RADIO TEST REPORT

Test Report No.: 4786002569S-B

Applicant	:	**KONICA MINOLTA, INC.**
Type of Equipment	:	**AeroDR SYSTEM**
Model No.	:	**AeroDR P-31**
FCC ID	:	**YR7AERODRP3**
Test regulation	:	**FCC Part15 Subpart C: 2012**
Test result	:	**Complied**

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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:
February 21 – March 7, 2013

Representative test engineer:
Tatsuya Arai
Engineer of WiSE Japan,
UL Verification Service

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

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

RTL02610

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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

REVISION HISTORY

Original Test Report No.: 4786002569S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	4786002569S-B	April 5, 2013	-	-

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1 Applicant information

Company Name	:	KONICA MINOLTA, INC.
Address	:	1 Sakura-Machi, Hino-Shi, Tokyo, 191-8511 Japan
Telephone Number	:	+81-42-589-8429
Facsimile Number	:	+81-42-589-8053
Contact Person	:	Masayoshi Inoue

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

2.1 Identification of E.U.T.

Type of Equipment	:	AeroDR SYSTEM
Model No.	:	AeroDR P-31
Serial No.	:	See Section 4.
Rating	:	DC15V
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No modification by the test lab.
Receipt Date of Sample	:	February 5, 2013

2.2 Product description

Model: AeroDR P-31 (referred to as the EUT in this report) is a AeroDR SYSTEM.

Equipment type	:	Transceiver
Frequency of operation	:	5180-5320MHz *1 5500-5700MHz *1 5745-5825MHz
Clock frequency	:	32.768kHz, 26MHz
Bandwidth & channel spacing	:	Bandwidth : 18MHz Channel spacing : 20MHz
Type of modulation	:	11a : OFDM
Antenna type	:	Planar Inverted F Antenna
Antenna gain with cable loss	:	Main antenna: 3.78dBi , Sub antenna:3.78dBi
Antenna connector type	:	U.FL
ITU code	:	D1D, G1D
Operation temperature range	:	+10 to +30 deg.C.

*1) Refer to 4786002569S-A, FCC part 15E (FCC15.407) report.

FCC Part15.31 (e)
This EUT provides stable voltage (DC3.3V) constantly to RF part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart E: 2011, final revised on December 27, 2012 and effective January 28, 2013

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures & Results

Item	Test Procedure *1)	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.10:2009	FCC 15.207	-	N/A *1)	N/A	N/A
6dB bandwidth	ANSI C63.10:2009	FCC 15.247 (a)(2)	Conducted	N/A	* See data	Complied
Maximum peak conducted output power	ANSI C63.10:2009	FCC 15.247 (b)(3)	Conducted	N/A		Complied
Out of band emission & Restricted band edges	ANSI C63.10:2009	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	3.6dB Freq.: 3883.342MHz Polarization: Horizontal Detection: Average Mode: Tx 5825MHz,	Complied
Power density	ANSI C63.10:2009	FCC 15.247 (e)	Conducted	N/A	* See data	Complied

Note: UL Japan's EMI Work Procedures No.13-EM-W0420 and 13-EM-W0422.
*) These tests were also referred to KDB 558074 (FCC), "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".
*1) This equipment cannot operate WLAN card when it is connected to the control box at the interface cable. In that case, it can only use wire communication mode. This mode is tested by customer based on IEC 60601-1-2 for the compliance of Part 15 subpart B.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.10:2009, 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*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
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
*3: Value of Antenna Terminal Voltage measurement is also applies to the No.5 and No.6 Shielded Room.

Radiated Emission Test

The data listed in this 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
Conducted emissions, Power Density Measurement (below 1GHz) uncertainty for this test was: (±) 1.7dB
Conducted emissions, Power Density Measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB
Conducted emissions, Power Density Measurement (3G-18GHz) uncertainty for this test was: (±) 3.0dB
Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.9dB
Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).
IC Registration No. : 2973D-1 (No1 anechoic chamber)
2973D-2 (No2 anechoic chamber)
2973D-3 (No3 anechoic chamber)

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5m	No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7

3.6 Test setup, Data of EMI & Test instruments

Refer to Appendix 1 to 3.

4 System test configuration

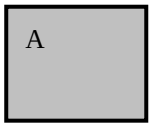
4.1 Justification

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

Test Item	Mode	Tested frequency	Worst data mode *1)
Radiated emission (below 1GHz) *2)	Transmitting IEEE 802.11a	5785MHz	6Mbps
Other items	Transmitting IEEE 802.11a	5745MHz 5785MHz 5825MHz	6Mbps
*1) The worst condition was determined based on the test result of Maximum peak conduced 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.			

*EUT has the power settings by the software as follows;
Power settings: 14
Software: Console application Version 1.1.2.0

4.2 Configuration and peripherals



Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remark)
A	AeroDR SYSTEM	AeroDR P-31	*1)	KONICA MINOLTA, INC.	YR7AERODRP3 (EUT)

*1) Antenna terminal conducted tests: C1-35, Radiated emission tests: C1-24

5 6dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The test was measured based on Method 7.1 Option 1 and 7.2 Option 2 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

Summary of the test results: Pass
Refer to APPENDIX

6 Maximum peak conducted output power

Test procedure
The Maximum Peak Output Power was measured with a power meter connected to the antenna port.
The test was measured based on Method 8.1.3 Option 3 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".
Detection type: Peak / Average *1)

Summary of the test results: Pass
Refer to APPENDIX 1

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

7 Spurious emission (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX

8 Radiated emissions

8.1 Operating environment

The test was carried out in No.3 anechoic chamber.

8.2 Test configuration

EUT was placed on a platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
Photographs of the set up are shown in Appendix 1.

8.3 Test conditions

Frequency range : 30MHz - 40GHz

8.4 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		20dBc
Detection type	Quasi-Peak	Peak	Average *1)	Peak
IF Bandwidth	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 3MHz Detector: RMS	RBW: 100kHz VBW: 300kHz

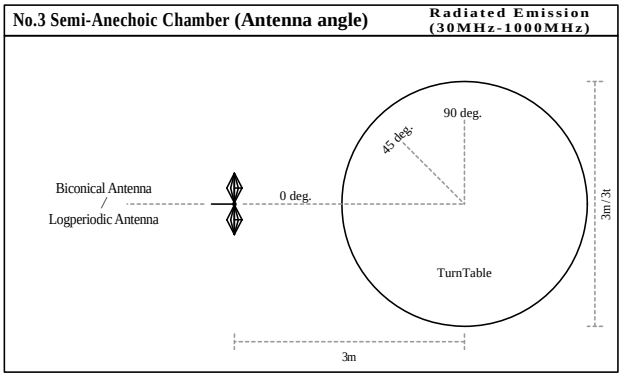
*1) Average Power Measurement was measured based on 10.2.3.3 and 8.2.1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247".

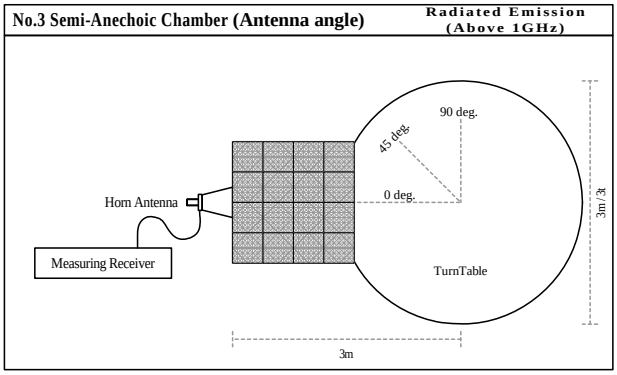
The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

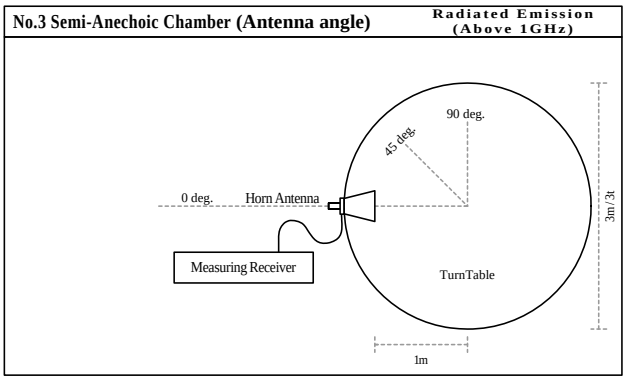
Combinations of the worst case

Model	Worst position	
	Below 1GHz	Above 1GHz
EUT	Horizontal: X, Vertical: Z	Carrier: Horizontal: X, Vertical: Z Spurious: Horizontal: X, Vertical: Z

Figure 1. Antenna angle







8.5 Band edge

Band edge level at 5725MHz and 5850MHz are less than 20dB of peak point of the carrier. Refer to the data of Radiated emission.

8.6 Results

Summary of the test results : Pass
Refer to APPENDIX

9 Peak power density

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

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

The test was measured based on Method 9.1 Option 1 of “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247”.

