



# RADIO TEST REPORT

**Test Report No.: 10009516S-B**

**Applicant** : **Japan Radio Co., Ltd.**  
**Type of Equipment** : **Wireless LAN Module**  
**Model No.** : **CMN-851A**  
**FCC ID** : **CKECMN851A**  
**Test regulation** : **FCC Part15 Subpart E: 2012**  
**Test result** : **Complied**

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

**Date of test:** April 26 to June 18, 2013

**Tested by:**

*M. Hosaka*

Makoto Hosaka  
Engineer of WiSE Japan,  
UL Verification Service

**Approved by :**

*G. Ishiwata*

Go Ishiwata  
Manager of WiSE Japan,  
UL Verification Service



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

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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Japan Radio Co., Ltd.  
Address : 1-1, Shimorenjaku 5-chome, Mitaka-shi, Tokyo, 181-8510 Japan  
Telephone Number : +81 422 45 9311  
Facsimile Number : +81 422 45 9956  
Contact Person : Shinsuke Miyazaki

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

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

Type of Equipment : Wireless LAN Module  
Model Number : CMN-851A  
Serial Number : Refer to 4.2 in this report.  
Rating : DC3.3V  
Country of Mass-production : Japan  
Condition of EUT : Production prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Receipt Date of Sample : April 23, 2013  
Modification of EUT : No modification by the test lab.

### **2.2 Product description**

Model: CMN-851A (referred to as the EUT in this report) is a Wireless LAN Module.

Clock frequency(ies) in the system : 40MHz

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Radio specification:

Equipment type : Transceiver  
Frequency of operation \*1) : 2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)  
2422-2452MHz (IEEE 802.11n-HT40)  
W52: 5180-5240MHz (IEEE 802.11a, 11n-HT20)  
5190-5230MHz (IEEE 802.11n-HT40)  
W53: 5260-5320MHz (IEEE 802.11a, 11n-HT20)  
5270-5310MHz (IEEE 802.11n-HT40)  
W56: 5500-5700MHz (IEEE 802.11a, 11n-HT20)  
5510-5670MHz (IEEE 802.11n-HT40)  
W58: 5745-5825MHz (IEEE 802.11a, 11n-HT20)  
5755-5795MHz (IEEE 802.11n-HT40)  
Bandwidth : 20MHz (IEEE 802.11a/b/g/n), 40MHz (IEEE 802.11n)  
Channel spacing : 5MHz (2.4GHz),  
20MHz (11a, 11n (HT20, 5GHz)), 40MHz (11n (HT40, 5GHz))  
Type of modulation : DSSS, OFDM  
Antenna type : Dual (2.4GHz band: Planar patch, 5GHz band: Inverted F)  
Antenna gain with cable loss : 2.4GHz band: 0.58dBi  
3.73dBi (Antenna gain) – 3.15dB (cable loss(18ft))  
5GHz band: -0.98dBi  
4.06dBi (Antenna gain) – 5.04dB (cable loss(18ft))  
Antenna connector type : Module side: U.FL  
Antenna side: RP-SMA  
ITU code : D1D, G1D

\*1) Refer to the test report 10009516S-A for FCC 15.247.

\* The EUT does not perform simultaneous transmission of 2.4GHz and 5GHz Wireless LAN.

Operation temperature range : 0 to +50 deg.C

FCC 15.31 (e)

The host device provides stable voltage (DC3.3V) constantly to the EUT regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC 15.203

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

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

### **3.1 Test specification**

Test specification : FCC Part 15 Subpart E: 2012, final revised on December 27, 2012 and effective January 28, 2013  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices  
Section 15.207 Conducted limits  
Section 15.209 Radiated emission limits, general requirements  
Section 15.407 General technical requirements

### **3.2 Procedures & Results**

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.407 (b)(6) & 15.207	-	N/A	8.3dB Freq.: 0.18151MHz Detector: Average Phase: N Mode: Tx 5320MHz, IEEE 802.11a	Complied
26dB & 20dB emission bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3) FCC 15.215 (c)	Conducted	N/A	See data	-
Maximum conducted output power	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	N/A		Complied
Peak power spectral density	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(1)(2)(3)	Conducted	N/A		Complied
Peak excursion ratio	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.407 (a)(6)	Conducted	N/A		Complied
Spurious emission & Restricted band edges	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.109, 15.407 (b), 15.205 & 15.209	Radiated	N/A		6.4dB Freq.: 335.982 MHz Detector: Quasi-Peak Polarization: Horizontal Mode: Tx 5320MHz, IEEE 802.11a
Dynamic frequency selection	FCC 06-96 APPENDIX	FCC 15.407 (h)	Conducted	*2)	N/A	N/A

\*1) These tests were also referred to KDB 789033 (FCC), "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".

\*2) Refer to the test report 10009516S-C.

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

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### 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.

### 3.4 Uncertainty

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

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

\*1: SAC=Semi-Anechoic Chamber

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

#### Conducted emission test

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

#### Radiated emission test

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

#### 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 checked="" 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 checked="" 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 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 checked="" type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input 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	-
<input type="checkbox"/> No.7 shielded room	-	-	2.76 x 3.76 x 2.4	2.76 x 3.76	-

### 3.6 Test setup, Test data & 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	Worst data mode *1)
Conducted emission Radiated emission (below 1GHz) *2)	Transmitting IEEE 802.11a (W53)	5320MHz	PN9, 48Mbps
Radiated emission (above 1GHz)	Transmitting IEEE 802.11a (W52/53)	5180MHz, 5240MHz, 5320MHz	PN9, 48Mbps
	Transmitting IEEE 802.11a (W56)	5500MHz, 5580MHz, 5700MHz	PN9, 48Mbps
	Transmitting IEEE 802.11n (HT20) (W52/53) (MIMO)	5180MHz, 5240MHz, 5320MHz	PN9, MCS8
	Transmitting IEEE 802.11n (HT20) (W56) (MIMO)	5500MHz, 5580MHz, 5700MHz	PN9, MCS8
	Transmitting IEEE 802.11n (HT40) (W52/53) (MIMO)	5190MHz, 5230MHz, 5310MHz	PN9, MCS10
	Transmitting IEEE 802.11n (HT40) (W56) (MIMO)	5510MHz, 5550MHz 5670MHz	PN9, MCS10
Other items	Transmitting IEEE 802.11a (W52)	5180MHz, 5220MHz, 5240MHz	PN9, 48Mbps
	Transmitting IEEE 802.11a (W53)	5260MHz, 5300MHz, 5320MHz	PN9, 48Mbps
	Transmitting IEEE 802.11a (W56)	5500MHz, 5580MHz, 5700MHz	PN9, 48Mbps
	Transmitting IEEE 802.11n (HT20) (W52) (SISO)	5180MHz, 5220MHz, 5240MHz	PN9, MCS5
	Transmitting IEEE 802.11n (HT20) (W53) (SISO)	5260MHz, 5300MHz, 5320MHz	PN9, MCS5
	Transmitting IEEE 802.11n (HT20) (W56) (SISO)	5500MHz, 5580MHz, 5700MHz	PN9, MCS5
	Transmitting IEEE 802.11n (HT20) (W52) (MIMO) *3)	5180MHz, 5220MHz, 5240MHz	PN9, MCS8
	Transmitting IEEE 802.11n (HT20) (W53) (MIMO) *3)	5260MHz, 5300MHz, 5320MHz	PN9, MCS8
	Transmitting IEEE 802.11n (HT20) (W56) (MIMO) *3)	5500MHz, 5580MHz, 5700MHz	PN9, MCS8
	Transmitting IEEE 802.11n (HT40) (W52) (SISO)	5190MHz, 5230MHz	PN9, MCS0
	Transmitting IEEE 802.11n (HT40) (W53) (SISO)	5270MHz, 5310MHz	PN9, MCS0
	Transmitting IEEE 802.11n (HT40) (W56) (SISO)	5510MHz, 5550MHz 5670MHz	PN9, MCS0
	Transmitting IEEE 802.11n (HT40) (W52) (MIMO) *3)	5190MHz, 5230MHz	PN9, MCS10
	Transmitting IEEE 802.11n (HT40) (W53) (MIMO) *3)	5270MHz, 5310MHz	PN9, MCS10
	Transmitting IEEE 802.11n (HT40) (W56) (MIMO) *3)	5510MHz, 5550MHz 5670MHz	PN9, MCS10

\*1) The worst condition was determined based on the test result of Maximum Peak Output Power.  
\*2) 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.  
\*3) As this transmitter has MIMO mode for only MCS8 to MCS15, we need not to consider array gains.

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EUT has the power settings by the software as follows;

Test software: ART v0.9 b34

Power settings: Fixed

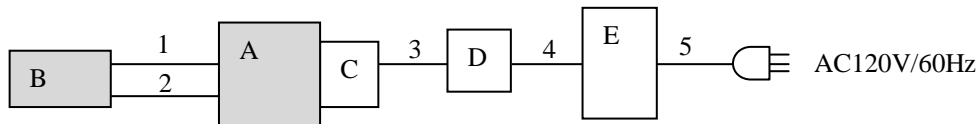
Antenna port used:

	Single output (11a, 11n (SISO))	Multi output (11n (MIMO))
Maximum peak output power	- Antenna 1 - Antenna 2	Antenna 1 + Antenna 2
Radiated emission	- Antenna 1 or Antenna 2 *4)	Antenna 1 + Antenna 2
Other tests	- Antenna 1 or Antenna 2 *4)	Antenna 1 or Antenna 2

\*4) The worse antenna port was determined based on the test result of Maximum Peak Output Power.

**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 LAN Module	CMN-851A	983109021212	Japan Radio Co., Ltd.	EUT
B	AP-Double WiFi Antenna	APP-WW	-	Antenna Plus LLC	EUT
C	Jig	PE-MINI-FLEX8-FH	-	-	-
D	Jig	-	-	-	-
E	PC	HP Compaq dc7800p	JPA831010C	HP	-

### List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Coaxial	5.5	Shielded	Shielded	-
2	Coaxial	5.5	Shielded	Shielded	-
3	Flat	0.2	Unshielded	Unshielded	-
4	HDMI	1.4	Shielded	Shielded	-
5	AC	1.9	Unshielded	Unshielded	-

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## **SECTION 5: Conducted emission**

### **5.1 Operating environment**

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

### **5.2 Test configuration**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN. Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. 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: Radiated emission**

### **6.1 Operating environment**

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

### **6.2 Test configuration**

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

### **6.3 Test conditions**

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

### **6.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz). 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. Drawing of the antenna direction is shown in Figure 1.

The radiated emission measurements were made with the following detection.

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

\*1) The test method was referred to Section H) 6) d) Method VB (Averaging using reduced video bandwidth) of FCC KDB 789033 D01 "Guidelines for Compliance Testing of unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E"

\*2) When duty cycle > 98 percent, VBW was set at 10Hz.

When duty cycle < 98 percent, VBW (Average) calculation sheet in APPENDIX 1.

Detector and averaging type set for linear voltage averaging.

Below 1GHz

The result also satisfied with the general limits specified in FCC 15.209 (a).

Above 1GHz

Inside of restricted bands (FCC 15.205): Limit in FCC 15.209 (a)

Outside of the restricted bands: Limit 68.2dBuV/m (-27dBm e.i.r.p.\*) in FCC 15.407(b)(1)(2)(3)

Restricted band edge: Limit in FCC 15.209(a)

Since this limit is severer than the limit of the inside of restricted bands.

\*Electric Field Strength to e.i.r.p. conversion

$P [dBm] = E [dBuV/m] - 95.2 [dB]$

$P [dBm] = 10 \times \text{LOG} ( ( \{ 10 ^ ( E [dBuV/m] / 20 ) * 10 ^ (-6) * ( \text{Distance} = 3[m] ) ) ^ 2 \} / 30 ) \times 10 ^ 3 ) (uV/m):$

P is the e.i.r.p. (Watts)

\* Distance Factor for the measurement at 1m:  $20 \times \text{log} (3.0m/1.0m) = 9.5dB$

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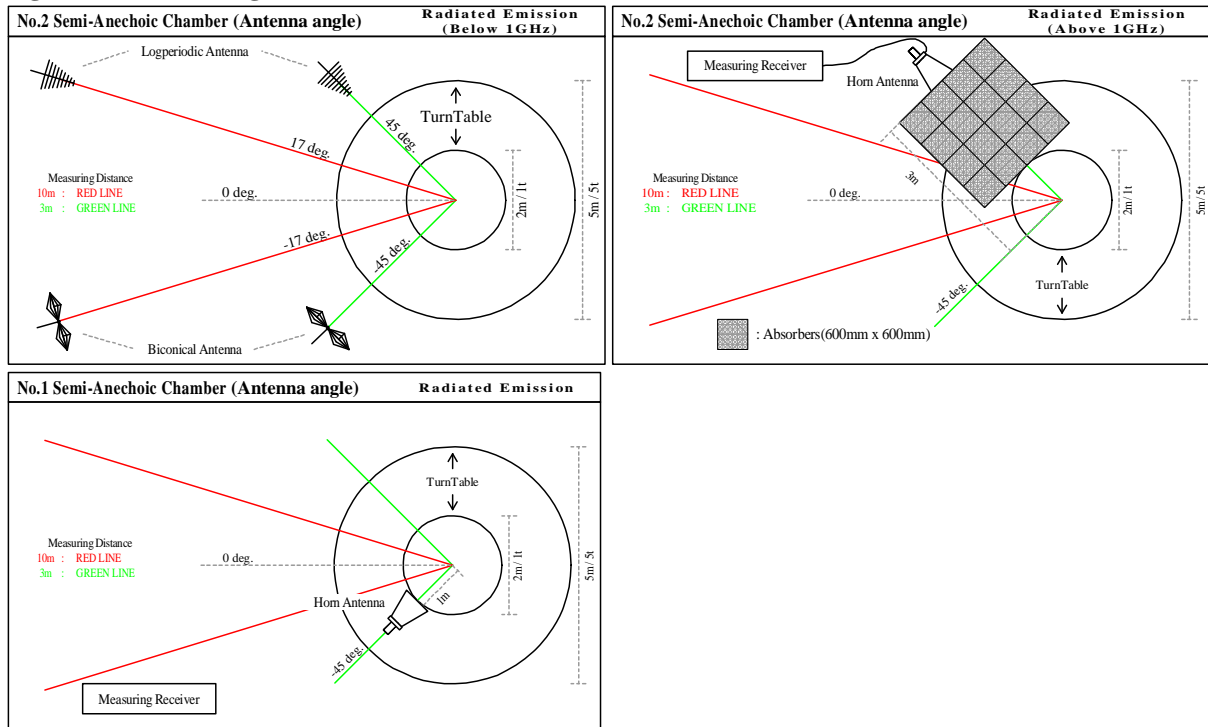
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The carrier levels and noise levels were confirmed at each position of X, Y and Z axes to see the position of maximum noise, and the test was made at the position that has the maximum noise.

**Worst case:**

Subject	Antenna polarization	Carrier	Spurious (Below 1GHz)	Spurious (Above 1GHz)
Module	Horizontal	X	X	X
Antenna		Z	X	Z
Module	Vertical	X	X	X
Antenna		X	X	X

**Figure 1. Antenna angle**



**6.5 Band edge**

Band edge level at 5150MHz and 5350MHz are below the limits of FCC 15.209.

**6.6 Results**

Summary of the test results : Pass  
\* No noise was detected other than listed points.

Refer to APPENDIX 1

## **SECTION 7: Antenna terminal conducted tests**

### **Test Procedure**

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

<b>Test</b>	<b>Span</b>	<b>RBW</b>	<b>VBW</b>	<b>Sweep time</b>	<b>Detector</b>	<b>Trace</b>	<b>Instrument used and Test method</b>
26dB bandwidth	Enough width to display	Close to 1% of EBW	Greater than RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99% occupied bandwidth	Enough width to display	Close to 1% of Span	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
20dB bandwidth	Enough width to display	Close 1% to 5% of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum conducted output power *1)	-	-	50MHz	-	-	-	Power Meter method PM
Peak power spectral density *2)	Enough width to display	1MHz	3MHz	Auto	RMS-Average Power Averaging (100 times)	Clear Write	Spectrum Analyzer method SA-2
Peak excursion ratio	Enough width to display	1MHz	3MHz	Auto	Peak	Max Hold	Spectrum Analyzer method SA-2
					RMS-Average Power Averaging (100 times)	Clear Write	

\*EBW: Emission Bandwidth

\*1) Maximum Conducted Output Power was measured based on Method PM of "Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".

\*2) PSD was measured based on Method SA-2 of "Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E".

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Summary of the test results : Pass

Refer to APPENDIX 1

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## **Contents of APPENDIXES**

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

Conducted emission  
26dB bandwidth  
99% Occupied bandwidth  
20dB bandwidth  
Maximum conducted output power  
Radiated emission  
Peak power density  
Peak excursion ratio

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

Test instruments

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

Conducted emission  
Radiated emission  
Pre-check of worst position

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**UL Japan, Inc.**

**Shonan EMC Lab.**

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# DATA OF CONDUCTED EMISSION TEST

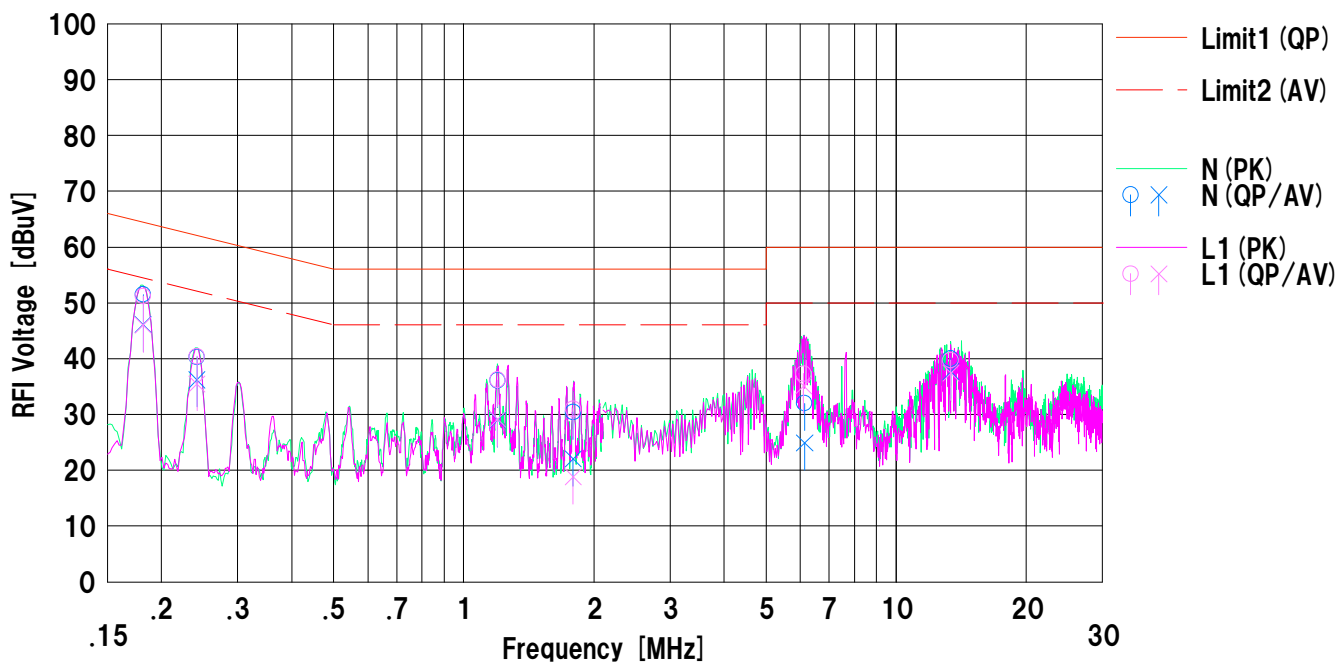
UL Japan,Inc. Shonan EMC Lab. No.2 Shielded Room  
Date : 2013/05/15

Company : Japan Radio Co., Ltd  
Kind of EUT : WLAN MODULE  
Model No. : CMN-851A  
Serial No. : -  
Remarks :

Mode : Tx 11a 5320MHz  
Order No. : 10009516S  
Power : AC 120V / 60Hz  
Temp./Humi. : 23deg.C. / 45%RH

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

Engineer : Makoto Hosaka



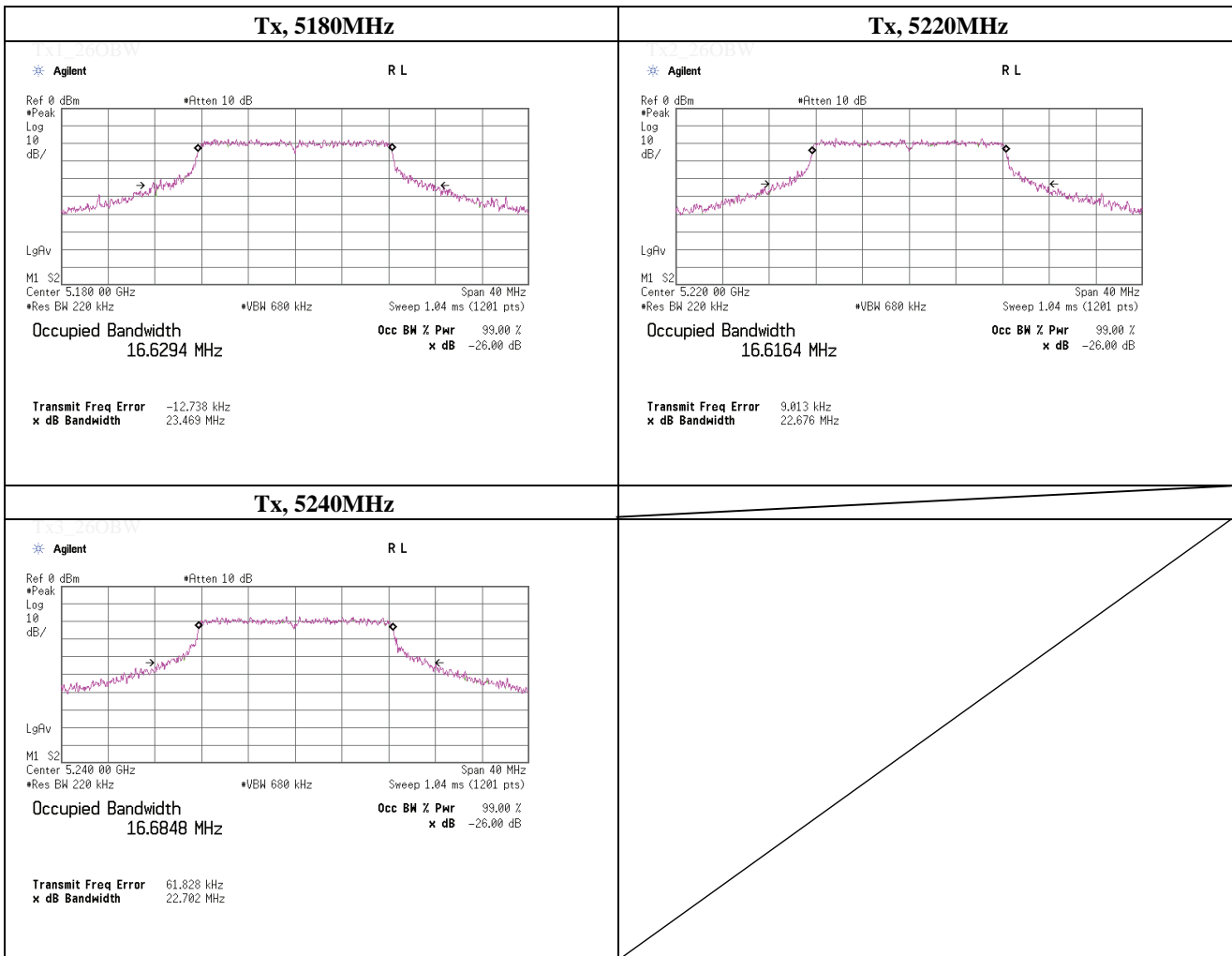
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18151	38.9	33.5	12.6	51.5	46.1	64.4	54.4	12.9	8.3	N	
2	0.24177	27.7	23.6	12.6	40.3	36.2	62.0	52.0	21.7	15.8	N	
3	1.19727	23.4	16.3	12.7	36.1	29.0	56.0	46.0	19.9	17.0	N	
4	1.79123	17.7	9.3	12.7	30.4	22.0	56.0	46.0	25.6	24.0	N	
5	6.14050	19.0	11.9	13.0	32.0	24.9	60.0	50.0	28.0	25.1	N	
6	13.36973	26.6	24.3	13.4	40.0	37.7	60.0	50.0	20.0	12.3	N	
7	0.18151	38.6	33.4	12.6	51.2	46.0	64.4	54.4	13.2	8.4	L1	
8	0.24177	27.8	22.9	12.6	40.4	35.5	62.0	52.0	21.6	16.5	L1	
9	1.19727	23.5	16.4	12.7	36.2	29.1	56.0	46.0	19.8	16.9	L1	
10	1.79123	18.3	6.1	12.7	31.0	18.8	56.0	46.0	25.0	27.2	L1	
11	6.10816	24.3	22.1	13.0	37.3	35.1	60.0	50.0	22.7	14.9	L1	
12	13.36973	26.3	24.0	13.4	39.7	37.4	60.0	50.0	20.3	12.6	L1	



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

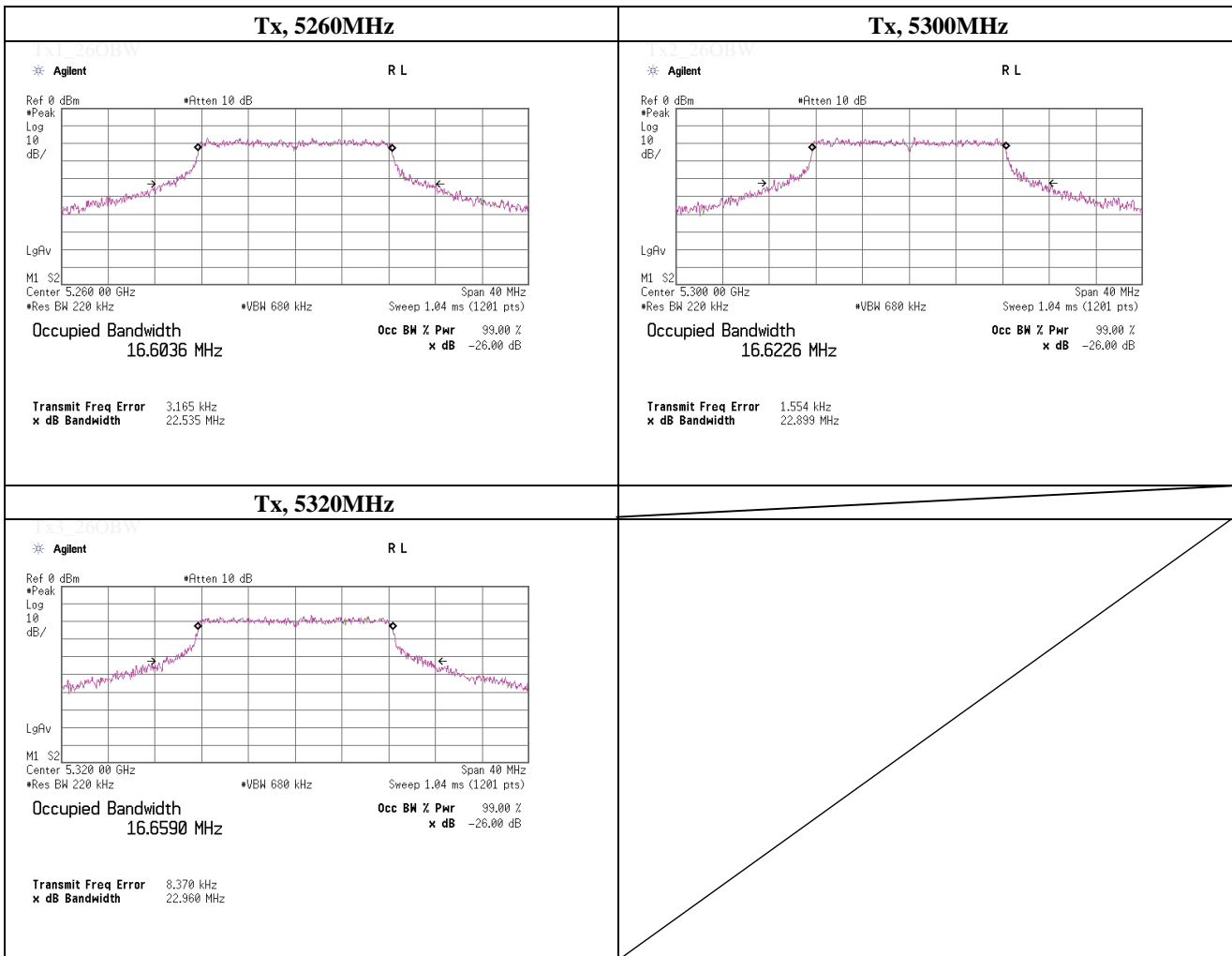
Freq. [MHz]	-26dB Bandwidth [MHz]
5180.0000	23.469
5220.0000	22.676
5240.0000	22.702



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

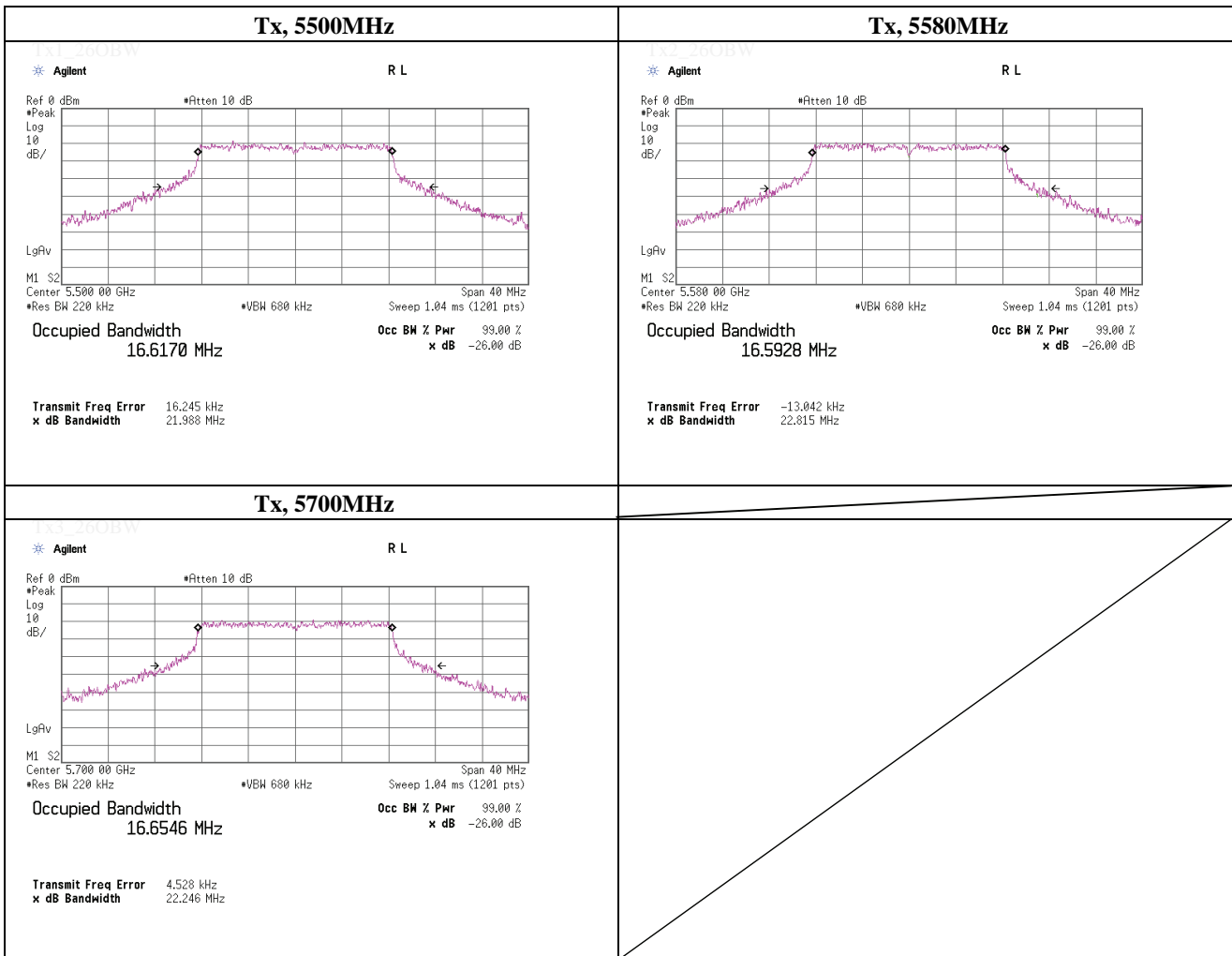
Freq. [MHz]	-26dB Bandwidth [MHz]
5260.0000	22.535
5300.0000	22.899
5320.0000	22.960



