



RADIO TEST REPORT

Test Report No.: 32CE0252-SH-02-B

Applicant : Yokogawa Electric Corporation
Type of Equipment : WLAN Redundant Module
Model No. : F9195KJ
FCC ID : SGJ-WFC009
Test regulation : FCC Part15 Subpart E: 2012
Test result : Complied

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Date of test: May 24 to July 18, 2012

Tested by: M. Hosaka
Makoto Hosaka
Engineer of WiSE Japan,
UL Verification Service

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

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 There is no testing item of "Non-accreditation".



UL Japan, Inc.

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Yokogawa Electric Corporation
Brand Name : YOKOGAWA
Address : 2-9-32, Nakacho, Musashino, Tokyo, 180-8750, Japan
Telephone Number : +81-422-52-5885
Facsimile Number : +81-422-52-2102
Contact Person : Yoshio Yoshida

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

2.1 Identification of E.U.T.

Type of Equipment : WLAN Redundant Module
Model Number : F9195KJ
Serial Number : 130
Rating : DC5.0V
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 : May 21, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: F9195KJ (referred to as the EUT in this report) is a WLAN Redundant Module.

Similar model: F9195KH (WLAN Single Module). Two Wireless LAN Modules are installed in F9195KJ and one Wireless LAN Module is installed in F9195KH.

Clock frequency(ies) in the system : 40MHz
Equipment type : Transceiver
Frequency of operation *1) : 2.4GHz: 2412-2462MHz (IEEE 802.11b, 11g)
W52: 5180-5240MHz (IEEE 802.11a)
W53: 5260-5320MHz (IEEE 802.11a)
W56: 5500-5700MHz (IEEE 802.11a)
W58: 5745-5825MHz (IEEE 802.11a)
Bandwidth : 20MHz
Channel spacing : 5MHz (2.4GHz), 20MHz (5GHz)
Type of modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11a/g)
ITU code : D1D, G1D
Operation temperature range : -40 to +70 deg.C

*1) Refer to the test report 32CE0252-SH-02-A for FCC 15.247.

Antenna type	Type:1 Sleeve antenna (Dual) *3)	Type:2 Sleeve antenna (Single)	Type:3 Collinear antenna	Type: 4 Collinear antenna	Type: 5 Patch compound antenna
Antenna Model Name	MTA-11DAD2-YO	ASSL-NP-00400	ASCL-NP-00200	ASCL-NP-00300	MTA-11PA15-Y0
Frequency band	2.4G/5GHz	2.4GHz	2.4GHz	2.4GHz	2.4GHz
External antenna connector type	N Connector				
External antenna cable	Coax antenna cable (less than cable loss: 3.1dB for 2.4GHz, 6.6dB for 5GHz)				
Antenna gain with internal cable loss (direct connecting)	2.14dBi	2.14dBi	6dBi (6.1dBi *2)	9dBi (8.6dBi *2)	15dBi

*2) Actual measured value

*3) The "Dual" means common use of 2.4GHz and 5GHz, and the antenna cannot perform the concurrent transmission.

FCC 15.31 (e) / 212

The RF Module has its own regulator. The RF Module is constantly provided voltage (DC3.3V) through the regulator regardless of input voltage. Therefore, the EUT complies with the requirement.

FCC 15.203 / 212

The EUT has an external antenna connector, but it is installed by the professionals. Therefore the EUT 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 August 13, 2012 and effective September 12, 2012
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.407 General technical requirements

* The revision on August 13, 2012 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 C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.407 (b)(6) & 15.207	-	N/A	11.8dB Freq.: 10.09435MHz Detector: Average Phase: N Mode: Tx 5260MHz Freq.: 10.09336MHz Detector: Average Phase: N Mode: Tx 5580MHz	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	Conducted / Radiated	N/A	0.7dB Freq.: 399.999MHz Detector: Quasi-Peak Polarization: Vertical Mode: Tx 5260MHz	Complied
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 32CE0252-SH-02-C.						
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422						

3.3 Addition to standard

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

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

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

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 ^{*1} /SR ^{*2} (±)	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) 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

Spurious emission (Conducted) measurement (26.5G-50GHz) uncertainty for this test was: (±) 2.8dB

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

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3.5 Test location

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Telephone number : +81 463 50 6400

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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 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 checked="" 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 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 3 to 3.

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

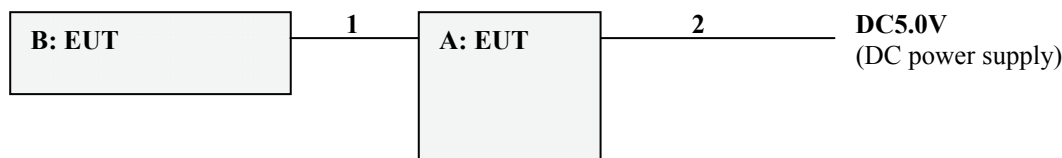
4.1 Operating mode

Test item	Mode	Tested frequency	Worst data rate *1)
Conducted emission Radiated emission (below 1GHz) *2)	Transmitting IEEE 802.11a (W52, W53)	5260MHz	12Mbps, PN9
	Transmitting IEEE 802.11a (W56)	5580MHz	12Mbps, PN9
Other items	Transmitting IEEE 802.11a (W52)	5180MHz, 5220MHz, 5240MHz	54Mbps, PN9
	Transmitting IEEE 802.11a (W53)	5260MHz, 5300MHz, 5320MHz	12Mbps, PN9
	Transmitting IEEE 802.11a (W56)	5500MHz, 5580MHz, 5700MHz	12Mbps, PN9

*1) The worst condition was determined based on the test result of Maximum Conducted 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) Power setting: Attenuator setting: 0, Software: YFGW510 Tool, Revision: 0326
*4) Two of the same WLAN modules are installed in the equipment, and the module which outputs the higher power is selected for the test, based on the result of pre-check measurement.

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 worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	WLAN Redundant Module	F9195KJ	130	YOKOGAWA	EUT
B	Sleeve antenna	MTA-11DAD2	-	Alfact	EUT (2.14dBi, Dual)

List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna	0.1	Shielded	Shielded	-
2	DC	1.4	Unshielded	Unshielded	-
3	DC	2.6	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 was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN were resistively terminated in 50ohm when not connected to the measuring equipment.

Photographs of the set up are shown in APPENDIX 3.

5.3 Test conditions

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

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via DC power supply within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN) via DC power supply.

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detection of the test receiver.

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

5.5 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Radiated emission

6.1 Operating environment

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

6.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 0.8m above the conducting ground plane. The rear of EUT was aligned and flushed with rear of tabletop.

Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

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

6.4 Test procedure

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

The radiated emission measurements were made with the following detection.

Frequency	30-1000MHz	1-40GHz	
Detection type	Quasi-Peak	Peak	Average *1)
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *2)

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

*2) VBW was set to 10Hz since the EUT has 100% of duty.

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

$$P \text{ [dBm]} = E \text{ [dBuV/m]} - 95.2 \text{ [dB]}$$

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

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

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

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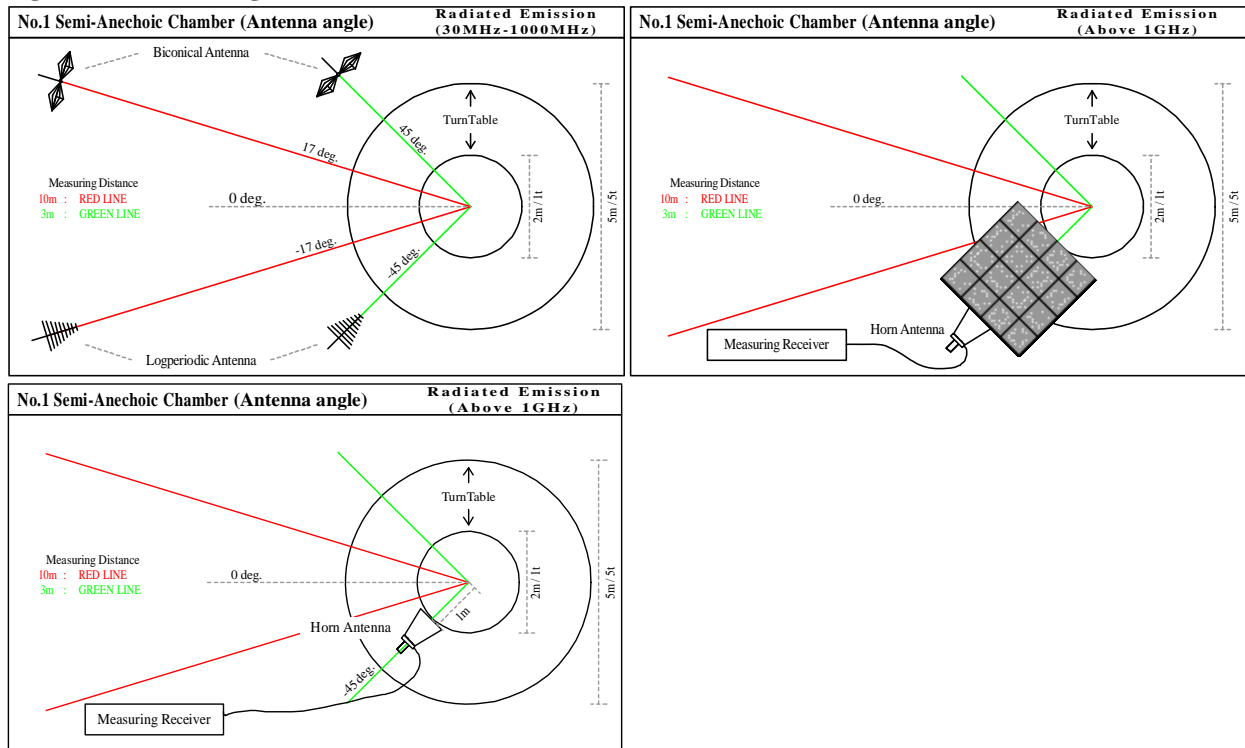
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Combinations of the worst case

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

* The definition of the axis was listed in a 'Pre-check of the worst position' in APPENDIX.

Figure 1. Antenna angle



6.5 Band edge

Band edge level at 5150MHz and 5350MHz is below the limits of FCC 15.209. Refer to the data.

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.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used and Test method
26dB bandwidth	30MHz	Close to 1% of EBW	Greater than RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99% occupied bandwidth	Enough width to display 20dB Bandwidth	Close to 1% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
20dB bandwidth	30MHz	Close to 1% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum conducted output power *1)	50MHz	1MHz	3MHz	Auto	Sample Power Averaging (100 times)	Clear Write	Spectrum Analyzer method SA-1
Peak power spectral density *2)	50MHz	1MHz	3MHz	Auto	Sample Power Averaging (100 times)	Clear Write	Spectrum Analyzer method SA-1
Peak excursion ratio	Enough width to display 26dB Bandwidth	1MHz	3MHz	Auto	Peak Sample Power Averaging (100 times)	Max Hold Clear Write	Spectrum Analyzer method SA-1
Conducted spurious emission *4) (below 1GHz) *3)	9kHz to 150kHz, 150kHz to 30MHz, 30MHz to 1GHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Conducted spurious emission *4) (above 1GHz)	Less or equal to 5GHz (Range: 1GHz-40GHz)	1MHz	3MHz	Auto	Peak	Max Hold	Spectrum Analyzer

*EBW: Emission Bandwidth

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

*3) 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 low enough as shown in the chart (9kHz-150kHz: RBW=200Hz, 150kHz-30MHz: RBW=10kHz). Since the margin is more than about 40dB, the EUT complies with the limit of FCC15.209 if the measurement is performed with RBW=100kHz.

*4) The conducted measurement is reference data and the radiated emission measurement is the data for the compliance.

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

Contents of APPENDIXES

APPENDIX 1: Data of Radio test

Conducted emission
26dB bandwidth
99% Occupied bandwidth
20dB bandwidth
Maximum conducted output power
Radiated emission
Spurious emission (Antenna port conducted)
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

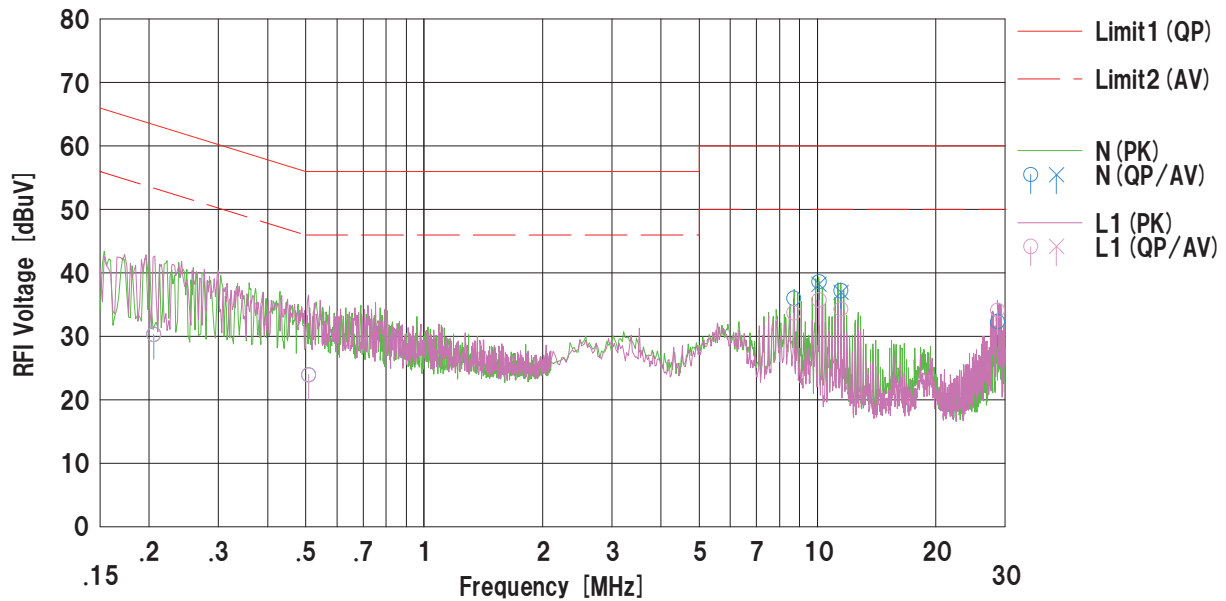
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2012/07/18

Model No. : F9195KJ
 Serial No. : 130
 Remarks :

Mode : Tx 11a 5260MHz
 Report No. : 32CE0252-SH-02-B
 Power : DC 5.0V
 Temp./Humi. : 26deg.C / 54%RH

Limit1 : FCC 15C (15.207) QP
 Limit2 : FCC 15C (15.207) AV
 Engineer : Wataru Kojima



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
		[dBuV]	[dBuV]		[dBuV]	[dBuV]	[dB]	[dB]	[dB]	[dB]		
1	0.20560	17.7	---	12.6	30.3	---	63.3	53.3	33.0	---	N	
2	0.50891	11.3	---	12.6	23.9	---	56.0	46.0	32.1	---	N	
3	8.70855	22.9	---	13.1	36.0	---	60.0	50.0	24.0	---	N	
4	10.09435	25.5	25.1	13.1	38.6	38.2	60.0	50.0	21.4	11.8	N	
5	11.47923	24.1	23.8	13.1	37.2	36.9	60.0	50.0	22.8	13.1	N	
6	28.68620	18.5	---	13.8	32.3	---	60.0	50.0	27.7	---	N	
7	0.20560	17.7	---	12.6	30.3	---	63.3	53.3	33.0	---	L1	
8	0.50891	11.3	---	12.6	23.9	---	56.0	46.0	32.1	---	L1	
9	8.70882	20.6	---	13.1	33.7	---	60.0	50.0	26.3	---	L1	
10	10.09385	22.6	---	13.1	35.7	---	60.0	50.0	24.3	---	L1	
11	11.48000	21.2	---	13.1	34.3	---	60.0	50.0	25.7	---	L1	
12	28.68460	20.3	---	13.8	34.1	---	60.0	50.0	25.9	---	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-01

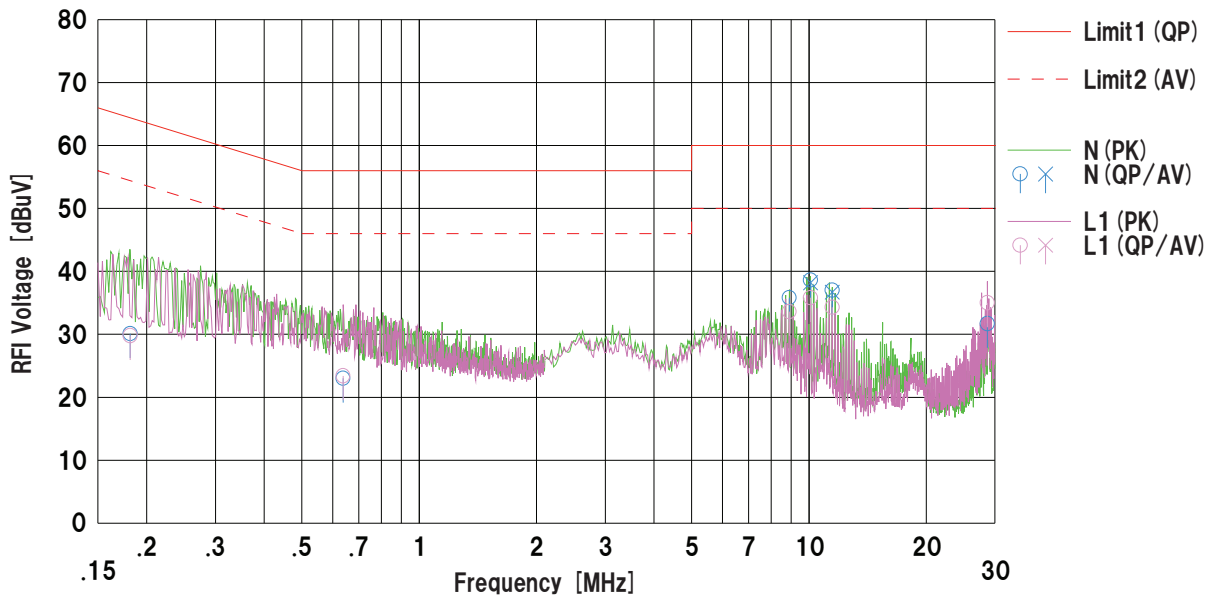
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Shielded Room
Date : 2012/07/18

Model No. : F9195KJ Serial No. : 130 Remarks :	Mode : Tx 11a 5580MHz Report No. : 32CE0252-SH-02-B Power : DC 5.0V Temp./Humi. : 26deg.C / 54%RH
--	--

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

Engineer : Wataru Kojima



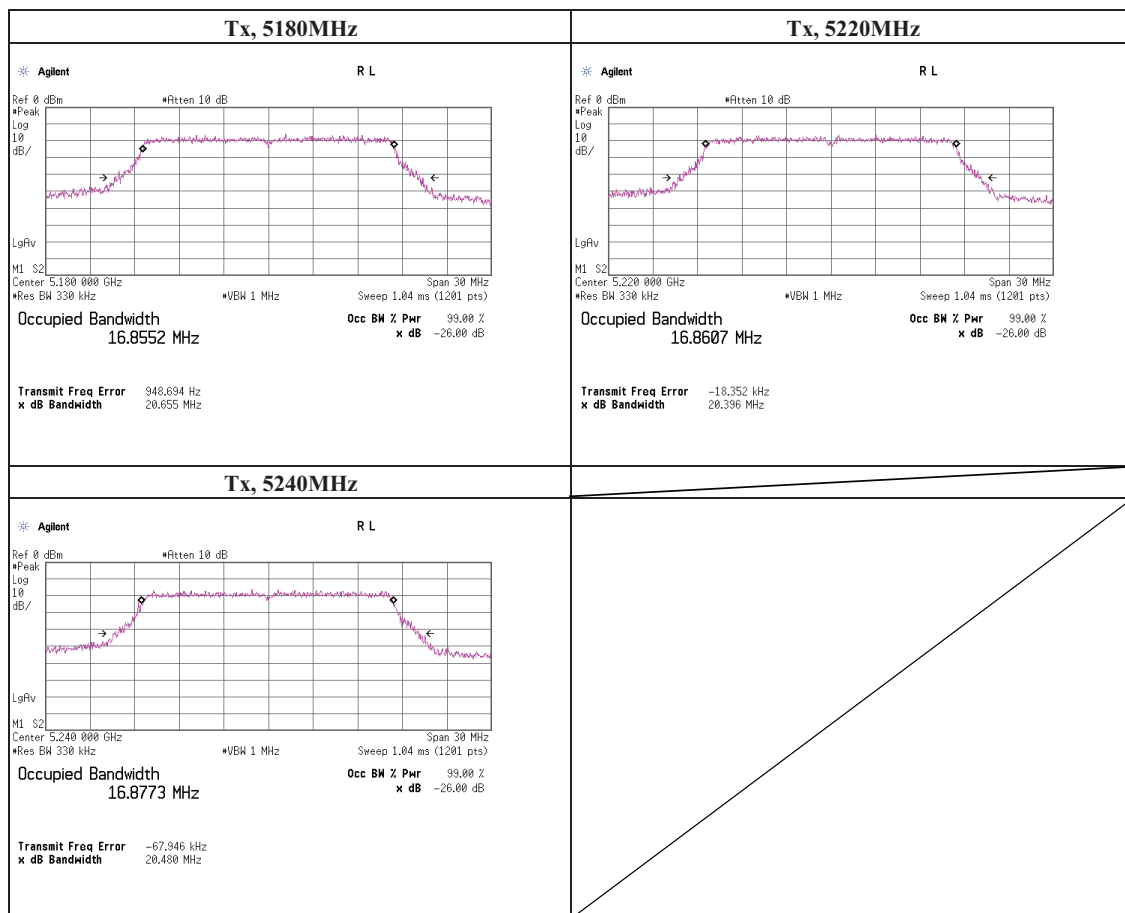
No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.18127	17.5	---	12.6	30.1	---	64.4	54.4	34.3	---	N	
2	0.63779	10.4	---	12.6	23.0	---	56.0	46.0	33.0	---	N	
3	8.90578	22.7	---	13.1	35.8	---	60.0	50.0	24.2	---	N	
4	10.09336	25.5	25.1	13.1	38.6	38.2	60.0	50.0	21.4	11.8	N	
5	11.47888	23.9	23.6	13.1	37.0	36.7	60.0	50.0	23.0	13.3	N	
6	28.68525	17.9	---	13.8	31.7	---	60.0	50.0	28.3	---	N	
7	0.18127	17.2	---	12.6	29.8	---	64.4	54.4	34.6	---	L1	
8	0.63779	10.8	---	12.6	23.4	---	56.0	46.0	32.6	---	L1	
9	8.90608	20.5	---	13.1	33.6	---	60.0	50.0	26.4	---	L1	
10	10.09330	22.7	---	13.1	35.8	---	60.0	50.0	24.2	---	L1	
11	11.47906	21.2	---	13.1	34.3	---	60.0	50.0	25.7	---	L1	
12	28.69833	21.2	---	13.8	35.0	---	60.0	50.0	25.0	---	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+ATT) [dB]
LISN: SLS-01

-26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 54Mbps	

Freq. [MHz]	-26dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
5180.0000	20.655	17.113
5220.0000	20.396	17.144
5240.0000	20.480	17.141



UL Japan, Inc.

Shonan EMC Lab.

