



RADIO TEST REPORT

Test Report No.: 32AE0305-SH-02-B

Applicant : Sony Corporation
Type of Equipment : Digital Media Player
Model No. : NWZ-Z1040
FCC ID : AK8NWZZ1000
Test regulation : FCC Part15 Subpart C: 2011
Test result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: October 31 to November 19, 2011

Tested by:

H. Shirasawa

Hikaru Shirasawa
Engineer of WiSE Japan, UL
Verification Service

Approved by :

I. Isozaki

Ichiro Isozaki
Leader of WiSE Japan, UL
Verification Service

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony Corporation
 Brand Name : SONY
 Address : Shinagawa INTERCITY C Tower 2-15-3, Konan Minato-ku, Tokyo, Japan
 Telephone Number : +81-3-5769-5222
 Facsimile Number : +81-3-5769-5901
 Contact Person : Shinichi Maru

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of Equipment : Digital Media Player
 Model Number : NWZ-Z1040
 Serial Number : Refer to Section 4.2
 Rating : DC3.7V
 Country of Mass-production : China
 Condition of EUT : Engineering prototype
 (Not for Sale: This sample is equivalent to mass-produced items.)
 Receipt Date of Sample : October 24, 2011
 Modification of EUT : The test lab did not make the modification to the EUT supplied from the customer to have it pass the tests.

2.2 Product description

Model: NWZ-Z1040 (referred to as the EUT in this report) is a Digital Media Player.

The EUT has some derived models:

	NWZ-Z1040	NWZ-Z1050	NWZ-Z1060
NAND memory	8GB	16GB	32GB

Clock frequency(ies) in the system : 22.5792MHz(Audio), 26MHz(CPU), 32.768kHz(RTC), 26MHz(GPS), 26MHz(WiFi), 26MHz(BT)

<Radio part> [DSSS: Wireless LAN (IEEE802.11 series)]

Equipment type : Transceiver
 Frequency of operation : 2412-2462MHz (IEEE 802.11b, 11g, 11n-HT20)
 Bandwidth / Channel spacing : 20MHz & 5MHz
 Type of modulation : IEEE802.11b: DSSS (DBPSK, DQPSK, CCK)
 IEEE802.11g/n(20HT): OFDM (BPSK, QPSK, 16QAM, 64QAM)
 Antenna type : Chip antenna
 Antenna connector type : None
 Antenna gain : 1.2dBi
 ITU code : D1D, G1D
 Operating Voltage (Radio part) : 1.8V
 Operation temperature range : +5 to +35 deg.C.

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[FHSS: Bluetooth]

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth / Channel spacing : 79MHz & 1MHz
Type of modulation : FHSS(GFSK, $\pi/4$ -DQPSK, 8DPSK)
Antenna type : Chip Antenna
Antenna connector type : None
Antenna gain : 1.2dBi
ITU code : F1D, G1D
Operating Voltage (Radio part) : 1.8V
Operation temperature range : +5 to +35 deg.C.

*1) For Bluetooth Part, Please see UL Japan, Inc. Test Report Number 32BE0305-SH-02-A.

FCC 15.31 (e) / 212 (*15.212 = for module approval only)

The RF Module has its own regulator.

The RF Module is constantly provided voltage (DC1.8V) through its own regulator regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 / 212 (*15.212 = for module approval only)

Since the antenna used is a type of chip component and is permanently mounted by soldering on a printed circuit board in Type of Equipment, it is impossible for end users to replace it without assistance of professionals. Therefore, the equipment complies with the requirement of 15.203.

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SECTION 3: Test specification, procedures & results**3.1 Test specification**

Test specification : FCC Part 15 Subpart C: 2011, final revised on July 8, 2011
and effective August 8, 2011

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**[DSSS]**

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	(Tx) 22.2dB (0.15000MHz, QP, L1, Tx 2437MHz, IEEE 802.11g)	Complied
6dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(2) & 15.209	Conducted	N/A	* See data	Complied
Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (b)(3) & 15.209	Conducted	N/A		Complied
Out of Band Emission & Restricted Band Edges	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.109, 15.247 (d) & 15.209	Conducted / Radiated	N/A	(Tx) 3.2dB (2390MHz, AV, Horizontal, Tx 2412MHz, IEEE802.11g)	Complied
Power Density	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (e) & 15.209	Conducted	N/A	* See data	Complied

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

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

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	N/A *1)

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

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

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3.4 Uncertainty

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

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.6 dB
Radiated emission (Measurement distance: 3m)	30MHz-300MHz	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-18GHz	4.8 dB	4.8 dB	4.9 dB
	18GHz-26.5GHz	5.0 dB	4.5 dB	4.5 dB
Radiated emission (Measurement distance: 10m)	30MHz-300MHz	4.9 dB	5.1 dB	-
	300MHz-1GHz	4.9 dB	5.0 dB	-
Radiated emission (Measurement distance: 1m)	1GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.8 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.

Power Measurement uncertainty above 1GHz for this test was: (±) 1.3dB

Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.9dB

Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 2.5dB

Conducted emissions Measurement (3G-18GHz) uncertainty for this test was: (±) 3.8dB

Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 4.1dB

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

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3.5 Test location

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JAB Accreditation No. : RTL02610

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

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

[DSSS: Wireless LAN (IEEE802.11 series)]

Test item	Operating mode	Tested frequency
Conducted emission Spurious emission	Transmitting (Tx)	2412MHz, 2437MHz, 2462MHz
	Receiving (Rx)	2437MHz
6dB bandwidth Maximum peak output power Power density 99% occupied bandwidth	Transmitting (Tx)	2412MHz, 2437MHz, 2462MHz
Restricted band edge	Transmitting (Tx)	2412MHz, 2462MHz

*Transmitting duty was refer to APPENDIX 1.

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum power.

*EUT has the power settings by the software as follows;

Device driver: adb driver Version 1.0.29

Test software : athtestcmd Version 3.1

Power settings: IEEE802.11b mode is "15", IEEE802.11g mode is "15",
IEEE802.11n SISO 20MHz BW mode is "12".
(TPC on is power setting all subtract 3.5.)

Worst rate*1): IEEE802.11b mode is "2Mbps", IEEE802.11g mode is "36Mbps",
IEEE802.11n SISO 20MHz BW mode is "MCS3".

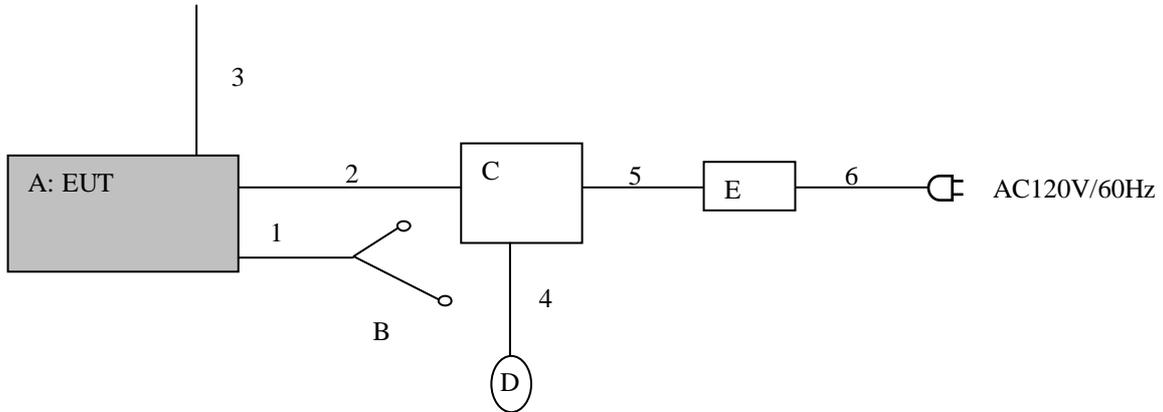
*1) As a result of preliminary test, the formal test was performed with the above modes, which had the maximum power.

*This setting of software is the worst case.

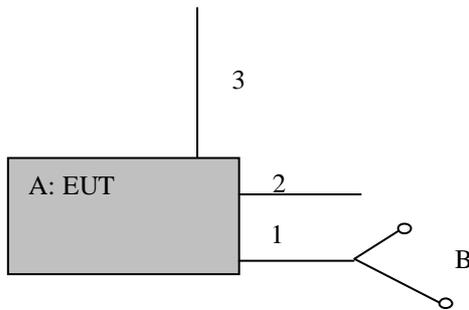
Any conditions under the normal use do not exceed the condition of setting.

In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration of tested system
[Conducted emission]



[Radiated emission]



* Test data was taken under worst case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	Digital Media Player	NWZ-Z1040	400500 *1), 400508 *2)	Sony Corporation	AK8NWZZ1000
B	Headphone set	MDR-EX0300LP	-	Sony Corporation	-
C	Laptop PC	HP ProBook 4420s	CNF1062V3N	HP	-
D	Mouse	MO28UOL	44A0208067	lenovo	-
E	AC adapter	PA-1650-32HT	PPP009L-E	HP	-

*1) Used for Radiated emission tests.

*2) Used for Antenna terminal tests.

List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Headphone	1.5	Unshielded	Unshielded	-
2	WM-PORNT Jack: USB conversion	1.0	Shielded	Shielded	-
3	HDMI	1.5	Shielded	Shielded	-
4	USB	1.8	Shielded	Shielded	-
5	DC	1.8	Shielded	Shielded	-
6	AC	1.7	Shielded	Shielded	-

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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 80cm above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from LISN and excess AC cable was bundled in center. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. 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
EUT operation mode : Refer to SECTION 4.1

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via Host device within a Shielded room. The Host device was connected to a Line Impedance Stabilization Network (LISN). 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 platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The configuration was set in accordance with ANSI C63.4: 2003.

The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Photographs of the set up are shown in APPENDIX 3.

6.3 Test conditions

Frequency range : 30MHz to 26GHz
 Test distance : 3m(below 13GHz) / 1m(above13GHz)
 EUT position : Table top
 EUT operation mode : Refer to SECTION 4.1

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 13GHz) / 1m(above 13GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

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

Frequency	:	30M-1000MHz	1000M-26000MHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW:10Hz

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

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

Worst position:

	Frequency	Carrier	Spurious			
			30M-1GHz	1-13GHz	13-18GHz	18-26.5GHz
EUT	Horizontal	Z	Z	Z	Z	Z
	Vertical	Y	Y	Z	Z	Z

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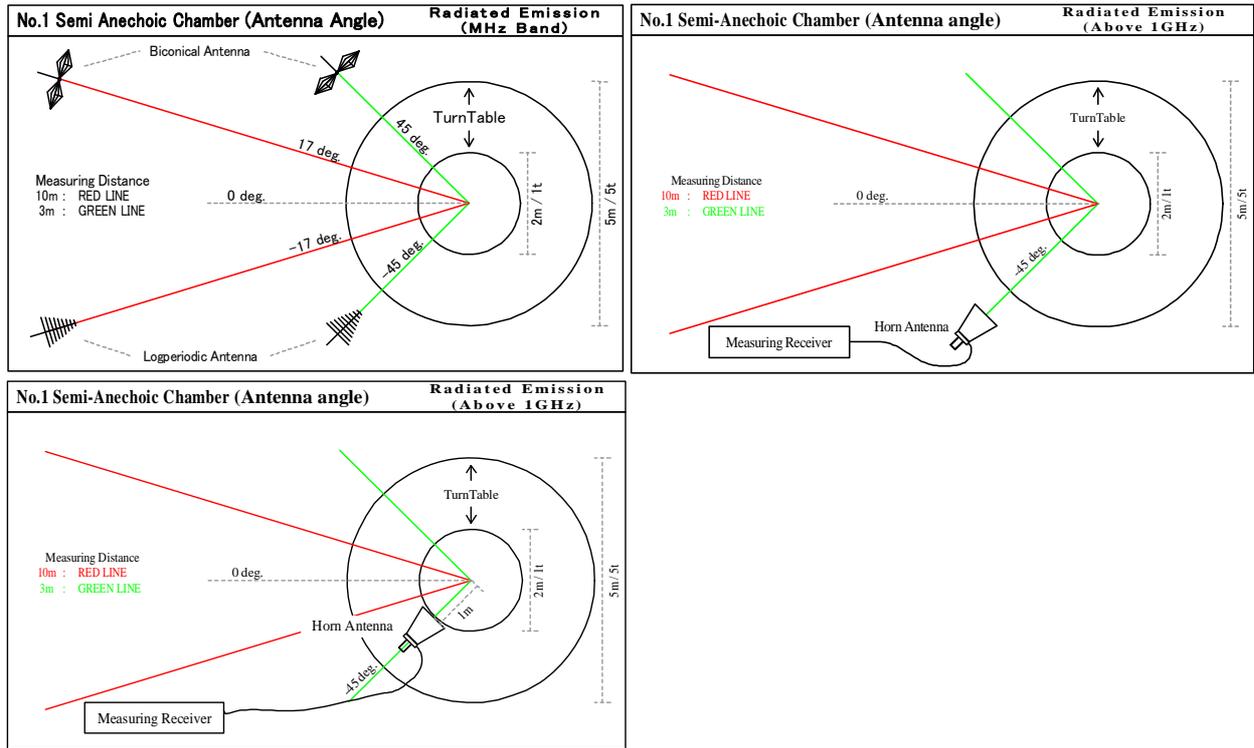


Figure 1. Antenna angle

6.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions (Antenna Port Conducted). Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

6.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
Refer to APPENDIX 1

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

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port. In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 8: 20dB or 6dB bandwidth & Occupied bandwidth (99%)

Test procedure

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

The bandwidth was measured 6dB bandwidth and 99% occupied bandwidth.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 9: Maximum peak output power

Test procedure

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

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 10: Peak power density

Test procedure

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

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

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

*2) The test was not performed at RBW : 3kHz that was stated in the Regulation.

However, the measurement value with RBW: 3kHz is less than the value of RBW: 30kHz and the test data met the limit with RBW: 30kHz.

Summary of the test results: Pass
Refer to APPENDIX 1

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Contents of APPENDIXES

APPENDIX 1: Data of EMI test

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APPENDIX 2: Test instruments

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DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

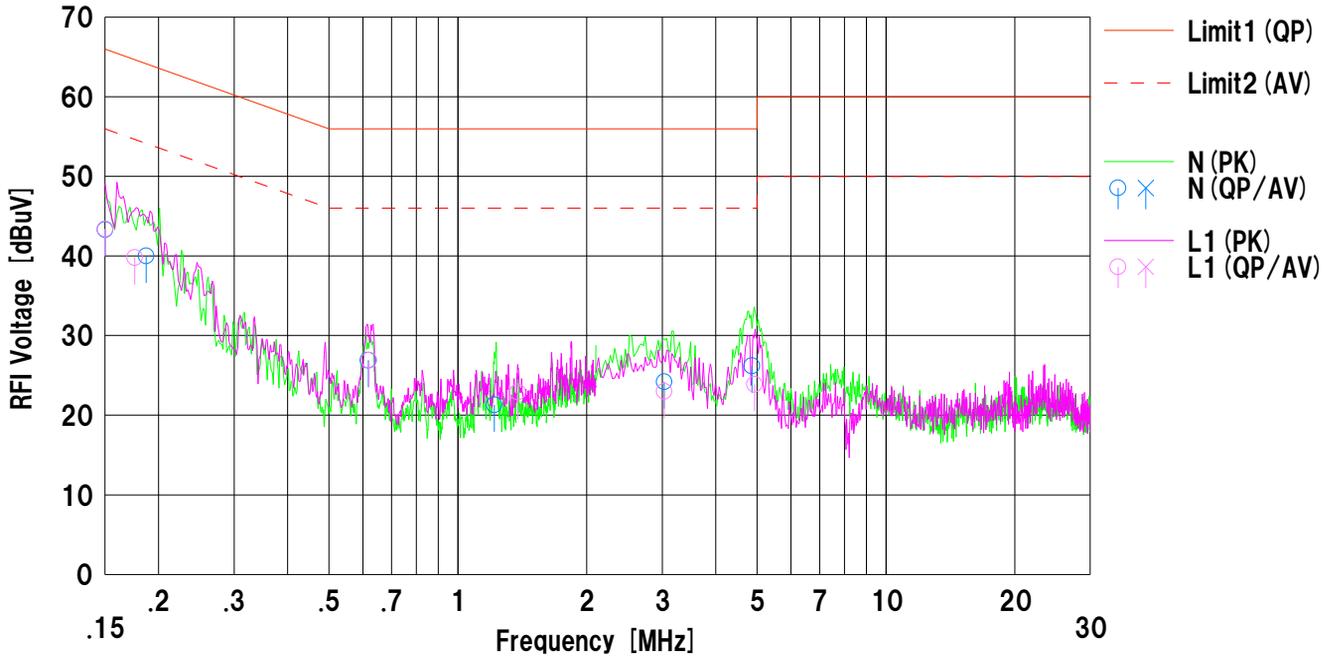
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11b_2437MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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	0.15000	30.6	---	12.7	43.3	---	66.0	56.0	22.7	---	N	
2	0.18690	27.3	---	12.7	40.0	---	64.1	54.1	24.1	---	N	
3	0.61760	14.2	---	12.7	26.9	---	56.0	46.0	29.1	---	N	
4	1.21700	8.5	---	12.8	21.3	---	56.0	46.0	34.7	---	N	
5	3.03530	11.3	---	12.9	24.2	---	56.0	46.0	31.8	---	N	
6	4.86180	13.3	---	12.9	26.2	---	56.0	46.0	29.8	---	N	
7	0.15000	30.7	---	12.7	43.4	---	66.0	56.0	22.6	---	L1	
8	0.17580	27.1	---	12.7	39.8	---	64.6	54.6	24.8	---	L1	
9	0.62015	14.2	---	12.7	26.9	---	56.0	46.0	29.1	---	L1	
10	1.37920	10.1	---	12.8	22.9	---	56.0	46.0	33.1	---	L1	
11	3.03545	10.1	---	12.9	23.0	---	56.0	46.0	33.0	---	L1	
12	4.93080	11.0	---	12.9	23.9	---	56.0	46.0	32.1	---	L1	

DATA OF CONDUCTED EMISSION TEST

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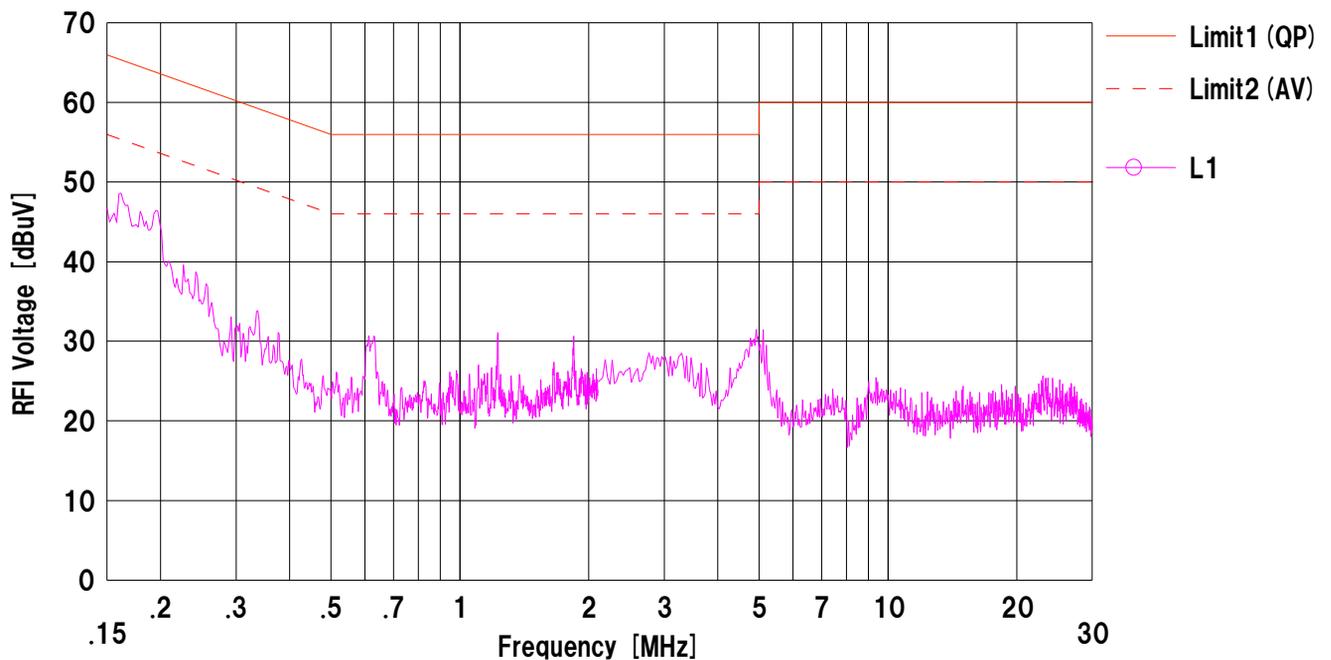
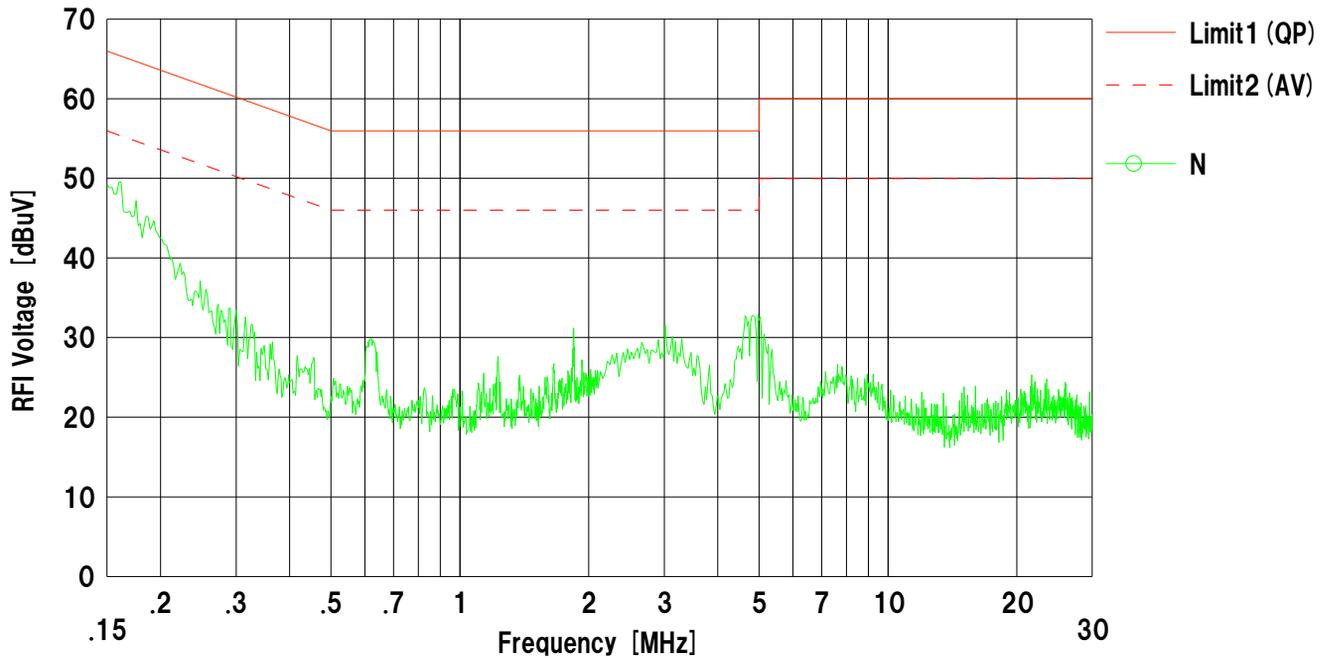
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11b_2412MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

