




RADIO TEST REPORT


Test Report No. : 31JE0038-HO-05-A-R1

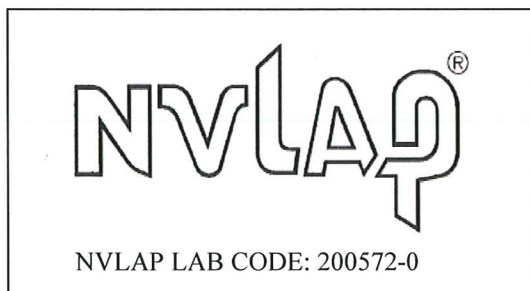
Applicant : silex technology, Inc.
Type of Equipment : Wireless LAN PCI Express Mini Card Module
Model No. : SX-PCEAN
FCC ID : N6C-SXPCEAN
Test regulation : **FCC Part 15 Subpart C: 2012**
(Permissive Change Class II Application)
* Conducted emission and Radiated Spurious Emission tests only
Test Result : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this 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 NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 31JE0038-HO-05-A. 31JE0038-HO-05-A is replaced with this report.

Date of test: July 28 to August 9, 2012

Representative test engineer: 
Takumi Shimada
Engineer of WiSE Japan,
UL Verification Service

Approved by: 
Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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SECTION 1: Customer information

Company Name : silex technology, Inc.
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Telephone Number : +81-774-98-3878
Facsimile Number : +81-774-98-3758
Contact Person : Toshiro Kometani

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless LAN PCI Express Mini Card Module
Model No. : SX-PCEAN
Serial No. : Refer to Clause 4.2
Rating : DC3.3V
Receipt Date of Sample : July 28, 2012
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No: SX-PCEAN (referred to as the EUT in this report) is the Wireless LAN PCI Express Mini Card Module.

General Specification

Clock frequency(ies) in the system : 40MHz

Radio Specification

Radio Type : Transceiver
Method of Frequency Generation : Synthesizer
Power Supply (inner) : DC1.2V

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	IEEE802.11b	IEEE802.11g	IEEE802.11a	IEEE802.11n (20 M band)	IEEE802.11n (40 M band)
Frequency of operation	2412-2462MHz	2412-2462MHz	5180-5320MHz *1) 5745-5825MHz	2412 - 2462MHz 5180-5320MHz *1) 5745-5825MHz	2422 - 2452MHz 5190 - 5310MHz *2) 5755 - 5795MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel spacing	5MHz		20MHz	2.4GHz band 5MHz 5GHz band 20MHz	2.4GHz band 5MHz 5GHz band 40MHz
Antenna type	Inverted-F Antenna (Omni-Directional)				
Antenna Gain: G _{ANT}	1.27dBi@2.4GHz Band, 3.71dBi@5.25GHz Band, 3.94dBi@5.6GHz Band, 4.31dBi@5.85GHz Band				
Antenna Connector type	U.FL Alternative connector				

*1) 5180 - 5320MHz is applied for other test report.(Test Report No.: 31JE0038-HO-05-B)

*2) 5190 - 5310MHz is applied for other test report.(Test Report No.: 31JE0038-HO-05-B)

<Contents of the change from original model>

Test Report Number of original model is 31JE0038-HO-01-A.

Specification was changed from the original model as follows:

*Antenna of IEEE802.11a/b/g/n was changed and the EUT was changed from Master device to Client device.

Therefore only Conducted emission test and Radiated Spurious Emission test of 11a/b/g/n was performed in this report.

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, 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 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

* The revision on August 13, 2012 and December 27, 2012 does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	QP 19.2dB, 6.23586MHz, N AV 15.3dB, 6.23586MHz, N	Complied	-
Spurious Emission Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	2.8dB 5350.550MHz, Horizontal, AV 5173.870MHz, Horizontal, AV	Complied	Conducted/ Radiated

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

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

FCC 15.31 (e)

The RF Module has own regulator.

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

FCC Part 15.203/212 Antenna requirement

The EUT has a unique antenna connector (U.FL on the Module and Reverse SMA for Antenna itself).
Therefore the equipment complies with the requirement of 15.203/212.

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3.3 Addition to standard

No addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

*3m/1m/0.5m = Measurement distance

Conducted Emission test

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

Radiated emission test(3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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.

Mode	Remarks*
IEEE 802.11a (11a)	6Mbps, PN9
IEEE 802.11b (11b)	1Mbps(Long), PN9
IEEE 802.11g (11g)	6Mbps, PN9
IEEE 802.11n MIMO 20MHz BW (11n-20): 2.4GHz / 5GHz	MCS 8, PN9
IEEE 802.11n MIMO 40MHz BW (11n-40): 2.4GHz / 5GHz	MCS 8, PN9
*Transmitting duty was close to 100% on all tests.	
*The worst condition was determined based on the test result of Maximum Peak Output Power (Mid Channel)	
*EUT has the power settings by the software as follows; Power settings: 11b(1Mbps): 13.5dBm(2412 to 2462MHz), 11g(6Mbps): 13.5dBm(2412MHz), 17.0dBm(2417 to 2457MHz), 15.0dBm(2462MHz) 11n-20 2.4GHz (MCS8): 10.5dBm(2412MHz), 14.5dBm(2417 to 2457MHz), 10.5dBm(2462MHz) 11n-40 2.4GHz (MCS8): 6.0dBm(2422MHz), 13.5dBm(2427 to 2447MHz), 7.0dBm(2452MHz) 11a(6Mbps): 15.0dBm(5745 to 5825MHz) 11n-20 5GHz (MCS8): 13.5dBm(5745 to 5825MHz) 11n-40 5GHz (MCS8): 11.0dBm(5755 and 5795MHz)	
Software: Atheros Radio Test (ART) - Revision 0.9 BUILD #27 ART_11n - Customer Version (ANWI BUILD)	
*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.	