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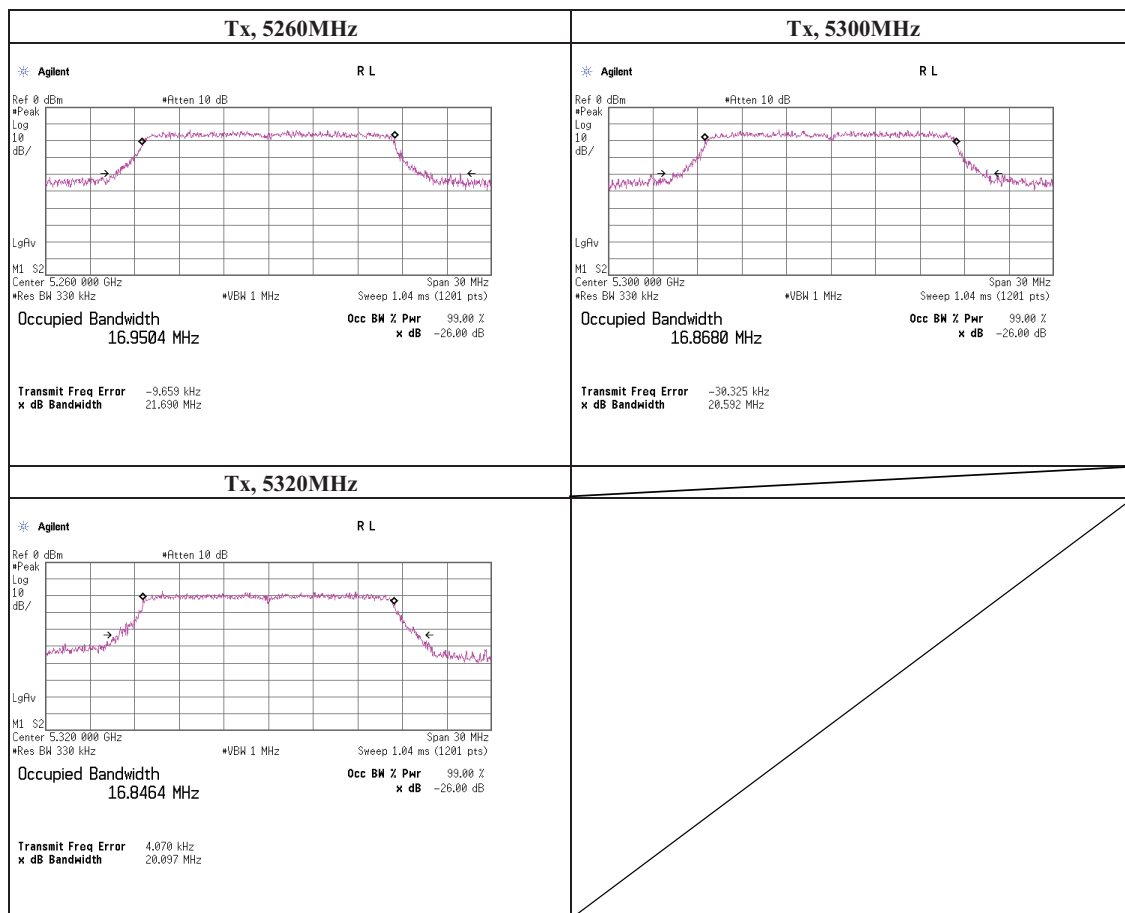
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

-26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Freq. [MHz]	-26dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
5260.0000	21.690	17.256
5300.0000	20.592	17.268
5320.0000	20.097	17.134

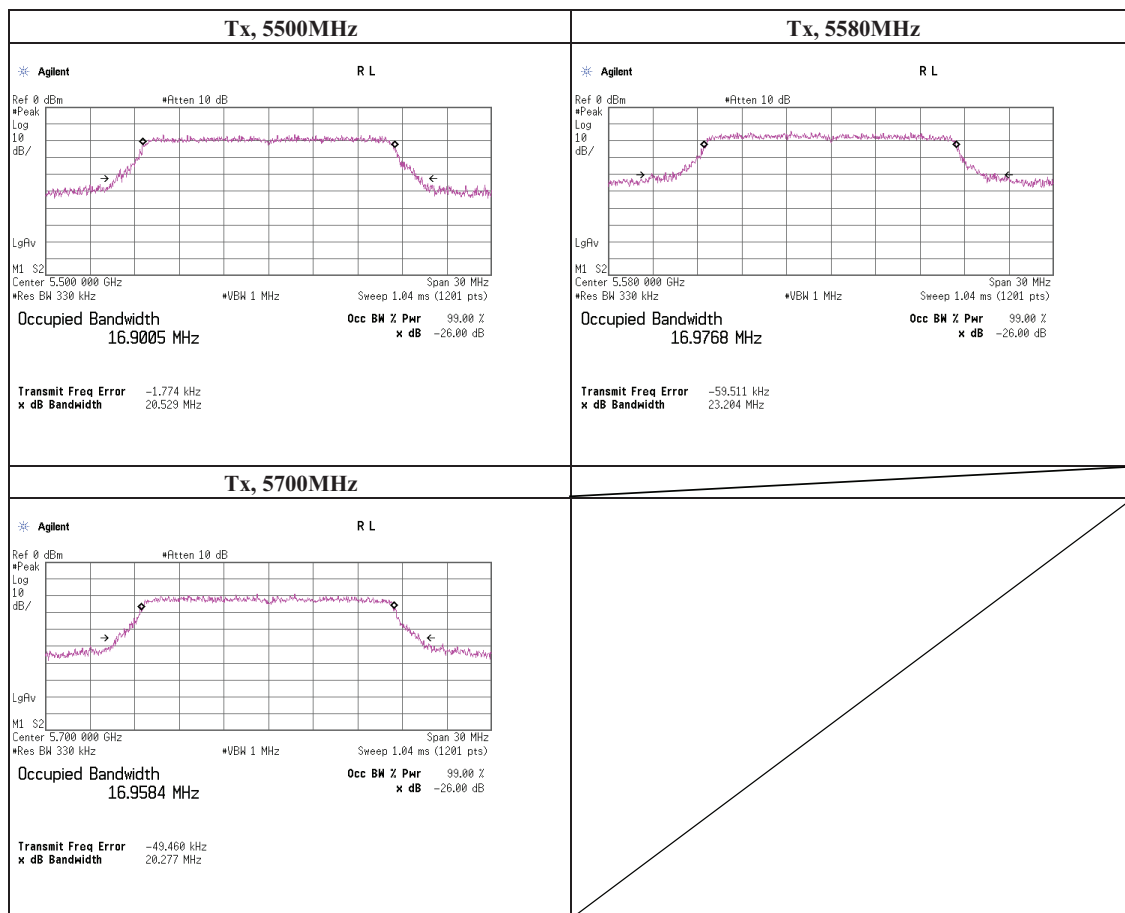


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-26dB Bandwidth

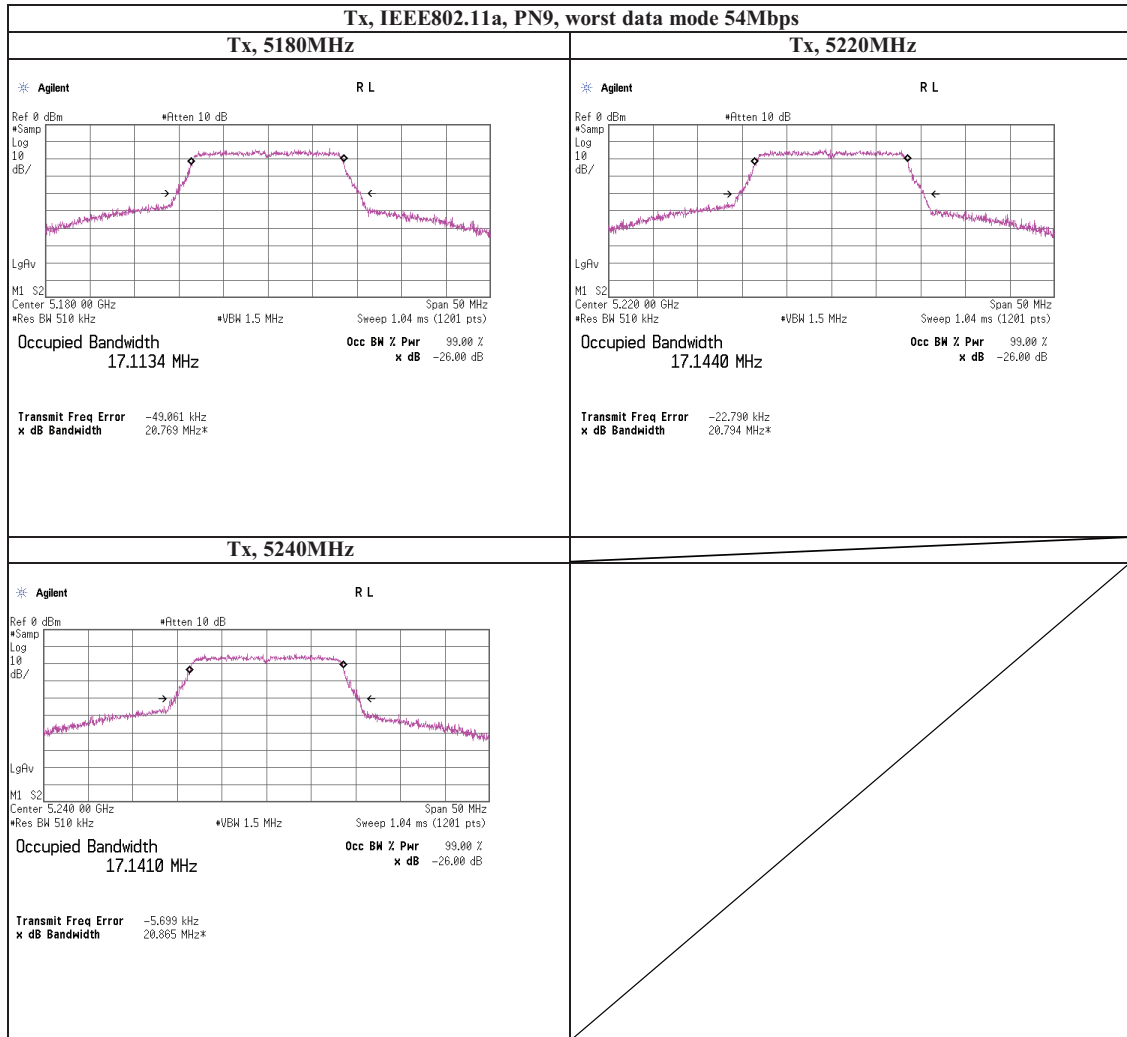
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Freq. [MHz]	-26dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
5500.0000	20.529	17.201
5580.0000	23.204	17.348
5700.0000	20.277	17.260



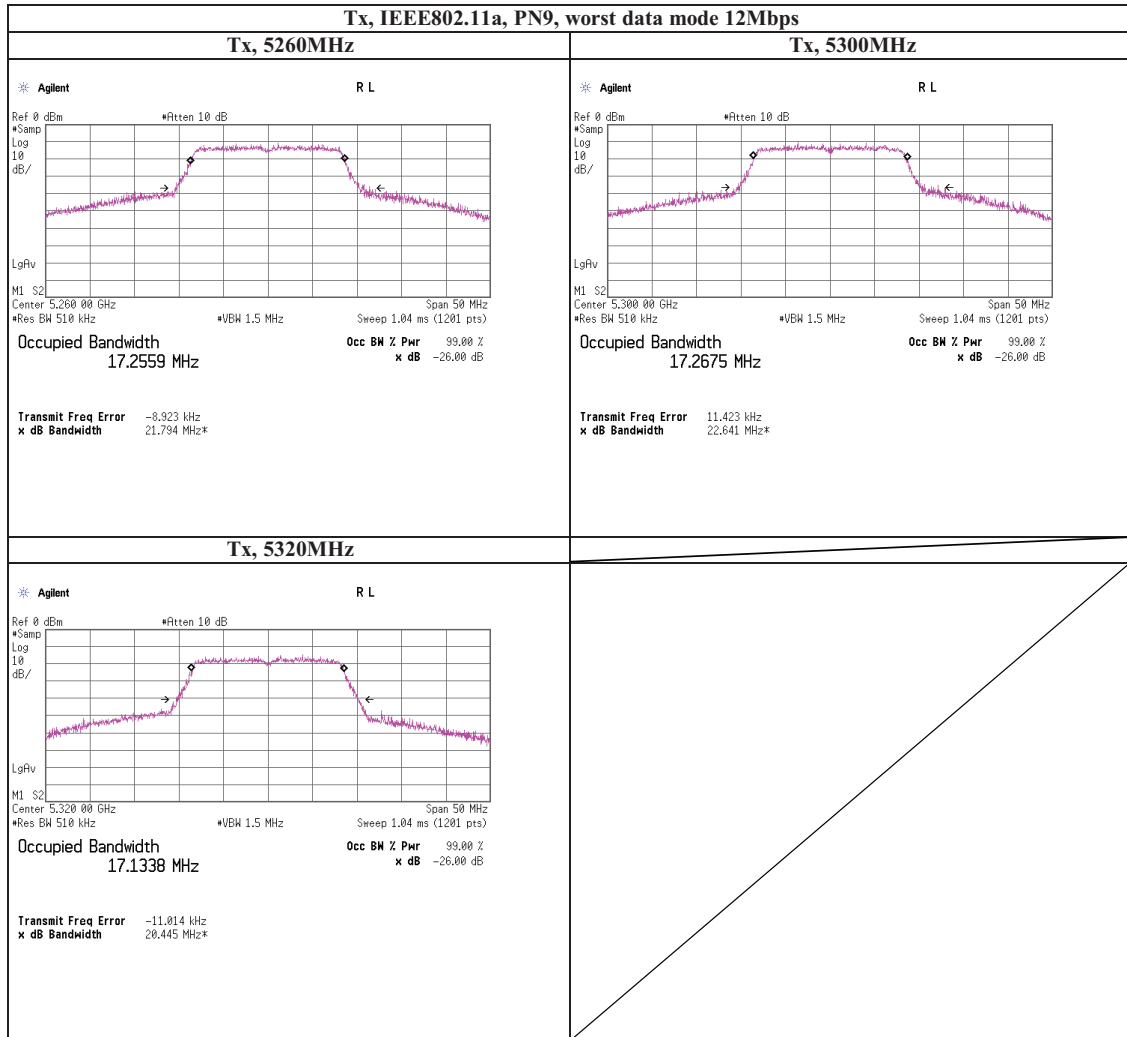
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99% Occupied Bandwidth



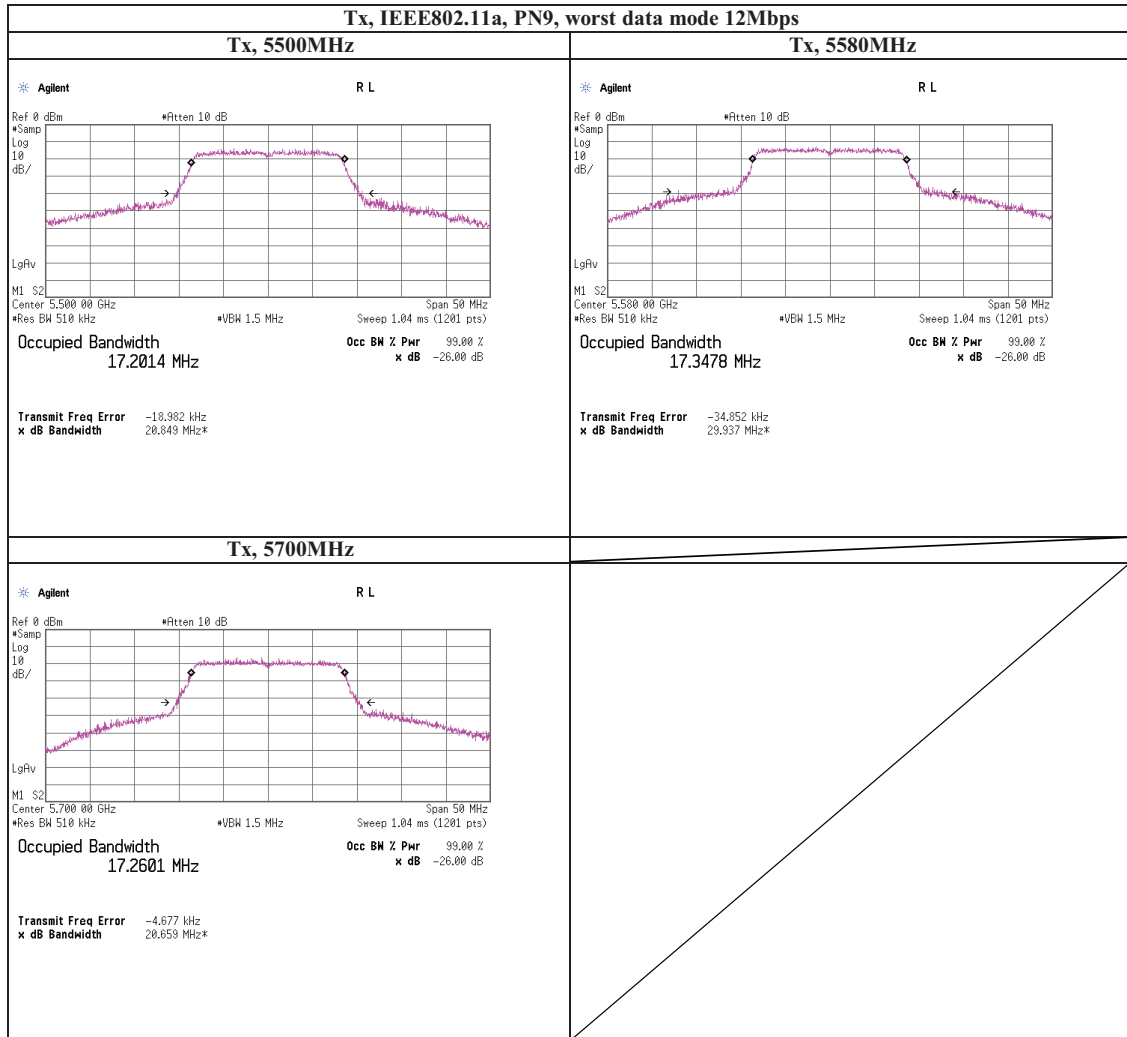
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99% Occupied Bandwidth



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99% Occupied Bandwidth

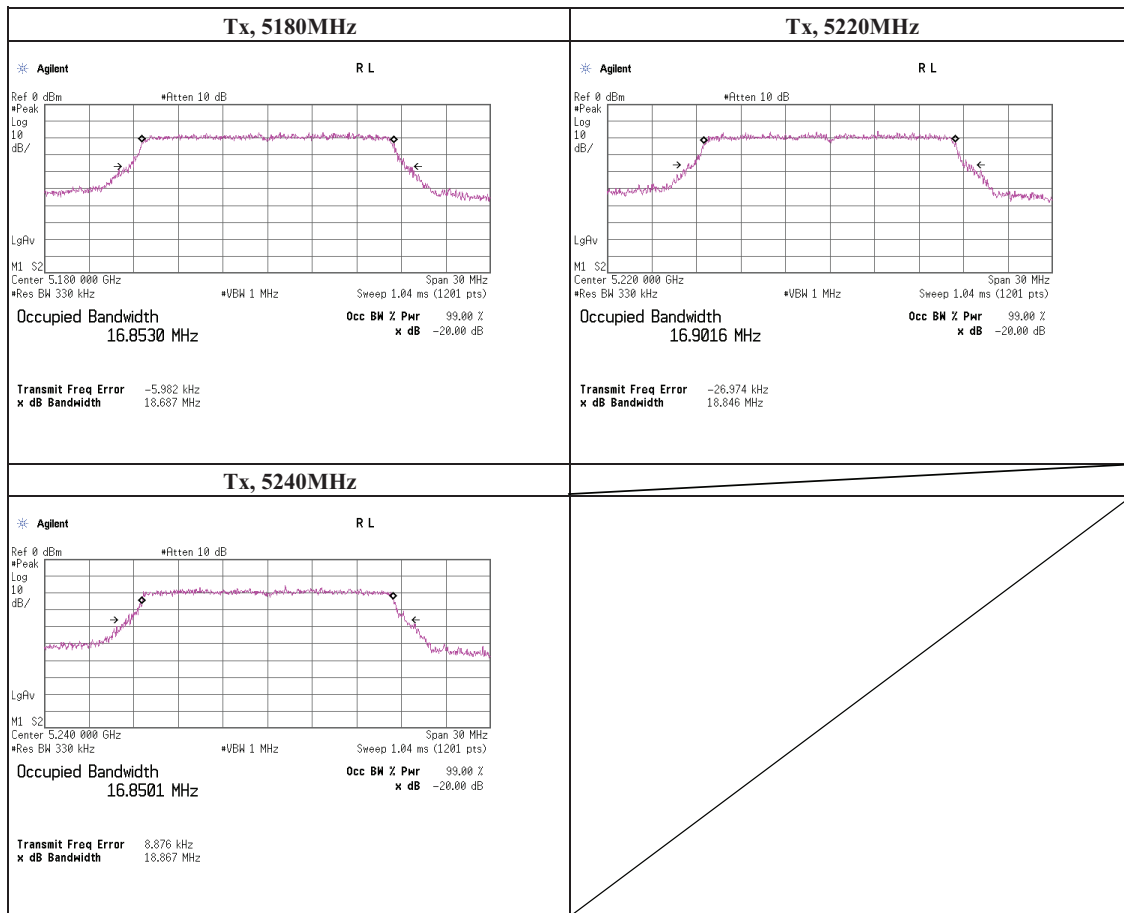


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-20dB Bandwidth

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/5/24
 Temperature / Humidity 23deg.C , 47%RH
 Engineer Makoto Hosaka
 Mode Tx, IEEE802.11a, PN9, worst data mode 54Mbps

Freq. [MHz]	-20dB Bandwidth [MHz]
5180.0000	18.687
5220.0000	18.846
5240.0000	18.867

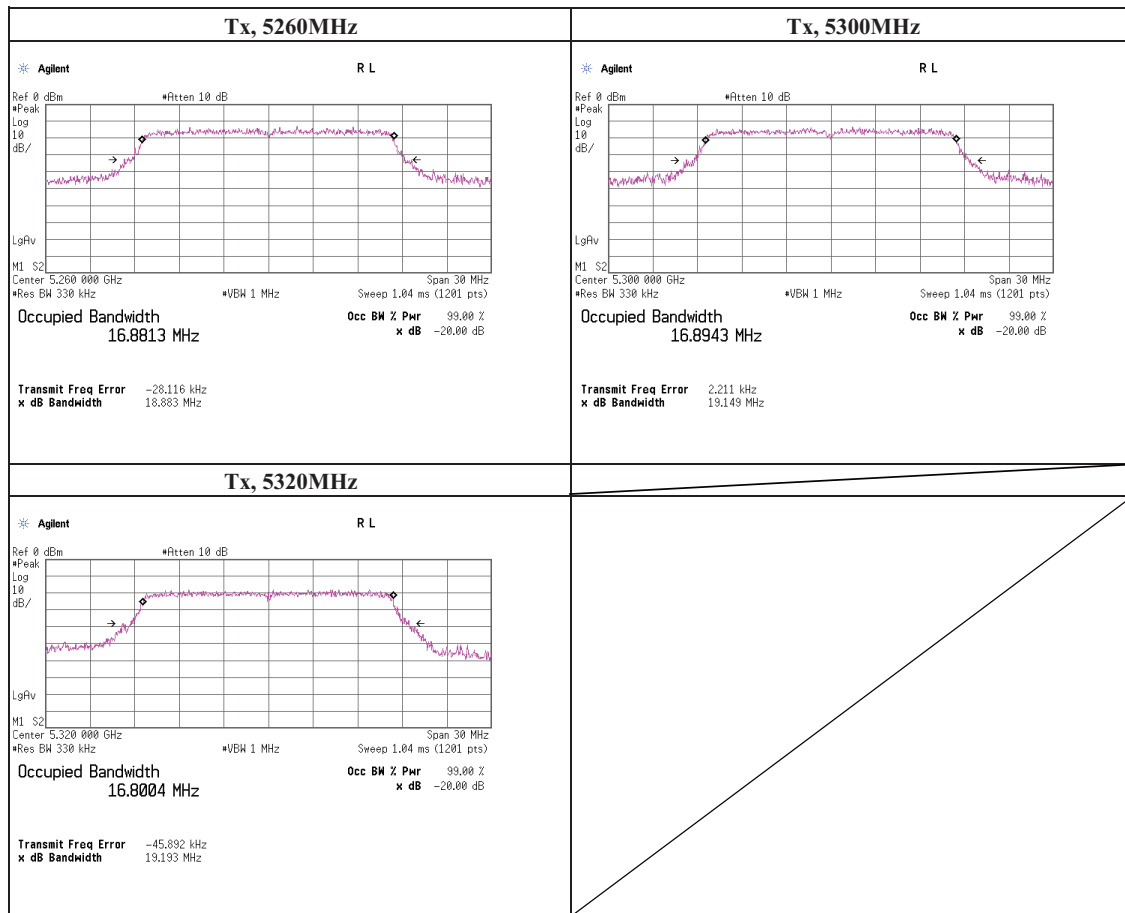


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-20dB Bandwidth

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/5/24
 Temperature / Humidity 23deg.C , 47%RH
 Engineer Makoto Hosaka
 Mode Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Freq. [MHz]	-20dB Bandwidth [MHz]
5260.0000	18.883
5300.0000	19.149
5320.0000	19.193