Engineer : Wataru Kojima



DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

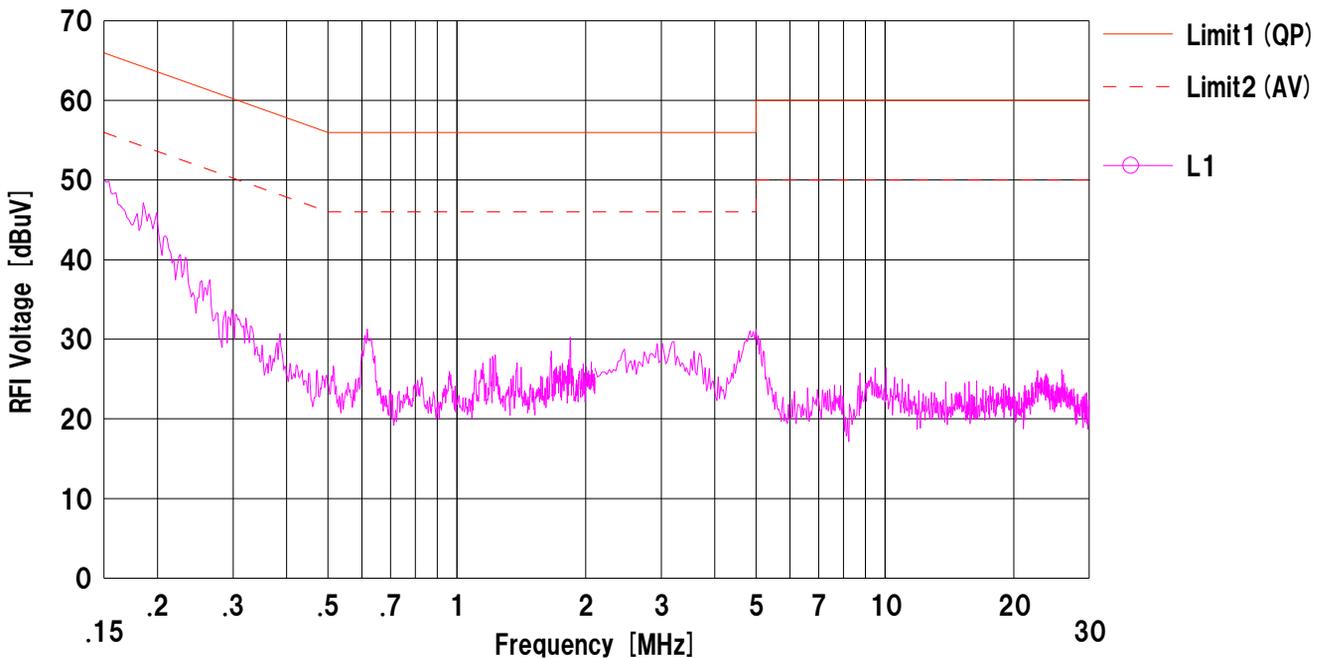
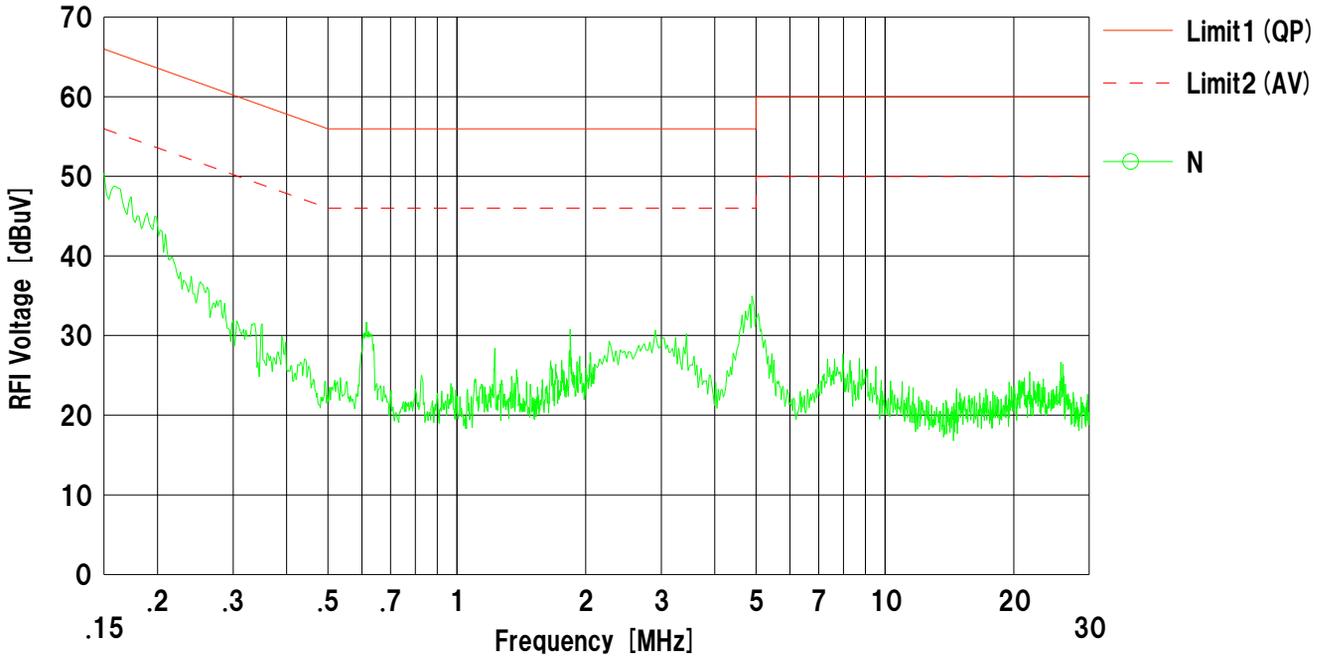
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11b_2462MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

Engineer : Wataru Kojima



DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

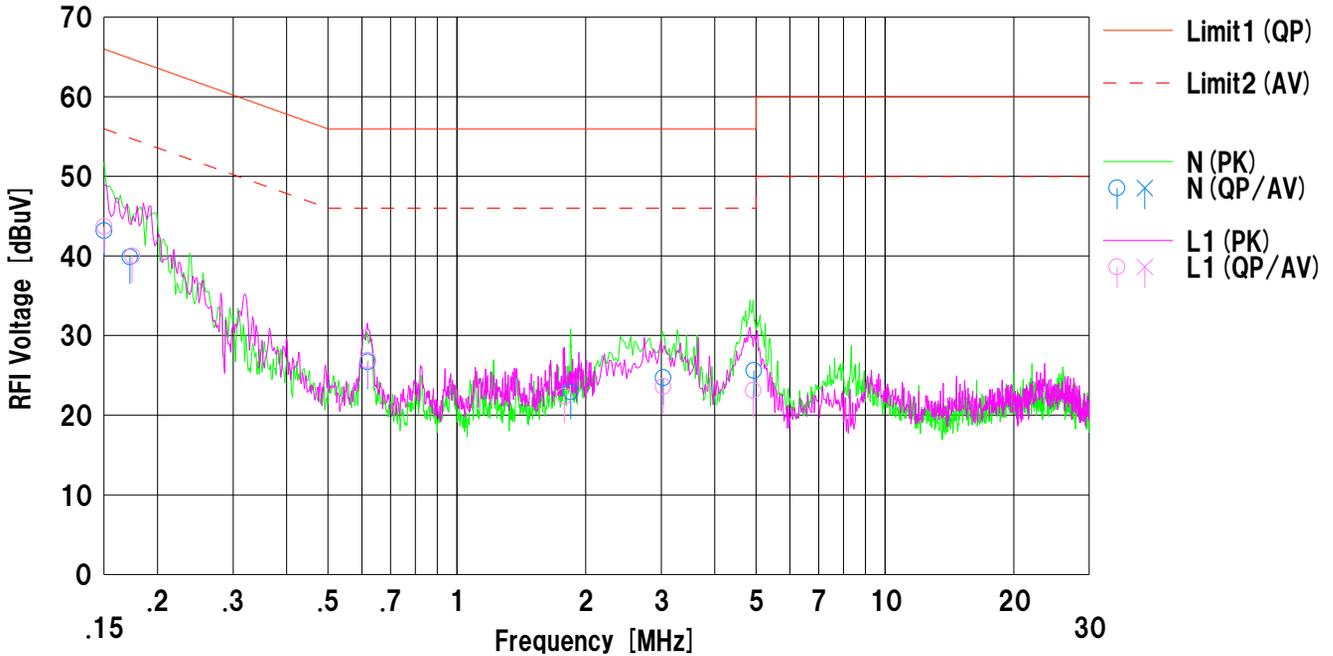
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11g_2437MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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	0.15000	30.5	---	12.7	43.2	---	66.0	56.0	22.8	---	N	
2	0.17235	27.2	---	12.7	39.9	---	64.8	54.8	24.9	---	N	
3	0.61900	14.0	---	12.7	26.7	---	56.0	46.0	29.3	---	N	
4	1.84429	10.1	---	12.8	22.9	---	56.0	46.0	33.1	---	N	
5	3.03370	11.8	---	12.9	24.7	---	56.0	46.0	31.3	---	N	
6	4.93900	12.7	---	12.9	25.6	---	56.0	46.0	30.4	---	N	
7	0.15000	31.0	---	12.7	43.7	---	65.9	55.9	22.2	---	L1	
8	0.17425	27.3	---	12.7	40.0	---	64.7	54.7	24.7	---	L1	
9	0.62035	14.2	---	12.7	26.9	---	56.0	46.0	29.1	---	L1	
10	1.78344	9.6	---	12.8	22.4	---	56.0	46.0	33.6	---	L1	
11	3.03410	10.7	---	12.9	23.6	---	56.0	46.0	32.4	---	L1	
12	4.92600	10.2	---	12.9	23.1	---	56.0	46.0	32.9	---	L1	

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

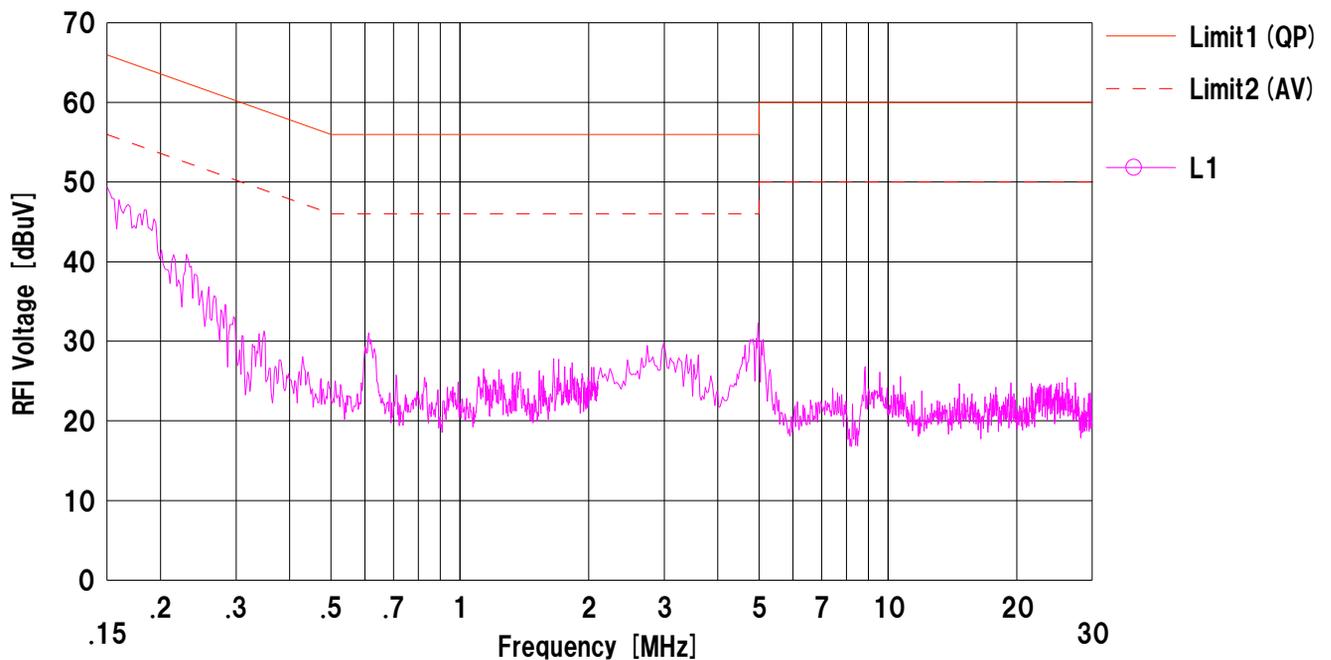
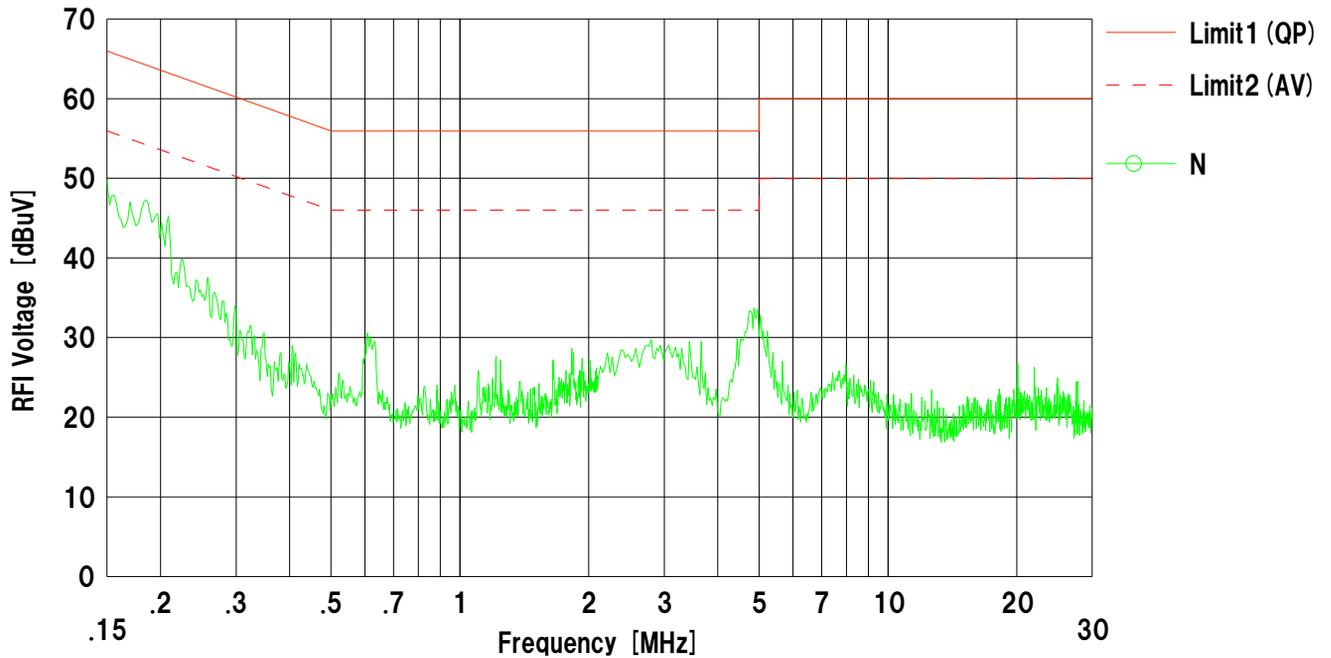
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11g_2412MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

Engineer : Wataru Kojima



DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

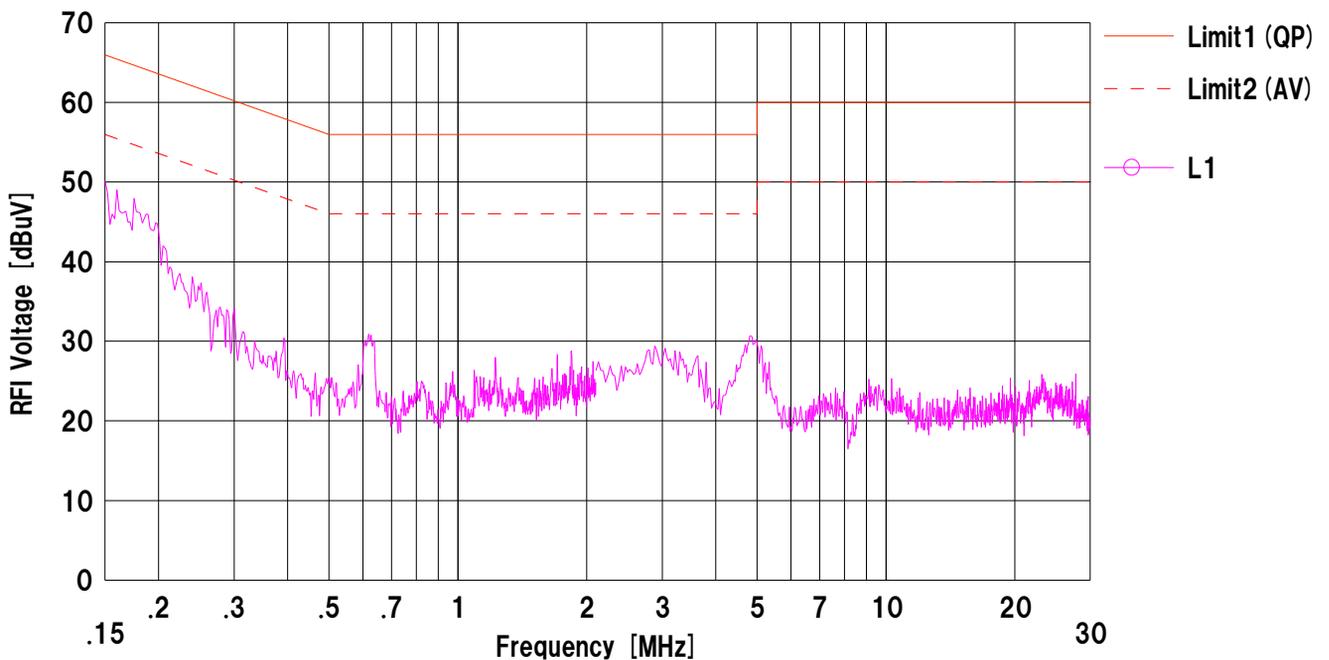
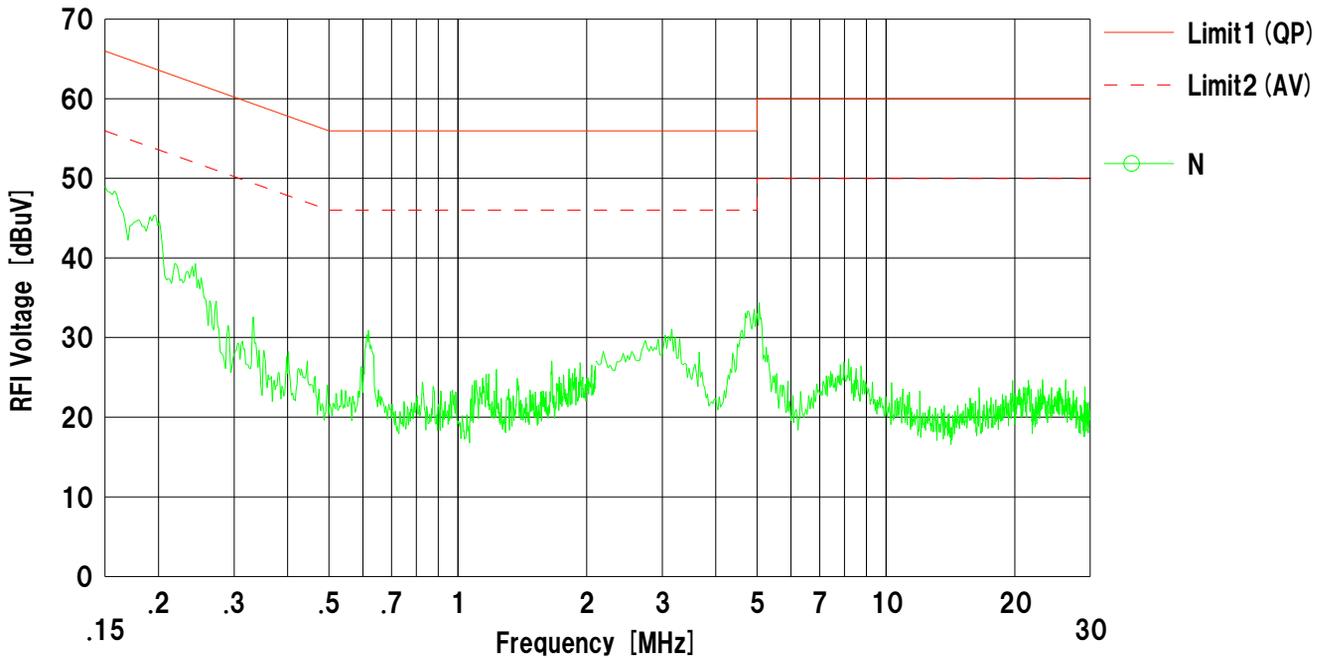
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11g_2462MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