Summary of the test results: Pass
Refer to APPENDIX

APPENDIX 1: Test data

6dB bandwidth
Maximum peak conducted output power
Radiated emission
Spurious emission (Antenna port conducted)
Peak power densiy
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission
Pre-check of the worst position

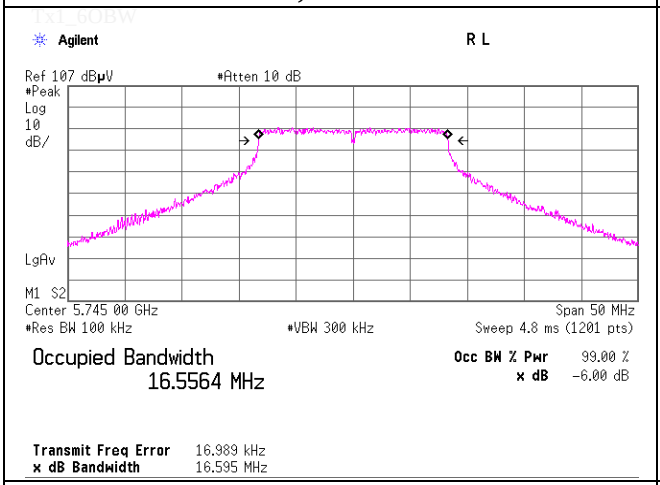
APPENDIX 1: Data of Radio tests

-6dB Bandwidth

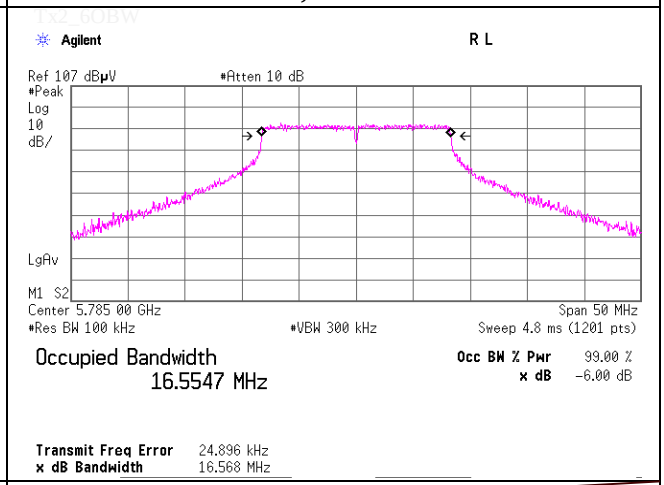
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 7, 2013	
Temperature / Humidity	24deg.C , 50%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
5745.0000	16.595	> 0.500
5785.0000	16.568	> 0.500
5825.0000	16.561	> 0.500

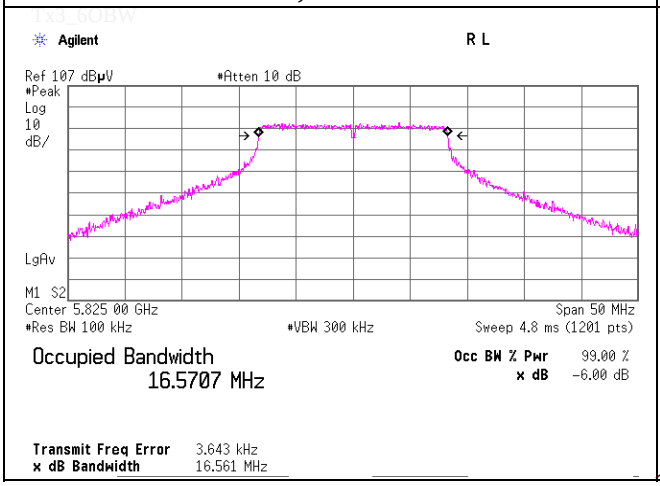
Tx, 5745MHz



Tx, 5785MHz



Tx, 5825MHz



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

Maximum Peak Conducted Output Power

(Option 3)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	February 21, 2013		
Temperature / Humidity	22 deg.C , 47 %RH		
Engineer	Tatsuya Arai		
Mode	Tx, IEEE802.11a, PN9,	worst antenna : Sub	worst data mode : 6 Mbps

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

Ch	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Low	5745.0	4.54	2.68	10.02	17.24	52.97	30.00	1000	12.76
Mid	5785.0	5.63	2.69	10.02	18.34	68.23	30.00	1000	11.66
High	5825.0	5.39	2.65	10.02	18.06	63.97	30.00	1000	11.94

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

[Pre check]
Antenna Main

	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Main	6	5785.0	5.13	2.69	10.02	17.84	60.81	30.00	1000	12.16
Main	9	5785.0	5.02	2.69	10.02	17.73	59.29	30.00	1000	12.27
Main	12	5785.0	5.04	2.69	10.02	17.75	59.57	30.00	1000	12.25
Main	18	5785.0	4.96	2.69	10.02	17.67	58.48	30.00	1000	12.33
Main	24	5785.0	4.79	2.69	10.02	17.50	56.23	30.00	1000	12.50
Main	36	5785.0	5.11	2.69	10.02	17.82	60.53	30.00	1000	12.18
Main	48	5785.0	4.98	2.69	10.02	17.69	58.75	30.00	1000	12.31
Main	54	5785.0	4.99	2.69	10.02	17.70	58.88	30.00	1000	12.30

Antenna Sub

	Data rate [Mbps]	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]	
Sub	6	5785.0	5.63	2.69	10.02	**18.34**	68.23	30.00	1000	**11.66**	**Worst**
Sub	9	5785.0	5.50	2.69	10.02	18.21	66.22	30.00	1000	11.79	
Sub	12	5785.0	5.43	2.69	10.02	18.14	65.16	30.00	1000	11.86	
Sub	18	5785.0	5.53	2.69	10.02	18.24	66.68	30.00	1000	11.76	
Sub	24	5785.0	5.54	2.69	10.02	18.25	66.83	30.00	1000	11.75	
Sub	36	5785.0	5.60	2.69	10.02	18.31	67.76	30.00	1000	11.69	
Sub	48	5785.0	5.58	2.69	10.02	18.29	67.45	30.00	1000	11.71	
Sub	54	5785.0	5.51	2.69	10.02	18.22	66.37	30.00	1000	11.78	

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

UL Japan, Inc.
Shonan EMC Lab.

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

Maximum Conducted Output Power (Reference data)

(Option 3)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	February 21, 2013		
Temperature / Humidity	22 deg.C , 47 %RH		
Engineer	Tatsuya Arai		
Mode	Tx, IEEE802.11a, PN9,	worst antenna : Main	worst data mode : 6 Mbps

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

Ch	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Low	5745.0	-3.51	2.68	10.02	0.00	9.19	8.30	30.00	1000	20.81
Mid	5785.0	-3.21	2.69	10.02	0.00	9.50	8.91	30.00	1000	20.50
High	5825.0	-3.02	2.65	10.02	0.00	9.65	9.23	30.00	1000	20.35

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor
E.I.R.P = Result + Antenna Gain

[Pre check]
Antenna Main

	Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]	
Main	6	5785.0	-3.21	2.69	10.02	0.00	**9.50**	8.91	30.00	1000	**20.50**	**Worst**
Main	9	5785.0	-3.22	2.69	10.02	0.00	9.49	8.89	30.00	1000	20.51	
Main	12	5785.0	-3.34	2.69	10.02	0.00	9.37	8.65	30.00	1000	20.63	
Main	18	5785.0	-3.45	2.69	10.02	0.00	9.26	8.43	30.00	1000	20.74	
Main	24	5785.0	-3.32	2.69	10.02	0.00	9.39	8.69	30.00	1000	20.61	
Main	36	5785.0	-3.25	2.69	10.02	0.00	9.46	8.83	30.00	1000	20.54	
Main	48	5785.0	-3.36	2.69	10.02	0.00	9.35	8.61	30.00	1000	20.65	
Main	54	5785.0	-3.26	2.69	10.02	0.00	9.45	8.81	30.00	1000	20.55	

Antenna Sub

	Data rate [Mbps]	Freq. [MHz]	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
Sub	6	5785.0	-3.57	2.69	10.02	0.00	9.14	8.20	30.00	1000	20.86
Sub	9	5785.0	-3.59	2.69	10.02	0.00	9.12	8.17	30.00	1000	20.88
Sub	12	5785.0	-5.60	2.69	10.02	0.00	7.11	5.14	30.00	1000	22.89
Sub	18	5785.0	-3.59	2.69	10.02	0.00	9.12	8.17	30.00	1000	20.88
Sub	24	5785.0	-3.59	2.69	10.02	0.00	9.12	8.17	30.00	1000	20.88
Sub	36	5785.0	-3.60	2.69	10.02	0.00	9.11	8.15	30.00	1000	20.89
Sub	48	5785.0	-3.72	2.69	10.02	0.00	8.99	7.93	30.00	1000	21.01
Sub	54	5785.0	-3.68	2.69	10.02	0.00	9.03	8.00	30.00	1000	20.97