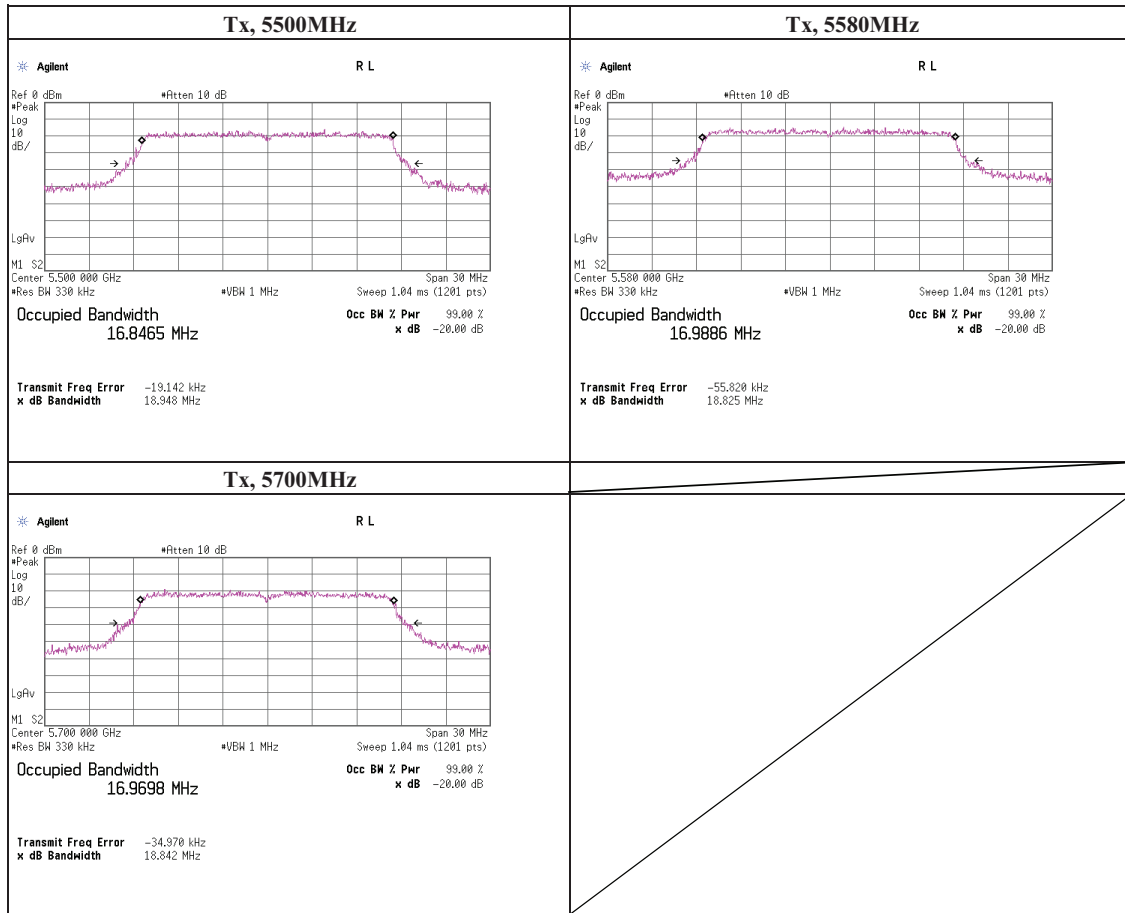


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 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

-20dB Bandwidth

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/5/24
 Temperature / Humidity 23deg.C , 47%RH
 Engineer Makoto Hosaka
 Mode Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Freq. [MHz]	-20dB Bandwidth [MHz]
5500.0000	18.948
5580.0000	18.825
5700.0000	18.842



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Maximum conducted output power

Test place: UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date: 2012/5/24
 Temperature / Humidity: 23deg.C , 47%RH
 Engineer: Makoto Hosaka
 Mode: Tx, IIEEE802.11a, PN9, worst data mode : 54 Mbps

Antenna terminal power (* S/A: Spectrum Analyzer)

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5180.0	-8.36	3.38	9.65	4.67	2.93	16.99	50.00	12.32
Mid	5220.0	-8.30	3.38	9.66	4.74	2.98	16.99	50.00	12.25
High	5240.0	-8.28	3.39	9.66	4.77	3.00	16.99	50.00	12.22

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss +Duty Factor (0dB)

EIRP (* S/A: Spectrum Analyzer)

Reference Data

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [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	-8.36	3.38	9.65	2.14	6.81	4.80	-	-	-
Mid	5220.0	-8.30	3.38	9.66	2.14	6.88	4.87	-	-	-
High	5240.0	-8.28	3.39	9.66	2.14	6.91	4.91	-	-	-

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss +Duty Factor (0dB) + Antenna Gain

[Pre check]

Data rate [Mbps]	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]
6	5220.0	-8.53	3.38	9.66	4.51
9	5220.0	-8.43	3.38	9.66	4.61
12	5220.0	-8.39	3.38	9.66	4.65
18	5220.0	-8.39	3.38	9.66	4.65
24	5220.0	-8.38	3.38	9.66	4.66
36	5220.0	-8.37	3.38	9.66	4.67
48	5220.0	-8.34	3.38	9.66	4.70
54	5220.0	-8.30	3.38	9.66	4.74

Worst

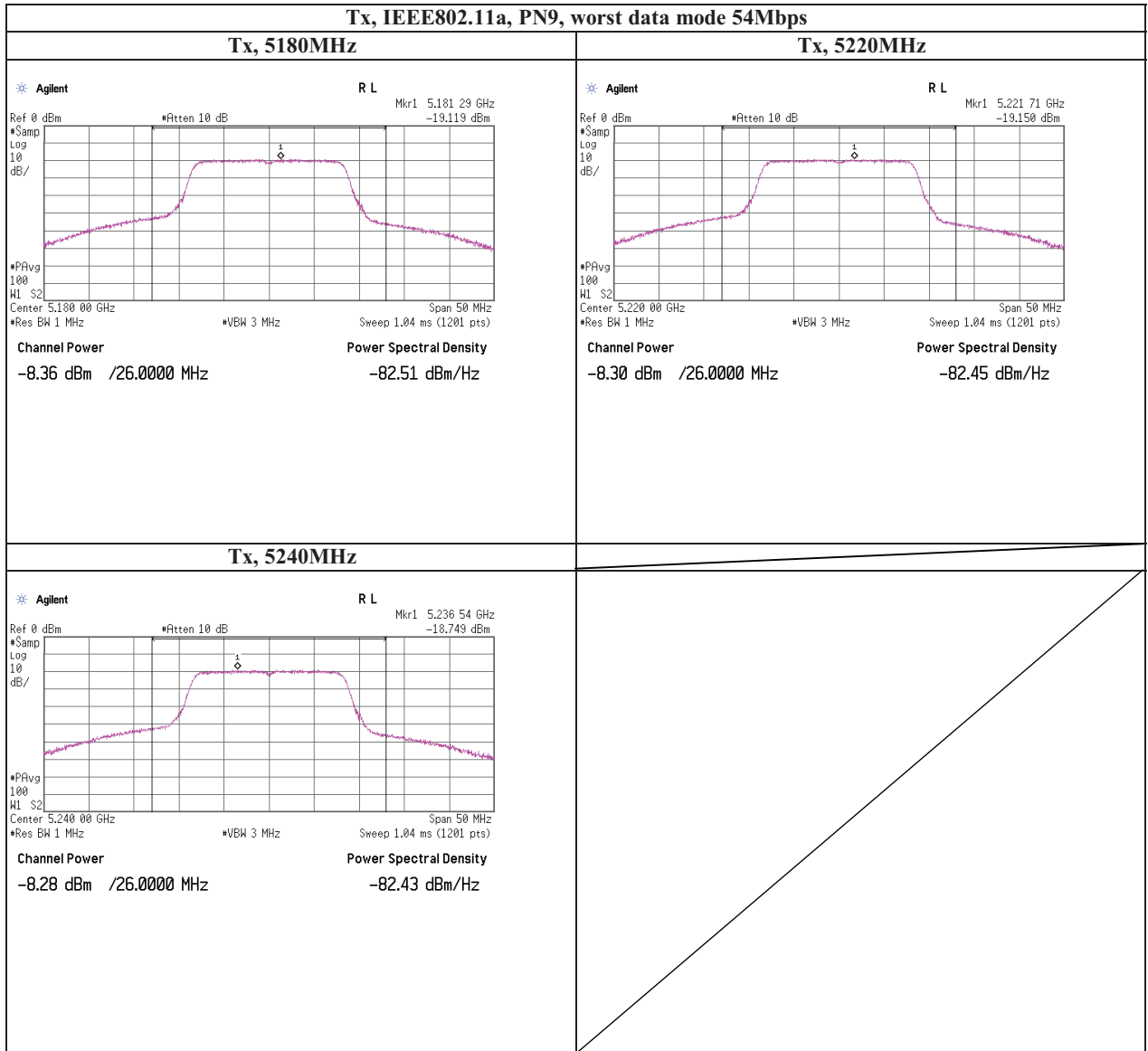
**UL Japan, Inc.
Shonan EMC Lab.**

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Facsimile : +81 463 50 6401

Maximum conducted output power



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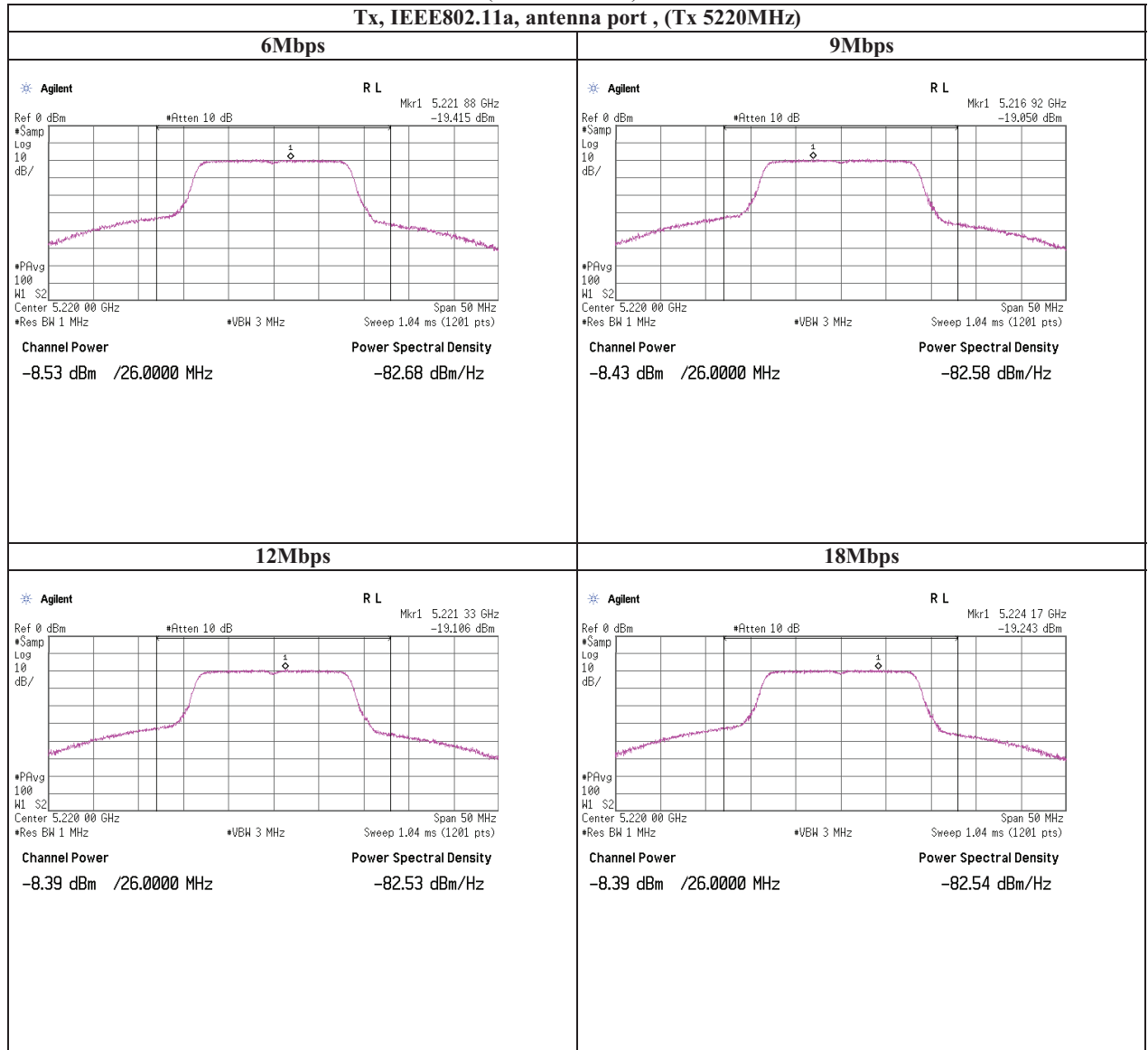
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Facsimile : +81 463 50 6401

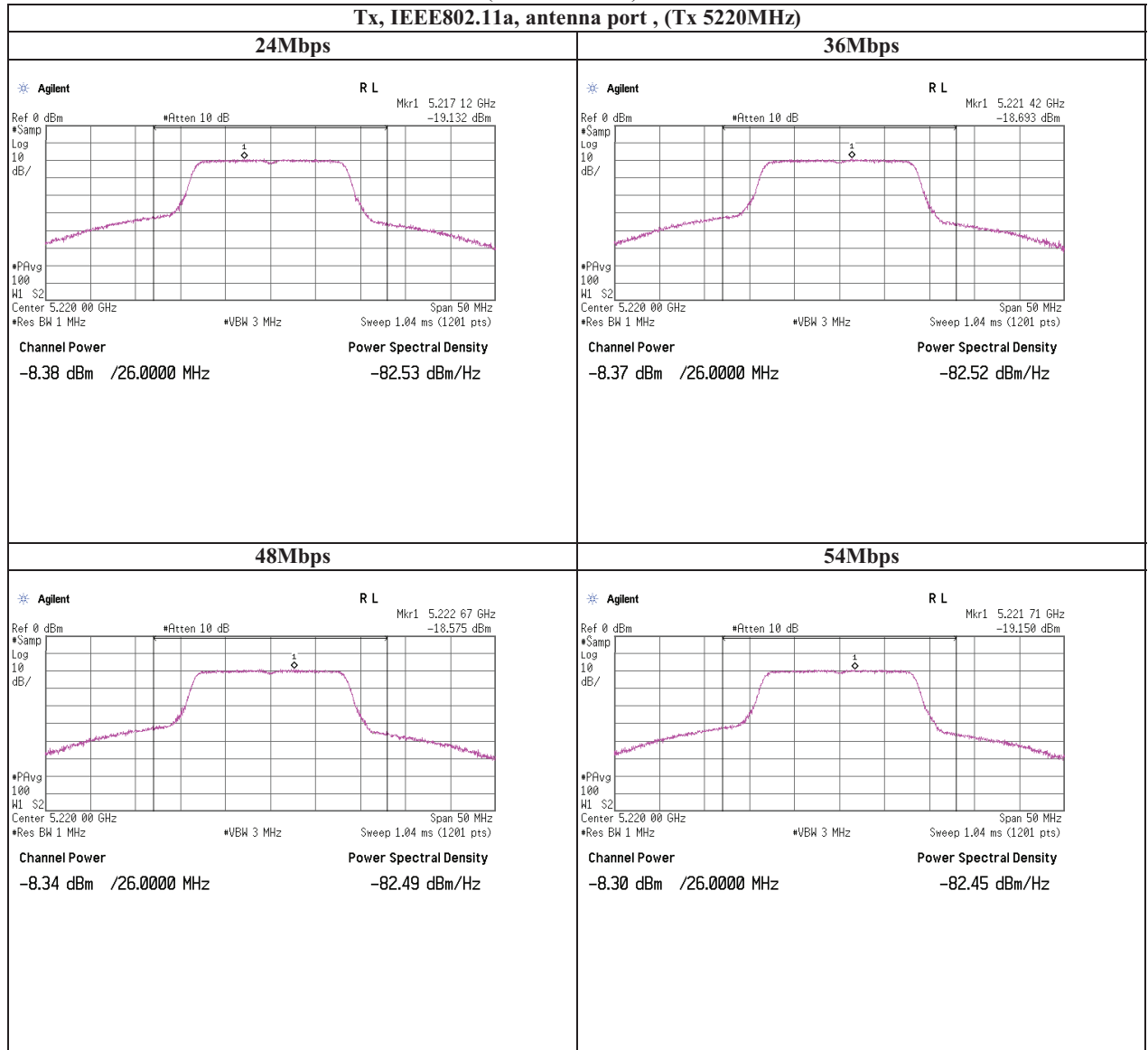
Maximum conducted output power

(Reference chart)



Maximum conducted output power

(Reference chart)



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Telephone : +81 463 50 6400

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Maximum conducted output power

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/5/24
 Temperature / Humidity 23deg.C , 47%RH
 Engineer Makoto Hosaka
 Mode Tx, IEEE802.11a, PN9, worst data mode : 12 Mbps

Antena terminal power (* S/A: Spectrum Analyzer)

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5260.0	-4.96	3.39	9.67	8.10	6.45	23.98	249.98	15.88
Mid	5300.0	-5.00	3.40	9.67	8.07	6.42	23.98	249.98	15.91
High	5320.0	-8.94	3.40	9.68	4.14	2.59	23.98	249.98	19.84

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss +Duty Factor (0dB)

EIRP (* S/A: Spectrum Analyzer)

Reference Data

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [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	5260.0	-4.96	3.39	9.67	2.14	10.24	10.56	-	-	-
Mid	5300.0	-5.00	3.40	9.67	2.14	10.21	10.51	-	-	-
High	5320.0	-8.94	3.40	9.68	2.14	6.28	4.24	-	-	-

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss +Duty Factor (0dB) + Antenna Gain

[Pre check]

Data rate [Mbps]	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]
6	5300.0	-5.07	3.40	9.67	8.00
9	5300.0	-5.05	3.40	9.67	8.02
12	5300.0	-5.00	3.40	9.67	8.07
18	5300.0	-5.07	3.40	9.67	8.00
24	5300.0	-5.07	3.40	9.67	8.00
36	5300.0	-5.05	3.40	9.67	8.02
48	5300.0	-7.33	3.40	9.67	5.74
54	5300.0	-7.25	3.40	9.67	5.82

Worst

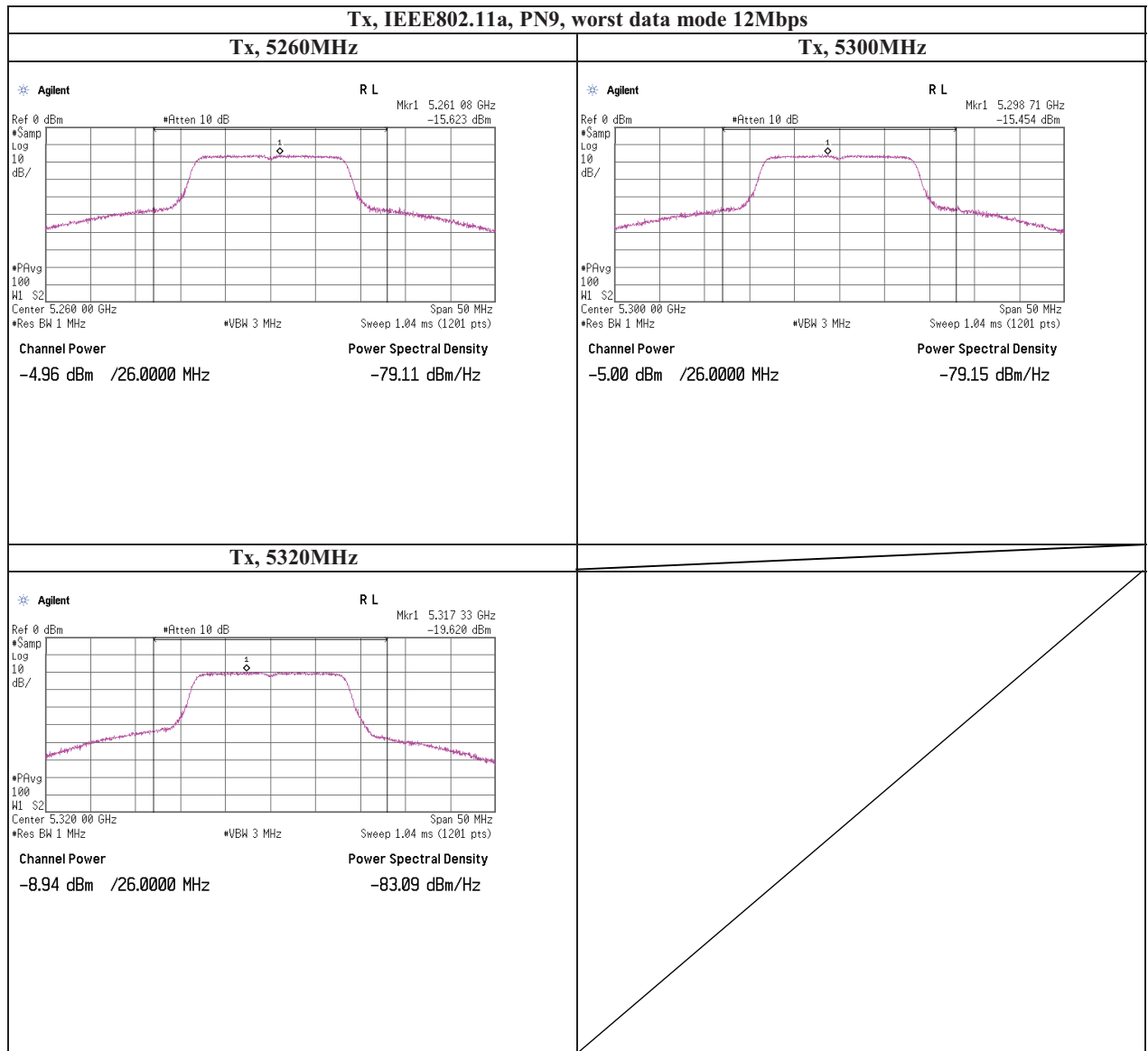
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Shonan EMC Lab.**

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum conducted output power



UL Japan, Inc.

Shonan EMC Lab.