Engineer : Wataru Kojima



DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

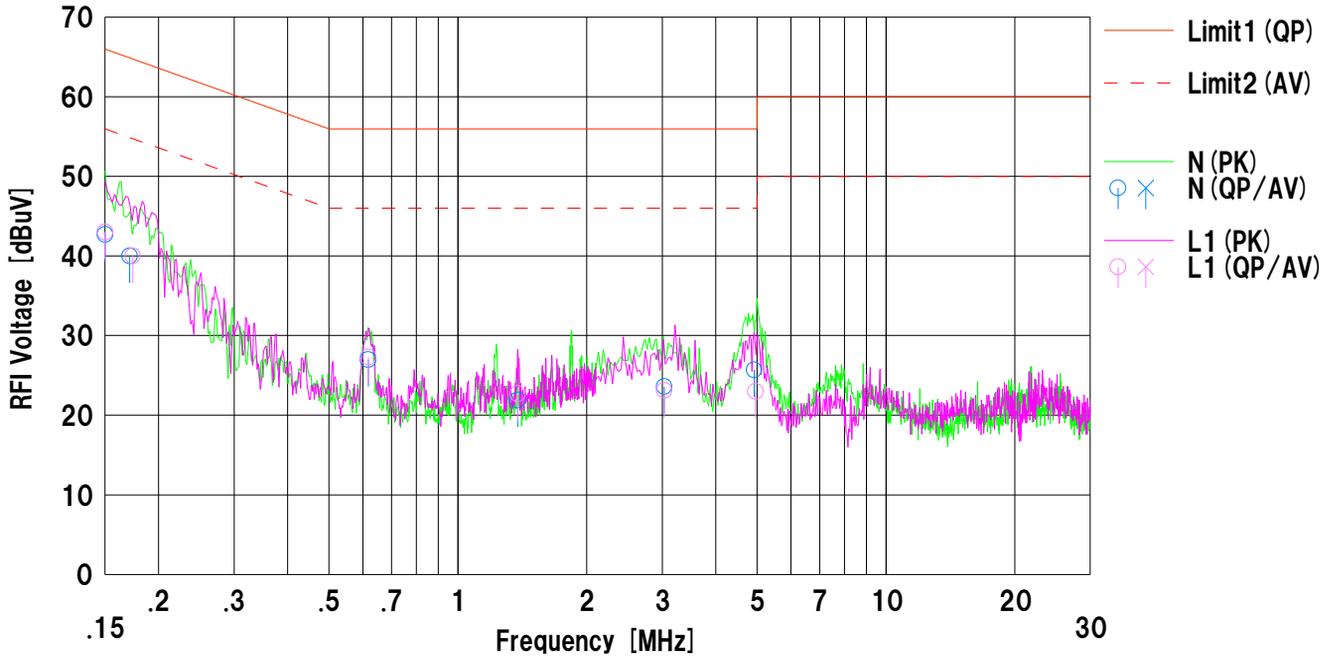
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11n (HT-20)_2437MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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	0.15000	30.0	---	12.7	42.7	---	65.9	55.9	23.2	---	N	
2	0.17110	27.3	---	12.7	40.0	---	64.9	54.9	24.9	---	N	
3	0.61770	14.3	---	12.7	27.0	---	56.0	46.0	29.0	---	N	
4	1.37920	9.1	---	12.8	21.9	---	56.0	46.0	34.1	---	N	
5	3.03560	10.7	---	12.9	23.6	---	56.0	46.0	32.4	---	N	
6	4.91800	12.8	---	12.9	25.7	---	56.0	46.0	30.3	---	N	
7	0.15000	30.3	---	12.7	43.0	---	66.0	56.0	23.0	---	L1	
8	0.17390	27.3	---	12.7	40.0	---	64.7	54.7	24.7	---	L1	
9	0.61745	14.6	---	12.7	27.3	---	56.0	46.0	28.7	---	L1	
10	1.37922	9.9	---	12.8	22.7	---	56.0	46.0	33.3	---	L1	
11	3.03554	10.2	---	12.9	23.1	---	56.0	46.0	32.9	---	L1	
12	4.95625	10.1	---	12.9	23.0	---	56.0	46.0	33.0	---	L1	

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

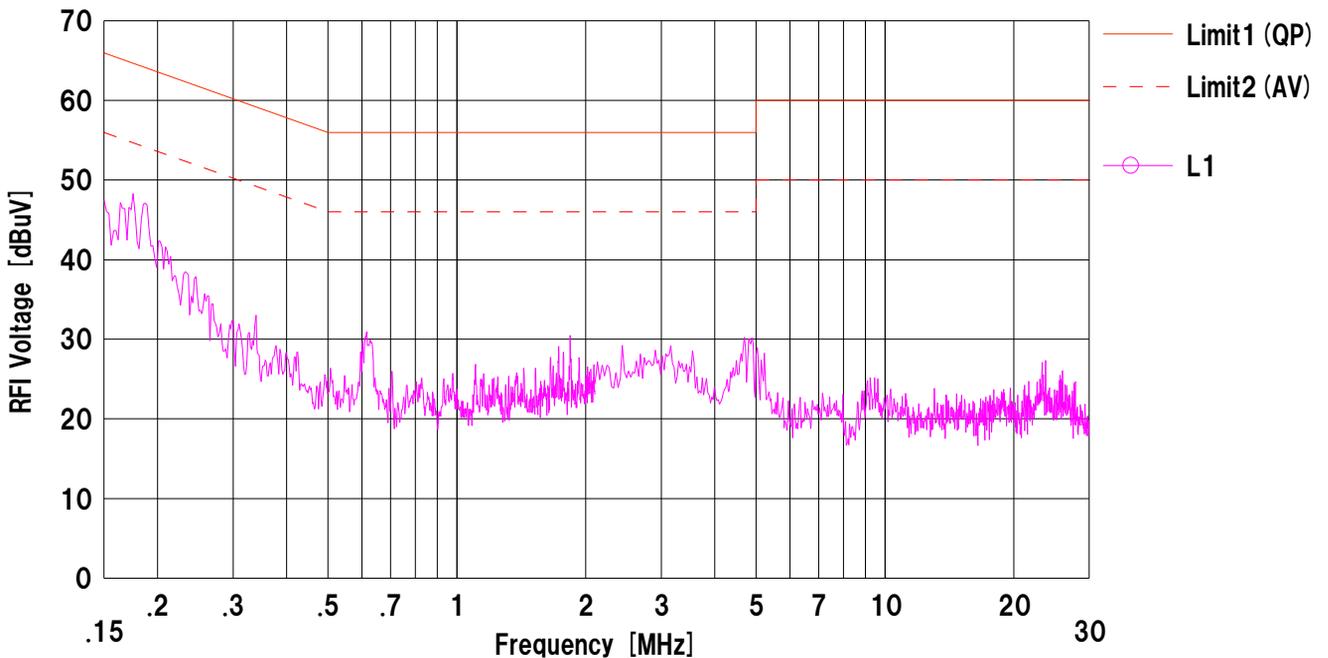
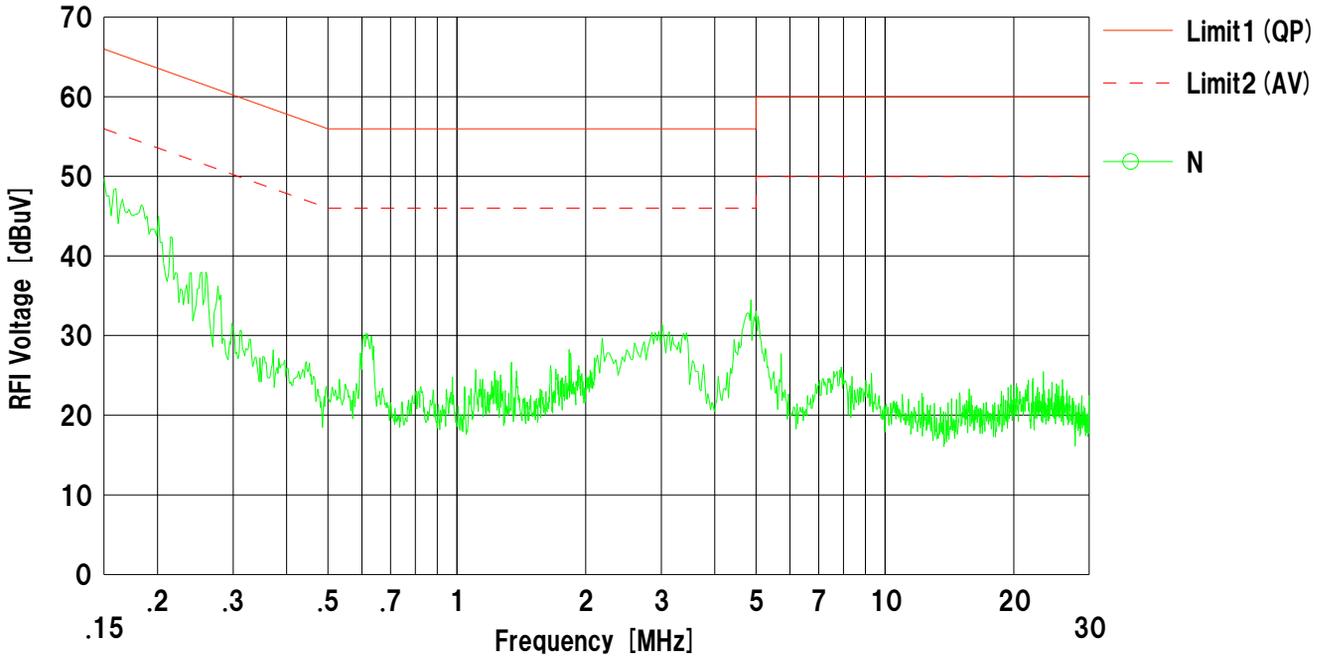
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11n (HT-20) _2412MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

Engineer : Wataru Kojima



DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2011/11/19

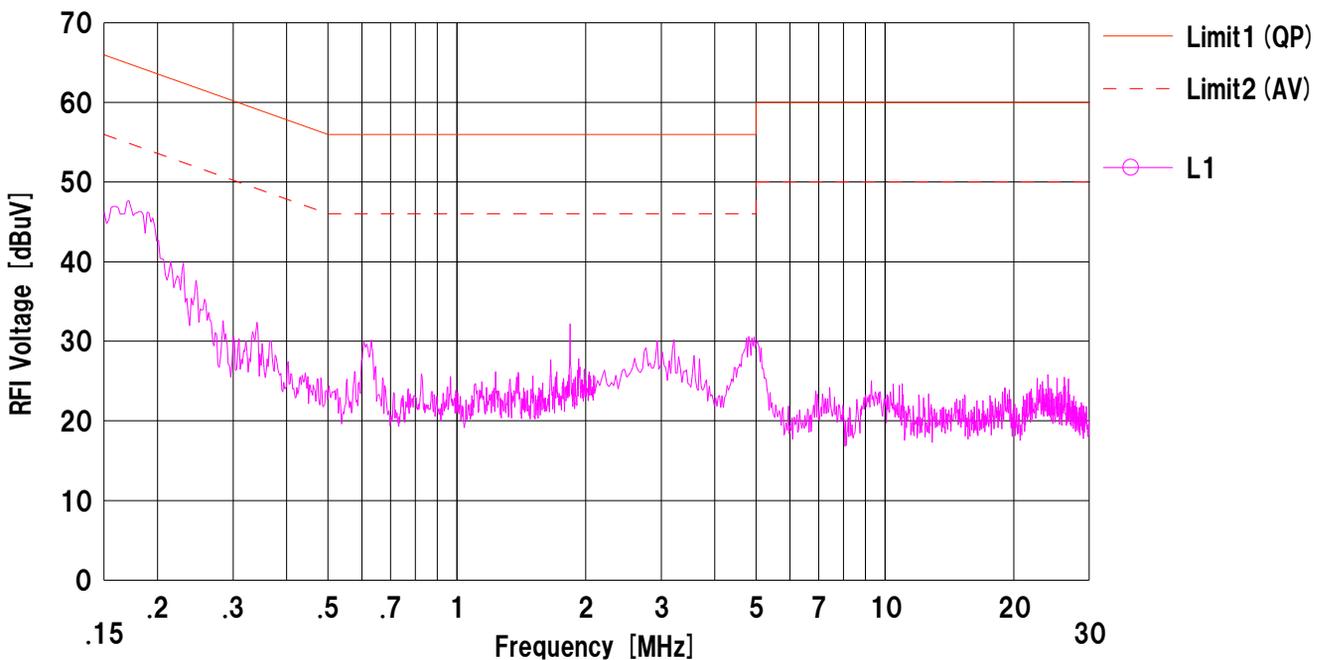
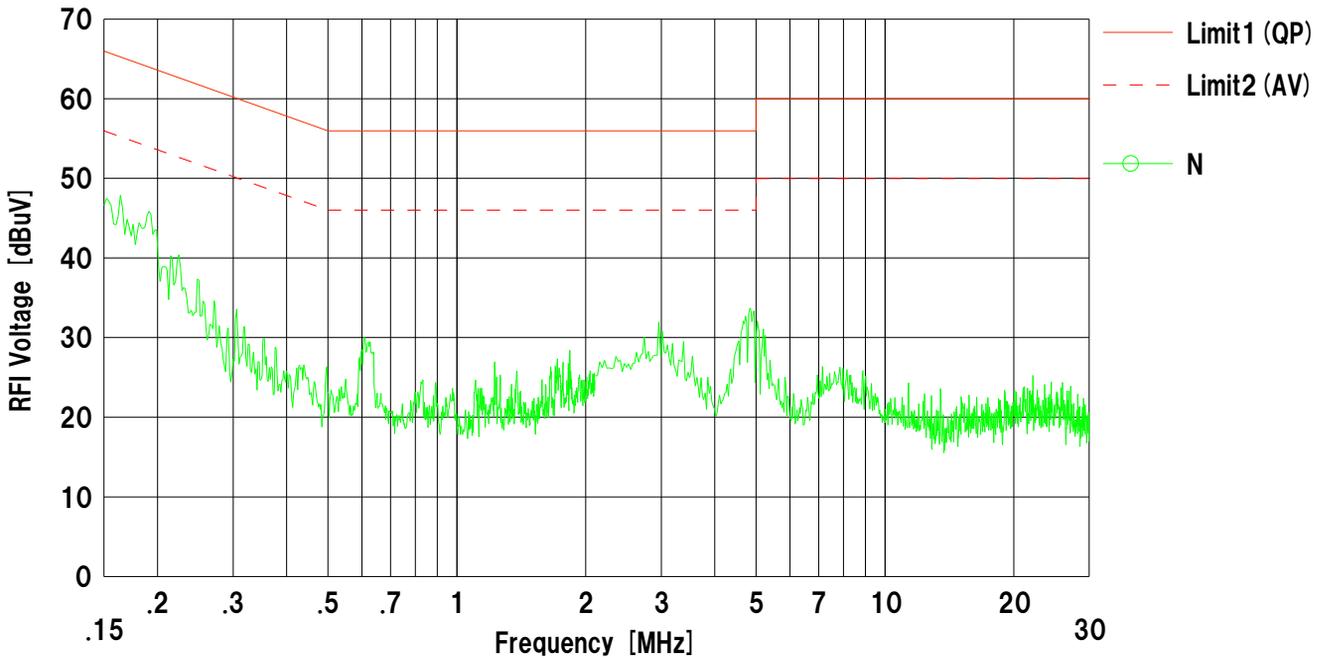
Company : Sony Corporation
Kind of EUT : Digital Media Player
Model No. : NWZ-Z1040
Serial No. : 400500

Mode : WLAN_Tx_802.11n (HT-20)_2462MHz
Report No. : 32AE0305-SH-02-B
Power : AC120V/60Hz
Temp./Humi. : 23deg.C. / 56%RH

Remarks : -

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

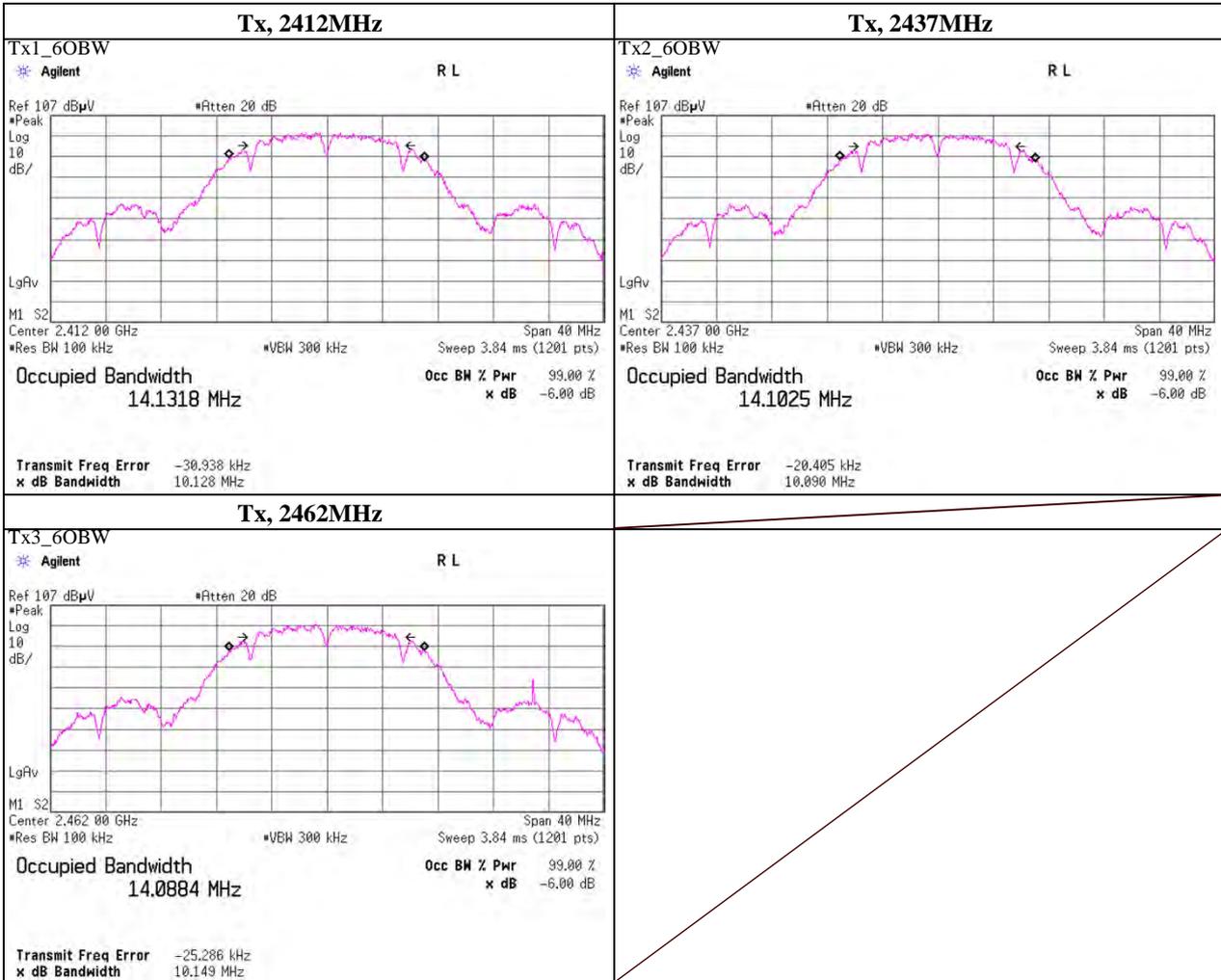
Engineer : Wataru Kojima



-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 3, 2011	
Temperature / Humidity	25deg.C , 47%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11b, PN9, worst data mode 2Mbps	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	10.128	> 0.500
2437.0000	10.090	> 0.500
2462.0000	10.149	> 0.500