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

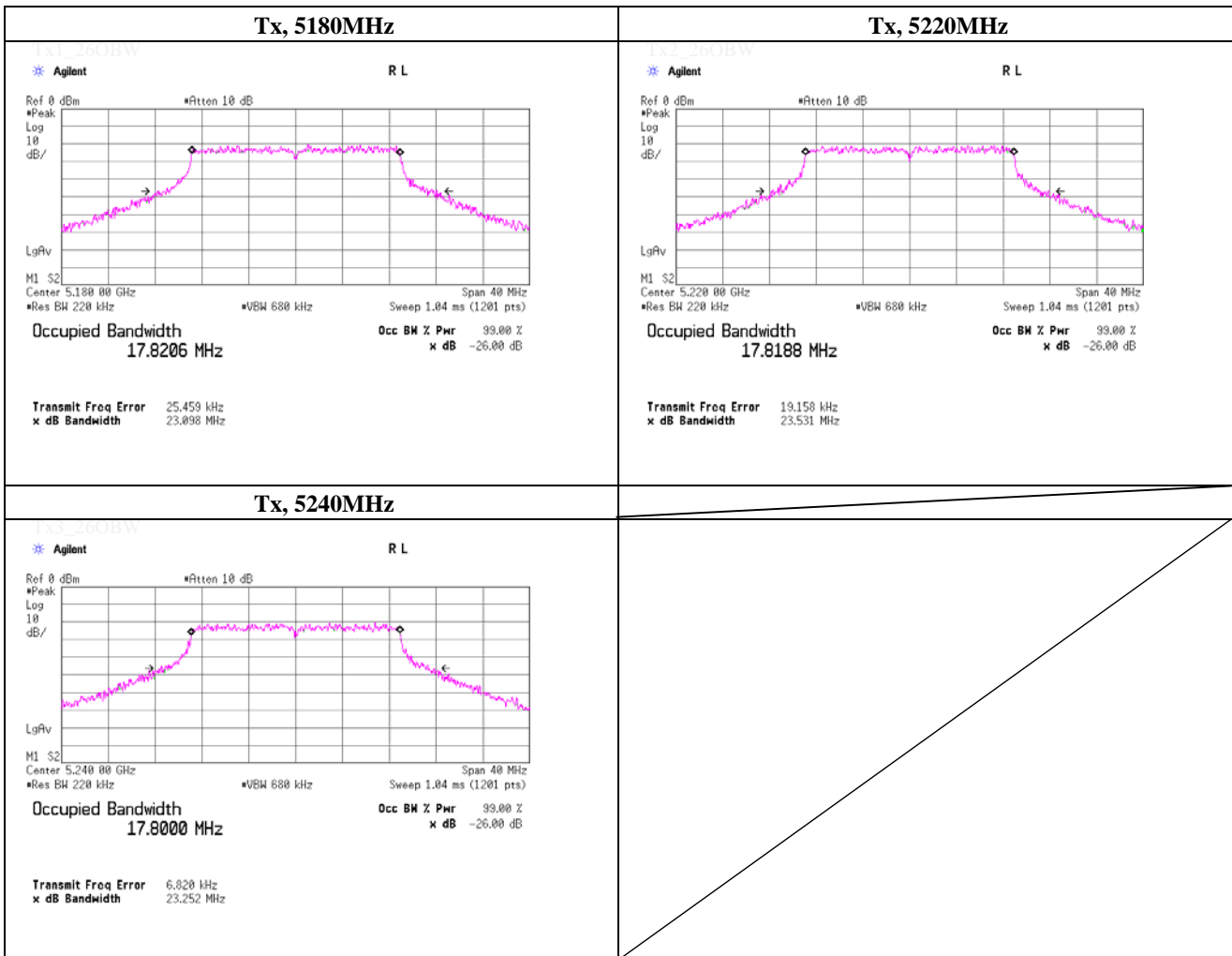
Freq. [MHz]	-26dB Bandwidth [MHz]
5500.0000	21.988
5580.0000	22.815
5700.0000	22.246



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

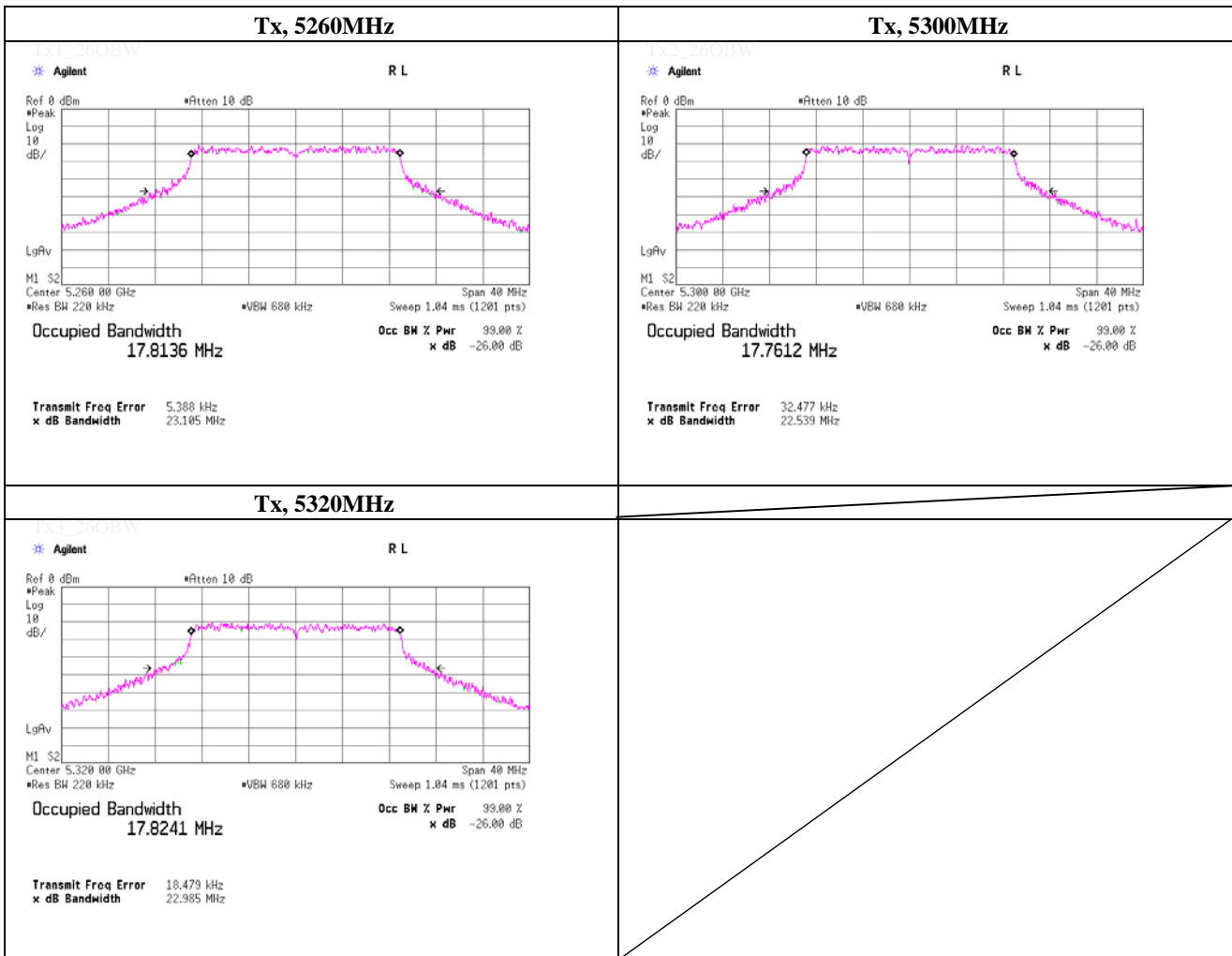
Freq. [MHz]	-26dB Bandwidth [MHz]
5180.0000	23.098
5220.0000	23.531
5240.0000	23.252



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

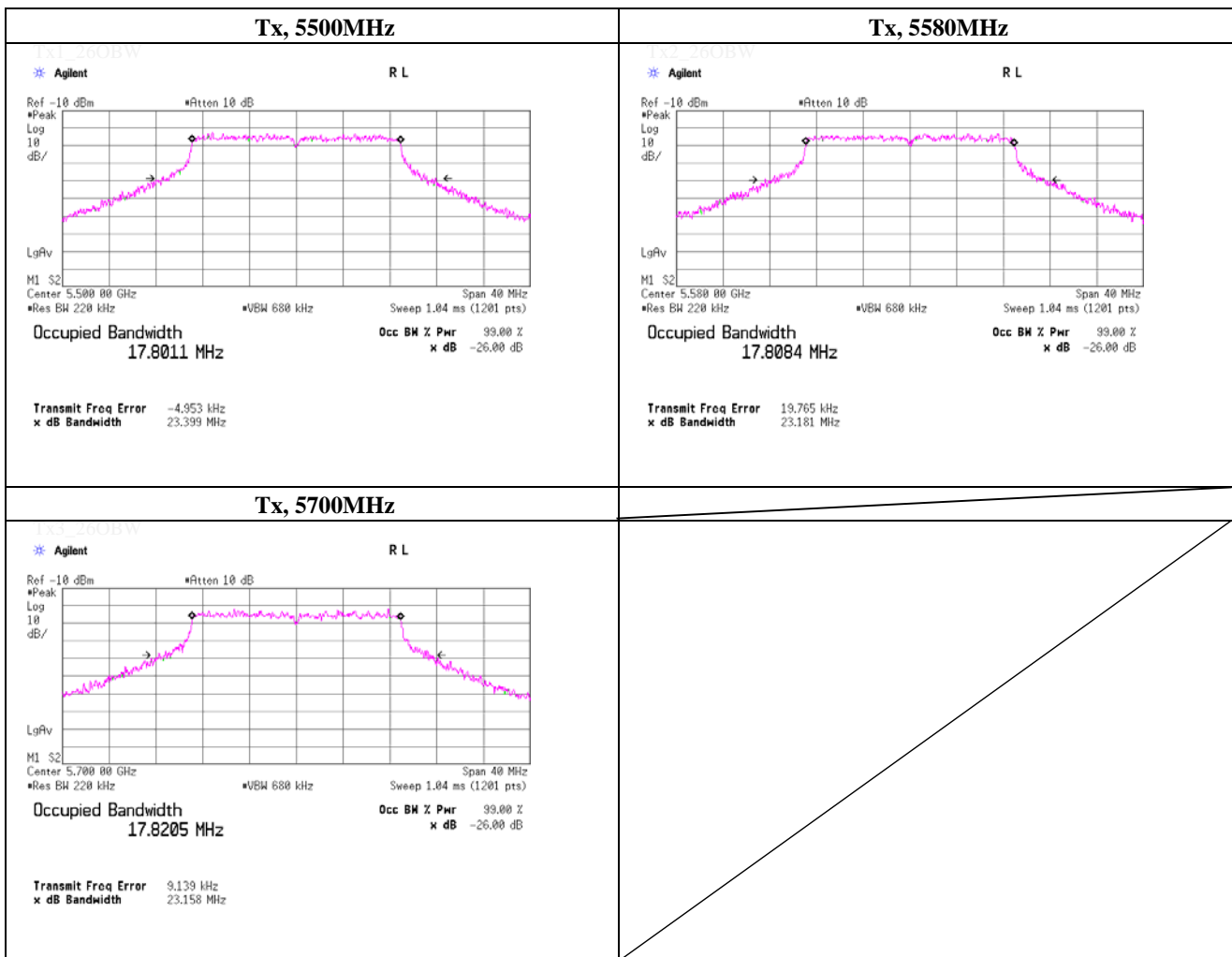
Freq. [MHz]	-26dB Bandwidth [MHz]
5260.0000	23.105
5300.0000	22.539
5320.0000	22.985



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

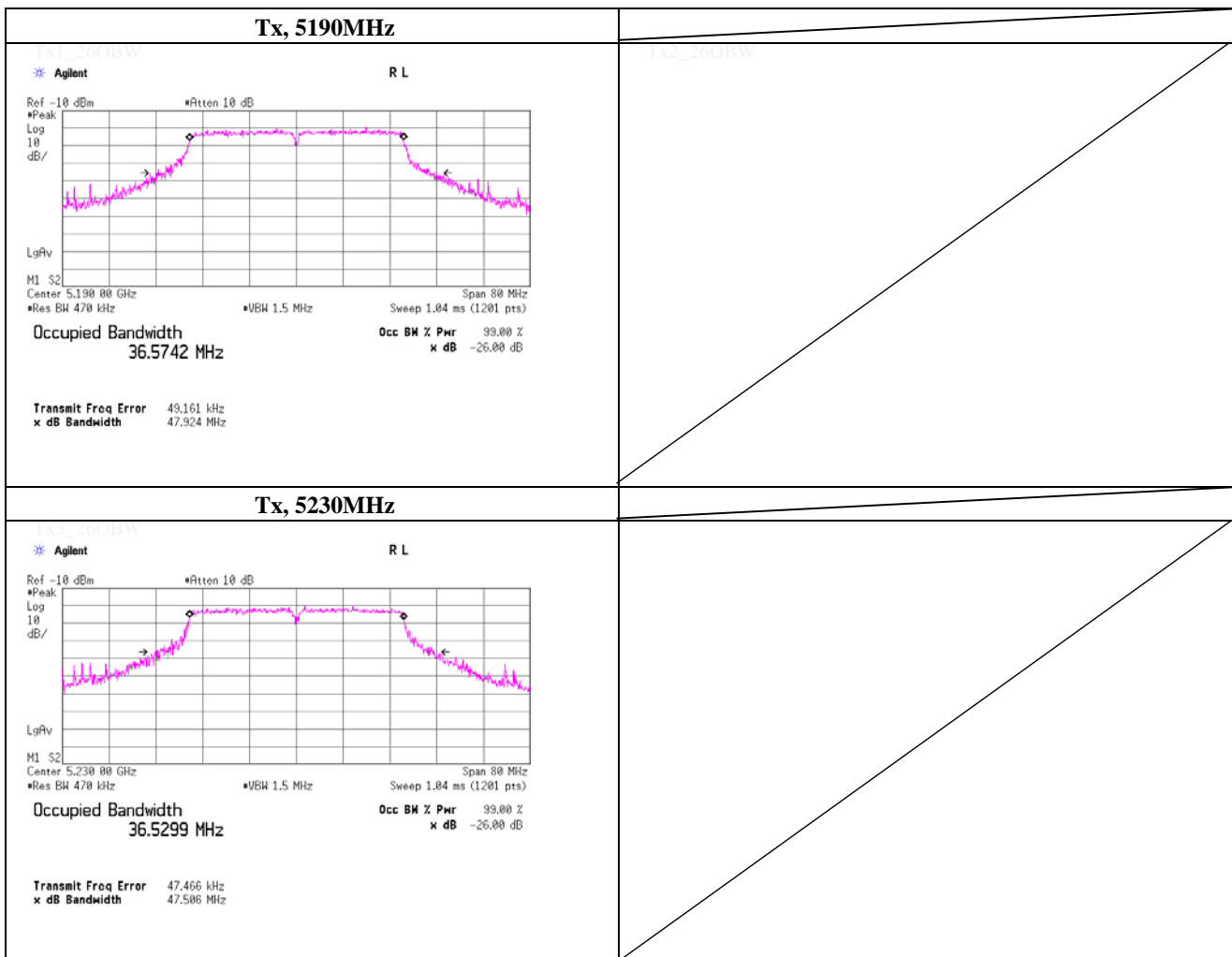
Freq. [MHz]	-26dB Bandwidth [MHz]
5500.0000	23.399
5580.0000	23.181
5700.0000	23.158



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	-26dB Bandwidth [MHz]
5190.0000	47.924
5230.0000	47.506



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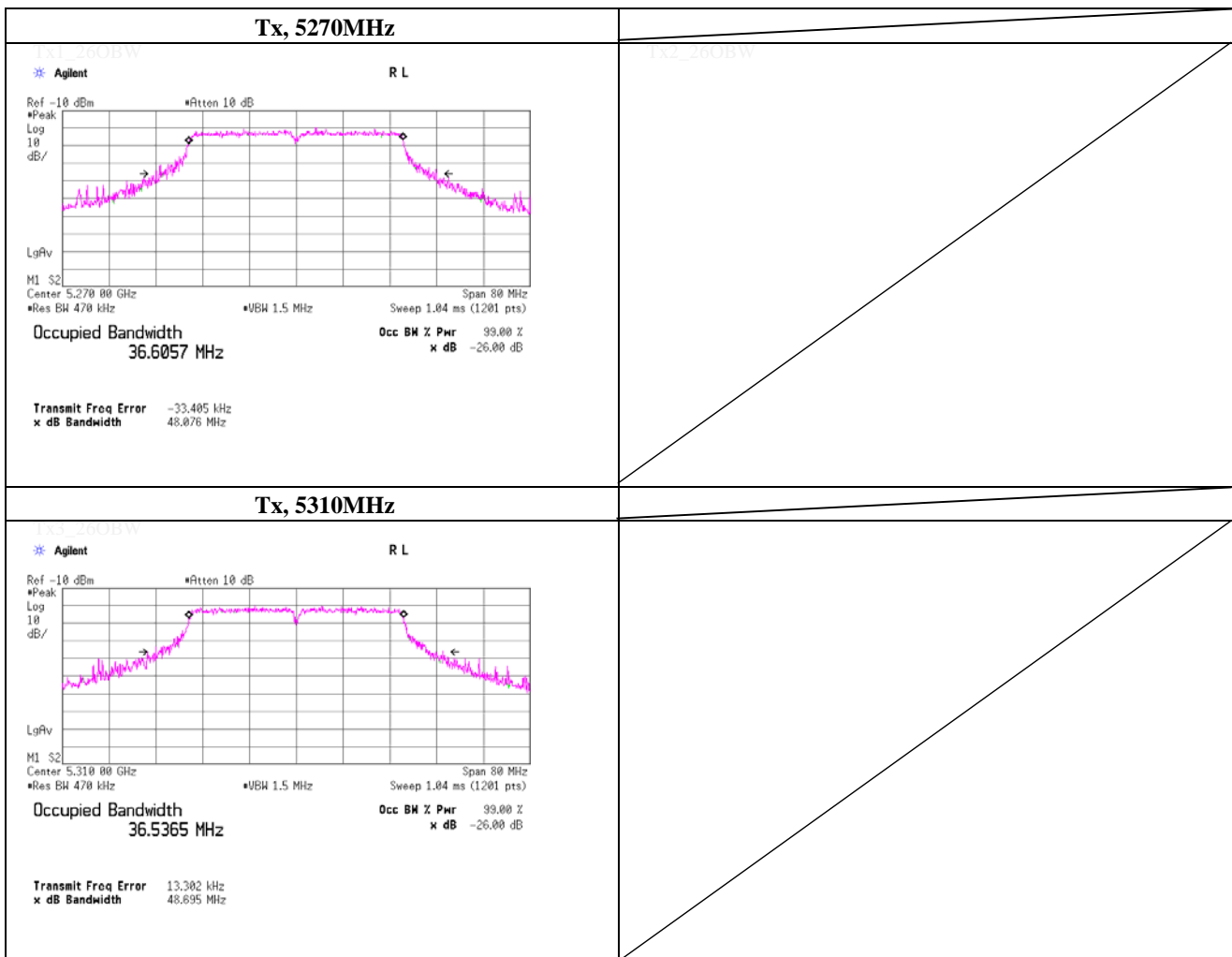
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	-26dB Bandwidth [MHz]
5270.0000	48.076
5310.0000	48.695



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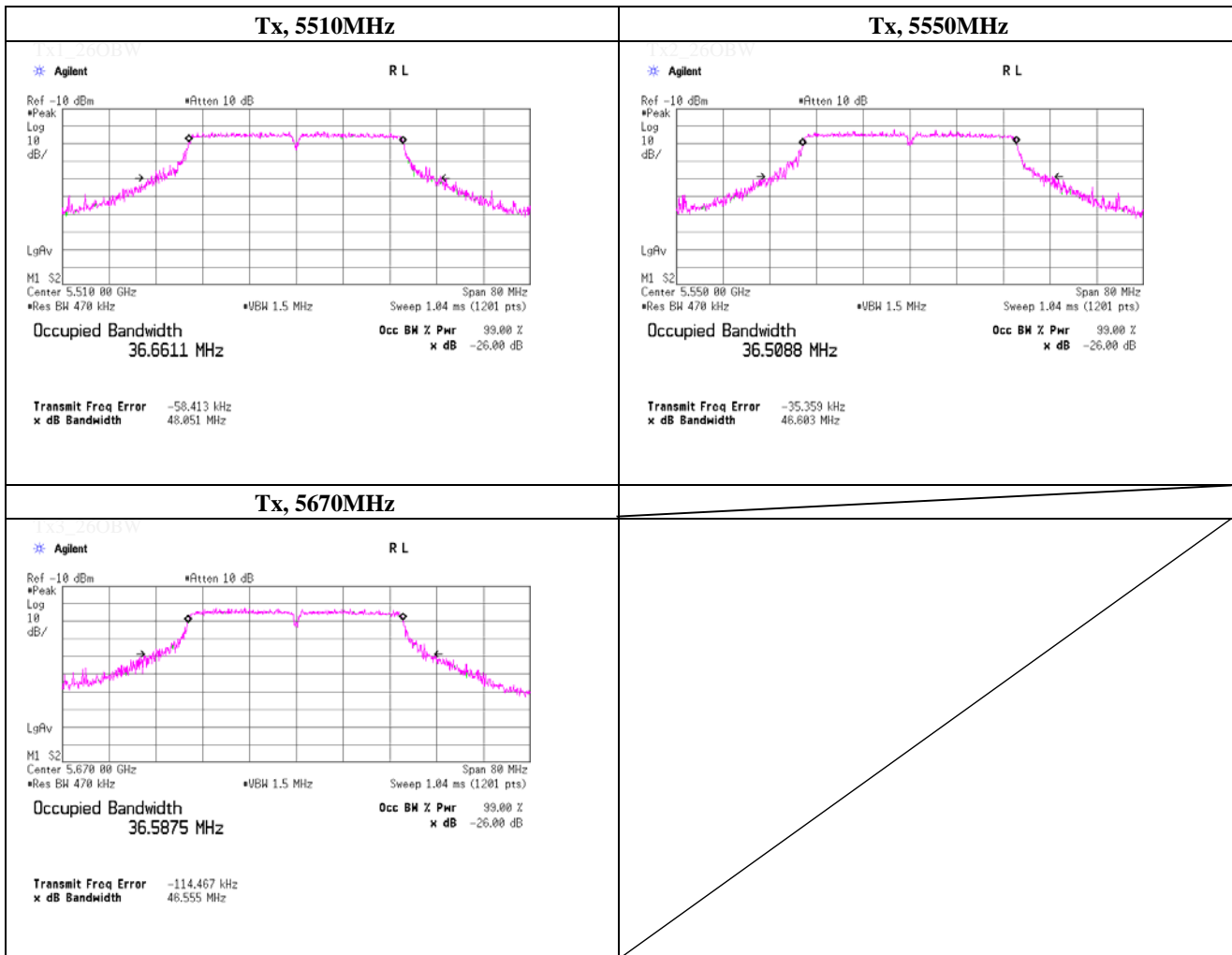
Facsimile : +81 463 50 6401



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

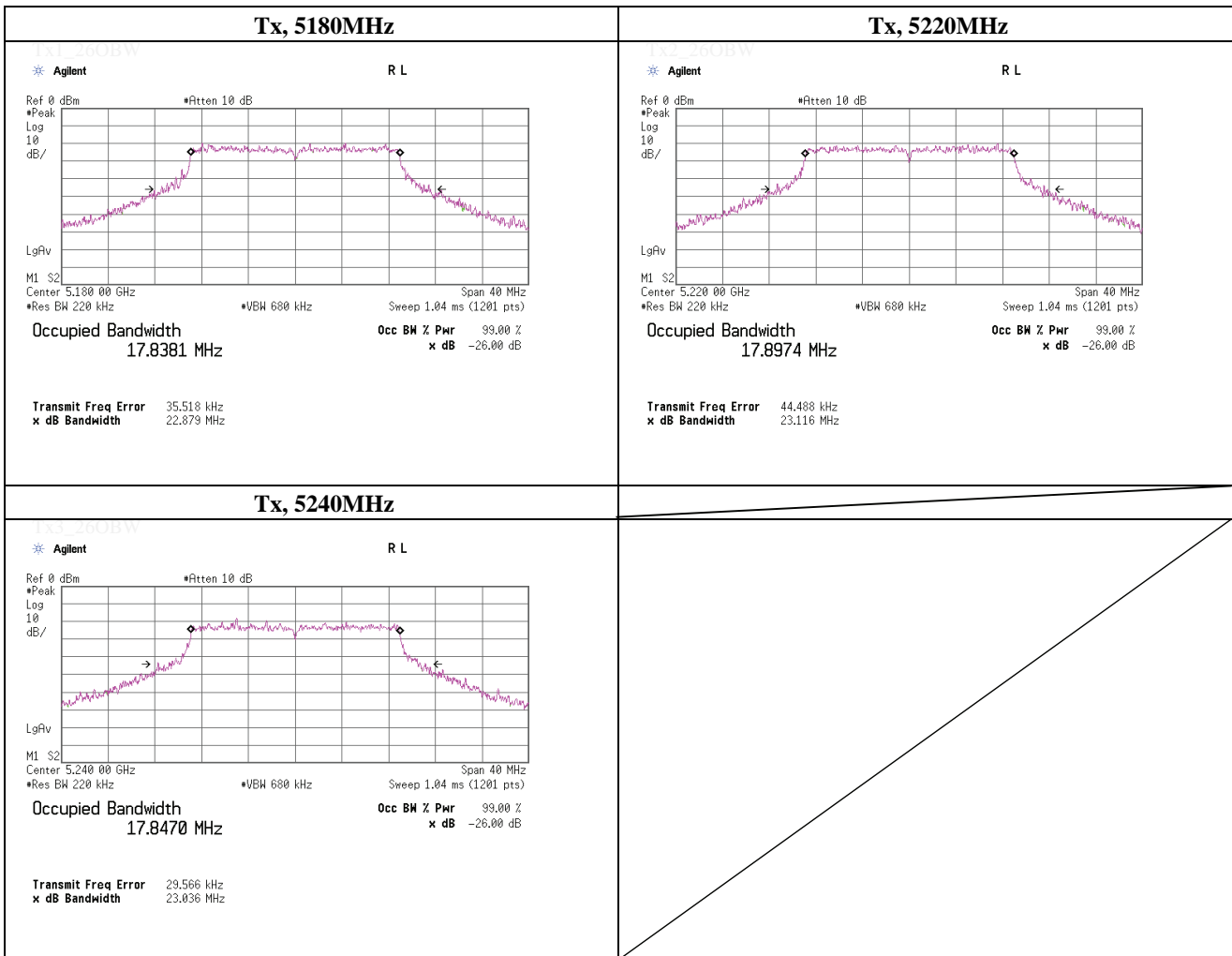
Freq. [MHz]	-26dB Bandwidth [MHz]
5510.0000	48.051
5550.0000	46.603
5670.0000	46.555



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

Freq. [MHz]	-26dB Bandwidth [MHz]
5180.0000	22.879
5220.0000	23.116
5240.0000	23.036

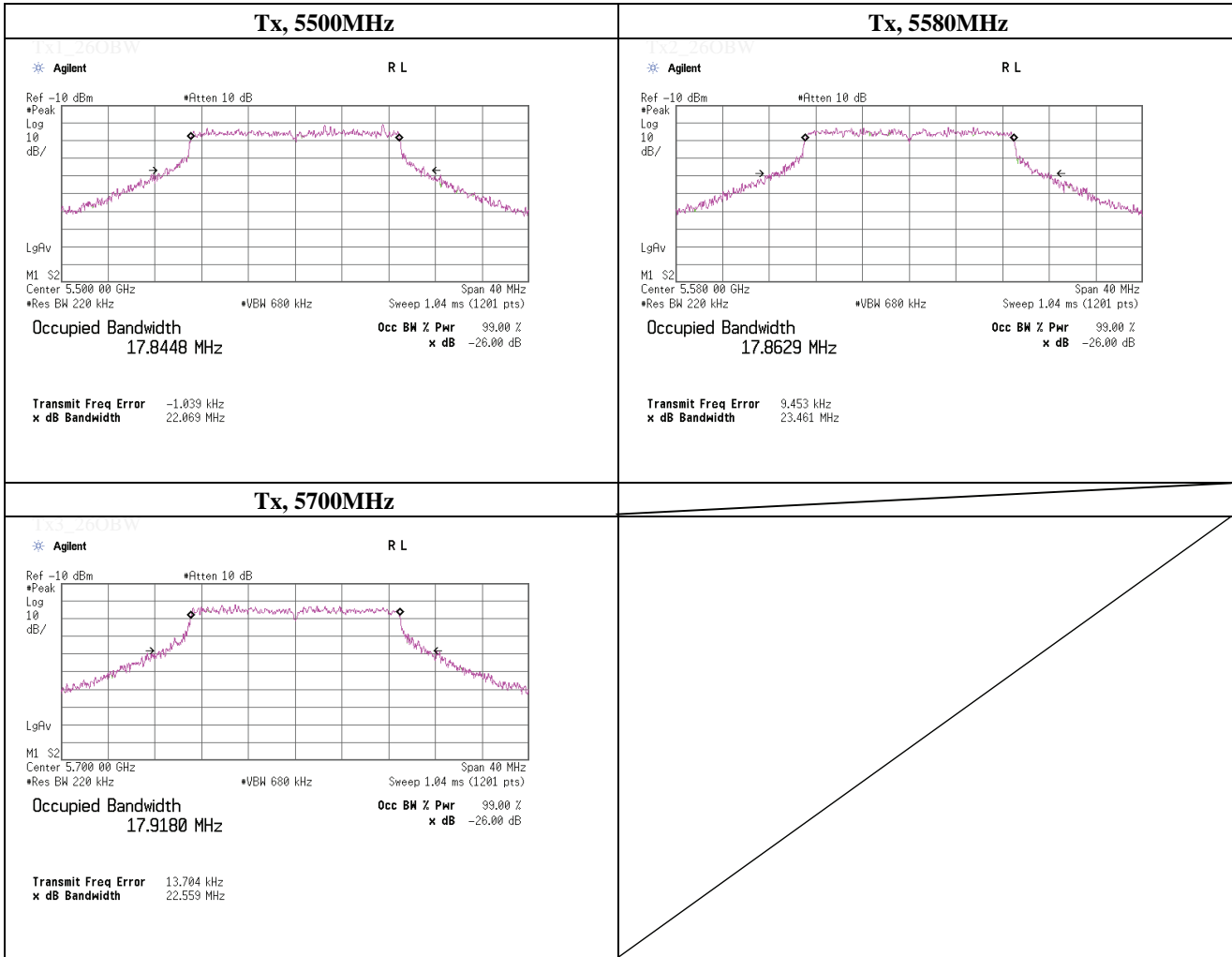




### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

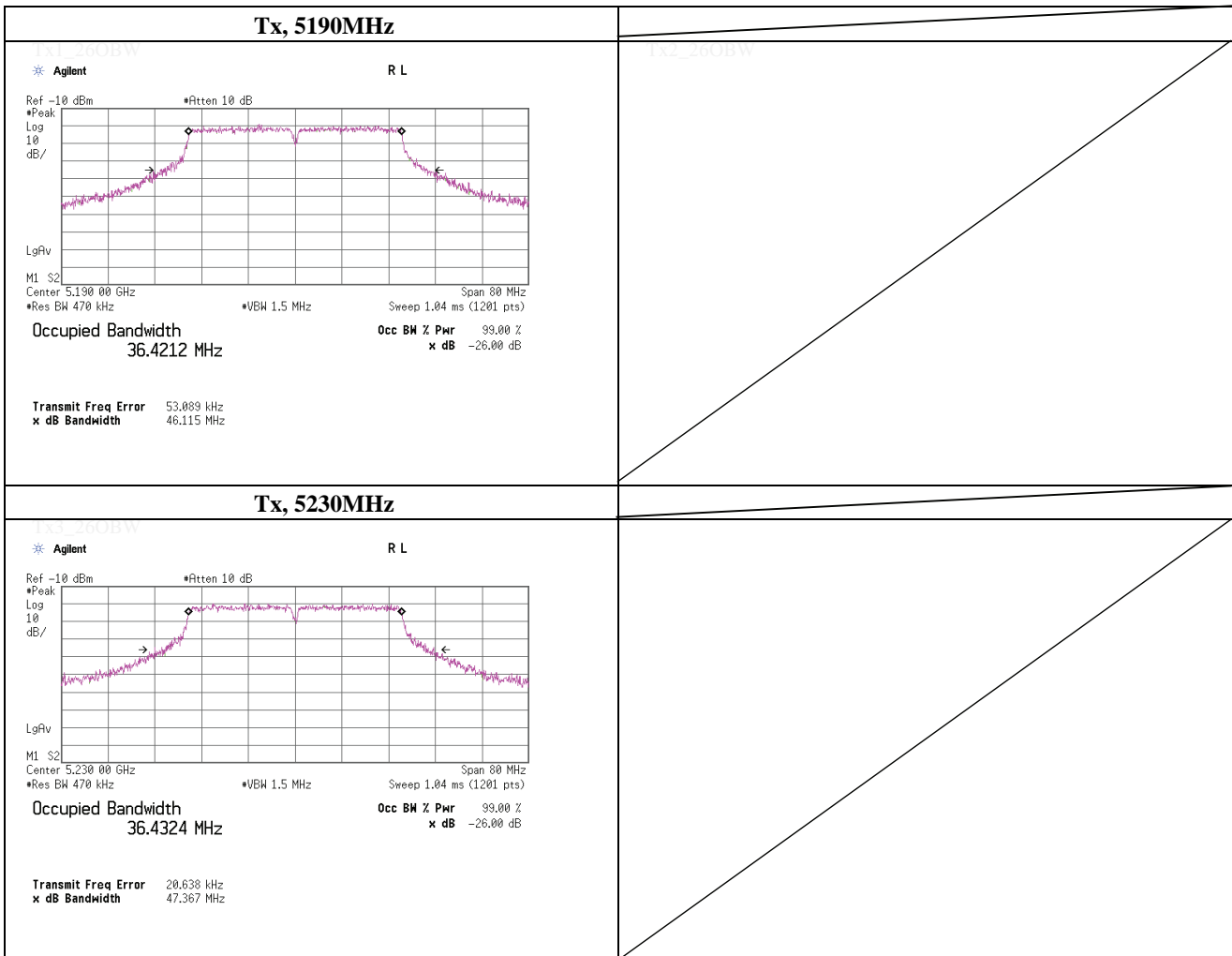
Freq. [MHz]	-26dB Bandwidth [MHz]
5500.0000	22.069
5580.0000	23.461
5700.0000	22.559



