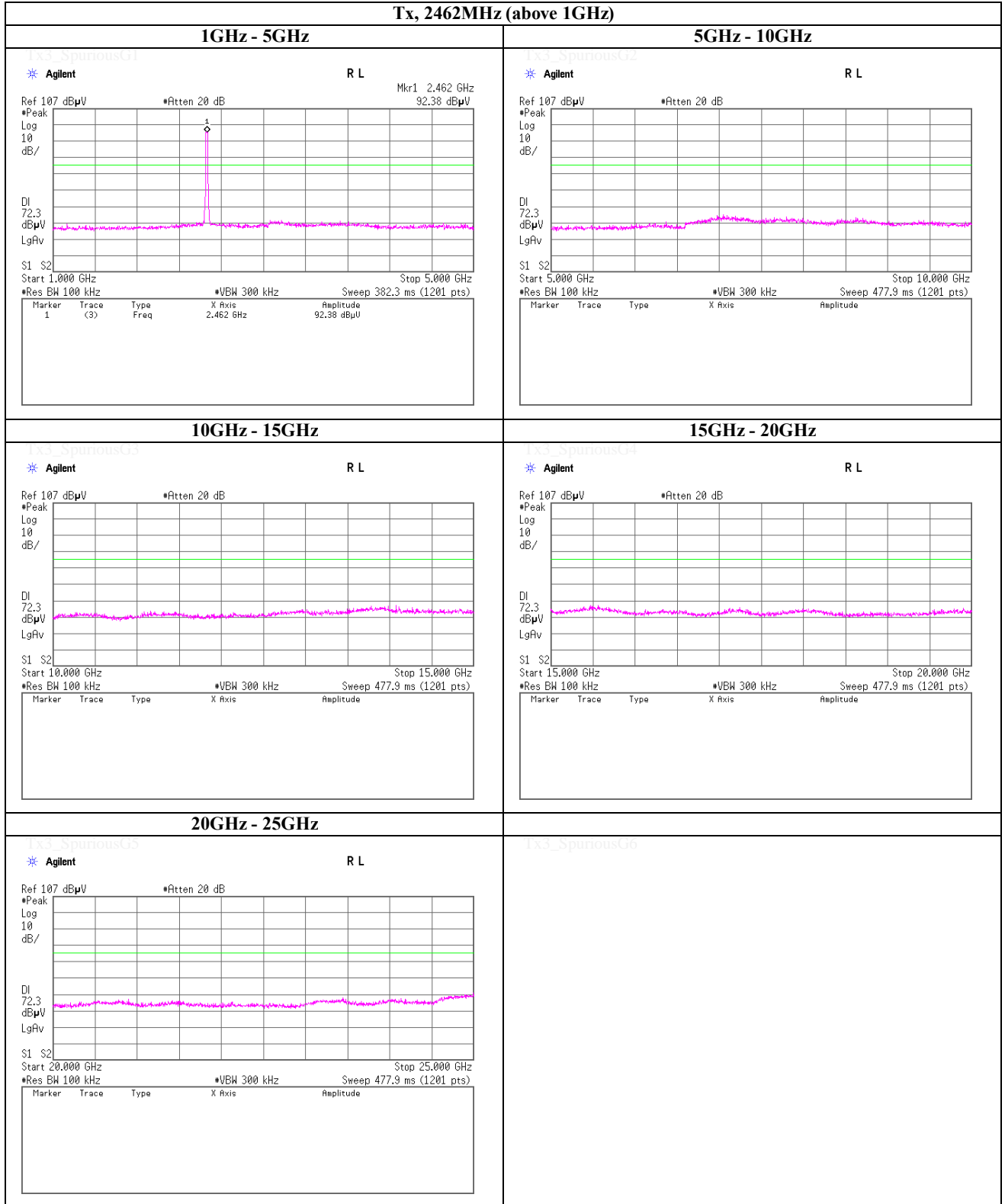
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10**

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



**UL Japan, Inc.**

**Shonan EMC Lab.**

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

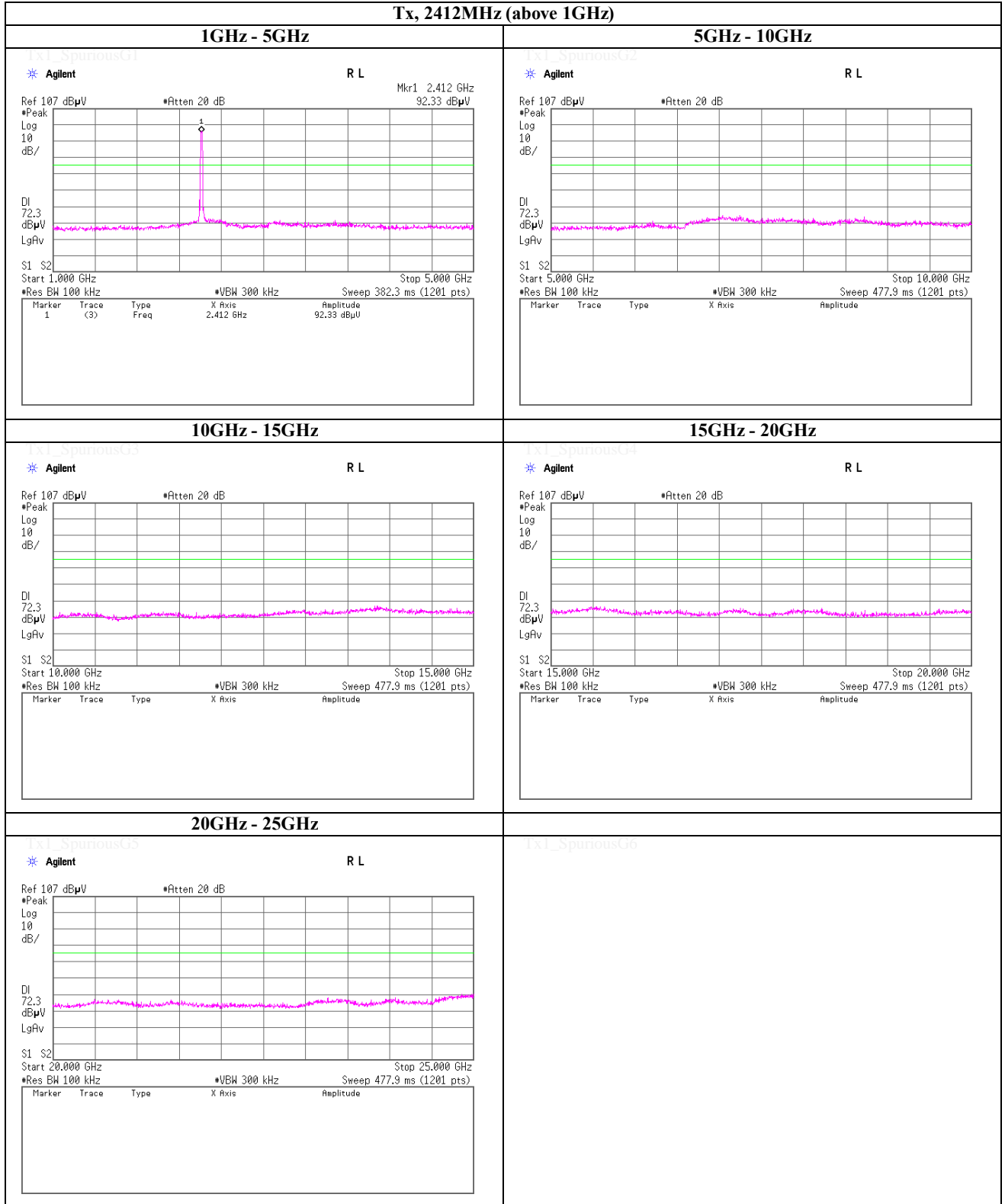
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12**

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



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**Shonan EMC Lab.**

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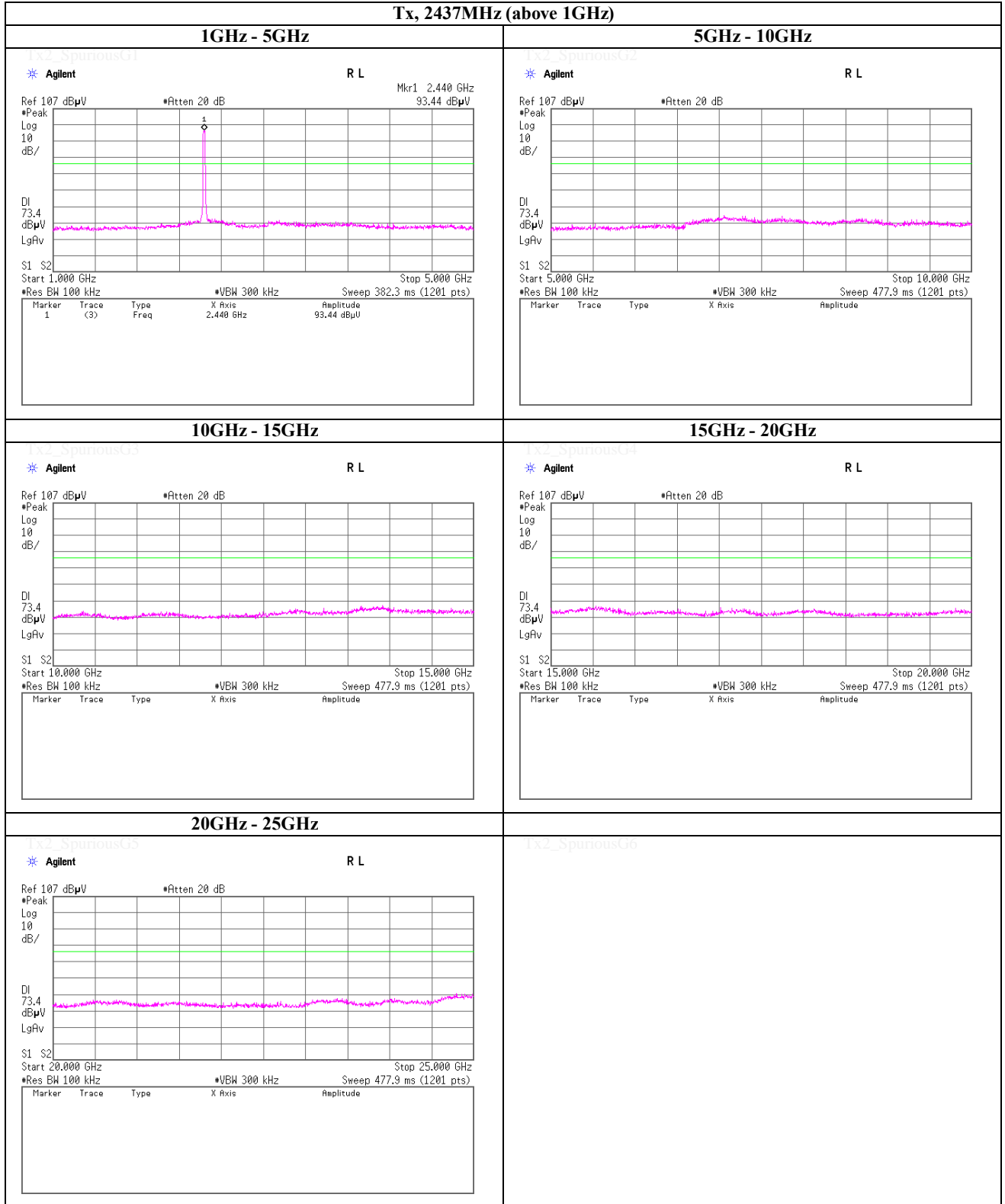
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12**

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



**UL Japan, Inc.**

**Shonan EMC Lab.**

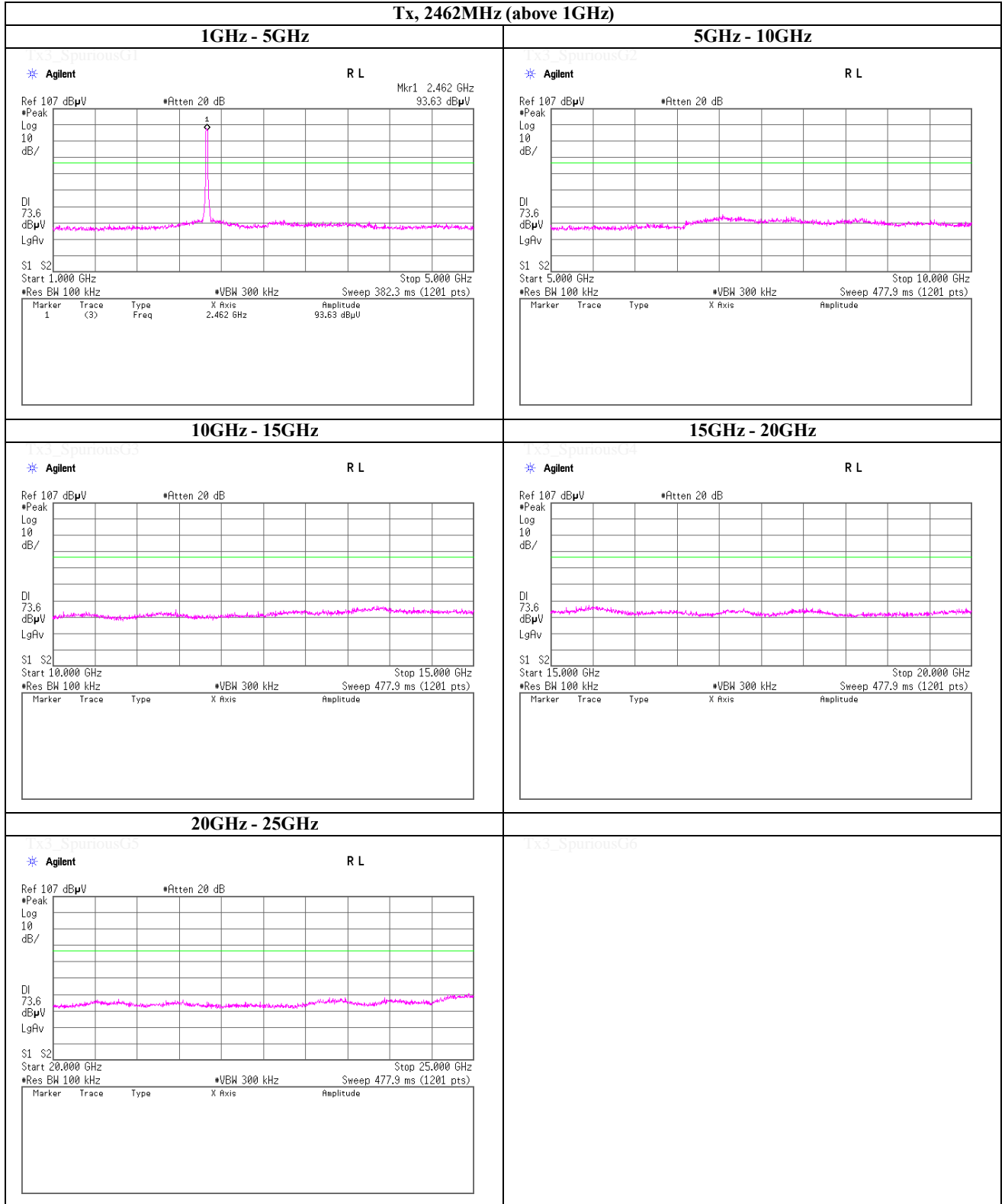
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12**