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*The details of Operating mode(s): 2.4GHz

Test Item	Operating Mode	Tested Antenna	Tested frequency
Conducted Emission	11n-20(MIMO) Tx *1)	0+1	2437MHz
Spurious Emission (Radiated)	11b Tx	0 *3)	2412MHz 2437MHz 2462MHz
	11n-20(MIMO) Tx *2)	0+1	2412MHz 2437MHz 2462MHz
	11n-40(MIMO) Tx	0+1	2422MHz 2437MHz 2452MHz

*1) The mode was tested as a representative, because it had the highest power at antenna terminal test.

*2) Since 11g and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

*3) After the comparison between Antenna 0 and Antenna 1, test was performed with the antenna that had higher power as a representative.

*The details of Operating mode(s): 5GHz

Test Item	Operating Mode	Tested Antenna	Tested frequency
Spurious Emission (Radiated)	11n-20(MIMO) Tx *1)	0+1	5745MHz 5785MHz 5825MHz
	11n-40(MIMO) Tx	0+1	5755MHz 5795MHz

*1) Since 11a and 11n-20 have the same modulation method and no differences in transmitting specification, test was performed on the representative mode that had the highest peak output power.

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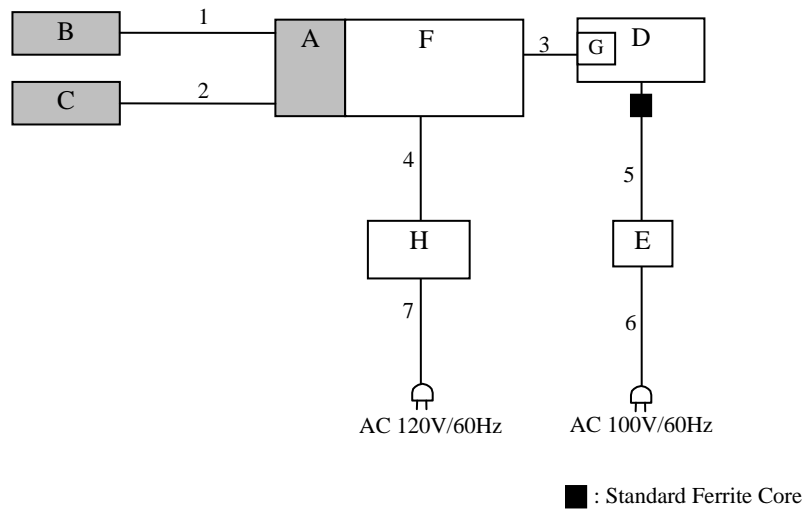
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4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Wireless LAN PCI Express Mini Card Module	SX-PCEAN	008092-01 1B48	silex technology, Inc.	EUT
B	Antenna	ANT1267-164C/U-100B	001	NISSEI ELECTRIC CO., LTD	EUT
C	Antenna	ANT1267-164C/U-100B	002	NISSEI ELECTRIC CO., LTD	EUT
D	Laptop PC	T60	L3-KY149	Lenovo	-
E	AC Adaptor	92P1160	11S92P1160Z1ZBGH77W	Lenovo	-
F	Jig	MR11-EC2C	-	B plus	-
G	Express Card Adaptor	-	-	B plus	-
H	DC Power Supply	PW8-3ATP	09067054	KENWOOD TMI	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Antenna Cable	0.1	Shielded	Shielded	-
2	Antenna Cable	0.1	Shielded	Shielded	-
3	MiniPCI Cable	0.3	Shielded	Shielded	-
4	DC Cable	2.0	Unshielded	Unshielded	-
5	DC Cable	1.8	Unshielded	Unshielded	-
6	AC Cable	0.9	Unshielded	Unshielded	-
7	AC Cable	2.0	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector : QP and AV
Measurement range : 0.15-30MHz
Test data : APPENDIX
Test result : Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

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

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted 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.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m*2) (above 10GHz)		3m (below 10GHz), 1m*2) (above 10GHz)

*1) The test was performed with VBW 10Hz since the EUT had transmitting duty cycle close to 100%. (see Appendix).

*2) Distance Factor: $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

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

Measurement range : 30M-40GHz
Test data : APPENDIX
Test result : Pass

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APPENDIX 1: Data of EMI test

Conducted emission

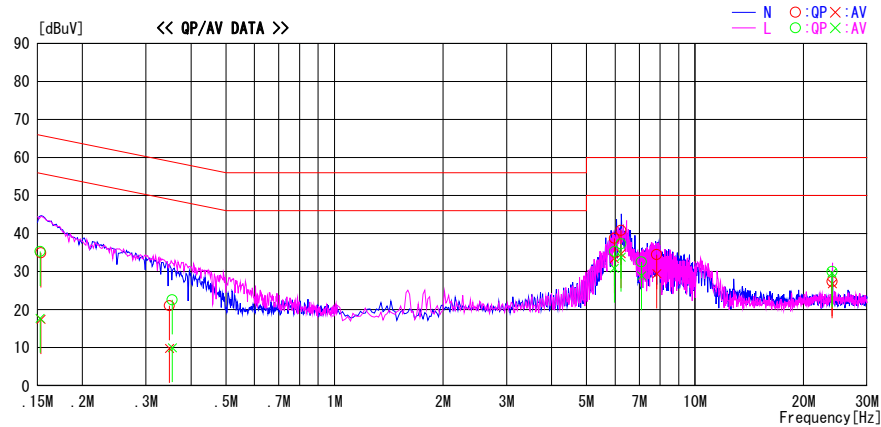
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 3 Semi Anechoic Chamber
Date : 2012/08/01

Report No. : 31JE0038-H0
 Temp./Humi. : 22deg. C / 57% RH
 Engineer : Tomohisa Nakagawa