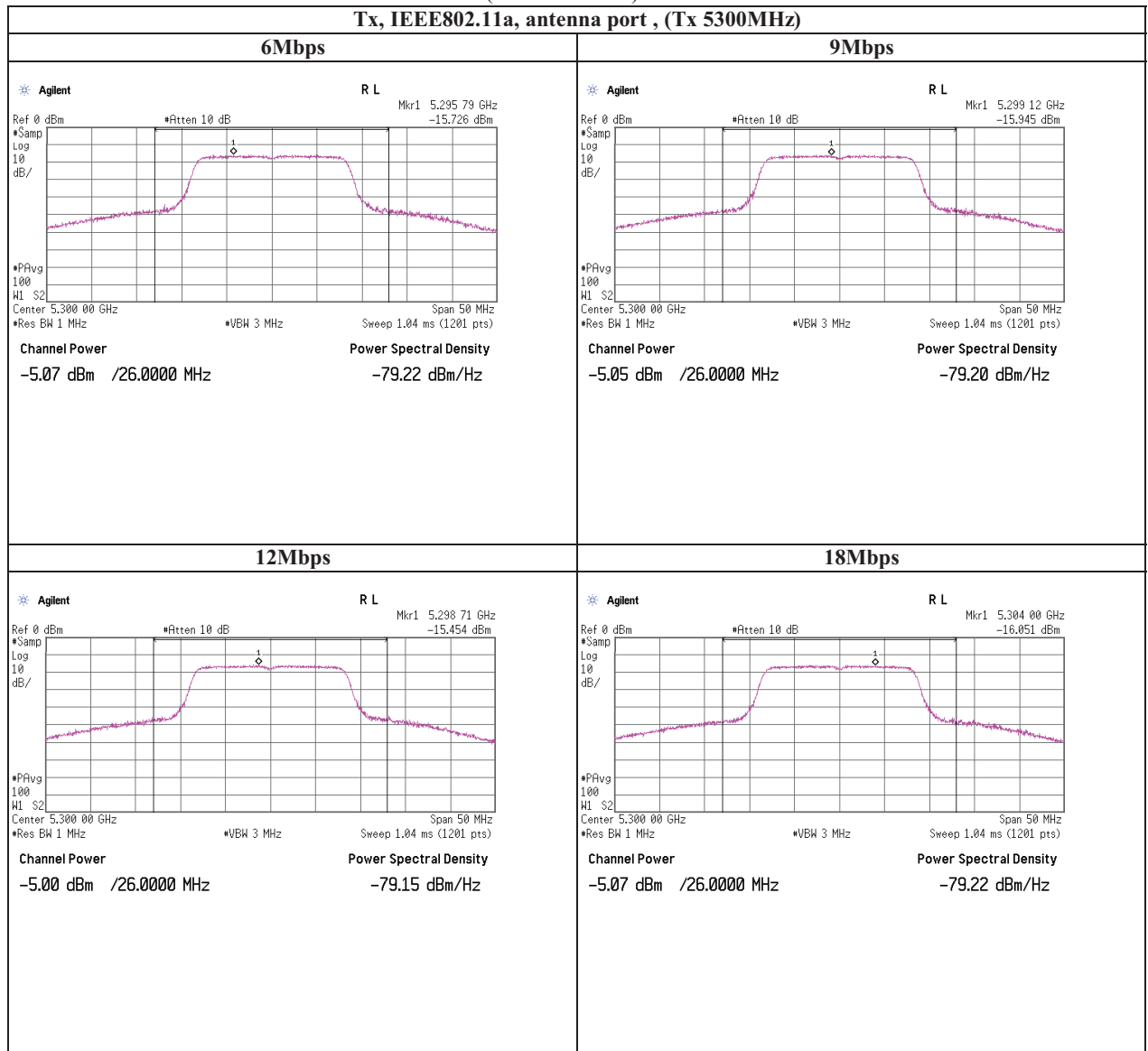
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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum conducted output power

(Reference chart)



UL Japan, Inc.

Shonan EMC Lab.

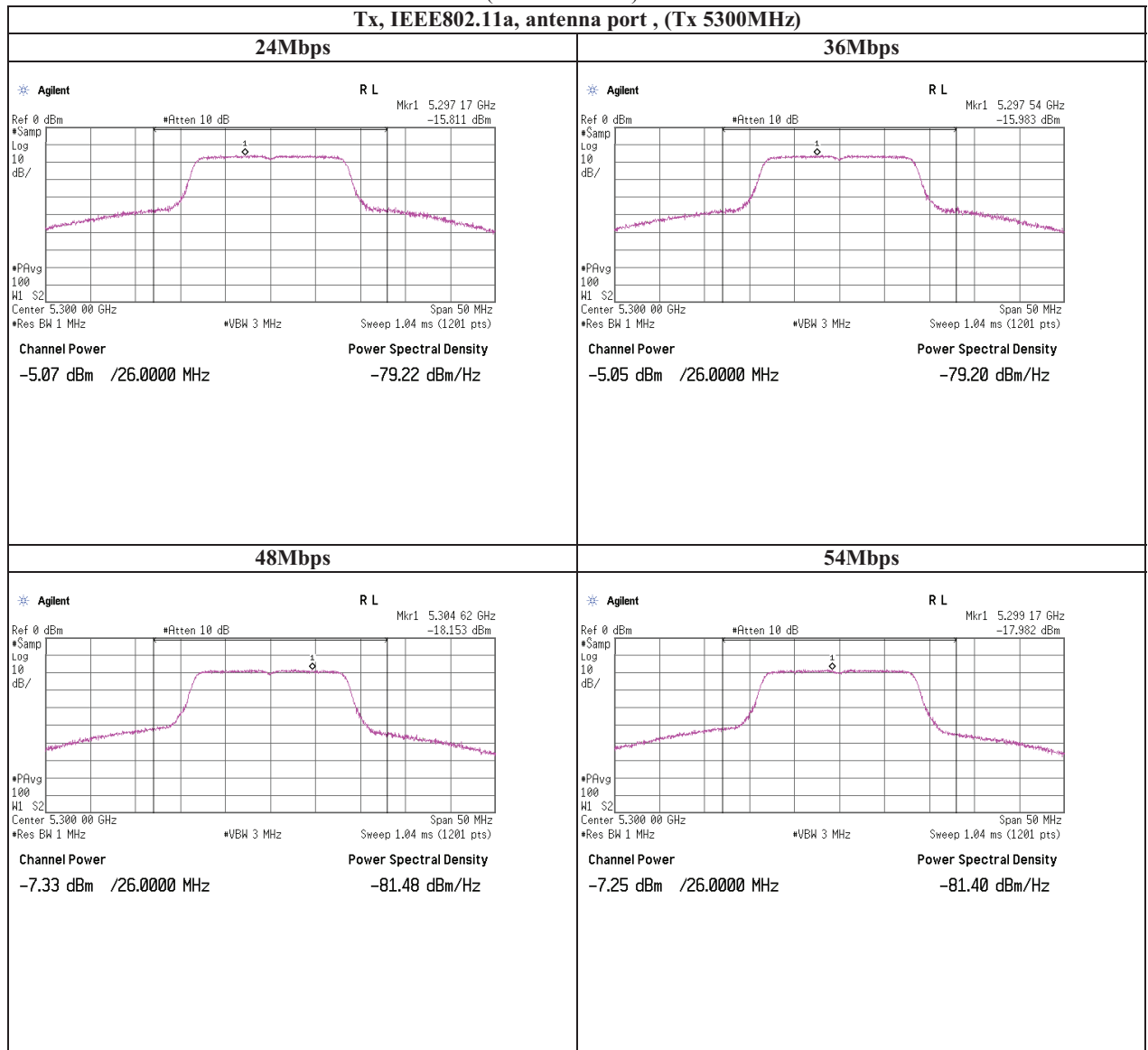
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Maximum conducted output power

(Reference chart)



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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum conducted output power

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
 Date 2012/5/24
 Temperature / Humidity 23deg.C , 47%RH
 Engineer Makoto Hosaka
 Mode Tx, IEEE802.11a, PN9, worst data mode : 12 Mbps

Antena terminal power (* S/A: Spectrum Analyzer)

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	5500.0	-7.67	3.44	9.71	5.48	3.53	23.98	249.98	18.50
Mid	5580.0	-5.95	3.45	9.72	7.22	5.27	23.98	249.98	16.76
High	5700.0	-10.69	3.48	9.73	2.52	1.78	23.98	249.98	21.46

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor (0dB)

EIRP (* S/A: Spectrum Analyzer) **Reference Data**

Ch	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [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	5500.0	-7.67	3.44	9.71	2.14	7.62	5.78	-	-	-
Mid	5580.0	-5.95	3.45	9.72	2.14	9.36	8.62	-	-	-
High	5700.0	-10.69	3.48	9.73	2.14	4.66	2.92	-	-	-

Sample Calculation: Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor (0dB) + Antenna Gain

[Pre check]

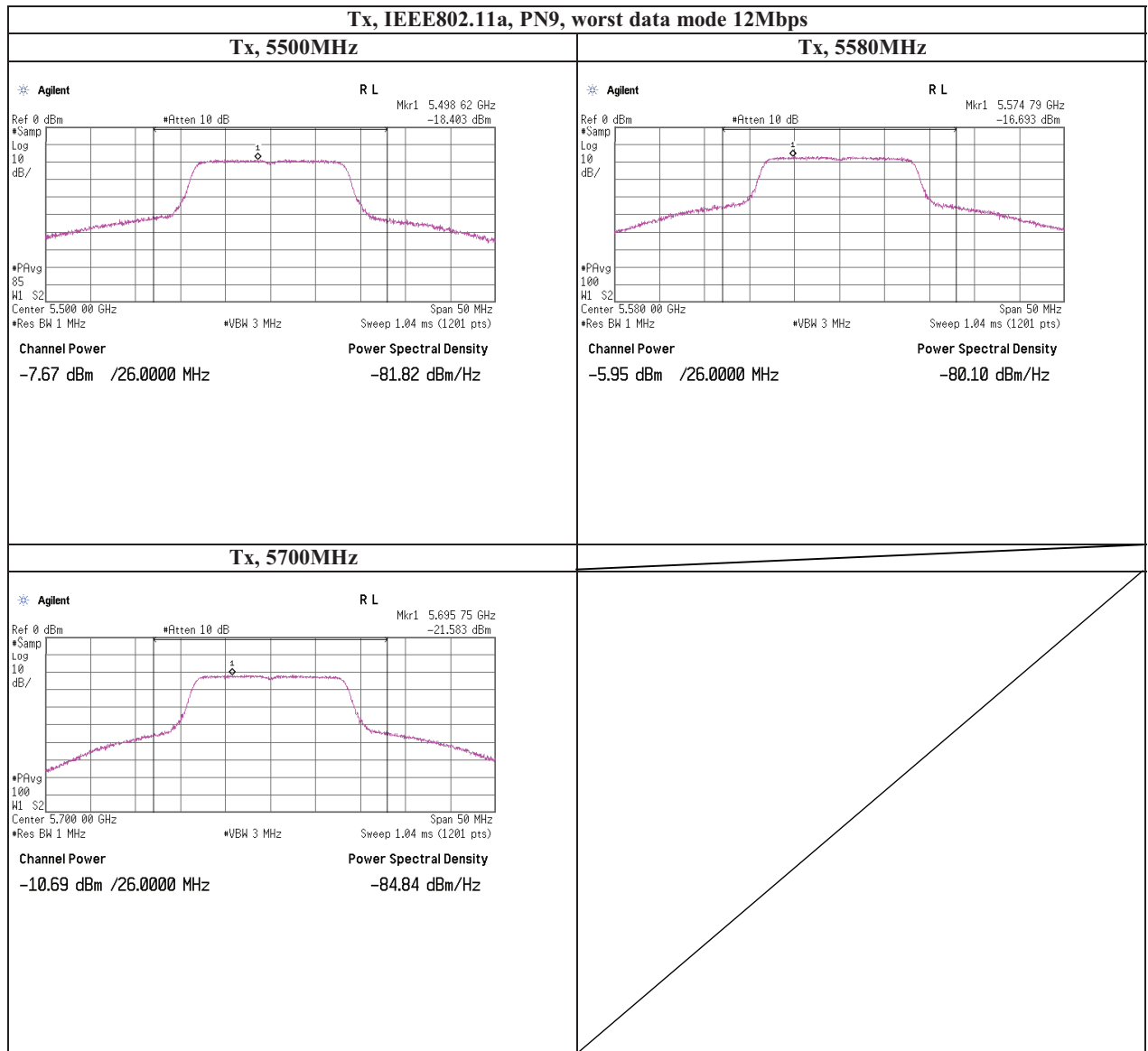
Data rate [Mbps]	Freq. [MHz]	S/A (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]
6	5580.0	-6.03	3.45	9.72	7.14
9	5580.0	-5.99	3.45	9.72	7.18
12	5580.0	-5.95	3.45	9.72	7.22
18	5580.0	-6.05	3.45	9.72	7.12
24	5580.0	-6.74	3.45	9.72	6.43
36	5580.0	-6.64	3.45	9.72	6.53
48	5580.0	-7.96	3.45	9.72	5.21
54	5580.0	-7.88	3.45	9.72	5.29

Worst

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 Shonan EMC Lab.**

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Maximum conducted output power



UL Japan, Inc.

Shonan EMC Lab.

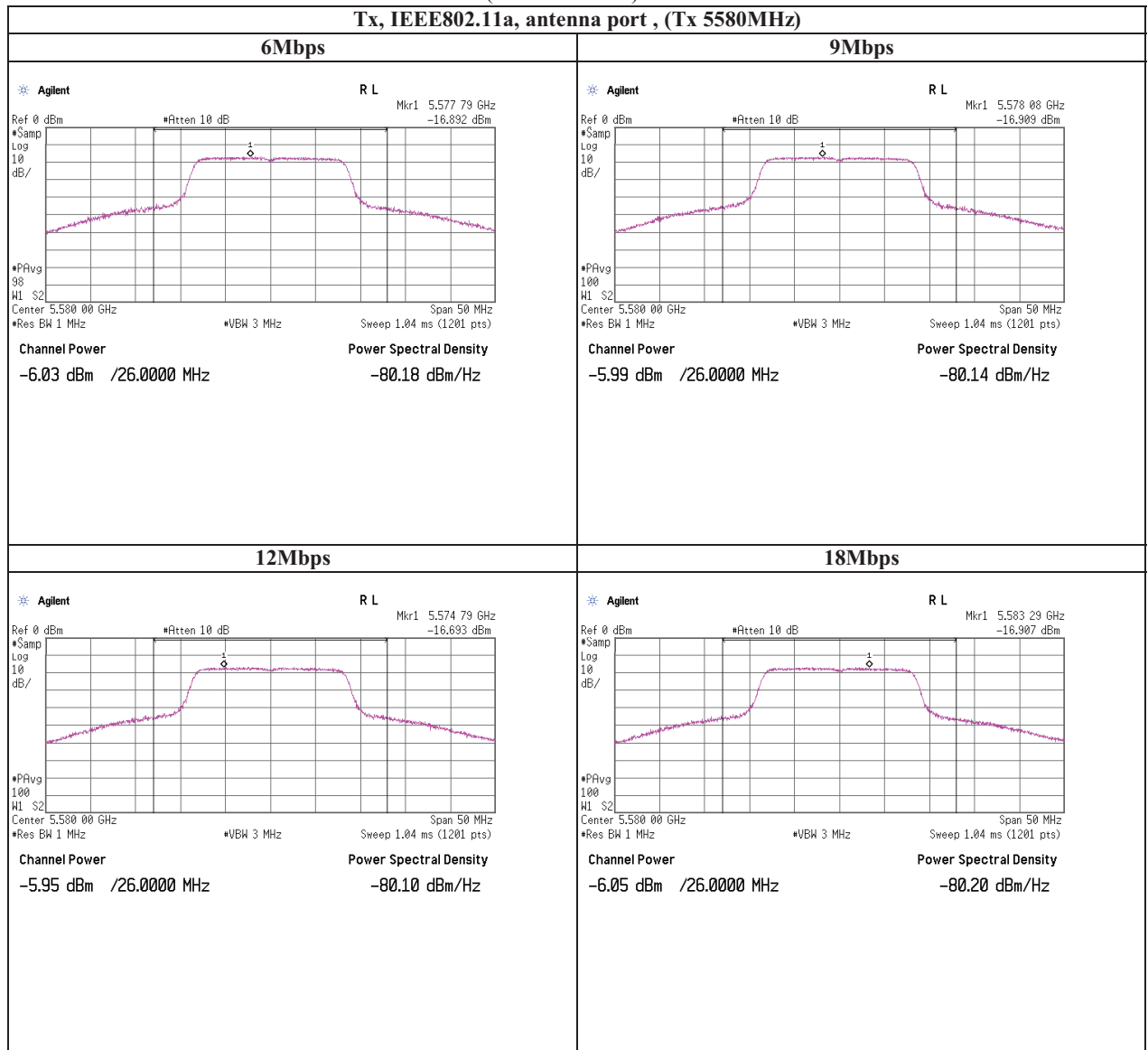
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Telephone : +81 463 50 6400

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Maximum conducted output power

(Reference chart)



UL Japan, Inc.

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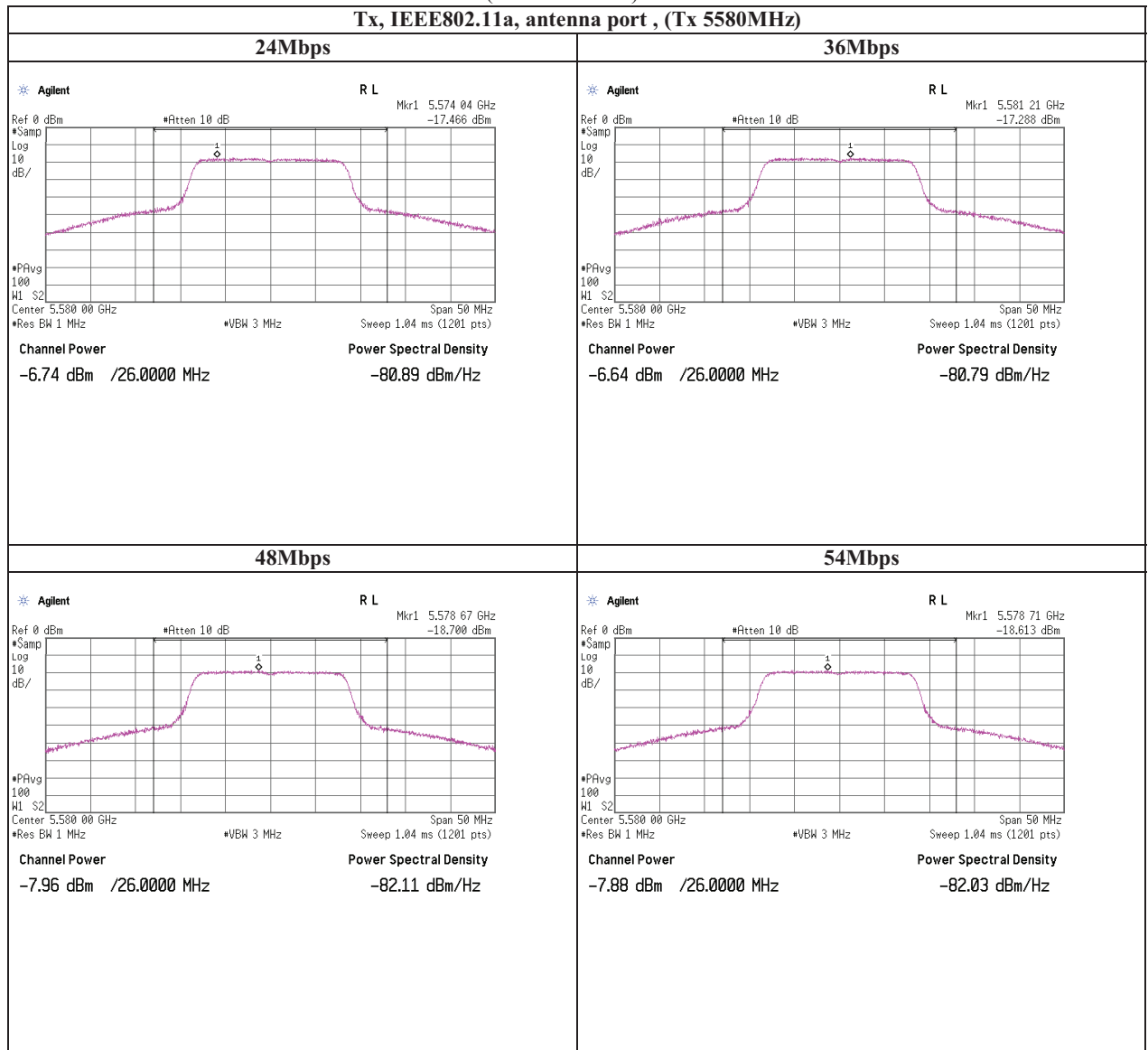
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Maximum conducted output power

(Reference chart)



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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber		
Date	July 12, 2012	July 13, 2012	July 17, 2012
Temperature / Humidity	26deg.C , 69%RH	26deg.C , 58%RH	23deg.C , 64%RH
Engineer	Kenichi Adachi	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5180 MHz		
	Tx, IEEE802.11a, PN9, worst data mode 54Mbps		

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	50.7	31.8	16.0	41.1	57.4	73.9	16.5	100	29	
Hori.	5150.000	AV	35.9	31.8	16.0	41.1	42.6	53.9	11.3	100	29	
Vert.	5150.000	PK	49.8	31.8	16.0	41.1	56.5	73.9	17.4	148	12	
Vert.	5150.000	AV	35.8	31.8	16.0	41.1	42.5	53.9	11.4	148	12	

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

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

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

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.	3453.326	PK	48.6	28.9	14.5	41.5	50.5	-44.7	-27.0	17.7	103	224	
Hori.	10360.000	PK	47.0	40.0	8.8	40.2	55.6	-39.6	-27.0	12.6	100	0	noise floor level
Vert.	3453.326	PK	48.5	28.9	14.5	41.5	50.4	-44.8	-27.0	17.8	117	251	
Vert.	10360.000	PK	46.9	40.0	8.8	40.2	55.5	-39.7	-27.0	12.7	100	0	noise floor level

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).

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber		
Date	July 12, 2012	July 13, 2012	July 17, 2012
Temperature / Humidity	26deg.C , 69%RH	26deg.C , 58%RH	23deg.C , 64%RH
Engineer	Kenichi Adachi	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5220 MHz Tx, IEEE802.11a, PN9, worst data mode 54Mbps		

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

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

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

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

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.	3479.993	PK	50.1	28.9	14.5	41.5	52.0	-43.2	-27.0	16.2	104	222	
Hori.	10440.000	PK	47.1	40.2	8.9	40.2	56.0	-39.2	-27.0	12.2	100	0	noise floor level
Vert.	3479.993	PK	49.6	28.9	14.5	41.5	51.5	-43.7	-27.0	16.7	119	250	
Vert.	10440.000	PK	47.0	40.2	8.9	40.2	55.9	-39.3	-27.0	12.3	100	0	noise floor level

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).

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber		
Date	July 12, 2012	July 13, 2012	July 17, 2012
Temperature / Humidity	26deg.C , 69%RH	26deg.C , 58%RH	23deg.C , 64%RH
Engineer	Kenichi Adachi	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5240 MHz Tx, IEEE802.11a, PN9, worst data mode 54Mbps		

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

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

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

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

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.	3493.326	PK	48.5	28.9	14.5	41.5	50.4	-44.8	-27.0	17.8	102	229	noise floor level
Hori.	10480.000	PK	47.2	40.3	8.9	40.2	56.2	-39.0	-27.0	12.0	100	0	
Vert.	3493.326	PK	48.8	28.9	14.5	41.5	50.7	-44.5	-27.0	17.5	118	248	
Vert.	10480.000	PK	47.1	40.3	8.9	40.2	56.1	-39.1	-27.0	12.1	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).