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

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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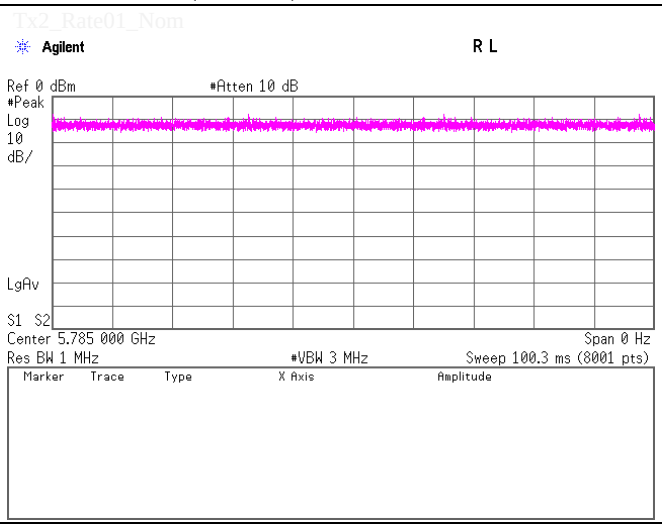
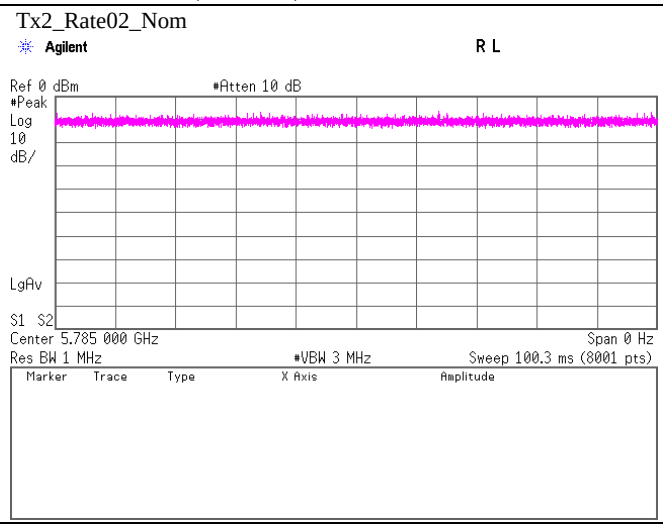
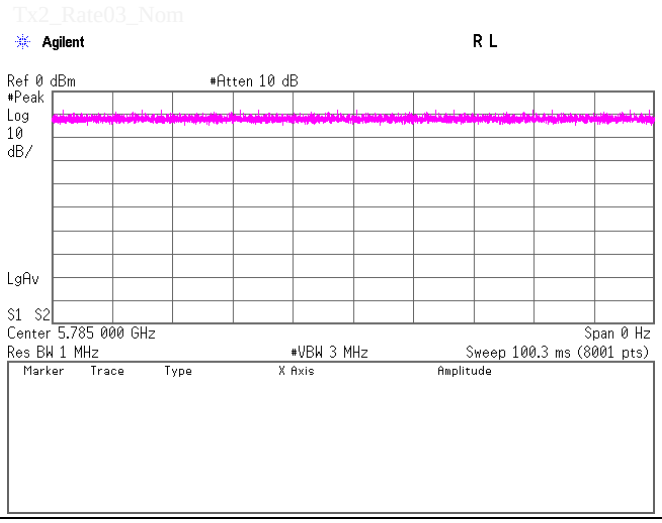
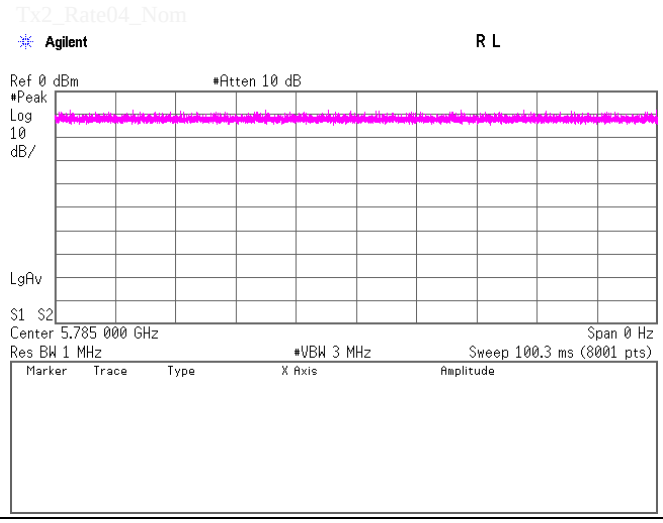
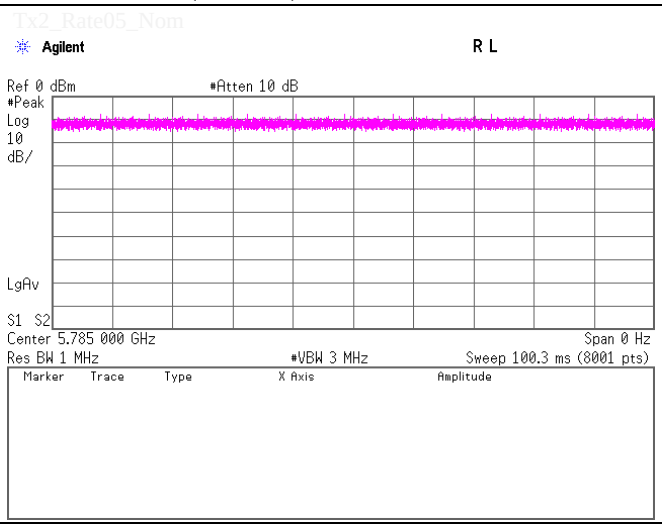
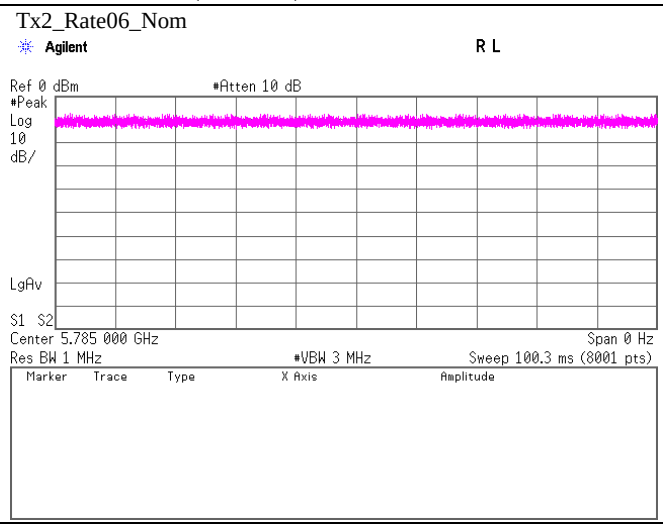
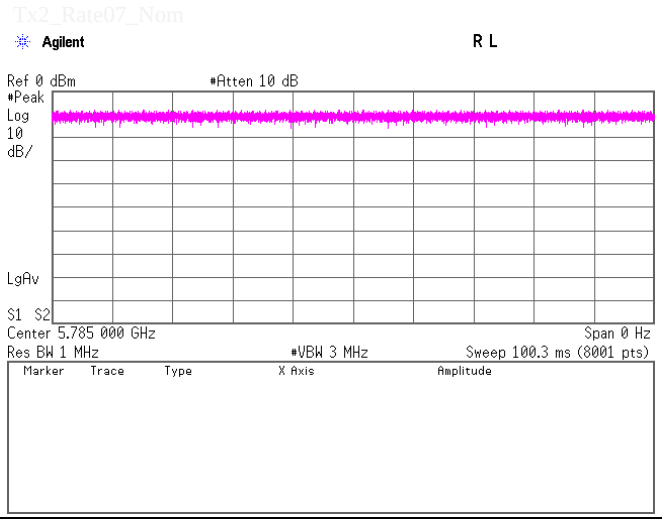
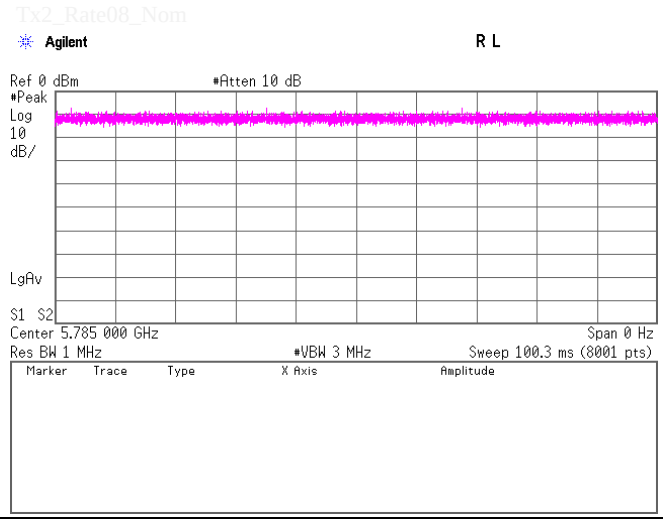
Duty Factor Caliculation chart for Maximum Conducted Output Power

6[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB **x:Ton/(Ton+Toff)= 100.00 / 100.00**	**9[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB** **x:Ton/(Ton+Toff)= 100.00 / 100.00**
	
12[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB **x:Ton/(Ton+Toff)= 100.00 / 100.00**	**18[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB** **x:Ton/(Ton+Toff)= 100.00 / 100.00**
	

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

Duty Factor Caliculation chart for Maximum Conducted Output Power

24[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB **x:Ton/(Ton+Toff)= 100.00 / 100.00**	**36[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB** **x:Ton/(Ton+Toff)= 100.00 / 100.00**
	
48[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB **x:Ton/(Ton+Toff)= 100.00 / 100.00**	**54[Mbps]: Duty Factor =10*log(1/x)= 0.0 dB** **x:Ton/(Ton+Toff)= 100.00 / 100.00**
	