Mode / Remarks : Tx 11n 20HT 2437MHz

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15338	21.7	4.2	13.2	34.9	17.4	65.8	55.8	30.9	38.4	N	
0.34875	7.7	-3.5	13.3	21.0	9.8	59.0	49.0	38.0	39.2	N	
5.97141	24.9	19.6	13.8	38.7	33.4	60.0	50.0	21.3	16.6	N	
6.23586	26.9	20.8	13.9	40.8	34.7	60.0	50.0	19.2	15.3	N	
7.83050	20.5	15.4	14.0	34.5	29.4	60.0	50.0	25.5	20.6	N	
24.00228	12.7	12.1	14.7	27.4	26.8	60.0	50.0	32.6	23.2	N	
0.15255	22.1	4.5	13.2	35.3	17.7	65.9	55.9	30.6	38.2	L	
0.35463	9.3	-3.3	13.3	22.6	10.0	58.9	48.9	36.3	38.9	L	
5.97531	21.5	17.1	13.8	35.3	30.9	60.0	50.0	24.7	19.1	L	
6.23776	23.4	19.9	13.9	37.3	33.8	60.0	50.0	22.7	16.2	L	
7.09947	18.7	15.0	13.9	32.6	28.9	60.0	50.0	27.4	21.1	L	
23.99927	15.3	14.9	14.7	30.0	29.6	60.0	50.0	30.0	20.4	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT=READING+C.F (LISN+CABLE LOSS+ATTEN LOSS)
Except for the above table : adequate margin data below the limits.

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 08/09/2012 08/09/2012
Temperature/ Humidity 23 deg. C / 66% RH 24 deg. C / 63% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama
(1-10GHz) (Above 10GHz)
Mode 11b Tx 2437MHz, 1Mbps, Antenna 0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2493.800	PK	65.2	27.5	2.3	34.8	60.2	73.9	13.7	
Hori	4874.000	PK	44.9	31.4	3.9	34.0	46.2	73.9	27.7	
Hori	4987.600	PK	57.4	31.7	4.0	34.0	59.1	73.9	14.8	
Hori	7311.000	PK	43.0	36.0	4.7	34.2	49.5	73.9	24.4	
Hori	9748.000	PK	44.6	38.9	5.3	34.7	54.1	73.9	19.8	
Hori	2493.800	AV	48.2	27.5	2.3	34.8	43.2	53.9	10.7	
Hori	4874.000	AV	33.7	31.4	3.9	34.0	35.0	53.9	18.9	
Hori	4987.600	AV	38.3	31.7	4.0	34.0	40.0	53.9	13.9	
Hori	7311.000	AV	30.6	36.0	4.7	34.2	37.1	53.9	16.8	
Hori	9748.000	AV	32.2	38.9	5.3	34.7	41.7	53.9	12.2	
Vert	2493.800	PK	64.3	27.5	2.3	34.8	59.3	73.9	14.6	
Vert	4874.000	PK	45.2	31.4	3.9	34.0	46.5	73.9	27.4	
Vert	4987.600	PK	58.1	31.7	4.0	34.0	59.8	73.9	14.1	
Vert	7311.000	PK	44.4	36.0	4.7	34.2	50.9	73.9	23.0	
Vert	9748.000	PK	45.9	38.9	5.3	34.7	55.4	73.9	18.5	
Vert	2493.800	AV	47.0	27.5	2.3	34.8	42.0	53.9	11.9	
Vert	4874.000	AV	34.1	31.4	3.9	34.0	35.4	53.9	18.5	
Vert	4987.600	AV	39.0	31.7	4.0	34.0	40.7	53.9	13.2	
Vert	7311.000	AV	30.7	36.0	4.7	34.2	37.2	53.9	16.7	
Vert	9748.000	AV	34.8	38.9	5.3	34.7	44.3	53.9	9.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 08/09/2012 08/09/2012
Temperature/ Humidity 23 deg. C / 66% RH 24 deg. C / 63% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama
(1-10GHz) (Above 10GHz)
Mode 11b Tx 2462MHz, 1Mbps, Antenna 0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	51.1	27.5	2.3	34.8	46.1	73.9	27.8	
Hori	2486.840	PK	51.9	27.5	2.3	34.8	46.9	73.9	27.0	
Hori	2493.800	PK	65.7	27.5	2.3	34.8	60.7	73.9	13.2	
Hori	4924.000	PK	44.3	31.5	4.0	34.0	45.8	73.9	28.1	
Hori	4987.600	PK	56.8	31.7	4.0	34.0	58.5	73.9	15.4	
Hori	7386.000	PK	43.7	36.1	4.7	34.3	50.2	73.9	23.7	
Hori	9848.000	PK	45.3	39.1	5.4	34.7	55.1	73.9	18.8	
Hori	2483.500	AV	39.0	27.5	2.3	34.8	34.0	53.9	19.9	
Hori	2486.840	AV	39.5	27.5	2.3	34.8	34.5	53.9	19.4	
Hori	2493.800	AV	48.3	27.5	2.3	34.8	43.3	53.9	10.6	
Hori	4924.000	AV	33.8	31.5	4.0	34.0	35.3	53.9	18.6	
Hori	4987.600	AV	37.8	31.7	4.0	34.0	39.5	53.9	14.4	
Hori	7386.000	AV	31.2	36.1	4.7	34.3	37.7	53.9	16.2	
Hori	9848.000	AV	32.9	39.1	5.4	34.7	42.7	53.9	11.2	
Vert	2483.500	PK	52.3	27.5	2.3	34.8	47.3	73.9	26.6	
Vert	2486.840	PK	52.5	27.5	2.3	34.8	47.5	73.9	26.4	
Vert	2493.800	PK	64.9	27.5	2.3	34.8	59.9	73.9	14.0	
Vert	4924.000	PK	44.8	31.5	4.0	34.0	46.3	73.9	27.6	
Vert	4987.600	PK	57.6	31.7	4.0	34.0	59.3	73.9	14.6	
Vert	7386.000	PK	43.7	36.1	4.7	34.3	50.2	73.9	23.7	
Vert	9848.000	PK	46.2	39.1	5.4	34.7	56.0	73.9	17.9	
Vert	2483.500	AV	44.1	27.5	2.3	34.8	39.1	53.9	14.8	
Vert	2486.840	AV	41.1	27.5	2.3	34.8	36.1	53.9	17.8	
Vert	2493.800	AV	47.8	27.5	2.3	34.8	42.8	53.9	11.1	
Vert	4924.000	AV	36.7	31.5	4.0	34.0	38.2	53.9	15.7	
Vert	4987.600	AV	38.7	31.7	4.0	34.0	40.4	53.9	13.5	
Vert	7386.000	AV	31.2	36.1	4.7	34.3	37.7	53.9	16.2	
Vert	9848.000	AV	37.0	39.1	5.4	34.7	46.8	53.9	7.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Above 10GHz)
Mode 11n-20(MIMO) Tx 2412MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	65.2	27.4	2.2	34.8	60.0	73.9	13.9	
Hori	2497.700	PK	67.9	27.5	2.3	34.8	62.9	73.9	11.0	
Hori	4824.000	PK	42.5	31.3	4.0	34.0	43.8	73.9	30.1	
Hori	4980.334	PK	55.3	31.7	4.0	34.0	57.0	73.9	16.9	
Hori	7236.000	PK	44.0	35.9	4.6	34.2	50.3	73.9	23.6	
Hori	9648.000	PK	45.8	38.8	5.3	34.7	55.2	73.9	18.7	
Hori	2390.000	AV	47.5	27.4	2.2	34.8	42.3	53.9	11.6	
Hori	2497.700	AV	50.5	27.5	2.3	34.8	45.5	53.9	8.4	
Hori	4824.000	AV	31.0	31.3	4.0	34.0	32.3	53.9	21.6	
Hori	4980.334	AV	36.8	31.7	4.0	34.0	38.5	53.9	15.4	
Hori	7236.000	AV	31.2	35.9	4.6	34.2	37.5	53.9	16.4	
Hori	9648.000	AV	32.8	38.8	5.3	34.7	42.2	53.9	11.7	
Vert	2390.000	PK	68.5	27.4	2.2	34.8	63.3	73.9	10.6	
Vert	2497.700	PK	68.1	27.5	2.3	34.8	63.1	73.9	10.8	
Vert	4824.000	PK	42.5	31.3	4.0	34.0	43.8	73.9	30.1	
Vert	4980.334	PK	56.4	31.7	4.0	34.0	58.1	73.9	15.8	
Vert	7236.000	PK	43.8	35.9	4.6	34.2	50.1	73.9	23.8	
Vert	9648.000	PK	45.6	38.8	5.3	34.7	55.0	73.9	18.9	
Vert	2390.000	AV	51.9	27.4	2.2	34.8	46.7	53.9	7.2	
Vert	2497.700	AV	51.0	27.5	2.3	34.8	46.0	53.9	7.9	
Vert	4824.000	AV	31.0	31.3	4.0	34.0	32.3	53.9	21.6	
Vert	4980.334	AV	37.8	31.7	4.0	34.0	39.5	53.9	14.4	
Vert	7236.000	AV	31.2	35.9	4.6	34.2	37.5	53.9	16.4	
Vert	9648.000	AV	32.8	38.8	5.3	34.7	42.2	53.9	11.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