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date July 12, 2012 July 13, 2012 July 17, 2012
 Temperature / Humidity 26deg.C , 69%RH 26deg.C , 58%RH 23deg.C , 64%RH
 Engineer Kenichi Adachi Kenichi Adachi Wataru Kojima
 Mode Tx, 5260 MHz
 Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Below 1GHz (* 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.	39.999	QP	30.8	14.9	7.1	31.8	21.0	40.0	19.0	312	303	
Hori.	119.999	QP	38.4	13.0	8.2	31.8	27.8	43.5	15.7	153	118	
Hori.	199.999	QP	40.4	16.3	9.1	31.8	34.0	43.5	9.5	166	127	
Hori.	319.999	QP	51.4	14.5	7.1	31.7	41.3	46.0	4.7	100	27	
Hori.	399.999	QP	50.0	15.9	7.7	31.8	41.8	46.0	4.2	271	355	
Hori.	439.999	QP	43.0	16.6	8.0	31.8	35.8	46.0	10.2	204	160	
Vert.	39.999	QP	41.9	14.9	7.1	31.8	32.1	40.0	7.9	100	347	
Vert.	119.999	QP	45.6	13.0	8.2	31.8	35.0	43.5	8.5	100	194	
Vert.	199.999	QP	39.0	16.3	9.1	31.8	32.6	43.5	10.9	100	272	
Vert.	319.999	QP	40.0	14.5	7.1	31.7	29.9	46.0	16.1	302	298	
Vert.	399.999	QP	53.5	15.9	7.7	31.8	45.3	46.0	0.7	121	166	
Vert.	439.999	QP	44.9	16.6	8.0	31.8	37.7	46.0	8.3	110	81	

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).

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

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

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

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

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.	3506.662	PK	49.5	28.9	14.5	41.6	51.3	-43.9	-27.0	16.9	104	231	
Hori.	10520.000	PK	47.1	40.4	8.9	40.2	56.2	-39.0	-27.0	12.0	100	0	noise floor level
Vert.	3506.662	PK	49.3	28.9	14.5	41.6	51.1	-44.1	-27.0	17.1	113	247	
Vert.	10520.000	PK	47.2	40.4	8.9	40.2	56.3	-38.9	-27.0	11.9	100	0	noise floor level

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).

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber		
Date	July 12, 2012	July 13, 2012	July 17, 2012
Temperature / Humidity	26deg.C , 69%RH	26deg.C , 58%RH	23deg.C , 64%RH
Engineer	Kenichi Adachi	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5300 MHz		
	Tx, IEEE802.11a, PN9, worst data mode 12Mbps		

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.	10600.000	PK	47.0	40.4	8.9	40.1	56.2	73.9	17.7	100	0	noise floor level
Hori.	10600.000	AV	34.0	40.4	8.9	40.1	43.2	53.9	10.7	100	0	noise floor level
Vert.	10600.000	PK	47.1	40.4	8.9	40.1	56.3	73.9	17.6	100	0	noise floor level
Vert.	10600.000	AV	34.0	40.4	8.9	40.1	43.2	53.9	10.7	100	0	noise floor level

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

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

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

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.	3533.326	PK	50.3	28.9	14.5	41.6	52.1	-43.1	-27.0	16.1	104	222	
Vert.	3533.326	PK	49.1	28.9	14.5	41.6	50.9	-44.3	-27.0	17.3	118	246	

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).

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date July 12, 2012 July 13, 2012 July 17, 2012
 Temperature / Humidity 26deg.C , 69%RH 26deg.C , 58%RH 23deg.C , 64%RH
 Engineer Kenichi Adachi Kenichi Adachi Wataru Kojima
 Mode Tx, 5320 MHz
 Tx, IEEE802.11a, PN9, worst data mode 12Mbps

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	49.8	31.9	16.1	40.7	57.1	73.9	16.8	100	25	
Hori.	5350.000	AV	35.8	31.9	16.1	40.7	43.1	53.9	10.8	100	25	
Hori.	10640.000	PK	46.9	40.4	8.9	40.1	56.1	73.9	17.8	100	0	noise floor level
Hori.	10640.000	AV	33.7	40.4	8.9	40.1	42.9	53.9	11.0	100	0	noise floor level
Vert.	5350.000	PK	49.6	31.9	16.1	40.7	56.9	73.9	17.0	146	7	
Vert.	5350.000	AV	35.7	31.9	16.1	40.7	43.0	53.9	10.9	146	7	
Vert.	10640.000	PK	46.8	40.4	8.9	40.1	56.0	73.9	17.9	100	0	noise floor level
Vert.	10640.000	AV	33.6	40.4	8.9	40.1	42.8	53.9	11.1	100	0	noise floor level

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

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

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

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.	3546.659	PK	52.3	29.0	14.5	41.6	54.2	-41.0	-27.0	14.0	102	226	
Vert.	3546.659	PK	51.9	29.0	14.5	41.6	53.8	-41.4	-27.0	14.4	114	253	

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).

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

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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date July 12, 2012 July 13, 2012 July 17, 2012
 Temperature / Humidity 26deg.C , 69%RH 26deg.C , 58%RH 23deg.C , 64%RH
 Engineer Kenichi Adachi Kenichi Adachi Wataru Kojima
 Mode Tx, 5500 MHz
 Tx, IEEE802.11a, PN9, worst data mode 12Mbps

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.	3666.659	PK	48.8	29.2	14.8	41.7	51.1	73.9	22.8	102	221	
Hori.	3666.659	AV	36.4	29.2	14.8	41.7	38.7	53.9	15.2	102	221	
Hori.	11000.000	PK	46.7	40.4	9.0	40.1	56.0	73.9	17.9	100	0	noise floor level
Hori.	11000.000	AV	33.7	40.4	9.0	40.1	43.0	53.9	10.9	100	0	noise floor level
Vert.	3666.659	PK	48.1	29.2	14.8	41.7	50.4	73.9	23.5	115	252	
Vert.	3666.659	AV	35.6	29.2	14.8	41.7	37.9	53.9	16.0	115	252	
Vert.	11000.000	PK	46.8	40.4	9.0	40.1	56.1	73.9	17.8	100	0	noise floor level
Vert.	11000.000	AV	33.8	40.4	9.0	40.1	43.1	53.9	10.8	100	0	noise floor level

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

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

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

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	53.9	32.0	16.2	40.5	61.6	-33.6	-27.0	6.6	100	33	
Vert.	5470.000	PK	53.2	32.0	16.2	40.5	60.9	-34.3	-27.0	7.3	138	16	

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).

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Semi Anechoic Chamber	
Date	July 12, 2012	July 13, 2012	July 17, 2012
Temperature / Humidity	26deg.C , 69%RH	26deg.C , 58%RH	23deg.C , 64%RH
Engineer	Kenichi Adachi	Kenichi Adachi	Wataru Kojima
Mode	Tx, 5580 MHz		
	Tx, IEEE802.11a, PN9, worst data mode 12Mbps		

Below 1GHz (* 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.	39.999	QP	30.6	14.9	7.1	31.8	20.8	40.0	19.2	309	301	
Hori.	119.999	QP	38.2	13.0	8.2	31.8	27.6	43.5	15.9	156	121	
Hori.	199.999	QP	40.5	16.3	9.1	31.8	34.1	43.5	9.4	164	123	
Hori.	319.999	QP	50.0	14.5	7.1	31.7	39.9	46.0	6.1	100	28	
Hori.	399.999	QP	49.8	15.9	7.7	31.8	41.6	46.0	4.4	265	353	
Hori.	439.999	QP	42.8	16.6	8.0	31.8	35.6	46.0	10.4	206	156	
Vert.	39.999	QP	42.0	14.9	7.1	31.8	32.2	40.0	7.8	100	349	
Vert.	119.999	QP	45.7	13.0	8.2	31.8	35.1	43.5	8.4	100	196	
Vert.	199.999	QP	39.8	16.3	9.1	31.8	33.4	43.5	10.1	100	267	
Vert.	319.999	QP	39.9	14.5	7.1	31.7	29.8	46.0	16.2	298	302	
Vert.	399.999	QP	53.1	15.9	7.7	31.8	44.9	46.0	1.1	118	162	
Vert.	439.999	QP	44.8	16.6	8.0	31.8	37.6	46.0	8.4	108	78	

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).

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.	3719.993	PK	49.3	29.3	14.8	41.7	51.7	73.9	22.2	103	227	
Hori.	3719.993	AV	37.2	29.3	14.8	41.7	39.6	53.9	14.3	103	227	
Hori.	11160.000	PK	46.9	40.3	9.1	40.1	56.2	73.9	17.7	100	0	noise floor level
Hori.	11160.000	AV	33.8	40.3	9.1	40.1	43.1	53.9	10.8	100	0	noise floor level
Vert.	3719.993	PK	48.5	29.3	14.8	41.7	50.9	73.9	23.0	112	249	
Vert.	3719.993	AV	36.8	29.3	14.8	41.7	39.2	53.9	14.7	112	249	
Vert.	11160.000	PK	47	40.3	9.1	40.1	56.3	73.9	17.6	100	0	noise floor level
Vert.	11160.000	AV	33.9	40.3	9.1	40.1	43.2	53.9	10.7	100	0	noise floor level

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

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

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

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

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).

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

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 Engineer Kenichi Adachi Kenichi Adachi Wataru Kojima
 Mode Tx, 5700 MHz
 Tx, IEEE802.11a, PN9, worst data mode 12Mbps

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.	3799.989	PK	51.0	29.5	14.9	41.8	53.6	73.9	20.3	102	224	
Hori.	3799.989	AV	40.6	29.5	14.9	41.8	43.2	53.9	10.7	102	224	
Hori.	11400.000	PK	47.0	40.2	9.5	40.0	56.7	73.9	17.2	100	0	noise floor level
Hori.	11400.000	AV	33.8	40.2	9.5	40.0	43.5	53.9	10.4	100	0	noise floor level
Vert.	3799.989	PK	50.4	29.5	14.9	41.8	53.0	73.9	20.9	113	248	
Vert.	3799.989	AV	40.3	29.5	14.9	41.8	42.9	53.9	11.0	113	248	
Vert.	11400.000	PK	47.1	40.2	9.5	40.0	56.8	73.9	17.1	100	0	noise floor level
Vert.	11400.000	AV	33.9	40.2	9.5	40.0	43.6	53.9	10.3	100	0	noise floor level

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

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

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

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	53.7	32.3	16.3	40.5	61.8	-33.4	-27.0	6.4	100	28	
Vert.	5725.000	PK	53.0	32.3	16.3	40.5	61.1	-34.1	-27.0	7.1	131	22	

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

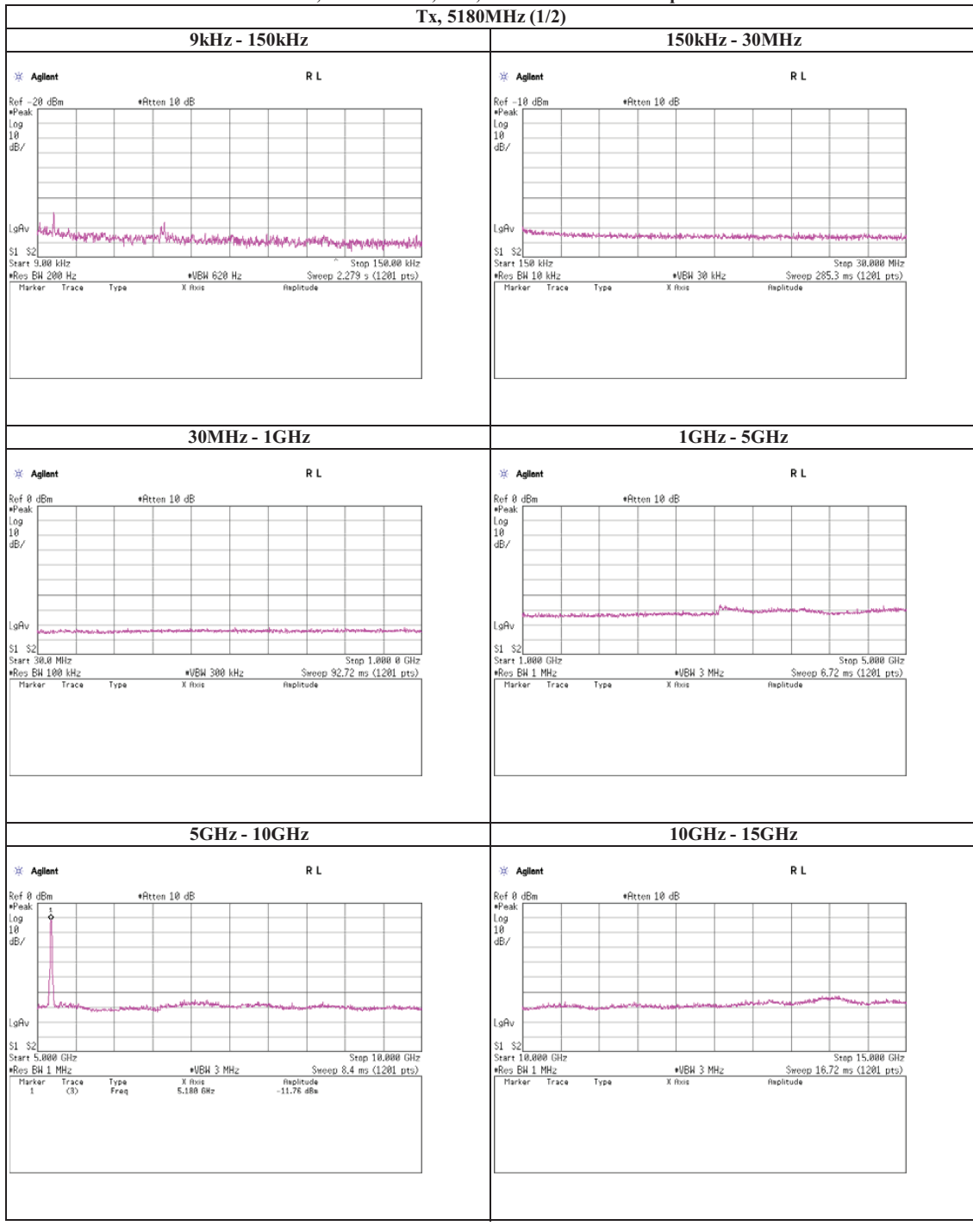
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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

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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps



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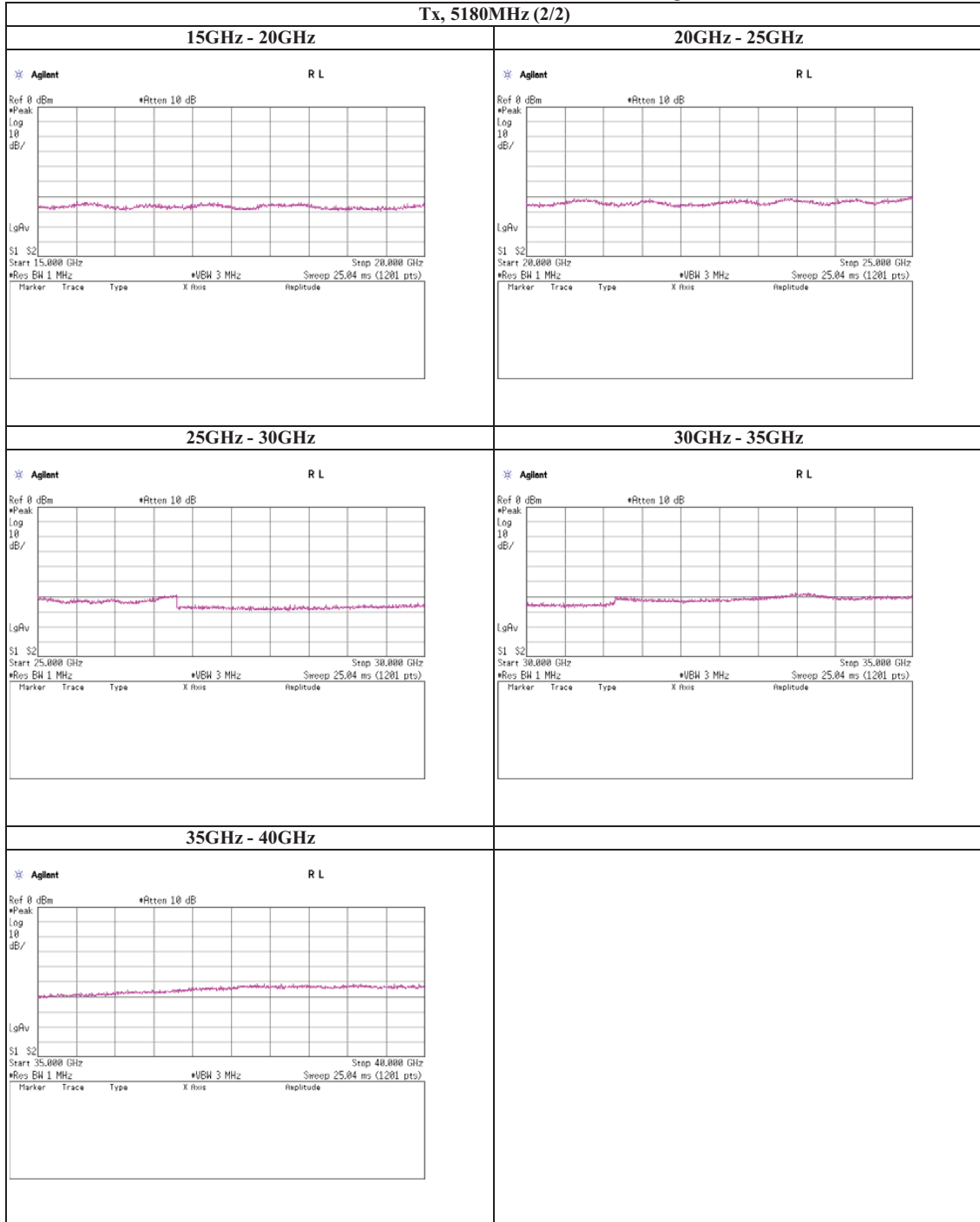
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps

Tx, 5180MHz (2/2)



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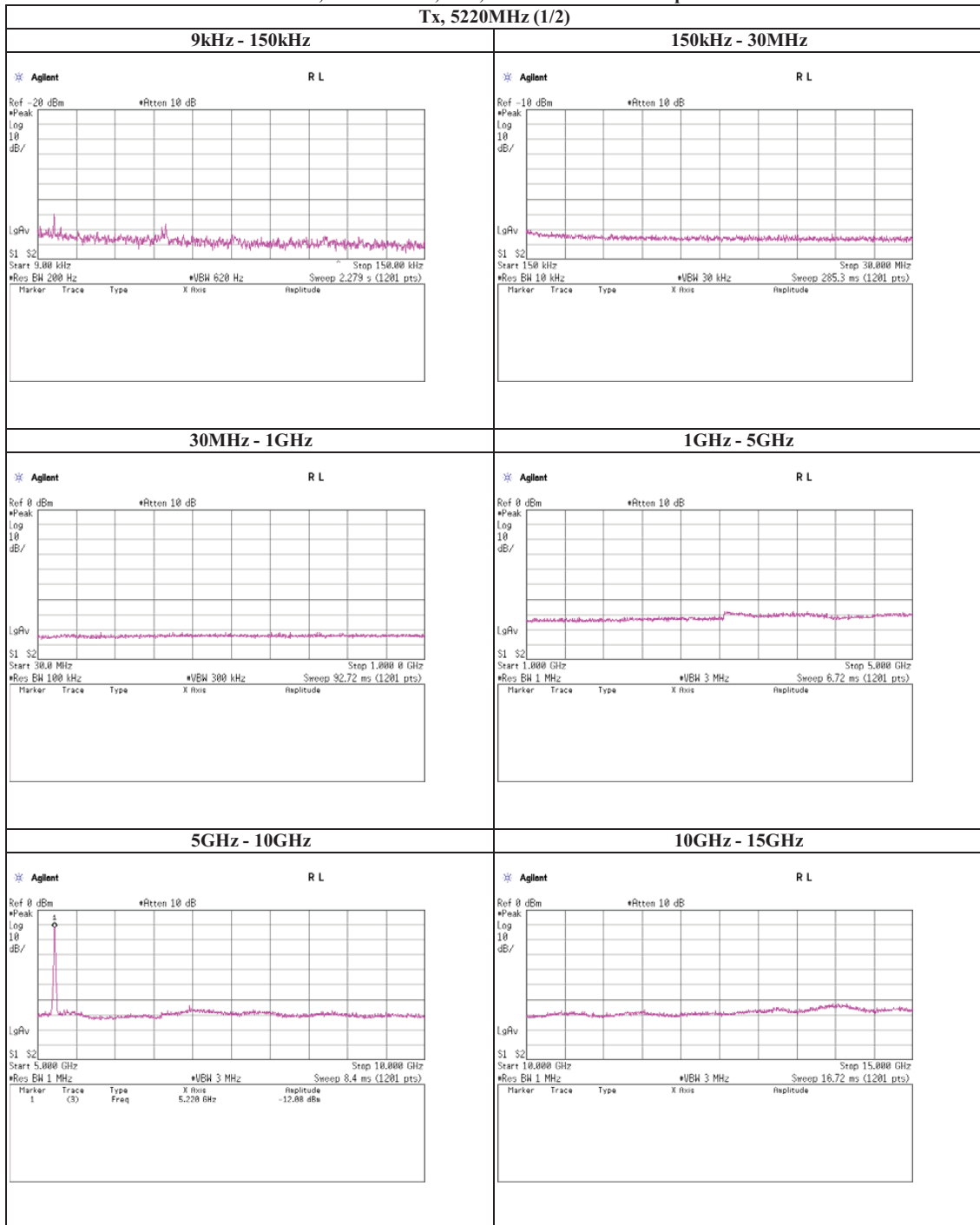
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps

Tx, 5220MHz (1/2)



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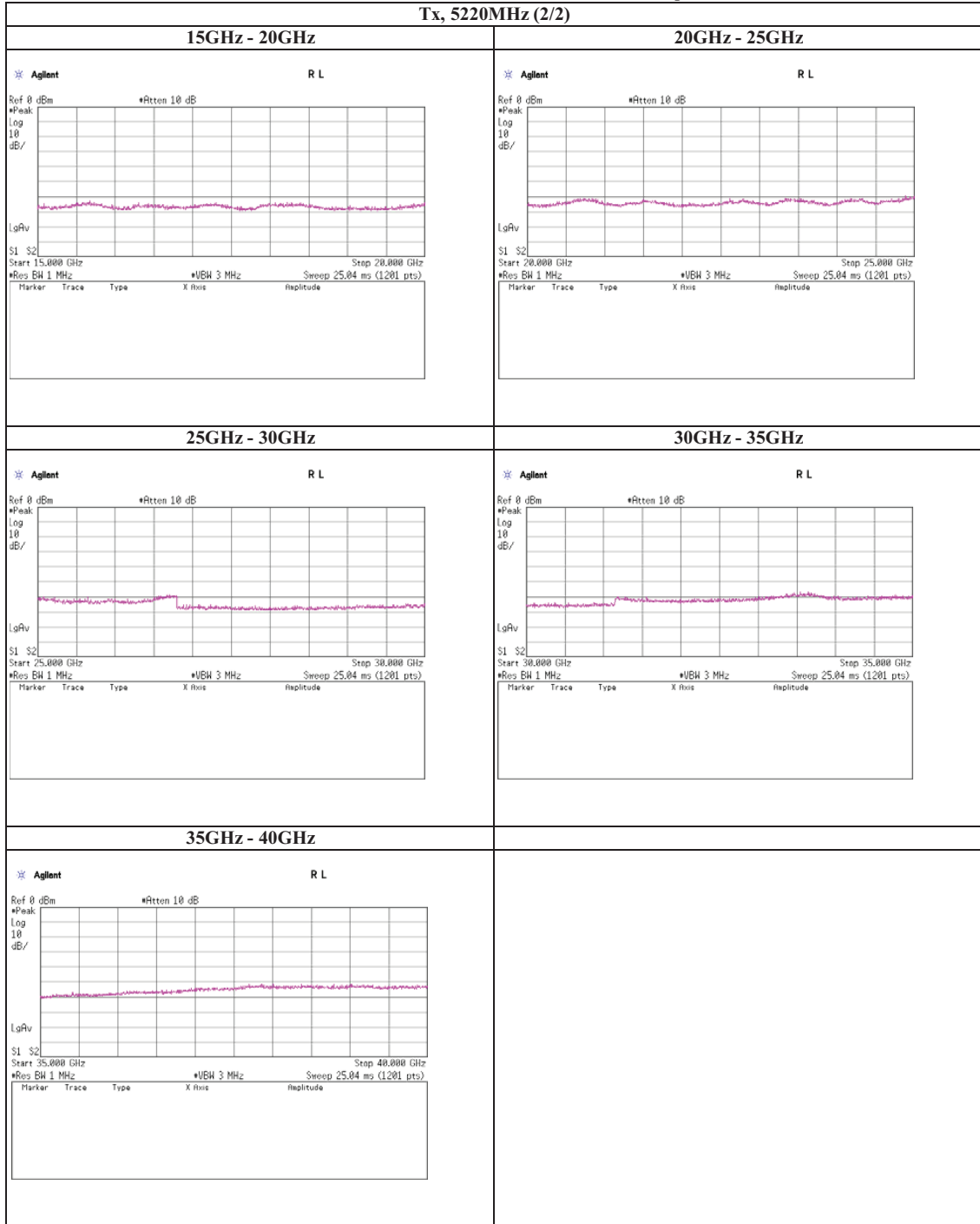
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps

Tx, 5220MHz (2/2)



UL Japan, Inc.