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



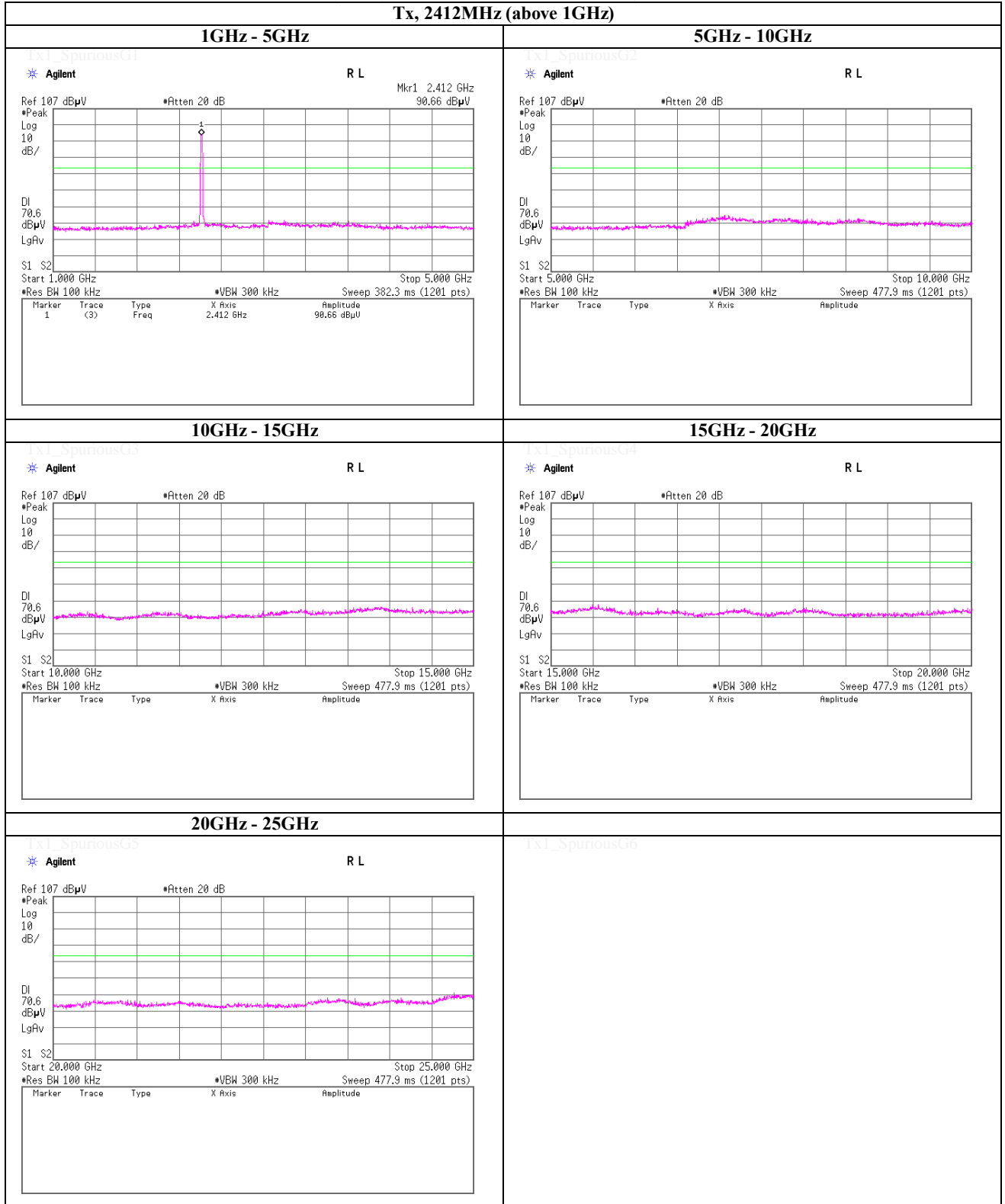
**UL Japan, Inc.**  
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 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10**

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



**UL Japan, Inc.**

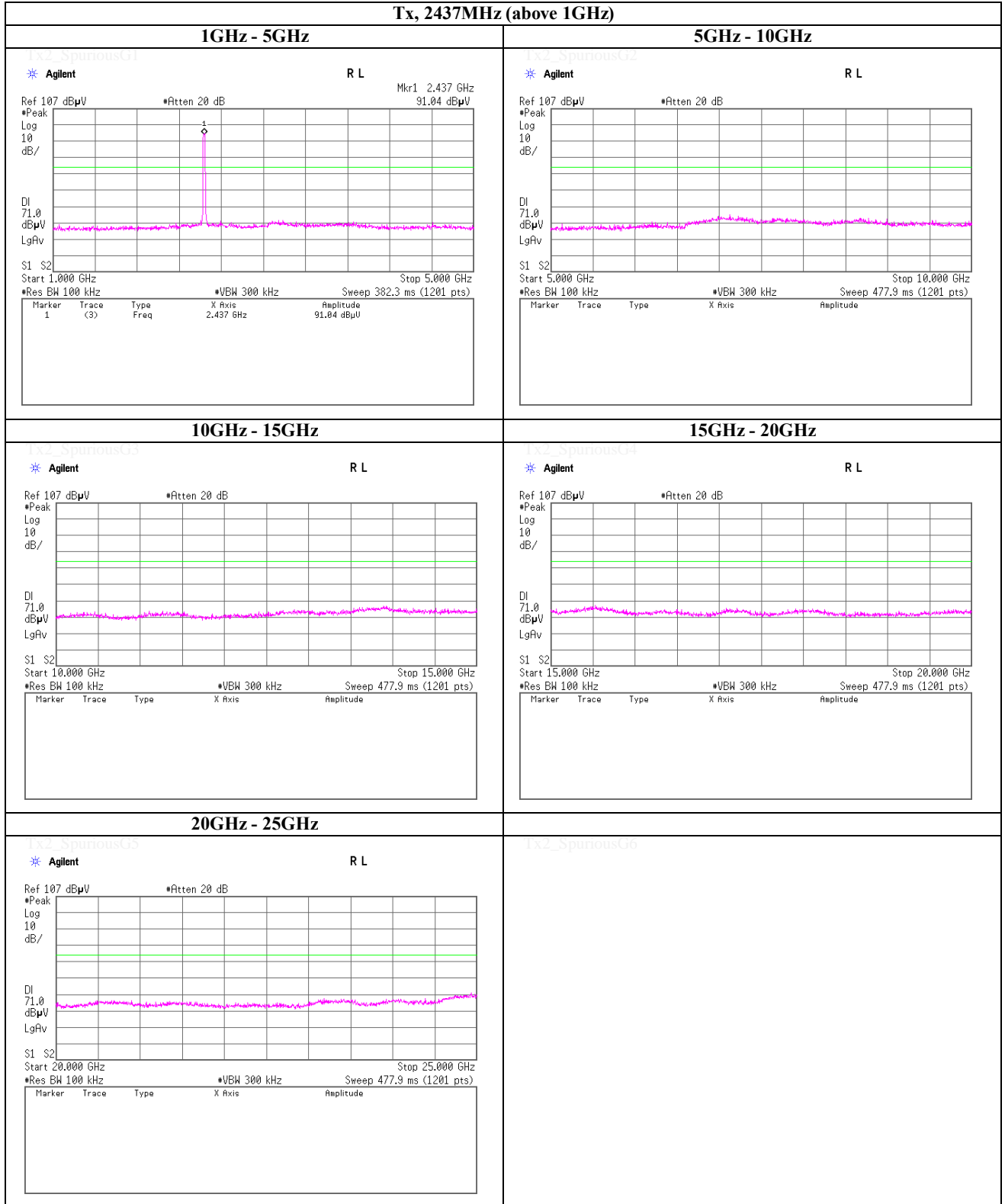
**Shonan EMC Lab.**

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

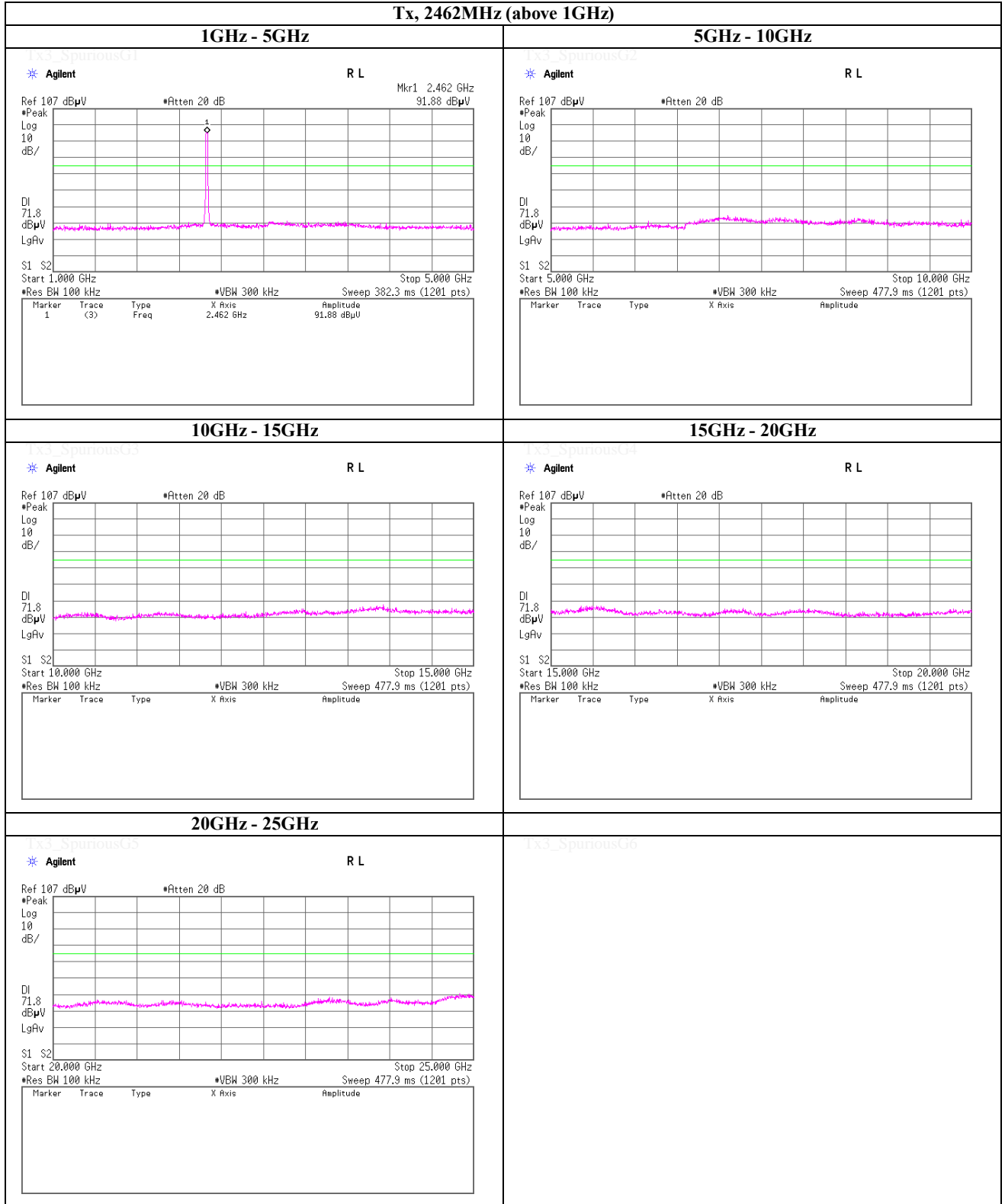
**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10**



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**Shonan EMC Lab.**  
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**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10**

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

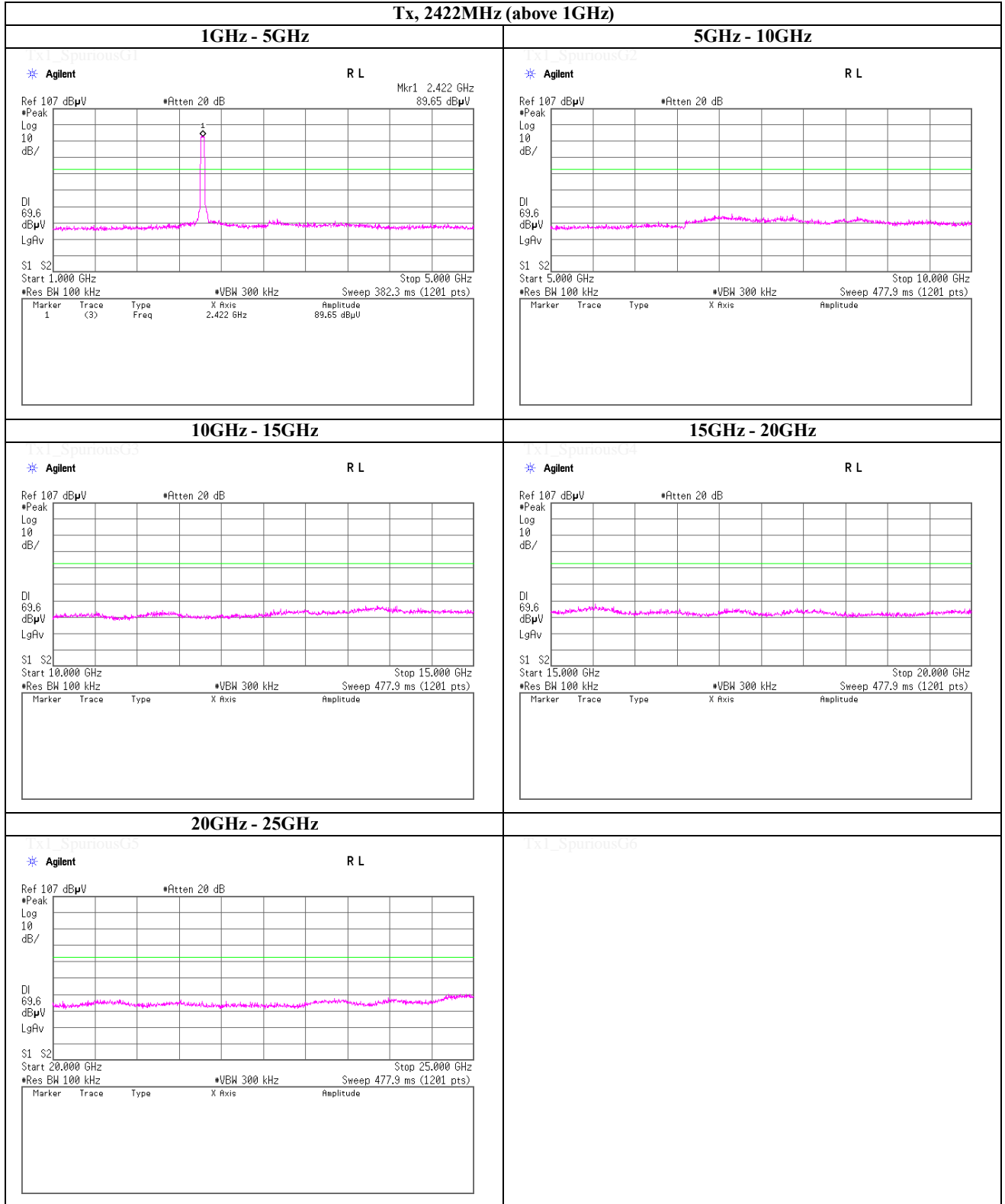


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12**

**Tx, 2422MHz (above 1GHz)**



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**Shonan EMC Lab.**

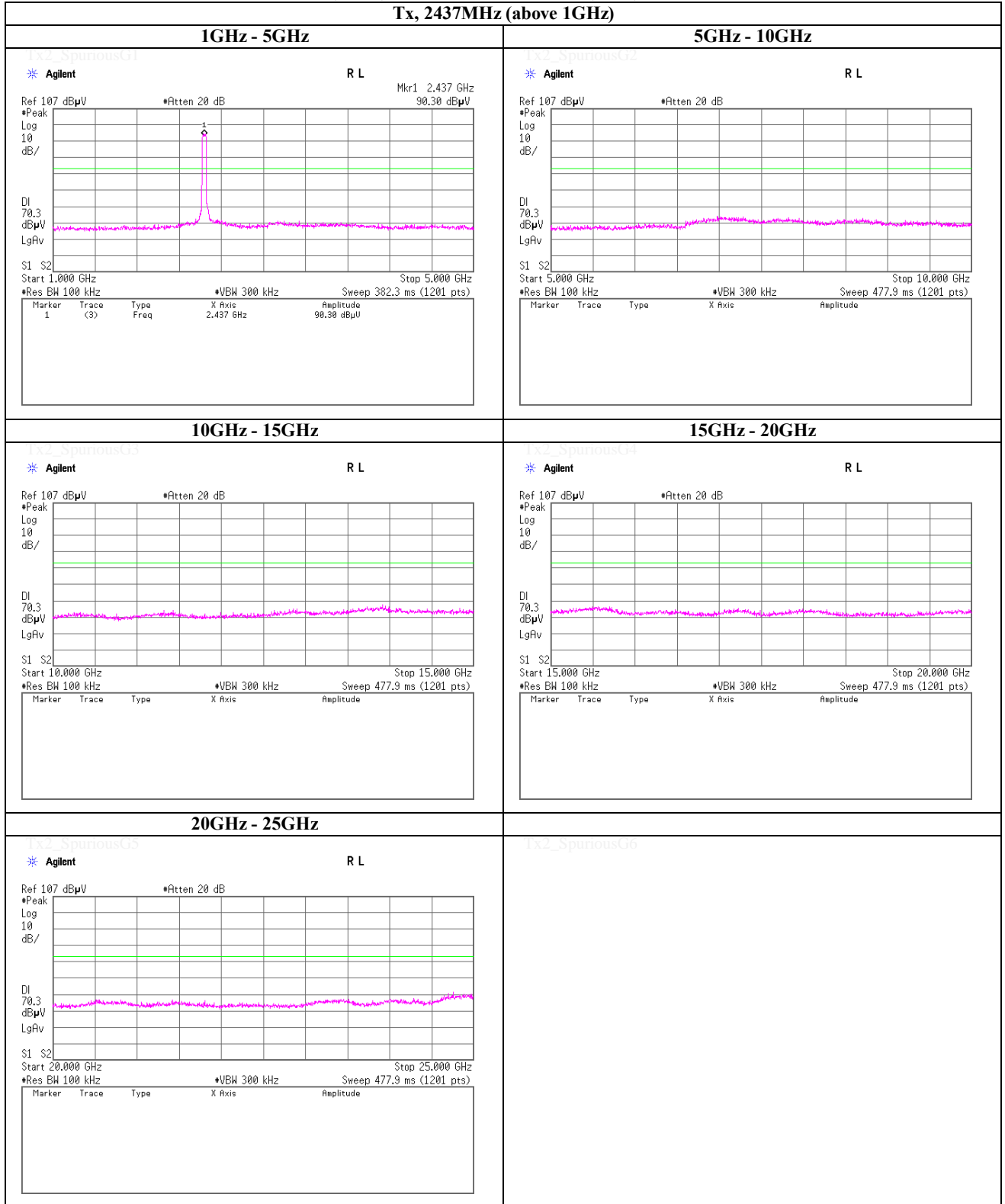
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12**