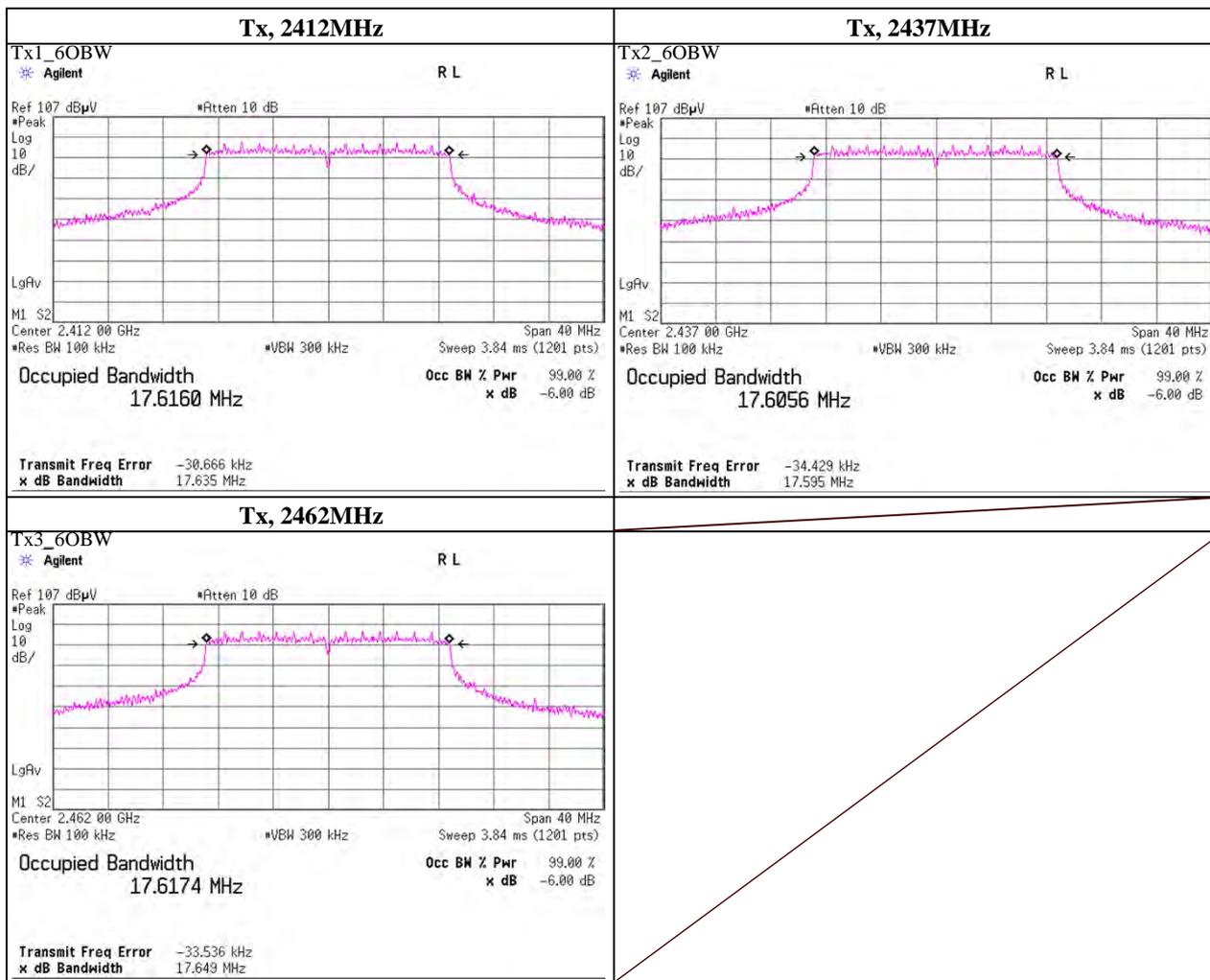


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-6dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 17, 2011	
Temperature / Humidity	23deg.C , 43%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)	

Freq. [MHz]	-6dB Bandwidth [MHz]	Limit [MHz]
2412.0000	17.635	> 0.500
2437.0000	17.595	> 0.500
2462.0000	17.649	> 0.500



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Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 2, 2011 November 10, 2011 November 12, 2011
 Temperature / Humidity 24deg.C , 49%RH 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Hikaru Shirasawa Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2412 MHz
 Tx, IEEE802.11b, PN9, worst data mode 2Mbps

(* 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.	336.000	QP	34.0	14.9	7.1	31.8	24.2	46.0	21.8	100	240	
Hori.	384.005	QP	33.7	15.9	7.5	31.8	25.3	46.0	20.7	100	96	
Hori.	432.247	QP	34.5	16.6	7.8	31.8	27.1	46.0	18.9	100	147	
Hori.	2390.000	PK	49.7	28.2	13.8	40.6	51.1	73.9	22.8	100	154	
Hori.	4824.000	PK	52.9	31.2	6.0	41.5	48.6	73.9	25.3	100	90	
Hori.	7236.000	PK	49.7	36.1	7.6	40.7	52.7	73.9	21.2	100	121	
Hori.	9648.000	PK	47.6	38.6	8.7	40.5	54.4	73.9	19.5	100	122	
Hori.	12060.000	PK	46.2	39.5	10.3	39.5	56.5	73.9	17.4	100	120	
Hori.	2390.000	AV	36.8	28.2	13.8	40.6	38.2	53.9	15.7	100	154	
Hori.	4824.000	AV	46.6	31.2	6.0	41.5	42.3	53.9	11.6	100	90	
Hori.	7236.000	AV	36.5	36.1	7.6	40.7	39.5	53.9	14.4	100	121	
Hori.	9648.000	AV	34.7	38.6	8.7	40.5	41.5	53.9	12.4	100	122	
Hori.	12060.000	AV	32.9	39.5	10.3	39.5	43.2	53.9	10.7	100	120	
Vert.	102.724	QP	26.7	10.6	8.0	31.8	13.5	43.5	30.0	100	10	
Vert.	165.034	QP	28.3	15.2	8.6	31.8	20.3	43.5	23.2	100	358	
Vert.	192.006	QP	31.3	16.1	8.9	31.8	24.5	43.5	19.0	100	7	
Vert.	2390.000	PK	49.9	28.2	13.8	40.6	51.3	73.9	22.6	100	141	
Vert.	4824.000	PK	50.4	31.2	6.0	41.5	46.1	73.9	27.8	109	147	
Vert.	7236.000	PK	48.6	36.1	7.6	40.7	51.6	73.9	22.3	100	202	
Vert.	9648.000	PK	46.0	38.6	8.7	40.5	52.8	73.9	21.1	100	113	
Vert.	12060.000	PK	46.2	39.5	10.3	39.5	56.5	73.9	17.4	119	161	
Vert.	2390.000	AV	36.8	28.2	13.8	40.6	38.2	53.9	15.7	100	141	
Vert.	4824.000	AV	42.4	31.2	6.0	41.5	38.1	53.9	15.8	109	147	
Vert.	7236.000	AV	35.3	36.1	7.6	40.7	38.3	53.9	15.6	100	202	
Vert.	9648.000	AV	34.1	38.6	8.7	40.5	40.9	53.9	13.0	100	113	
Vert.	12060.000	AV	32.7	39.5	10.3	39.5	43.0	53.9	10.9	119	161	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	95.8	28.3	13.8	40.6	97.3	-	-	Carrier
Hori.	2397.160	PK	62.5	28.2	13.8	40.6	63.9	77.3	13.4	
Hori.	2400.000	PK	52.5	28.2	13.8	40.6	53.9	77.3	23.4	
Vert.	2412.000	PK	95.1	28.3	13.8	40.6	96.6	-	-	Carrier
Vert.	2397.168	PK	62.2	28.2	13.8	40.6	63.6	76.6	13.0	
Vert.	2400.000	PK	52.6	28.2	13.8	40.6	54.0	76.6	22.6	

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

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 10, 2011 November 12, 2011
 Temperature / Humidity 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2437 MHz
 Tx, IEEE802.11b, PN9, worst data mode 2Mbps

(* 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.	335.997	QP	33.8	14.9	7.1	31.8	24.0	46.0	22.0	100	242	
Hori.	384.007	QP	33.4	15.9	7.5	31.8	25.0	46.0	21.0	100	92	
Hori.	432.011	QP	34.2	16.6	7.8	31.8	26.8	46.0	19.2	100	143	
Hori.	4874.000	PK	54.1	31.4	6.0	41.5	50.0	73.9	23.9	112	100	
Hori.	7311.000	PK	48.7	36.2	7.6	40.7	51.8	73.9	22.1	100	128	
Hori.	9748.000	PK	46.3	38.7	8.7	40.5	53.2	73.9	20.7	100	87	
Hori.	12185.000	PK	45.6	39.6	10.3	39.5	56.0	73.9	17.9	100	99	
Hori.	4874.000	AV	48.8	31.4	6.0	41.5	44.7	53.9	9.2	112	100	
Hori.	7311.000	AV	35.7	36.2	7.6	40.7	38.8	53.9	15.1	100	128	
Hori.	9748.000	AV	34.0	38.7	8.7	40.5	40.9	53.9	13.0	100	87	
Hori.	12185.000	AV	33.5	39.6	10.3	39.5	43.9	53.9	10.0	100	99	
Vert.	102.617	QP	27.3	10.5	8.0	31.8	14.0	43.5	29.5	100	3	
Vert.	165.022	QP	28.8	15.2	8.6	31.8	20.8	43.5	22.7	100	355	
Vert.	192.004	QP	31.6	16.1	8.9	31.8	24.8	43.5	18.7	100	11	
Vert.	4874.000	PK	51.9	31.4	6.0	41.5	47.8	73.9	26.1	110	100	
Vert.	7311.000	PK	49.7	36.2	7.6	40.7	52.8	73.9	21.1	100	90	
Vert.	9748.000	PK	47.5	38.7	8.7	40.5	54.4	73.9	19.5	100	187	
Vert.	12185.000	PK	46.8	39.6	10.3	39.5	57.2	73.9	16.7	100	115	
Vert.	4874.000	AV	43.7	31.4	6.0	41.5	39.6	53.9	14.3	110	100	
Vert.	7311.000	AV	35.6	36.2	7.6	40.7	38.7	53.9	15.2	100	90	
Vert.	9748.000	AV	34.5	38.7	8.7	40.5	41.4	53.9	12.5	100	187	
Vert.	12185.000	AV	33.6	39.6	10.3	39.5	44.0	53.9	9.9	100	115	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 2, 2011 November 10, 2011 November 12, 2011
 Temperature / Humidity 24deg.C , 49%RH 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Hikaru Shirasawa Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2462 MHz
 Tx, IEEE802.11b, PN9, worst data mode 2Mbps

(* 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.	335.998	QP	33.8	14.9	7.1	31.8	24.0	46.0	22.0	100	244	
Hori.	384.018	QP	33.6	15.9	7.5	31.8	25.2	46.0	20.8	100	90	
Hori.	432.016	QP	34.4	16.6	7.8	31.8	27.0	46.0	19.0	100	148	
Hori.	2483.500	PK	48.5	28.7	13.7	40.5	50.4	73.9	23.5	120	162	
Hori.	4924.000	PK	55.3	31.5	6.1	41.5	51.4	73.9	22.5	100	80	
Hori.	7386.000	PK	47.5	36.3	7.5	40.7	50.6	73.9	23.3	100	128	
Hori.	9848.000	PK	47.0	38.8	8.7	40.5	54.0	73.9	19.9	100	102	
Hori.	12310.000	PK	45.9	39.6	10.3	39.5	56.3	73.9	17.6	100	128	
Hori.	2483.500	AV	35.1	28.7	13.7	40.5	37.0	53.9	16.9	120	162	
Hori.	4924.000	AV	48.3	31.5	6.1	41.5	44.4	53.9	9.5	100	80	
Hori.	7386.000	AV	35.6	36.3	7.5	40.7	38.7	53.9	15.2	100	128	
Hori.	9848.000	AV	35.8	38.8	8.7	40.5	42.8	53.9	11.1	100	102	
Hori.	12310.000	AV	33.4	39.6	10.3	39.5	43.8	53.9	10.1	100	128	
Vert.	102.572	QP	26.9	10.5	8.0	31.8	13.6	43.5	29.9	100	8	
Vert.	165.042	QP	28.6	15.2	8.6	31.8	20.6	43.5	22.9	100	354	
Vert.	192.007	QP	31.5	16.1	8.9	31.8	24.7	43.5	18.8	100	13	
Vert.	2483.500	PK	48.1	28.7	13.7	40.5	50.0	73.9	23.9	100	0	
Vert.	4924.000	PK	52.8	31.5	6.1	41.5	48.9	73.9	25.0	105	201	
Vert.	7386.000	PK	48.6	36.3	7.5	40.7	51.7	73.9	22.2	100	98	
Vert.	9848.000	PK	46.9	38.8	8.7	40.5	53.9	73.9	20.0	100	156	
Vert.	12310.000	PK	45.8	39.6	10.3	39.5	56.2	73.9	17.7	100	124	
Vert.	2483.500	AV	34.9	28.7	13.7	40.5	36.8	53.9	17.1	100	0	
Vert.	4924.000	AV	45.7	31.5	6.1	41.5	41.8	53.9	12.1	105	201	
Vert.	7386.000	AV	35.7	36.3	7.5	40.7	38.8	53.9	15.1	100	98	
Vert.	9848.000	AV	36.0	38.8	8.7	40.5	43.0	53.9	10.9	100	156	
Vert.	12310.000	AV	33.4	39.6	10.3	39.5	43.8	53.9	10.1	100	124	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 2, 2011 November 10, 2011 November 12, 2011
 Temperature / Humidity 24deg.C , 49%RH 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Hikaru Shirasawa Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2412 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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.	144.004	QP	34.1	14.4	8.4	31.8	25.1	43.5	18.4	200	70	
Hori.	288.013	QP	34.0	18.5	9.7	31.8	30.4	46.0	15.6	154	350	
Hori.	384.005	QP	36.0	15.9	7.5	31.8	27.6	46.0	18.4	100	269	
Hori.	432.012	QP	32.2	16.6	7.8	31.8	24.8	46.0	21.2	100	109	
Hori.	576.010	QP	33.6	18.6	8.5	32.0	28.7	46.0	17.3	150	314	
Hori.	2390.000	PK	34.5	28.2	3.8	0.0	66.5	73.9	7.4	120	150	
Hori.	4824.000	PK	48.7	31.2	6.0	41.5	44.4	73.9	29.5	100	103	
Hori.	7236.000	PK	47.9	36.1	7.6	40.7	50.9	73.9	23.0	100	132	
Hori.	9648.000	PK	47.7	38.6	8.7	40.5	54.5	73.9	19.4	100	141	
Hori.	12060.000	PK	46.3	39.5	10.3	39.5	56.6	73.9	17.3	100	76	
Hori.	2390.000	AV	18.7	28.2	3.8	0.0	50.7	53.9	3.2	120	150	
Hori.	4824.000	AV	34.0	31.2	6.0	41.5	29.7	53.9	24.2	100	103	
Hori.	7236.000	AV	35.5	36.1	7.6	40.7	38.5	53.9	15.4	100	132	
Hori.	9648.000	AV	35.0	38.6	8.7	40.5	41.8	53.9	12.1	100	141	
Hori.	12060.000	AV	33.8	39.5	10.3	39.5	44.1	53.9	9.8	100	76	
Vert.	169.032	QP	26.3	15.4	8.7	31.8	18.6	43.5	24.9	100	100	
Vert.	2390.000	PK	33.8	28.2	3.8	0.0	65.8	73.9	8.1	100	153	
Vert.	4824.000	PK	48.8	31.2	6.0	41.5	44.5	73.9	29.4	100	95	
Vert.	7236.000	PK	48.3	36.1	7.6	40.7	51.3	73.9	22.6	100	178	
Vert.	9648.000	PK	45.9	38.6	8.7	40.5	52.7	73.9	21.2	100	127	
Vert.	12060.000	PK	46.6	39.5	10.3	39.5	56.9	73.9	17.0	100	151	
Vert.	2390.000	AV	18.0	28.2	3.8	0.0	50.0	53.9	3.9	100	153	
Vert.	4824.000	AV	35.3	31.2	6.0	41.5	31.0	53.9	22.9	100	95	
Vert.	7236.000	AV	35.7	36.1	7.6	40.7	38.7	53.9	15.2	100	178	
Vert.	9648.000	AV	33.8	38.6	8.7	40.5	40.6	53.9	13.3	100	127	
Vert.	12060.000	AV	33.1	39.5	10.3	39.5	43.4	53.9	10.5	100	151	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	95.1	28.3	13.8	40.6	96.6	-	-	Carrier
Hori.	2400.000	PK	65.8	28.2	13.8	40.6	67.2	76.6	9.4	
							0.0	76.6	76.6	
Vert.	2412.000	PK	93.6	28.3	13.8	40.6	95.1	-	-	Carrier
Vert.	2400.000	PK	63.3	28.2	13.8	40.6	64.7	75.1	10.4	
							0.0	75.1	75.1	

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

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 2, 2011 November 10, 2011 November 12, 2011
 Temperature / Humidity 24deg.C , 49%RH 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Hikaru Shirasawa Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2437 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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.	144.002	QP	34.3	14.4	8.4	31.8	25.3	43.5	18.2	233	73	
Hori.	288.004	QP	34.2	18.5	9.7	31.8	30.6	46.0	15.4	159	351	
Hori.	384.002	QP	36.4	15.9	7.5	31.8	28.0	46.0	18.0	100	266	
Hori.	432.007	QP	32.4	16.6	7.8	31.8	25.0	46.0	21.0	100	104	
Hori.	576.008	QP	33.5	18.6	8.5	32.0	28.6	46.0	17.4	155	309	
Hori.	4874.000	PK	51.8	31.4	6.0	41.5	47.7	73.9	26.2	100	159	
Hori.	7311.000	PK	49.9	36.2	7.6	40.7	53.0	73.9	20.9	100	109	
Hori.	9748.000	PK	48.6	38.7	8.7	40.5	55.5	73.9	18.4	100	65	
Hori.	12185.000	PK	45.0	39.6	10.3	39.5	55.4	73.9	18.5	100	76	
Hori.	4874.000	AV	40.9	31.4	6.0	41.5	36.8	53.9	17.1	100	159	
Hori.	7311.000	AV	36.8	36.2	7.6	40.7	39.9	53.9	14.0	100	109	
Hori.	9748.000	AV	35.8	38.7	8.7	40.5	42.7	53.9	11.2	100	65	
Hori.	12185.000	AV	33.7	39.6	10.3	39.5	44.1	53.9	9.8	100	76	
Vert.	169.060	QP	26.4	15.4	8.7	31.8	18.7	43.5	24.8	100	109	
Vert.	4874.000	PK	51.6	31.4	6.0	41.5	47.5	73.9	26.4	100	137	
Vert.	7311.000	PK	49.3	36.2	7.6	40.7	52.4	73.9	21.5	100	99	
Vert.	9748.000	PK	46.8	38.7	8.7	40.5	53.7	73.9	20.2	100	193	
Vert.	12185.000	PK	46.2	39.6	10.3	39.5	56.6	73.9	17.3	100	111	
Vert.	4874.000	AV	37.2	31.4	6.0	41.5	33.1	53.9	20.8	100	137	
Vert.	7311.000	AV	36.0	36.2	7.6	40.7	39.1	53.9	14.8	100	99	
Vert.	9748.000	AV	34.3	38.7	8.7	40.5	41.2	53.9	12.7	100	193	
Vert.	12185.000	AV	33.4	39.6	10.3	39.5	43.8	53.9	10.1	100	111	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 2, 2011 November 10, 2011 November 12, 2011
 Temperature / Humidity 24deg.C , 49%RH 23deg.C , 50%RH 23deg.C , 48%RH
 Engineer Hikaru Shirasawa Takahiro Suzuki Hikaru Shirasawa
 Mode Tx, 2462 MHz
 Tx, IEEE802.11g, PN9, worst data mode 36Mbps