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

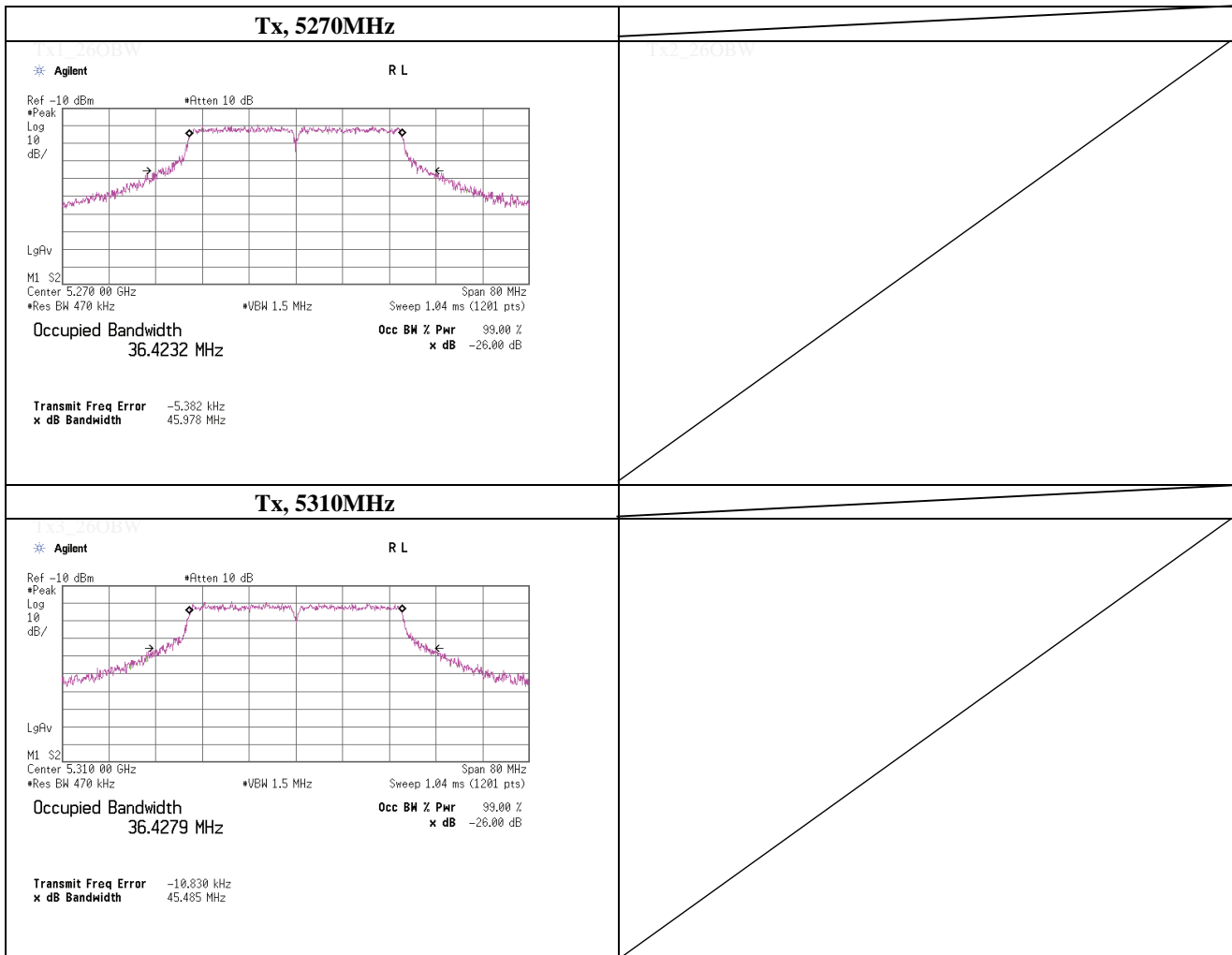
Freq. [MHz]	-26dB Bandwidth [MHz]
5190.0000	46.115
5230.0000	47.367



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

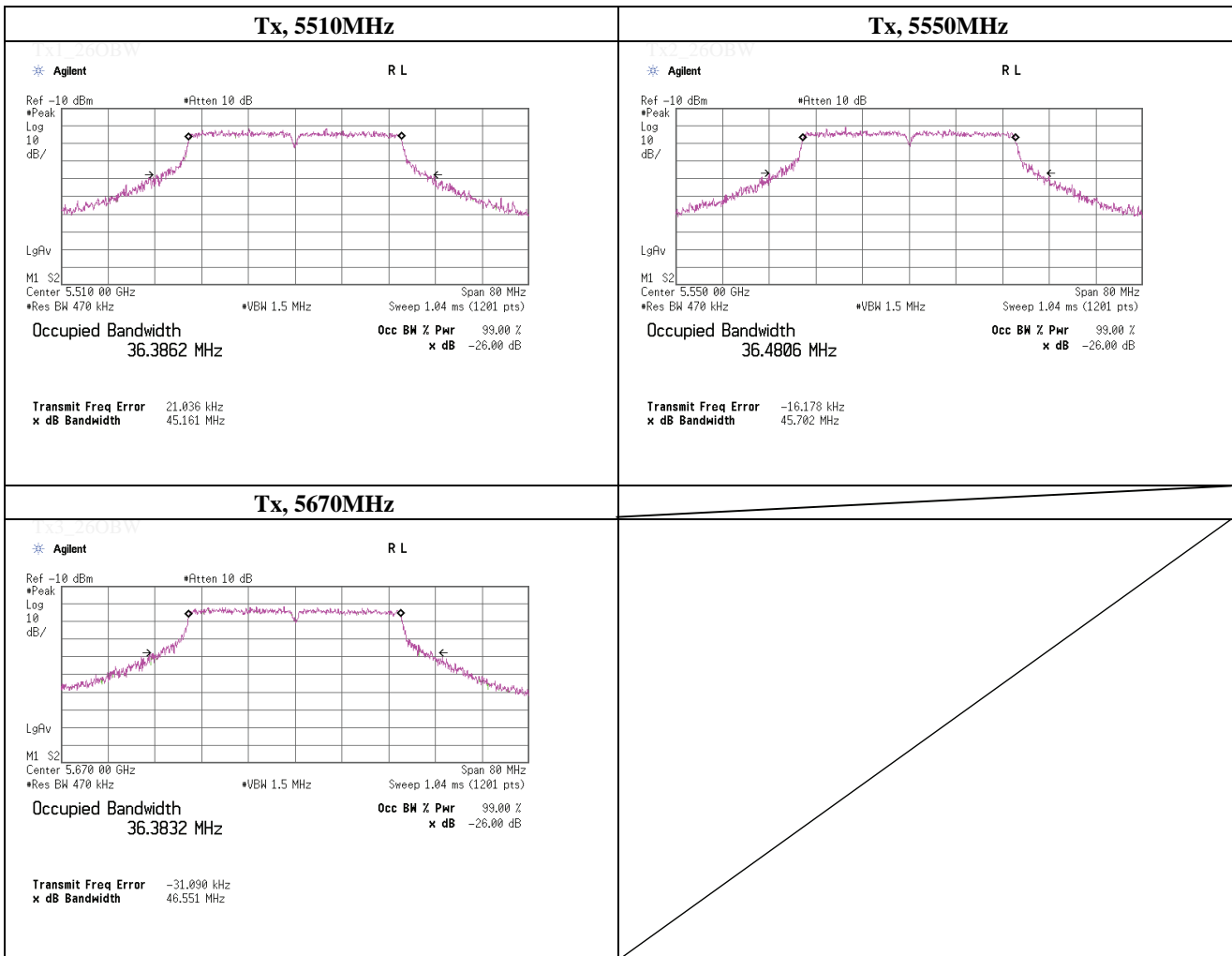
Freq. [MHz]	-26dB Bandwidth [MHz]
5270.0000	45.978
5310.0000	45.485



### -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

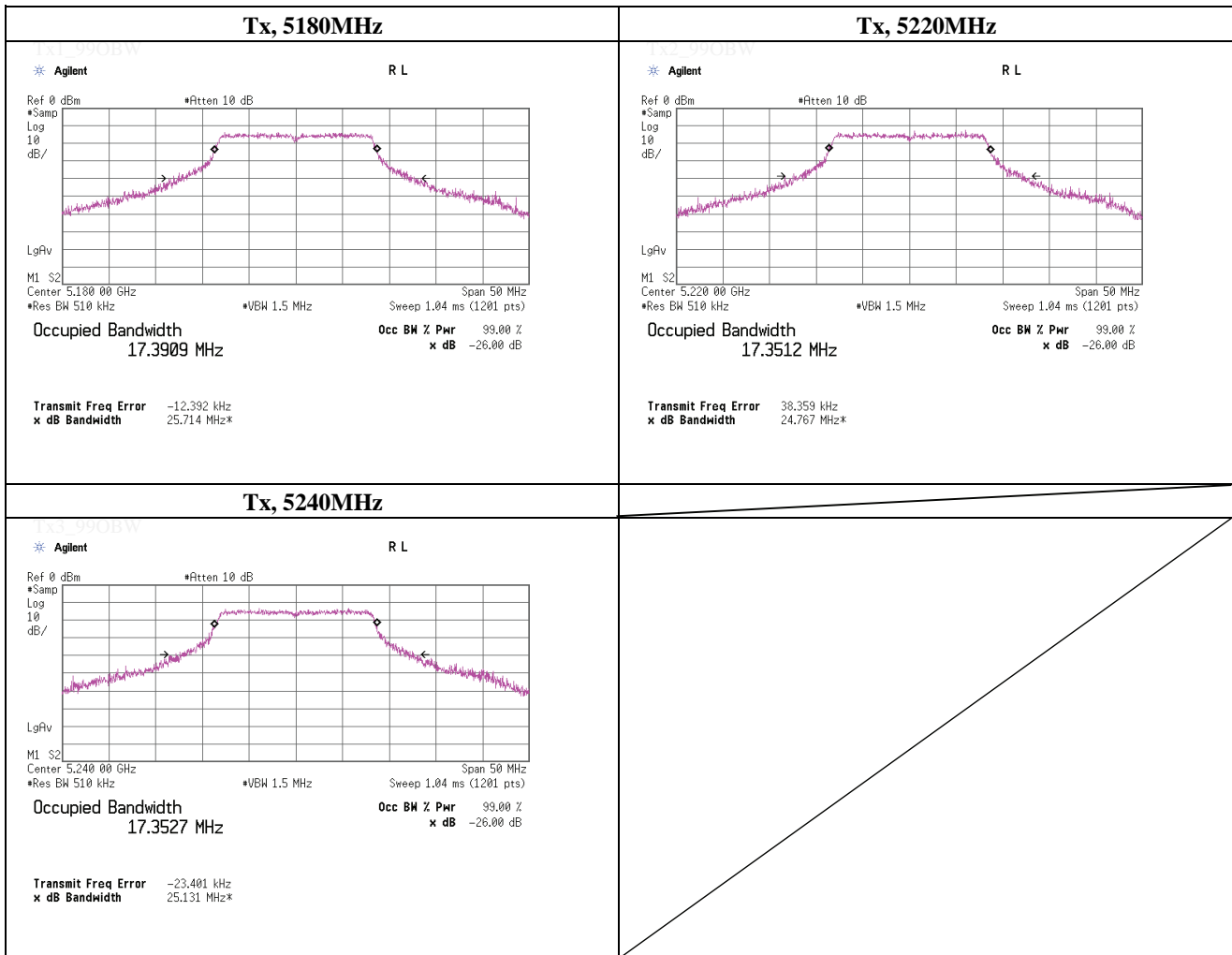
Freq. [MHz]	-26dB Bandwidth [MHz]
5510.0000	45.161
5550.0000	45.702
5670.0000	46.551



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5180.0000	17.391
5220.0000	17.351
5240.0000	17.353

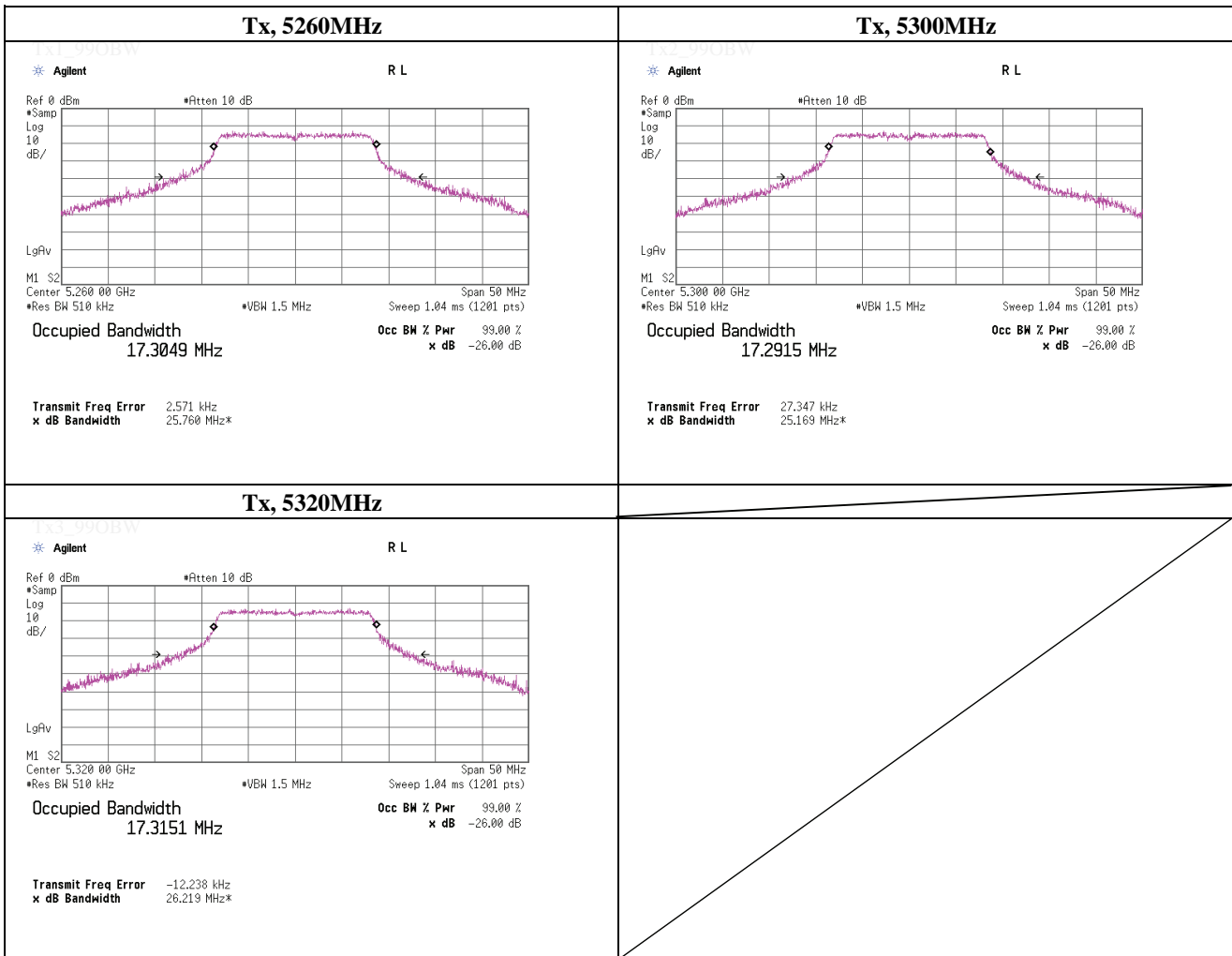




### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

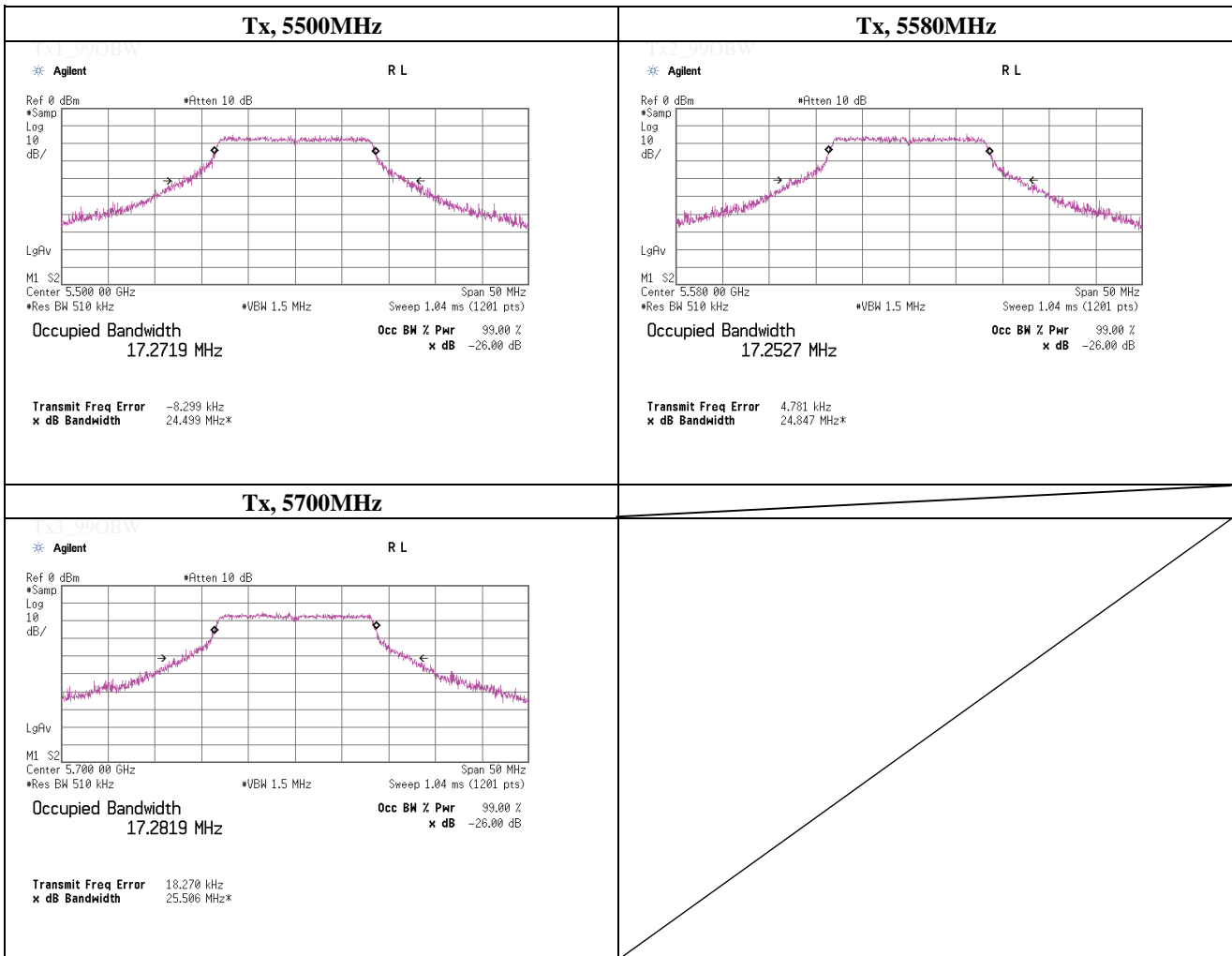
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5260.0000	17.305
5300.0000	17.292
5320.0000	17.315



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5500.0000	17.272
5580.0000	17.253
5700.0000	17.282

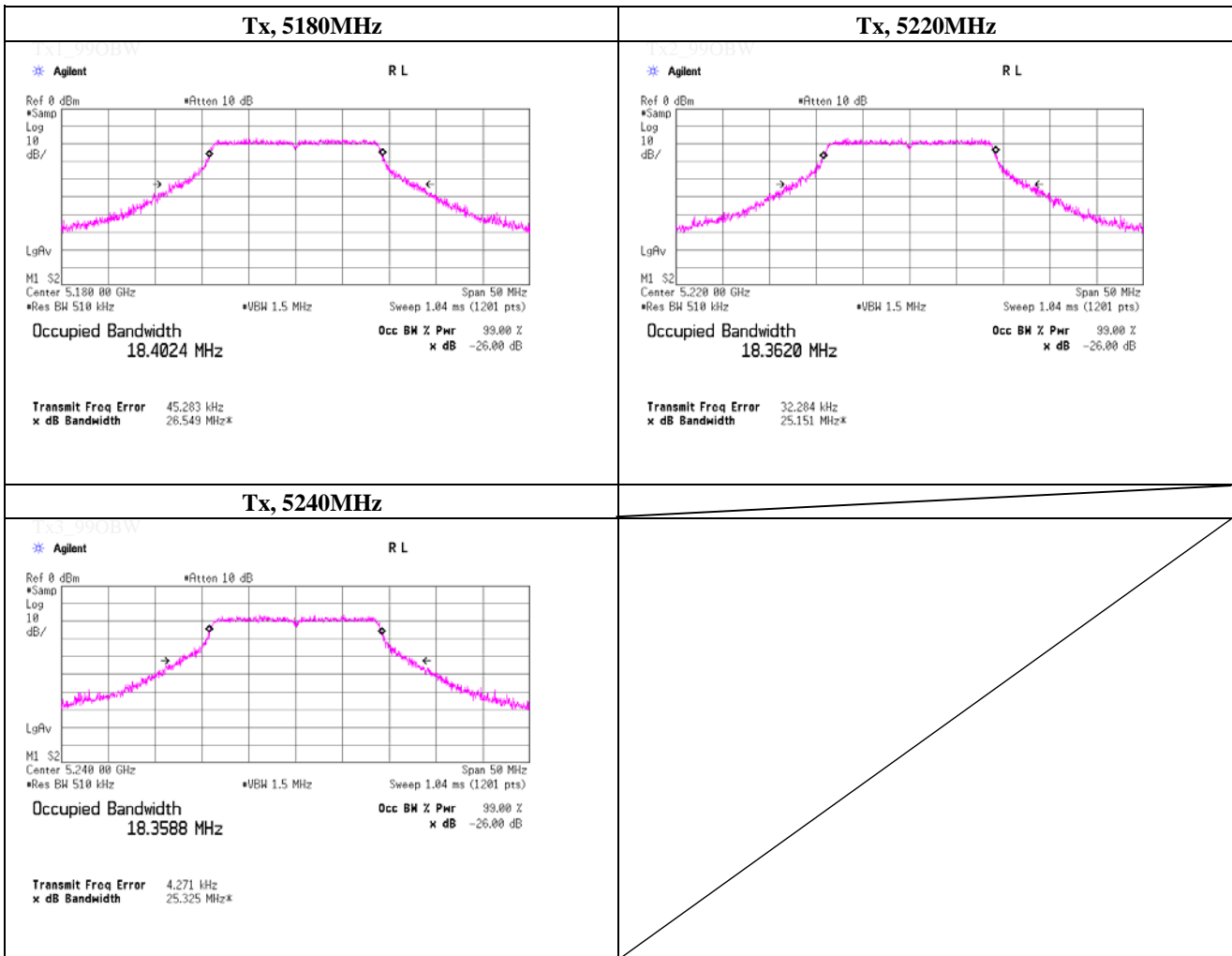


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 Facsimile : +81 463 50 6401

### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5180.0000	18.402
5220.0000	18.362
5240.0000	18.359

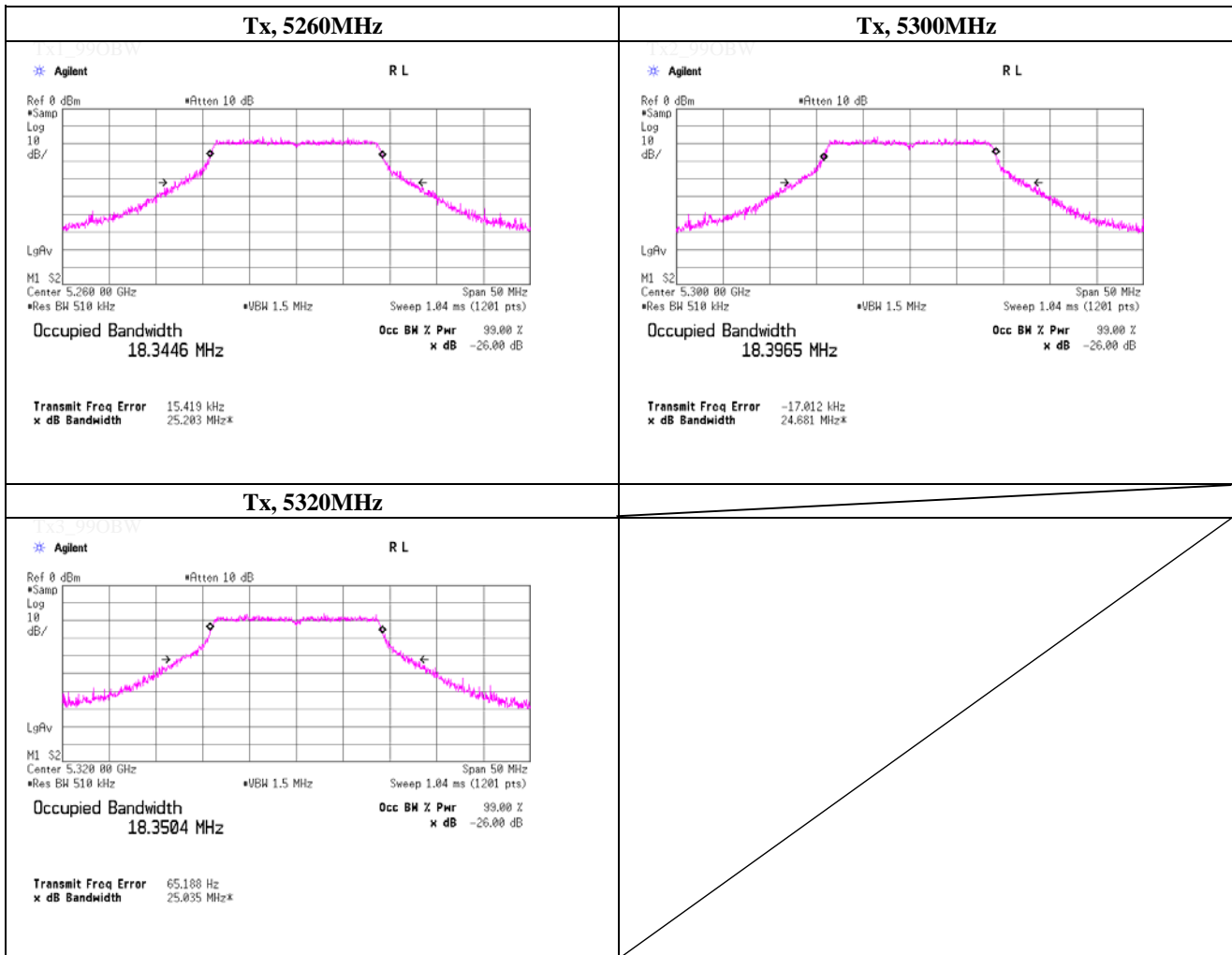


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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

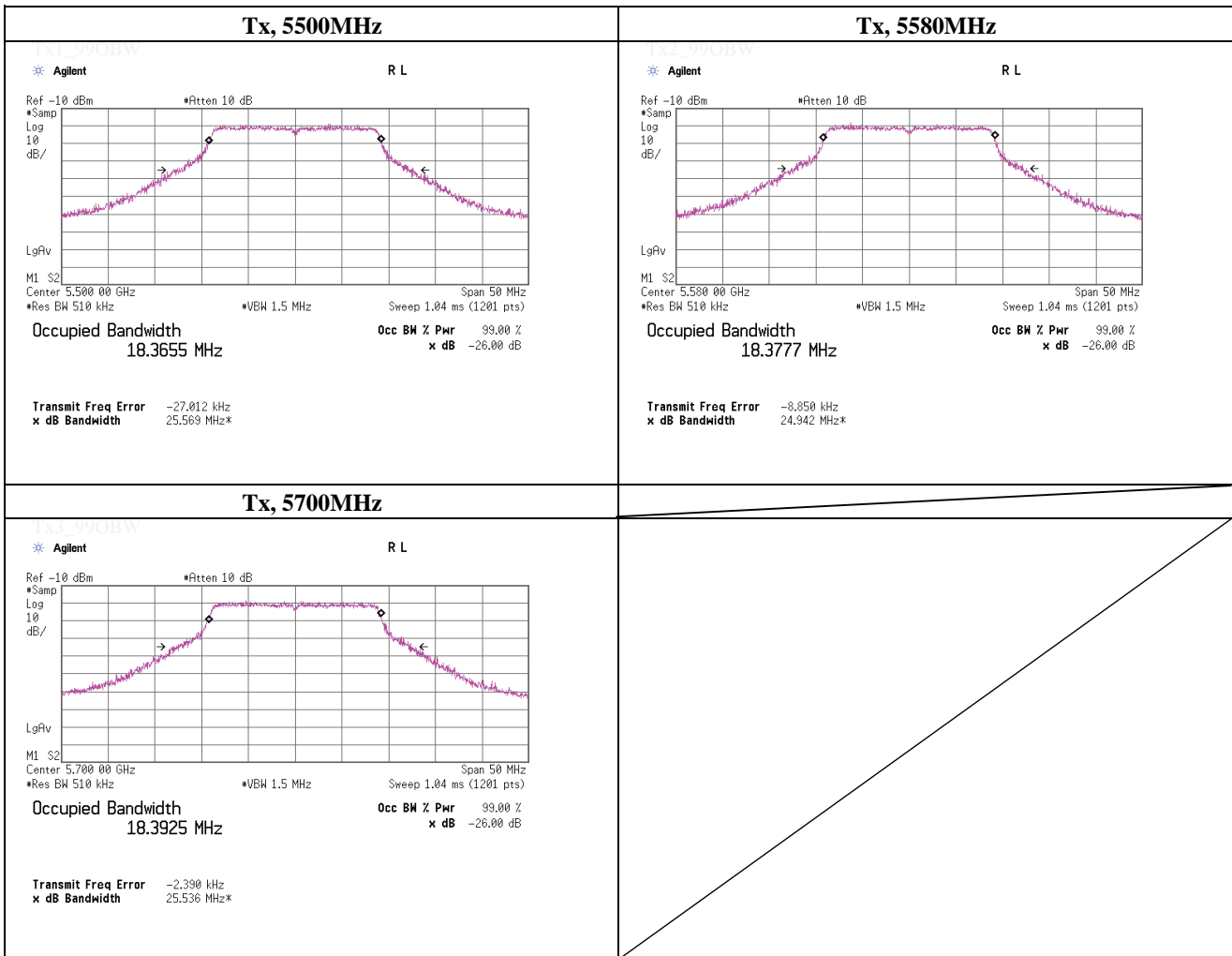
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5260.0000	18.345
5300.0000	18.397
5320.0000	18.350