Shonan EMC Lab.

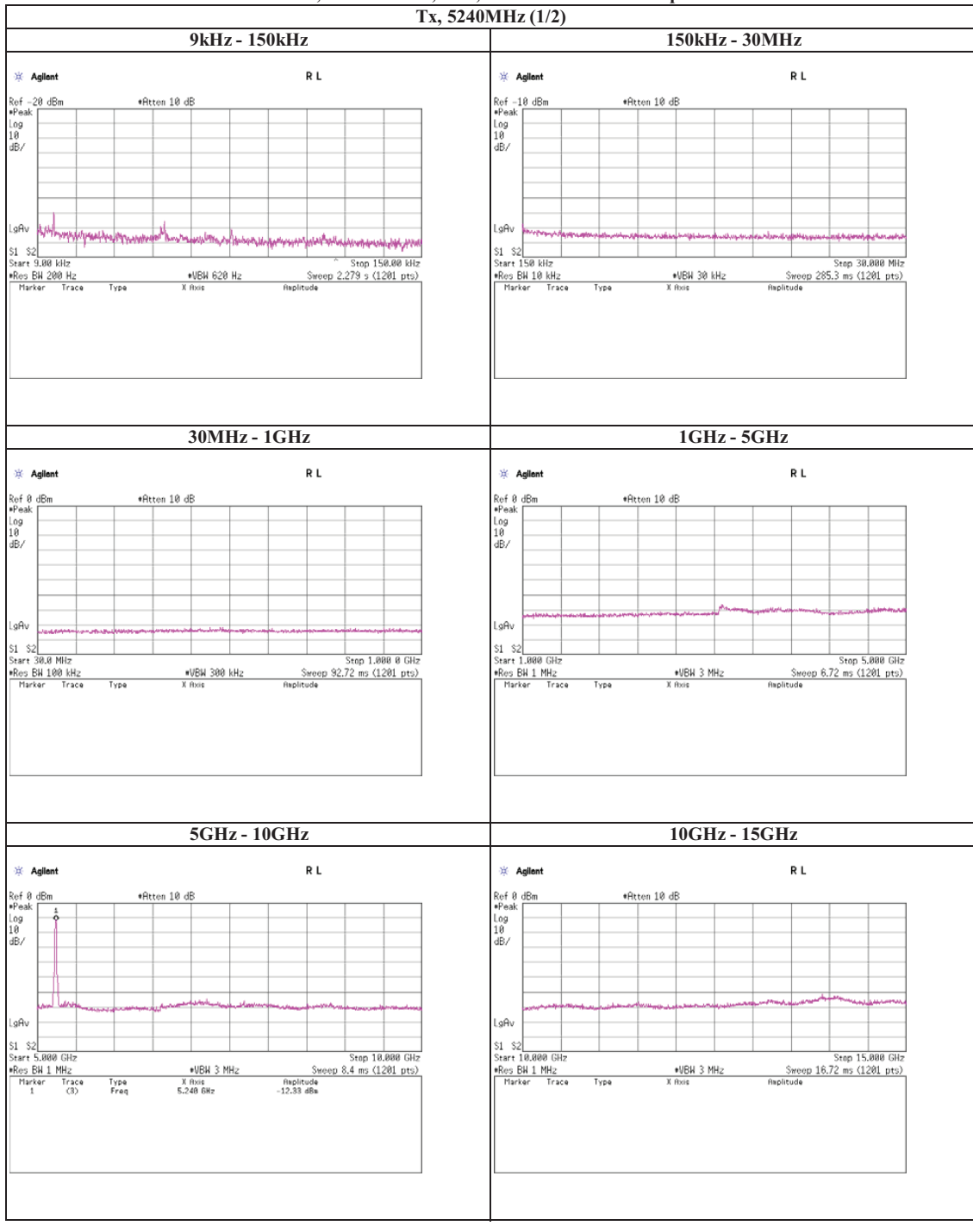
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps



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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 54Mbps

Tx, 5240MHz (2/2)



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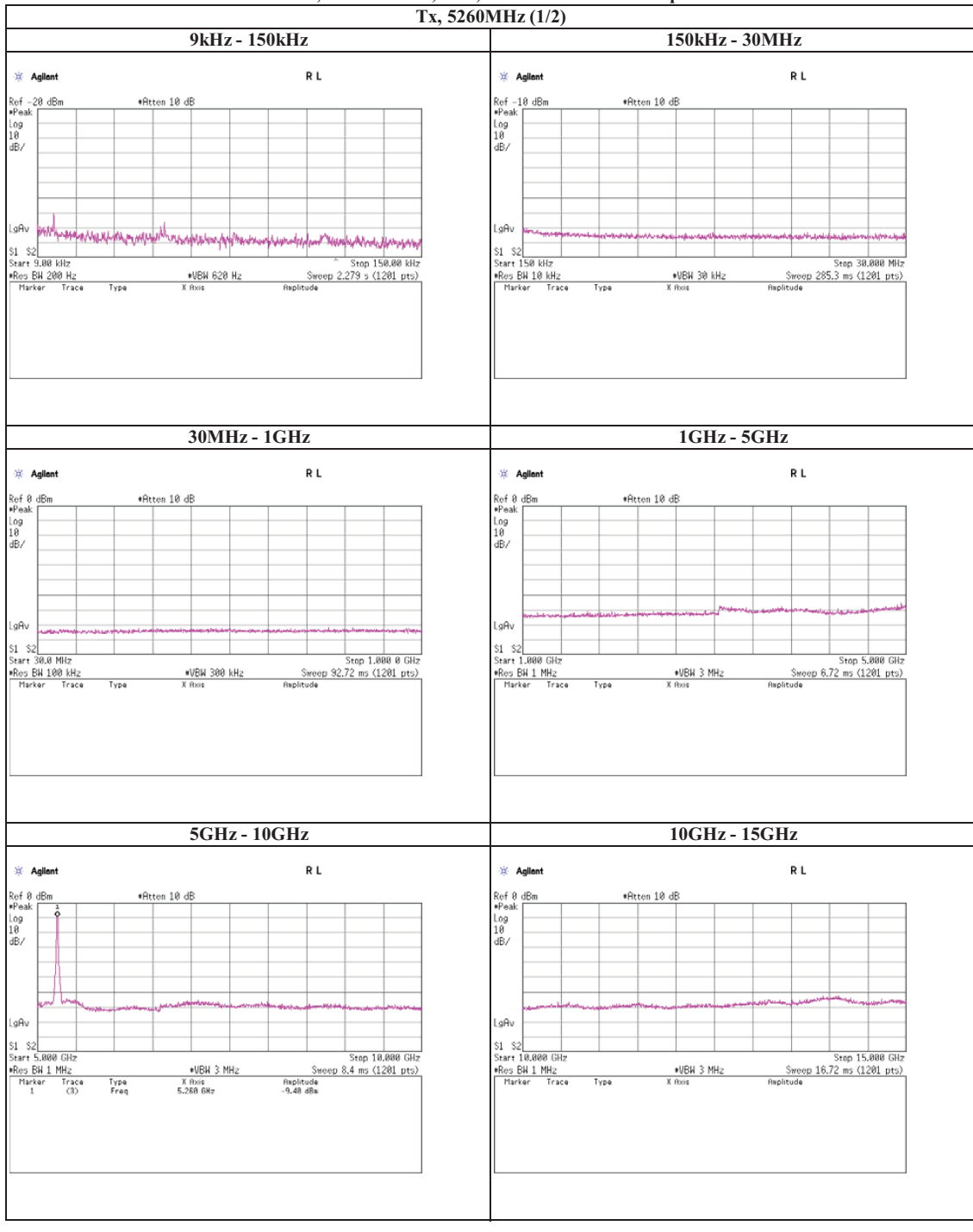
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5260MHz (1/2)



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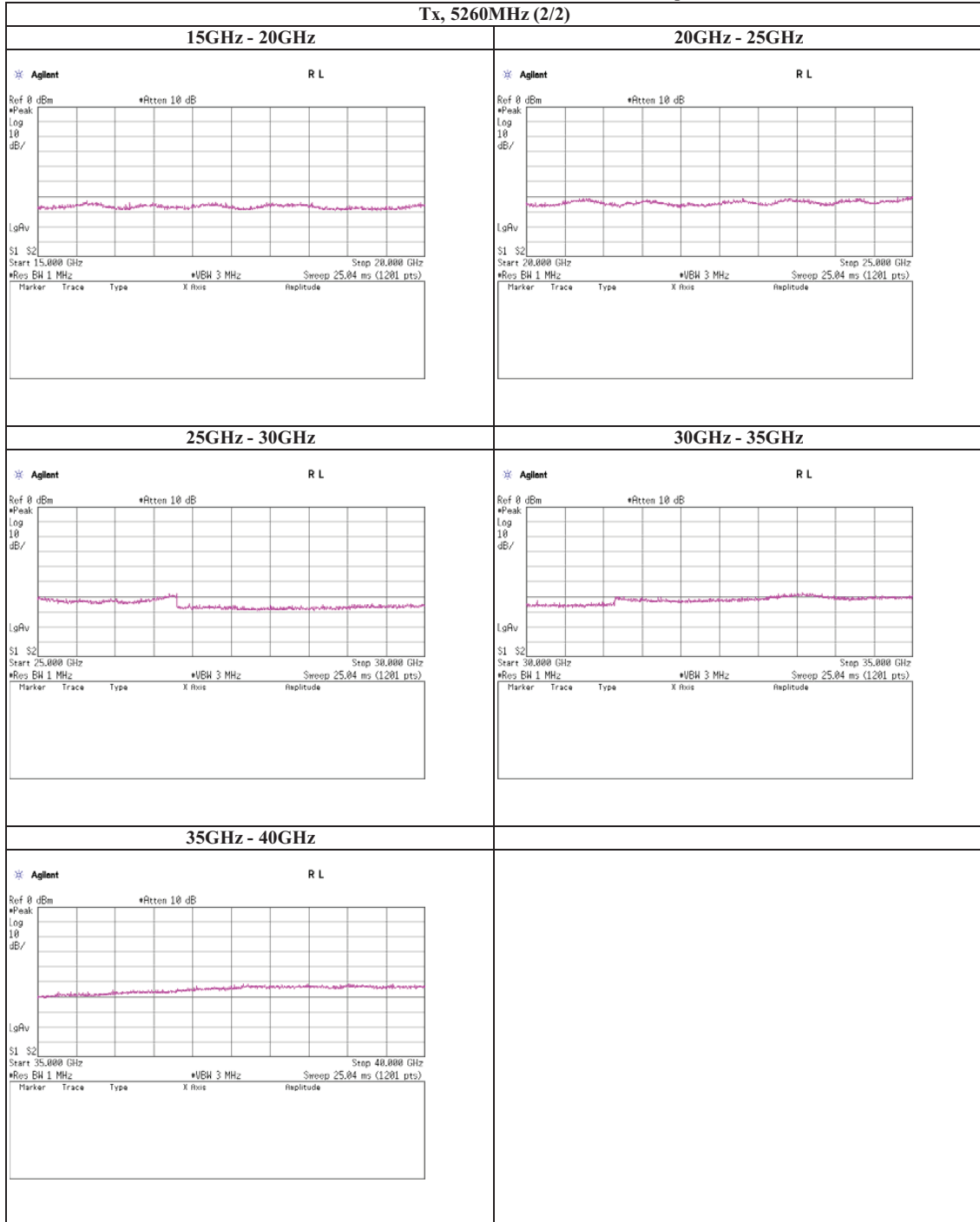
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5260MHz (2/2)



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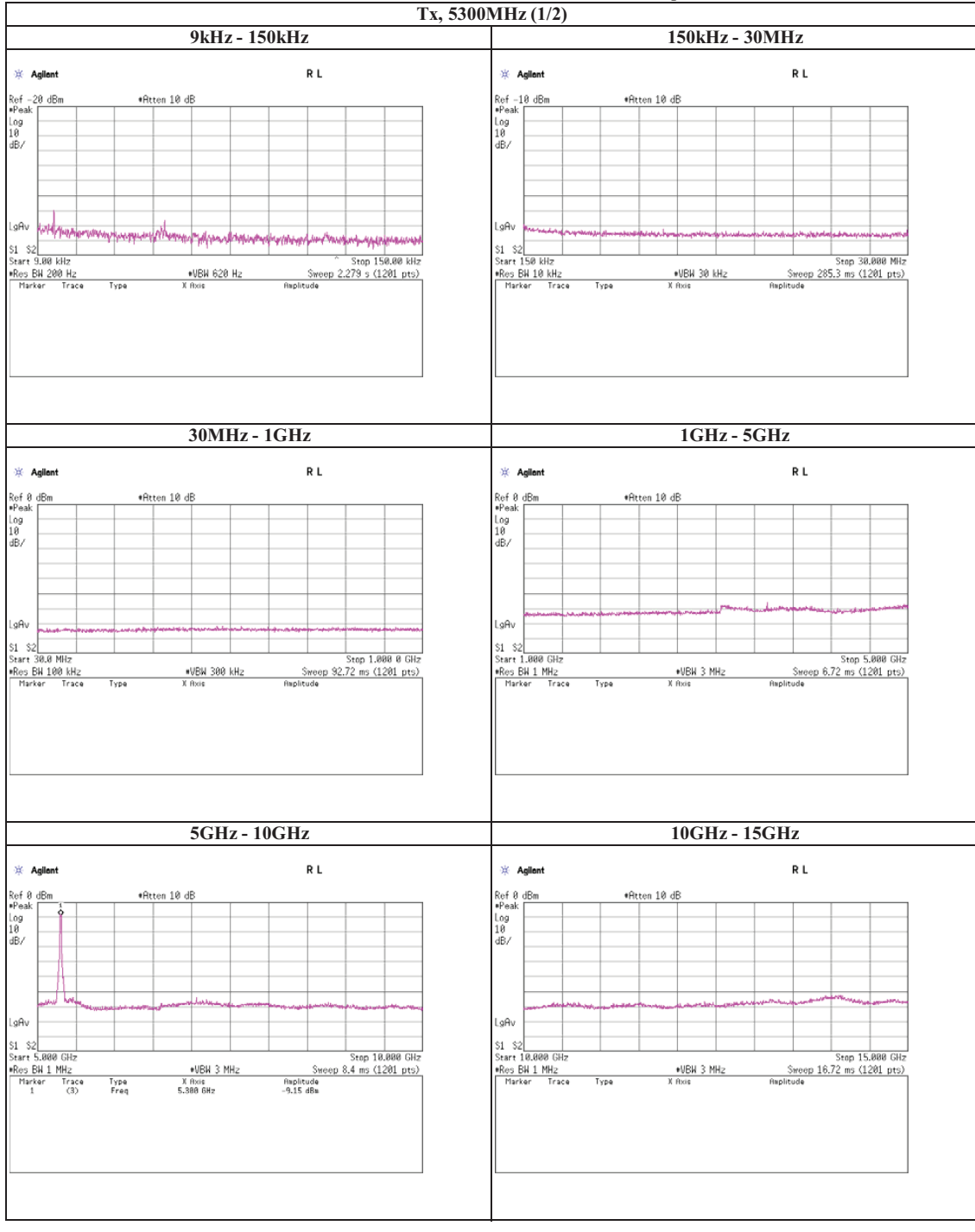
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5300MHz (1/2)

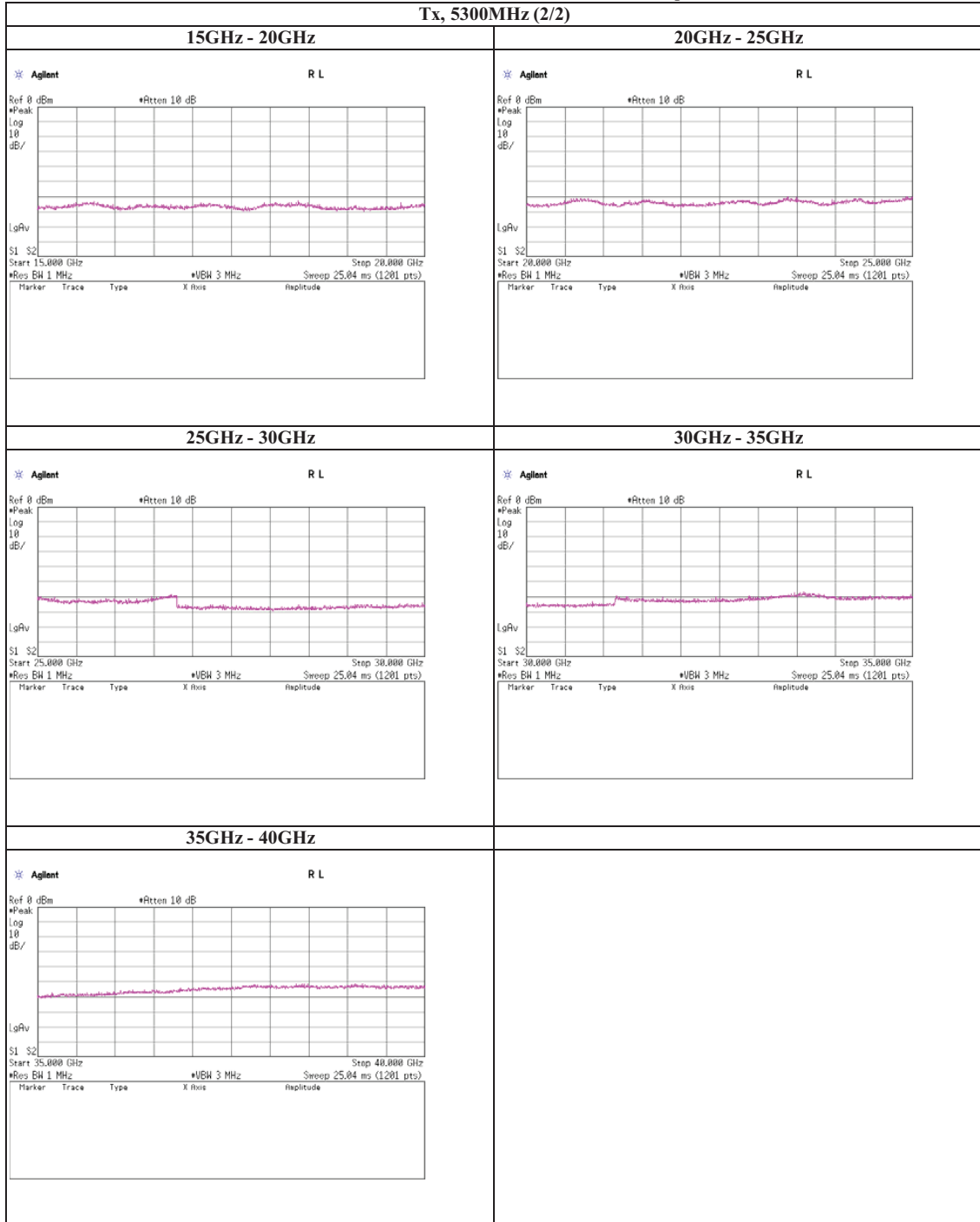


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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5300MHz (2/2)



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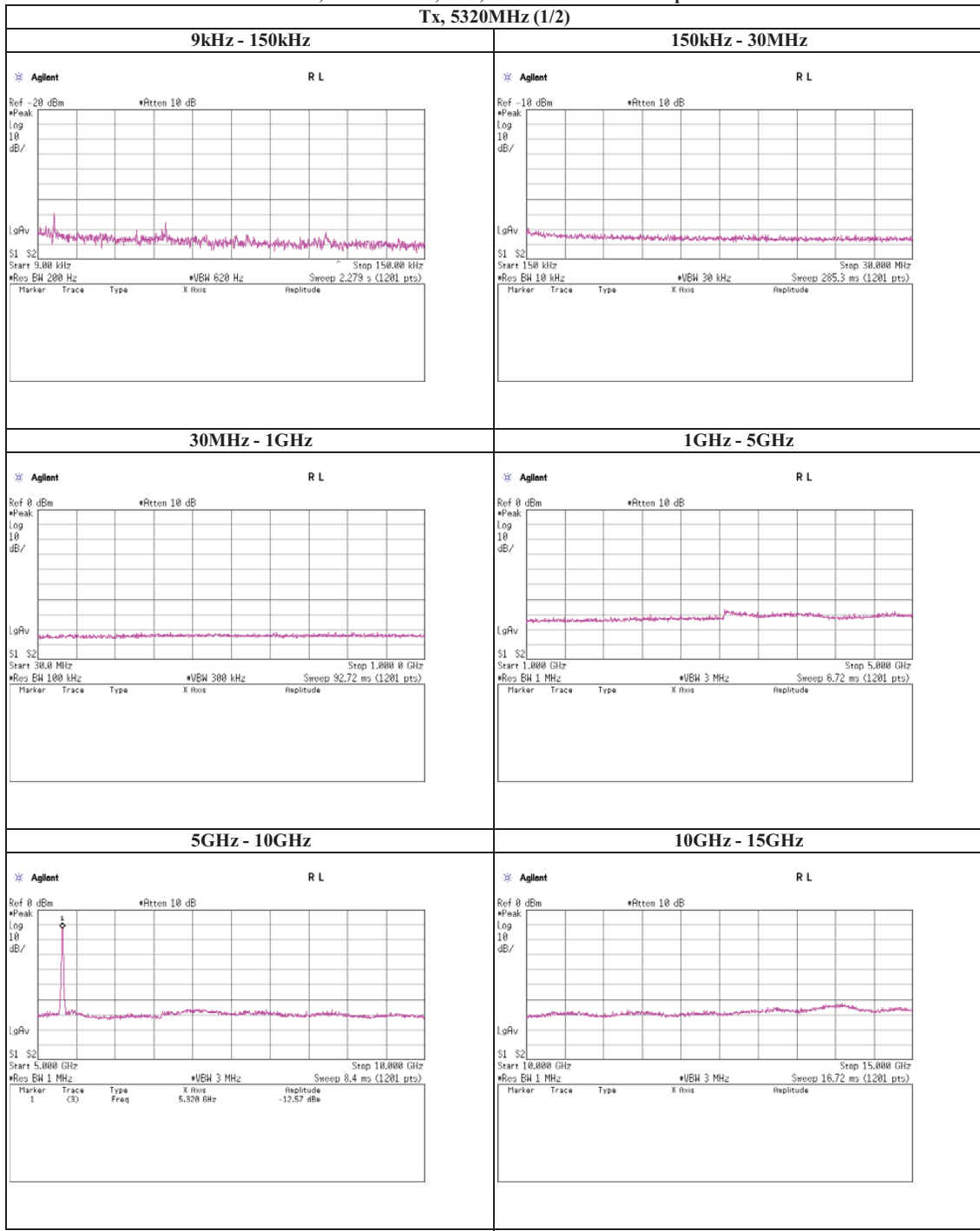
Telephone : +81 463 50 6400