(* 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.	144.000	QP	33.9	14.4	8.4	31.8	24.9	43.5	18.6	201	71	
Hori.	288.010	QP	34.0	18.5	9.7	31.8	30.4	46.0	15.6	155	248	
Hori.	384.006	QP	36.4	15.9	7.5	31.8	28.0	46.0	18.0	100	257	
Hori.	432.011	QP	32.5	16.6	7.8	31.8	25.1	46.0	20.9	100	115	
Hori.	576.012	QP	33.8	18.6	8.5	32.0	28.9	46.0	17.1	152	300	
Hori.	2483.500	PK	63.3	28.7	13.7	40.5	65.2	73.9	8.7	119	168	
Hori.	4924.000	PK	56.8	31.5	6.1	41.5	52.9	73.9	21.0	100	99	
Hori.	7386.000	PK	50.1	36.3	7.5	40.7	53.2	73.9	20.7	100	92	
Hori.	9848.000	PK	47.9	38.8	8.7	40.5	54.9	73.9	19.0	100	121	
Hori.	12310.000	PK	46.3	39.6	10.3	39.5	56.7	73.9	17.2	100	136	
Hori.	2483.500	AV	46.6	28.7	13.7	40.5	48.5	53.9	5.4	119	168	
Hori.	4924.000	AV	43.8	31.5	6.1	41.5	39.9	53.9	14.0	100	99	
Hori.	7386.000	AV	37.1	36.3	7.5	40.7	40.2	53.9	13.7	100	92	
Hori.	9848.000	AV	36.5	38.8	8.7	40.5	43.5	53.9	10.4	100	121	
Hori.	12310.000	AV	33.6	39.6	10.3	39.5	44.0	53.9	9.9	100	136	
Vert.	169.053	QP	26.0	15.4	8.7	31.8	18.3	43.5	25.2	100	114	
Vert.	2483.500	PK	62.3	28.7	13.7	40.5	64.2	73.9	9.7	100	163	
Vert.	4924.000	PK	51.8	31.5	6.1	41.5	47.9	73.9	26.0	100	78	
Vert.	7386.000	PK	48.2	36.3	7.5	40.7	51.3	73.9	22.6	100	100	
Vert.	9848.000	PK	46.7	38.8	8.7	40.5	53.7	73.9	20.2	100	145	
Vert.	12310.000	PK	46.0	39.6	10.3	39.5	56.4	73.9	17.5	100	117	
Vert.	2483.500	AV	45.7	28.7	13.7	40.5	47.6	53.9	6.3	100	163	
Vert.	4924.000	AV	38.9	31.5	6.1	41.5	35.0	53.9	18.9	100	78	
Vert.	7386.000	AV	36.0	36.3	7.5	40.7	39.1	53.9	14.8	100	100	
Vert.	9848.000	AV	36.3	38.8	8.7	40.5	43.3	53.9	10.6	100	145	
Vert.	12310.000	AV	33.2	39.6	10.3	39.5	43.6	53.9	10.3	100	117	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 17, 2011 November 19, 2011
 Temperature / Humidity 26deg.C , 40%RH 23deg.C , 40%RH
 Engineer Akira Sato Akira Sato
 Mode Tx, 2412 MHz
 Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	335.991	QP	32.3	14.9	7.1	31.8	22.5	46.0	23.5	100	114	
Hori.	384.002	QP	34.6	15.9	7.5	31.8	26.2	46.0	19.8	100	76	
Hori.	431.993	QP	26.4	16.6	7.8	31.8	19.0	46.0	27.0	100	43	
Hori.	2382.000	PK	51.1	28.1	13.8	40.6	52.4	73.9	21.5	147	140	
Hori.	2390.000	PK	61.6	28.2	13.8	40.6	63.0	73.9	10.9	147	140	
Hori.	4823.000	PK	47.4	31.2	6.0	41.5	43.1	73.9	30.8	100	175	
Hori.	7236.000	PK	44.7	36.1	7.6	40.7	47.7	73.9	26.2	100	21	
Hori.	9648.000	PK	45.2	38.6	8.7	40.5	52.0	73.9	21.9	100	73	
Hori.	12060.000	PK	41.7	39.5	10.3	39.5	52.0	73.9	21.9	100	12	
Hori.	2382.000	AV	38.1	28.1	13.8	40.6	39.4	53.9	14.5	147	140	
Hori.	2390.000	AV	48.4	28.2	13.8	40.6	49.8	53.9	4.1	147	140	
Hori.	4823.000	AV	33.7	31.2	6.0	41.5	29.4	53.9	24.5	100	175	
Hori.	7236.000	AV	33.7	36.1	7.6	40.7	36.7	53.9	17.2	100	21	
Hori.	9648.000	AV	33.4	38.6	8.7	40.5	40.2	53.9	13.7	100	73	
Hori.	12060.000	AV	31.6	39.5	10.3	39.5	41.9	53.9	12.0	100	12	
Vert.	121.503	QP	31.0	13.1	8.2	31.8	20.5	43.5	23.0	100	292	
Vert.	240.002	QP	30.4	17.1	9.3	31.7	25.1	46.0	20.9	100	125	
Vert.	287.999	QP	29.1	18.5	9.8	31.8	25.6	46.0	20.4	100	178	
Vert.	2382.000	PK	46.2	28.1	13.8	40.6	47.5	73.9	26.4	100	126	
Vert.	2390.000	PK	61.1	28.2	13.8	40.6	62.5	73.9	11.4	100	126	
Vert.	4823.000	PK	48.4	31.2	6.0	41.5	44.1	73.9	29.8	118	121	
Vert.	7236.000	PK	45.8	36.1	7.6	40.7	48.8	73.9	25.1	100	359	
Vert.	9648.000	PK	47.4	38.6	8.7	40.5	54.2	73.9	19.7	100	40	
Vert.	12060.000	PK	45.2	39.5	10.3	39.5	55.5	73.9	18.4	100	350	
Vert.	2382.000	AV	37.4	28.1	13.8	40.6	38.7	53.9	15.2	100	126	
Vert.	2390.000	AV	46.9	28.2	13.8	40.6	48.3	53.9	5.6	100	126	
Vert.	4823.000	AV	37.3	31.2	6.0	41.5	33.0	53.9	20.9	118	121	
Vert.	7236.000	AV	33.9	36.1	7.6	40.7	36.9	53.9	17.0	100	359	
Vert.	9648.000	AV	33.3	38.6	8.7	40.5	40.1	53.9	13.8	100	40	
Vert.	12060.000	AV	31.7	39.5	10.3	39.5	42.0	53.9	11.9	100	350	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2412.000	PK	93.5	28.3	13.8	40.6	95.0	-	-	Carrier
Hori.	2399.888	PK	63.3	28.2	13.8	40.6	64.7	75.0	10.3	
Hori.	2400.000	PK	62.3	28.2	13.8	40.6	63.7	75.0	11.3	
Vert.	2412.000	PK	91.8	28.3	13.8	40.6	93.3	-	-	Carrier
Vert.	2399.888	PK	63.0	28.2	13.8	40.6	64.4	73.3	8.9	
Vert.	2400.000	PK	61.2	28.2	13.8	40.6	62.6	73.3	10.7	

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

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

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 17, 2011 November 19, 2011
 Temperature / Humidity 26deg.C , 40%RH 23deg.C , 40%RH
 Engineer Akira Sato Akira Sato
 Mode Tx, 2437 MHz
 Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	155.656	QP	26.0	14.9	8.5	31.8	17.6	43.5	25.9	193	215	
Hori.	336.001	QP	30.3	14.9	7.1	31.8	20.5	46.0	25.5	100	126	
Hori.	384.006	QP	36.2	15.9	7.5	31.8	27.8	46.0	18.2	100	271	
Hori.	432.001	QP	30.5	16.6	7.8	31.8	23.1	46.0	22.9	100	183	
Hori.	877.547	QP	21.7	21.9	9.9	31.5	22.0	46.0	24.0	150	108	
Hori.	2400.000	PK	47.7	28.2	13.8	40.6	49.1	73.9	24.8	146	155	
Hori.	2510.000	PK	46.0	28.7	13.8	40.5	48.0	73.9	25.9	146	155	
Hori.	4874.000	PK	49.0	31.4	6.0	41.5	44.9	73.9	29.0	100	37	
Hori.	7311.000	PK	46.1	36.2	7.6	40.7	49.2	73.9	24.7	100	112	
Hori.	9748.000	PK	45.7	38.7	8.7	40.5	52.6	73.9	21.3	119	37	
Hori.	12185.000	PK	44.7	39.6	10.3	39.5	55.1	73.9	18.8	100	12	
Hori.	2400.000	AV	36.1	28.2	13.8	40.6	37.5	53.9	16.4	146	155	
Hori.	2510.000	AV	33.8	28.7	13.8	40.5	35.8	53.9	18.1	146	155	
Hori.	4874.000	AV	37.9	31.4	6.0	41.5	33.8	53.9	20.1	100	37	
Hori.	7311.000	AV	32.8	36.2	7.6	40.7	35.9	53.9	18.0	100	112	
Hori.	9748.000	AV	34.5	38.7	8.7	40.5	41.4	53.9	12.5	119	37	
Hori.	12185.000	AV	32.1	39.6	10.3	39.5	42.5	53.9	11.4	100	12	
Vert.	240.003	QP	29.3	17.1	9.3	31.7	24.0	46.0	22.0	100	350	
Vert.	2400.000	PK	47.4	28.2	13.8	40.6	48.8	73.9	25.1	100	198	
Vert.	2510.000	PK	44.7	28.7	13.8	40.5	46.7	73.9	27.2	100	198	
Vert.	4874.000	PK	46.8	31.4	6.0	41.5	42.7	73.9	31.2	100	12	
Vert.	7311.000	PK	45.7	36.2	7.6	40.7	48.8	73.9	25.1	100	347	
Vert.	9748.000	PK	47.0	38.7	8.7	40.5	53.9	73.9	20.0	100	13	
Vert.	12185.000	PK	44.1	39.6	10.3	39.5	54.5	73.9	19.4	100	357	
Vert.	2400.000	AV	37.5	28.2	13.8	40.6	38.9	53.9	15.0	100	198	
Vert.	2510.000	AV	34.2	28.7	13.8	40.5	36.2	53.9	17.7	100	198	
Vert.	4874.000	AV	34.6	31.4	6.0	41.5	30.5	53.9	23.4	100	12	
Vert.	7311.000	AV	33.2	36.2	7.6	40.7	36.3	53.9	17.6	100	347	
Vert.	9748.000	AV	32.8	38.7	8.7	40.5	39.7	53.9	14.2	100	13	
Vert.	12185.000	AV	32.7	39.6	10.3	39.5	43.1	53.9	10.8	100	357	

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

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

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

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Emission

Test place UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
 Date November 17, 2011 November 19, 2011
 Temperature / Humidity 26deg.C , 40%RH 23deg.C , 40%RH
 Engineer Akira Sato Akira Sato
 Mode Tx, 2462 MHz
 Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	148.537	QP	30.9	14.6	8.5	31.8	22.2	43.5	21.3	206	259	
Hori.	151.869	QP	27.7	14.7	8.5	31.8	19.1	43.5	24.4	214	237	
Hori.	287.998	QP	29.5	18.5	9.7	31.8	25.9	46.0	20.1	118	274	
Hori.	383.998	QP	35.6	15.9	7.5	31.8	27.2	46.0	18.8	100	96	
Hori.	2367.000	PK	46.1	28.1	13.6	40.6	47.2	73.9	26.7	113	178	
Hori.	2483.500	PK	61.2	28.7	13.7	40.5	63.1	73.9	10.8	113	178	
Hori.	2493.000	PK	49.9	28.7	13.7	40.5	51.8	73.9	22.1	113	178	
Hori.	4924.000	PK	49.5	31.5	6.1	41.5	45.6	73.9	28.3	113	75	
Hori.	7386.000	PK	45.5	36.3	7.5	40.7	48.6	73.9	25.3	100	359	
Hori.	9848.000	PK	46.3	38.8	8.7	40.5	53.3	73.9	20.6	100	35	
Hori.	12310.000	PK	44.7	39.6	10.3	39.5	55.1	73.9	18.8	100	306	
Hori.	2367.000	AV	32.5	28.1	13.6	40.6	33.6	53.9	20.3	113	178	
Hori.	2483.500	AV	44.8	28.7	13.7	40.5	46.7	53.9	7.2	113	178	
Hori.	2493.000	AV	36.3	28.7	13.7	40.5	38.2	53.9	15.7	113	178	
Hori.	4924.000	AV	38.4	31.5	6.1	41.5	34.5	53.9	19.4	113	75	
Hori.	7386.000	AV	33.2	36.3	7.5	40.7	36.3	53.9	17.6	100	359	
Hori.	9848.000	AV	34.0	38.8	8.7	40.5	41.0	53.9	12.9	100	35	
Hori.	12310.000	AV	32.6	39.6	10.3	39.5	43.0	53.9	10.9	100	306	
Vert.	192.000	QP	27.9	16.1	8.9	31.8	21.1	43.5	22.4	100	203	
Vert.	239.996	QP	30.5	17.1	9.3	31.7	25.2	46.0	20.8	100	277	
Vert.	384.004	QP	30.8	15.9	7.5	31.8	22.4	46.0	23.6	157	36	
Vert.	2367.000	PK	43.7	28.1	13.6	40.6	44.8	73.9	29.1	100	218	
Vert.	2483.500	PK	52.8	28.7	13.7	40.5	54.7	73.9	19.2	100	218	
Vert.	2493.000	PK	46.6	28.7	13.7	40.5	48.5	73.9	25.4	100	218	
Vert.	4924.000	PK	49.0	31.5	6.1	41.5	45.1	73.9	28.8	136	86	
Vert.	7386.000	PK	45.0	36.3	7.5	40.7	48.1	73.9	25.8	100	123	
Vert.	9848.000	PK	44.6	38.8	8.7	40.5	51.6	73.9	22.3	108	23	
Vert.	12310.000	PK	44.3	39.6	10.3	39.5	54.7	73.9	19.2	100	2	
Vert.	2367.000	AV	34.5	28.1	13.6	40.6	35.6	53.9	18.3	100	218	
Vert.	2483.500	AV	42.2	28.7	13.7	40.5	44.1	53.9	9.8	100	218	
Vert.	2493.000	AV	35.4	28.7	13.7	40.5	37.3	53.9	16.6	100	218	
Vert.	4924.000	AV	36.6	31.5	6.1	41.5	32.7	53.9	21.2	136	86	
Vert.	7386.000	AV	34.0	36.3	7.5	40.7	37.1	53.9	16.8	100	123	
Vert.	9848.000	AV	33.0	38.8	8.7	40.5	40.0	53.9	13.9	108	23	
Vert.	12310.000	AV	32.2	39.6	10.3	39.5	42.6	53.9	11.3	100	2	

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

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

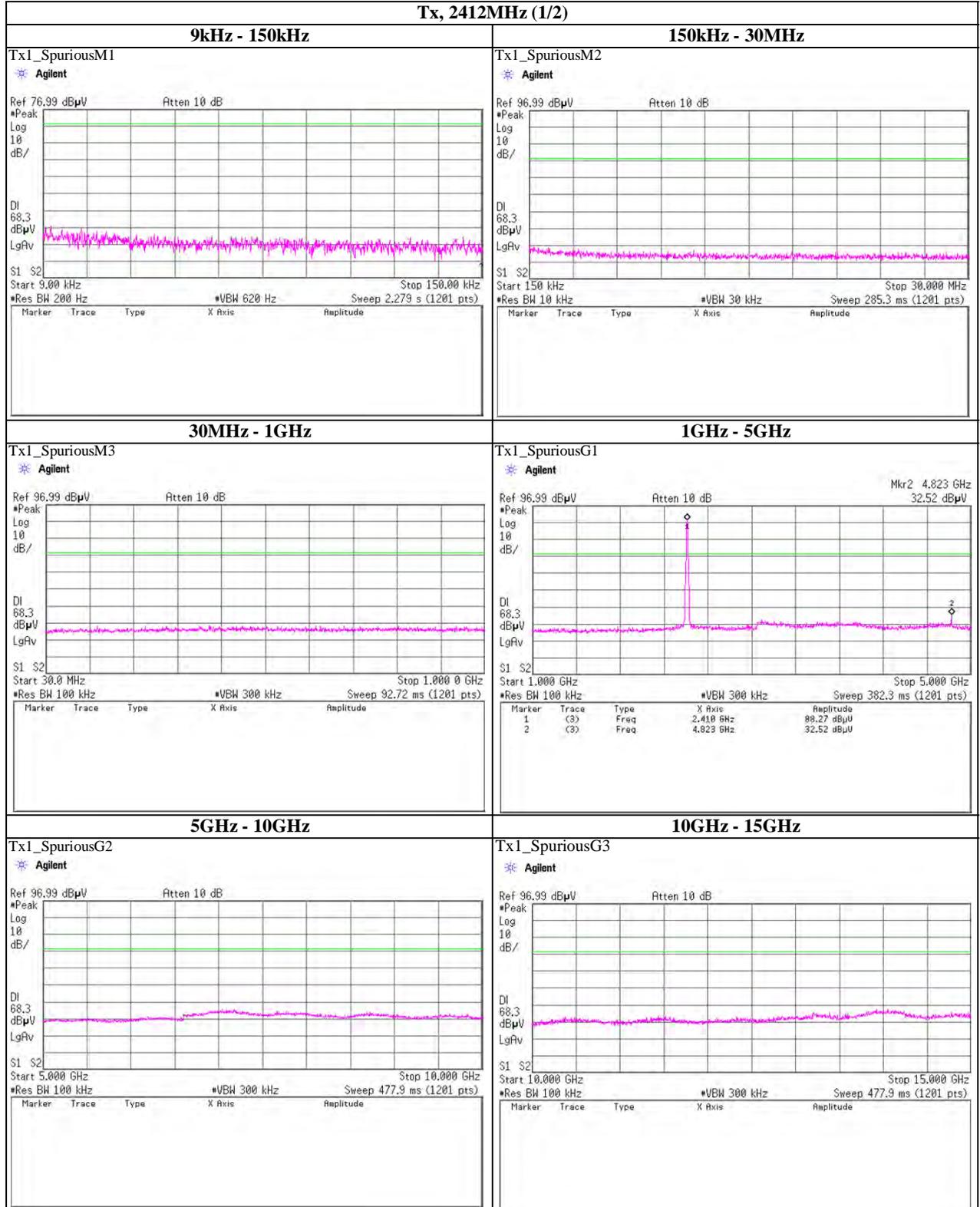
*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 13GHz-40GHz 20log(3.0m/1.0m)= 9.5dB

Spurious emission (Conducted)

Tx, IEEE802.11b, PN9, worst data mode 2Mbps

Tx, 2412MHz (1/2)



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)

Tx, IEEE802.11b, PN9, worst data mode 2Mbps

Tx, 2412MHz (2/2)



UL Japan, Inc.

Shonan EMC Lab.