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

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	March 6, 2013	March 7, 2013
Temperature / Humidity	24 deg.C, 29 %RH	22 deg.C, 33 %RH
Engineer	Shinichi Takano	
Mode	Tx, 5745 MHz	
	Tx, IEEE802.11a	

(* 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.	3829.967	PK	50.9	29.6	15.3	41.8	54.0	73.9	19.9	100	328	
Hori.	11490.000	PK	44.4	40.1	9.8	39.5	54.8	73.9	19.1	100	0	
Hori.	17235.000	PK	44.9	42.5	2.6	39.5	50.5	73.9	23.4	100	0	
Hori.	3829.967	AV	45.2	29.6	15.3	41.8	48.3	53.9	**5.6**	100	328	
Hori.	11490.000	AV	33.9	40.1	9.8	39.5	44.3	53.9	9.6	100	0	
Hori.	17235.000	AV	36.3	42.5	2.6	39.5	41.9	53.9	12.0	100	0	
Vert.	3829.967	PK	50.2	29.6	15.3	41.8	53.3	73.9	20.6	100	222	
Vert.	11490.000	PK	44.1	40.1	9.8	39.5	54.5	73.9	19.4	100	0	
Vert.	17235.000	PK	45.0	42.5	2.6	39.5	50.6	73.9	23.3	100	0	
Vert.	3829.967	AV	44.9	29.6	15.3	41.8	48.0	53.9	5.9	100	222	
Vert.	11490.000	AV	34.7	40.1	9.8	39.5	45.1	53.9	8.8	100	0	
Vert.	17235.000	AV	36.5	42.5	2.6	39.5	42.1	53.9	11.8	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5745.000	PK	82.4	32.7	16.7	40.2	91.6	-	-	Carrier
Hori.	5725.000	PK	38.5	32.6	16.7	40.2	47.6	71.6	24.0	
Vert.	5745.000	PK	81.2	32.7	16.7	40.2	90.4	-	-	Carrier
Vert.	5725.000	PK	38.8	32.6	16.7	40.2	47.9	70.4	22.5	

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

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

Radiated Emission

Test place	No.3 Semi Anechoic Chamber		
Date	March 5, 2013	March 6, 2013	March 7, 2013
Temperature / Humidity	24 deg.C, 33 %RH	24 deg.C, 29 %RH	22 deg.C, 33 %RH
Engineer	Shinichi Takano		
Mode	Tx, 5785 MHz		
	Tx, IEEE802.11a		

(* 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.	30.276	QP	24.6	17.9	6.5	32.2	16.8	40.0	23.2	300	346	
Hori.	664.993	QP	34.2	19.8	10.0	32.0	32.0	46.0	14.0	140	120	
Hori.	909.177	QP	23.8	22.3	10.7	31.0	25.8	46.0	20.2	150	20	
Hori.	3856.538	PK	51.0	29.6	15.3	41.8	54.1	73.9	19.8	100	0	
Hori.	11570.000	PK	44.7	40.0	9.8	39.5	55.0	73.9	18.9	100	0	
Hori.	17355.000	PK	44.8	43.2	2.6	39.5	51.1	73.9	22.8	100	0	
Hori.	3856.538	AV	45.9	29.6	15.3	41.8	49.0	53.9	**4.9**	100	0	
Hori.	11570.000	AV	37.1	40.0	9.8	39.5	47.4	53.9	6.5	100	0	
Hori.	17355.000	AV	36.6	43.2	2.6	39.5	42.9	53.9	11.0	100	0	
Vert.	78.343	QP	28.9	6.4	7.3	32.2	10.4	40.0	29.6	100	359	
Vert.	89.427	QP	28.8	8.1	7.5	32.2	12.2	43.5	31.3	100	1	
Vert.	664.993	QP	31.8	19.8	10.0	32.0	29.6	46.0	16.4	100	294	
Vert.	3856.538	PK	50.6	29.6	15.3	41.8	53.7	73.9	20.2	100	210	
Vert.	11570.000	PK	43.7	40.0	9.8	39.5	54.0	73.9	19.9	100	0	
Vert.	17355.000	PK	44.9	43.2	2.6	39.5	51.2	73.9	22.7	100	0	
Vert.	3856.538	AV	43.7	29.6	15.3	41.8	46.8	53.9	7.1	100	210	
Vert.	11570.000	AV	33.7	40.0	9.8	39.5	44.0	53.9	9.9	100	0	
Vert.	17355.000	AV	36.8	43.2	2.6	39.5	43.1	53.9	10.8	100	0	

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

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

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

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

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	March 6, 2013	March 7, 2013
Temperature / Humidity	24 deg.C, 29 %RH	22 deg.C, 33 %RH
Engineer	Shinichi Takano	
Mode	Tx, 5825 MHz	
	Tx, IEEE802.11a	

(* 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.	3883.342	PK	51.6	29.6	15.3	41.8	54.7	73.9	19.2	100	2	
Hori.	11650.000	PK	44.2	39.9	9.8	39.5	54.4	73.9	19.5	100	0	
Hori.	17475.000	PK	45.7	43.9	2.6	39.5	52.7	73.9	21.2	100	0	
Hori.	3883.342	AV	47.2	29.6	15.3	41.8	50.3	53.9	**3.6**	100	2	
Hori.	11650.000	AV	35.3	39.9	9.8	39.5	45.5	53.9	8.4	100	0	
Hori.	17475.000	AV	36.0	43.9	2.6	39.5	43.0	53.9	10.9	100	0	
Vert.	3883.342	PK	51.5	29.6	15.3	41.8	54.6	73.9	19.3	100	232	
Vert.	11650.000	PK	44.2	39.9	9.8	39.5	54.4	73.9	19.5	100	0	
Vert.	17475.000	PK	45.8	43.9	2.6	39.5	52.8	73.9	21.1	100	0	
Vert.	3883.342	AV	46.1	29.6	15.3	41.8	49.2	53.9	4.7	100	232	
Vert.	11650.000	AV	34.5	39.9	9.8	39.5	44.7	53.9	9.2	100	0	
Vert.	17475.000	AV	36.1	43.9	2.6	39.5	43.1	53.9	10.8	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	5825.000	PK	83.0	32.9	16.8	40.3	92.4	-	-	Carrier
Hori.	5850.000	PK	37.9	33.0	16.8	40.3	47.4	72.4	25.0	
Vert.	5825.000	PK	82.6	32.9	16.8	40.3	92.0	-	-	Carrier
Vert.	5850.000	PK	38.4	33.0	16.8	40.3	47.9	72.0	24.1	

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

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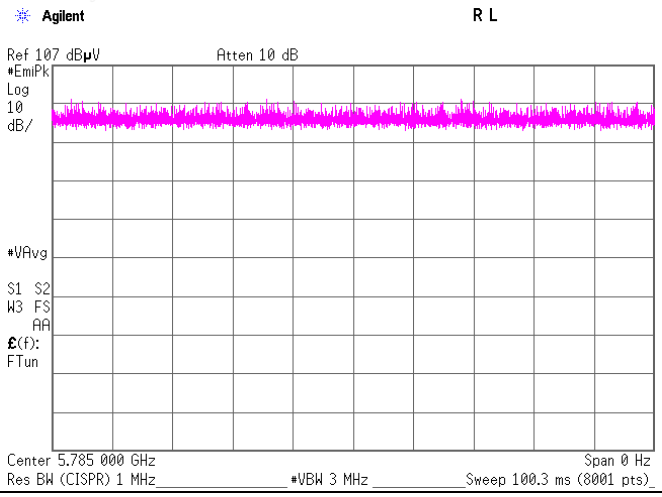
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Burst rate confirmation

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

Tx2_duty1  	Tx2_duty2

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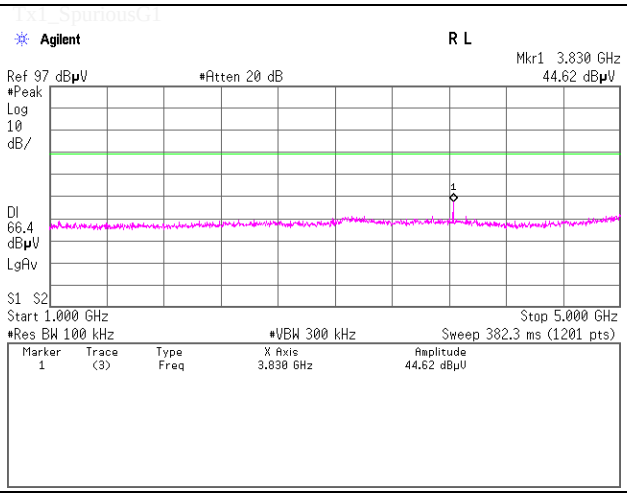
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