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	103.8	27.5	2.2	34.8	98.7	-	-	Carrier
Hori	2400.000	PK	72.2	27.5	2.2	34.8	67.1	78.7	11.6	
Vert	2412.000	PK	105.6	27.5	2.2	34.8	100.5	-	-	Carrier
Vert	2400.000	PK	74.8	27.5	2.2	34.8	69.7	80.5	10.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Except 1-10GHz)
Mode 11n-20(MIMO) Tx 2437MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	120.000	QP	45.0	12.7	7.6	28.3	37.0	43.5	6.5	
Hori	145.970	QP	33.2	14.6	7.8	28.1	27.5	43.5	16.0	
Hori	372.882	QP	31.6	16.6	9.3	28.1	29.4	46.0	16.6	
Hori	2497.133	PK	57.5	27.5	12.4	34.8	62.6	73.9	11.3	
Hori	4874.000	PK	43.0	31.4	3.9	34.0	44.3	73.9	29.6	
Hori	4979.167	PK	54.8	31.7	4.0	34.0	56.5	73.9	17.4	
Hori	7311.000	PK	43.0	36.0	4.7	34.2	49.5	73.9	24.4	
Hori	9748.000	PK	44.3	38.9	5.3	34.7	53.8	73.9	20.1	
Hori	2497.133	AV	41.0	27.5	12.4	34.8	46.1	53.9	7.8	
Hori	4874.000	AV	30.8	31.4	3.9	34.0	32.1	53.9	21.8	
Hori	4979.167	AV	36.7	31.7	4.0	34.0	38.4	53.9	15.5	
Hori	7311.000	AV	31.0	36.0	4.7	34.2	37.5	53.9	16.4	
Hori	9748.000	AV	32.3	38.9	5.3	34.7	41.8	53.9	12.1	
Vert	120.000	QP	42.2	12.7	7.6	28.3	34.2	43.5	9.3	
Vert	145.650	QP	32.0	14.6	7.8	28.1	26.3	43.5	17.2	
Vert	176.289	QP	36.8	15.9	8.0	28.1	32.6	43.5	10.9	
Vert	374.666	QP	24.5	16.7	9.3	28.1	22.4	46.0	23.6	
Vert	738.588	QP	28.1	21.3	10.7	28.3	31.8	46.0	14.2	
Vert	925.867	QP	27.9	22.5	11.3	27.8	33.9	46.0	12.1	
Vert	2497.133	PK	58.3	27.5	12.4	34.8	63.4	73.9	10.5	
Vert	4874.000	PK	43.2	31.4	3.9	34.0	44.5	73.9	29.4	
Vert	4979.167	PK	55.7	31.7	4.0	34.0	57.4	73.9	16.5	
Vert	7311.000	PK	43.2	36.0	4.7	34.2	49.7	73.9	24.2	
Vert	9748.000	PK	44.4	38.9	5.3	34.7	53.9	73.9	20.0	
Vert	2497.133	AV	41.8	27.5	12.4	34.8	46.9	53.9	7.0	
Vert	4874.000	AV	30.8	31.4	3.9	34.0	32.1	53.9	21.8	
Vert	4979.167	AV	37.5	31.7	4.0	34.0	39.2	53.9	14.7	
Vert	7311.000	AV	31.0	36.0	4.7	34.2	37.5	53.9	16.4	
Vert	9748.000	AV	32.3	38.9	5.3	34.7	41.8	53.9	12.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Above 10GHz)
Mode 11n-20(MIMO) Tx 2462MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	68.5	27.5	2.3	34.8	63.5	73.9	10.4	
Hori	2497.600	PK	67.6	27.5	2.3	34.8	62.6	73.9	11.3	
Hori	4924.000	PK	43.0	31.5	4.0	34.0	44.5	73.9	29.4	
Hori	4980.334	PK	55.7	31.7	4.0	34.0	57.4	73.9	16.5	
Hori	7386.000	PK	42.7	36.1	4.7	34.3	49.2	73.9	24.7	
Hori	9848.000	PK	45.2	39.1	5.4	34.7	55.0	73.9	18.9	
Hori	2483.500	AV	51.6	27.5	2.3	34.8	46.6	53.9	7.3	
Hori	2497.600	AV	50.8	27.5	2.3	34.8	45.8	53.9	8.1	
Hori	4924.000	AV	30.7	31.5	4.0	34.0	32.2	53.9	21.7	
Hori	4980.334	AV	36.9	31.7	4.0	34.0	38.6	53.9	15.3	
Hori	7386.000	AV	30.6	36.1	4.7	34.3	37.1	53.9	16.8	
Hori	9848.000	AV	32.5	39.1	5.4	34.7	42.3	53.9	11.6	
Vert	2483.500	PK	73.0	27.5	2.3	34.8	68.0	73.9	5.9	
Vert	2497.600	PK	67.9	27.5	2.3	34.8	62.9	73.9	11.0	
Vert	4924.000	PK	43.0	31.5	4.0	34.0	44.5	73.9	29.4	
Vert	4980.334	PK	56.3	31.7	4.0	34.0	58.0	73.9	15.9	
Vert	7386.000	PK	42.5	36.1	4.7	34.3	49.0	73.9	24.9	
Vert	9848.000	PK	44.9	39.1	5.4	34.7	54.7	73.9	19.2	
Vert	2483.500	AV	55.4	27.5	2.3	34.8	50.4	53.9	3.5	
Vert	2497.600	AV	51.0	27.5	2.3	34.8	46.0	53.9	7.9	
Vert	4924.000	AV	30.7	31.5	4.0	34.0	32.2	53.9	21.7	
Vert	4980.334	AV	37.7	31.7	4.0	34.0	39.4	53.9	14.5	
Vert	7386.000	AV	30.6	36.1	4.7	34.3	37.1	53.9	16.8	
Vert	9848.000	AV	32.5	39.1	5.4	34.7	42.3	53.9	11.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 08/09/2012 08/09/2012
Temperature/ Humidity 23 deg. C / 66% RH 24 deg. C / 63% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama
(1-10GHz) (Above 10GHz)
Mode 11n-40(MIMO) Tx 2422MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2390.000	PK	68.0	27.4	2.2	34.8	62.8	73.9	11.1	
Hori	2493.800	PK	65.3	27.5	2.3	34.8	60.3	73.9	13.6	
Hori	4844.000	PK	42.3	31.3	3.9	34.0	43.5	73.9	30.4	
Hori	4987.600	PK	56.4	31.7	4.0	34.0	58.1	73.9	15.8	
Hori	7266.000	PK	43.6	36.0	4.6	34.2	50.0	73.9	23.9	
Hori	9688.000	PK	43.6	38.9	5.3	34.7	53.1	73.9	20.8	
Hori	2390.000	AV	49.8	27.4	2.2	34.8	44.6	53.9	9.3	
Hori	2493.800	AV	48.2	27.5	2.3	34.8	43.2	53.9	10.7	
Hori	4844.000	AV	30.5	31.3	3.9	34.0	31.7	53.9	22.2	
Hori	4987.600	AV	37.7	31.7	4.0	34.0	39.4	53.9	14.5	
Hori	7266.000	AV	31.6	36.0	4.6	34.2	38.0	53.9	15.9	
Hori	9688.000	AV	32.0	38.9	5.3	34.7	41.5	53.9	12.4	
Vert	2390.000	PK	69.8	27.4	2.2	34.8	64.6	73.9	9.3	
Vert	2493.800	PK	64.1	27.5	2.3	34.8	59.1	73.9	14.8	
Vert	4844.000	PK	43.1	31.3	3.9	34.0	44.3	73.9	29.6	
Vert	4987.600	PK	56.4	31.7	4.0	34.0	58.1	73.9	15.8	