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

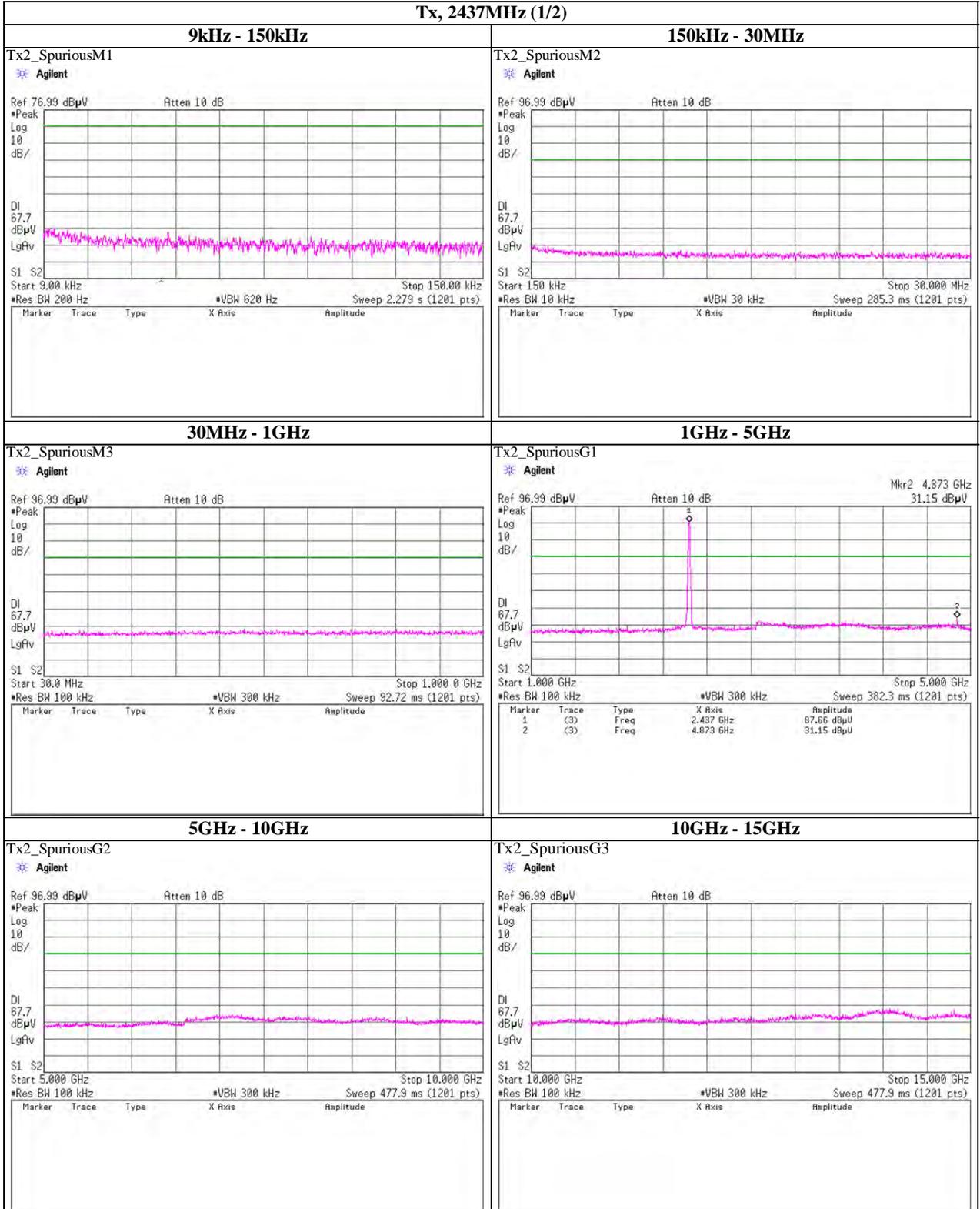
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, IEEE802.11b, PN9, worst data mode 2Mbps

Tx, 2437MHz (1/2)



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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Tx, IEEE802.11b, PN9, worst data mode 2Mbps

Tx, 2437MHz (2/2)



UL Japan, Inc.

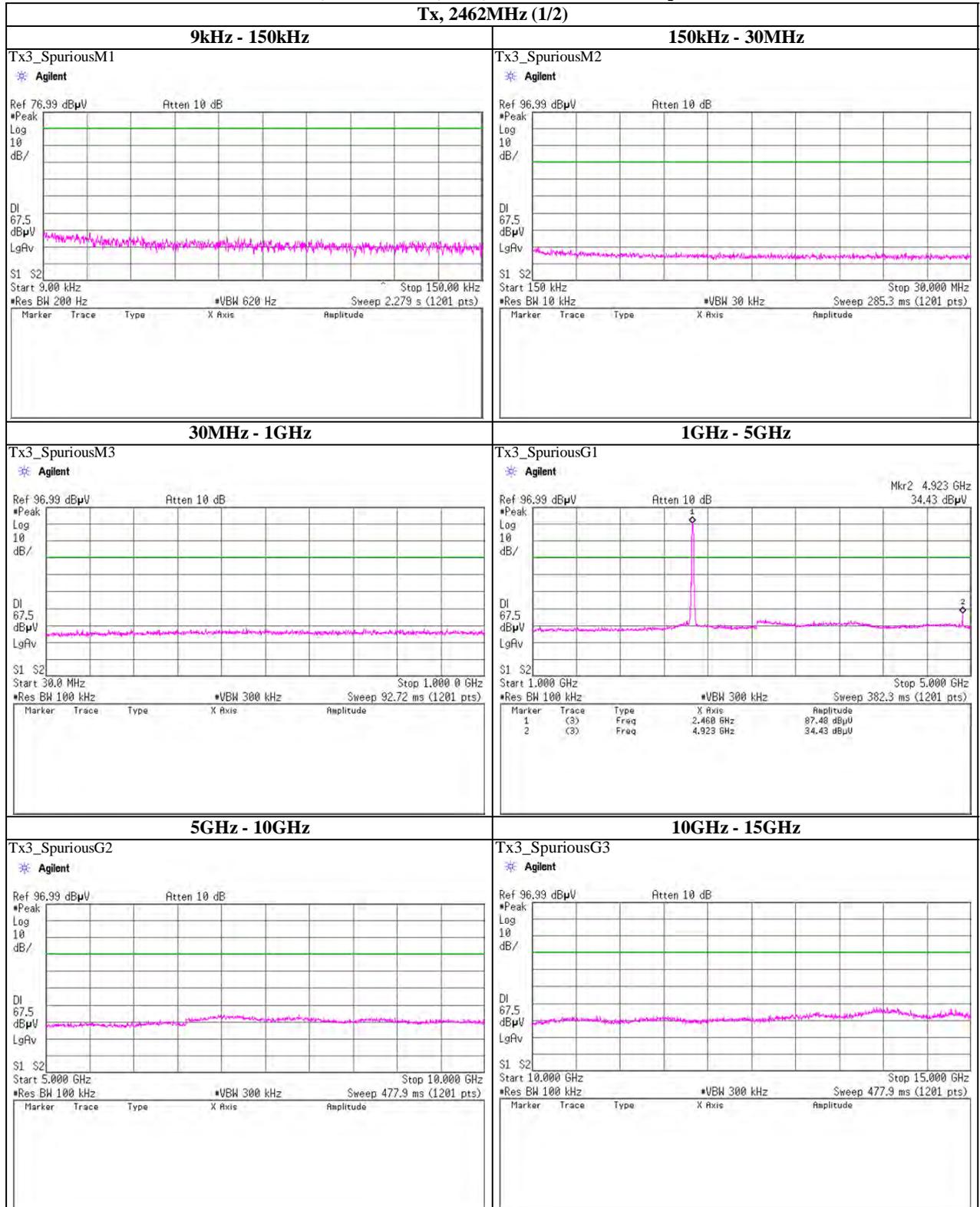
Shonan EMC Lab.

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Spurious emission (Conducted)
Tx, IEEE802.11b, PN9, worst data mode 2Mbps



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Spurious emission (Conducted)

Tx, IEEE802.11b, PN9, worst data mode 2Mbps

Tx, 2462MHz (2/2)



UL Japan, Inc.

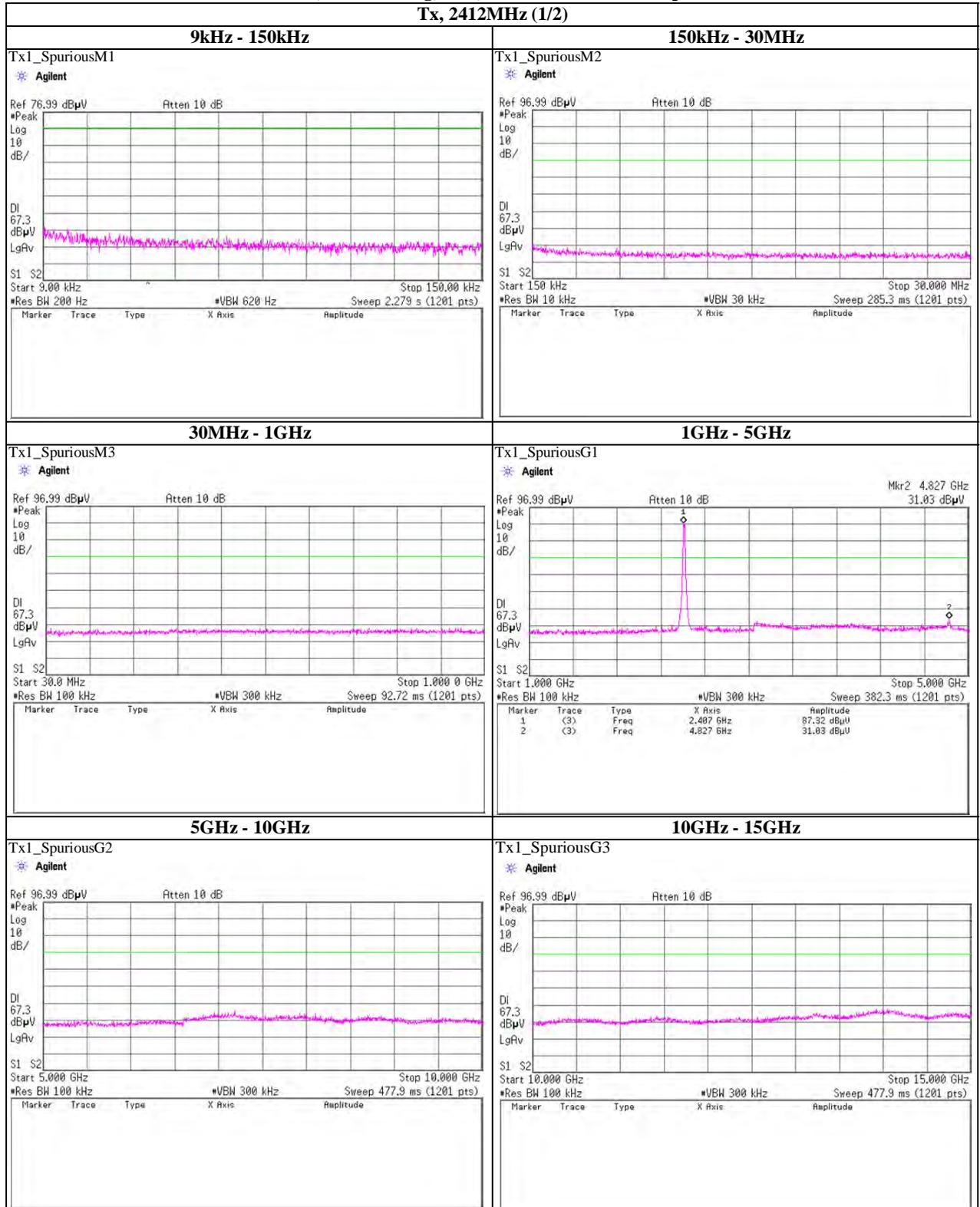
Shonan EMC Lab.

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

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Facsimile : +81 463 50 6401

Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps



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 Facsimile : +81 463 50 6401

Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps

Tx, 2437MHz (1/2)



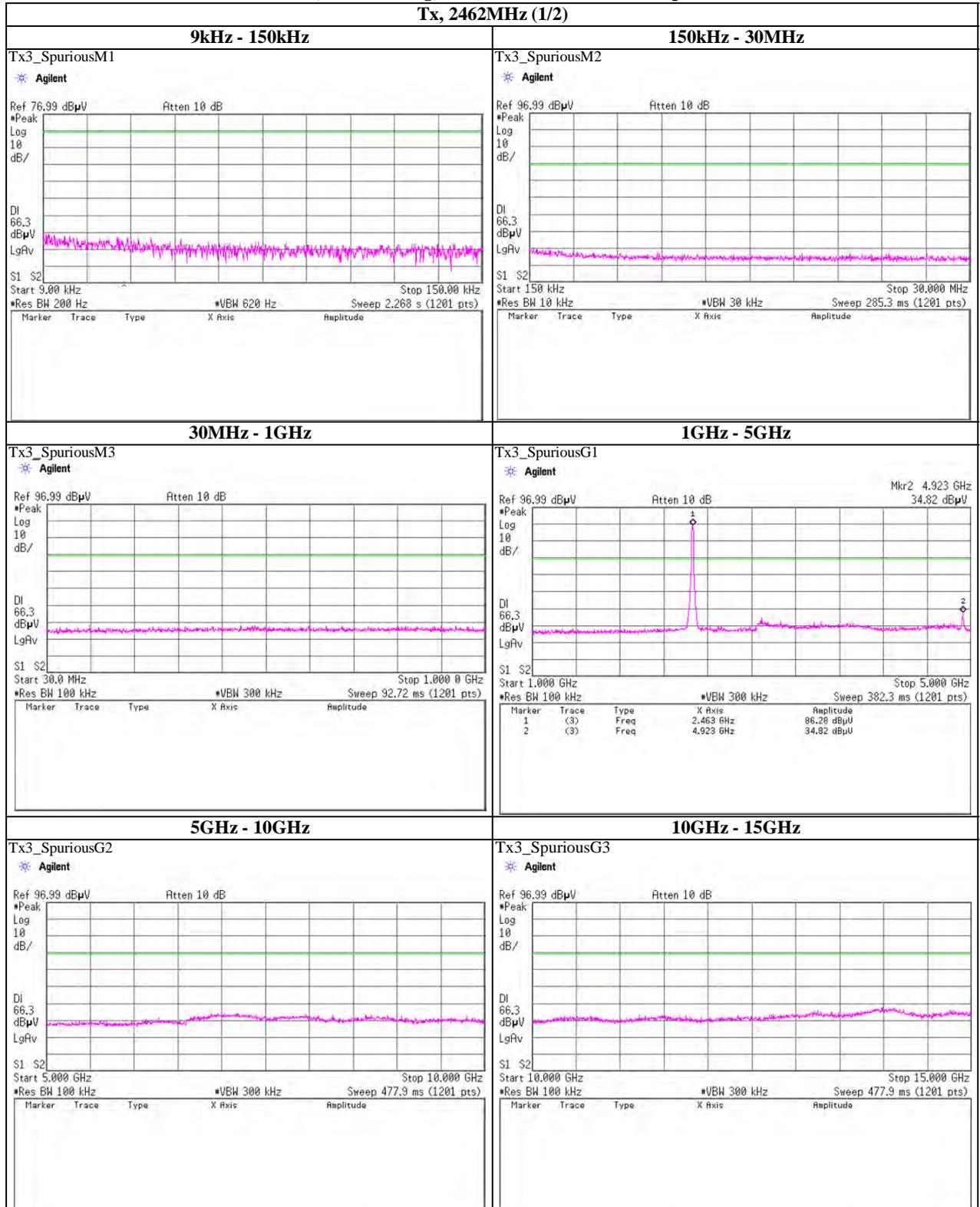
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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps



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Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps



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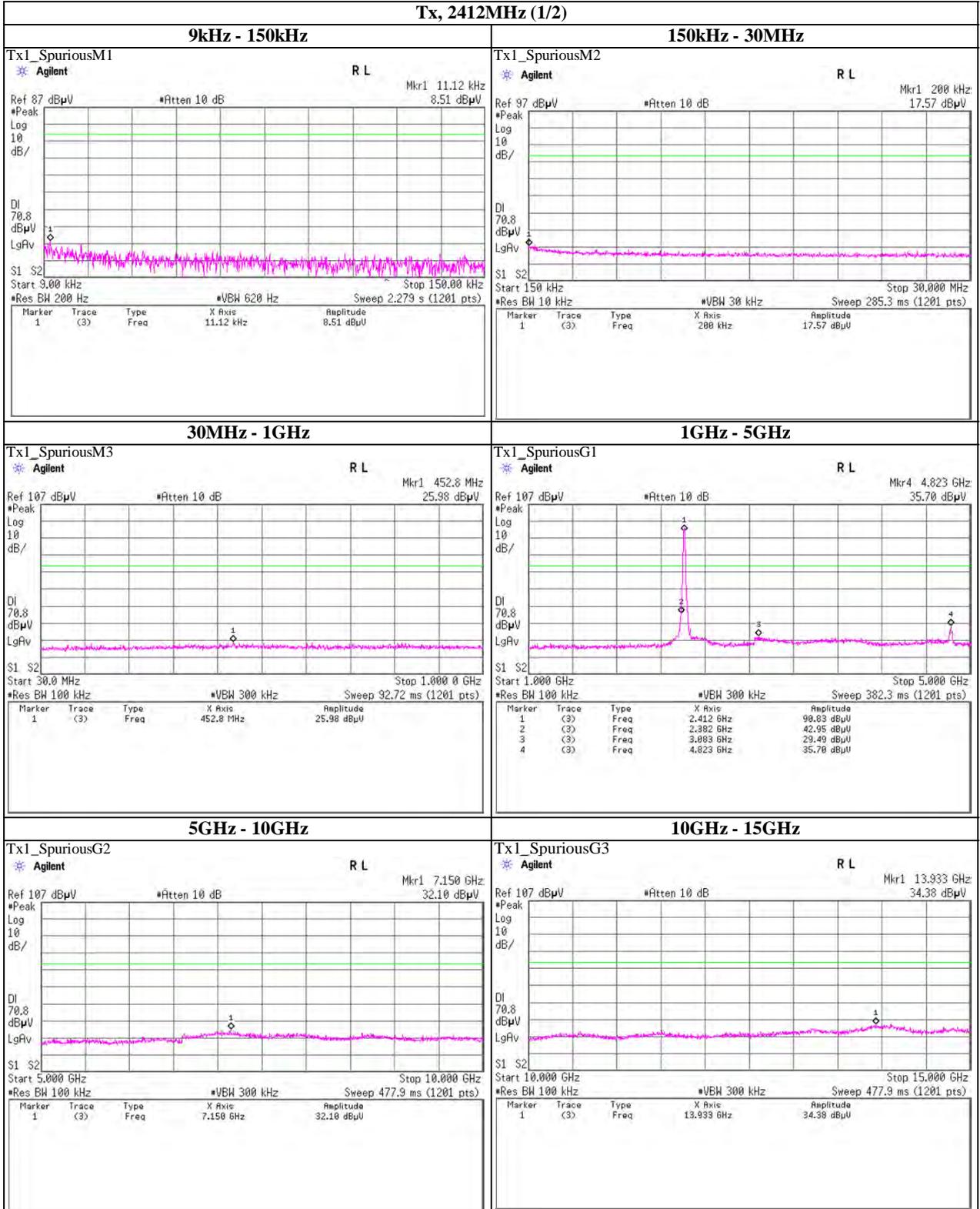
Spurious emission (Conducted)
Tx, IEEE802.11g, PN9, worst data mode 36Mbps



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Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)

Tx, 2412MHz (1/2)



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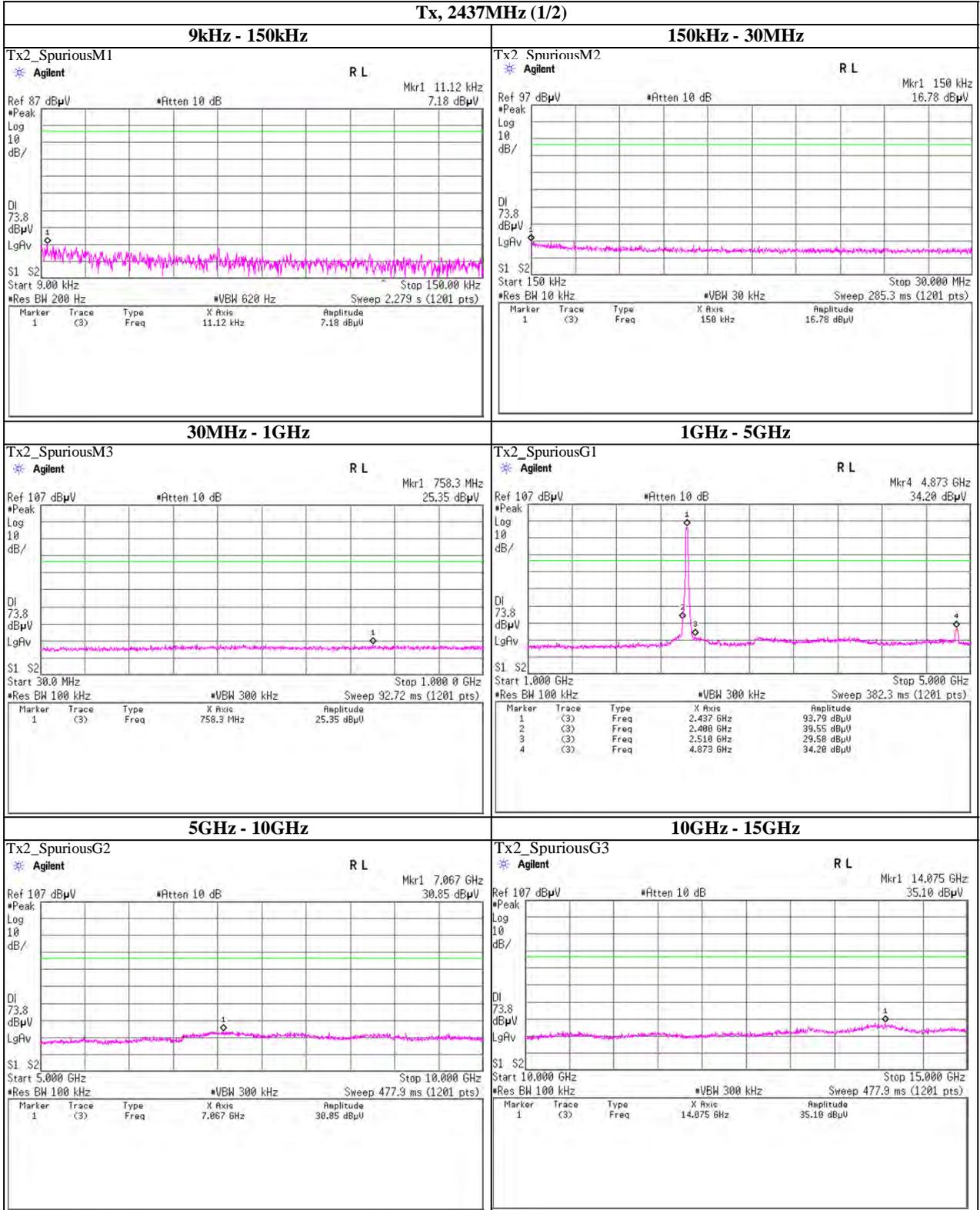
Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)