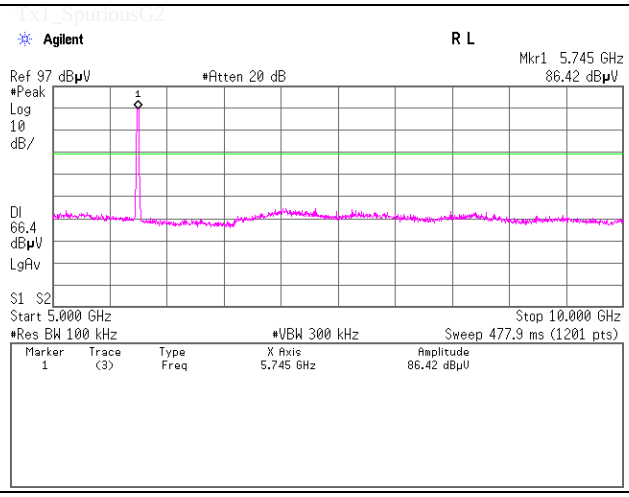
Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

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

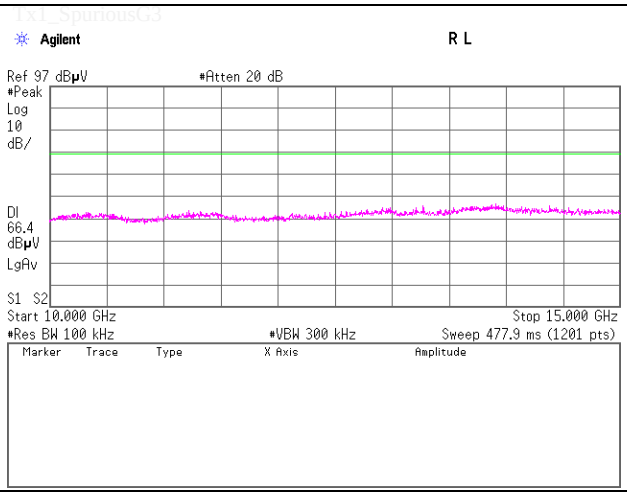
1GHz - 5GHz



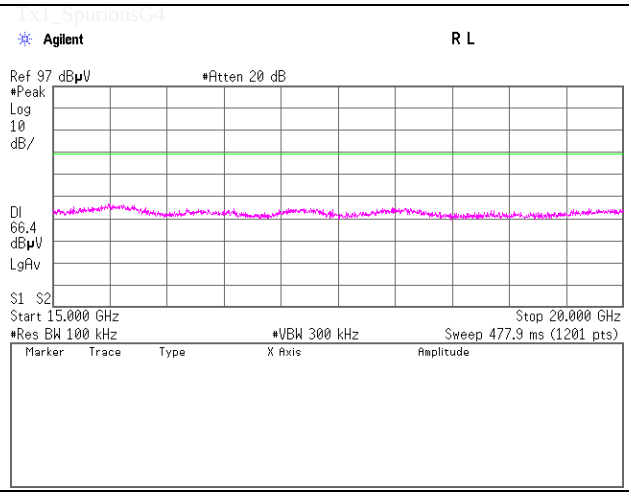
5GHz - 10GHz



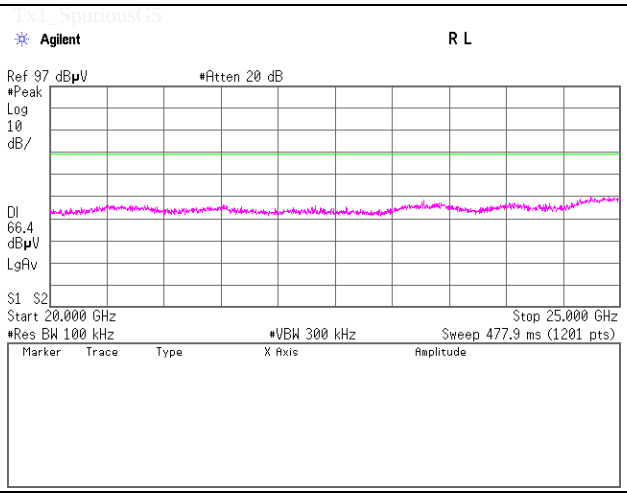
10GHz - 15GHz



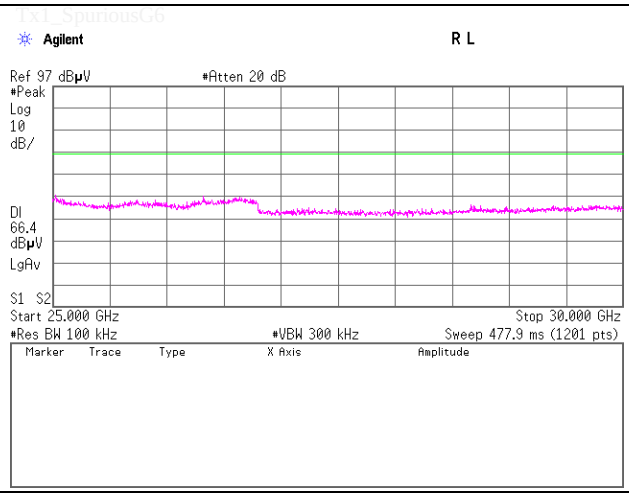
15GHz - 20GHz



20GHz - 25GHz



25GHz - 30GHz



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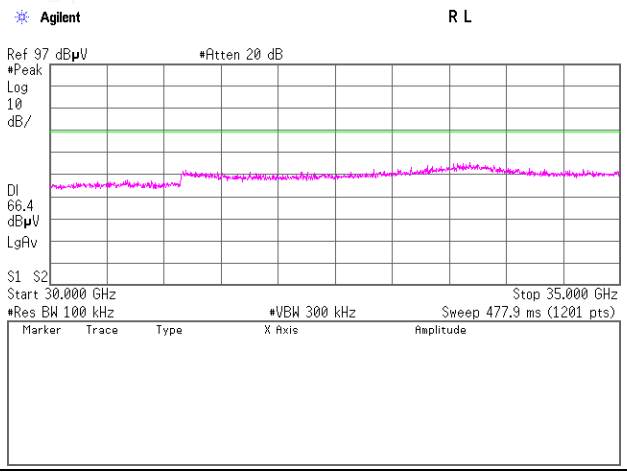
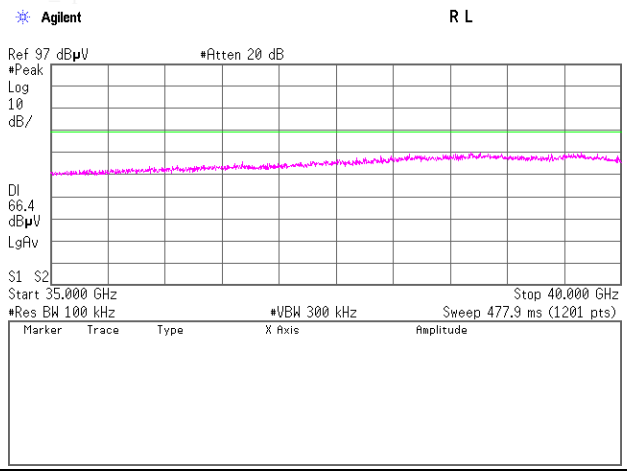
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

Tx, 5745MHz (above 1GHz)(2/2)	
30GHz - 35GHz	**35GHz - 40GHz**
	

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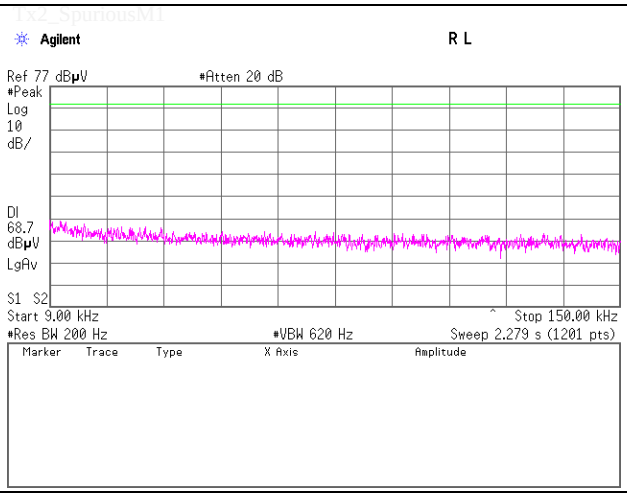
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

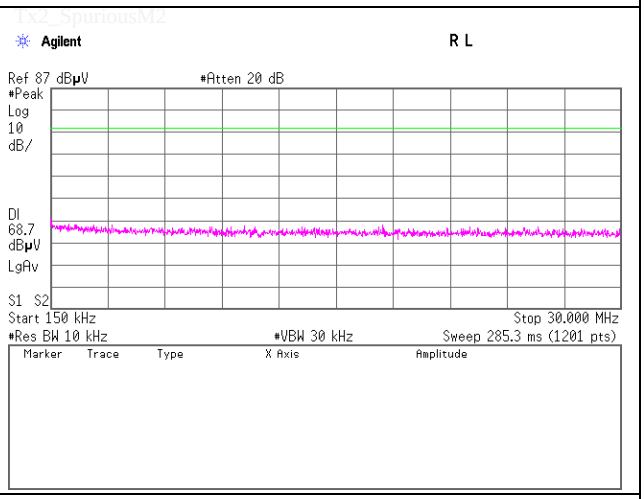
Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

Tx, 5785MHz (below 1GHz)