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

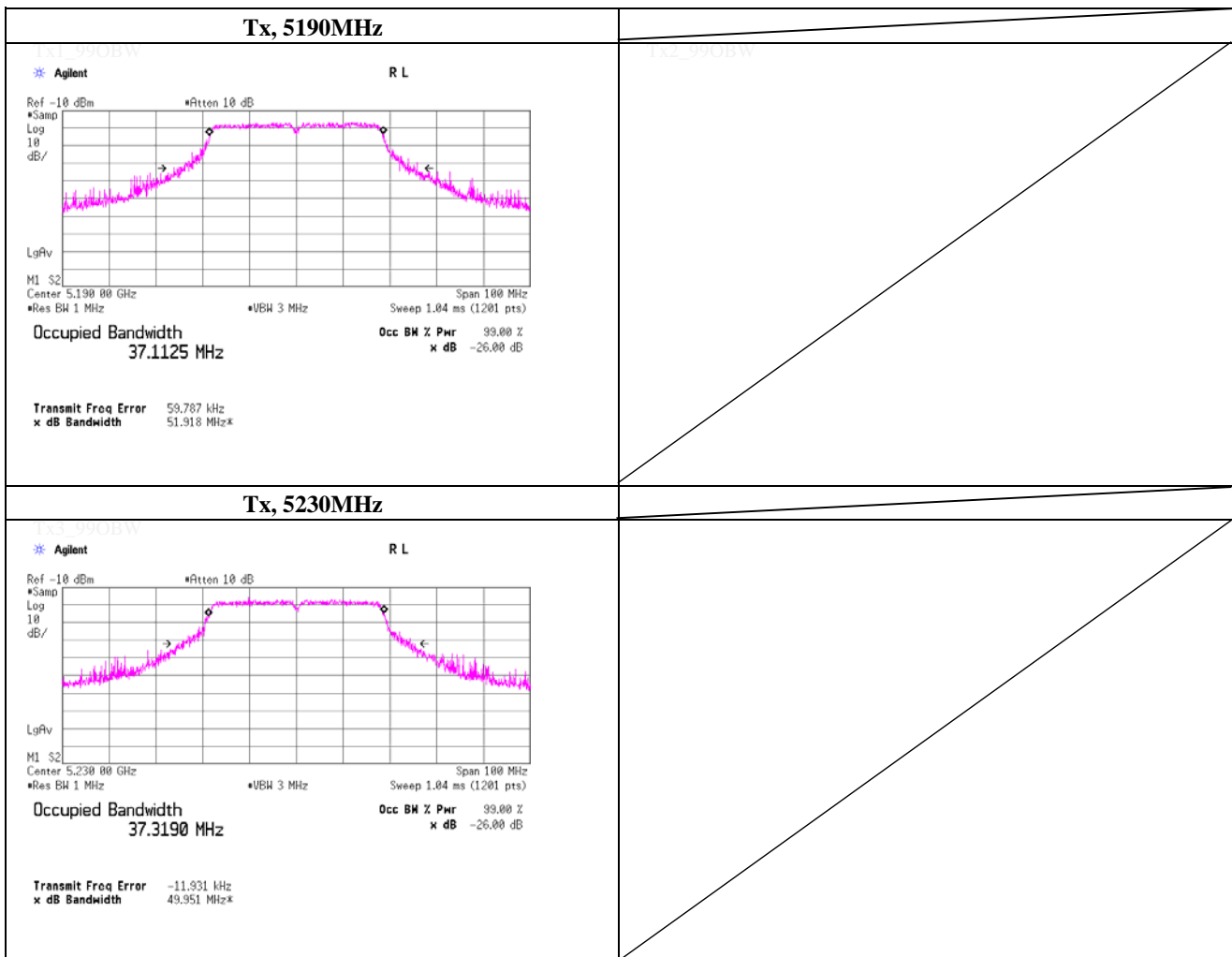
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5500.0000	18.366
5580.0000	18.378
5700.0000	18.393



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5190.0000	37.113
5230.0000	37.319



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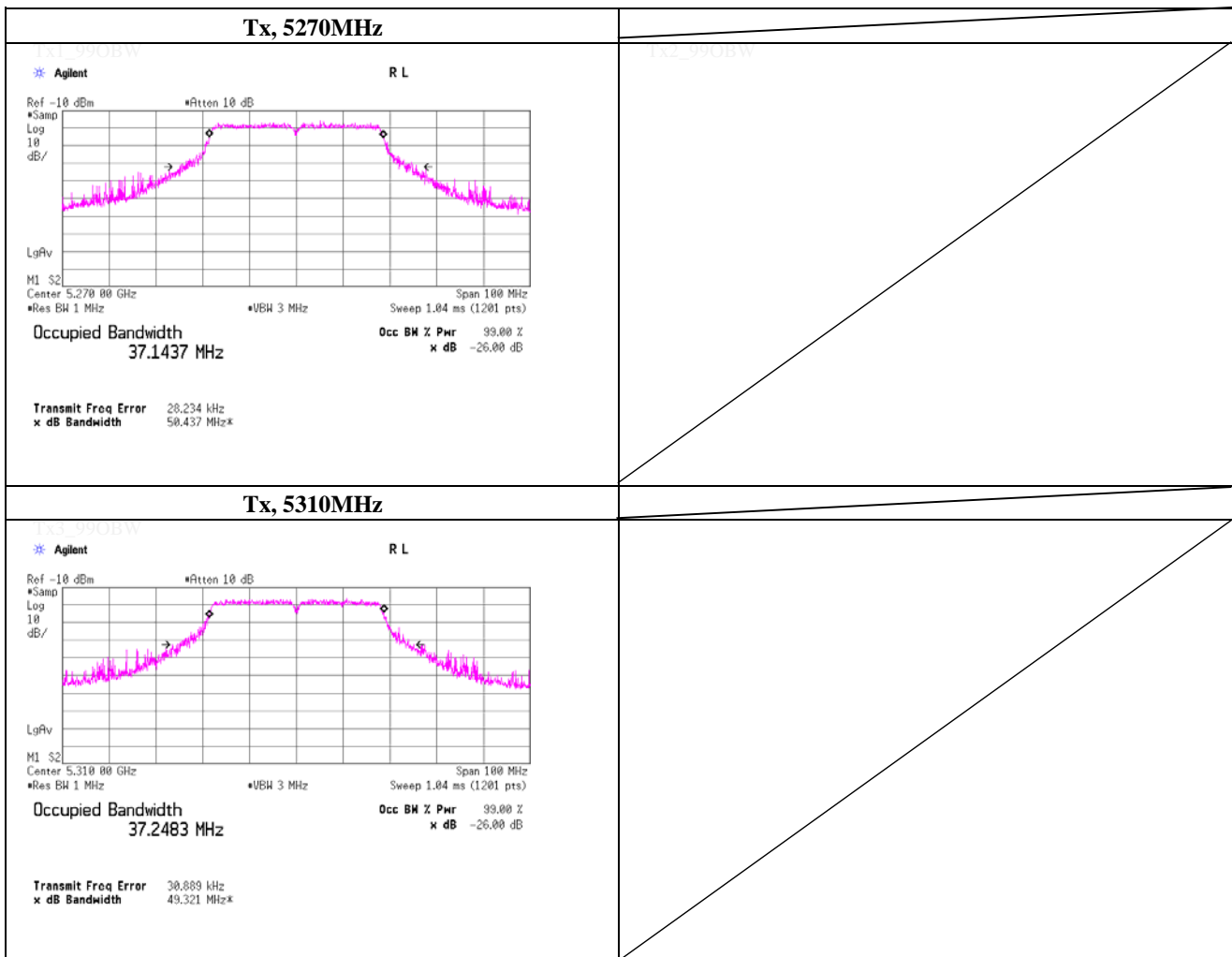
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5270.0000	37.144
5310.0000	37.248

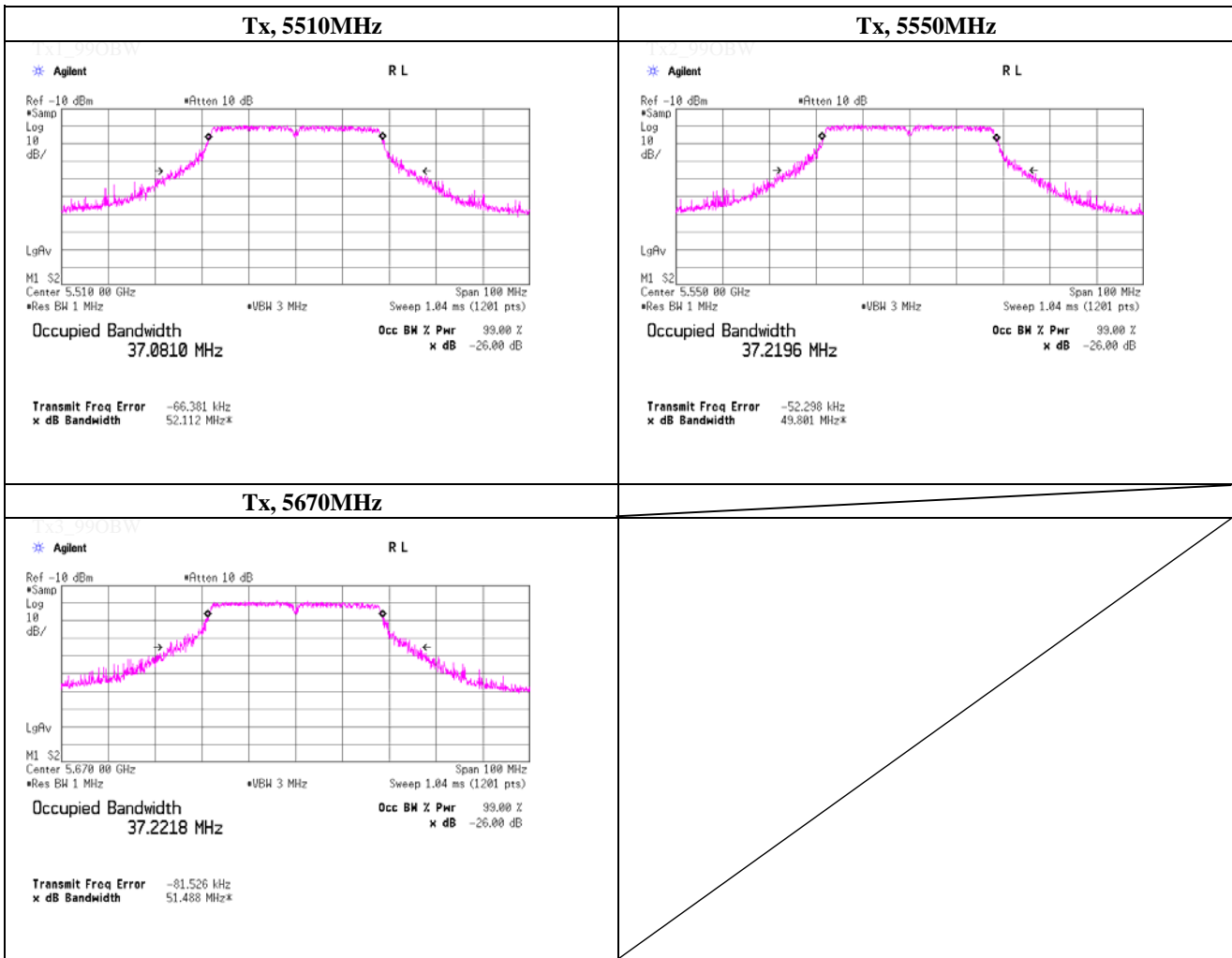


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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5510.0000	37.081
5550.0000	37.220
5670.0000	37.222



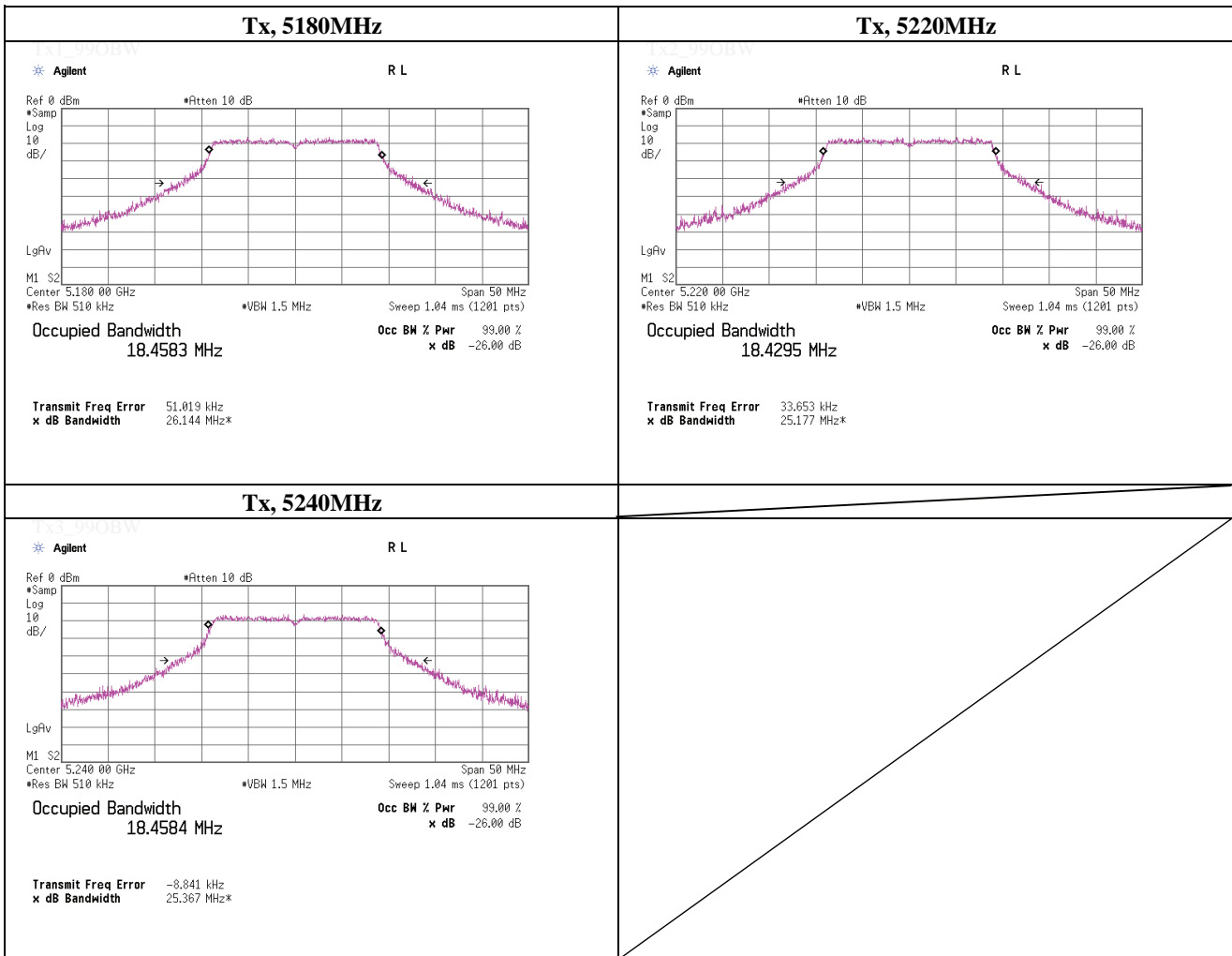
**UL Japan, Inc.**  
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 Telephone : +81 463 50 6400  
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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

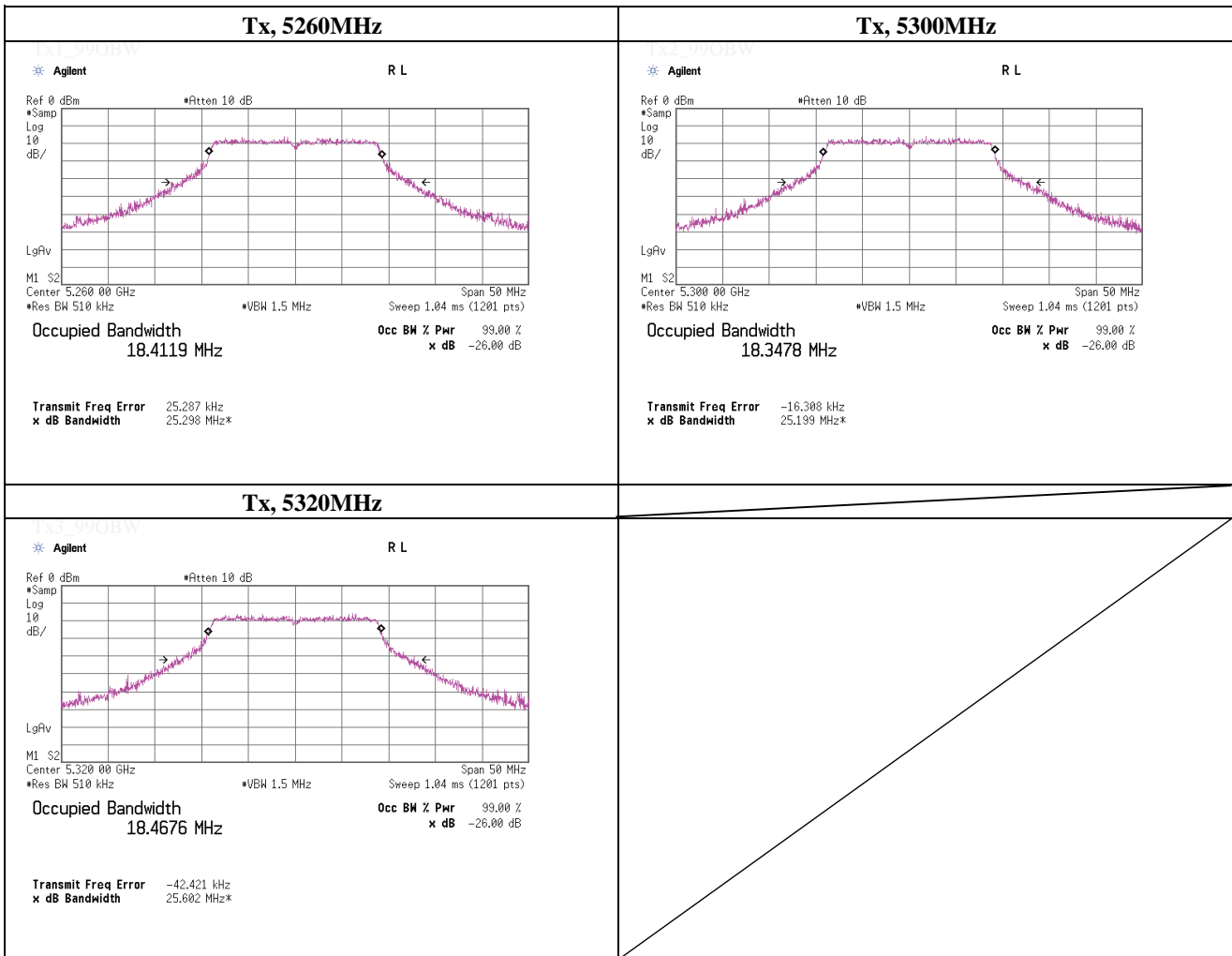
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5180.0000	18.458
5220.0000	18.430
5240.0000	18.458



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

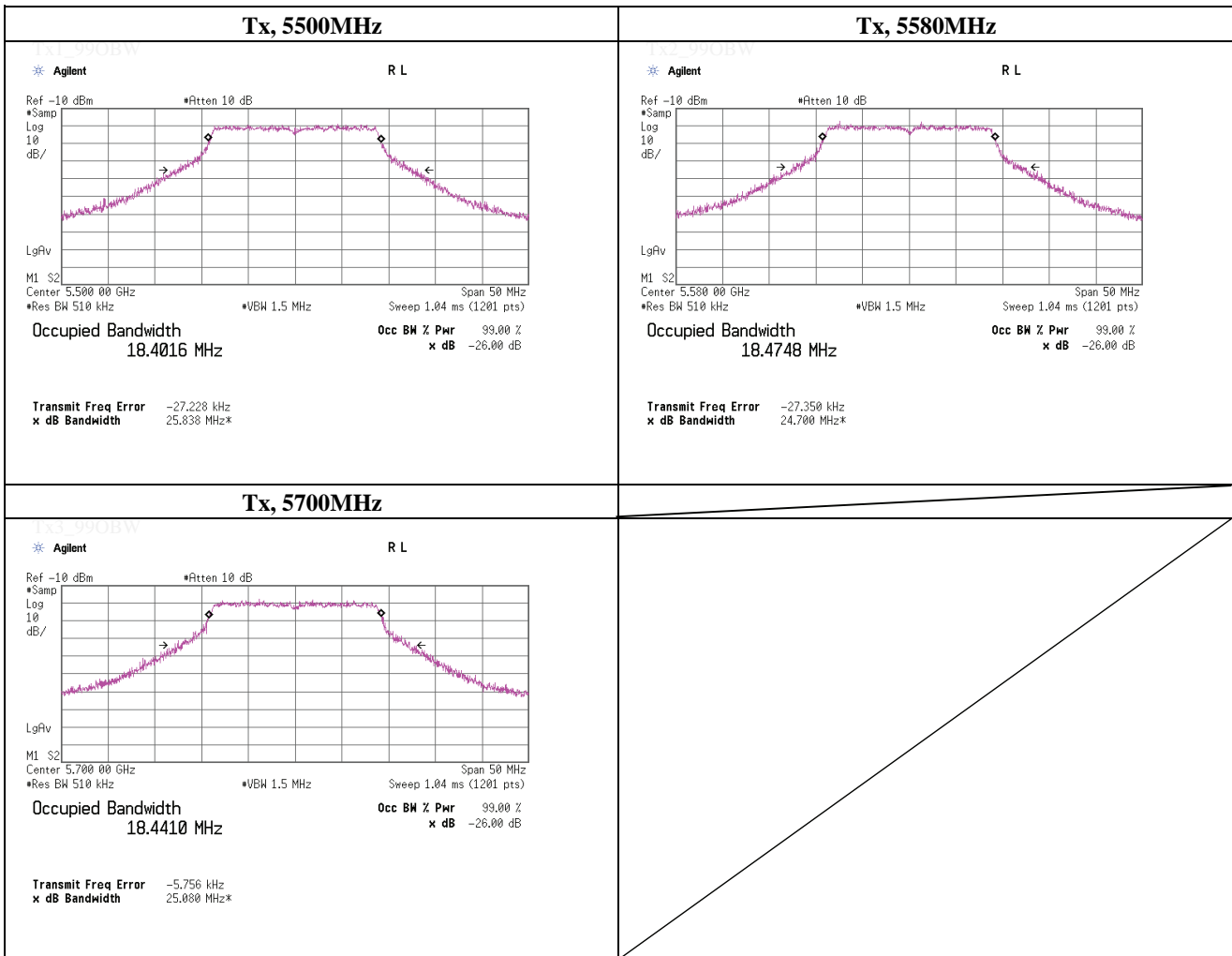
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5260.0000	18.412
5300.0000	18.348
5320.0000	18.468



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

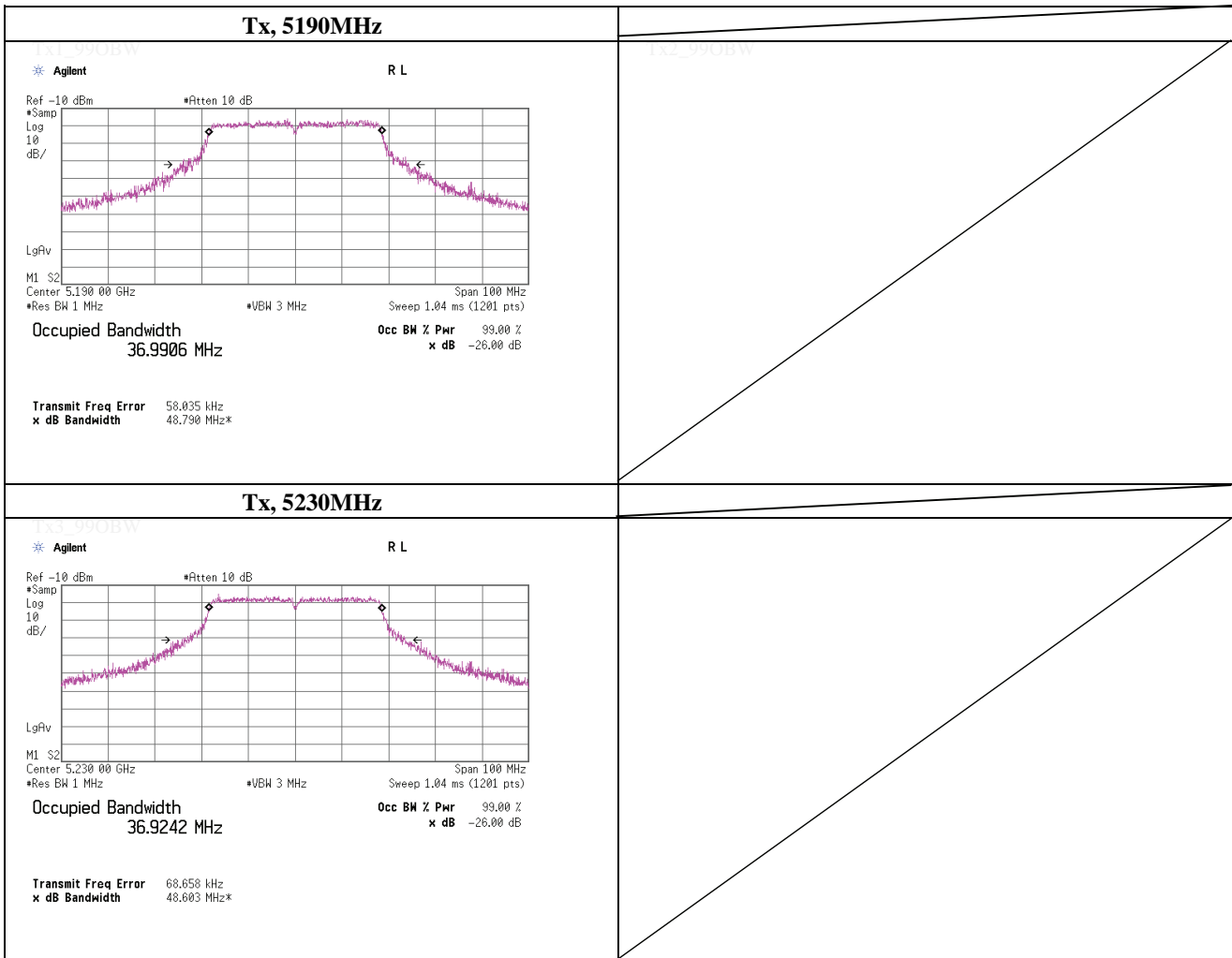
Freq. [MHz]	99% Occupied Bandwidth [MHz]
5500.0000	18.402
5580.0000	18.475
5700.0000	18.441



### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5190.0000	36.991
5230.0000	36.924

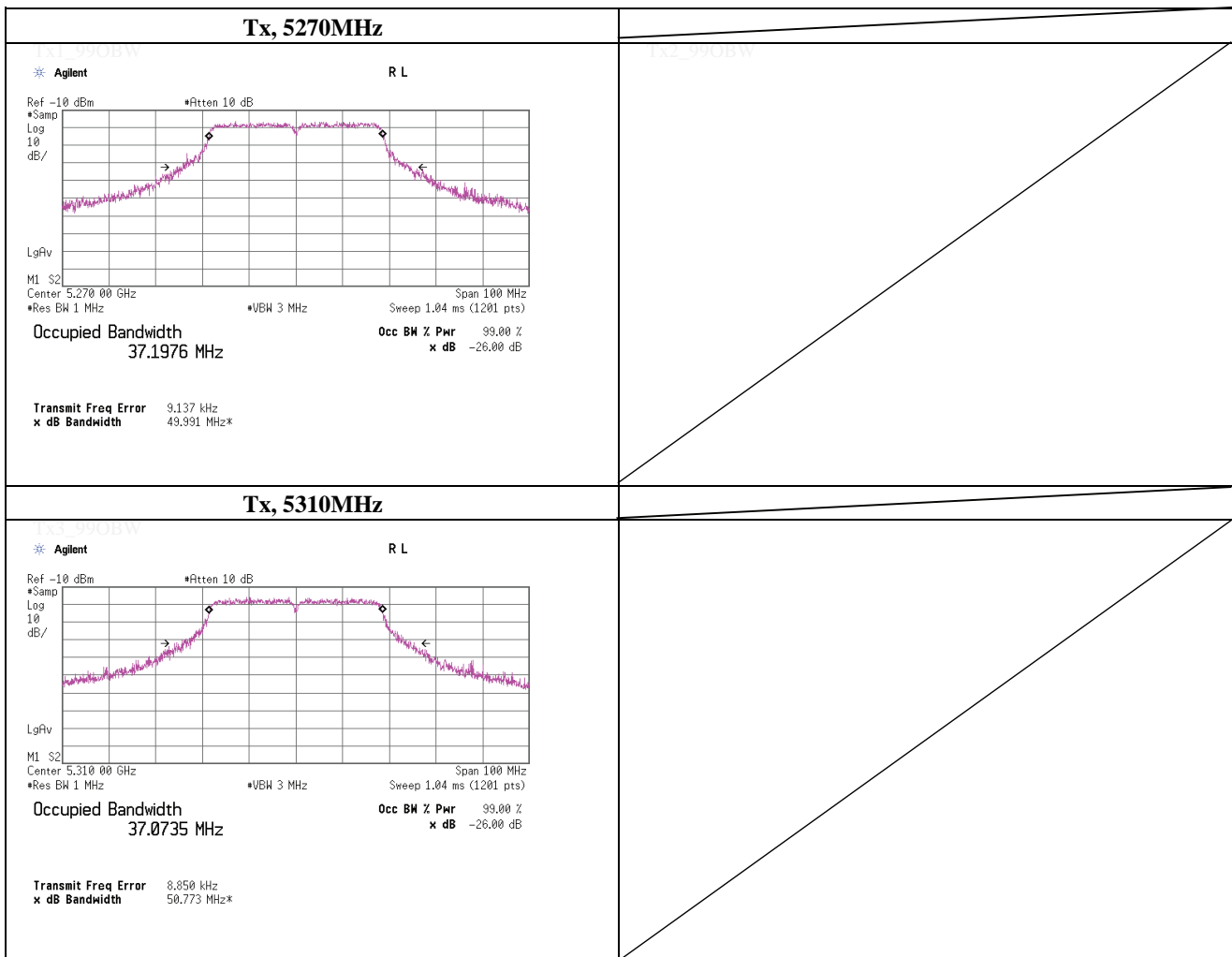


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 Facsimile : +81 463 50 6401

### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5270.0000	37.198
5310.0000	37.074