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

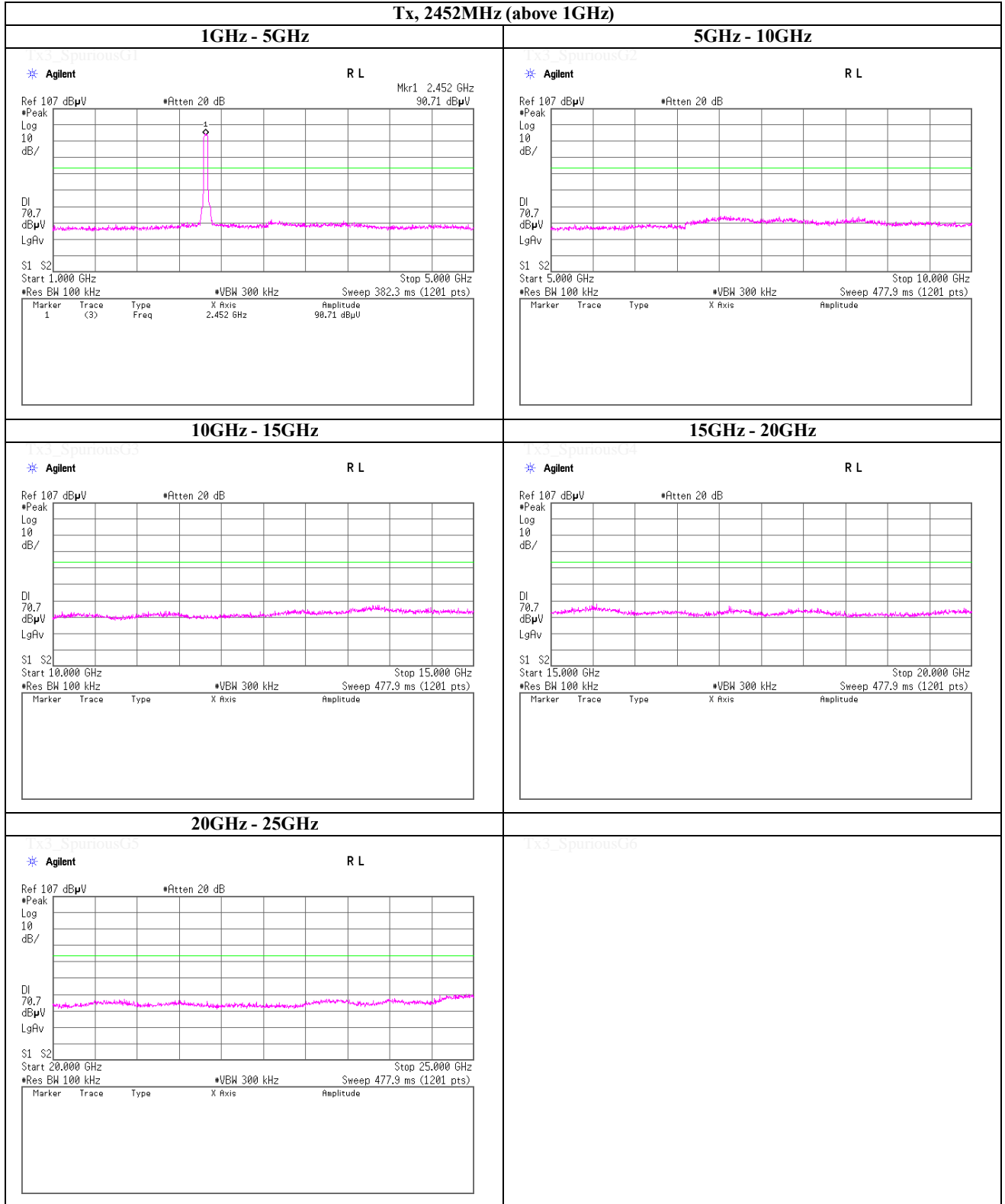


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12**

**Tx, 2452MHz (above 1GHz)**



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**Shonan EMC Lab.**

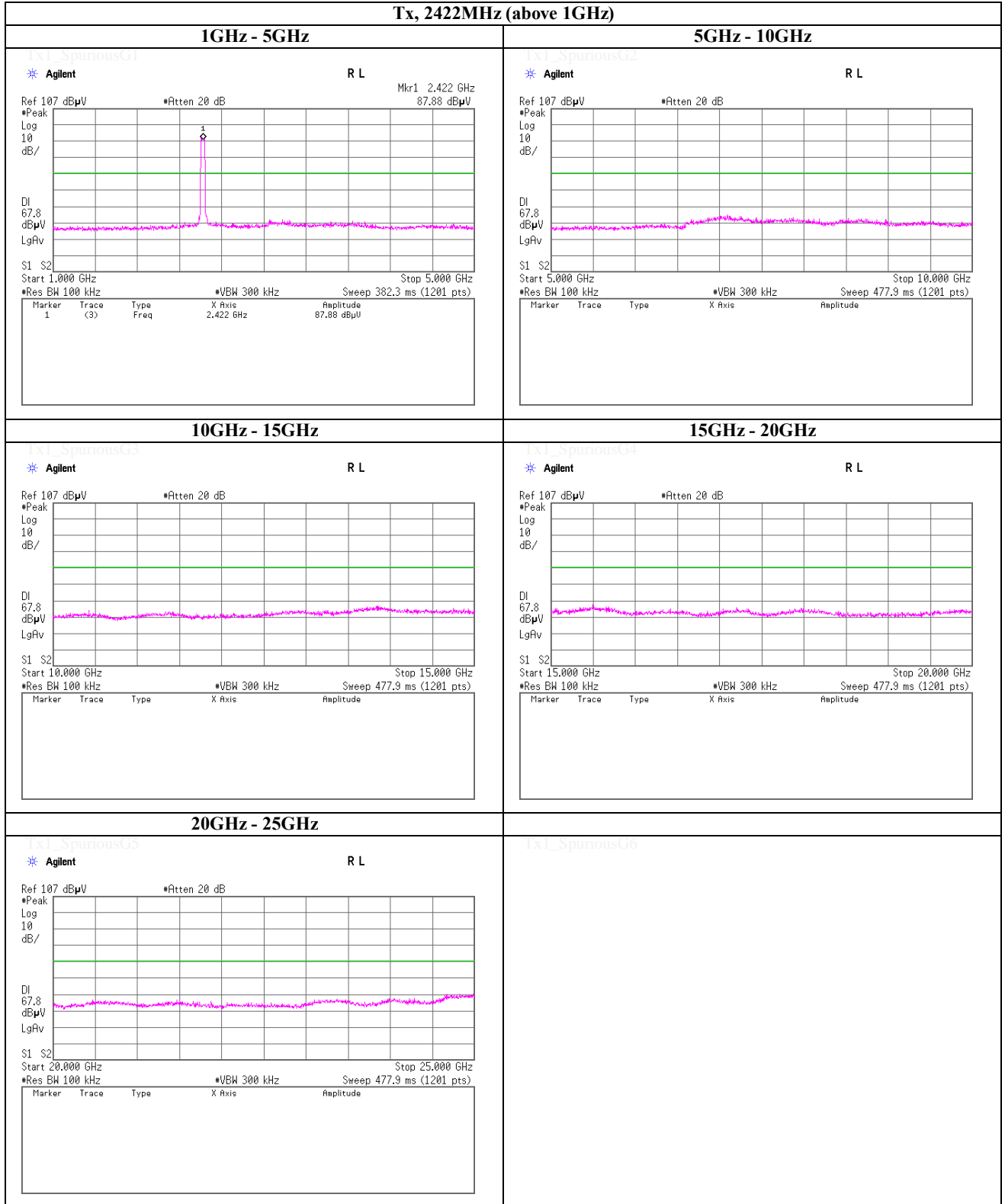
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10**

**Tx, 2422MHz (above 1GHz)**

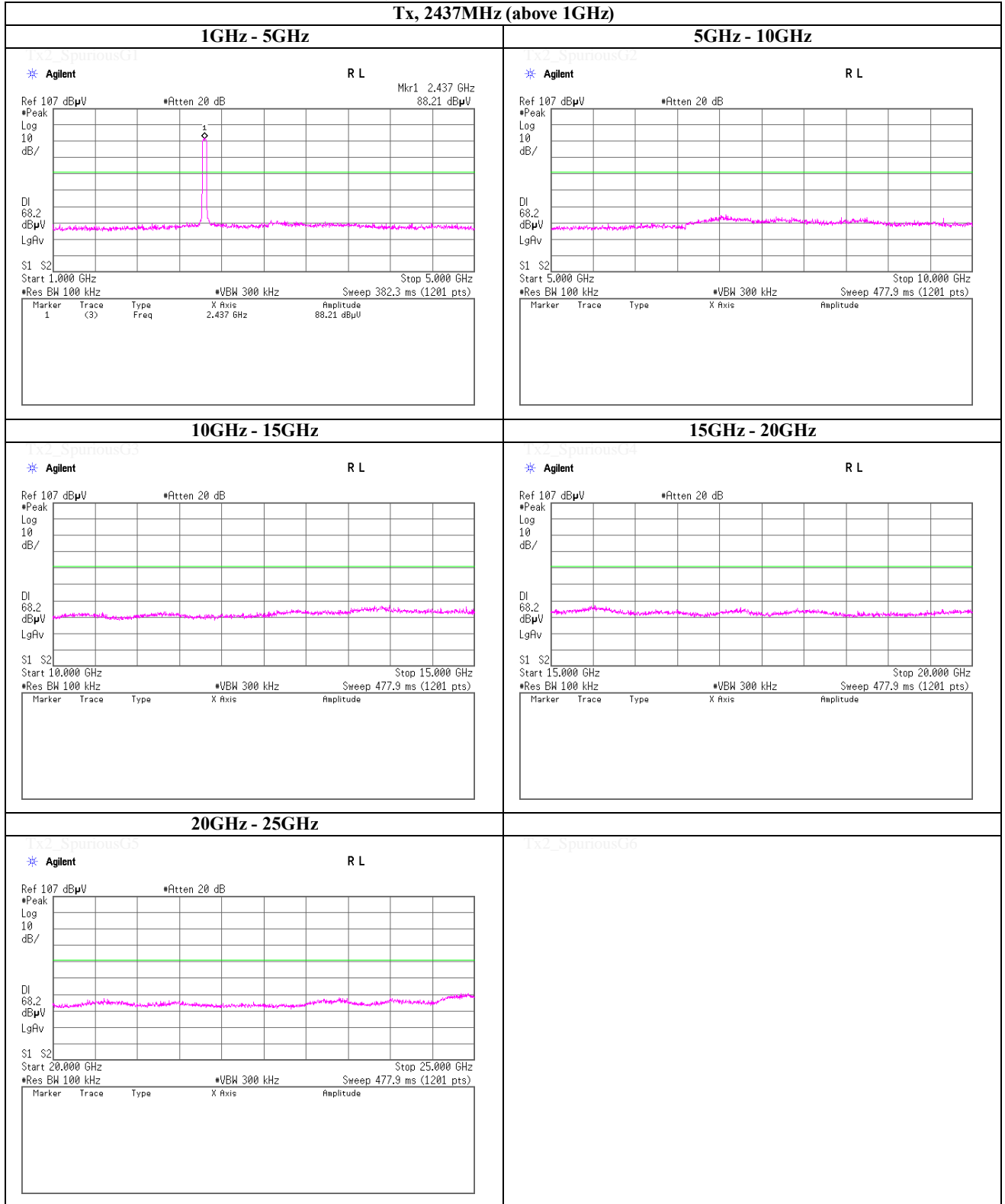


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**(Reference chart) Spurious emission (Conducted)**

**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10**

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



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**Shonan EMC Lab.**

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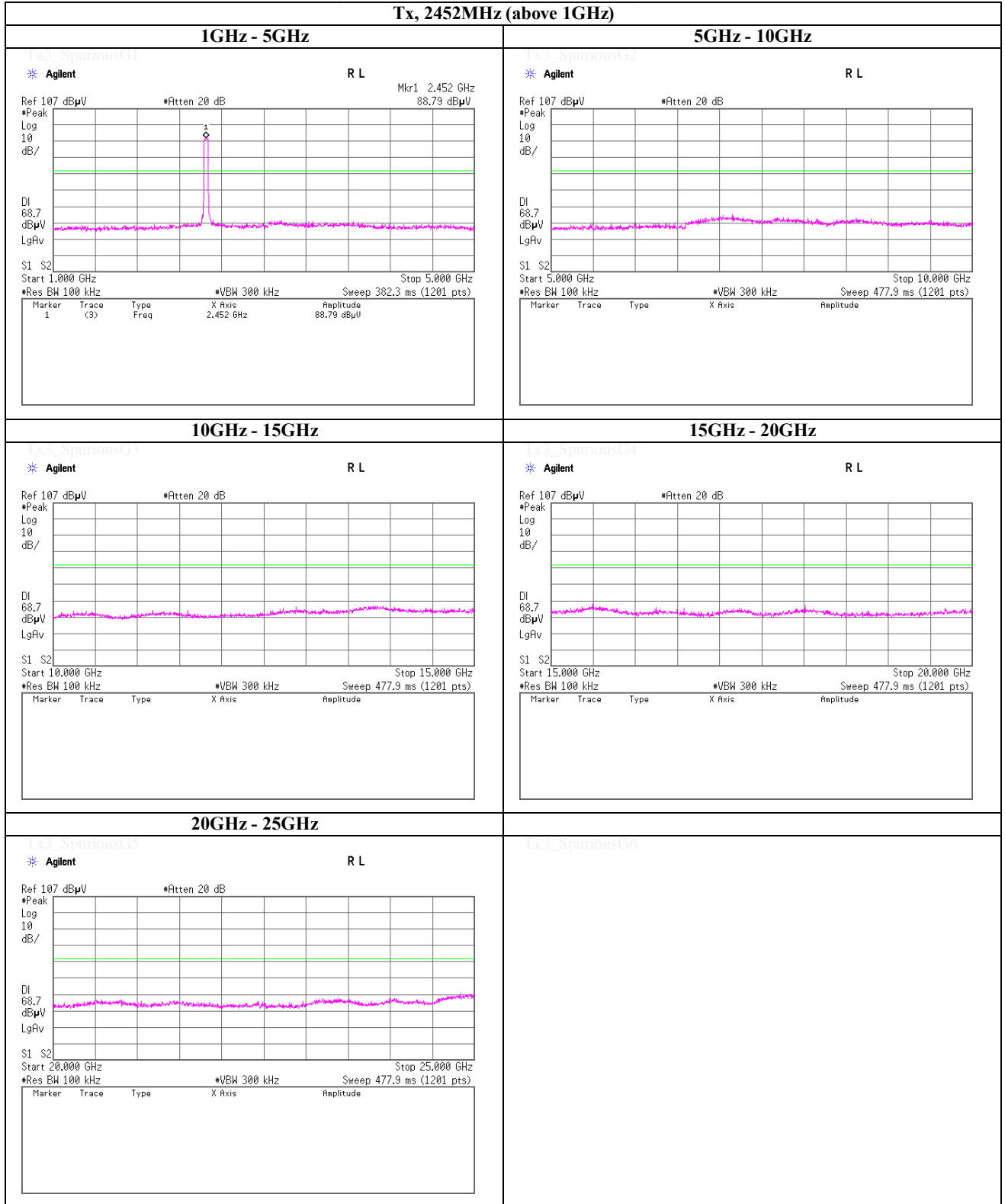
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**  
**Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting '10**