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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5320MHz (1/2)



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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5320MHz (2/2)



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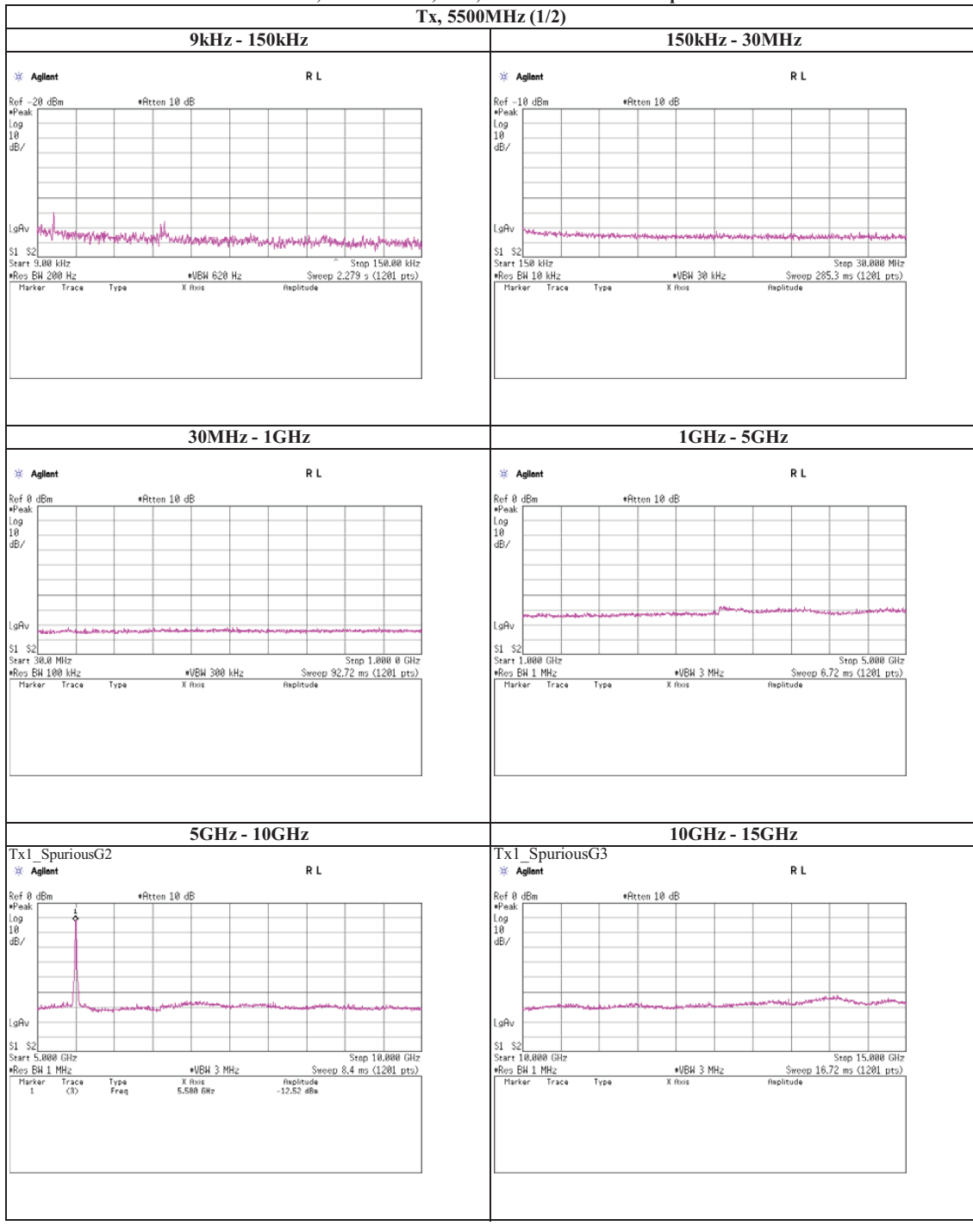
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps



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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5500MHz (2/2)



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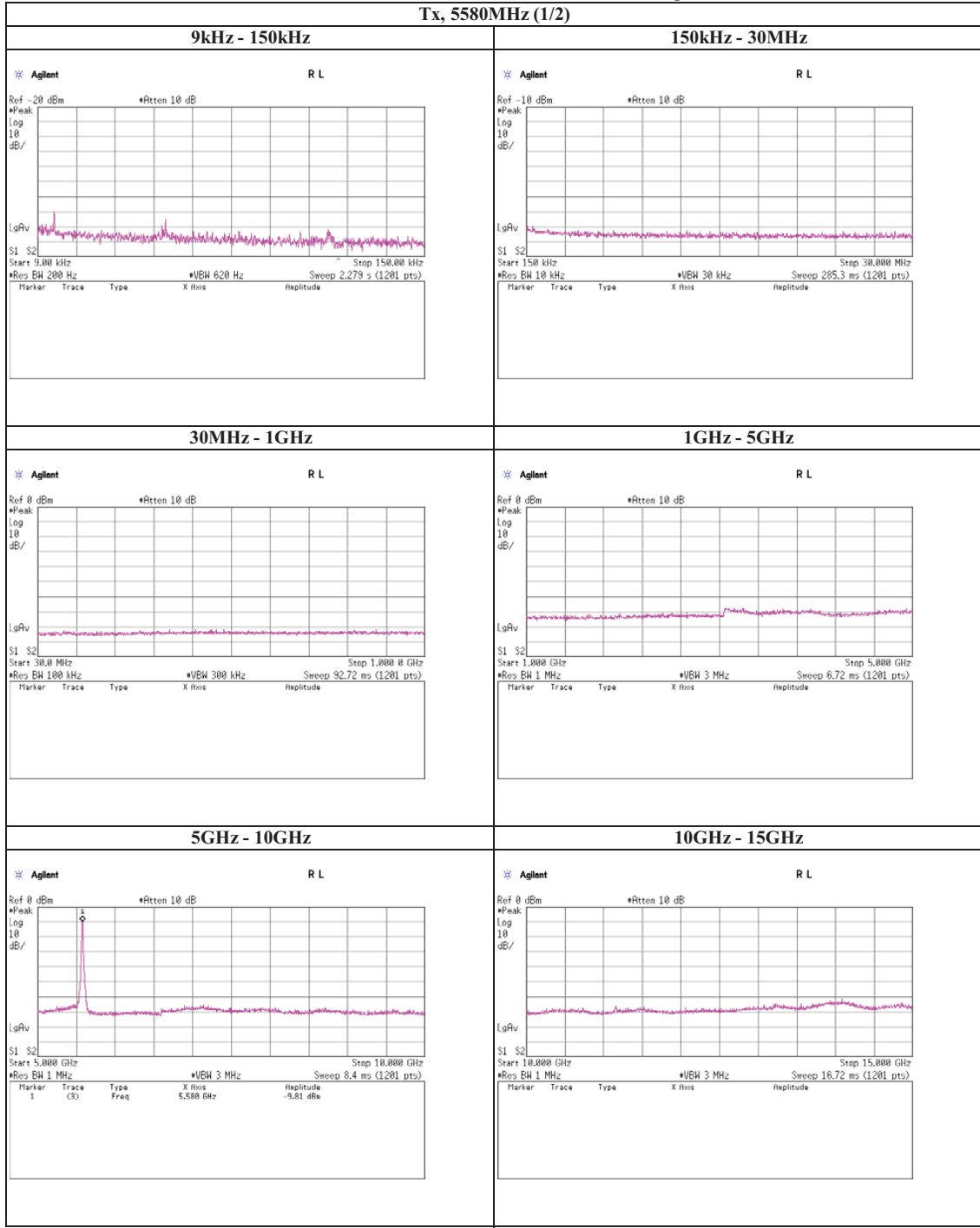
Telephone : +81 463 50 6400

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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5580MHz (1/2)



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(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5580MHz (2/2)



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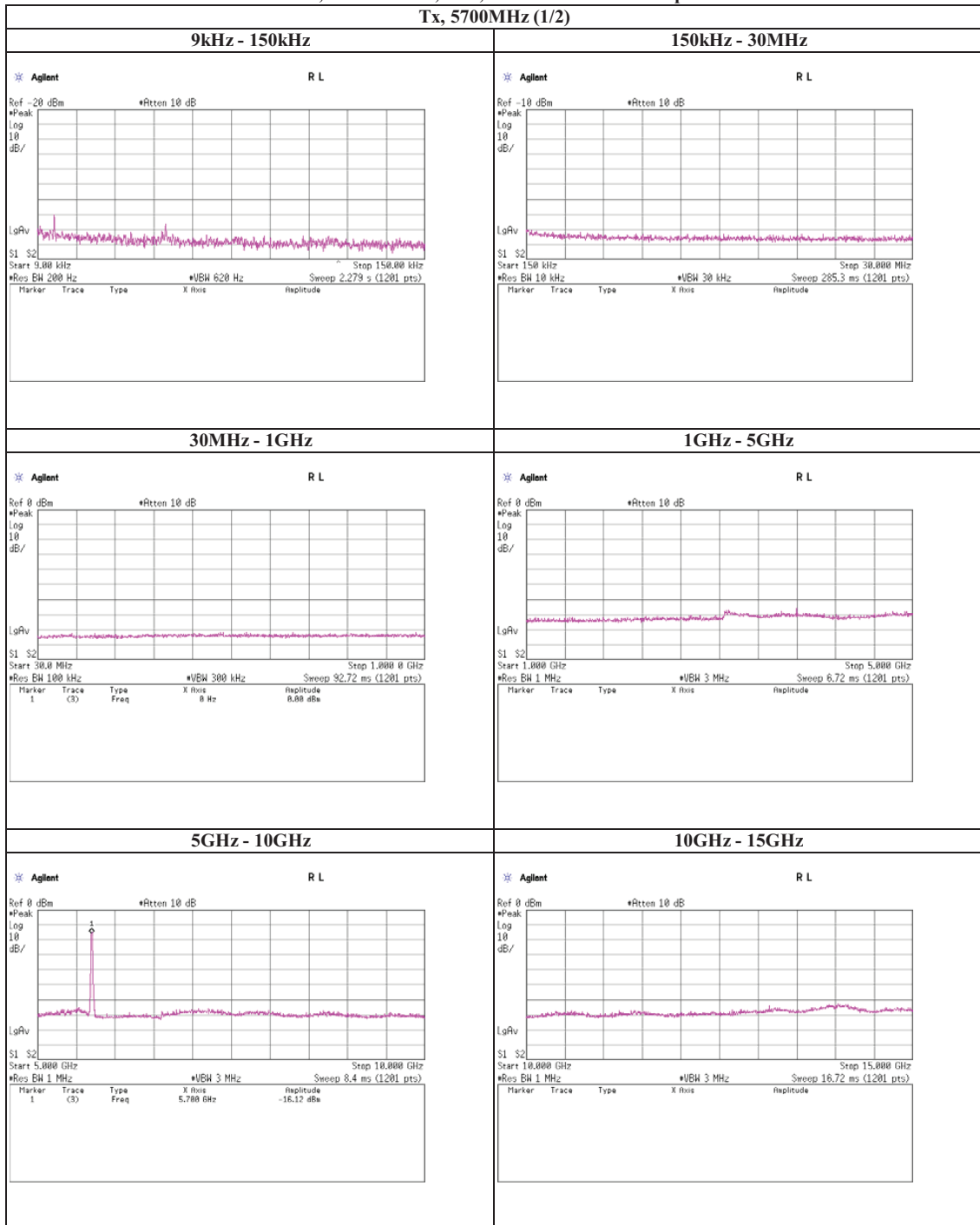
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5700MHz (1/2)



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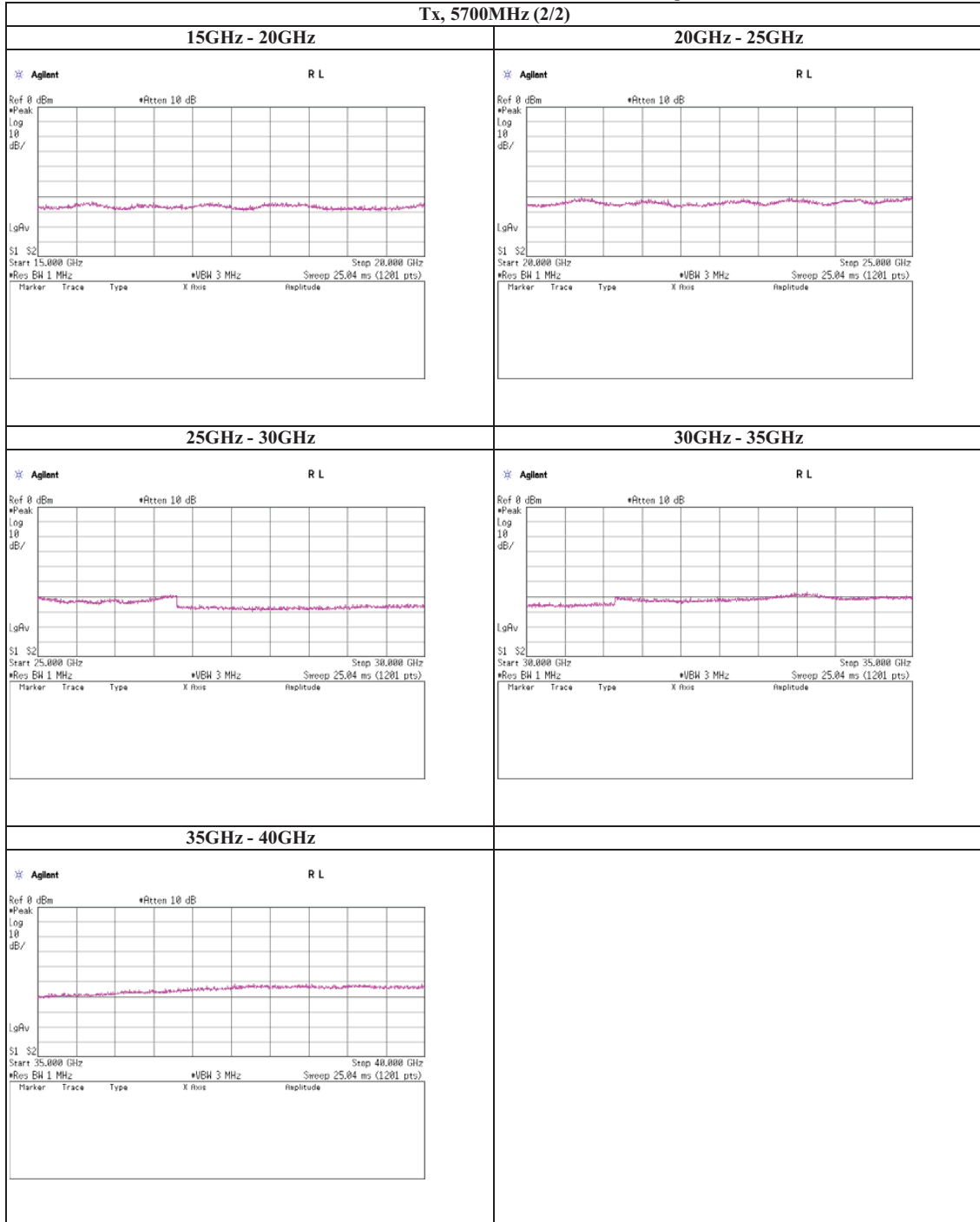
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

(Reference) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst data mode 12Mbps

Tx, 5700MHz (2/2)



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Shonan EMC Lab.

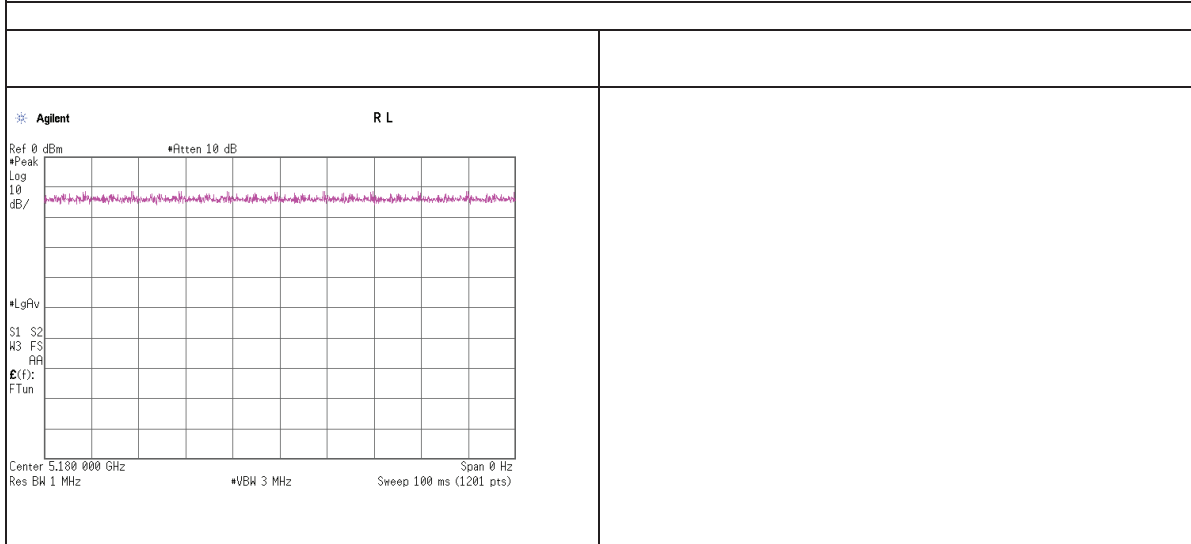
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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Burst rate confirmation

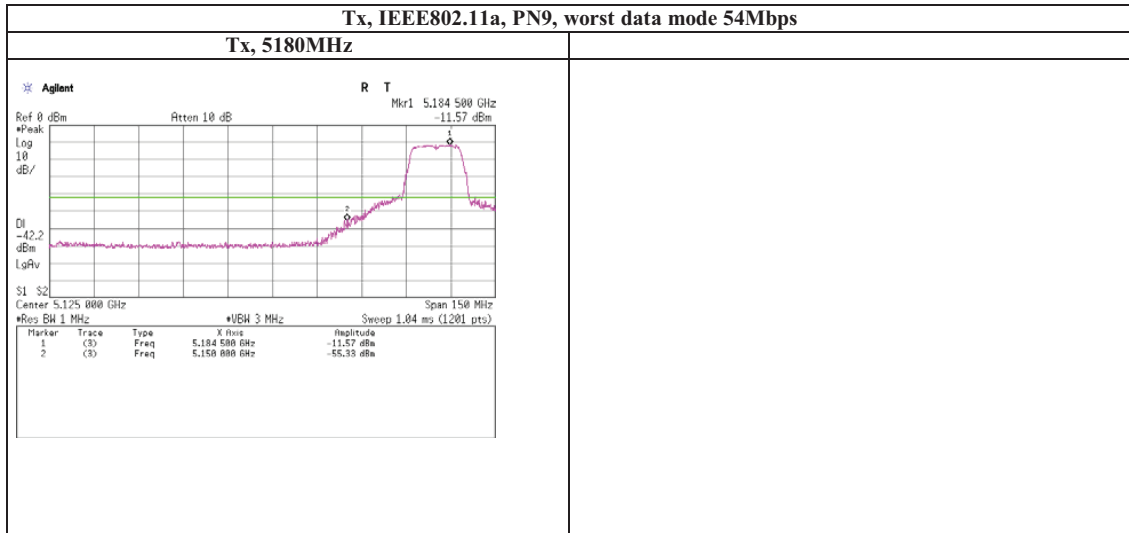
Tx, IEEE802.11a, PN9, worst data mode 54Mbps



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Spurious emission (Conducted)

Band Edge compliance



Specified value in the Regulation - Cable Loss (including the cable(s) customer supplied) - Atten. Loss - Antenna Gain = Limit line

FREQ [MHz]	Regulation [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain *1) [dBi]	Limit line [dBm]
5150.00	-27.00	3.37	9.65	2.14	-42.16
5350.00	-27.00	3.41	9.68	2.14	-42.23

*1) Selected worst antenna.

UL Japan, Inc.

Shonan EMC Lab.

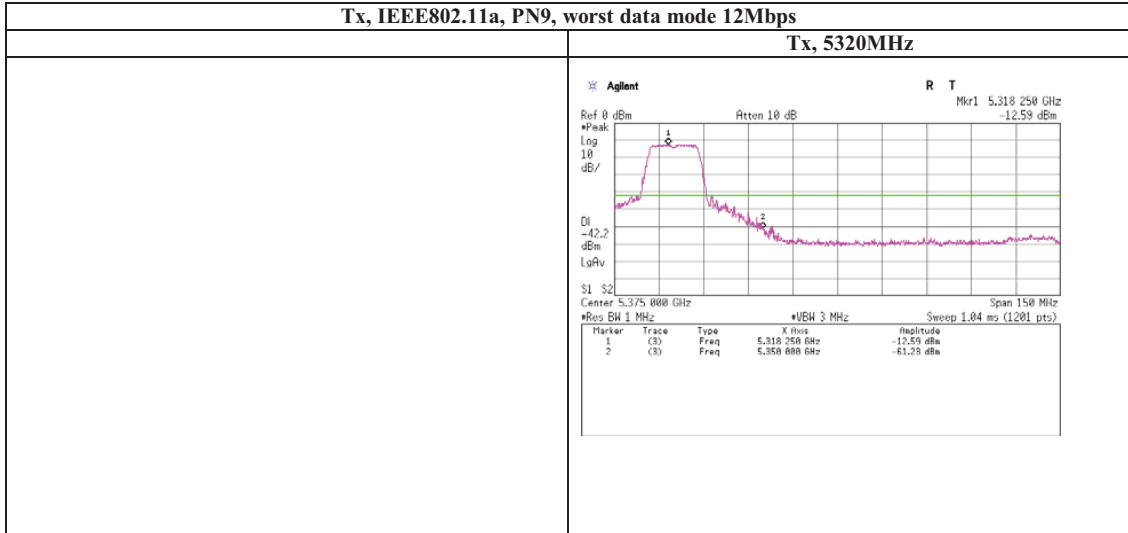
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



Specified value in the Regulation - Cable Loss (including the cable(s) customer supplied) - Atten. Loss - Antenna Gain = Limit line

FREQ [MHz]	Regulation [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain *1) [dBi]	Limit line [dBm]
5150.00	-27.00	3.37	9.65	2.14	-42.16
5350.00	-27.00	3.41	9.68	2.14	-42.23

*1) Selected worst antenna.

UL Japan, Inc.

Shonan EMC Lab.

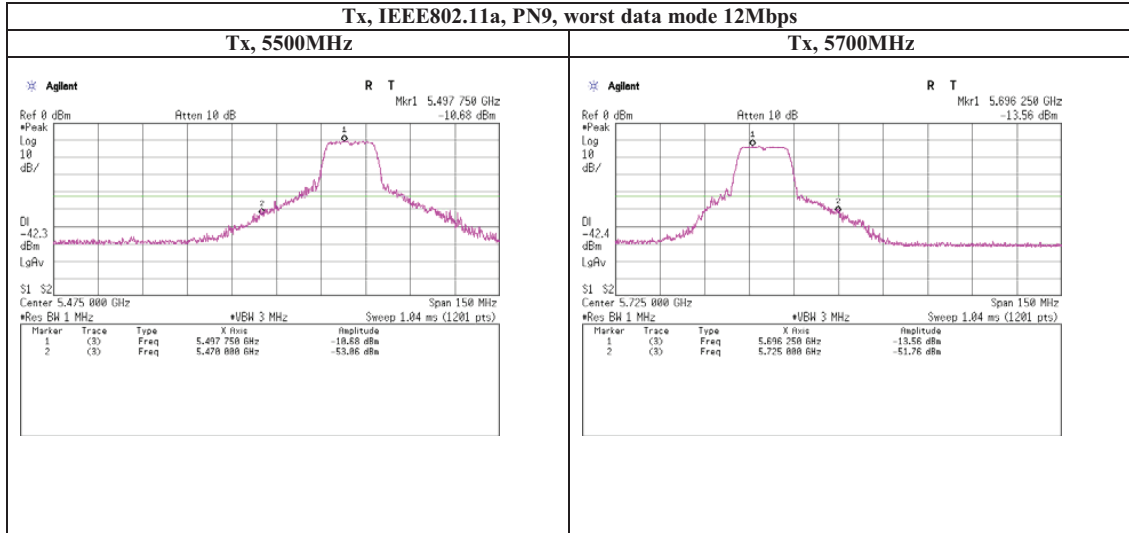
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



Specified value in the Regulation - Cable Loss (including the cable(s) customer supplied) - Atten. Loss - Antenna Gain = Limit line

FREQ [MHz]	Regulation [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain *1) [dBi]	Limit line [dBm]
5470.00	-27.00	3.43	9.70	2.14	-42.27
5725.00	-27.00	3.48	9.73	2.14	-42.35

*1) Selected worst antenna.