Vert	7266.000	PK	43.7	36.0	4.6	34.2	50.1	73.9	23.8	
Vert	9688.000	PK	43.8	38.9	5.3	34.7	53.3	73.9	20.6	
Vert	2390.000	AV	51.9	27.4	2.2	34.8	46.7	53.9	7.2	
Vert	2493.800	AV	47.4	27.5	2.3	34.8	42.4	53.9	11.5	
Vert	4844.000	AV	30.4	31.3	3.9	34.0	31.6	53.9	22.3	
Vert	4987.600	AV	37.7	31.7	4.0	34.0	39.4	53.9	14.5	
Vert	7266.000	AV	31.6	36.0	4.6	34.2	38.0	53.9	15.9	
Vert	9688.000	AV	32.0	38.9	5.3	34.7	41.5	53.9	12.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2422.000	PK	98.8	27.5	2.2	34.8	93.7	-	-	Carrier
Hori	2400.000	PK	68.2	27.5	2.2	34.8	63.1	73.7	10.6	
Vert	2422.000	PK	99.7	27.5	2.2	34.8	94.6	-	-	Carrier
Vert	2400.000	PK	69.5	27.5	2.2	34.8	64.4	74.6	10.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 08/09/2012 08/09/2012
Temperature/ Humidity 23 deg. C / 66% RH 24 deg. C / 63% RH
Engineer Hironobu Ohnishi Satofumi Matsuyama
(1-10GHz) (Above 10GHz)
Mode 11n-40(MIMO) Tx 2437MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2493.800	PK	66.1	27.5	2.3	34.8	61.1	73.9	12.8	
Hori	4874.000	PK	44.4	31.4	3.9	34.0	45.7	73.9	28.2	
Hori	4987.600	PK	57.0	31.7	4.0	34.0	58.7	73.9	15.2	
Hori	7311.000	PK	42.7	36.0	4.7	34.2	49.2	73.9	24.7	
Hori	9748.000	PK	44.5	38.9	5.3	34.7	54.0	73.9	19.9	
Hori	2493.800	AV	49.1	27.5	2.3	34.8	44.1	53.9	9.8	
Hori	4874.000	AV	32.4	31.4	3.9	34.0	33.7	53.9	20.2	
Hori	4987.600	AV	38.1	31.7	4.0	34.0	39.8	53.9	14.1	
Hori	7311.000	AV	30.6	36.0	4.7	34.2	37.1	53.9	16.8	
Hori	9748.000	AV	31.8	38.9	5.3	34.7	41.3	53.9	12.6	
Vert	2493.800	PK	65.9	27.5	2.3	34.8	60.9	73.9	13.0	
Vert	4874.000	PK	42.8	31.4	3.9	34.0	44.1	73.9	29.8	
Vert	4987.600	PK	56.2	31.7	4.0	34.0	57.9	73.9	16.0	
Vert	7311.000	PK	43.6	36.0	4.7	34.2	50.1	73.9	23.8	
Vert	9748.000	PK	45.1	38.9	5.3	34.7	54.6	73.9	19.3	
Vert	2493.800	AV	49.5	27.5	2.3	34.8	44.5	53.9	9.4	
Vert	4874.000	AV	30.8	31.4	3.9	34.0	32.1	53.9	21.8	
Vert	4987.600	AV	37.8	31.7	4.0	34.0	39.5	53.9	14.4	
Vert	7311.000	AV	30.7	36.0	4.7	34.2	37.2	53.9	16.7	
Vert	9748.000	AV	32.1	38.9	5.3	34.7	41.6	53.9	12.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 08/09/2012
Temperature/ Humidity 24 deg. C / 63% RH
Engineer Satofumi Matsuyama
Mode 11n-40(MIMO) Tx 2452MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2483.500	PK	69.7	27.5	2.3	34.8	64.7	73.9	9.2	
Hori	2488.739	PK	66.5	27.5	2.3	34.8	61.5	73.9	12.4	
Hori	2498.750	PK	66.2	27.5	2.3	34.8	61.2	73.9	12.7	
Hori	4904.000	PK	43.2	31.5	3.9	34.0	44.6	73.9	29.3	
Hori	4997.176	PK	56.9	31.7	4.0	34.0	58.6	73.9	15.3	
Hori	7356.000	PK	43.7	36.1	4.7	34.3	50.2	73.9	23.7	
Hori	9808.000	PK	44.1	39.0	5.3	34.7	53.7	73.9	20.2	
Hori	2483.500	AV	52.6	27.5	2.3	34.8	47.6	53.9	6.3	
Hori	2488.739	AV	50.6	27.5	2.3	34.8	45.6	53.9	8.3	
Hori	2498.750	AV	47.4	27.5	2.3	34.8	42.4	53.9	11.5	
Hori	4904.000	AV	30.1	31.5	3.9	34.0	31.5	53.9	22.4	
Hori	4997.176	AV	38.5	31.7	4.0	34.0	40.2	53.9	13.7	
Hori	7356.000	AV	31.1	36.1	4.7	34.3	37.6	53.9	16.3	
Hori	9808.000	AV	31.4	39.0	5.3	34.7	41.0	53.9	12.9	
Vert	2483.500	PK	71.1	27.5	2.3	34.8	66.1	73.9	7.8	
Vert	2489.403	PK	69.0	27.5	2.3	34.8	64.0	73.9	9.9	
Vert	2498.750	PK	62.7	27.5	2.3	34.8	57.7	73.9	16.2	
Vert	4904.000	PK	43.8	31.5	3.9	34.0	45.2	73.9	28.7	
Vert	4980.920	PK	57.6	31.7	4.0	34.0	59.3	73.9	14.6	
Vert	7356.000	PK	43.8	36.1	4.7	34.3	50.3	73.9	23.6	
Vert	9808.000	PK	43.1	39.0	5.3	34.7	52.7	73.9	21.2	
Vert	2483.500	AV	53.8	27.5	2.3	34.8	48.8	53.9	5.1	
Vert	2489.403	AV	51.0	27.5	2.3	34.8	46.0	53.9	7.9	
Vert	2498.750	AV	45.9	27.5	2.3	34.8	40.9	53.9	13.0	
Vert	4904.000	AV	30.1	31.5	3.9	34.0	31.5	53.9	22.4	
Vert	4980.920	AV	39.1	31.7	4.0	34.0	40.8	53.9	13.1	
Vert	7356.000	AV	31.1	36.1	4.7	34.3	37.6	53.9	16.3	
Vert	9808.000	AV	31.4	39.0	5.3	34.7	41.0	53.9	12.9	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Above 10GHz)
Mode 11n-20(MIMO) Tx 5745MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	11490.000	PK	48.9	39.9	-1.9	33.8	53.1	73.9	20.8	
Hori	17235.000	PK	52.1	42.1	-0.9	32.6	60.7	73.9	13.3	
Hori	11490.000	AV	35.3	39.9	-1.9	33.8	39.5	53.9	14.5	
Hori	17235.000	AV	39.2	42.1	-0.9	32.6	47.8	53.9	6.1	
Vert	11490.000	PK	52.1	39.9	-1.9	33.8	56.3	73.9	17.6	
Vert	17235.000	PK	48.9	42.1	-0.9	32.6	57.5	73.9	16.5	
Vert	11490.000	AV	38.5	39.9	-1.9	33.8	42.7	53.9	11.3	
Vert	17235.000	AV	36.3	42.1	-0.9	32.6	44.9	53.9	9.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz $20\log(3.0m/1.0m)= 9.5dB$
26.5GHz-40GHz $20\log(3.0m/0.5m)=15.6dB$