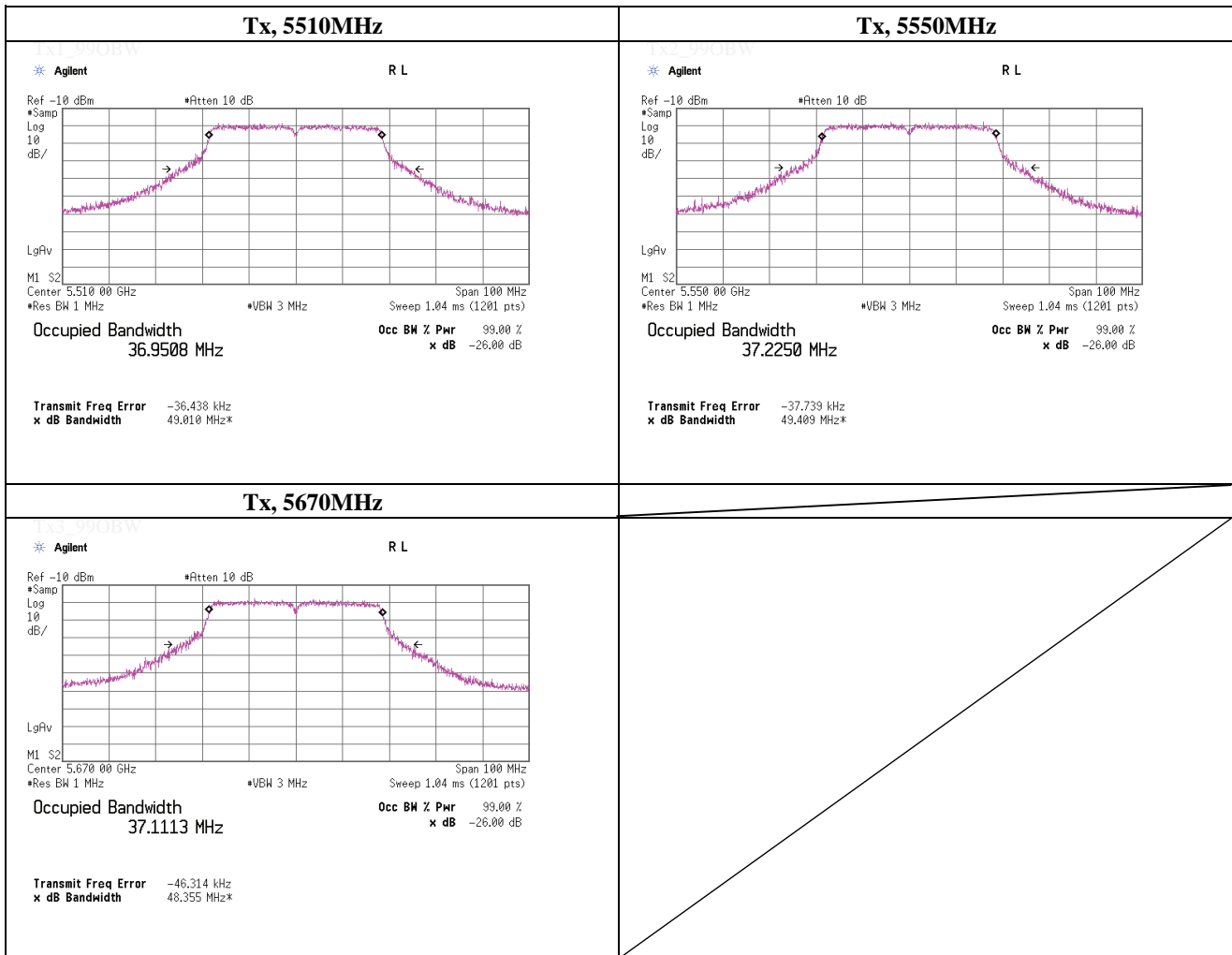


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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	99% Occupied Bandwidth [MHz]
5510.0000	36.951
5550.0000	37.225
5670.0000	37.111

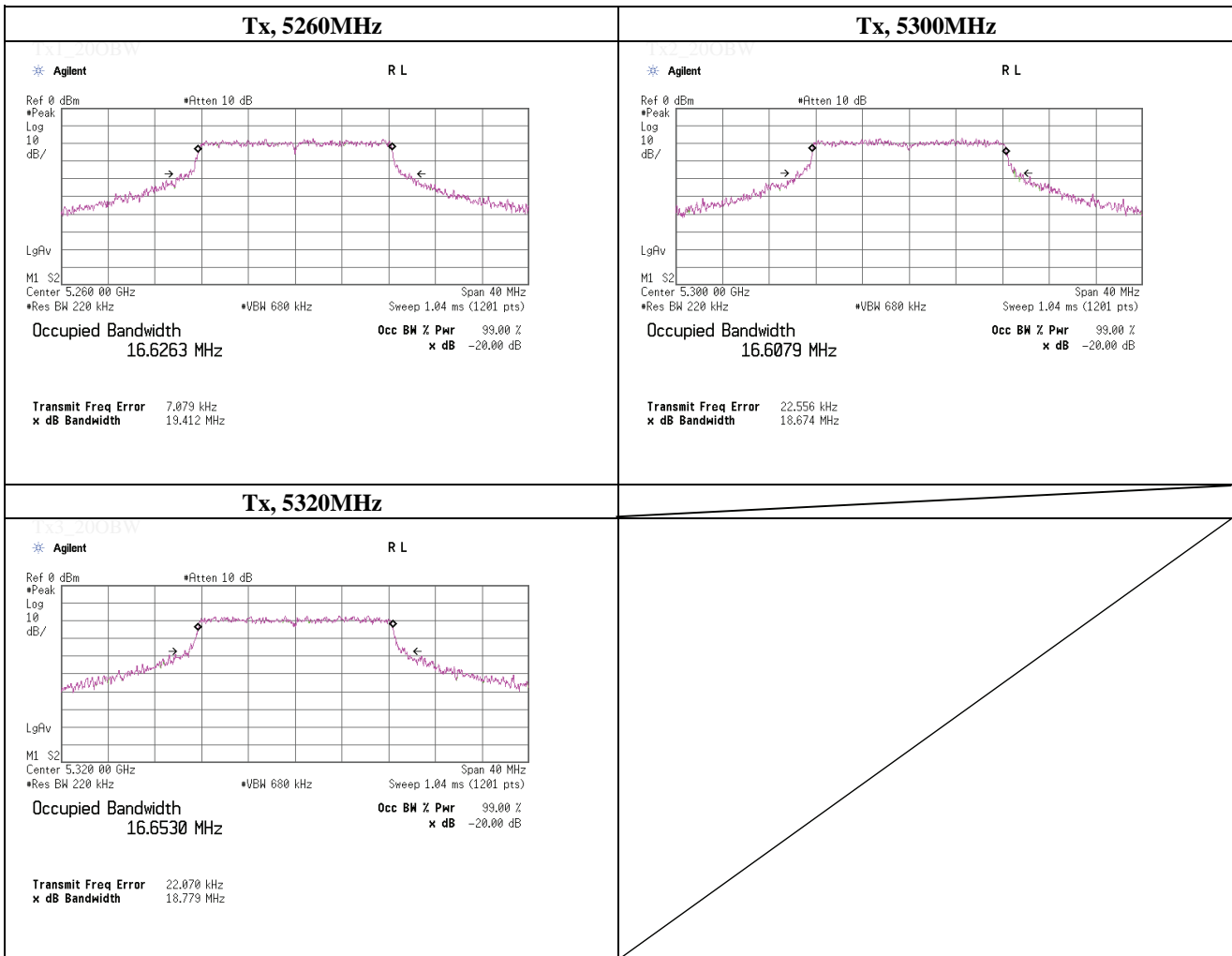




## -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

Freq. [MHz]	-20dB Bandwidth [MHz]
5260.0000	19.412
5300.0000	18.674
5320.0000	18.779

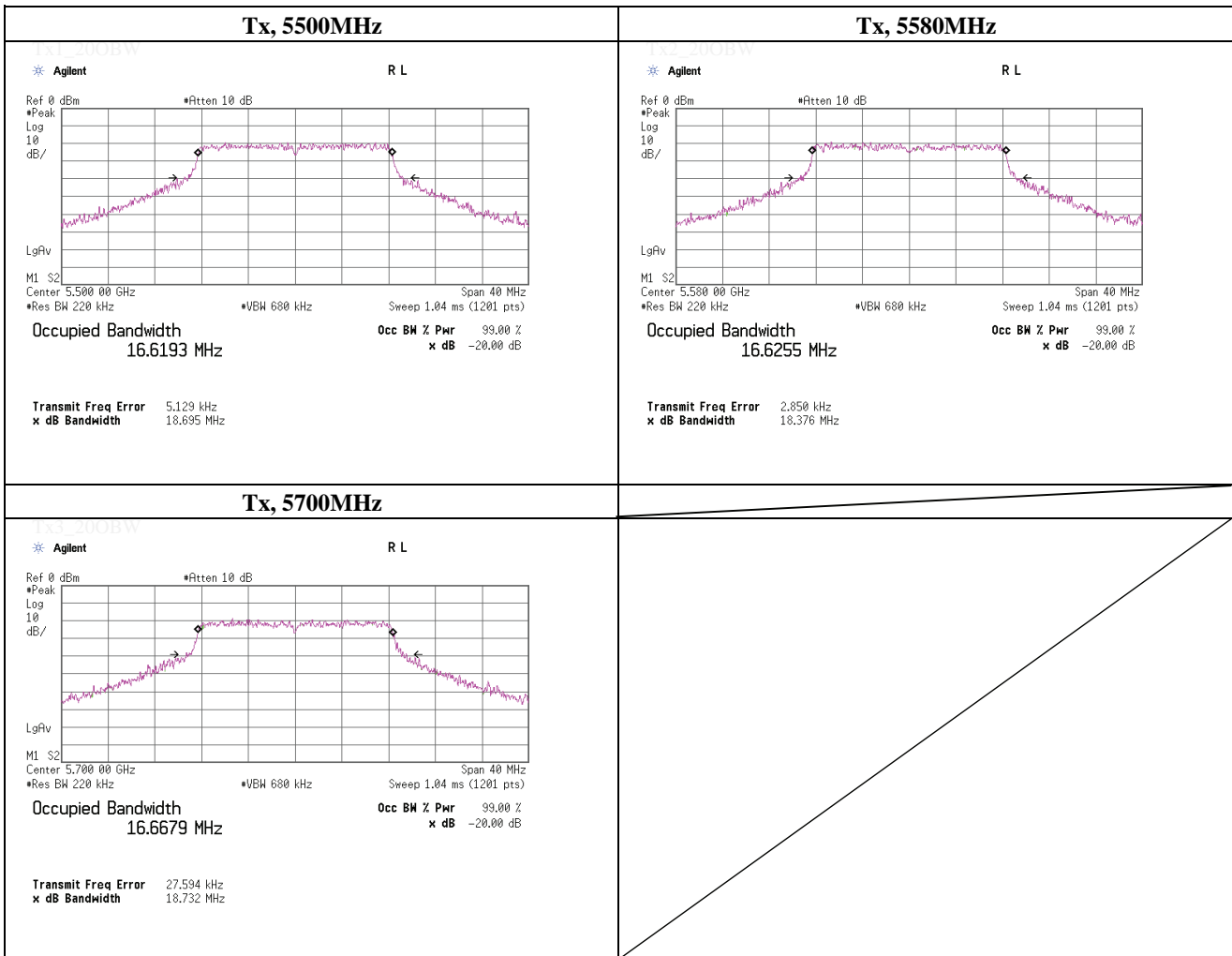




### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps	

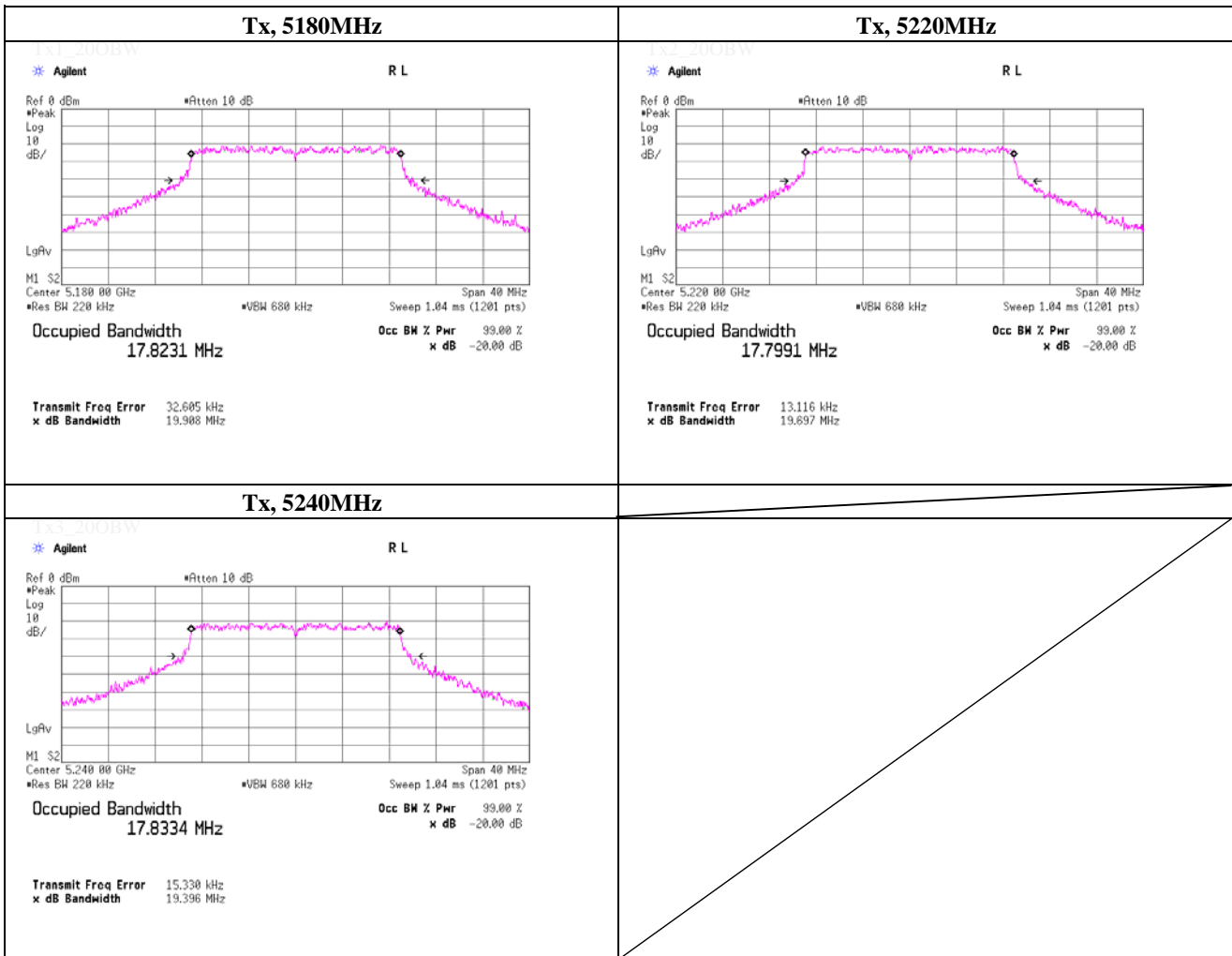
Freq. [MHz]	-20dB Bandwidth [MHz]
5500.0000	18.695
5580.0000	18.376
5700.0000	18.732



### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5180.0000	19.908
5220.0000	19.697
5240.0000	19.396

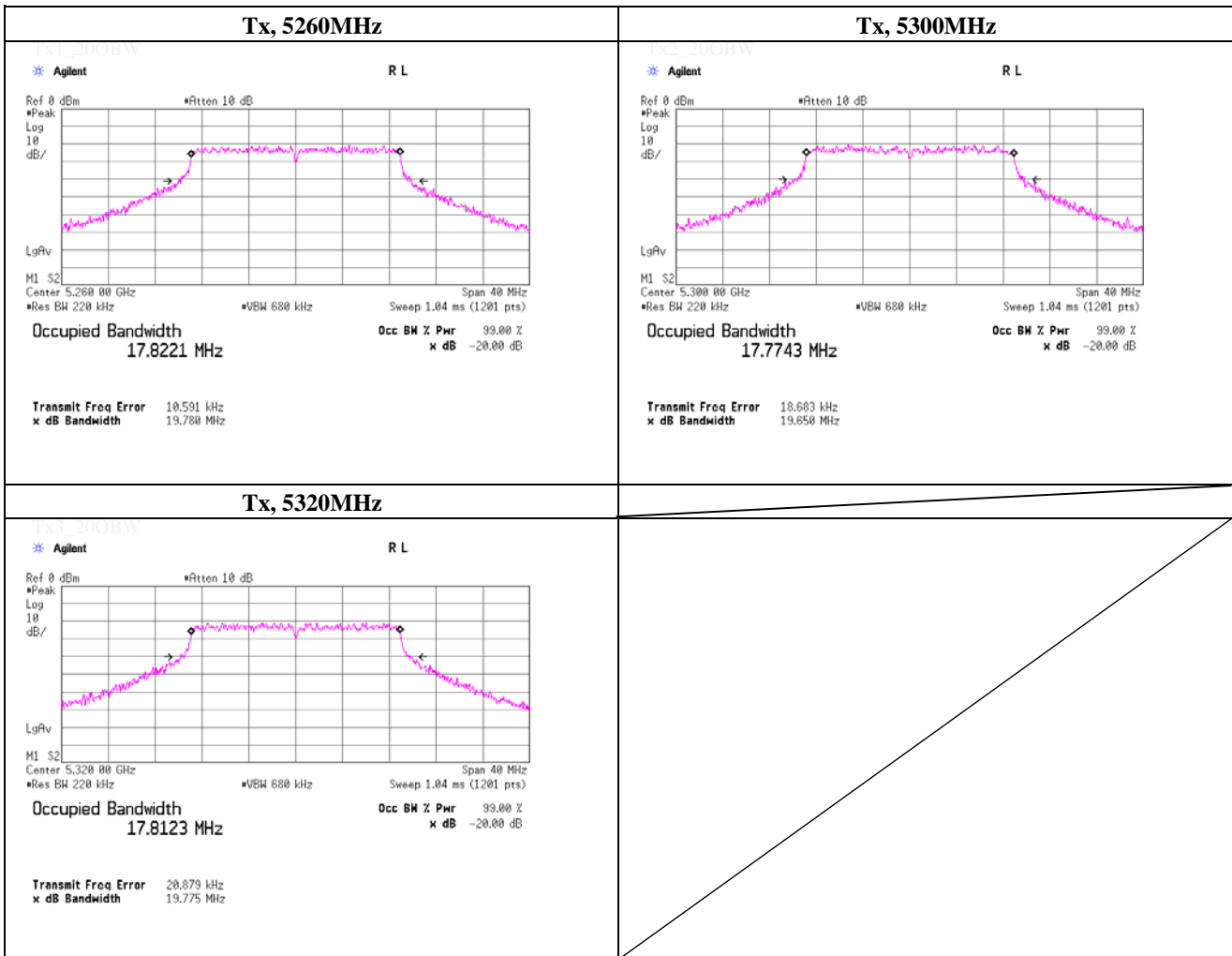


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### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5260.0000	19.780
5300.0000	19.650
5320.0000	19.775

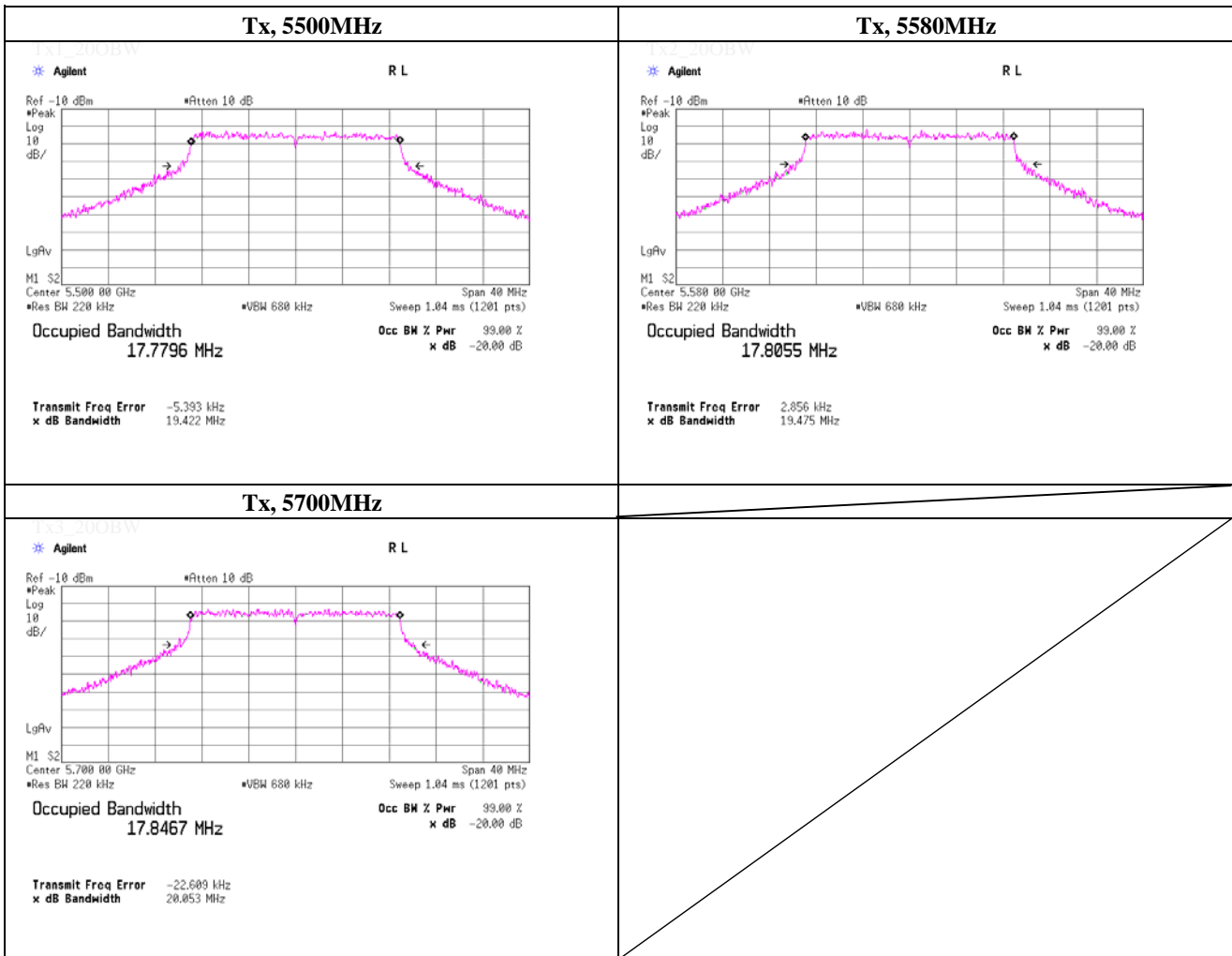


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### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, worst antenna port 1, worst data mode 5(MCS)	

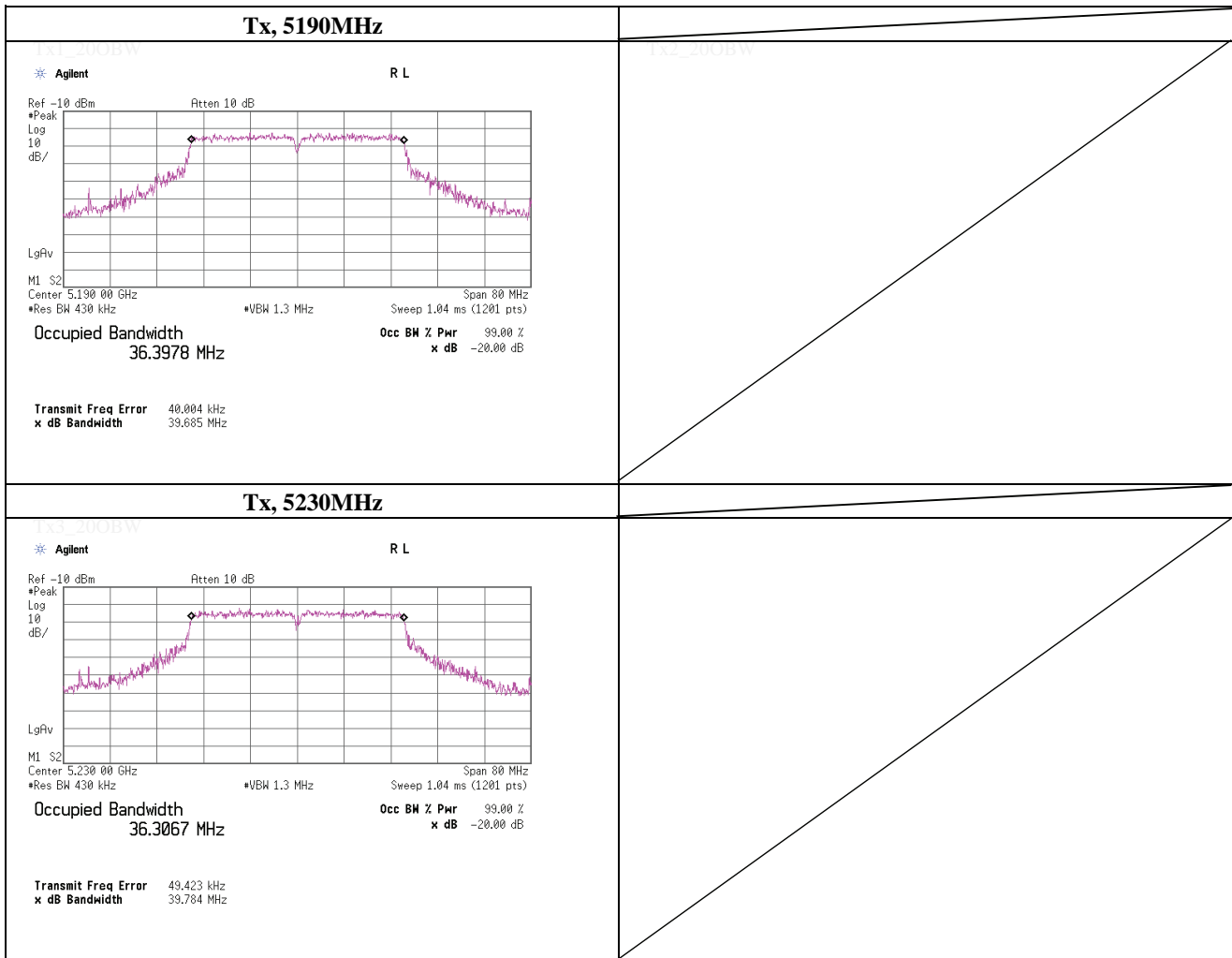
Freq. [MHz]	-20dB Bandwidth [MHz]
5500.0000	19.422
5580.0000	19.475
5700.0000	20.053



**-20dB Bandwidth**

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5190.0000	39.685
5230.0000	39.784

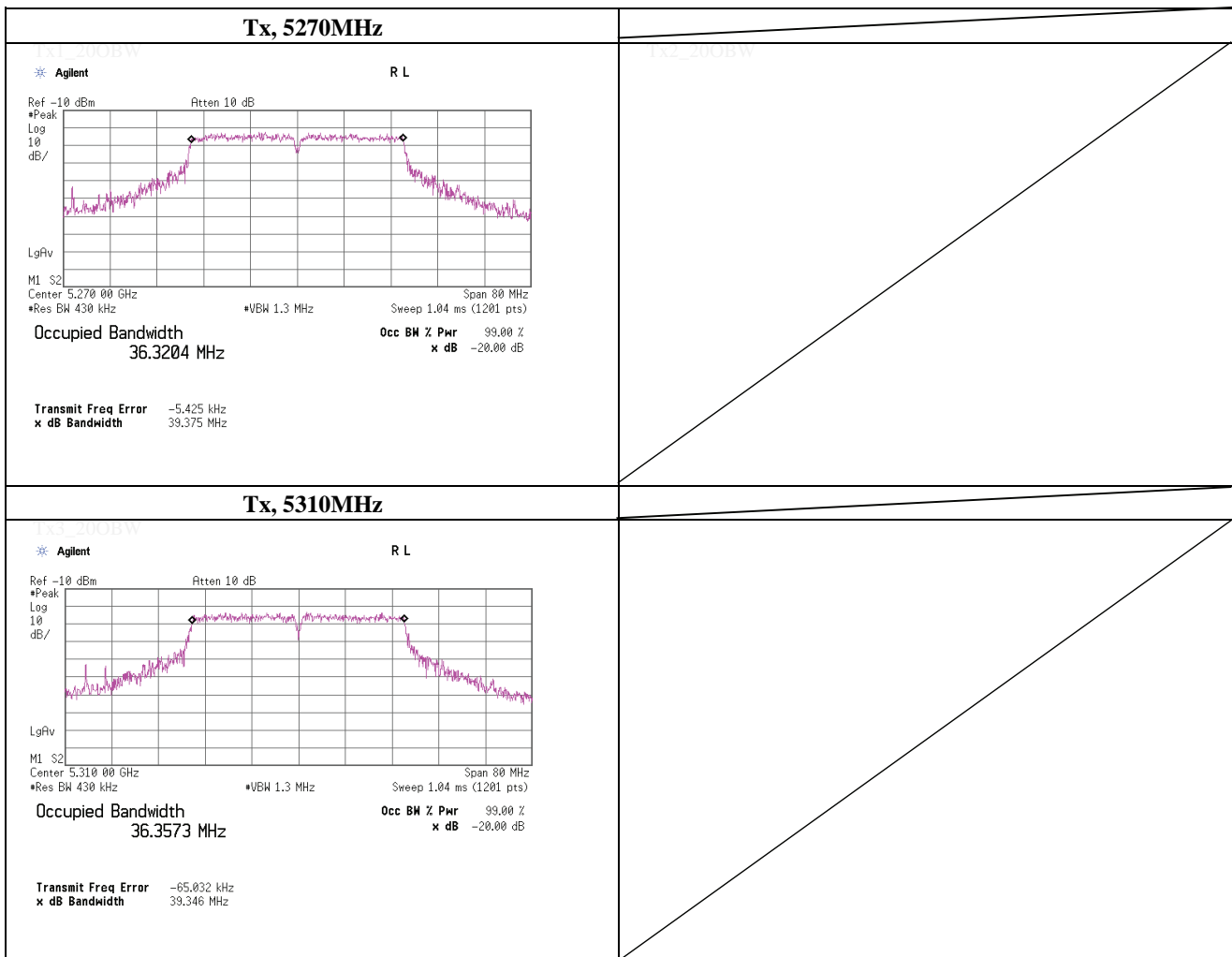


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### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5270.0000	39.375
5310.0000	39.346



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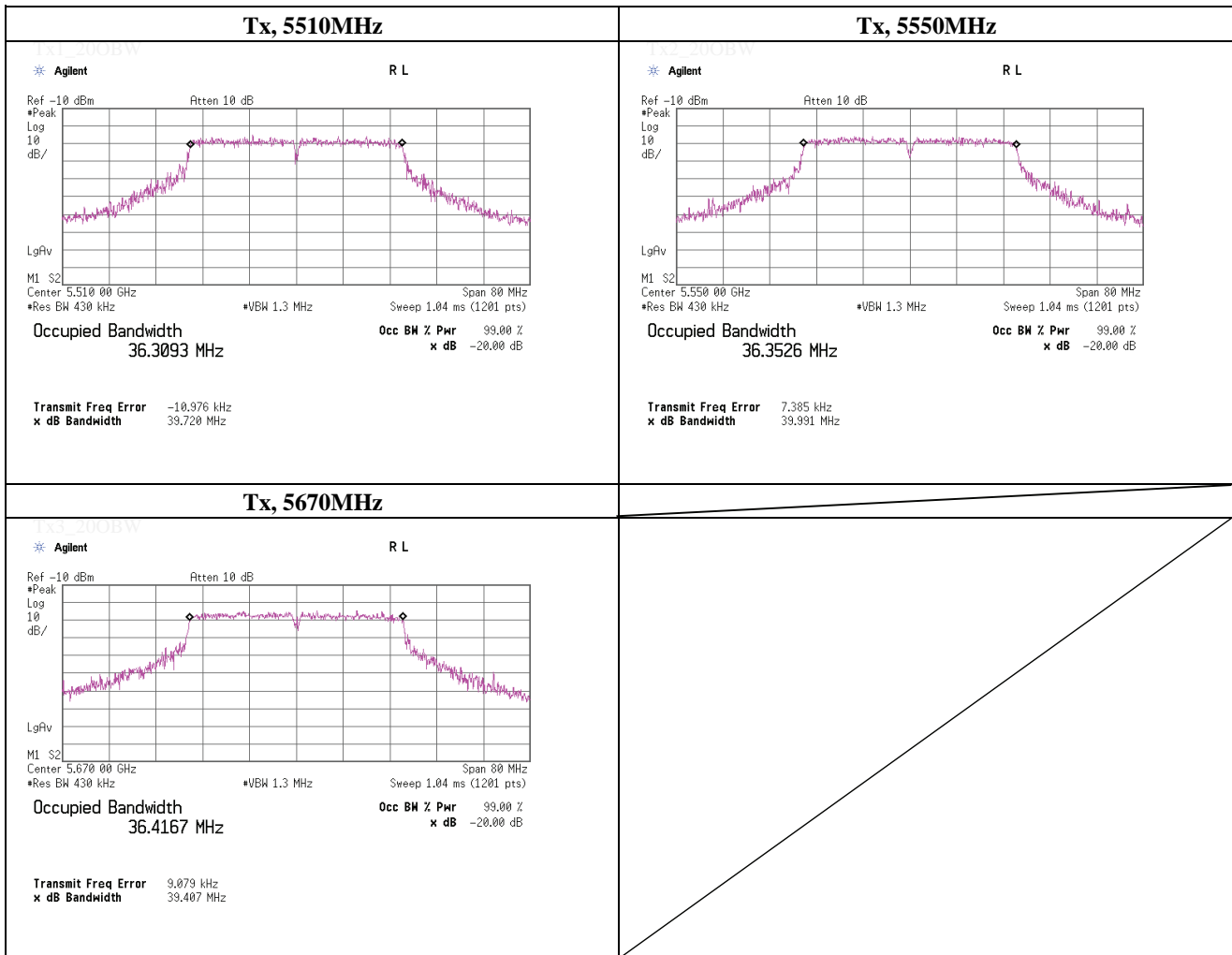
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Facsimile : +81 463 50 6401

### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, worst antenna port 1, worst data mode 0(MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5510.0000	39.720
5550.0000	39.991
5670.0000	39.407



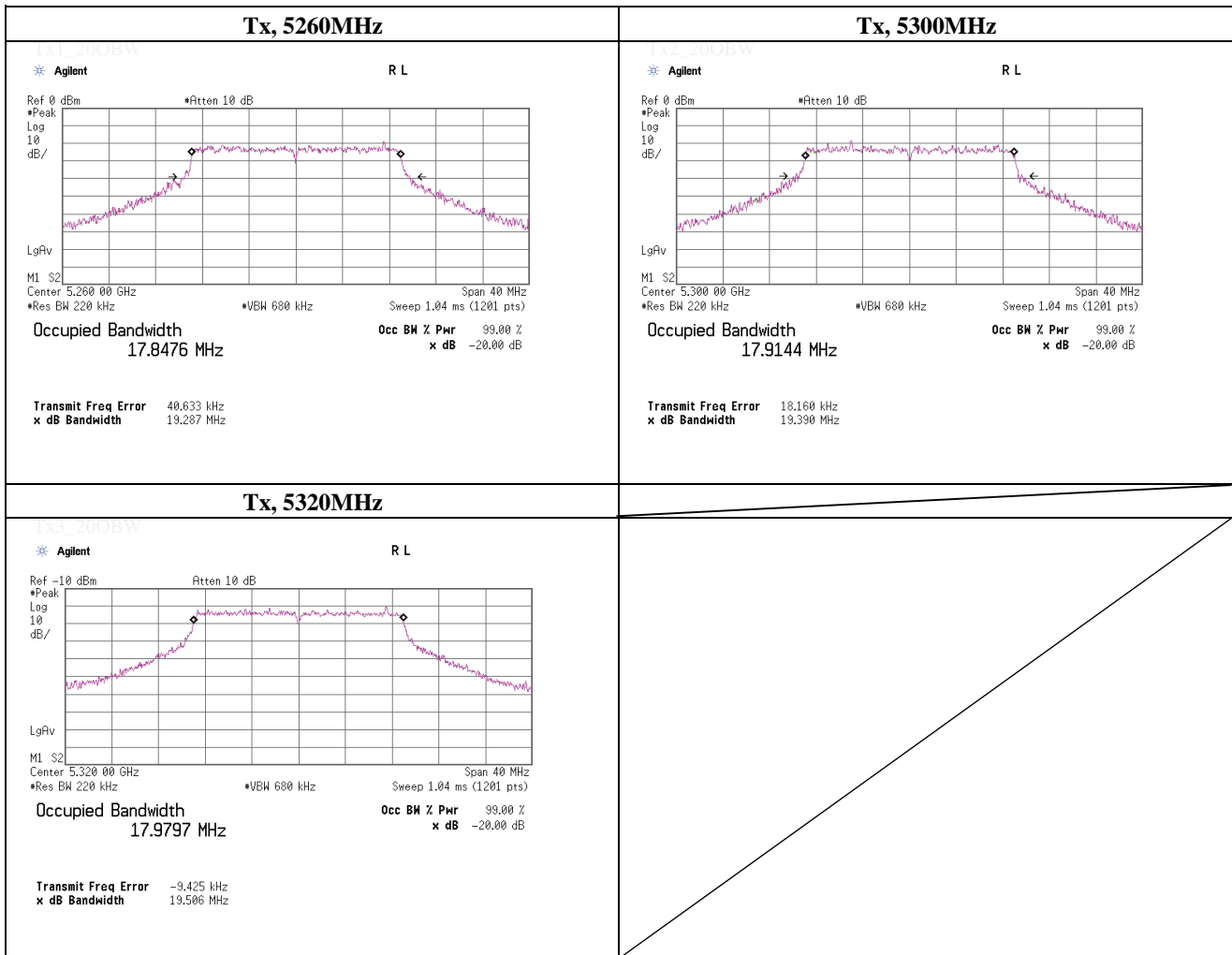




### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	June 18, 2013
Temperature / Humidity	24 deg.C , 52 %RH	24 deg.C , 60 %RH
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

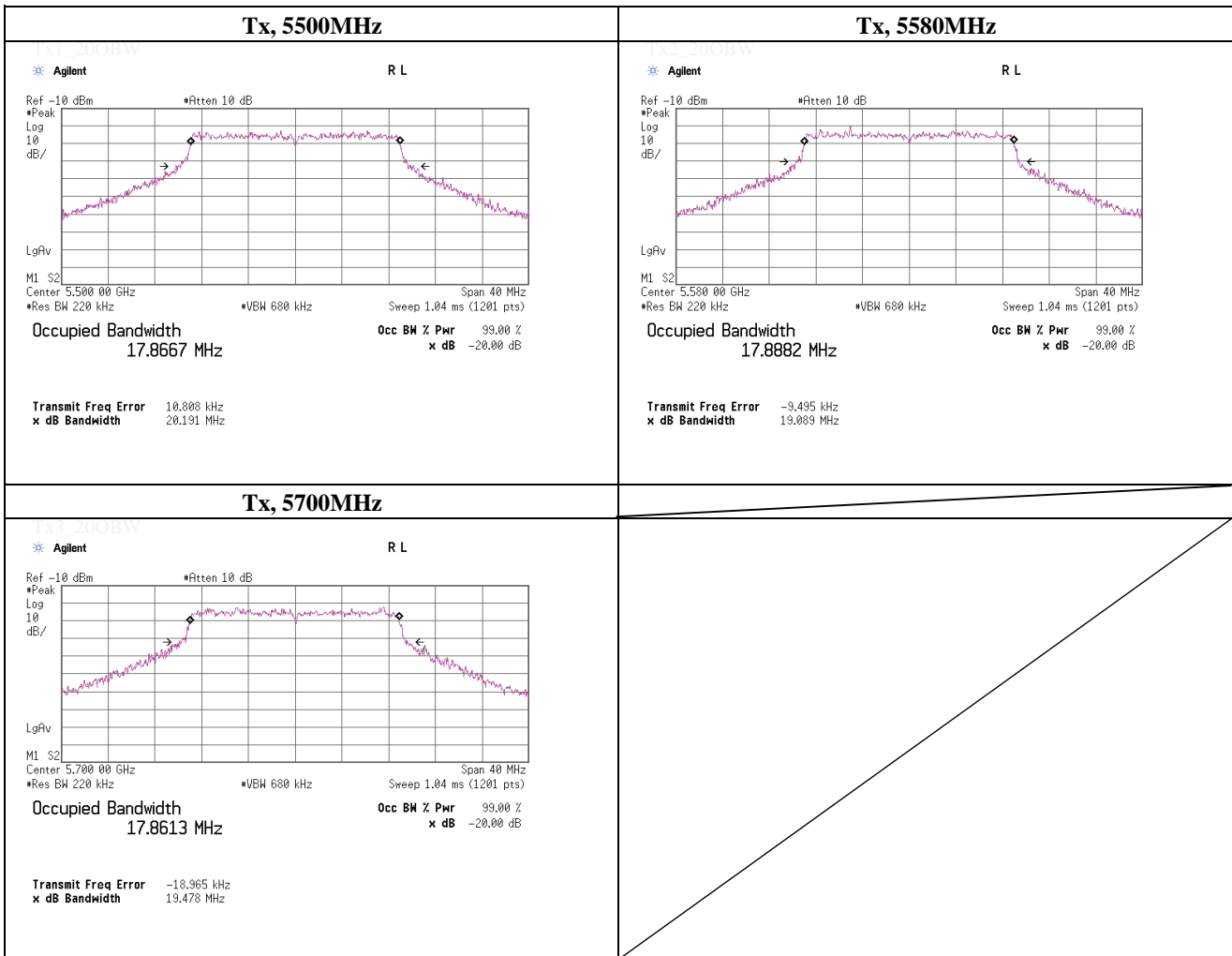
Freq. [MHz]	-20dB Bandwidth [MHz]
5260.0000	19.287
5300.0000	19.390
5320.0000	19.506



## -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	May 13, 2013	
Temperature / Humidity	24 deg.C , 52 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT20), PN9, Antenna port 1, worst data mode 8 (MCS)	

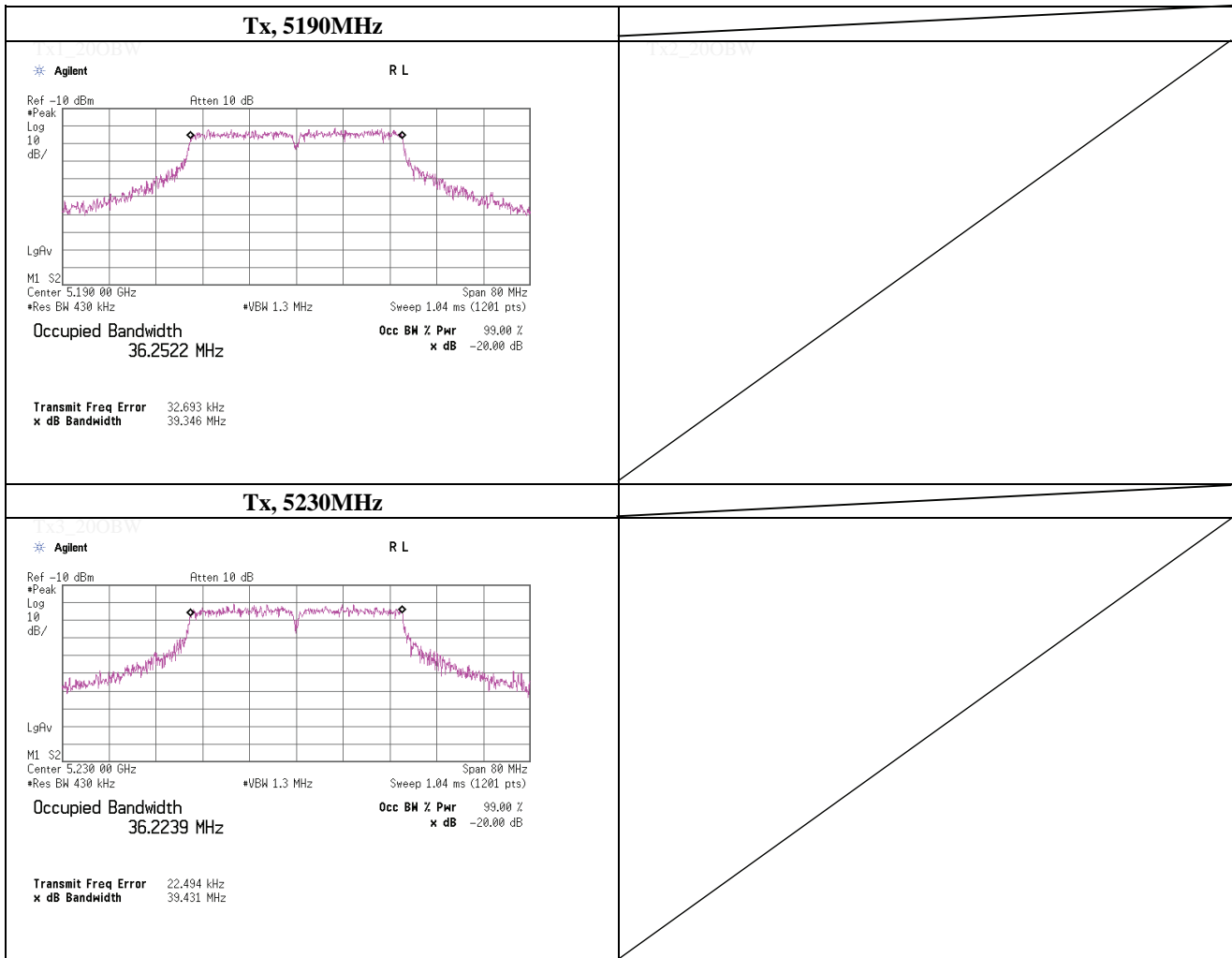
Freq. [MHz]	-20dB Bandwidth [MHz]
5500.0000	20.191
5580.0000	19.089
5700.0000	19.478



### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5190.0000	39.346
5230.0000	39.431



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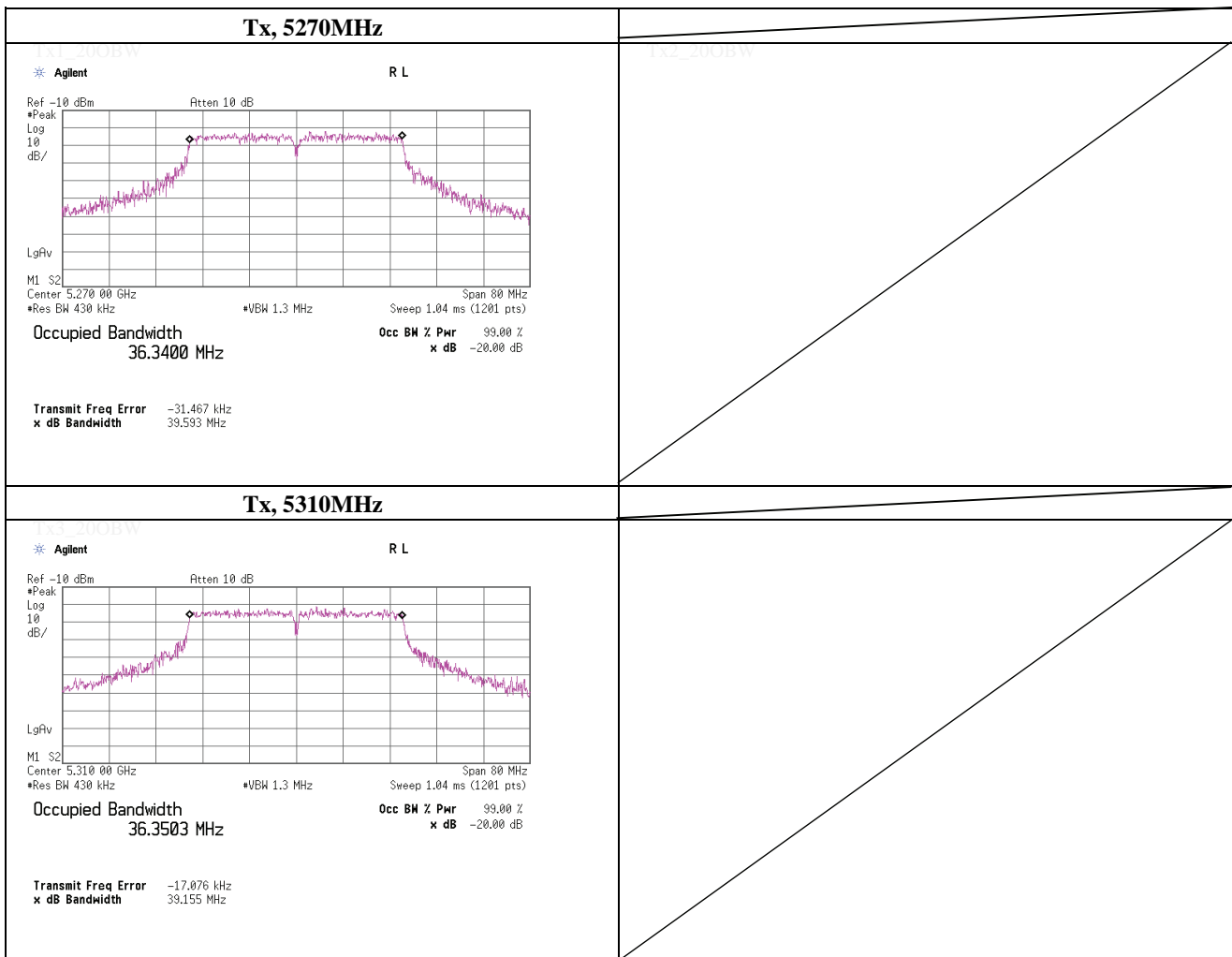
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### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5270.0000	39.593
5310.0000	39.155



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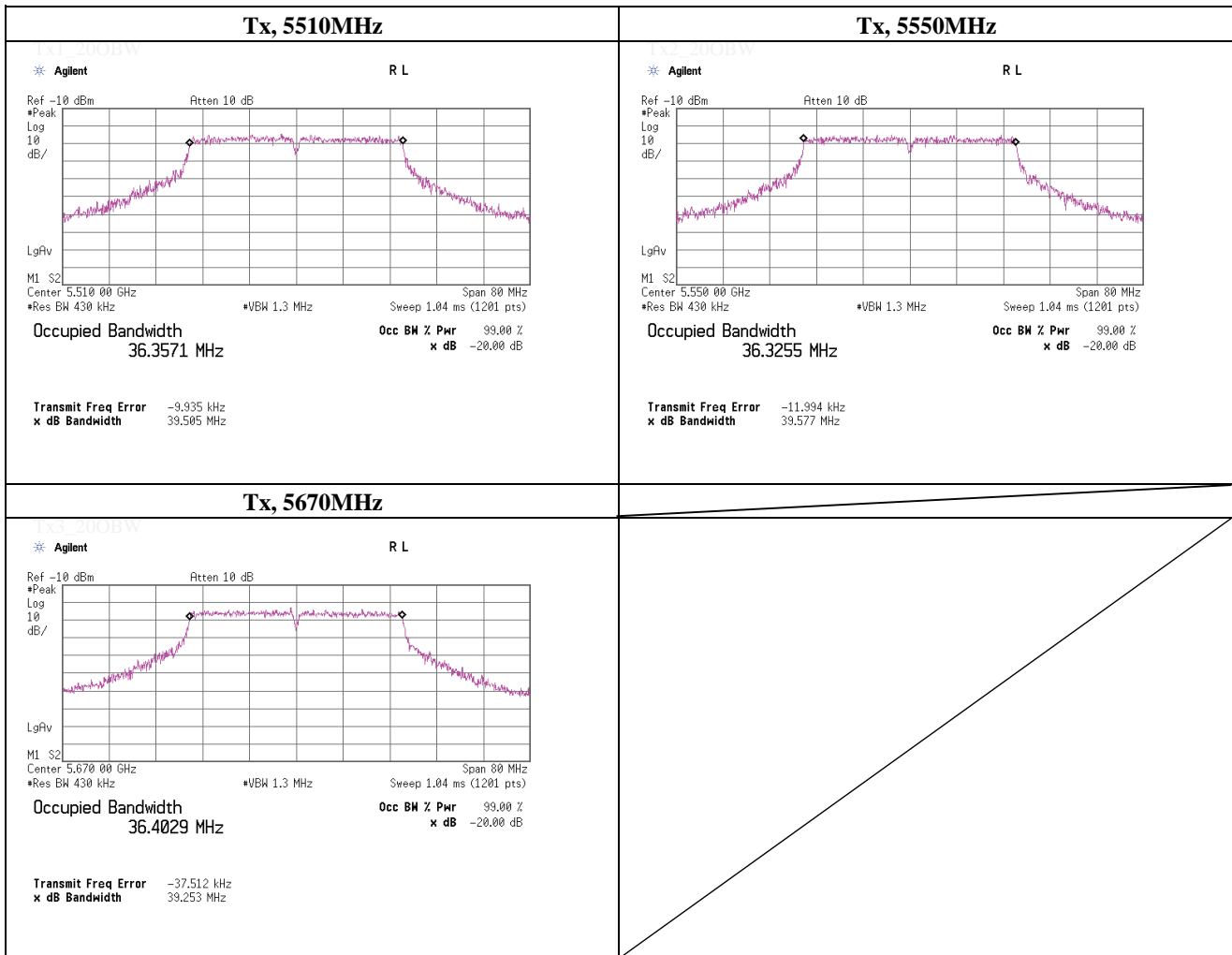
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### -20dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	June 18, 2013	
Temperature / Humidity	24 deg.C , 60 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11n(HT40), PN9, Antenna port 1, worst data mode 10 (MCS)	

Freq. [MHz]	-20dB Bandwidth [MHz]
5510.0000	39.505
5550.0000	39.577
5670.0000	39.253







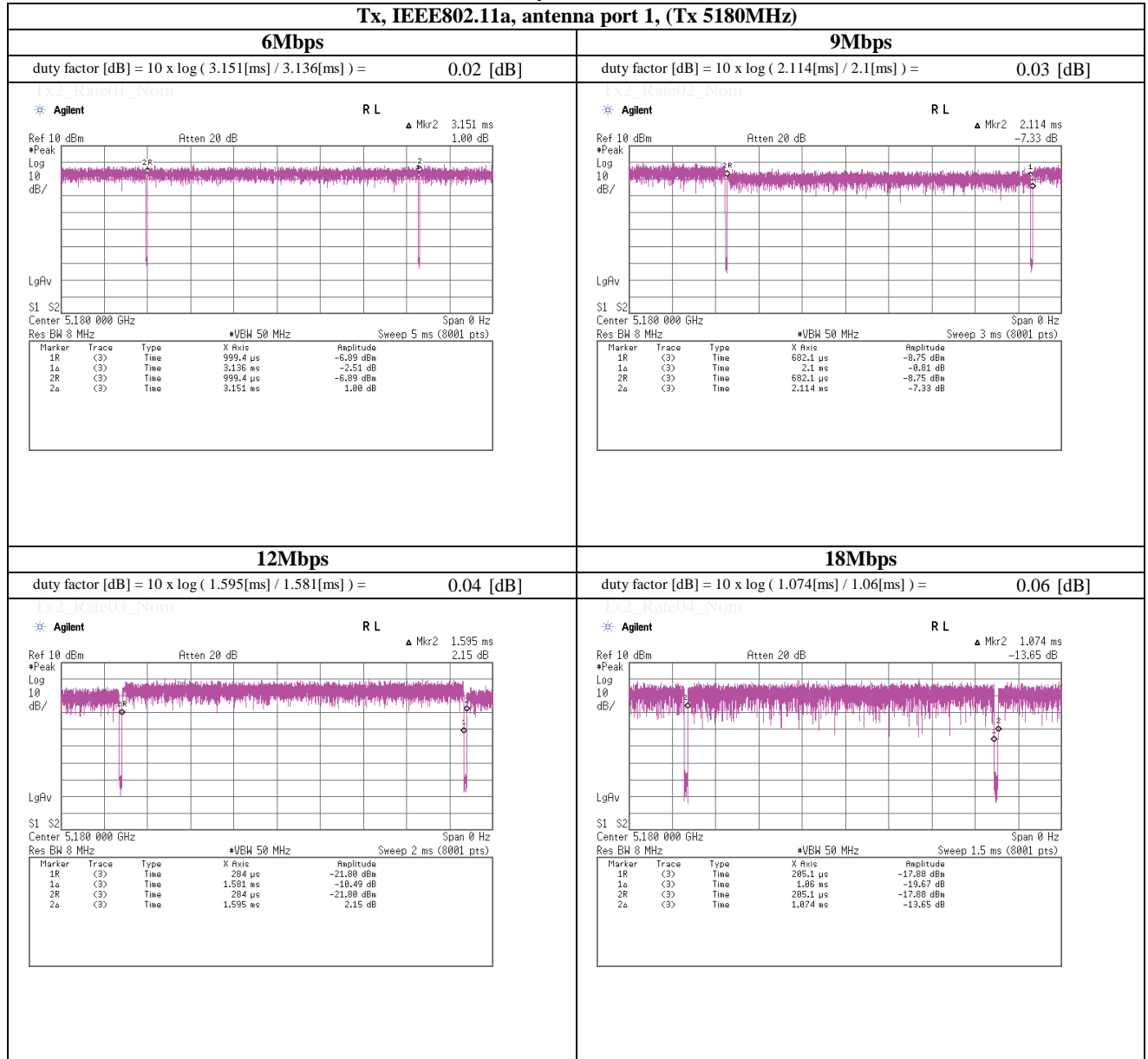




## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11a, antenna port 1, (Tx 5180MHz)**



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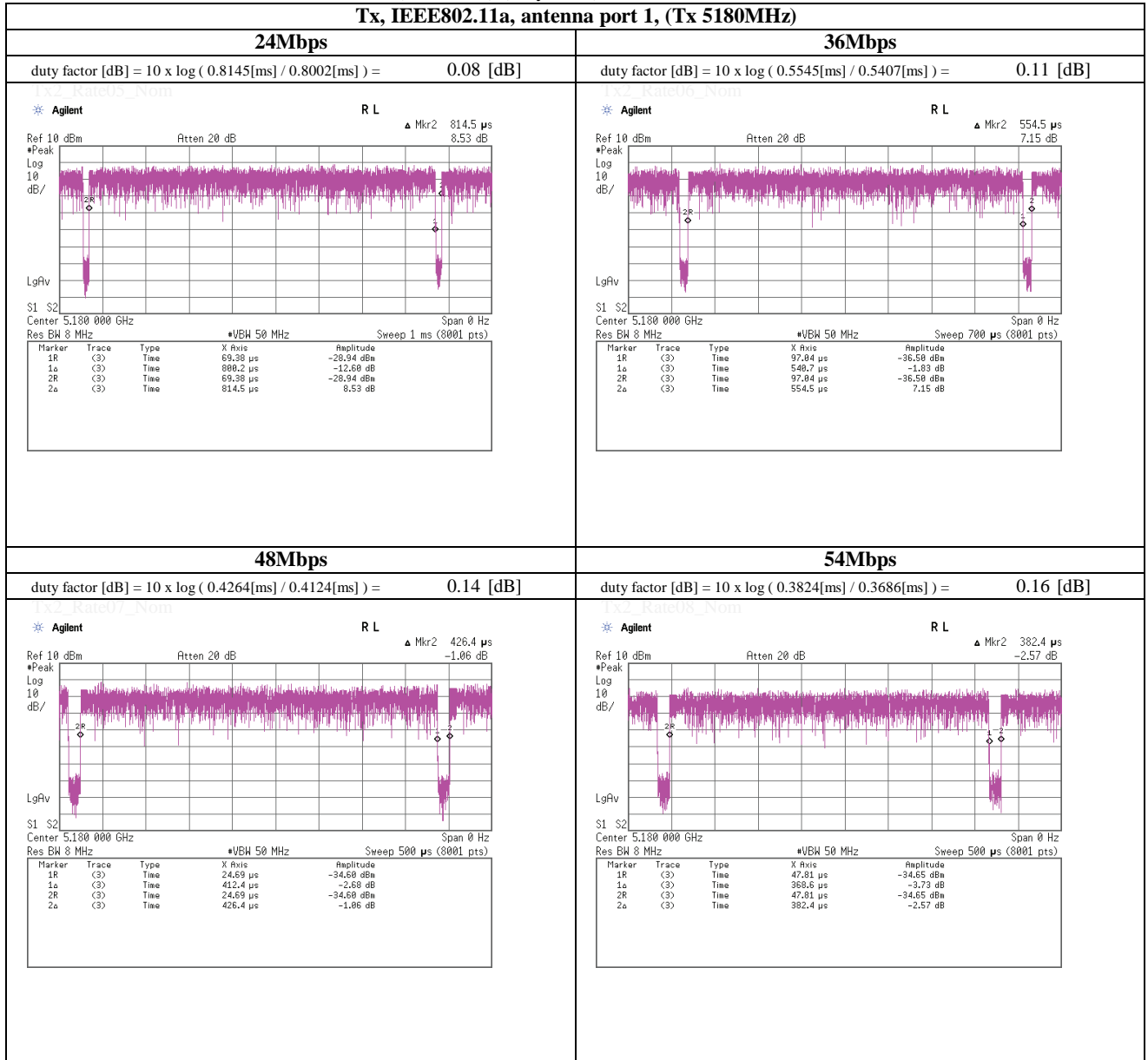
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11a, antenna port 1, (Tx 5180MHz)**



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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT20), PN9, worst antenna : 1 worst data mode : 5 (MCS)

**Antenna terminal power** (\* 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		Limit		Margin [dB]
						[dBm]	[mW]	[dBm]	[mW]	
Low	5180.0	-10.59	2.17	20.10	0.15	11.83	15.24	16.99	50.00	5.16
Mid	5220.0	-10.94	2.17	20.09	0.15	11.47	14.03	16.99	50.00	5.52
High	5240.0	-10.95	2.36	20.09	0.15	11.65	14.62	16.99	50.00	5.34

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
							(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	
Low	5180.0	-10.59	2.17	20.10	0.15	-0.98	10.85	12.16	-	-	-
Mid	5220.0	-10.94	2.17	20.09	0.15	-0.98	10.49	11.19	-	-	-
High	5240.0	-10.95	2.36	20.09	0.15	-0.98	10.67	11.67	-	-	-

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss + Antenna Gain

**[Pre check]****Antenna 1**

	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]
1	0	5180.0	-10.60	2.17	20.10	0.02	11.69
1	1	5180.0	-10.58	2.17	20.10	0.04	11.73
1	2	5180.0	-10.58	2.17	20.10	0.06	11.75
1	3	5180.0	-10.55	2.17	20.10	0.08	11.80
1	4	5180.0	-10.59	2.17	20.10	0.11	11.79
1	5	5180.0	-10.59	2.17	20.10	0.15	11.83
1	6	5180.0	-14.27	2.17	20.10	0.16	8.16
1	7	5180.0	-14.22	2.17	20.10	0.18	8.23

**Worst****Antenna 2**

	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]
2	0	5180.0	-10.62	2.19	20.10	0.02	11.69
2	1	5180.0	-10.64	2.19	20.10	0.04	11.69
2	2	5180.0	-10.65	2.19	20.10	0.06	11.70
2	3	5180.0	-10.67	2.19	20.10	0.08	11.70
2	4	5180.0	-10.78	2.19	20.10	0.11	11.62
2	5	5180.0	-10.74	2.19	20.10	0.15	11.70
2	6	5180.0	-13.28	2.19	20.10	0.16	9.17
2	7	5180.0	-13.56	2.19	20.10	0.18	8.91

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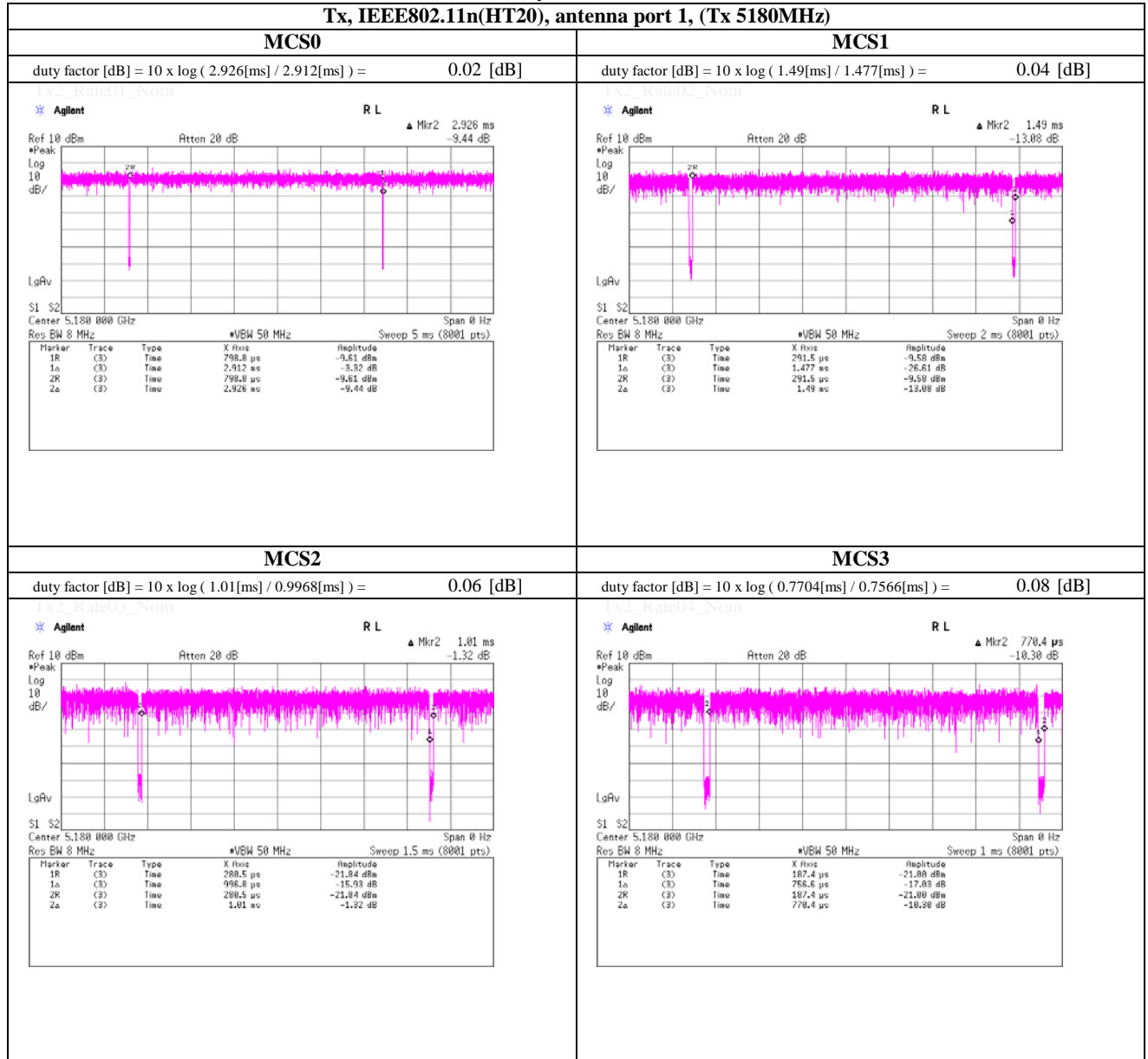




## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT20), antenna port 1, (Tx 5180MHz)**



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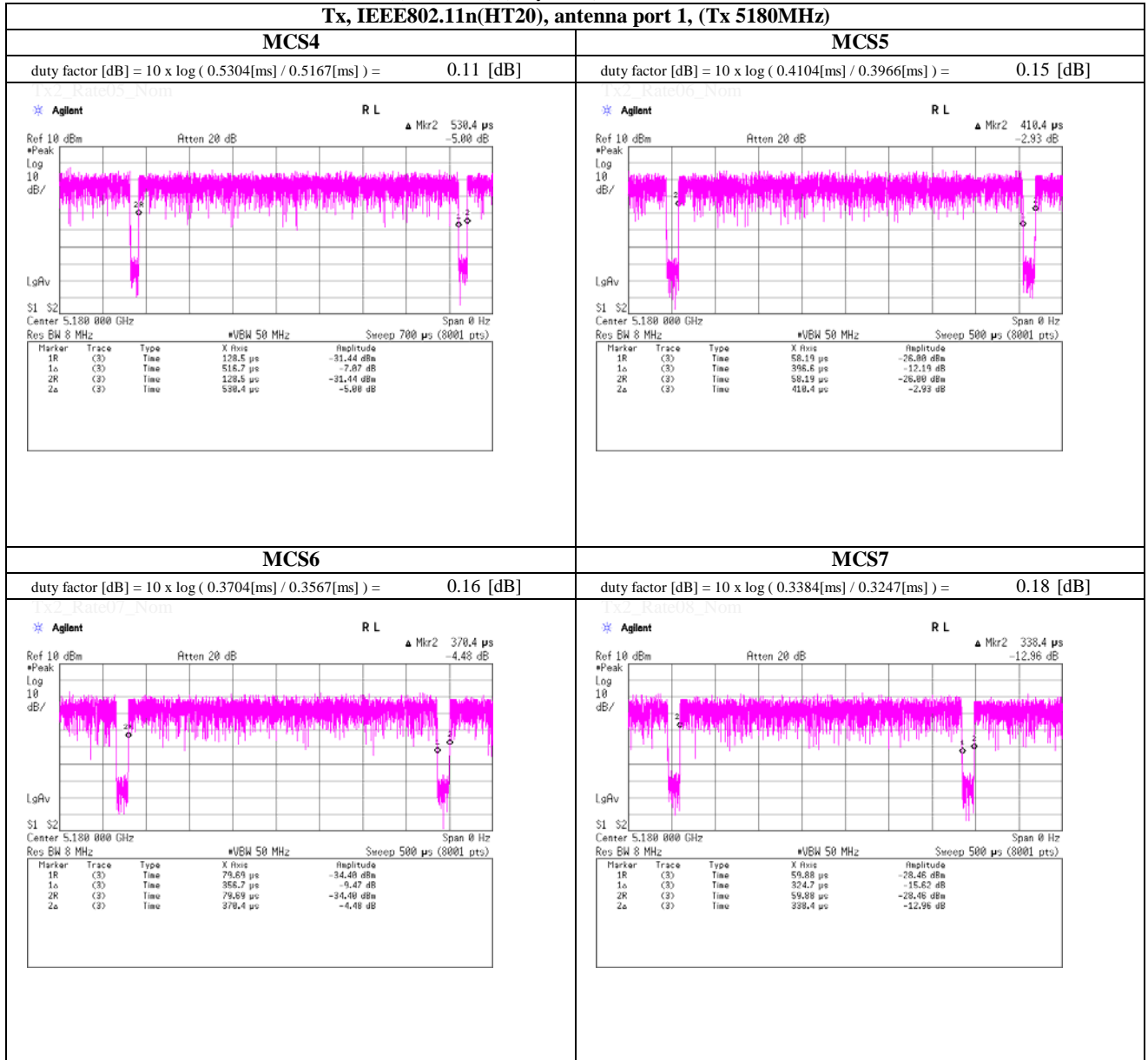
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT20), antenna port 1, (Tx 5180MHz)**



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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT40), PN9, worst antenna : 1 worst data mode : 0 (MCS)

**Antenna terminal power** (\* 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		Limit		Margin [dB]
						[dBm]	[mW]	[dBm]	[mW]	
Low	5190.0	-10.09	2.17	20.09	0.04	12.21	16.63	16.99	50.00	4.78
High	5230.0	-10.21	2.17	20.09	0.04	12.09	16.18	16.99	50.00	4.90

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
							(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	
Low	5190.0	-10.09	2.17	20.09	0.04	-0.98	11.23	13.27	-	-	-
High	5230.0	-10.21	2.17	20.09	0.04	-0.98	11.11	12.91	-	-	-

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss + Antenna Gain

**[Pre check]****Antenna 1**

	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]
	0	5190.0	-10.09	2.17	20.09	0.04	12.21
	1	5190.0	-10.23	2.17	20.09	0.08	12.11
	2	5190.0	-10.25	2.17	20.09	0.11	12.12
	3	5190.0	-10.35	2.17	20.09	0.15	12.06
	4	5190.0	-10.52	2.17	20.09	0.21	11.95
	5	5190.0	-10.57	2.17	20.09	0.26	11.95
	6	5190.0	-14.20	2.17	20.09	0.29	8.35
	7	5190.0	-14.19	2.17	20.09	0.32	8.39

**Worst****Antenna 2**

	Mode (MCS)	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]
	0	5190.0	-10.35	2.19	20.09	0.04	11.97
	1	5190.0	-10.42	2.19	20.09	0.08	11.94
	2	5190.0	-10.51	2.19	20.09	0.11	11.88
	3	5190.0	-10.61	2.19	20.09	0.15	11.82
	4	5190.0	-10.61	2.19	20.09	0.21	11.88
	5	5190.0	-10.72	2.19	20.09	0.26	11.82
	6	5190.0	-13.20	2.19	20.09	0.29	9.37
	7	5190.0	-13.15	2.19	20.09	0.32	9.45

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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT40), PN9, worst antenna : 1 worst data mode : 0 (MCS)

**Antenna terminal power** (\* 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		Limit		Margin [dB]
						[dBm]	[mW]	[dBm]	[mW]	
Low	5510.0	-10.09	2.21	20.07	0.04	12.23	16.71	23.98	250.00	11.75
Mid	5550.0	-12.43	2.22	20.07	0.04	9.90	9.77	23.98	250.00	14.08
High	5670.0	-12.43	2.41	20.08	0.04	10.10	10.23	23.98	250.00	13.88

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
							(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	(e.i.r.p.) [dBm]	(e.i.r.p.) [mW]	
Low	5510.0	-10.09	2.21	20.07	0.04	-0.98	11.25	13.34	-	-	-
Mid	5550.0	-12.43	2.22	20.07	0.04	-0.98	8.92	7.80	-	-	-
High	5670.0	-12.43	2.41	20.08	0.04	-0.98	9.12	8.17	-	-	-

Sample Calculation: Result = Reading + Cable Loss + Atten. Loss + Antenna Gain

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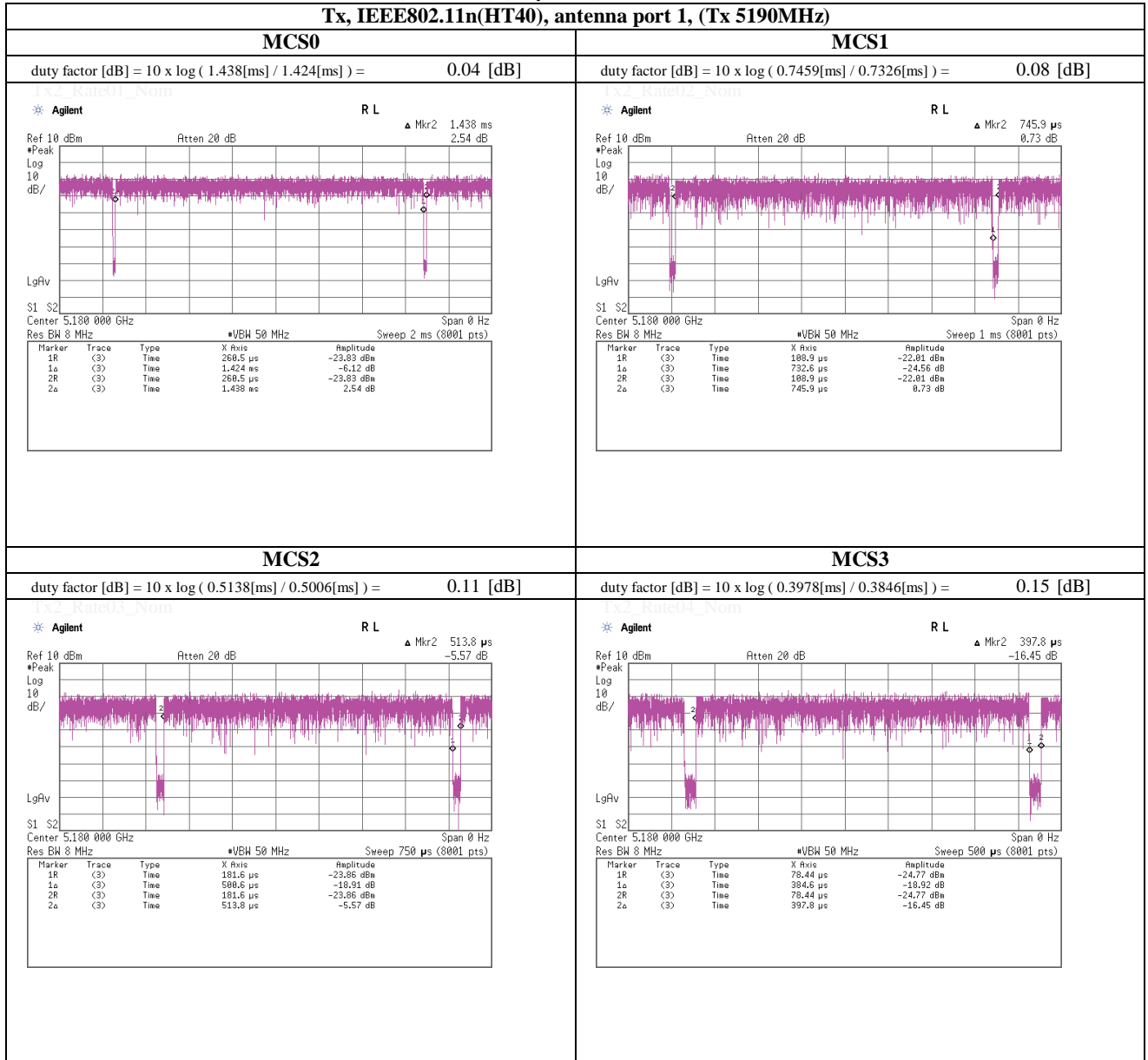
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT40), antenna port 1, (Tx 5190MHz)**



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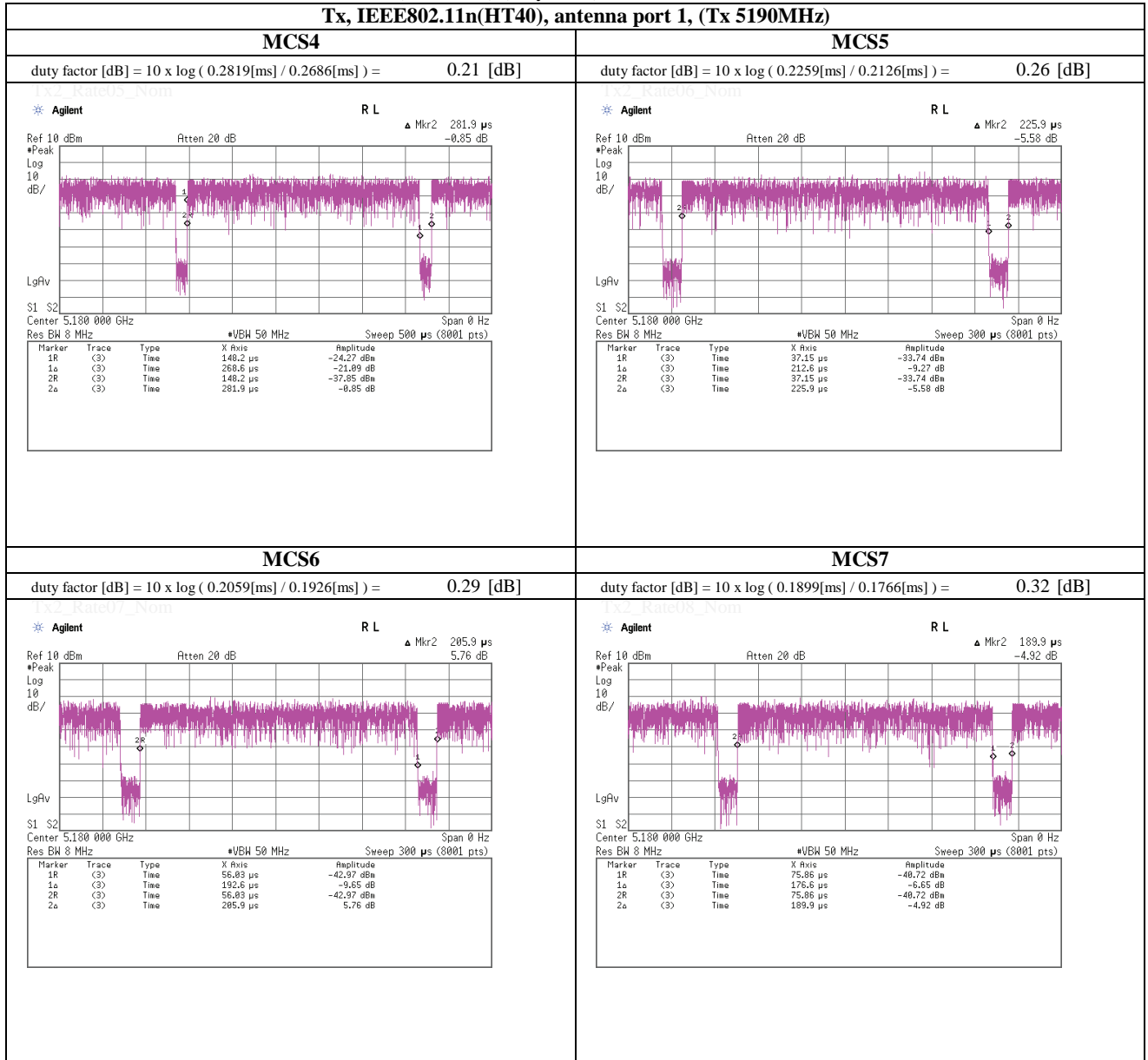
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT40), antenna port 1, (Tx 5190MHz)**



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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT20), PN9, worst data mode : 8 (MCS)

**Antenna 1 + 2**

Ch	Freq. [MHz]	Result (Cond.)		Result (e.i.r.p.)		Limit (Cond.)		Limit (e.i.r.p.)		Margin (Cond.) (e.i.r.p.)	
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dBm]
Low	5260.0	14.54	28.44	13.56	22.69	23.98	250.00	-	-	9.44	-
Mid	5300.0	14.43	27.70	13.45	22.11	23.98	250.00	-	-	9.55	-
High	5320.0	14.57	28.64	13.59	22.85	23.98	250.00	-	-	9.41	-

Sample Calculation: Result [mW] = Antenna 1 Result [mW] + Antenna 2 Result [mW]

**Antenna 1**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5260.0	-10.78	2.36	20.09	0.04	11.71	14.83	-0.98	10.73	11.83
Mid	5300.0	-11.03	2.36	20.09	0.04	11.46	14.00	-0.98	10.48	11.17
High	5320.0	-10.98	2.23	20.08	0.04	11.37	13.71	-0.98	10.39	10.94

**Antenna 2**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5260.0	-10.98	2.19	20.09	0.04	11.34	13.61	-0.98	10.36	10.86
Mid	5300.0	-11.05	2.29	20.09	0.04	11.37	13.71	-0.98	10.39	10.94
High	5320.0	-10.79	2.41	20.08	0.04	11.74	14.93	-0.98	10.76	11.91

Sample Calculation: (Cond.) Result = Reading + Cable Loss + Atten. Loss + Duty factor  
 (e.i.r.p) Result = Reading + Cable Loss + Atten. Loss + Duty factor + Antenna Gain

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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT20), PN9, worst data mode : 8 (MCS)

**Antenna 1 + 2**

Ch	Freq. [MHz]	Result (Cond.)		Result (e.i.r.p.)		Limit (Cond.)		Limit (e.i.r.p.)		Margin (Cond.) (e.i.r.p.)	
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dBm]
Low	5500.0	12.53	17.92	11.55	14.30	23.98	250.00	-	-	11.45	-
Mid	5580.0	13.01	20.00	12.03	15.96	23.98	250.00	-	-	10.97	-
High	5700.0	12.87	19.36	11.89	15.45	23.98	250.00	-	-	11.11	-

Sample Calculation: Result [mW] = Antenna 1 Result [mW] + Antenna 2 Result [mW]

**Antenna 1**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5500.0	-13.14	2.20	20.07	0.04	9.17	8.26	-0.98	8.19	6.59
Mid	5580.0	-12.78	2.23	20.08	0.04	9.57	9.06	-0.98	8.59	7.23
High	5700.0	-12.86	2.29	20.09	0.04	9.56	9.04	-0.98	8.58	7.21

**Antenna 2**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5500.0	-12.71	2.45	20.07	0.04	9.85	9.66	-0.98	8.87	7.71
Mid	5580.0	-12.21	2.48	20.08	0.04	10.39	10.94	-0.98	9.41	8.73
High	5700.0	-12.32	2.33	20.09	0.04	10.14	10.33	-0.98	9.16	8.24

Sample Calculation: (Cond.) Result = Reading + Cable Loss + Atten. Loss + Duty factor

(e.i.r.p) Result = Reading + Cable Loss + Atten. Loss + Duty factor + Antenna Gain

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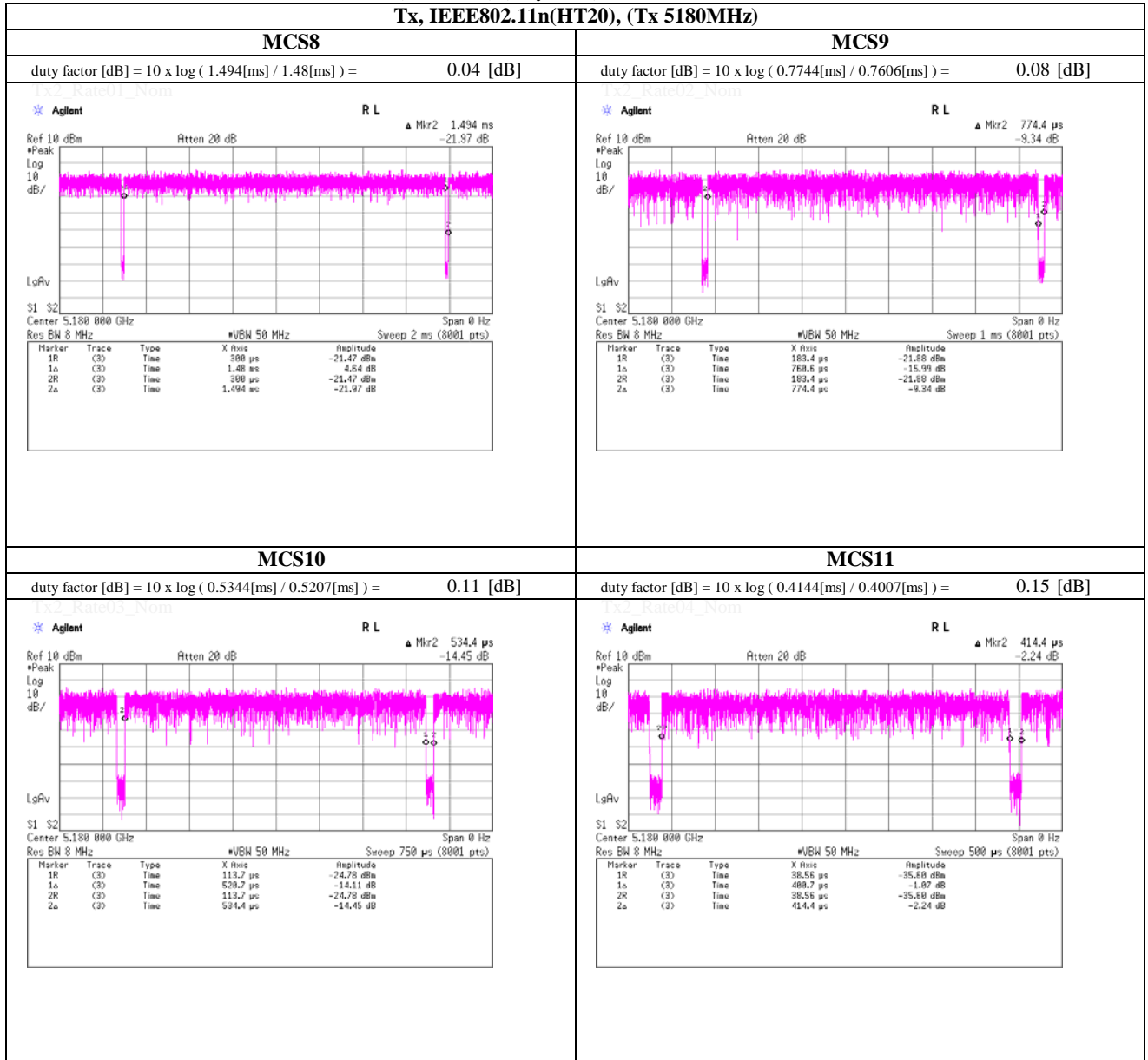
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT20), (Tx 5180MHz)**



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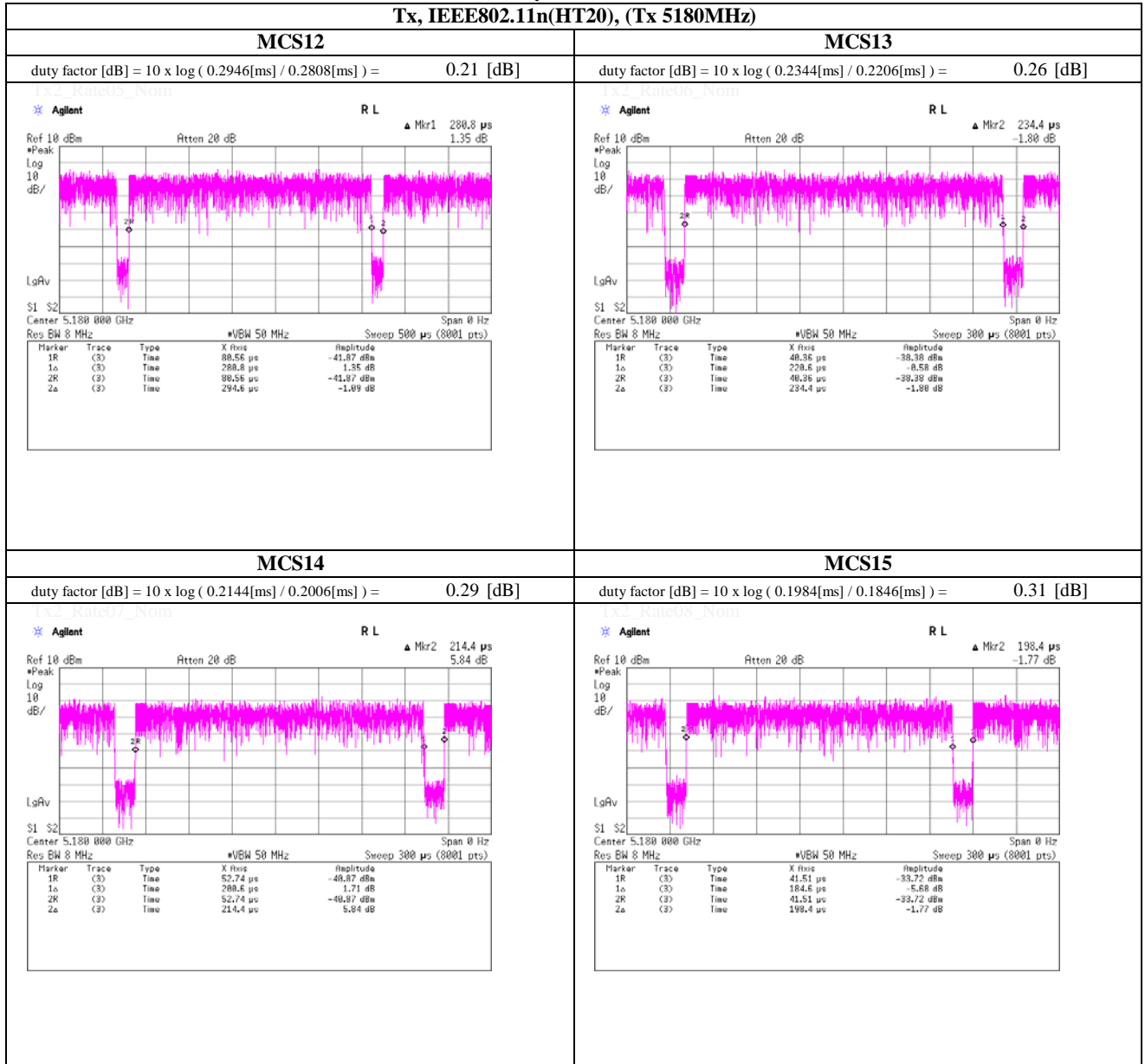
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT20), (Tx 5180MHz)**



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**Shonan EMC Lab.**

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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT40), PN9, worst data mode : 10 (MCS)

**Antenna 1 + 2**

Ch	Freq. [MHz]	Result (Cond.)		Result (e.i.r.p.)		Limit (Cond.)		Limit (e.i.r.p.)		Margin (Cond.) (e.i.r.p.)	
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dBm]
Low	5190.0	15.01	31.71	14.03	25.31	16.99	50.00	-	-	1.98	-
High	5230.0	14.95	31.27	13.97	24.95	16.99	50.00	-	-	2.04	-

Sample Calculation: Result [mW] = Antenna 1 Result [mW] + Antenna 2 Result [mW]

**Antenna 1**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5190.0	-10.34	2.17	20.09	0.21	12.13	16.33	-0.98	11.15	13.03
High	5230.0	-10.59	2.17	20.09	0.21	11.88	15.42	-0.98	10.90	12.30

**Antenna 2**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5190.0	-10.62	2.19	20.09	0.21	11.87	15.38	-0.98	10.89	12.27
High	5230.0	-10.62	2.32	20.09	0.21	12.00	15.85	-0.98	11.02	12.65

Sample Calculation: (Cond.) Result = Reading + Cable Loss + Atten. Loss + Duty factor  
 (e.i.r.p) Result = Reading + Cable Loss + Atten. Loss + Duty factor + Antenna Gain

**[Pre check]**

Mode (MCS)	Freq. [MHz]	Duty factor [dB]	Antenna 1			Antenna 2			Antenna 1 + 2	
			Reading [dBm]	Result [dBm]	[mW]	Reading [dBm]	Result [dBm]	[mW]	Result [dBm]	[mW]
8	5190.0	0.08	-10.31	-10.23	0.09	-10.55	-10.47	0.09	-7.34	0.18
9	5190.0	0.15	-10.33	-10.18	0.10	-10.61	-10.46	0.09	-7.31	0.19
10	5190.0	0.21	-10.34	-10.13	0.10	-10.62	-10.41	0.09	-7.26	0.19
11	5190.0	0.26	-10.44	-10.18	0.10	-10.67	-10.41	0.09	-7.28	0.19
12	5190.0	0.36	-10.57	-10.21	0.10	-10.82	-10.46	0.09	-7.32	0.19
13	5190.0	0.42	-10.66	-10.24	0.09	-10.92	-10.50	0.09	-7.36	0.18
14	5190.0	0.45	-14.41	-13.96	0.04	-13.21	-12.76	0.05	-10.31	0.09
15	5190.0	0.48	-14.35	-13.87	0.04	-13.28	-12.80	0.05	-10.29	0.09

Worst

Sample Calculation: Result = Duty factor + Reading

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**Maximum Conducted Output Power (Conducted)**

(Method: PM)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room  
 Date April 26, 2013  
 Temperature / Humidity 23 deg.C , 45 %RH  
 Engineer Makoto Hosaka  
 Mode Tx, IEEE802.11n(HT40), PN9, worst data mode : 10 (MCS)

**Antenna 1 + 2**

Ch	Freq. [MHz]	Result (Cond.)		Result (e.i.r.p.)		Limit (Cond.)		Limit (e.i.r.p.)		Margin (Cond.) (e.i.r.p.)	
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]	[dBm]	[dBm]
Low	5270.0	14.91	31.00	13.93	24.74	23.98	250.00	-	-	9.07	-
High	5310.0	14.68	29.36	13.70	23.43	23.98	250.00	-	-	9.30	-

Sample Calculation: Result [mW] = Antenna 1 Result [mW] + Antenna 2 Result [mW]

**Antenna 1**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5270.0	-10.58	2.36	20.09	0.21	12.08	16.14	-0.98	11.10	12.88
High	5310.0	-11.12	2.37	20.09	0.21	11.55	14.29	-0.98	10.57	11.40

**Antenna 2**

(\* 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 (Cond.)		Antenna Gain [dBi]	Result (e.i.r.p.)	
						[dBm]	[mW]		[dBm]	[mW]
Low	5270.0	-10.77	2.19	20.09	0.21	11.72	14.86	-0.98	10.74	11.86
High	5310.0	-10.84	2.32	20.09	0.21	11.78	15.07	-0.98	10.80	12.02

Sample Calculation: (Cond.) Result = Reading + Cable Loss + Atten. Loss + Duty factor  
 (e.i.r.p) Result = Reading + Cable Loss + Atten. Loss + Duty factor + Antenna Gain