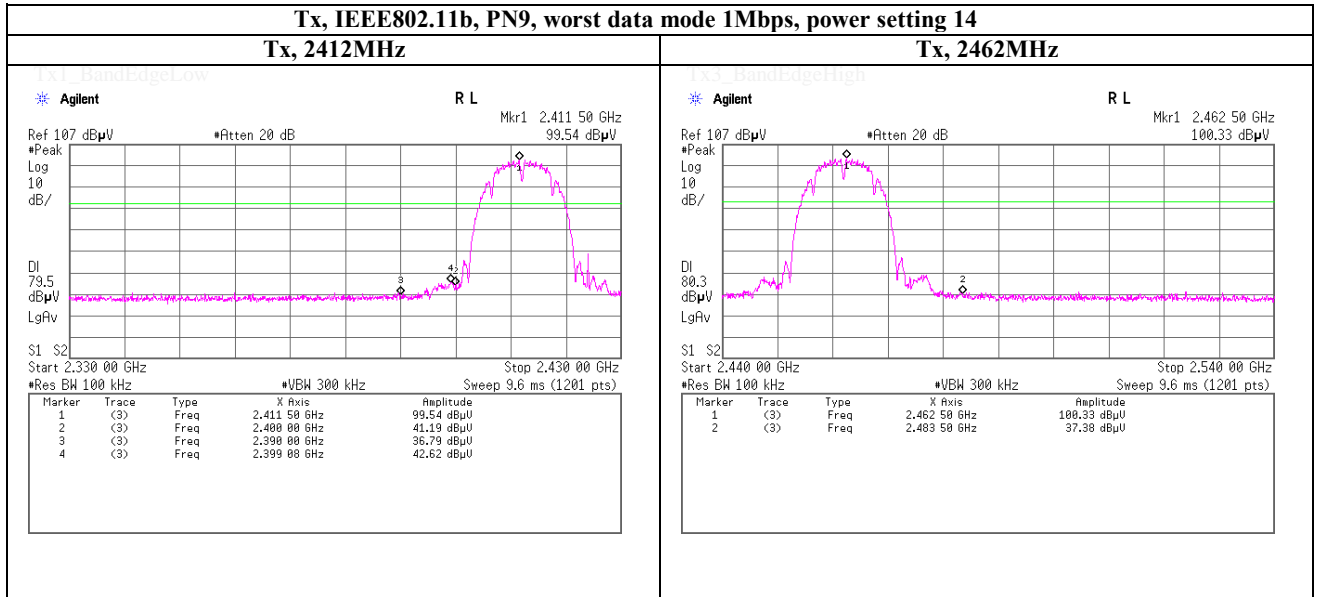
**Tx, 2452MHz (above 1GHz)**



**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

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

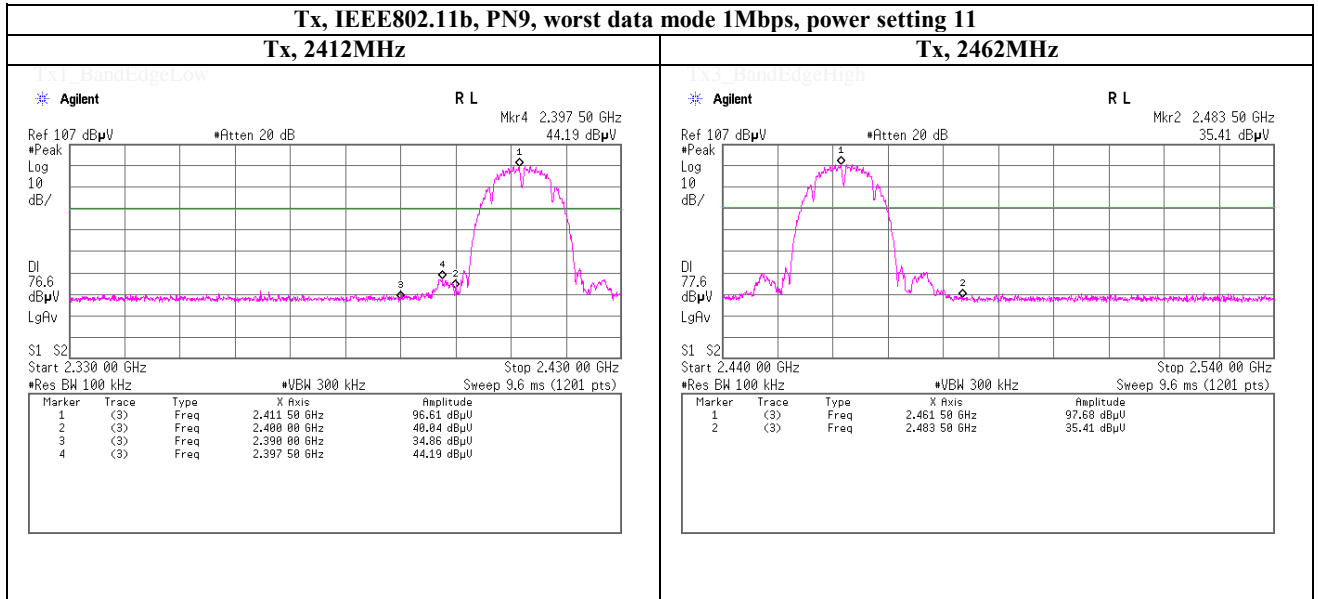
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

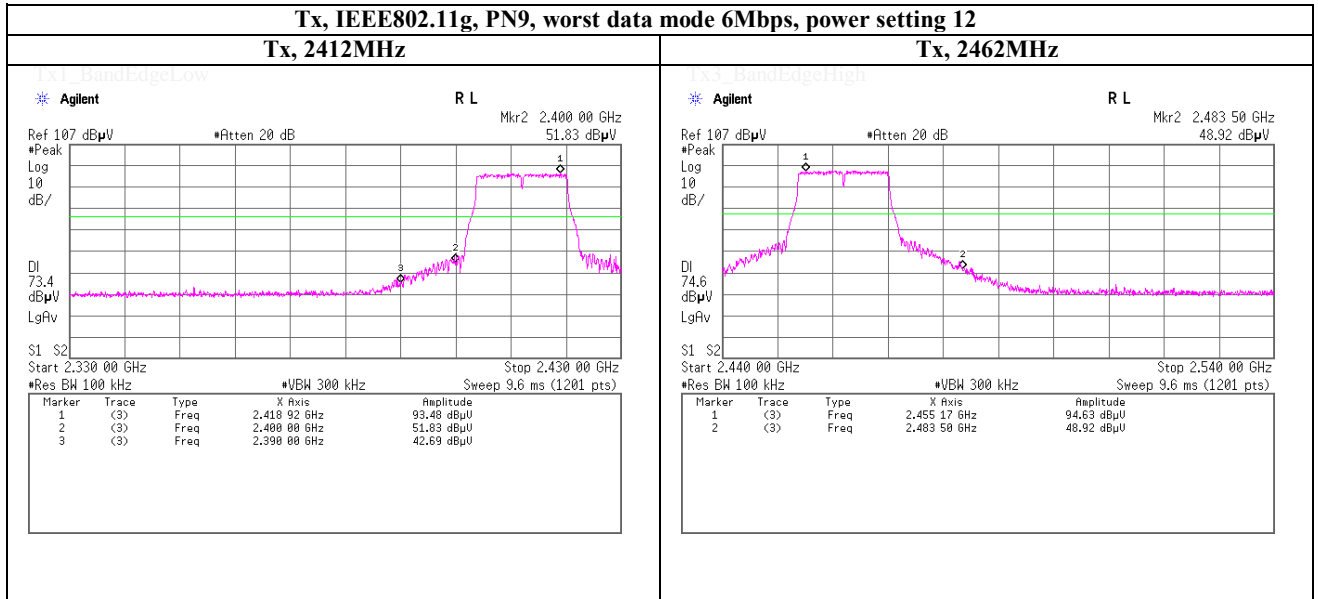
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

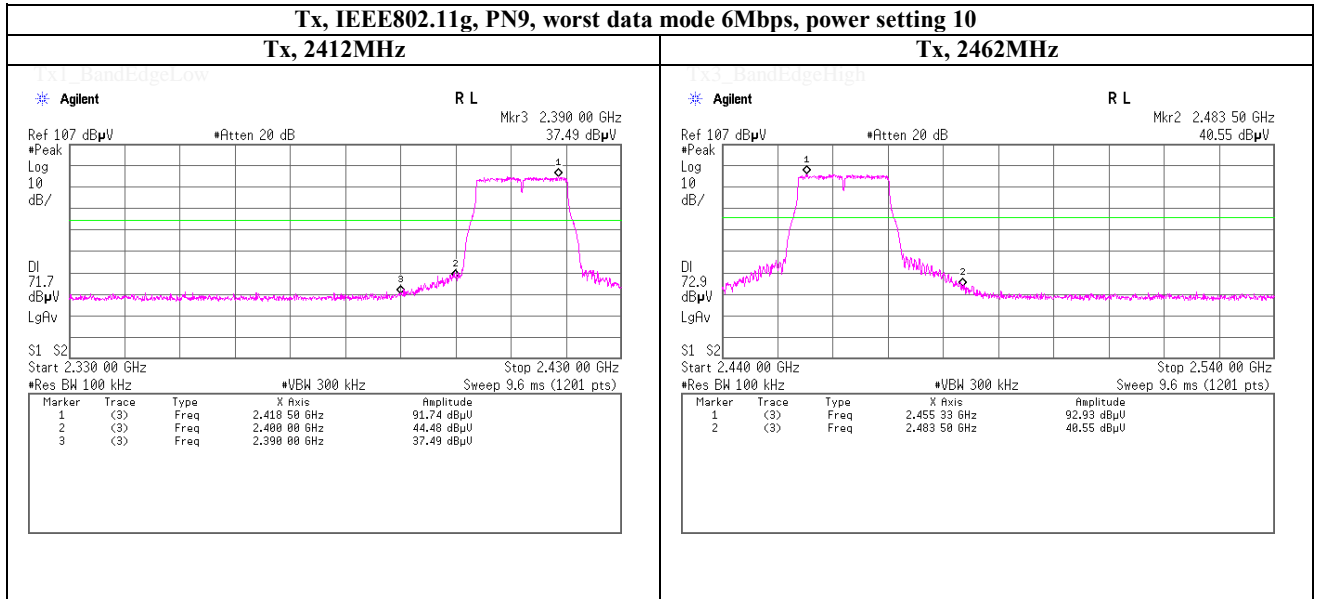
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

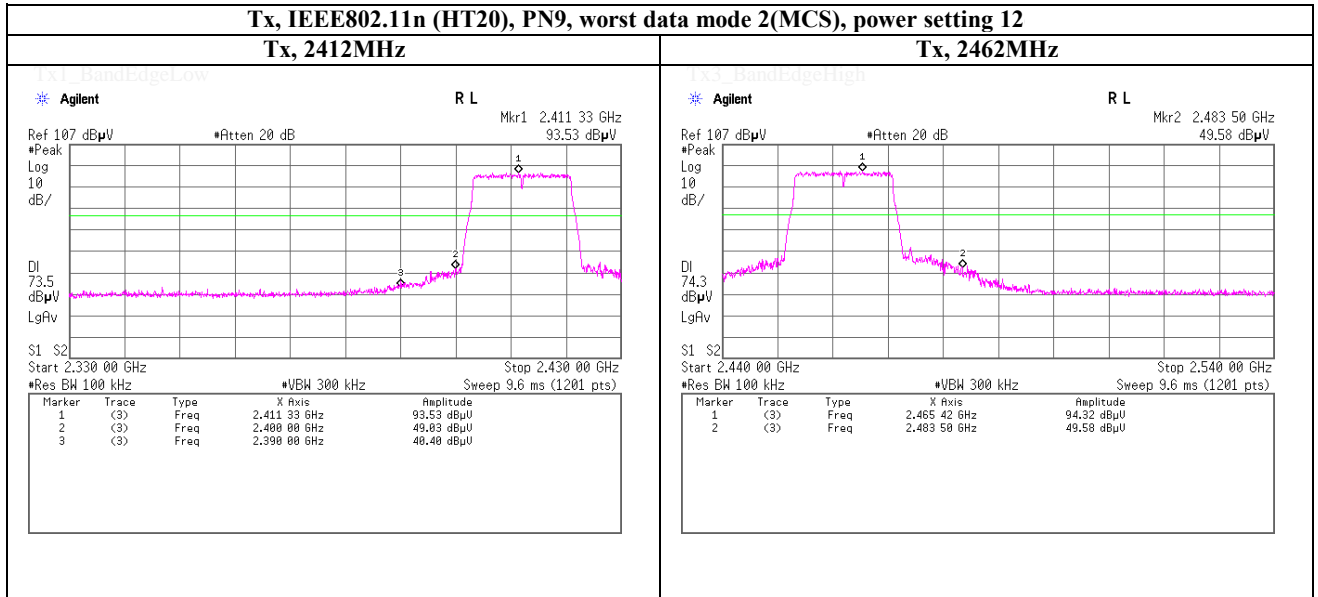
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

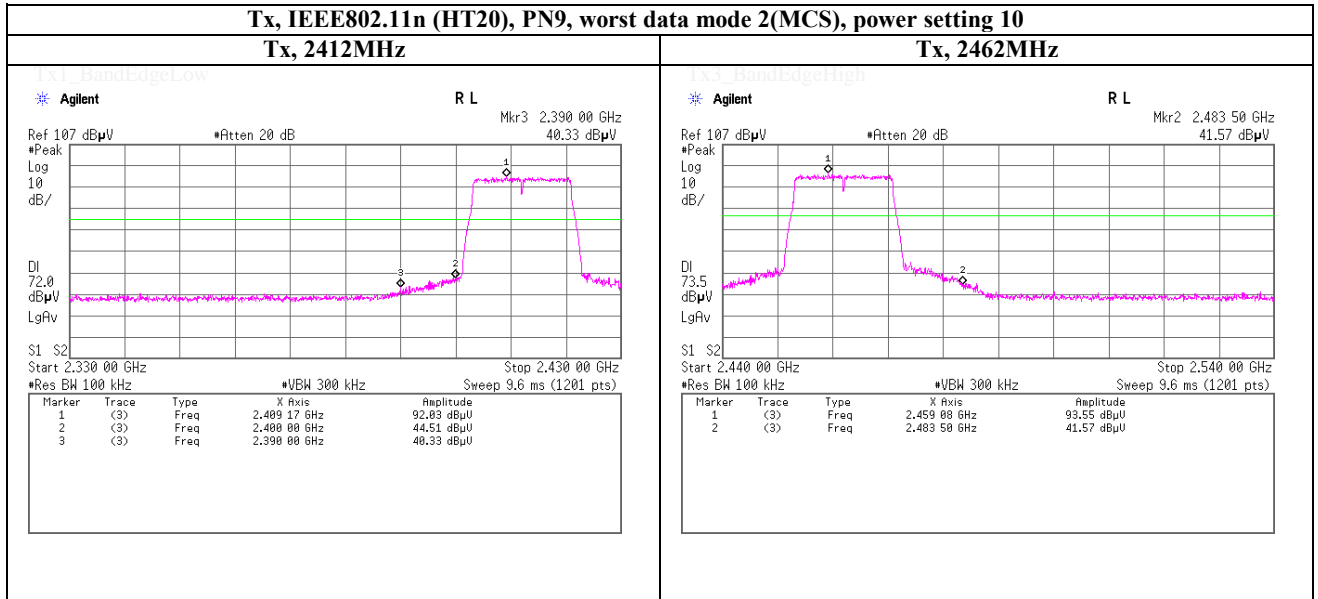
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

**Shonan EMC Lab.**

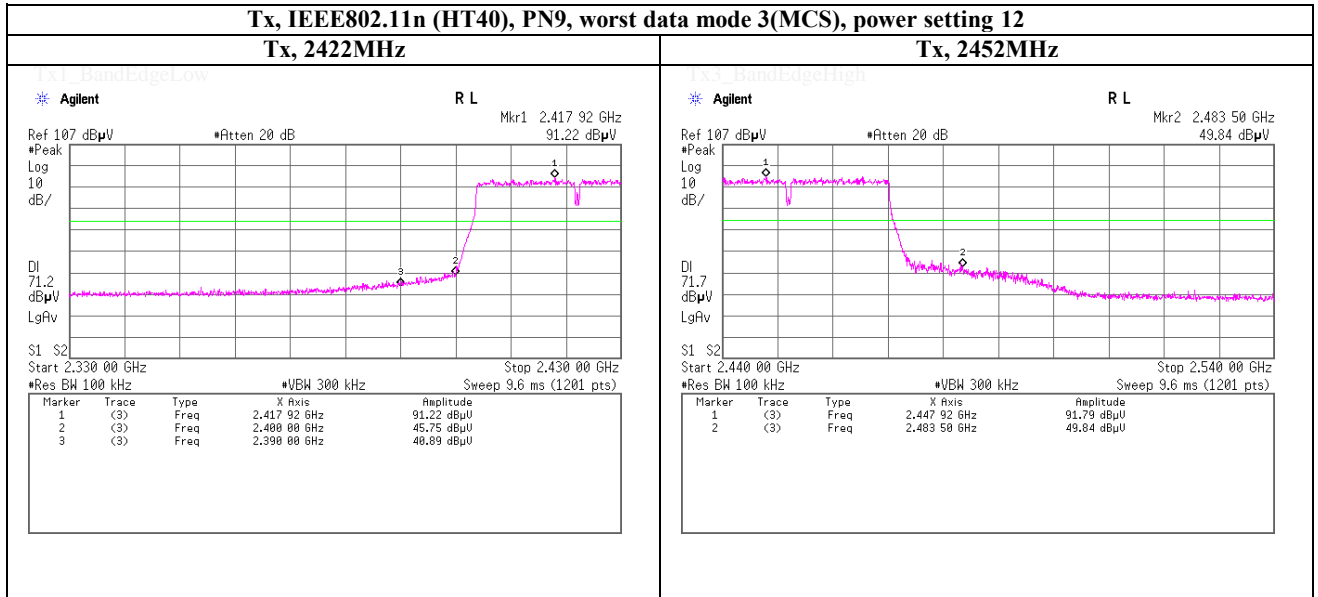
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