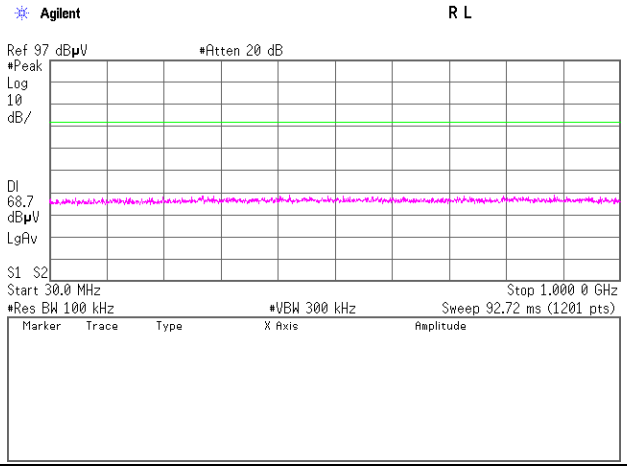
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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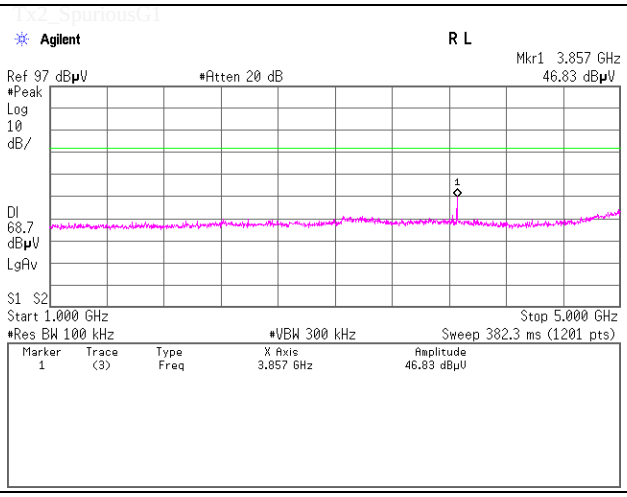
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

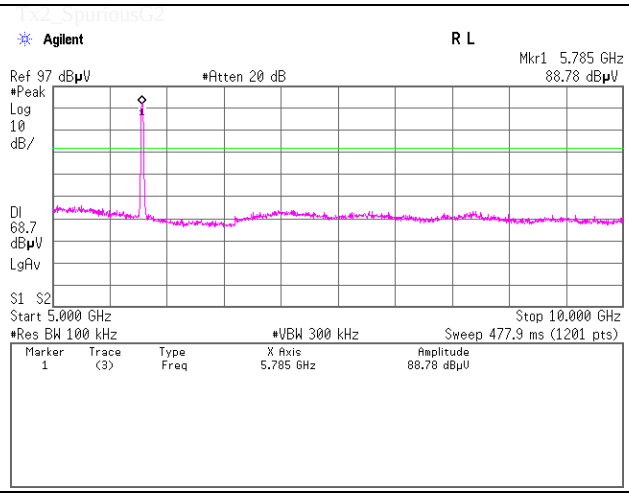
Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

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

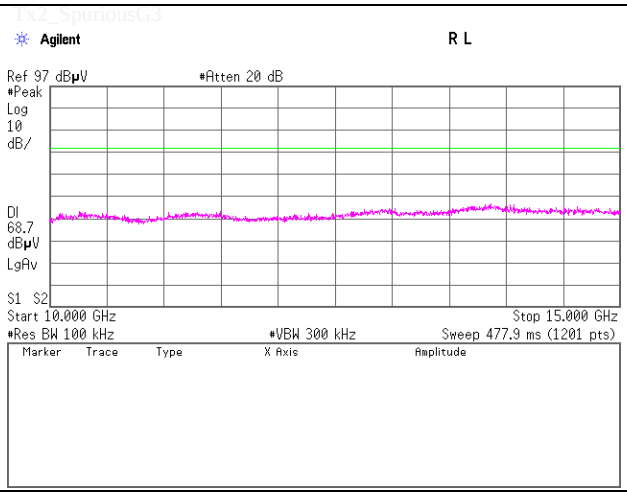
1GHz - 5GHz



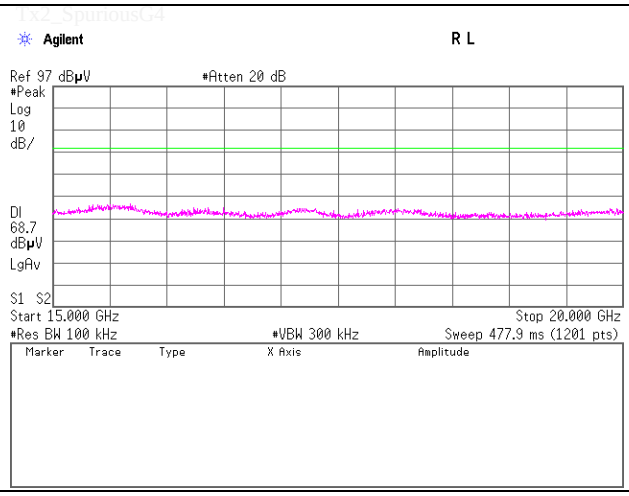
5GHz - 10GHz



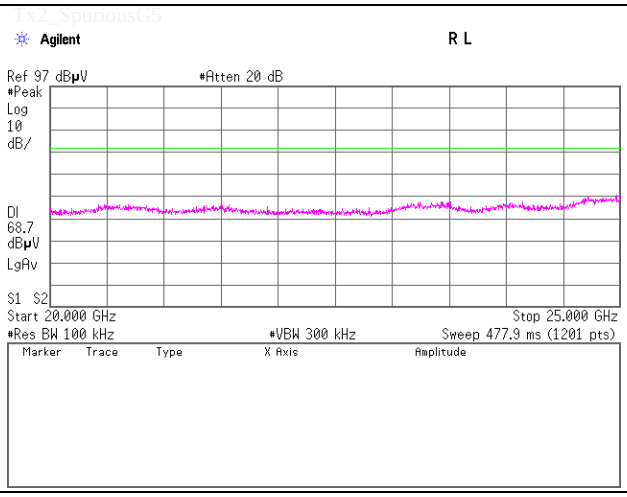
10GHz - 15GHz



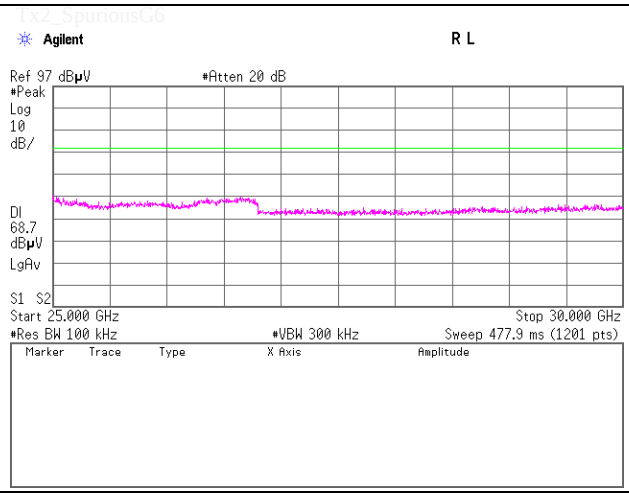
15GHz - 20GHz



20GHz - 25GHz



25GHz - 30GHz



UL Japan, Inc.
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Telephone : +81 463 50 6400
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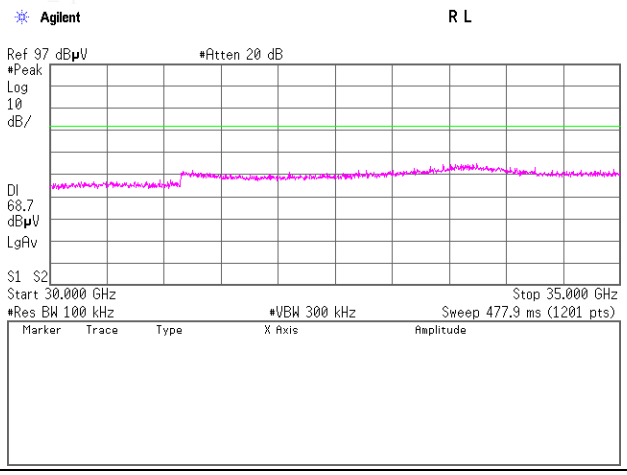
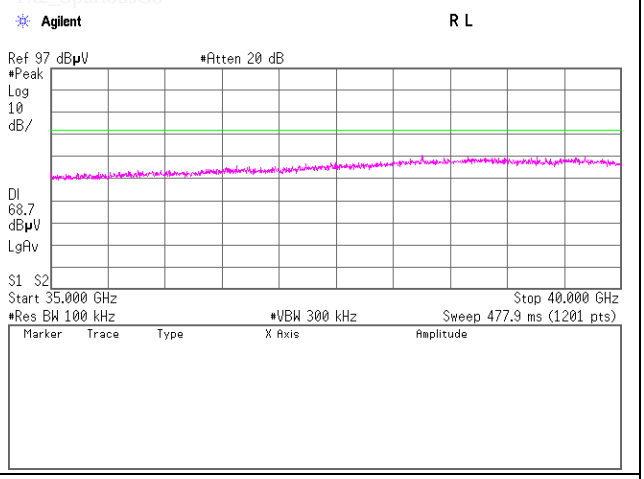
(Reference chart) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