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5745.000	PK	103.6	32.5	3.5	33.9	105.7	-	-	Carrier
Hori	5725.000	PK	65.8	32.4	3.5	33.8	67.9	85.7	17.8	
Hori	5724.883	PK	63.6	32.4	3.5	33.8	65.7	85.7	20.0	
Vert	5745.000	PK	100.4	32.5	3.5	33.9	102.5	-	-	Carrier
Vert	5725.000	PK	63.8	32.4	3.5	33.8	65.9	82.5	16.6	
Vert	5724.883	PK	62.2	32.4	3.5	33.8	64.3	82.5	18.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Above 10GHz)
Mode 11n-20(MIMO) Tx 5785MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.667	PK	60.2	32.0	3.4	33.8	61.8	73.9	12.1	
Hori	11570.000	PK	51.3	39.8	-1.8	33.8	55.5	73.9	18.4	
Hori	17355.000	PK	50.0	43.2	-0.8	32.6	59.8	73.9	14.1	
Hori	5350.667	AV	48.9	32.0	3.4	33.8	50.5	53.9	3.4	
Hori	11570.000	AV	37.0	39.8	-1.8	33.8	41.2	53.9	12.7	
Hori	17355.000	AV	37.2	43.2	-0.8	32.6	47.0	53.9	6.9	
Vert	5355.342	PK	58.3	32.1	3.4	33.8	60.0	73.9	13.9	
Vert	11570.000	PK	52.7	39.8	-1.8	33.8	56.9	73.9	17.0	
Vert	17355.000	PK	47.8	43.2	-0.8	32.6	57.6	73.9	16.3	
Vert	5355.342	AV	46.8	32.1	3.4	33.8	48.5	53.9	5.4	
Vert	11570.000	AV	38.9	39.8	-1.8	33.8	43.1	53.9	10.8	
Vert	17355.000	AV	35.3	43.2	-0.8	32.6	45.1	53.9	8.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