**UL Japan, Inc.**

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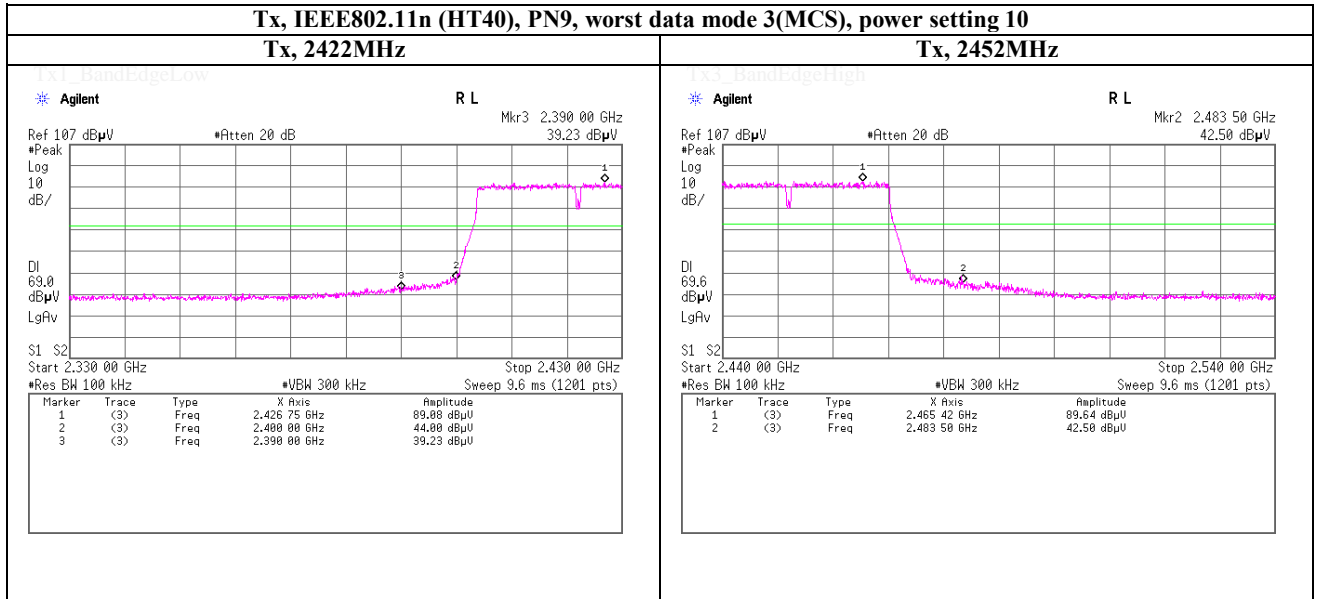
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401



**(Reference chart) Spurious emission (Conducted)**

**Band Edge compliance**



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Telephone : +81 463 50 6400

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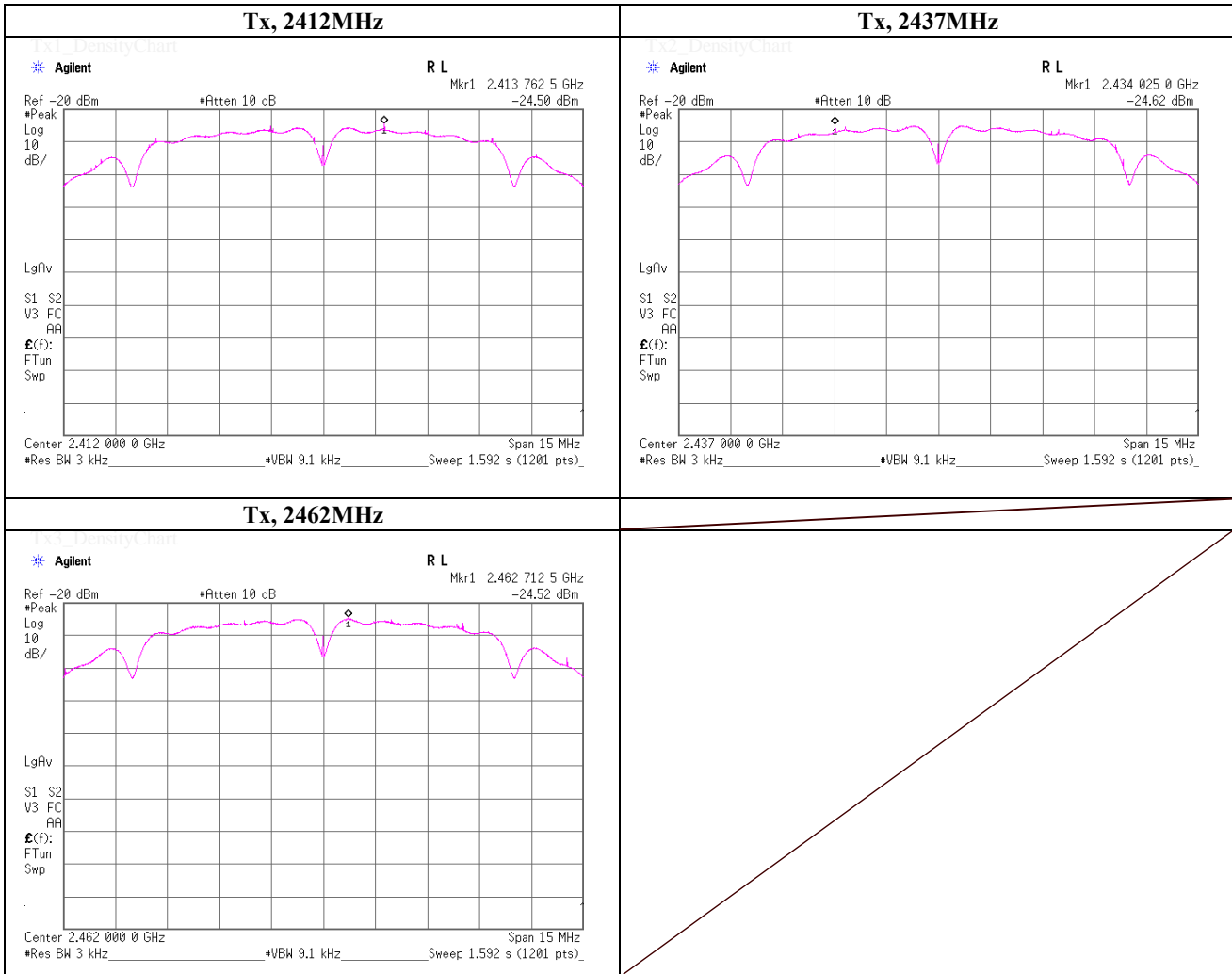
## Maximum Power Spectral Density

(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 14, 2013	
Temperature / Humidity	25deg.C , 62%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 14	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2413.76	-24.50	0.50	9.98	-14.02	8.00	22.02
2437.0000	2434.03	-24.62	0.50	9.98	-14.14	8.00	22.14
2462.0000	2462.71	-24.52	0.50	9.98	-14.04	8.00	22.04

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



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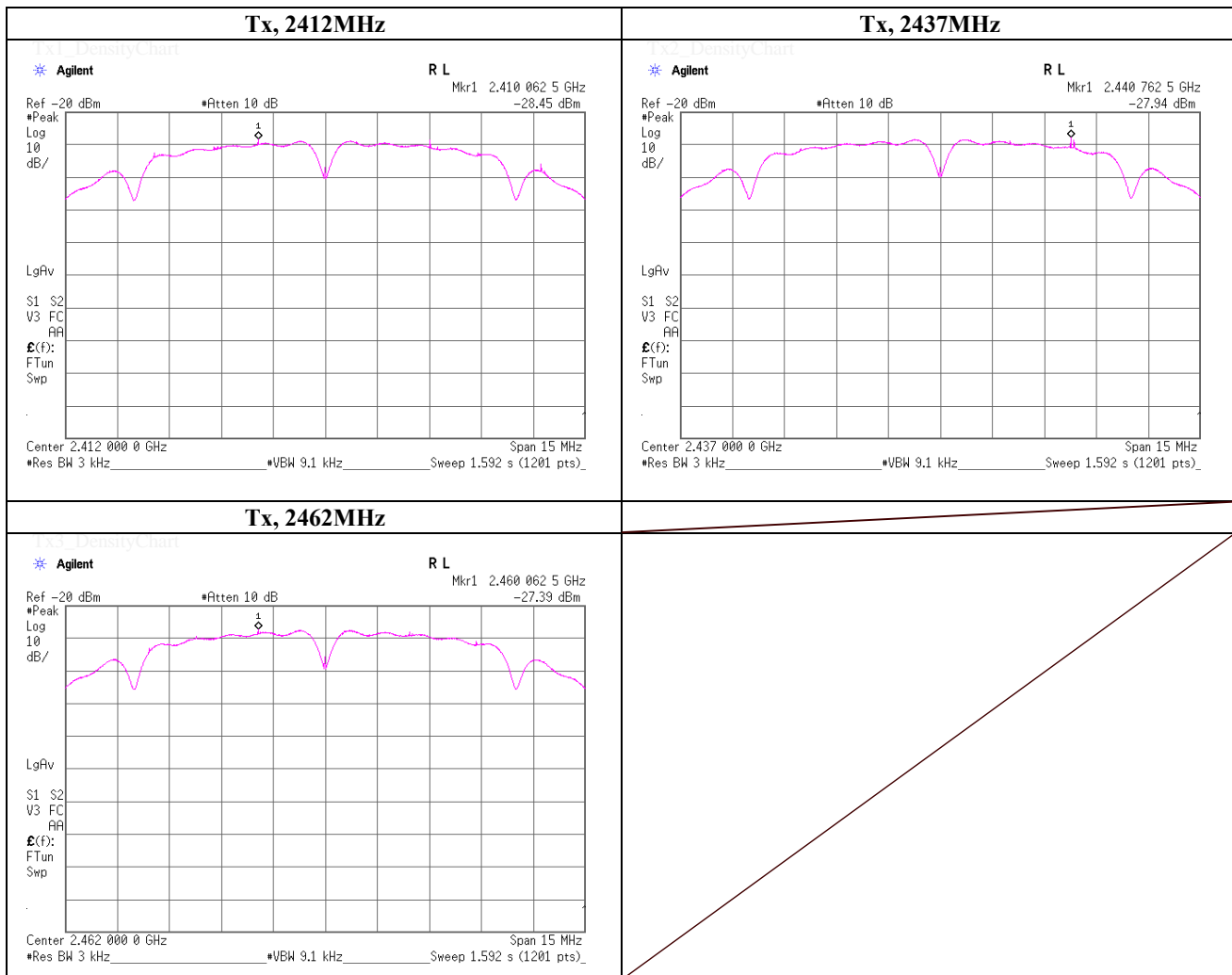
## Maximum Power Spectral Density

(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11b, PN9, worst data mode 1Mbps, power setting 11	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2410.06	-28.45	0.50	9.98	-17.97	8.00	25.97
2437.0000	2440.76	-27.94	0.50	9.98	-17.46	8.00	25.46
2462.0000	2460.06	-27.39	0.50	9.98	-16.91	8.00	24.91

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



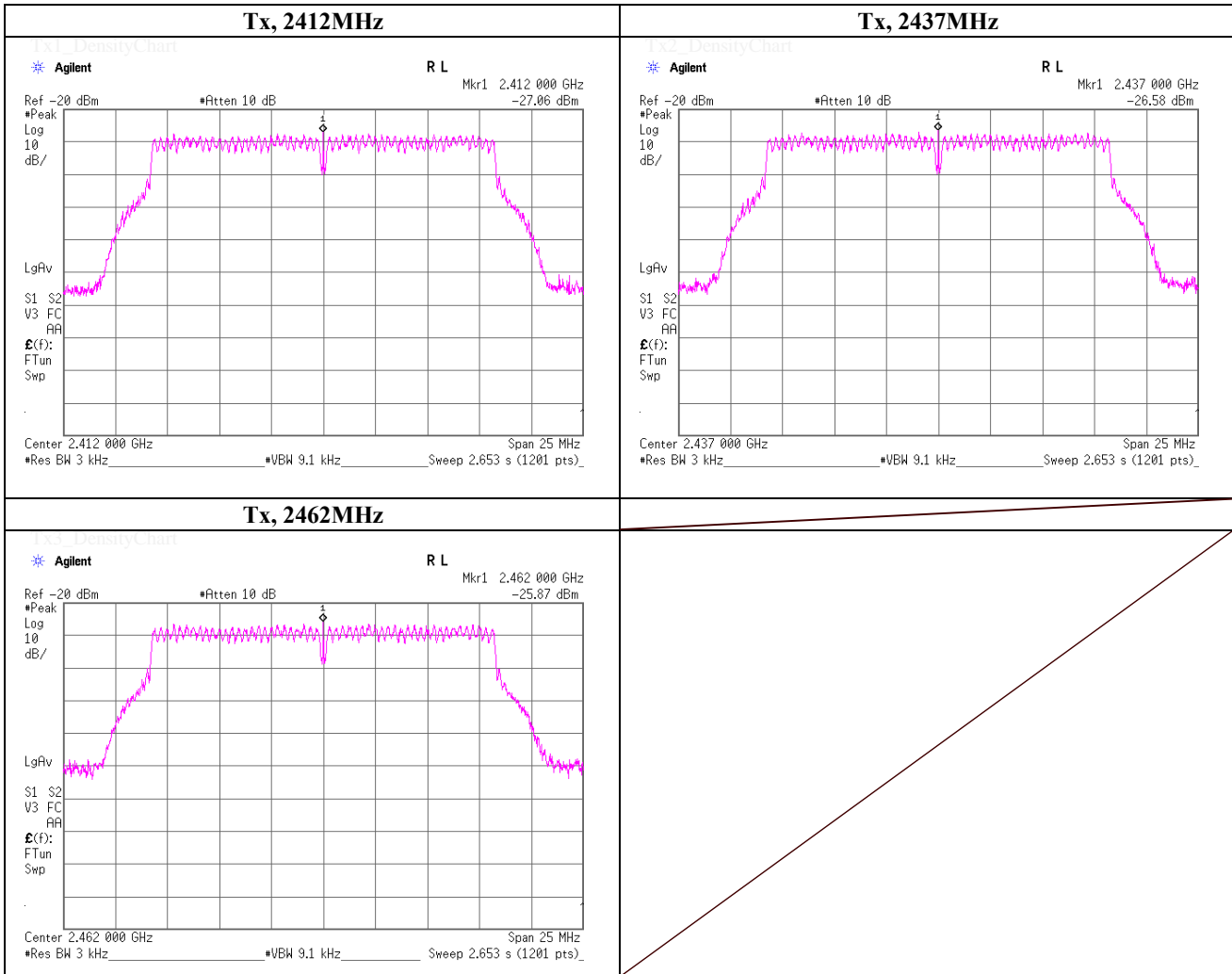
**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Maximum Power Spectral Density (PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 14, 2013	
Temperature / Humidity	25deg.C , 62%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 12	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2412.00	-27.06	0.50	9.98	-16.58	8.00	24.58
2437.0000	2437.00	-26.58	0.50	9.98	-16.10	8.00	24.10
2462.0000	2462.00	-25.87	0.50	9.98	-15.39	8.00	23.39