Tx, 5785MHz (above 1GHz)(2/2)	
30GHz - 35GHz	**35GHz - 40GHz**
	

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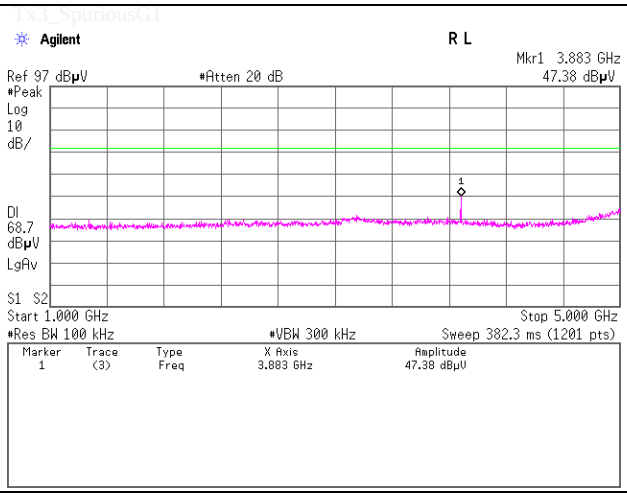
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

(Reference chart) Spurious emission (Conducted)

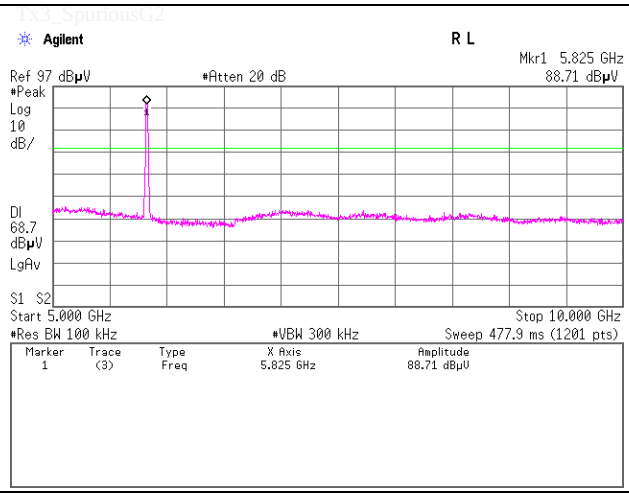
Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

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

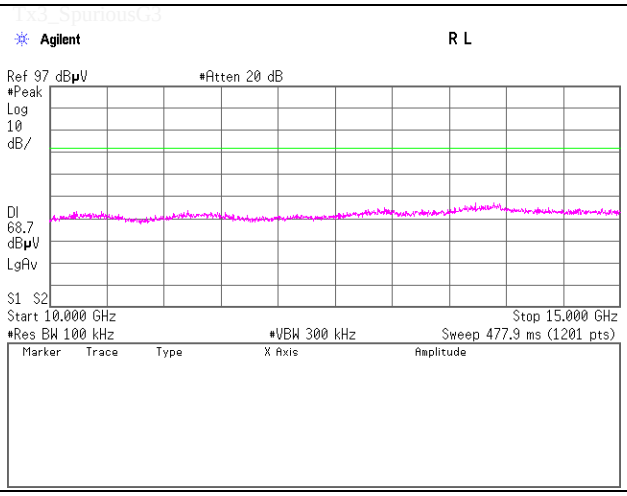
1GHz - 5GHz



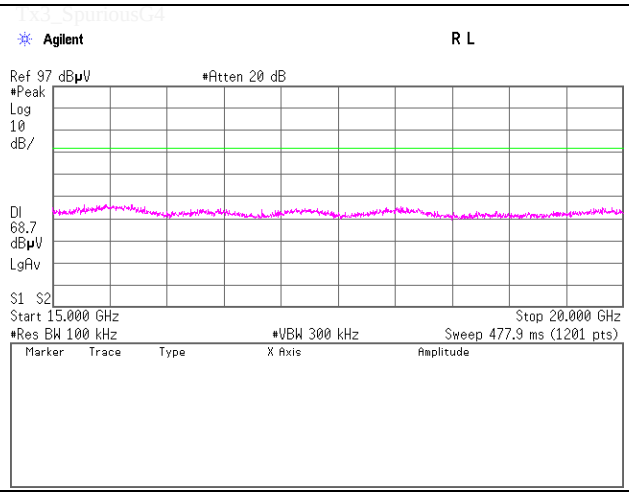
5GHz - 10GHz



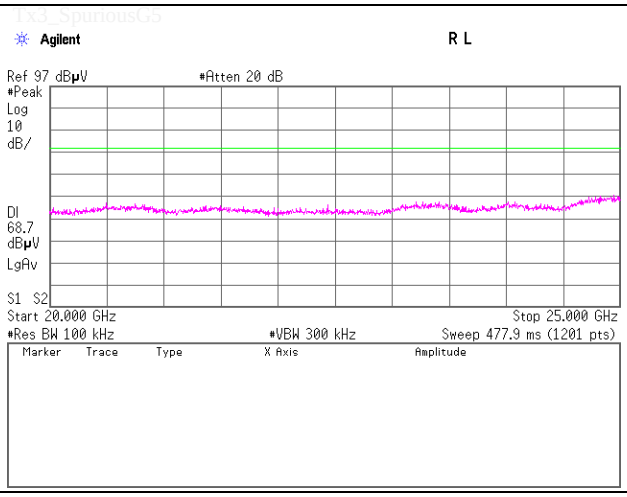
10GHz - 15GHz



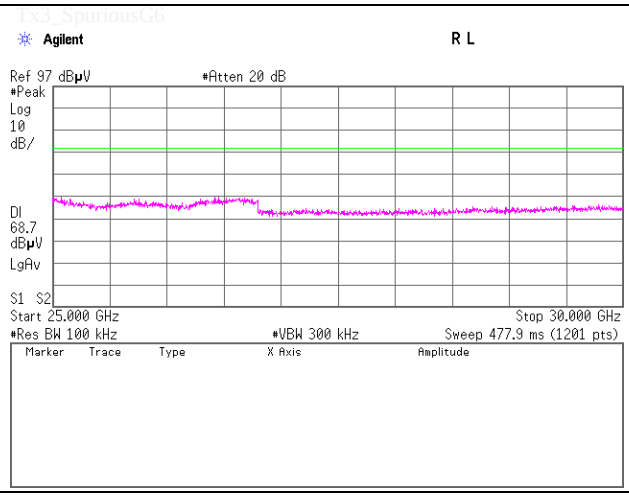
15GHz - 20GHz



20GHz - 25GHz



25GHz - 30GHz



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Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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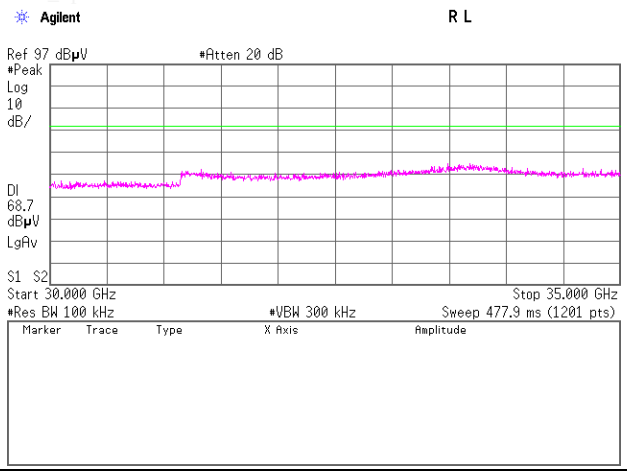
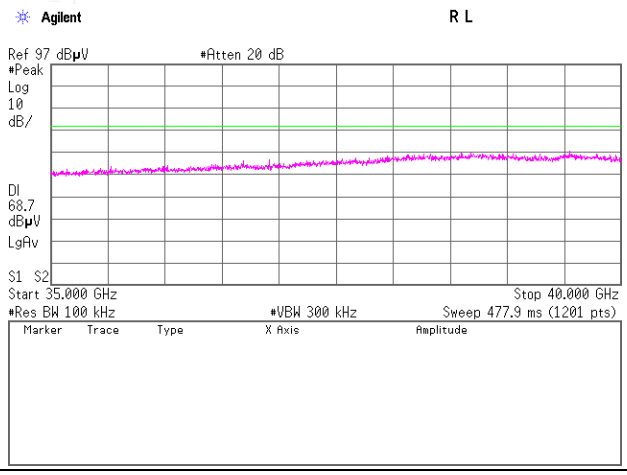
(Reference chart) Spurious emission (Conducted)