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Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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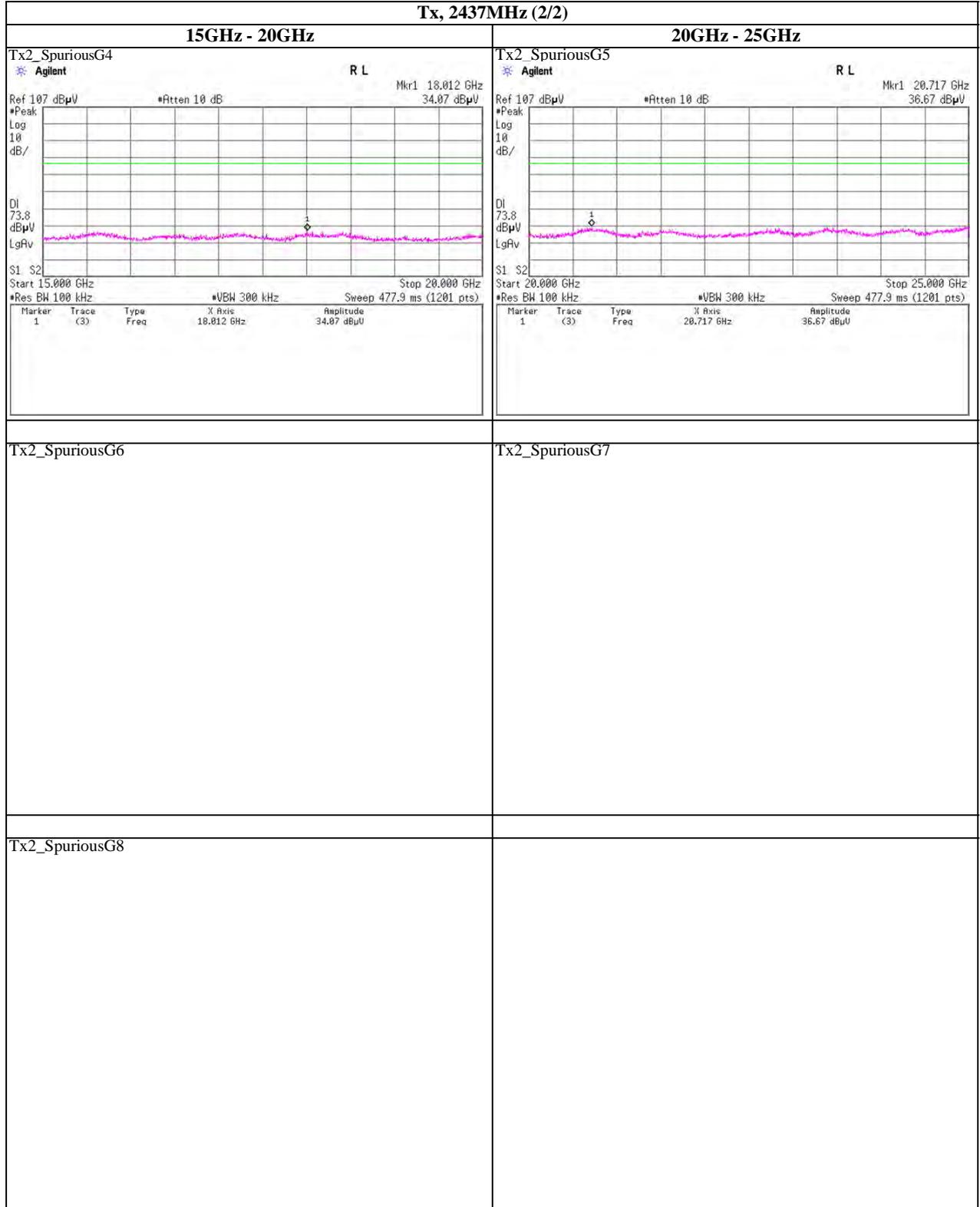
Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)

Tx, 2437MHz (1/2)



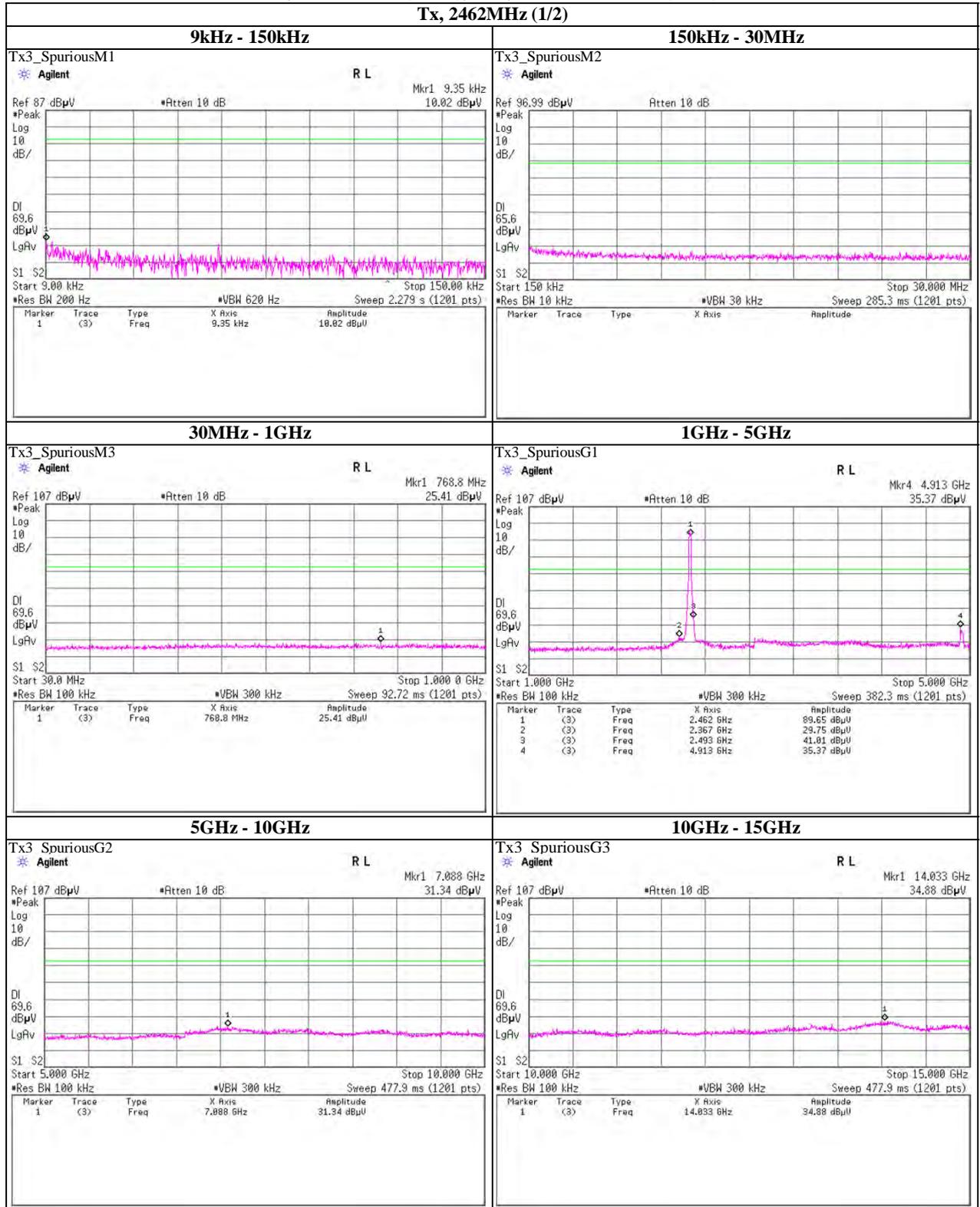
UL Japan, Inc.
Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
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Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)



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Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)



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Spurious emission (Conducted)
Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)



UL Japan, Inc.

Shonan EMC Lab.

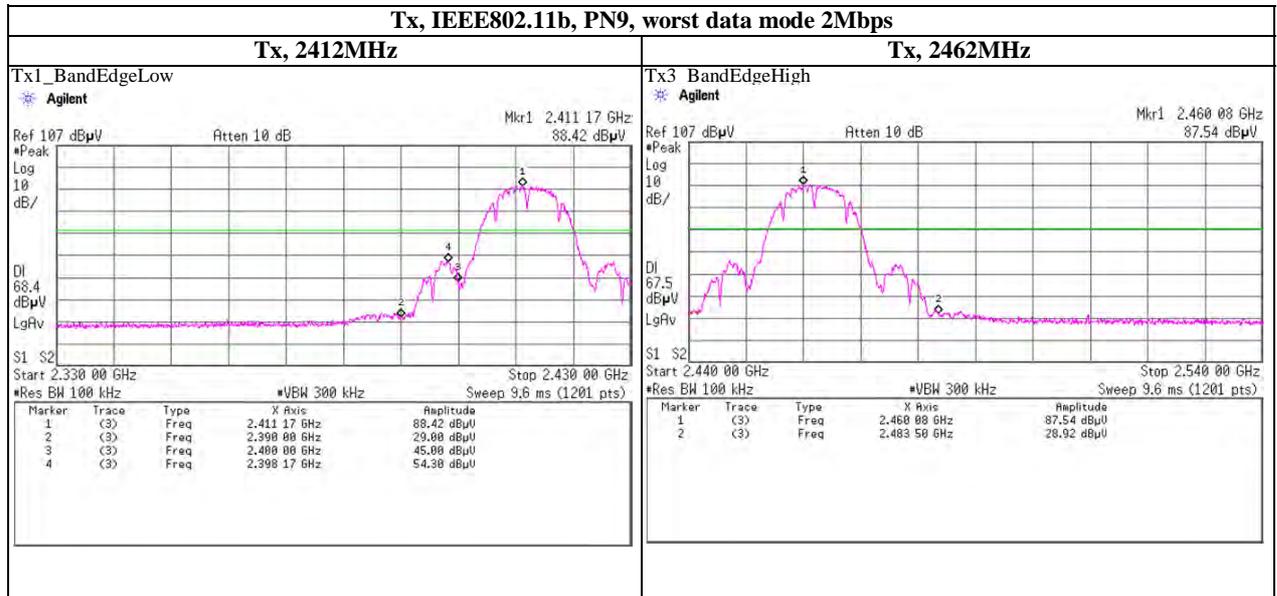
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

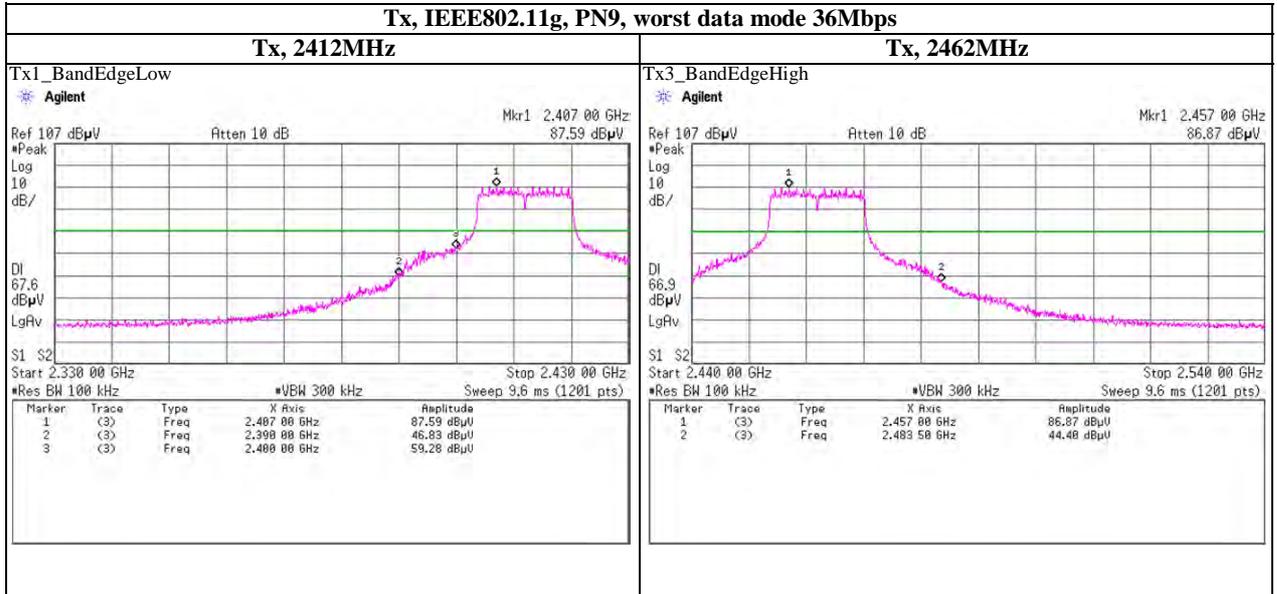
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Spurious emission (Conducted)

Band Edge compliance



UL Japan, Inc.

Shonan EMC Lab.

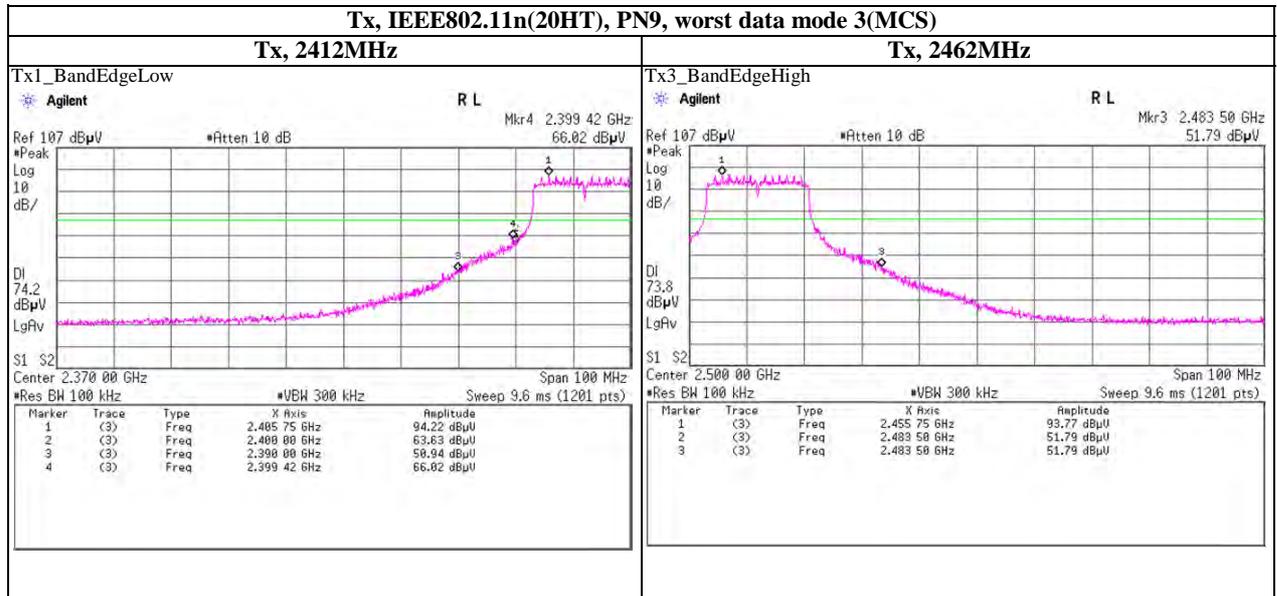
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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Spurious emission (Conducted)

Band Edge compliance



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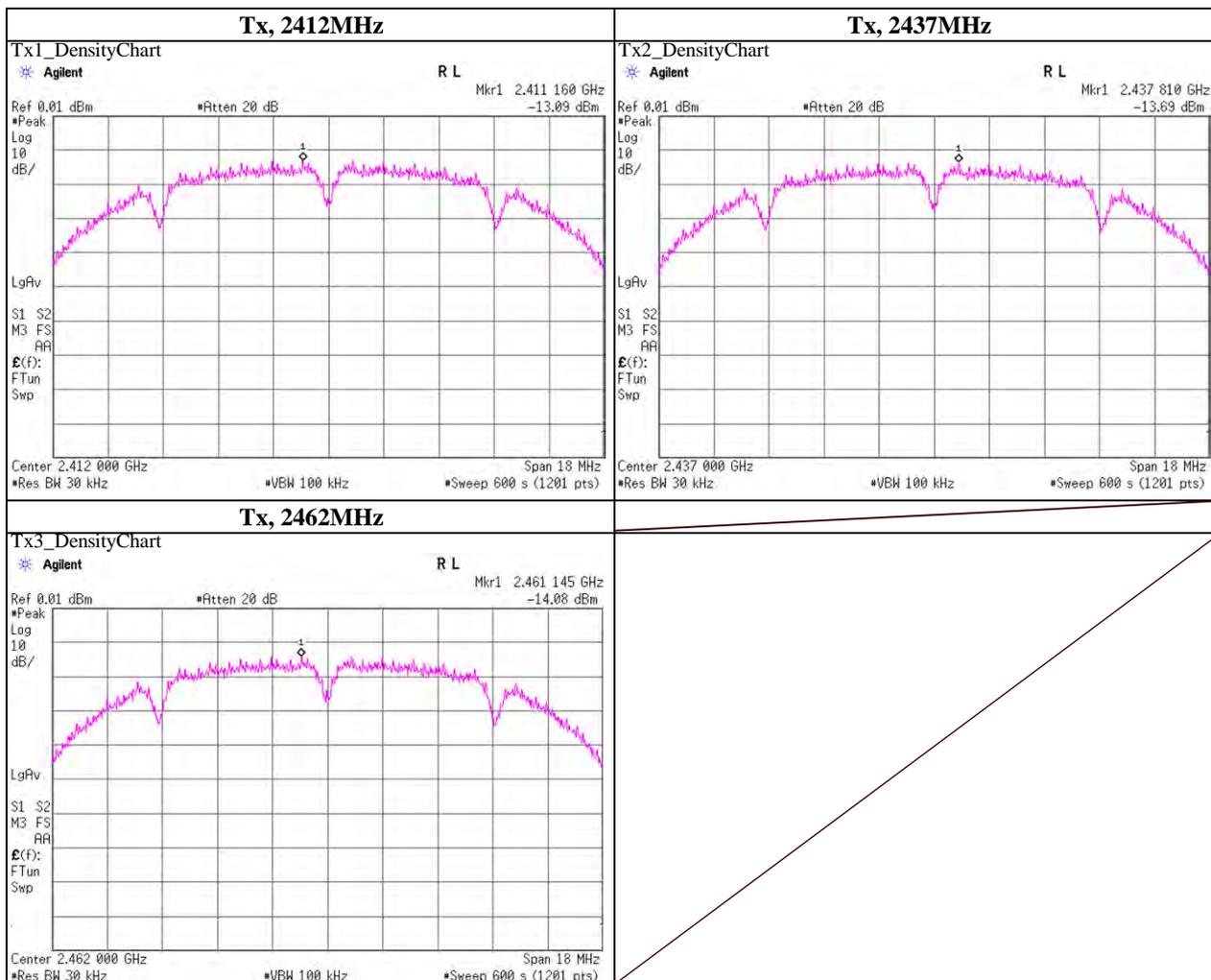
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 3, 2011	
Temperature / Humidity	25deg.C , 47%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11b, PN9, worst data mode 2Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2411.160	-13.09	1.43	9.97	-1.69	8.00	9.69
2437.0000	2437.810	-13.69	1.44	9.97	-2.28	8.00	10.28
2462.0000	2461.145	-14.08	1.44	9.97	-2.67	8.00	10.67