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Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 31JE0038-HO-05
Date 07/28/2012 07/29/2012
Temperature/ Humidity 23 deg. C / 58% RH 20 deg. C / 68% RH
Engineer Takayuki Shimada Takumi Shimada
(1-10GHz) (Above 10GHz)
Mode 11n-20(MIMO) Tx 5825MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5350.550	PK	63.2	32.0	3.4	33.8	64.8	73.9	9.1	
Hori	11650.000	PK	53.3	39.6	-1.8	33.8	57.3	73.9	16.6	
Hori	17475.000	PK	49.1	44.3	-0.8	32.6	60.0	73.9	13.9	
Hori	5350.550	AV	49.5	32.0	3.4	33.8	51.1	53.9	2.8	
Hori	11650.000	AV	40.5	39.6	-1.8	33.8	44.5	53.9	9.4	
Hori	17475.000	AV	36.5	44.3	-0.8	32.6	47.4	53.9	6.5	
Vert	5356.589	PK	58.3	32.1	3.4	33.8	60.0	73.9	13.9	
Vert	11650.000	PK	54.4	39.6	-1.8	33.8	58.4	73.9	15.5	
Vert	17475.000	PK	47.9	44.3	-0.8	32.6	58.8	73.9	15.1	
Vert	5356.589	AV	45.5	32.1	3.4	33.8	47.2	53.9	6.7	
Vert	11650.000	AV	41.8	39.6	-1.8	33.8	45.8	53.9	8.2	
Vert	17475.000	AV	35.7	44.3	-0.8	32.6	46.6	53.9	7.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5825.000	PK	103.5	32.5	3.6	33.9	105.7	-	-	Carrier
Hori	5850.000	PK	62.1	32.6	3.6	33.9	64.4	85.7	21.3	
Vert	5825.000	PK	100.3	32.5	3.6	33.9	102.5	-	-	Carrier
Vert	5850.000	PK	58.4	32.6	3.6	33.9	60.7	82.5	21.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 31JE0038-HO-05
Date : 08/09/2012
Temperature/ Humidity : 24 deg. C / 63% RH
Engineer : Satofumi Matsuyama
Mode : 11n-40(MIMO) Tx 5755MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5280.255	PK	61.1	32.0	3.4	33.9	62.6	73.9	11.3	
Hori	5280.255	AV	49.4	32.0	3.4	33.9	50.9	53.9	3.0	
Vert	5284.933	PK	59.8	32.0	3.4	33.9	61.3	73.9	12.6	
Vert	5284.933	AV	47.7	32.0	3.4	33.9	49.2	53.9	4.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
 26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5755.000	PK	101.3	32.5	3.5	33.9	103.4	-	-	Carrier
Hori	5725.000	PK	66.9	32.4	3.5	33.8	69.0	83.4	14.4	
Vert	5755.000	PK	98.6	32.5	3.5	33.9	100.7	-	-	Carrier
Vert	5725.000	PK	63.9	32.4	3.5	33.8	66.0	80.7	14.7	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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Radiated Spurious Emission