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



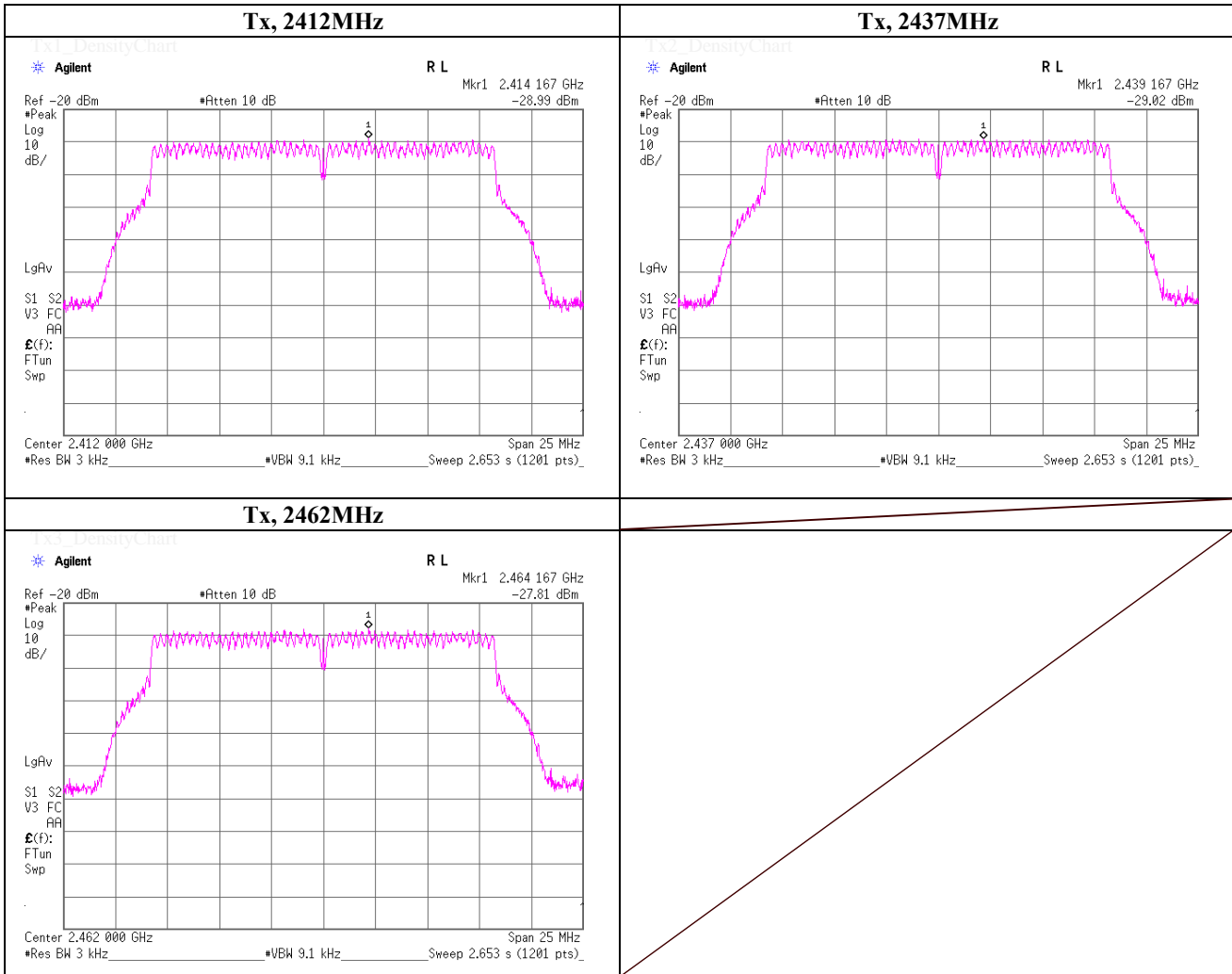
**UL Japan, Inc.**  
**Shonan EMC Lab.**  
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN  
 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Maximum Power Spectral Density (PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11g, PN9, worst data mode 6Mbps, power setting 10	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2414.17	-28.99	0.50	9.98	-18.51	8.00	26.51
2437.0000	2439.17	-29.02	0.50	9.98	-18.54	8.00	26.54
2462.0000	2464.17	-27.81	0.50	9.98	-17.33	8.00	25.33

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



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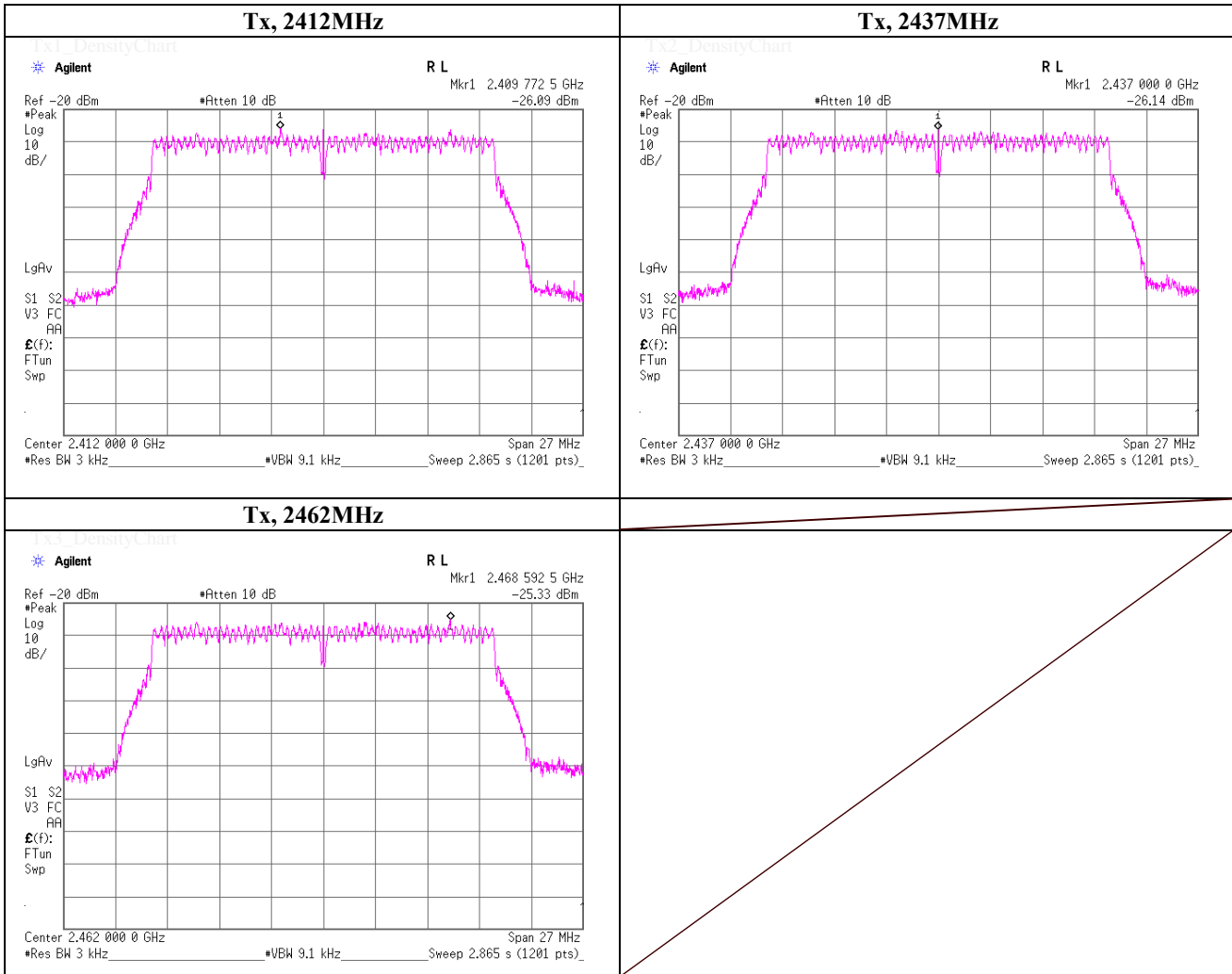
## Maximum Power Spectral Density

(PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 12	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2409.77	-26.09	0.50	9.98	-15.61	8.00	23.61
2437.0000	2437.00	-26.14	0.50	9.98	-15.66	8.00	23.66
2462.0000	2468.59	-25.33	0.50	9.98	-14.85	8.00	22.85

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



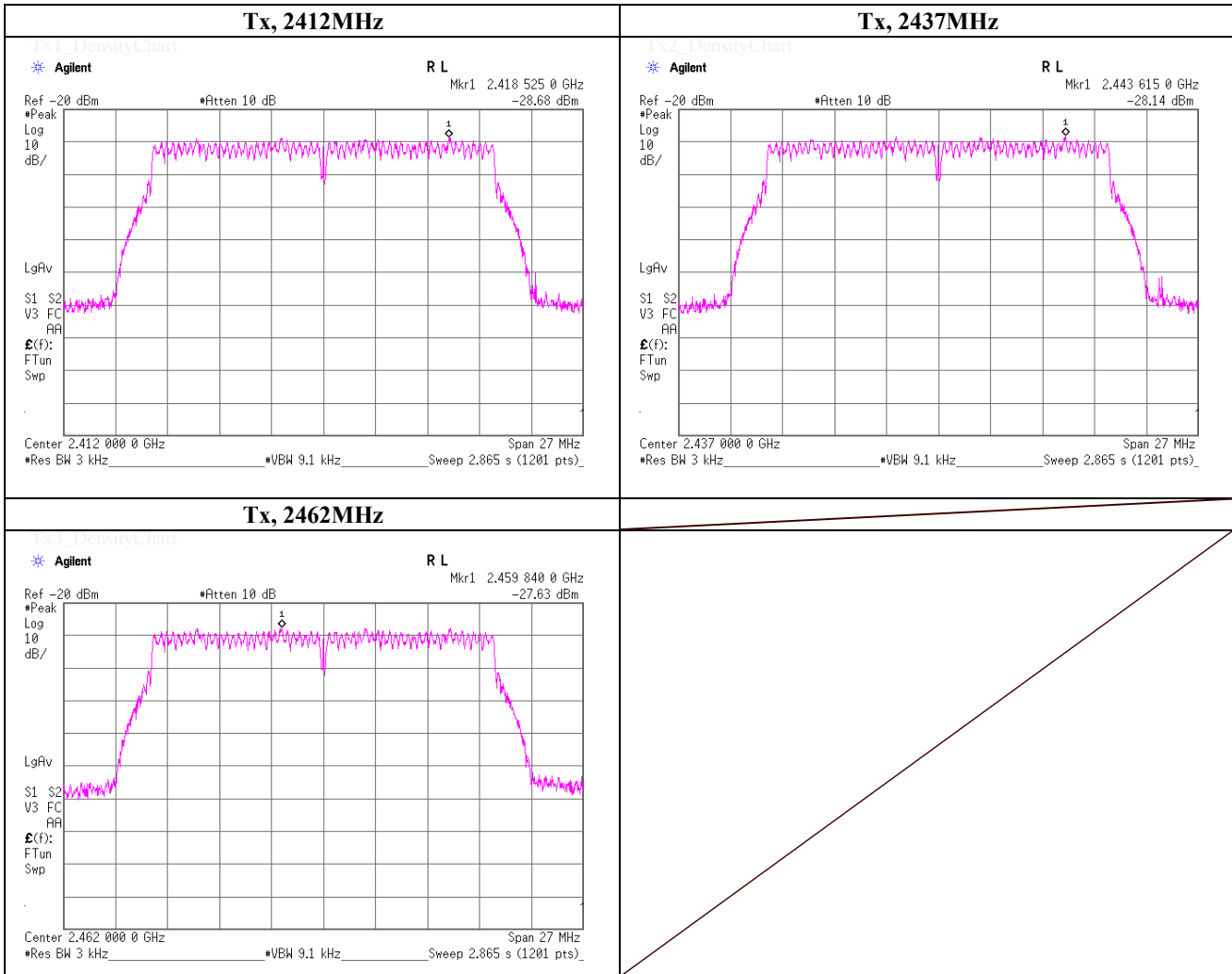
**UL Japan, Inc.**  
**Shonan EMC Lab.**  
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 Telephone : +81 463 50 6400  
 Facsimile : +81 463 50 6401

## Maximum Power Spectral Density (PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT20), PN9, worst data mode 2(MCS), power setting 10	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2418.53	-28.68	0.50	9.98	-18.20	8.00	26.20
2437.0000	2443.62	-28.14	0.50	9.98	-17.66	8.00	25.66
2462.0000	2459.84	-27.63	0.50	9.98	-17.15	8.00	25.15

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



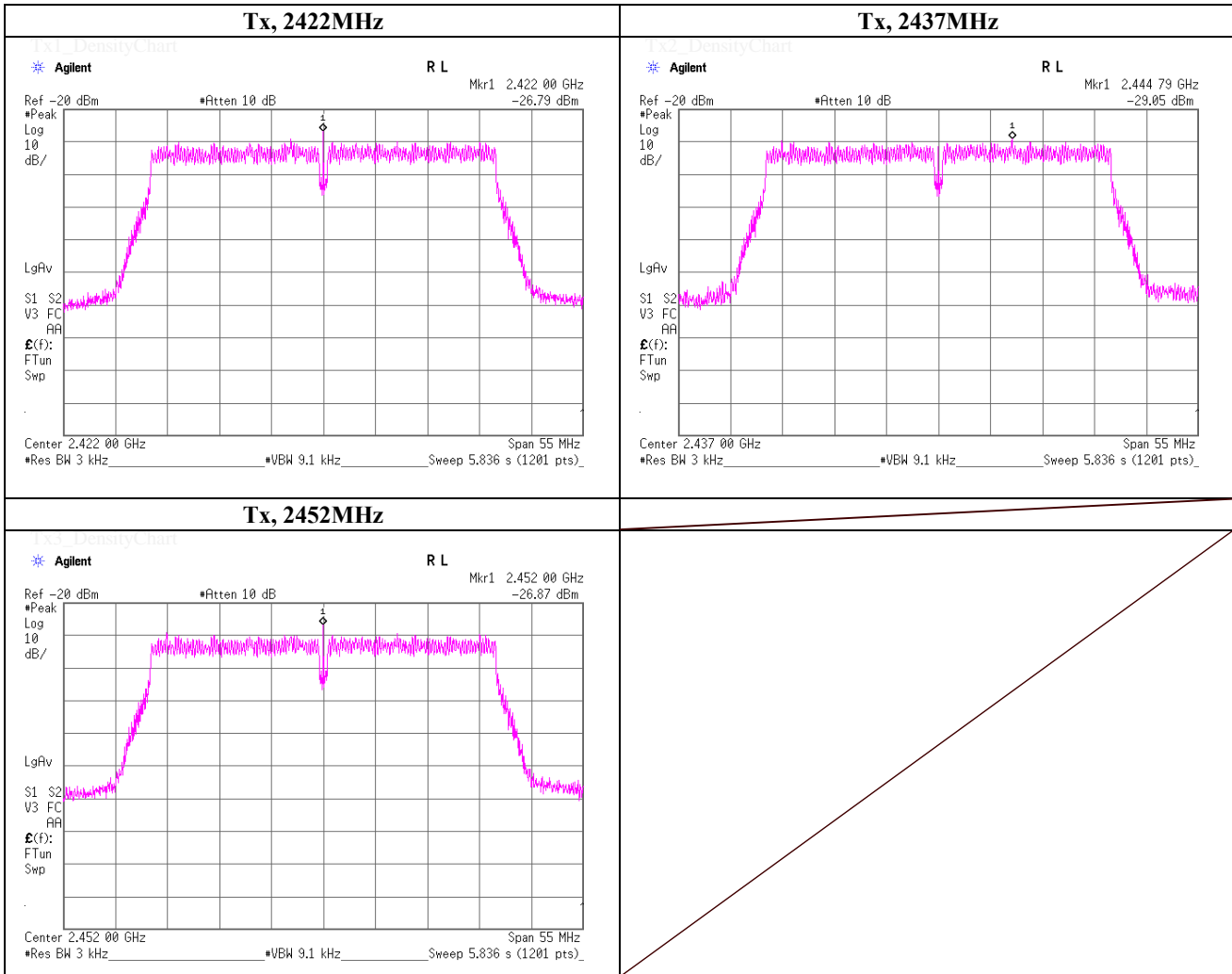
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## Maximum Power Spectral Density (PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	Augst 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 12	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2422.0000	2422.00	-26.79	0.50	9.98	-16.31	8.00	24.31
2437.0000	2444.79	-29.05	0.50	9.98	-18.57	8.00	26.57
2452.0000	2452.00	-26.87	0.50	9.98	-16.39	8.00	24.39