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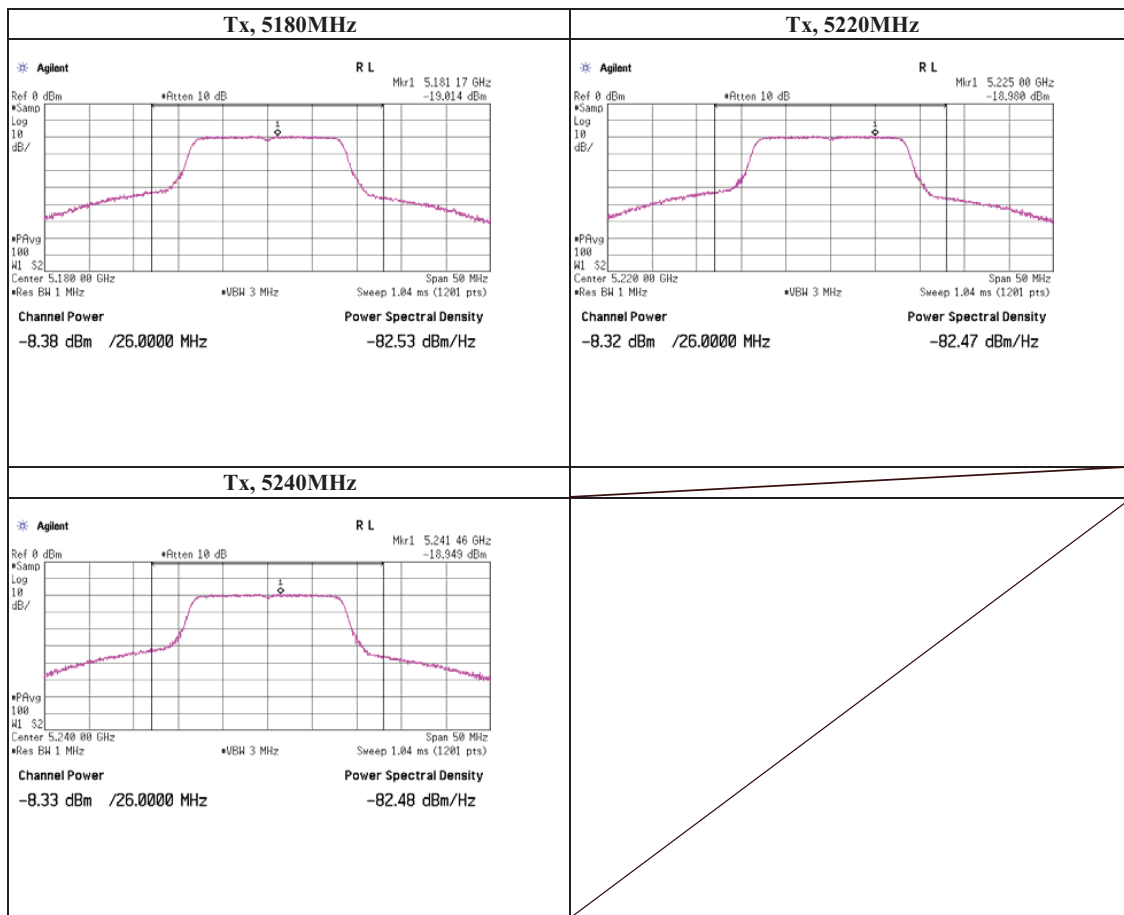
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 54Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]			Result [dBm/MHz]	Limit [dBm]	Margin [dB]
5180.0000	5181.17	-19.01	3.38	9.65			-5.98	4.00	9.98
5220.0000	5225.00	-18.98	3.38	9.66			-5.94	4.00	9.94
5240.0000	5241.46	-18.95	3.39	9.66			-5.90	4.00	9.90

Sample Calculation:

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



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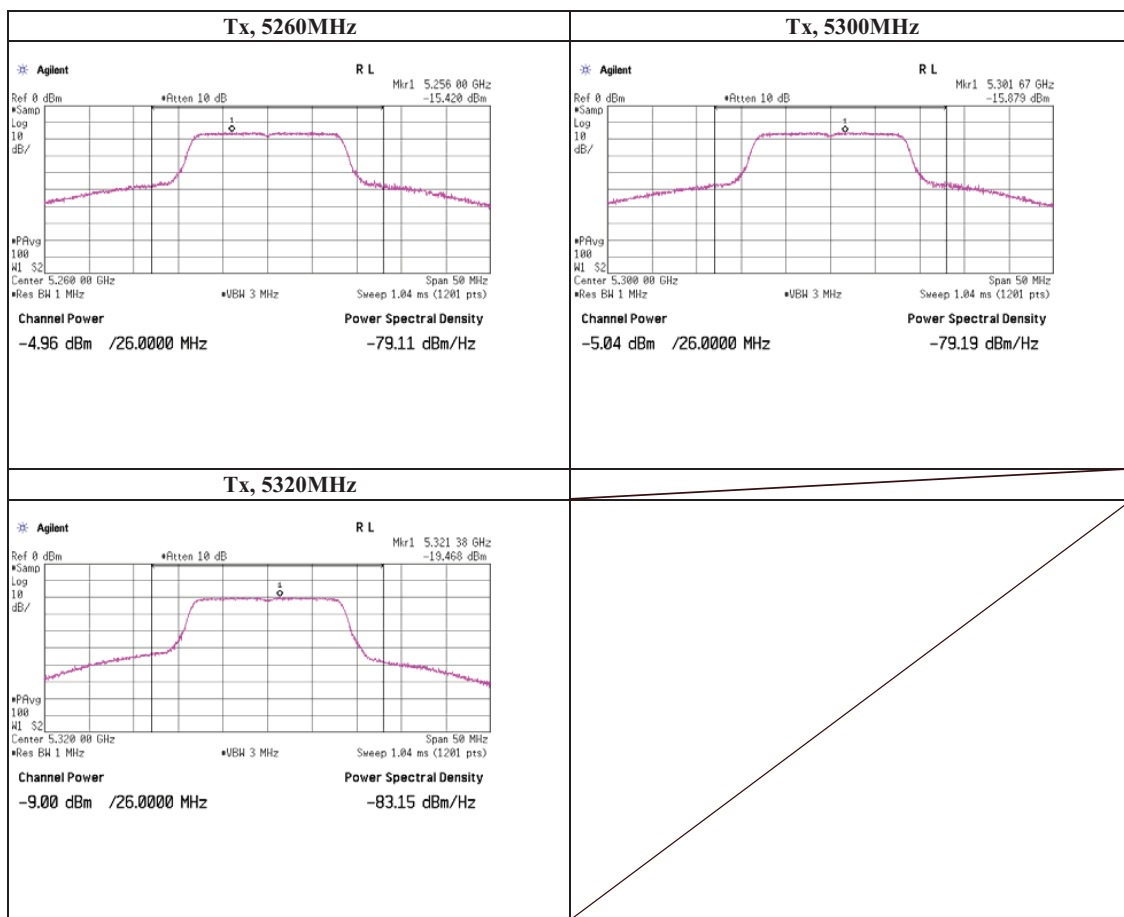
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm/MHz]	Limit [dBm]	Margin [dB]
5260.0000	5256.00	-15.42	3.39	9.67	-2.36	11.00	13.36
5300.0000	5301.67	-15.88	3.40	9.67	-2.81	11.00	13.81
5320.0000	5321.38	-19.47	3.40	9.68	-6.39	11.00	17.39

Sample Calculation:

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



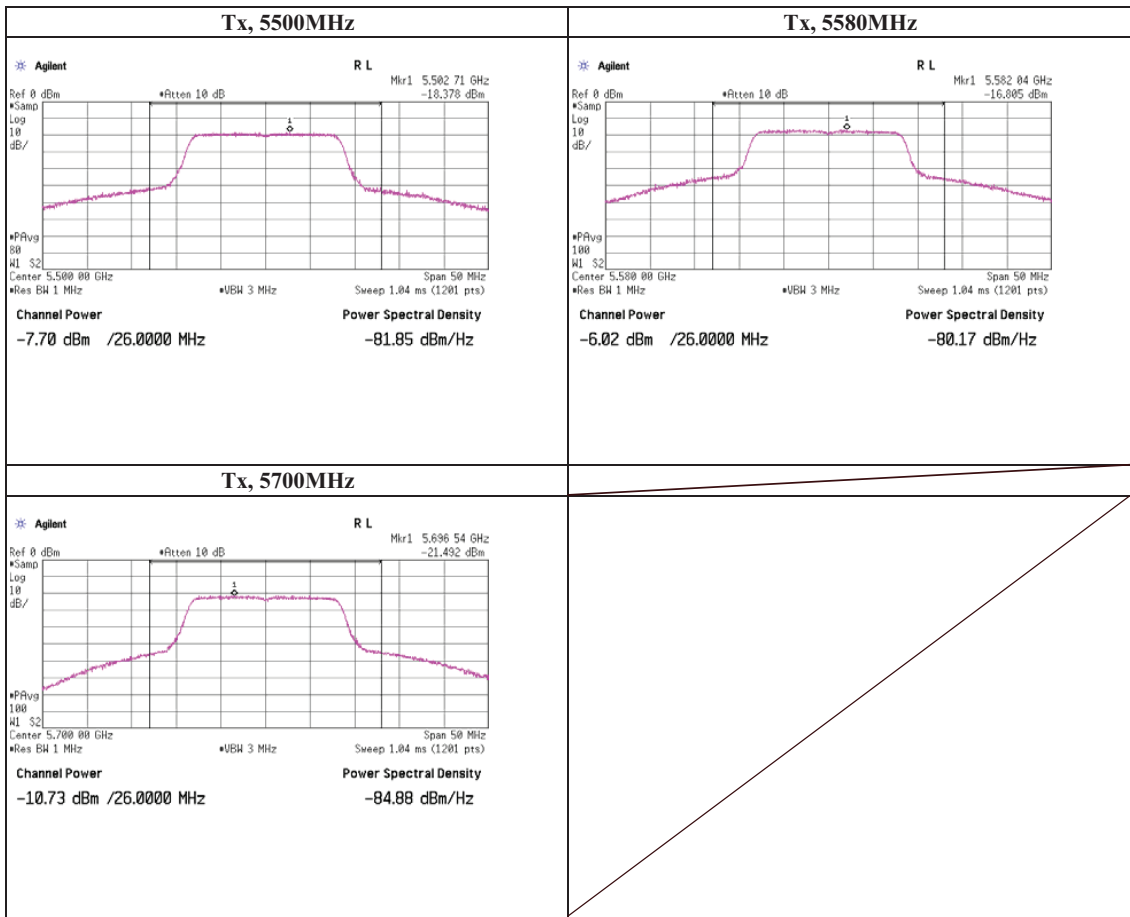
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 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
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Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm/MHz]	Cable Loss [dB]	Atten. Loss [dB]			Result [dBm/MHz]	Limit [dBm]	Margin [dB]
5500.0000	5502.71	-18.38	3.44	9.71			-5.23	11.00	16.23
5580.0000	5582.04	-16.81	3.45	9.72			-3.64	11.00	14.64
5700.0000	5696.54	-21.49	3.48	9.73			-8.29	11.00	19.29

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

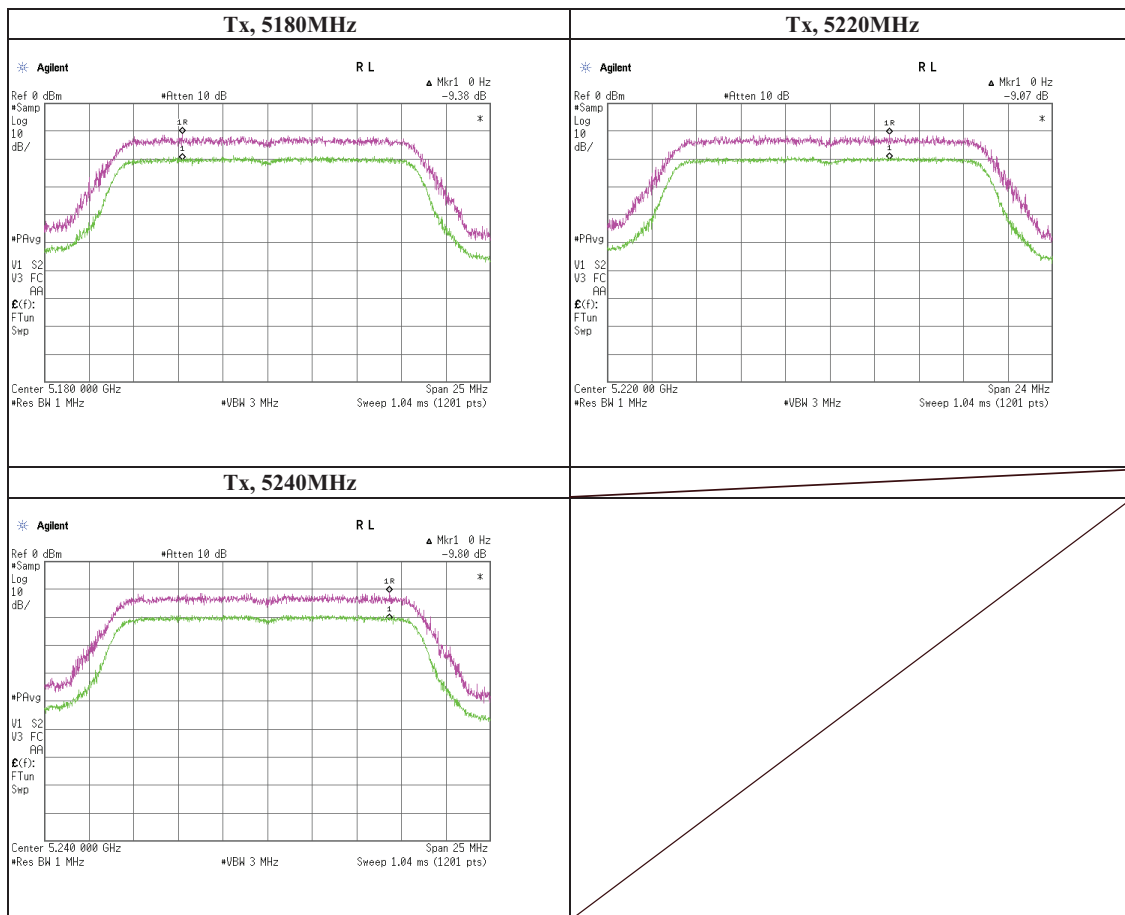


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 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

Peak Excursion Ratio

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 54Mbps	

Ch. Freq. [MHz]	Peak Power Excursion [dB]	Limit [dB]	Margin [dB]
5180.0000	9.38	=<13.0	3.62
5220.0000	9.07	=<13.0	3.93
5240.0000	9.80	=<13.0	3.20

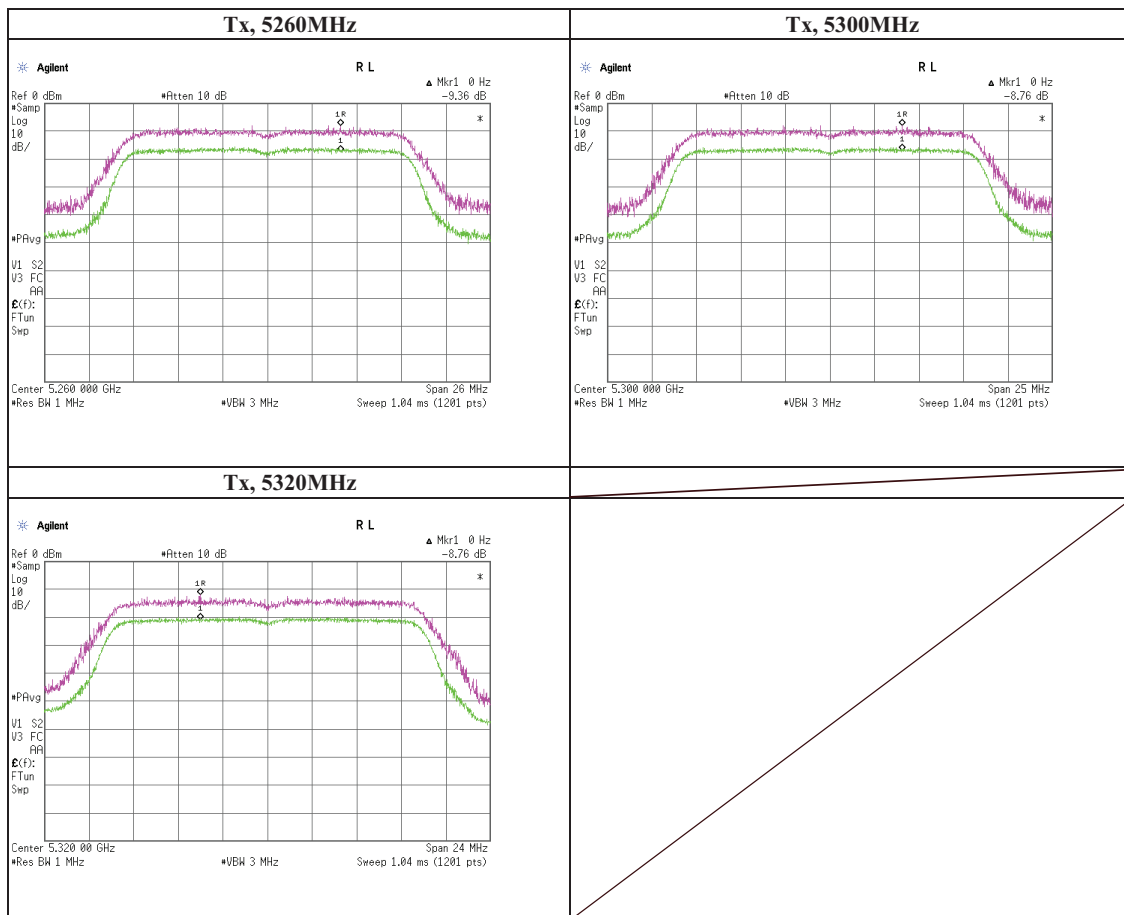


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Peak Excursion Ratio

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Ch. Freq. [MHz]	Peak Power Excursion [dB]	Limit [dB]	Margin [dB]
5260.0000	9.36	=<13.0	3.64
5300.0000	8.76	=<13.0	4.24
5320.0000	8.76	=<13.0	4.24

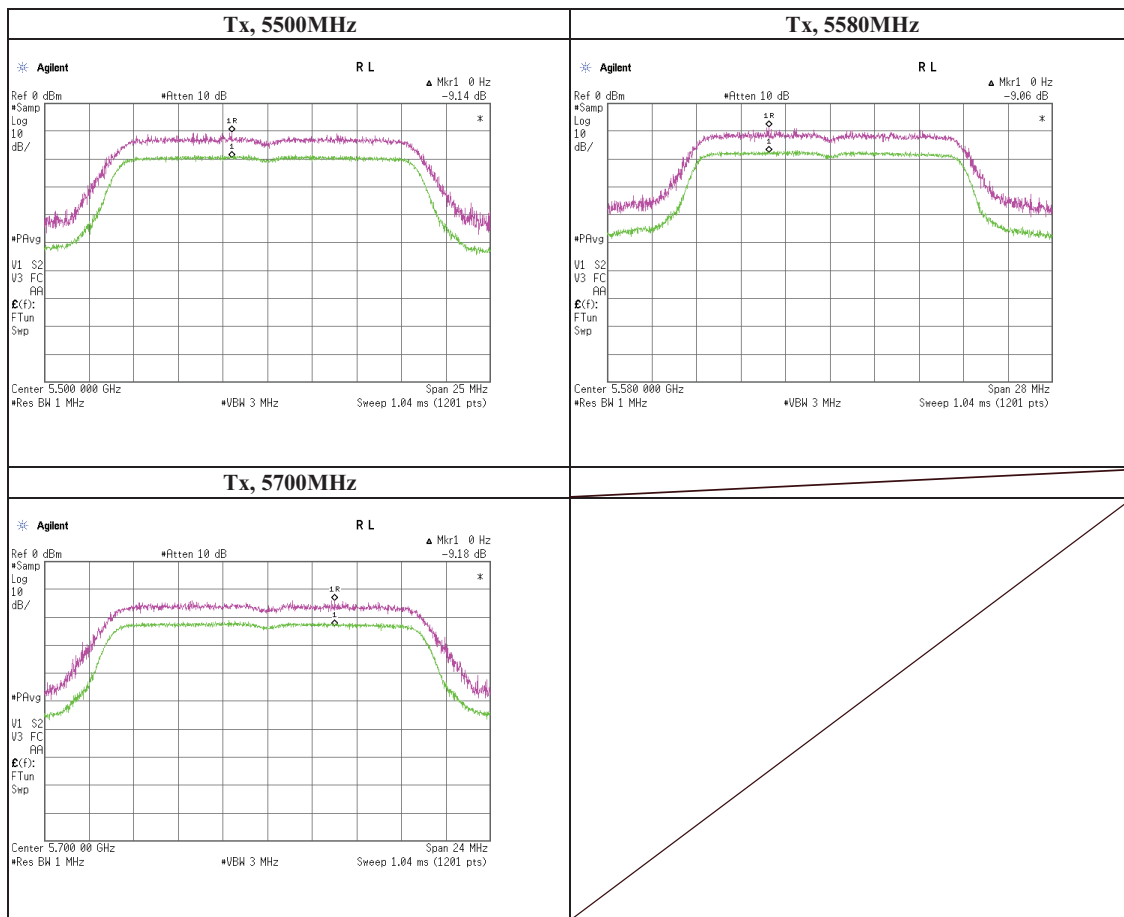


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Peak Excursion Ratio

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2012/5/24	
Temperature / Humidity	23deg.C , 47%RH	
Engineer	Makoto Hosaka	
Mode	Tx, IEEE802.11a, PN9, worst data mode 12Mbps	

Ch. Freq. [MHz]	Peak Power Excursion [dB]	Limit [dB]	Margin [dB]
5500.0000	9.14	=<13.0	3.86
5580.0000	9.06	=<13.0	3.94
5700.0000	9.18	=<13.0	3.82



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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)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE/AT	2011/12/05 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SAT20-05	Attenuator	Weinschel Corp.	54A-20	Y5649	AT	2011/11/09 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2012/03/12 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2012/03/12 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2012/04/10 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2012/05/22 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2011/08/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2012/02/06 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2012/03/16 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2012/02/16 * 12
SJM-12	Measure	PROMART	SEN1935	-	RE/CE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE/CE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2011/12/27 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2011/12/27 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2012/03/30 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2012/03/12 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2012/02/10 * 12
SAT6-05	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2012/02/10 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2011/10/15 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2012/04/10 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2012/04/10 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2011/11/23 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE/CE	2011/10/22 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2011/09/01 * 12
SCC-A12/A13/SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2012/04/10 * 12
SLS-01	LISN	Rohde & Schwarz	ENV216	100511	CE	2012/02/20 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	CE	2012/03/26 * 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