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

Tx, 5825MHz (above 1GHz)(2/2)	
30GHz - 35GHz	**35GHz - 40GHz**
	

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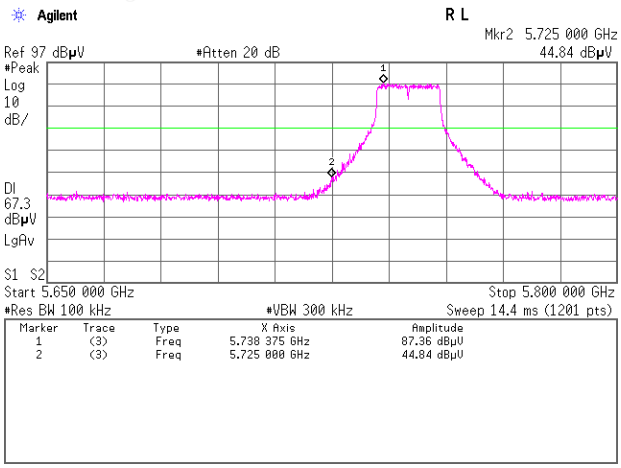
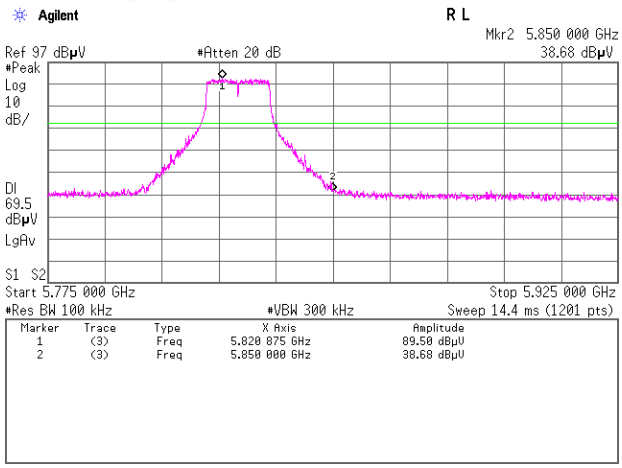
(Reference chart) Spurious emission (Conducted)

Band Edge compliance

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps	
Tx, 5745MHz	**Tx, 5825MHz**
TX1_BandEdgeLow	TX3_BandEdgeHigh





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Maximum Power Spectral Density

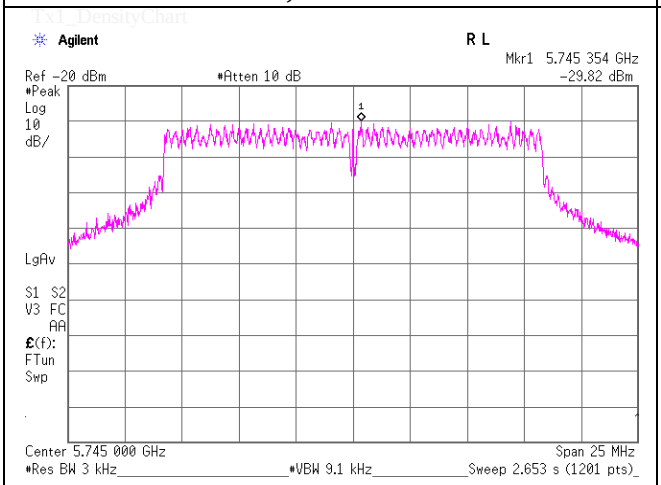
(Option 1)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	March 7, 2013	
Temperature / Humidity	24deg.C , 50%RH	
Engineer	Tatsuya Arai	
Mode	Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps	

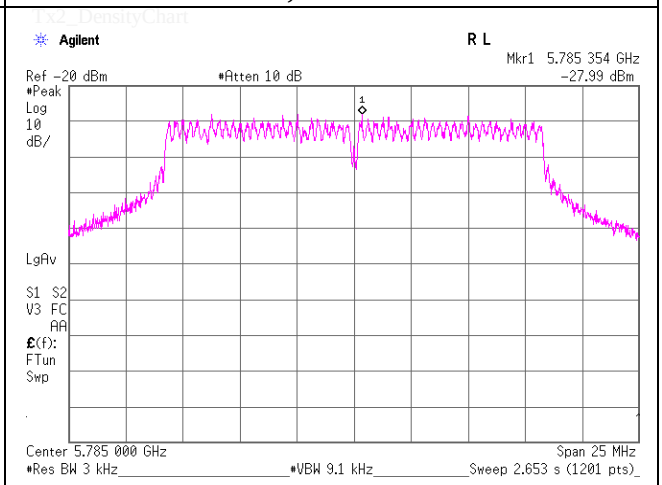
Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
5745.0000	5745.35	-29.82	3.18	9.98	-16.66	8.00	24.66
5785.0000	5785.35	-27.99	3.22	9.99	-14.78	8.00	22.78
5825.0000	5820.38	-28.42	3.19	9.99	-15.24	8.00	23.24

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

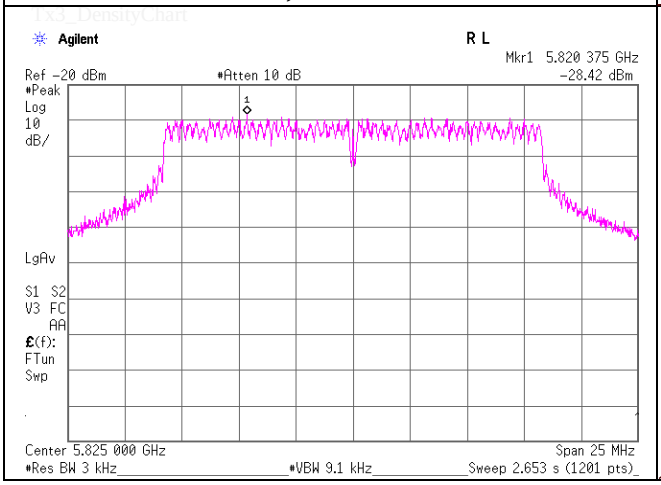
Tx, 5745MHz



Tx, 5785MHz



Tx, 5825MHz



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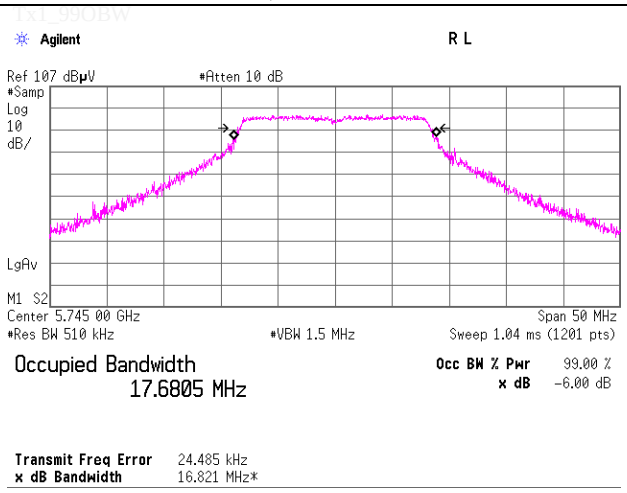
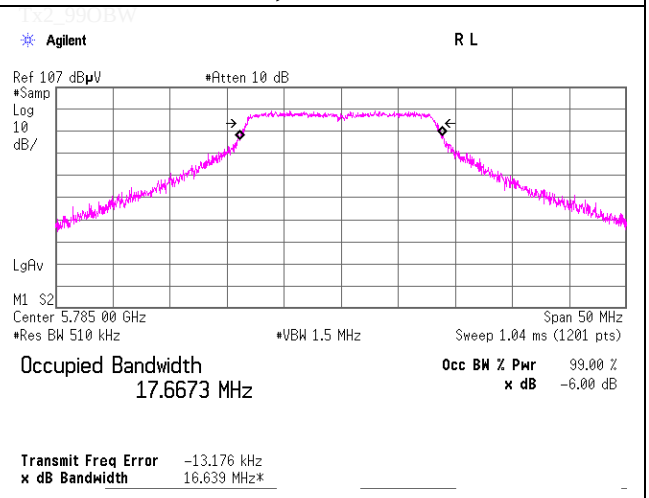
99% Occupied Bandwidth

Tx, IEEE802.11a, PN9, worst antenna port Sub, worst data mode 6Mbps

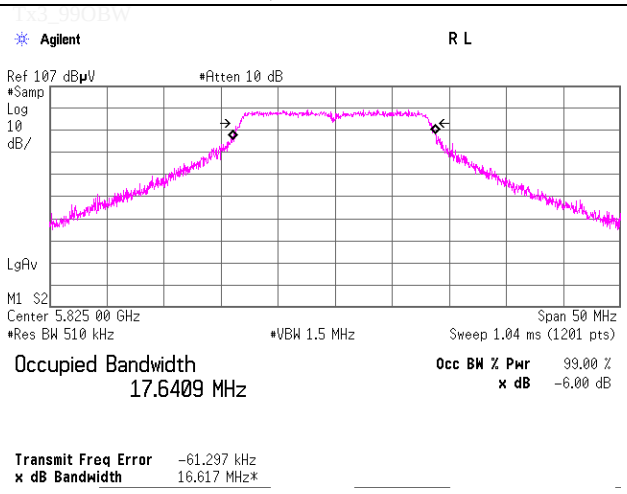
Tx, 5745MHz



Tx, 5785MHz



Tx, 5825MHz



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2012/04/19 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2012/04/19 * 12
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	AT	2012/03/12 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2012/04/06 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2012/03/26 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2013/03/04 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2012/04/06 * 12
SCC-G29	Coaxial Cable	Junkosha	MWX241-01000KM SKMS	SEP-20-12-003	AT	2012/09/26 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2013/03/27 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2012/09/21 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2012/07/18 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2012/04/10 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2012/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2012/08/17 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	RE	2013/01/08 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	028	RE	2012/12/18 * 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
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2012/03/30 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2012/03/12 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2012/03/12 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2012/03/12 * 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: Out of Band Emission (Radiated)
AT: Antenna terminal conducted test