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



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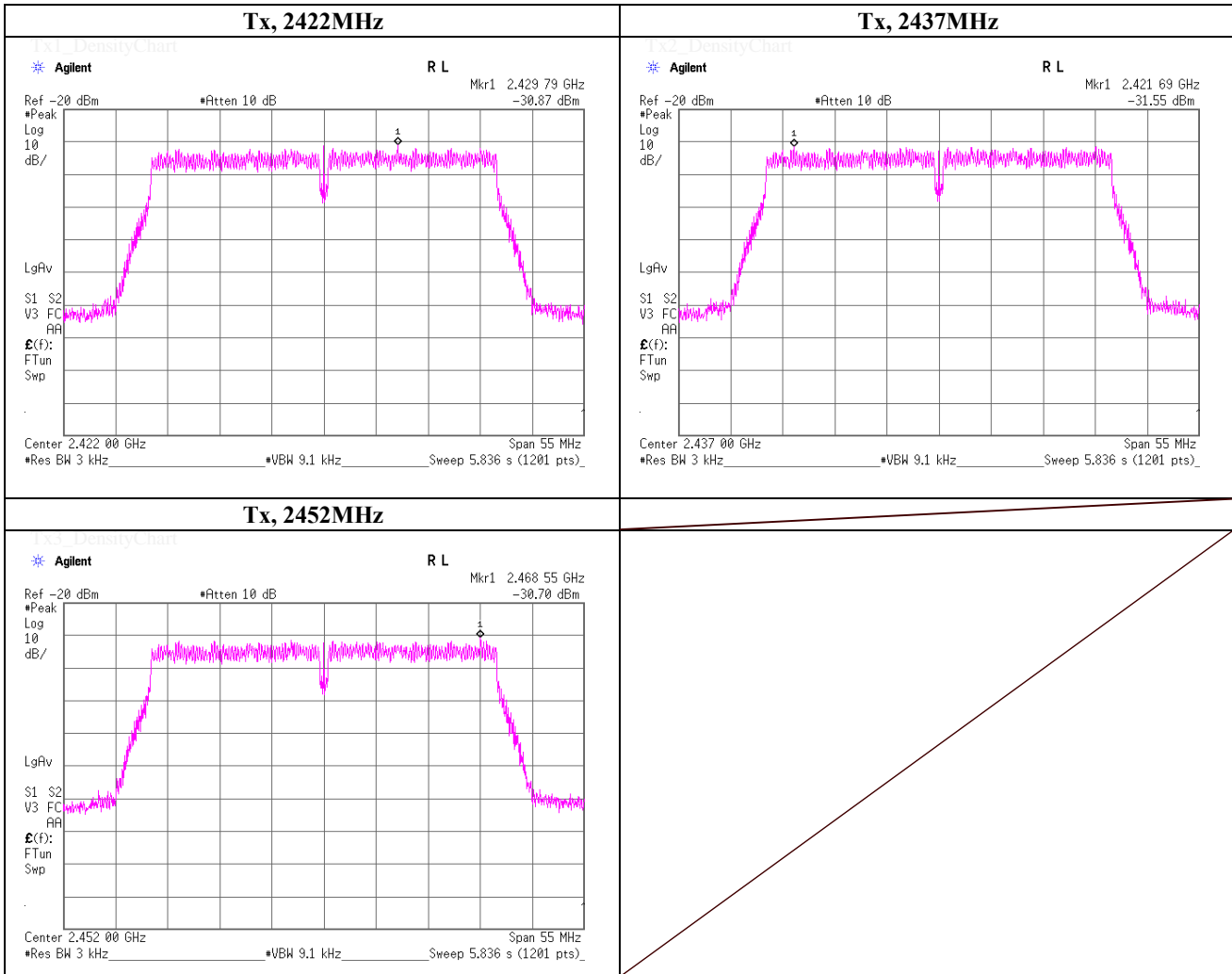


## Maximum Power Spectral Density (PKPSD)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	August 15, 2013	
Temperature / Humidity	25deg.C , 65%RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, IEEE802.11n (HT40), PN9, worst data mode 3(MCS), power setting 10	

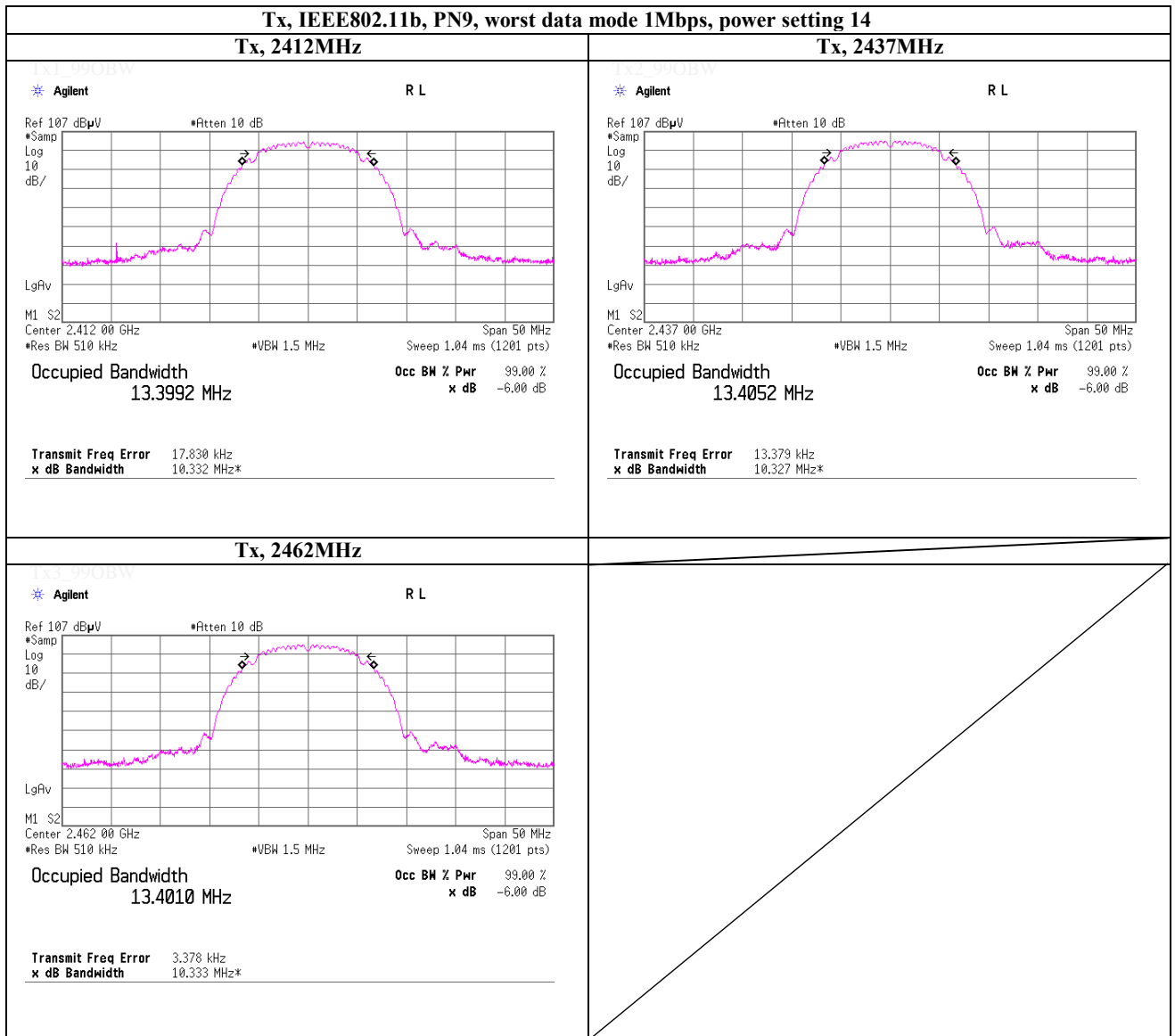
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2422.0000	2429.79	-30.87	0.50	9.98	-20.39	8.00	28.39
2437.0000	2421.69	-31.55	0.50	9.98	-21.07	8.00	29.07
2452.0000	2468.55	-30.70	0.50	9.98	-20.22	8.00	28.22

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



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## 99% Occupied Bandwidth



**UL Japan, Inc.**

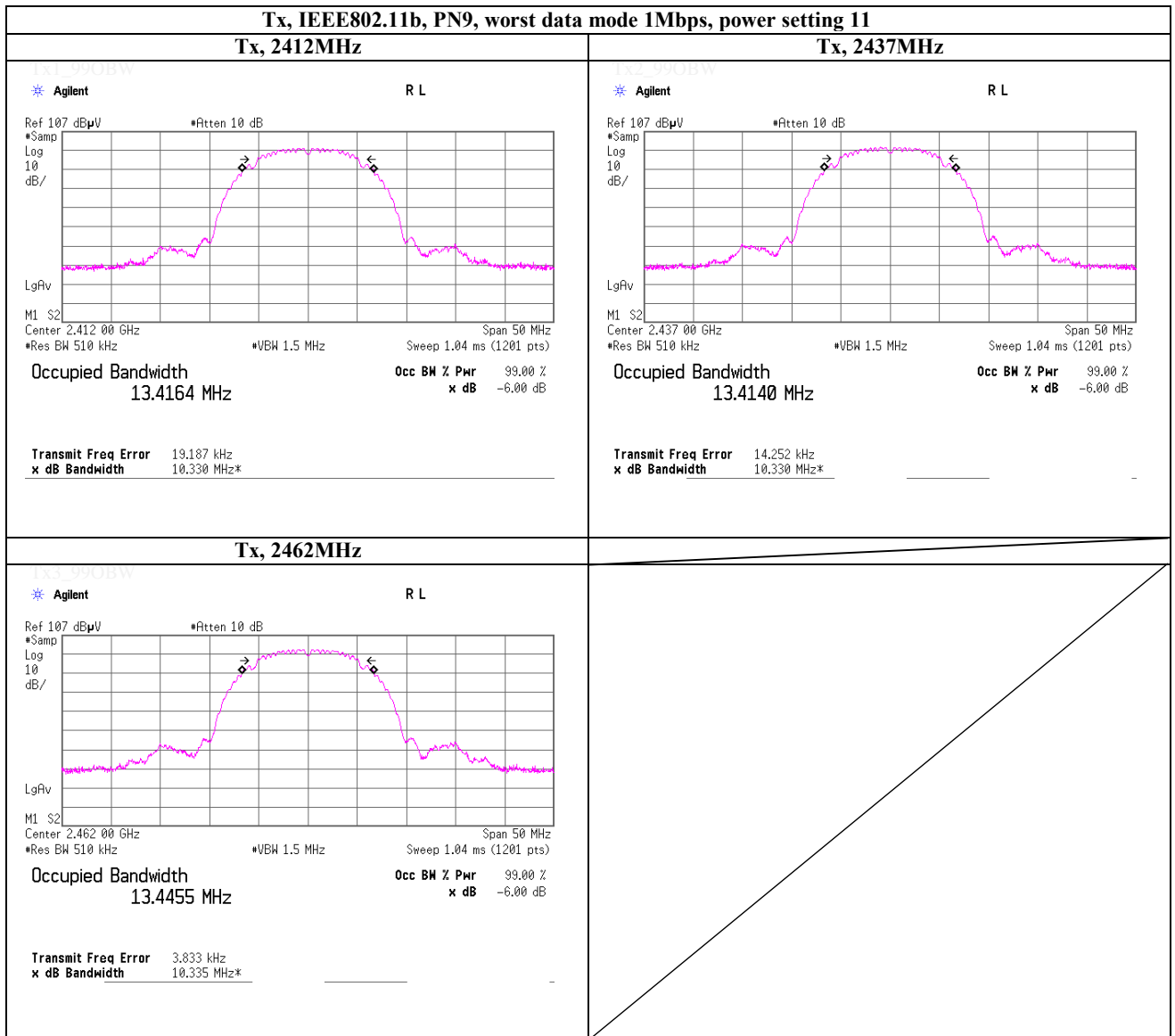
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## 99% Occupied Bandwidth



**UL Japan, Inc.**

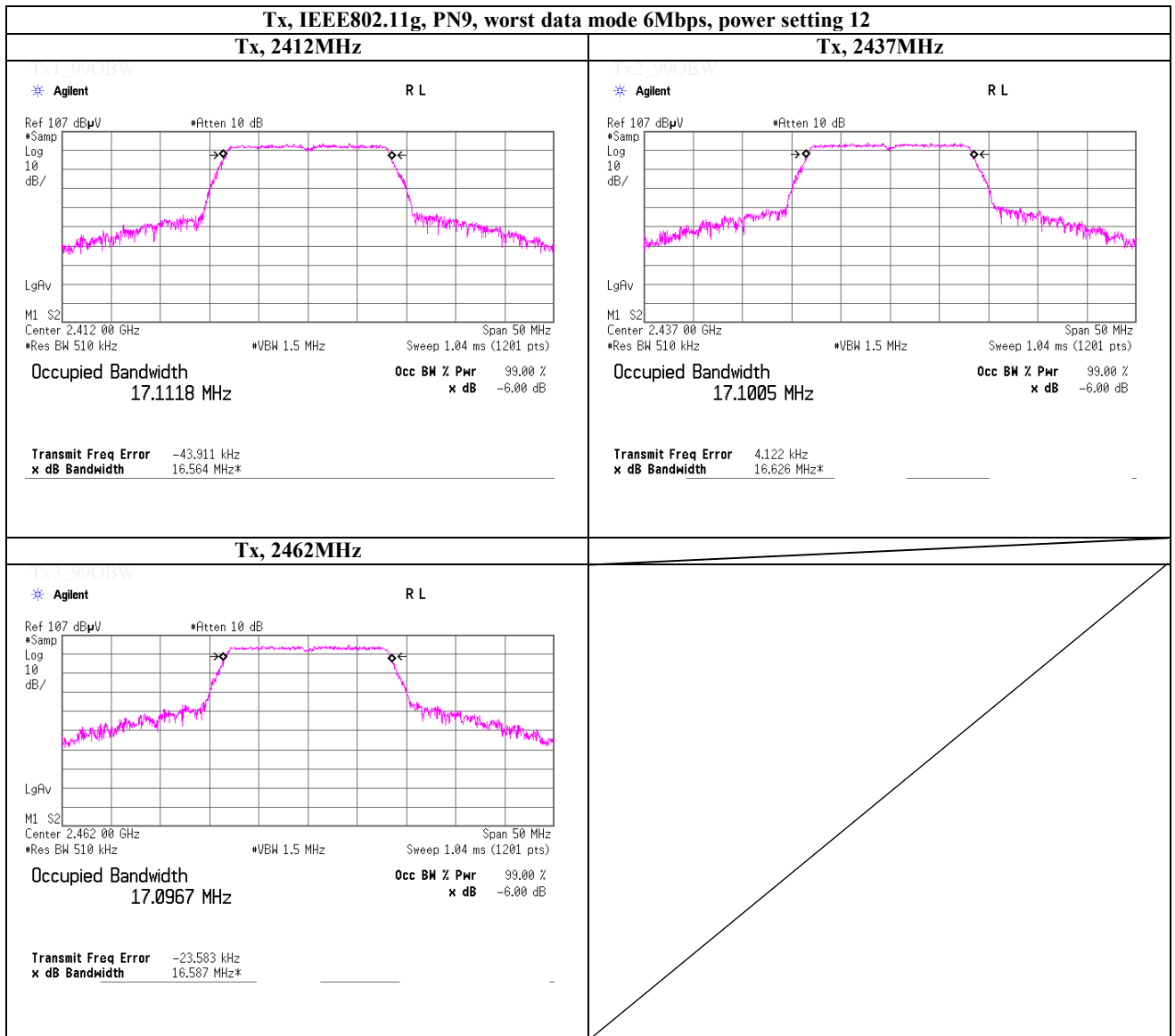
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## 99% Occupied Bandwidth



**UL Japan, Inc.**

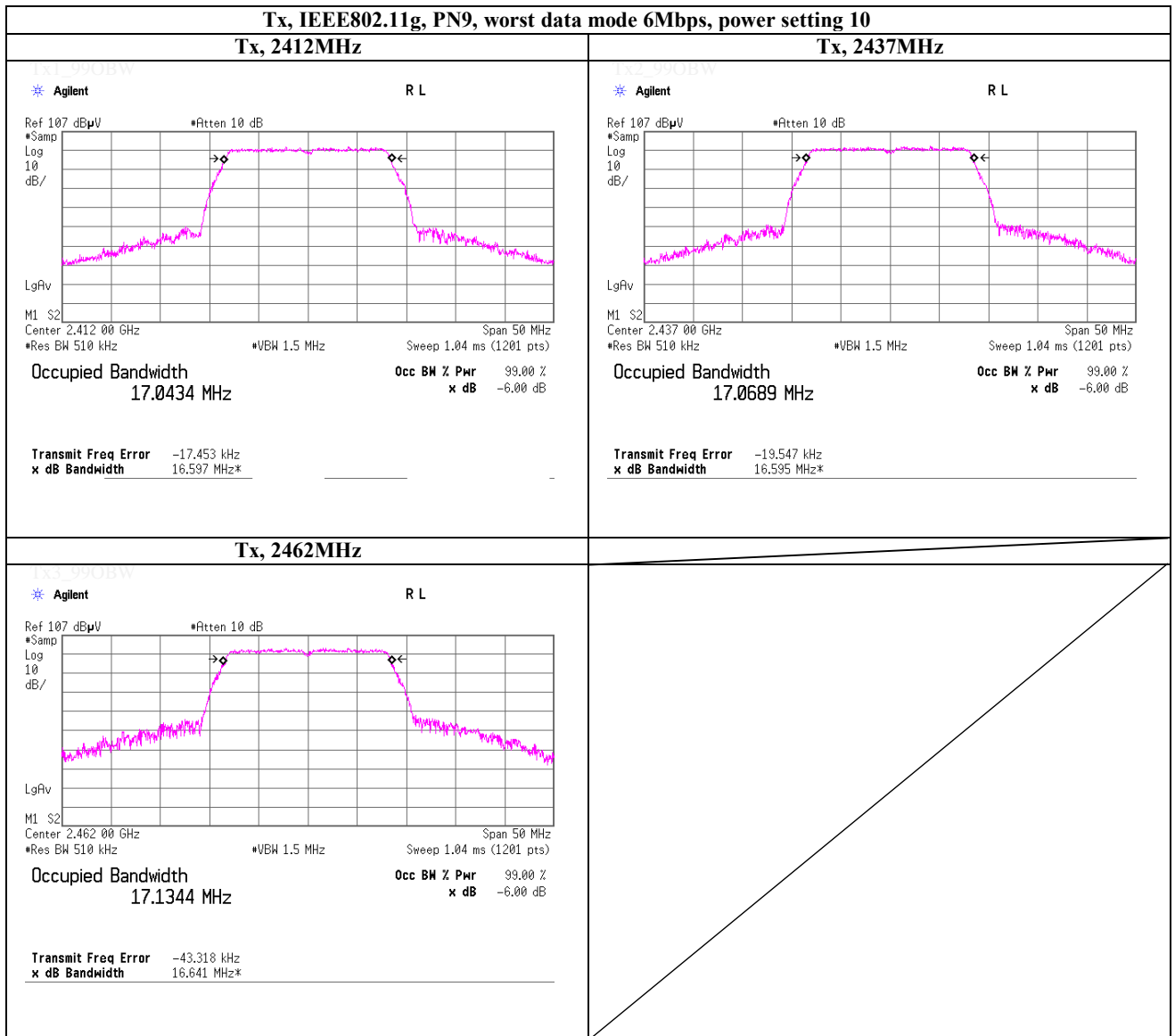
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## 99% Occupied Bandwidth