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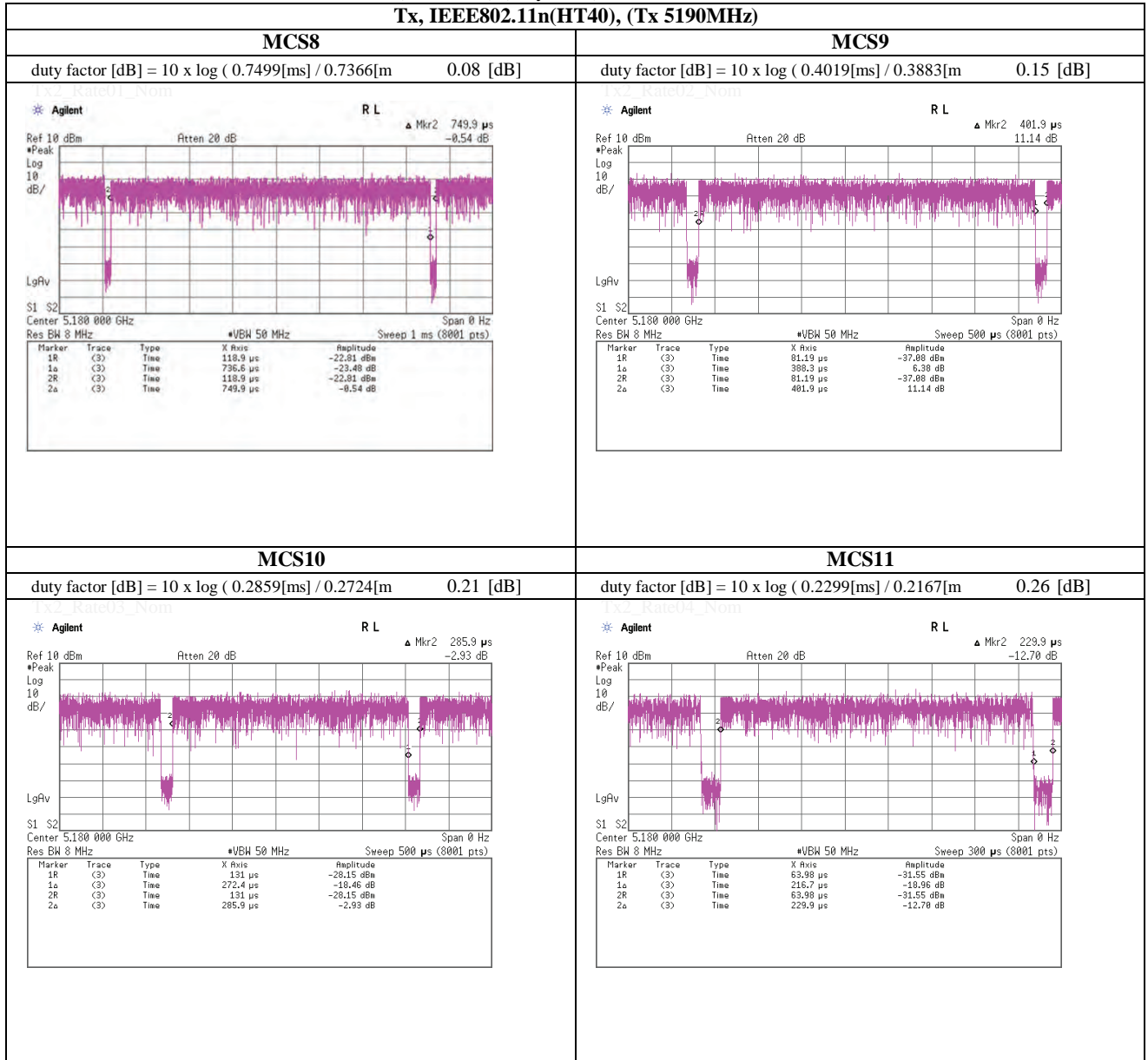
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT40), (Tx 5190MHz)**



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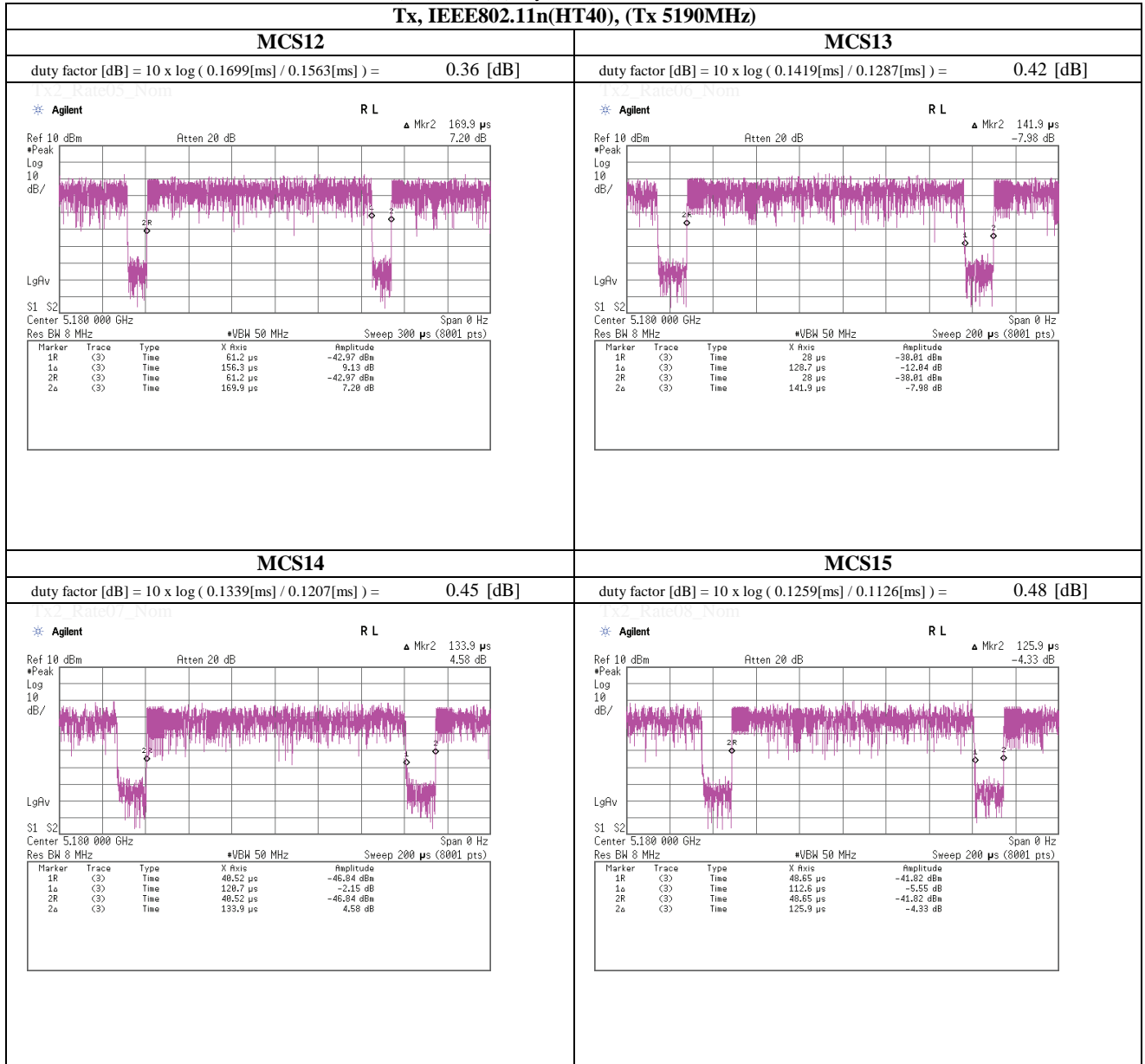
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## Maximum Conducted Output Power (Conducted)

(Reference) (duty chart)

**Tx, IEEE802.11n(HT40), (Tx 5190MHz)**



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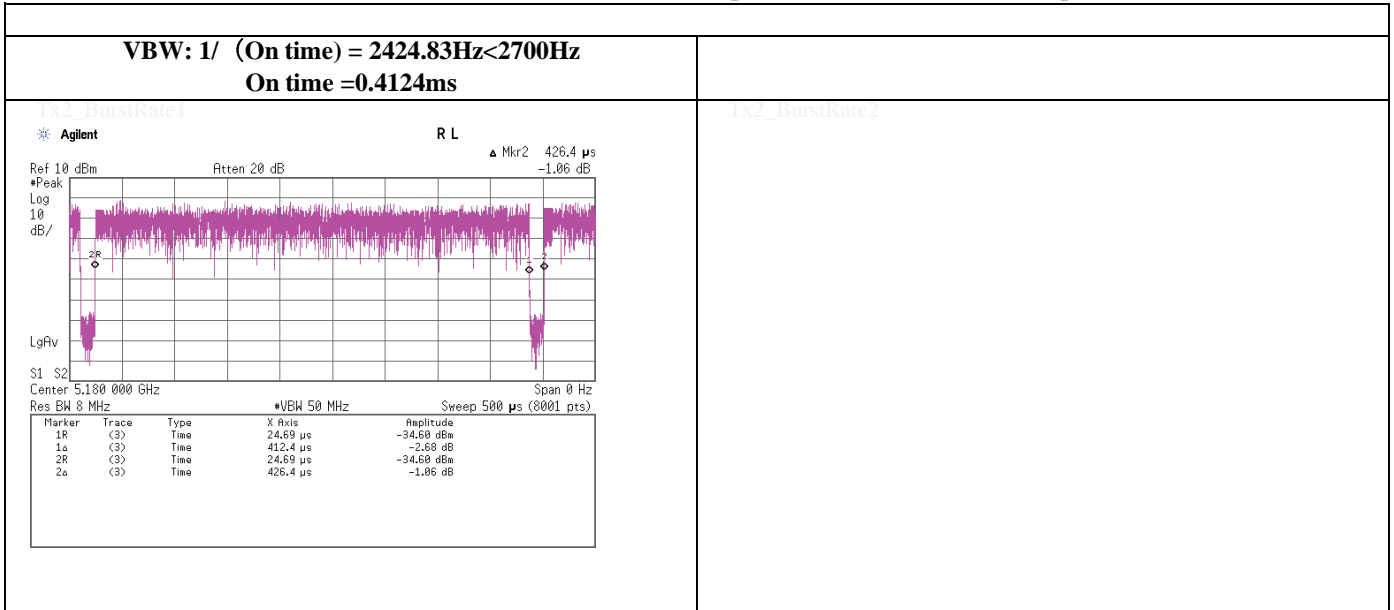
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## VBW (Average) Calculation & Duty chart

**Tx, IEEE802.11a, PN9, worst antenna port 2, worst data mode 48Mbps**



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**Shonan EMC Lab.**

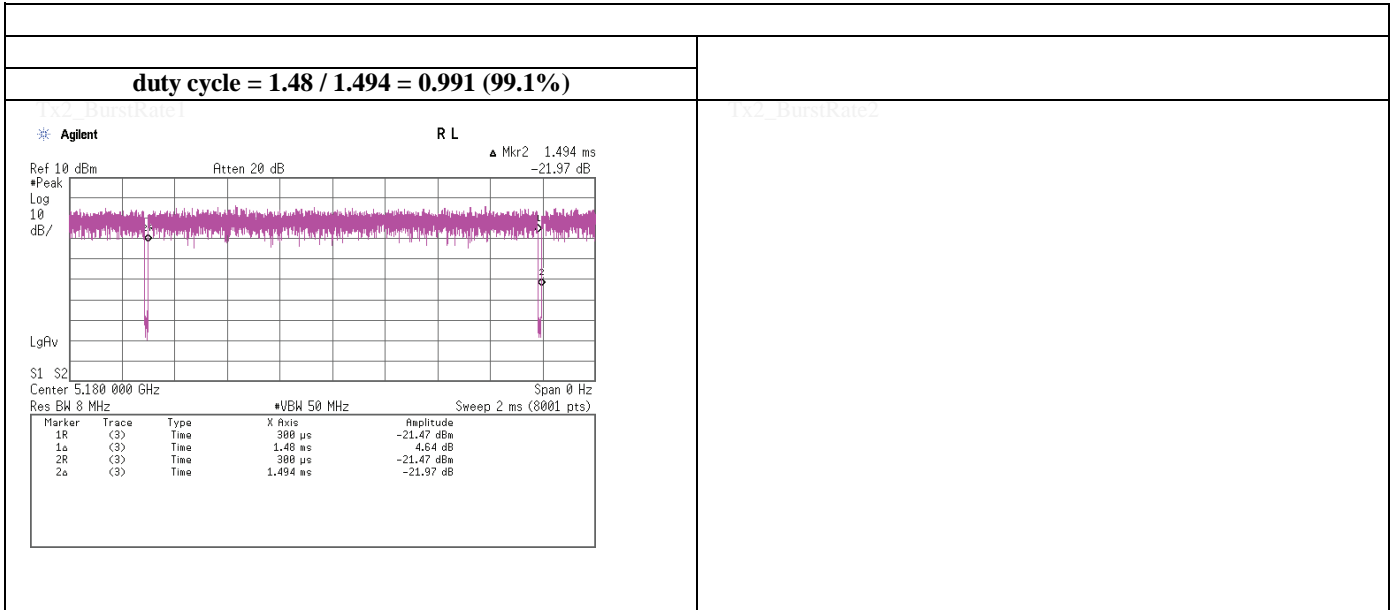
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## Burst rate confirmation

**Tx, IEEE802.11n(HT20), PN9, worst data mode 8 (MCS)**



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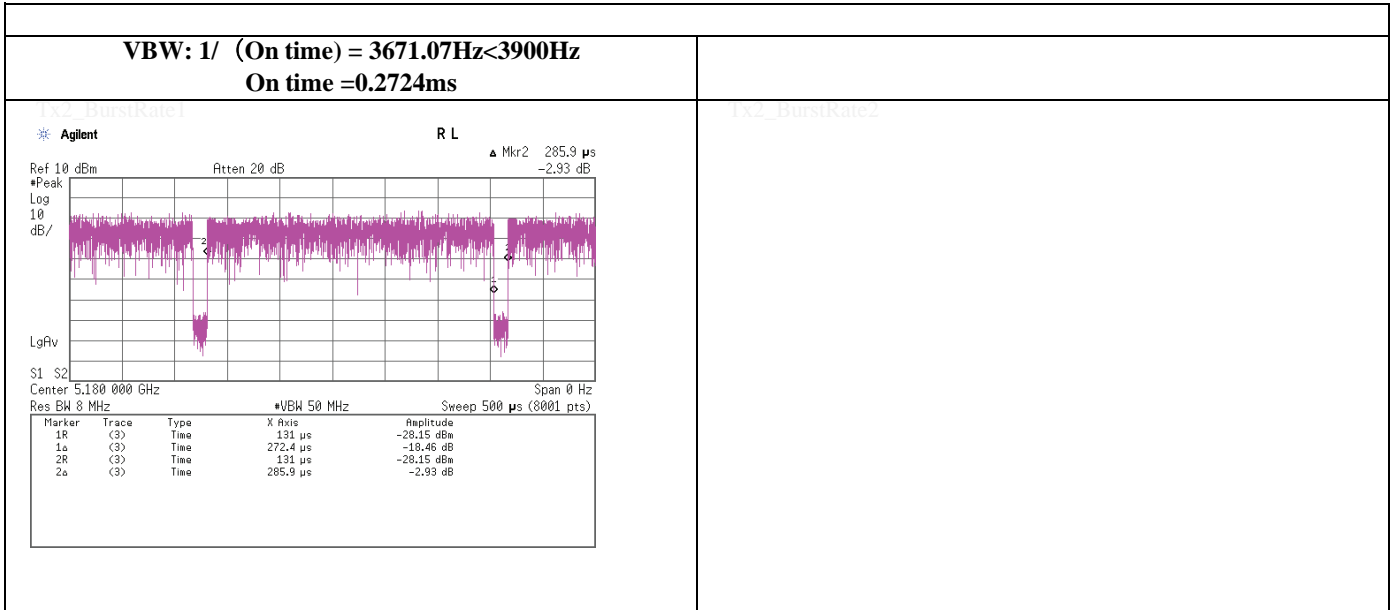
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## VBW (Average) Calculation & Duty chart

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



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Revised date: June 18, 2013

## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5180 MHz Tx, IEEE802.11a			

### (above 1GHz Inside of the restricted band)

(\* 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.	5150.000	PK	45.1	31.5	16.8	37.2	56.2	73.9	17.7	100	102	VBW:2.7kHz
Hori.	5150.000	AV	32.2	31.5	16.8	37.2	43.3	53.9	10.6	100	102	
Vert.	5150.000	PK	46	31.5	16.8	37.2	57.1	73.9	16.8	100	7	
Vert.	5150.000	AV	32	31.5	16.8	37.2	43.1	53.9	10.8	100	7	

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3453.330	PK	47.1	28.9	15.5	38.1	53.4	-41.83	-27.00	14.8	100	335	
Hori.	6906.670	PK	47.7	35.8	8.1	39.2	52.4	-42.83	-27.00	15.8	100	10	
Hori.	10360.000	PK	43.3	38.8	9.6	37.9	53.8	-41.43	-27.00	14.4	100	34	
Vert.	3453.330	PK	45.9	28.9	15.5	38.1	52.2	-43.03	-27.00	16.0	100	276	
Vert.	6906.670	PK	49.1	35.8	8.1	39.2	53.8	-41.43	-27.00	14.4	141	68	
Vert.	10360.000	PK	43.9	38.8	9.6	37.9	54.4	-40.83	-27.00	13.8	100	208	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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Revised date: June 18, 2013

## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5240 MHz Tx, IEEE802.11a			

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3493.330	PK	45.8	29	15.5	38.1	52.2	-43.03	-27.00	16.0	100	340	
Hori.	6986.670	PK	48.6	36	8.2	39.2	53.6	-41.63	-27.00	14.6	148	8	
Hori.	10480.000	PK	43.7	38.8	9.7	37.9	54.3	-40.93	-27.00	13.9	100	226	
Vert.	3493.330	PK	46.9	29	15.5	38.1	53.3	-41.93	-27.00	14.9	111	358	
Vert.	6986.670	PK	48.2	36	8.2	39.2	53.2	-42.03	-27.00	15.0	116	93	
Vert.	10480.000	PK	45.5	38.8	9.7	37.9	56.1	-39.13	-27.00	12.1	158	286	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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Revised date: June 18, 2013

## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5320 MHz Tx, IEEE802.11a			

### (below 1GHz and above 1GHz Inside of the restricted band)

(\* 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.	299.162	QP	35.2	18.9	11	31.7	33.4	46	12.6	133	19	
Hori.	335.982	QP	48.7	14.9	7.6	31.6	39.6	46	6.4	100	41	
Hori.	897.651	QP	32	22.9	10.2	30.9	34.2	46	11.8	179	256	
Hori.	5350.000	PK	43.9	31.6	17	37.2	55.3	73.9	18.6	100	17	
Hori.	10640.000	PK	43.4	39.1	9.7	38	54.2	73.9	19.7	118	12	
Hori.	5350.000	AV	31.8	31.6	17	37.2	43.2	53.9	10.7	100	17	VBW:2.7kHz
Hori.	10640.000	AV	31.1	39.1	9.7	38	41.9	53.9	12.0	118	12	VBW:2.7kHz
Vert.	70.370	QP	41.7	6.7	7.4	31.9	23.9	40	16.1	100	291	
Vert.	99.754	QP	43.4	10.6	8.1	31.9	30.2	43.5	13.3	100	52	
Vert.	199.767	QP	33.6	16.9	9.4	31.8	28.1	43.5	15.4	100	62	
Vert.	5350.000	PK	44.8	31.6	17	37.2	56.2	73.9	17.7	100	0	
Vert.	10640.000	PK	44.2	39.1	9.7	38	55	73.9	18.9	100	357	
Vert.	5350.000	AV	31.6	31.6	17	37.2	43	53.9	10.9	100	0	VBW:2.7kHz
Vert.	10640.000	AV	31.8	39.1	9.7	38	42.6	53.9	11.3	100	357	VBW:2.7kHz

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3546.670	PK	45.2	29.1	15.5	38.1	51.7	-43.53	-27.00	16.5	100	343	
Hori.	7093.330	PK	47.6	36.1	8.3	39.3	52.7	-42.53	-27.00	15.5	100	4	
Vert.	3546.670	PK	45.4	29.1	15.5	38.1	51.9	-43.33	-27.00	16.3	100	6	
Vert.	7093.330	PK	48.1	36.1	8.3	39.3	53.2	-42.03	-27.00	15.0	100	286	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] } ^ 2 ) / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5500 MHz Tx, IEEE802.11a			

### (above 1GHz Inside of the restricted band)

(\* 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.	3666.670	PK	45.5	29.2	15.7	38	52.4	73.9	21.5	109	343	
Hori.	7333.330	PK	47.6	36.3	8.4	39.6	52.7	73.9	21.2	135	30	
Hori.	11000.000	PK	43.6	39.8	9.7	38.1	55	73.9	18.9	100	0	
Hori.	3666.670	AV	31.8	29.2	15.7	38	38.7	53.9	15.2	109	343	VBW:10Hz
Hori.	7333.330	AV	36.6	36.3	8.4	39.6	41.7	53.9	12.2	135	30	VBW:10Hz
Hori.	11000.000	AV	31.5	39.8	9.7	38.1	42.9	53.9	11.0	100	0	VBW:2.7kHz
Vert.	3666.670	PK	44.3	29.2	15.7	38	51.2	73.9	22.7	112	6	
Vert.	7333.330	PK	47.6	36.3	8.4	39.6	52.7	73.9	21.2	100	89	
Vert.	11000.000	PK	43.3	39.8	9.7	38.1	54.7	73.9	19.2	100	0	
Vert.	3666.670	AV	31.2	29.2	15.7	38	38.1	53.9	15.8	112	6	VBW:10Hz
Vert.	7333.330	AV	39	36.3	8.4	39.6	44.1	53.9	9.8	100	89	VBW:10Hz
Vert.	11000.000	AV	30.6	39.8	9.7	38.1	42	53.9	11.9	100	0	VBW:2.7kHz

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5470.000	PK	43	31.7	17.1	37.3	54.5	-40.73	-27.00	13.7	100	5	
Vert.	5470.000	PK	43	31.7	17.1	37.3	54.5	-40.73	-27.00	13.7	100	358	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5580 MHz Tx, IEEE802.11a			

### (above 1GHz Inside of the restricted band)

(\* 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.	3720.000	PK	45	29.3	15.7	38	52	73.9	21.9	100	346	
Hori.	7440.000	PK	47.8	36.3	8.4	39.7	52.8	73.9	21.1	107	310	
Hori.	11160.000	PK	43.8	39.8	9.7	38.3	55	73.9	18.9	100	0	
Hori.	3720.000	AV	31.3	29.3	15.7	38	38.3	53.9	15.6	100	346	VBW:10Hz
Hori.	7440.000	AV	36.9	36.3	8.4	39.7	41.9	53.9	12.0	107	310	VBW:10Hz
Hori.	11160.000	AV	31.4	39.8	9.7	38.3	42.6	53.9	11.3	100	0	VBW:2.7kHz
Vert.	3720.000	PK	43.7	29.3	15.7	38	50.7	73.9	23.2	100	359	
Vert.	7440.000	PK	47.9	36.3	8.4	39.7	52.9	73.9	21.0	100	92	
Vert.	11160.000	PK	44.4	39.8	9.7	38.3	55.6	73.9	18.3	100	307	
Vert.	3720.000	AV	31.1	29.3	15.7	38	38.1	53.9	15.8	100	359	VBW:10Hz
Vert.	7440.000	AV	38.7	36.3	8.4	39.7	43.7	53.9	10.2	100	92	VBW:10Hz
Vert.	11160.000	AV	31.4	39.8	9.7	38.3	42.6	53.9	11.3	100	307	VBW:2.7kHz

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

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

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

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

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**Radiated Emission**

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5700 MHz Tx, IEEE802.11a			

**(above 1GHz Inside of the restricted band)**

(\* 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.	3800.000	PK	45.1	29.3	15.8	37.9	52.3	73.9	21.6	108	349	
Hori.	7600.000	PK	46.9	36.5	8.6	39.6	52.4	73.9	21.5	111	309	
Hori.	11400.000	PK	44.3	39.8	9.8	38.7	55.2	73.9	18.7	100	359	
Hori.	3800.000	AV	30.9	29.3	15.8	37.9	38.1	53.9	15.8	108	349	VBW:10Hz
Hori.	7600.000	AV	35.9	36.5	8.6	39.6	41.4	53.9	12.5	111	309	VBW:10Hz
Hori.	11400.000	AV	31.4	39.8	9.8	38.7	42.3	53.9	11.6	100	359	VBW:2.7kHz
Vert.	3800.000	PK	44.7	29.3	15.8	37.9	51.9	73.9	22.0	100	296	
Vert.	7600.000	PK	46.5	36.5	8.6	39.6	52	73.9	21.9	100	358	
Vert.	11400.000	PK	44.2	39.8	9.8	38.7	55.1	73.9	18.8	127	355	
Vert.	3800.000	AV	30.7	29.3	15.8	37.9	37.9	53.9	16.0	100	296	VBW:10Hz
Vert.	7600.000	AV	35.7	36.5	8.6	39.6	41.2	53.9	12.7	100	358	VBW:10Hz
Vert.	11400.000	AV	31.7	39.8	9.8	38.7	42.6	53.9	11.3	127	355	VBW:2.7kHz

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

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

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

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

**(Calculation) (above 1GHz Outside of the restricted band)**

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5725.000	PK	44.1	32.3	17.1	37.7	55.8	-39.43	-27.00	12.4	100	33	
Vert.	5725.000	PK	43.8	32.3	17.1	37.7	55.5	-39.73	-27.00	12.7	124	0	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5180 MHz Tx, IEEE802.11n HT20			

### (above 1GHz Inside of the restricted band)

(\* 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.	5150.000	PK	44	31.5	16.8	37.2	55.1	73.9	18.8	114	352	
Hori.	5150.000	AV	29.8	31.5	16.8	37.2	40.9	53.9	13.0	114	352	VBW:10Hz
Vert.	5150.000	PK	43.3	31.5	16.8	37.2	54.4	73.9	19.5	100	260	
Vert.	5150.000	AV	29.9	31.5	16.8	37.2	41	53.9	12.9	100	260	VBW:10Hz

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3453.330	PK	45	28.9	15.5	38.1	51.3	-43.93	-27.00	16.9	100	357	
Hori.	6906.670	PK	46.6	35.8	8.1	39.2	51.3	-43.93	-27.00	16.9	111	34	
Hori.	10360.000	PK	43.4	38.8	9.6	37.9	53.9	-41.33	-27.00	14.3	100	359	
Vert.	3453.330	PK	45.1	28.9	15.5	38.1	51.4	-43.83	-27.00	16.8	110	11	
Vert.	6906.670	PK	47.7	35.8	8.1	39.2	52.4	-42.83	-27.00	15.8	100	297	
Vert.	10360.000	PK	44	38.8	9.6	37.9	54.5	-40.73	-27.00	13.7	100	0	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5240 MHz Tx, IEEE802.11n HT20			

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3493.330	PK	45.4	29	15.5	38.1	51.8	-43.43	-27.00	16.4	100	6	
Hori.	6986.670	PK	47	36	8.2	39.2	52	-43.23	-27.00	16.2	105	358	
Hori.	10480.000	PK	44.6	38.8	9.7	37.9	55.2	-40.03	-27.00	13.0	100	0	
Vert.	3493.330	PK	45.8	29	15.5	38.1	52.2	-43.03	-27.00	16.0	118	358	
Vert.	6986.670	PK	47.6	36	8.2	39.2	52.6	-42.63	-27.00	15.6	100	86	
Vert.	10480.000	PK	44.3	38.8	9.7	37.9	54.9	-40.33	-27.00	13.3	100	358	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5320 MHz Tx, IEEE802.11n HT20			

### (above 1GHz Inside of the restricted band)

(\* 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.	5350.000	PK	44.1	31.6	17	37.2	55.5	73.9	18.4	100	1	
Hori.	10640.000	PK	42.9	39.1	9.7	38	53.7	73.9	20.2	100	359	
Hori.	5350.000	AV	30.2	31.6	17	37.2	41.6	53.9	12.3	100	1	VBW:10Hz
Hori.	10640.000	AV	29.7	39.1	9.7	38	40.5	53.9	13.4	100	359	VBW:10Hz
Vert.	5350.000	PK	43.9	31.6	17	37.2	55.3	73.9	18.6	100	0	
Vert.	10640.000	PK	43.6	39.1	9.7	38	54.4	73.9	19.5	100	358	
Vert.	5350.000	AV	30.1	31.6	17	37.2	41.5	53.9	12.4	100	0	VBW:10Hz
Vert.	10640.000	AV	30	39.1	9.7	38	40.8	53.9	13.1	100	358	VBW:10Hz

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	3546.670	PK	44.4	29.1	15.5	38.1	50.9	-44.33	-27.00	17.3	100	358	
Hori.	7093.330	PK	46.8	36.1	8.3	39.3	51.9	-43.33	-27.00	16.3	100	7	
Vert.	3546.670	PK	45	29.1	15.5	38.1	51.5	-43.73	-27.00	16.7	100	5	
Vert.	7093.330	PK	47.5	36.1	8.3	39.3	52.6	-42.63	-27.00	15.6	100	173	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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Revised date: June 18, 2013

## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5500 MHz Tx, IEEE802.11n HT20			

### (above 1GHz Inside of the restricted band)

(\* 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.	3666.666	PK	43.4	29.2	15.7	38	50.3	73.9	23.6	100	0	
Hori.	7333.333	PK	46.6	36.3	8.4	39.6	51.7	73.9	22.2	100	321	
Hori.	11000.000	PK	45	39.8	9.7	38.1	56.4	73.9	17.5	100	0	
Hori.	3666.666	AV	30.7	29.2	15.7	38	37.6	53.9	16.3	100	0	VBW:10Hz
Hori.	7333.333	AV	35.6	36.3	8.4	39.6	40.7	53.9	13.2	100	321	VBW:10Hz
Hori.	11000.000	AV	29.9	39.8	9.7	38.1	41.3	53.9	12.6	100	0	VBW:10Hz
Vert.	3666.666	PK	43.9	29.2	15.7	38	50.8	73.9	23.1	100	0	
Vert.	7333.333	PK	45.8	36.3	8.4	39.6	50.9	73.9	23.0	147	70	
Vert.	11000.000	PK	45.1	39.8	9.7	38.1	56.5	73.9	17.4	100	0	
Vert.	3666.666	AV	30.5	29.2	15.7	38	37.4	53.9	16.5	100	0	VBW:10Hz
Vert.	7333.333	AV	37.8	36.3	8.4	39.6	42.9	53.9	11.0	147	70	VBW:10Hz
Vert.	11000.000	AV	30	39.8	9.7	38.1	41.4	53.9	12.5	100	0	VBW:10Hz

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

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

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

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

### (Calculation) (above 1GHz Outside of the restricted band)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Result (EIRP) [dBm]	Limit [dBm]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	5470.000	PK	45.1	31.7	17.1	37.3	56.6	-38.63	-27.00	11.6	100	0	
Vert.	5470.000	PK	45.8	31.7	17.1	37.3	57.3	-37.93	-27.00	10.9	100	359	

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

Result(EIRP[dBm])=10\*LOG (({ 10 ^ ( Electric Field Strength [dBuV/m] / 20 ) \* 10 ^ (-6) \* Distance:3[m] ) ^ 2 } / 30) \*10^3)

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

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

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

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## Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber	No.1 Semi Anechoic Chamber
Date	May 5, 2013	May 7, 2013	May 9, 2013	May 10, 2013
Temperature / Humidity	19 deg.C, 45 %RH	22 deg.C, 43 %RH	25 deg.C, 40 %RH	24 deg.C, 41 %RH
Engineer	Hikaru Shirasawa	Makoto Hosaka	Makoto Hosaka	Makoto Hosaka
Mode	Tx, 5580 MHz Tx, IEEE802.11n HT20			

### (above 1GHz Inside of the restricted band)

(\* 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.	3720.000	PK	44.6	29.3	15.7	38	51.6	73.9	22.3	100	7	
Hori.	7440.000	PK	46.6	36.3	8.4	39.7	51.6	73.9	22.3	105	305	
Hori.	11160.000	PK	44.1	39.8	9.7	38.3	55.3	73.9	18.6	100	0	
Hori.	3720.000	AV	31.2	29.3	15.7	38	38.2	53.9	15.7	100	7	VBW:10Hz
Hori.	7440.000	AV	34.9	36.3	8.4	39.7	39.9	53.9	14.0	105	305	VBW:10Hz
Hori.	11160.000	AV	30.7	39.8	9.7	38.3	41.9	53.9	12.0	100	0	VBW:10Hz
Vert.	3720.000	PK	44.8	29.3	15.7	38	51.8	73.9	22.1	100	6	
Vert.	7440.000	PK	47.7	36.3	8.4	39.7	52.7	73.9	21.2	100	90	
Vert.	11160.000	PK	44.1	39.8	9.7	38.3	55.3	73.9	18.6	121	357	
Vert.	3720.000	AV	30.9	29.3	15.7	38	37.9	53.9	16.0	100	6	VBW:10Hz
Vert.	7440.000	AV	37.1	36.3	8.4	39.7	42.1	53.9	11.8	100	90	VBW:10Hz
Vert.	11160.000	AV	29.8	39.8	9.7	38.3	41	53.9	12.9	121	357	VBW:10Hz

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

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

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

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