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Atten. Loss



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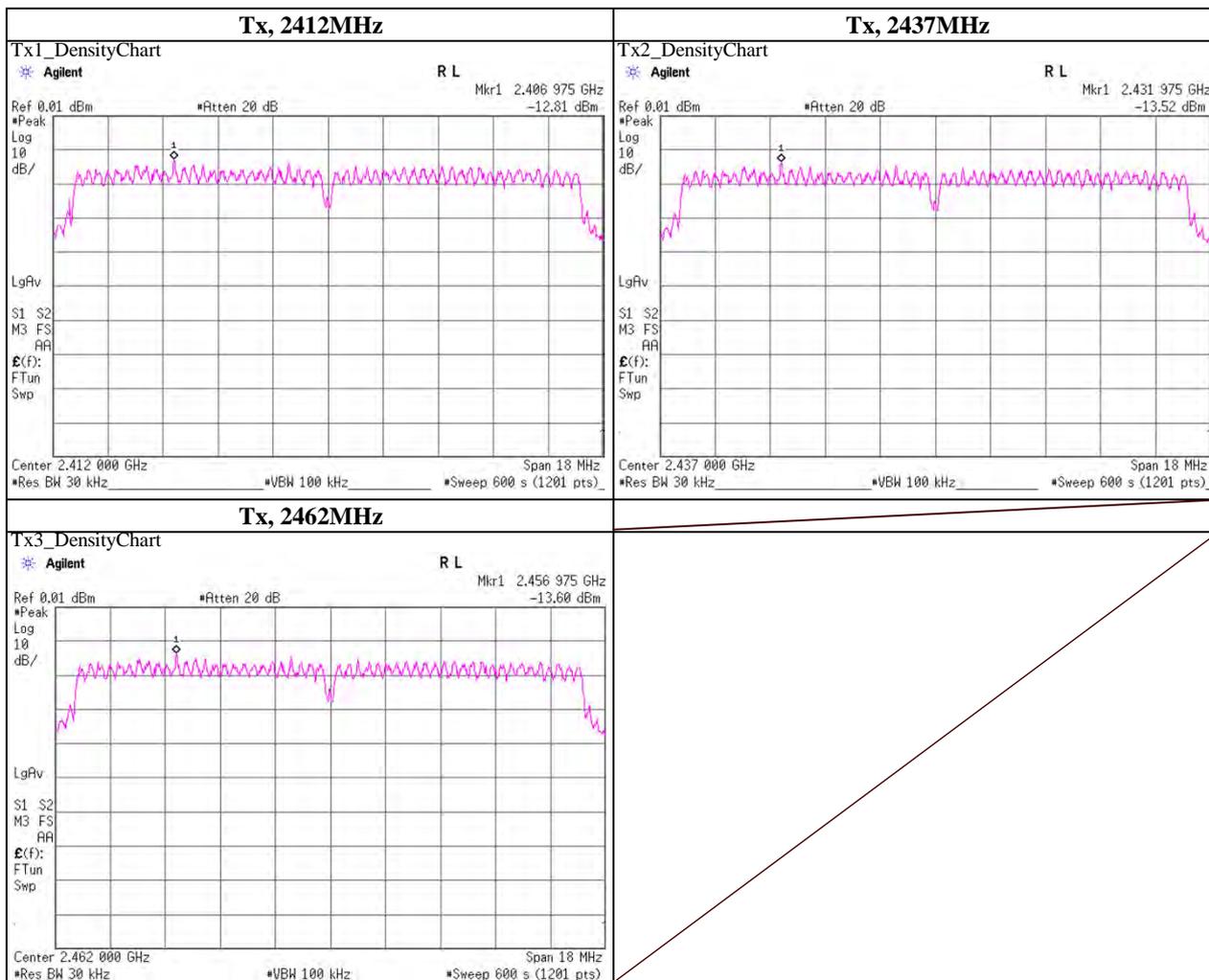
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 3, 2011	
Temperature / Humidity	25deg.C , 47%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11g, PN9, worst data mode 36Mbps	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2406.975	-12.81	1.43	9.97	-1.41	8.00	9.41
2437.0000	2431.975	-13.52	1.44	9.97	-2.11	8.00	10.11
2462.0000	2456.975	-13.60	1.44	9.97	-2.19	8.00	10.19

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Atten. Loss



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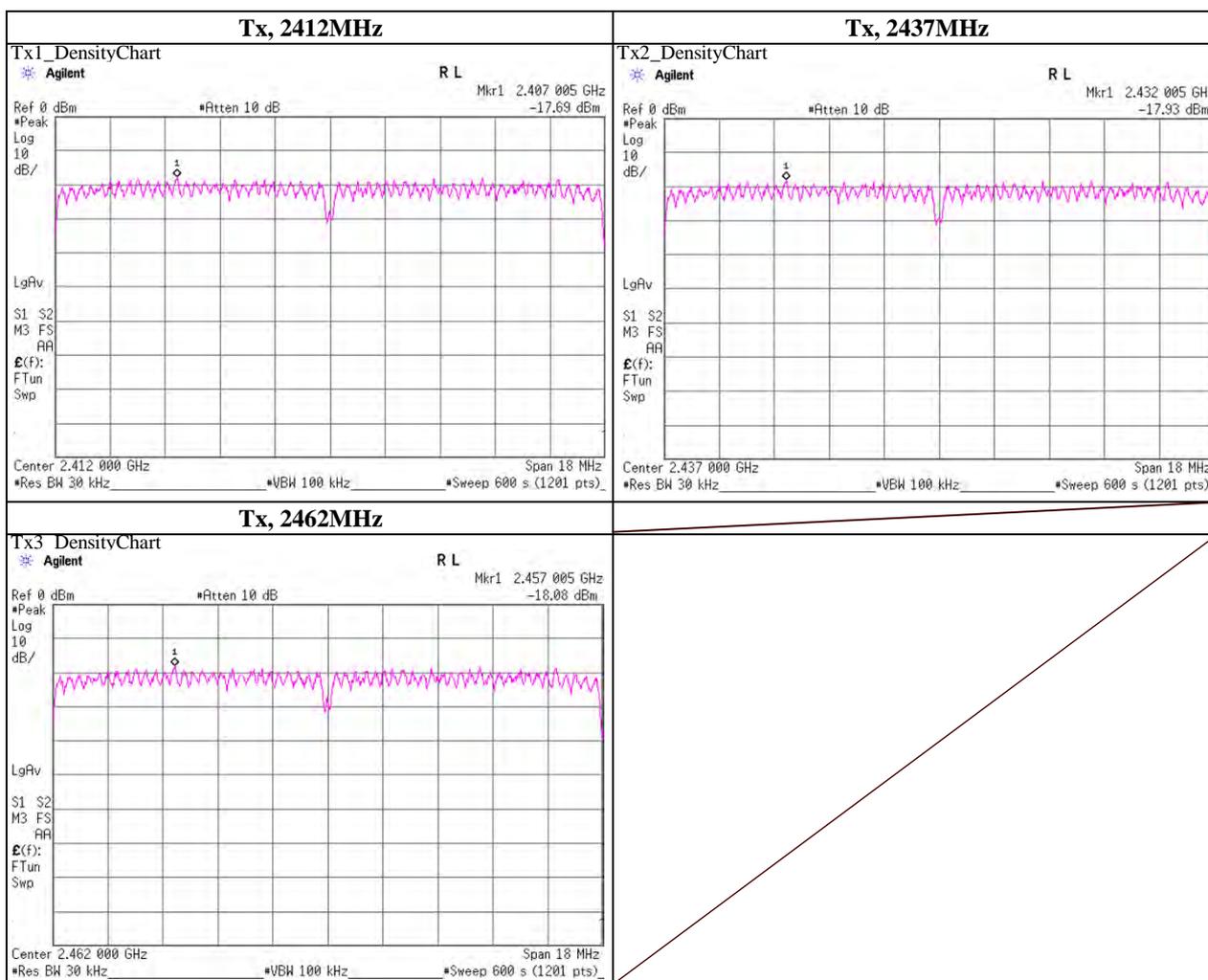
Power Density

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	November 17, 2011	
Temperature / Humidity	23deg.C , 43%RH	
Engineer	Kenichi Adachi	
Mode	Tx, IEEE802.11n(20HT), PN9, worst data mode 3(MCS)	

Ch. Freq. [MHz]	Freq. Reading [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2412.0000	2407.005	-17.69	1.43	9.97	-6.29	8.00	14.29
2437.0000	2432.005	-17.93	1.44	9.97	-6.52	8.00	14.52
2462.0000	2457.005	-18.08	1.44	9.97	-6.67	8.00	14.67

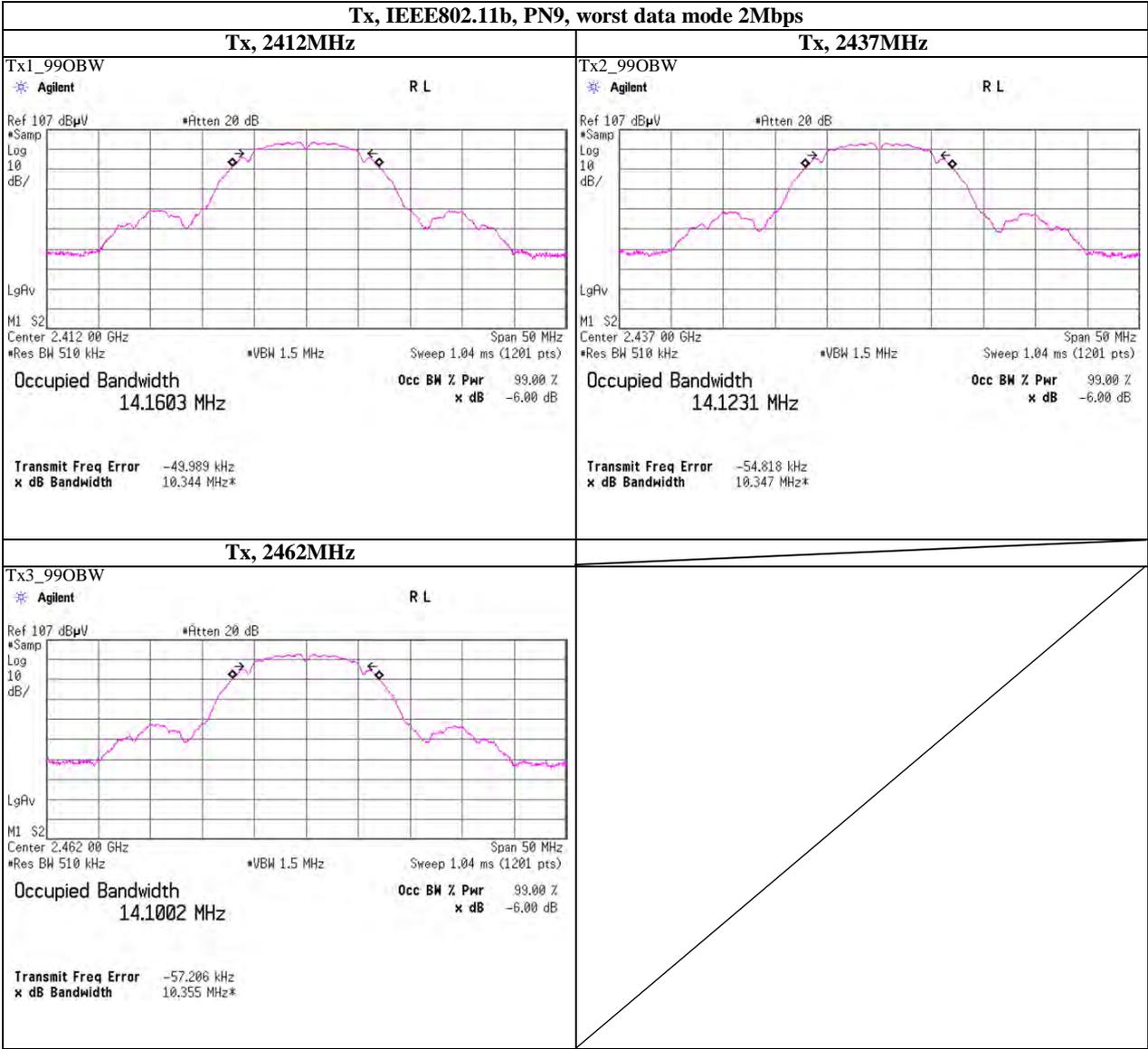
Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Atten. Loss



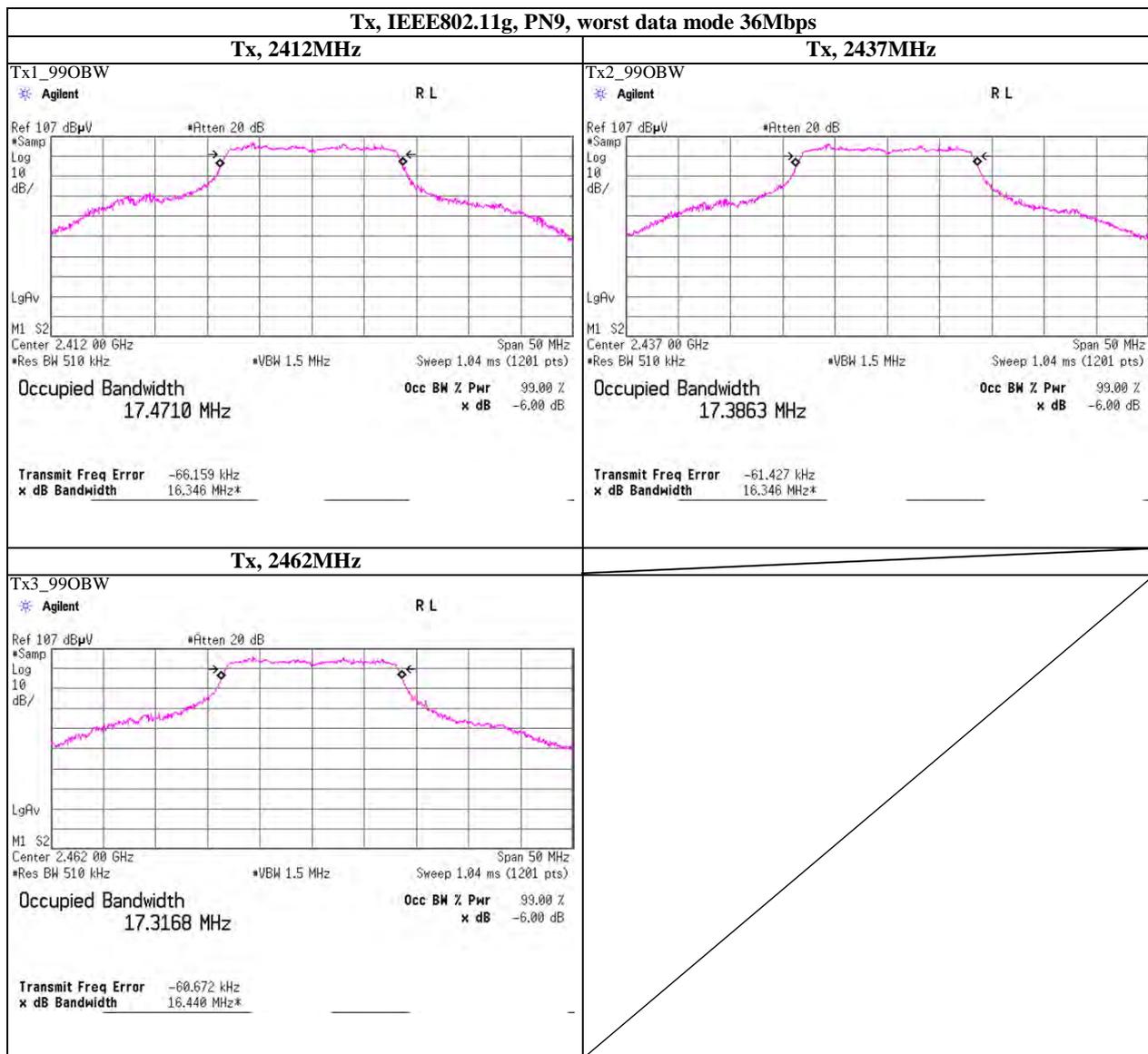
UL Japan, Inc.
Shonan EMC Lab.
 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
 Telephone : +81 463 50 6400
 Facsimile : +81 463 50 6401

99% Occupied Bandwidth



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99% Occupied Bandwidth



UL Japan, Inc.

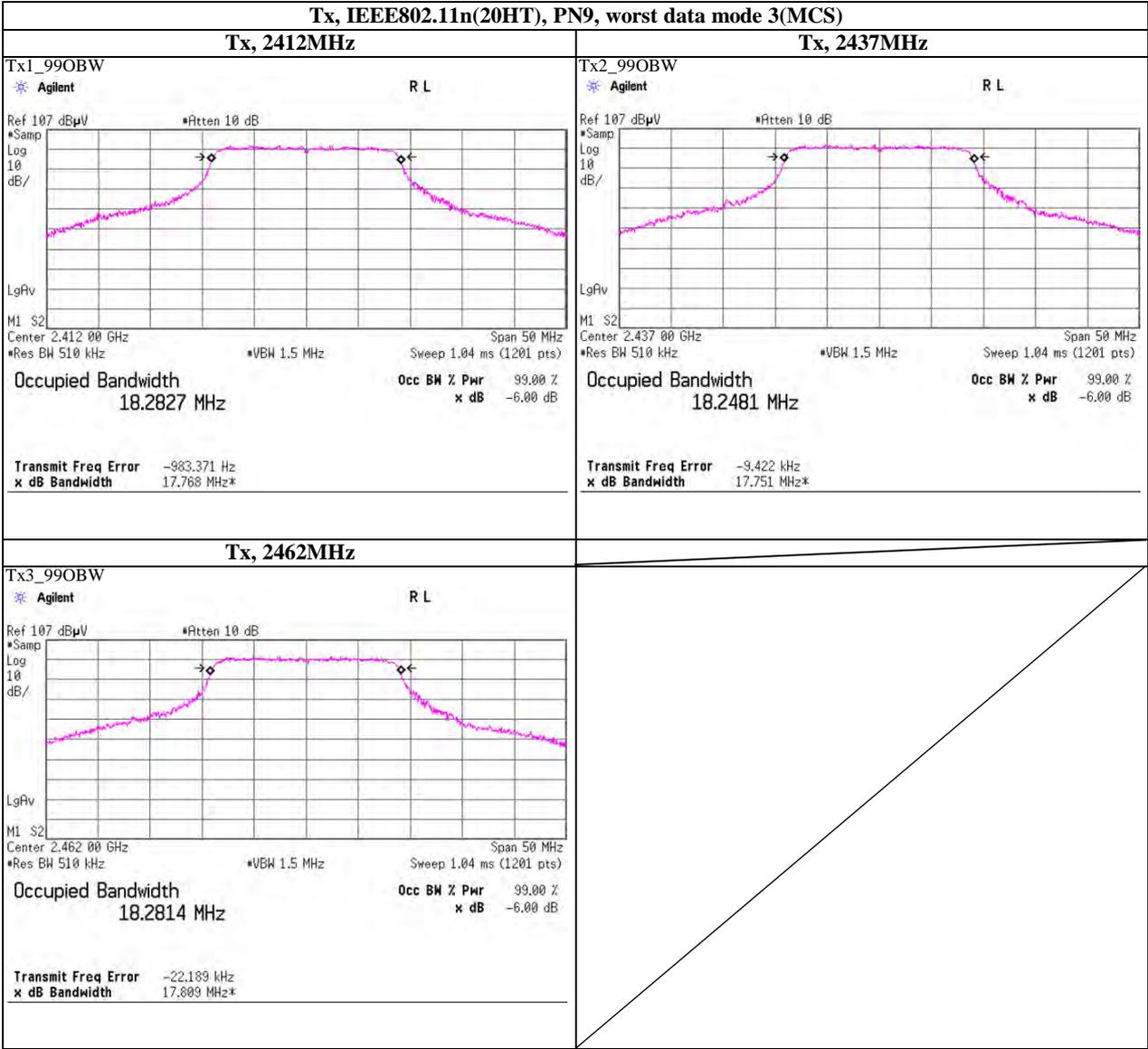
Shonan EMC Lab.

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99% Occupied Bandwidth



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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)
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2011/03/23 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2011/04/28 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2011/05/27 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2011/08/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2011/02/23 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2011/07/28 * 12
SJM-12	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE	-
SAT10-04	Attenuator(above1GHz)	Agilent	8493C-010	74863	RE	2010/12/15 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2010/12/15 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2011/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2011/03/16 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2011/03/16 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2011/02/17 * 12
SAT6-01	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2011/02/17 * 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	2011/04/28 * 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	2011/04/28 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2011/08/17 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2011/10/22 * 12
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2011/09/01 * 12
SCC-B12/B13/SRSE-02	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-270(RF Selector)	CE	2011/04/28 * 12
SLS-03	LISN	Rohde & Schwarz	ENV216	100513	CE	2011/02/23 * 12
SAT3-03	Attenuator	JFW	50HF-003N	-	CE	2011/02/17 * 12
SOS-04	Humidity Indicator	A&D	AD-5681	4061512	CE	2011/03/02 * 12
STM-03	Terminator	TME	CT-01 BP	-	CE	2011/01/07 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	CE	2011/08/04 * 12
SJM-02	Measure	KOMELON	KMC-36	-	CE	-

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

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

Test Item :

CE: Conducted emission ,
RE: Radiated emission ,

**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	AT	2010/11/16 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2011/03/23 * 12
SAT20-03	Attenuator	Agilent	8493C-020	74891	AT	2011/03/23 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	AT	2011/03/23 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2011/04/12 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2011/04/12 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2011/03/02 * 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 :

AT: Antenna terminal disturbance voltage