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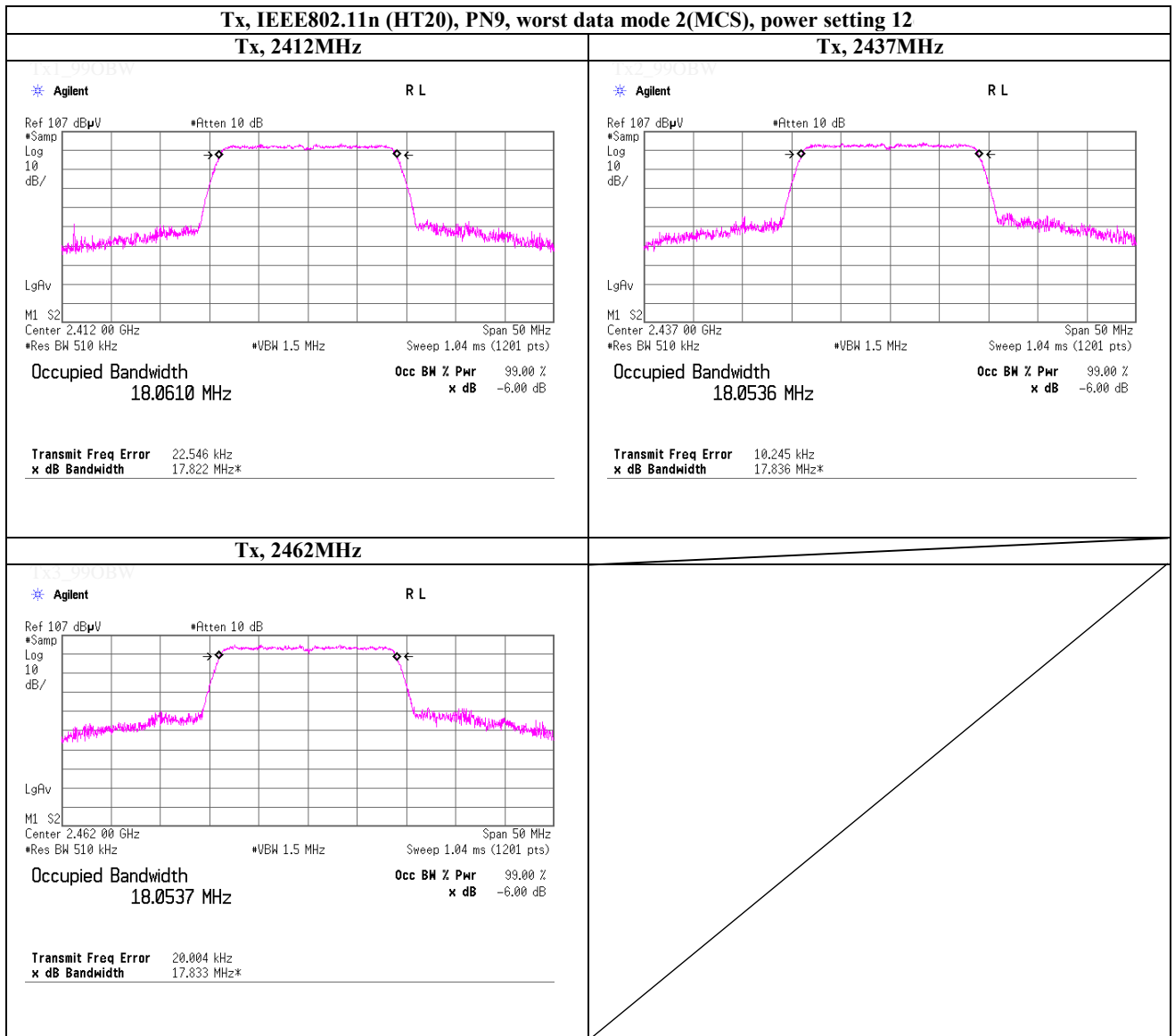
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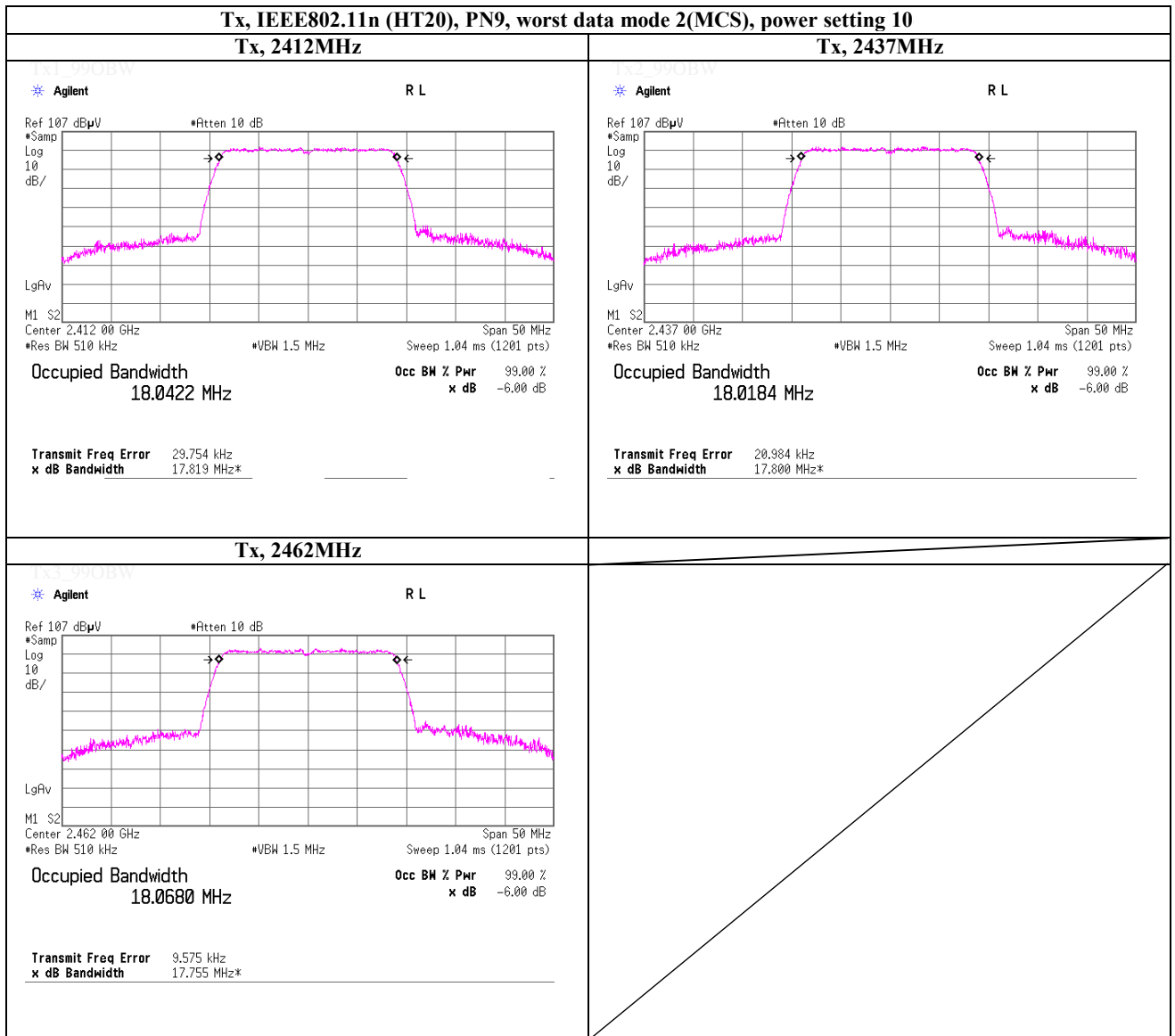
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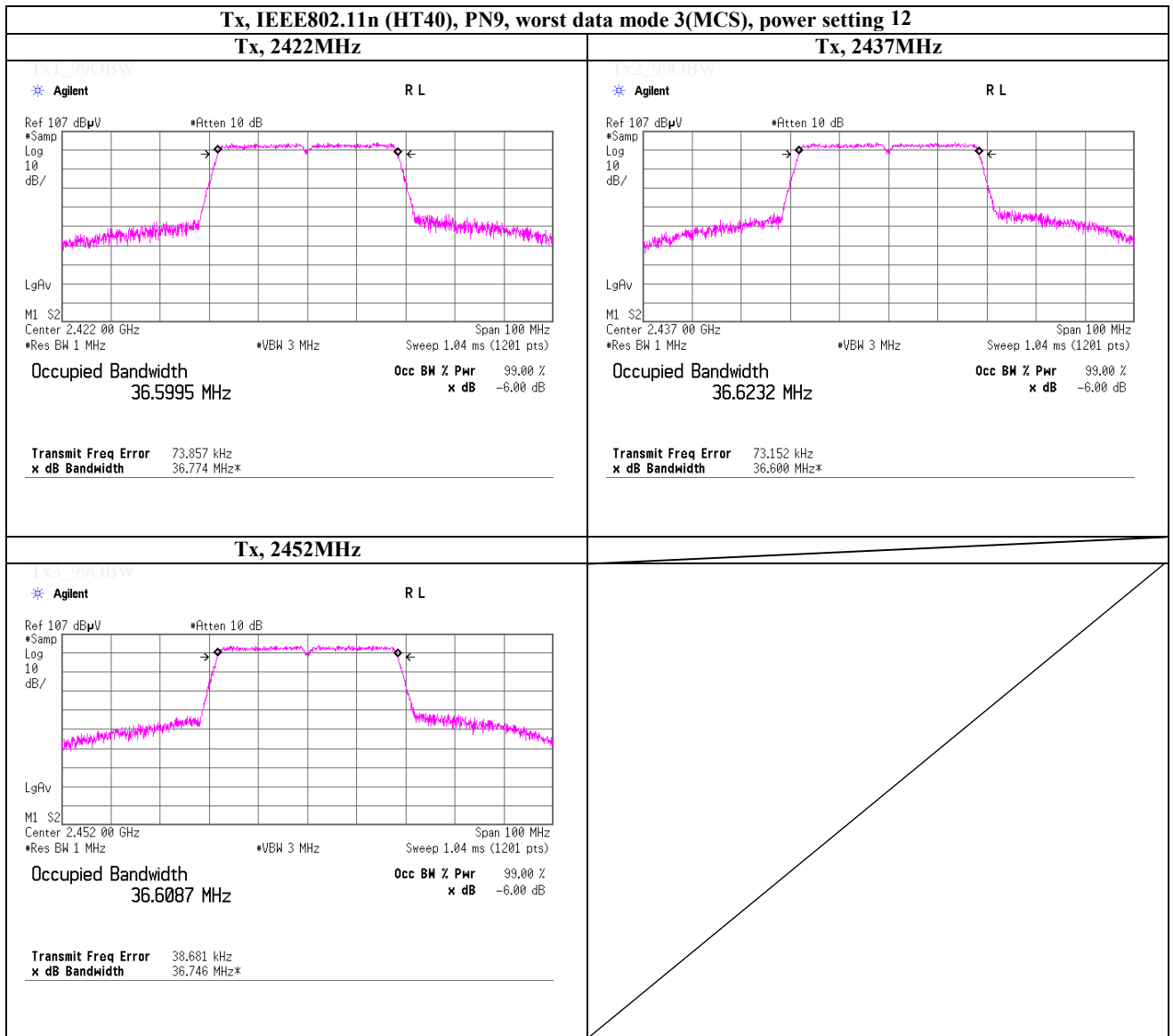
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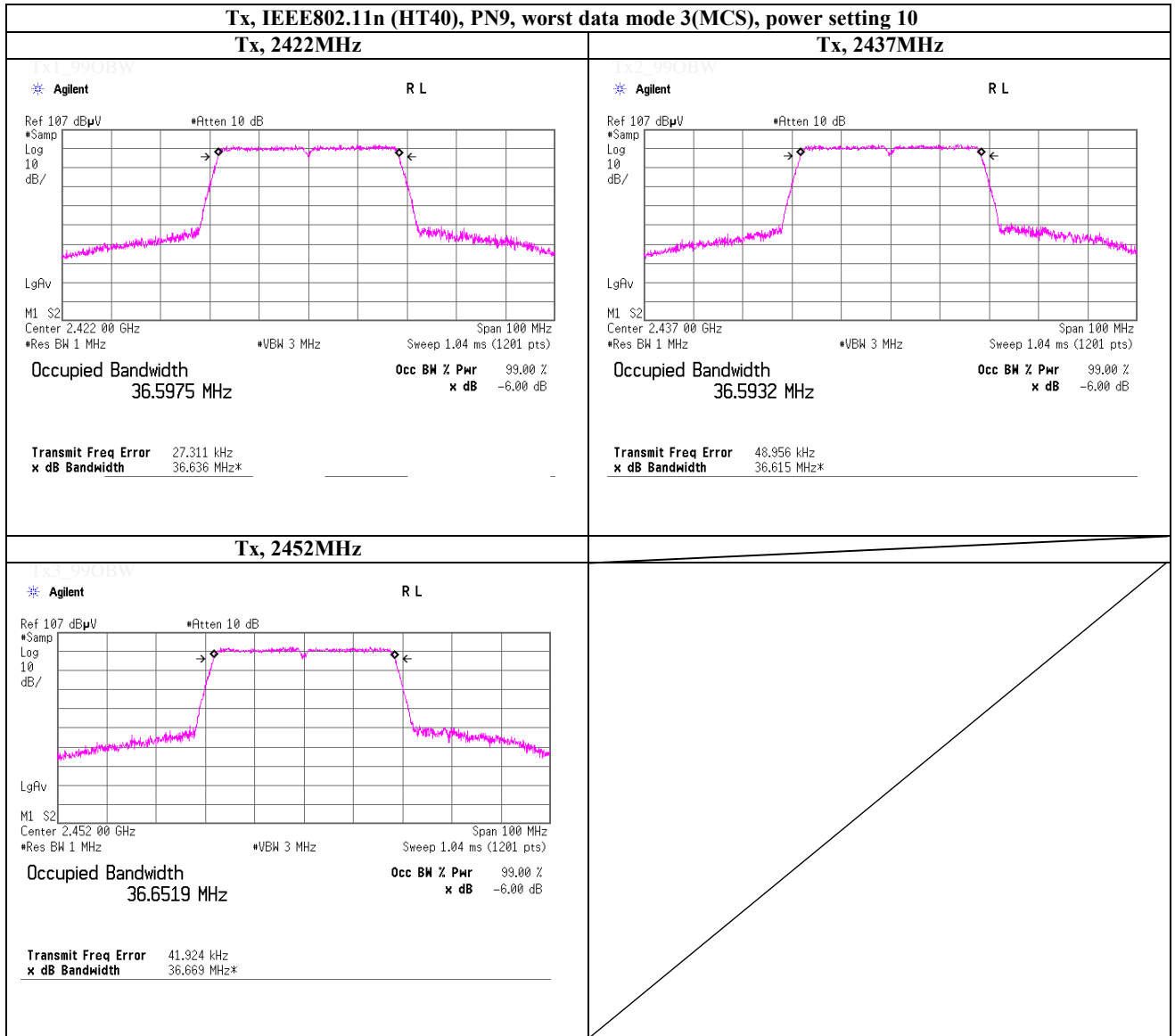
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## APPENDIX 2 Test Instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-01	Power Meter	Agilent	E4419B	MY45104212	AT	2013/01/30 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2013/03/04 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2013/04/09 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2012/08/20 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2013/03/28 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE,CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE,CE	-
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SAT20-01	Attenuator(above1GHz)	Agilent	8493C-020	74889	RE	2012/12/18 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2013/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 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	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE,CE	2013/02/27 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271(RF Selector)	CE	2013/04/03 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2013/02/25 * 12
SAT3-05	Attenuator	JFW	50HF-003N	-	CE	2013/02/12 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2013/03/07 * 12
STM-05	Terminator	TME	CT-01 BP	-	CE	2013/01/16 * 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 :

- CE: Conducted emission ,
- RE: Radiated emission ,
- AT: Antenna terminal conducted test