Test place : Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 31JE0038-HO-05
Date : 08/09/2012
Temperature/ Humidity : 24 deg. C / 63% RH
Engineer : Satofumi Matsuyama
Mode : 11n-40(MIMO) Tx 5795MHz, MCS 8

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5173.870	PK	62.5	31.9	3.3	33.9	63.8	73.9	10.1	
Hori	5173.870	AV	49.8	31.9	3.3	33.9	51.1	53.9	2.8	
Vert	5190.103	PK	59.2	31.9	3.4	33.9	60.6	73.9	13.3	
Vert	5190.103	AV	47.2	31.9	3.4	33.9	48.6	53.9	5.3	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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

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

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	5795.000	PK	101.8	32.5	3.6	33.9	104.0	-	-	Carrier
Hori	5850.000	PK	53.1	32.6	3.6	33.9	55.4	84.0	28.6	
Vert	5795.000	PK	97.5	32.5	3.6	33.9	99.7	-	-	Carrier
Vert	5850.000	PK	50.9	32.6	3.6	33.9	53.2	79.7	26.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

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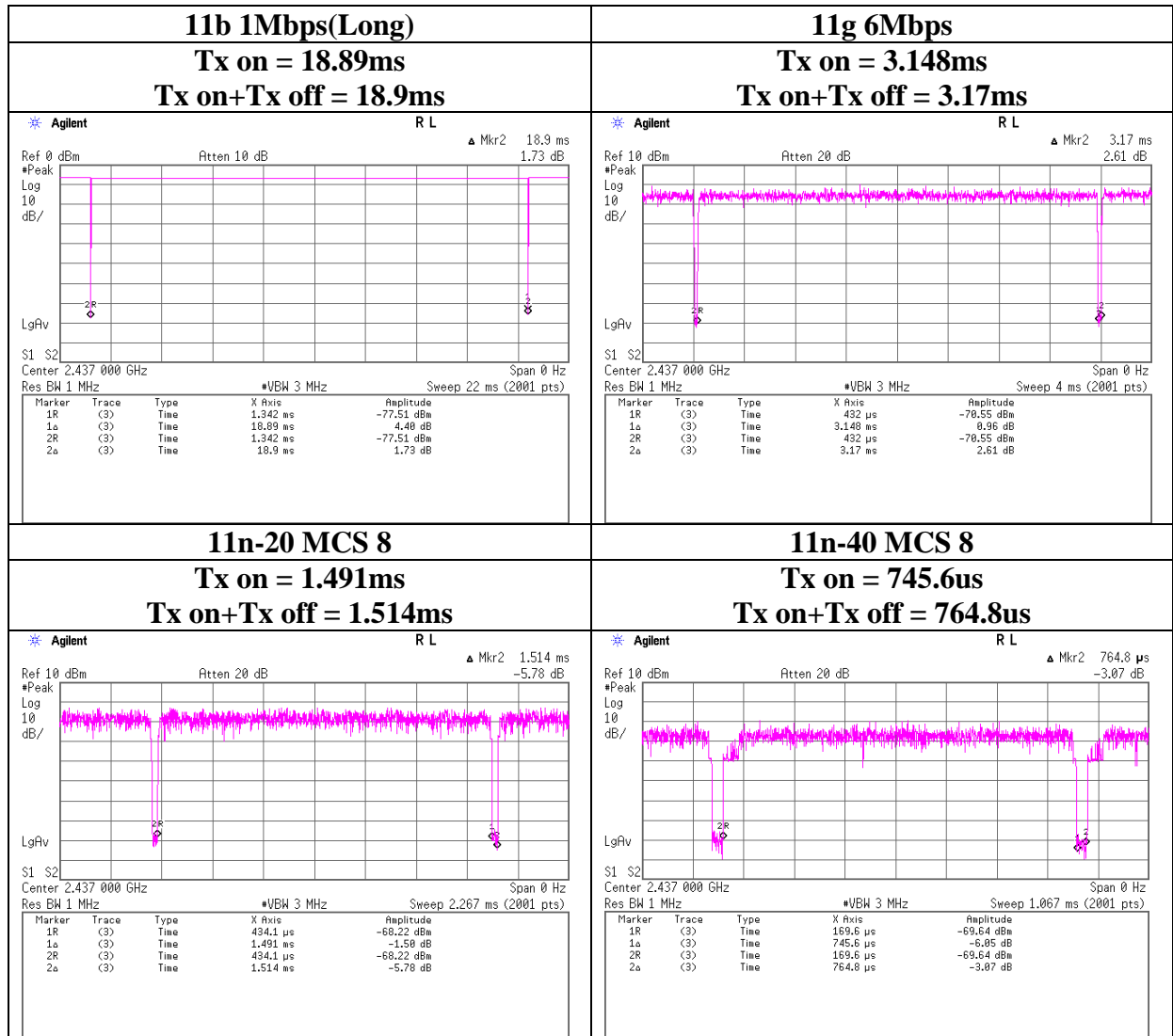
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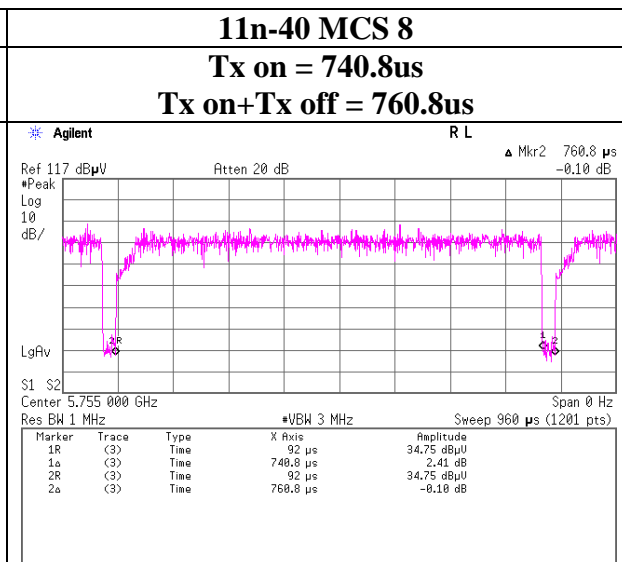
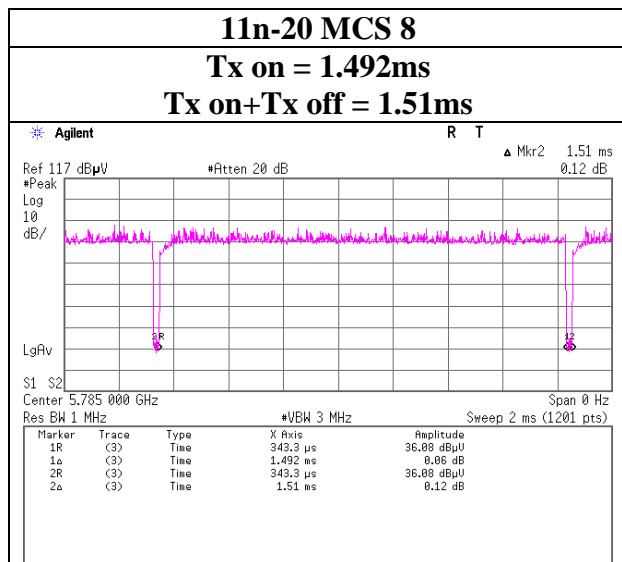
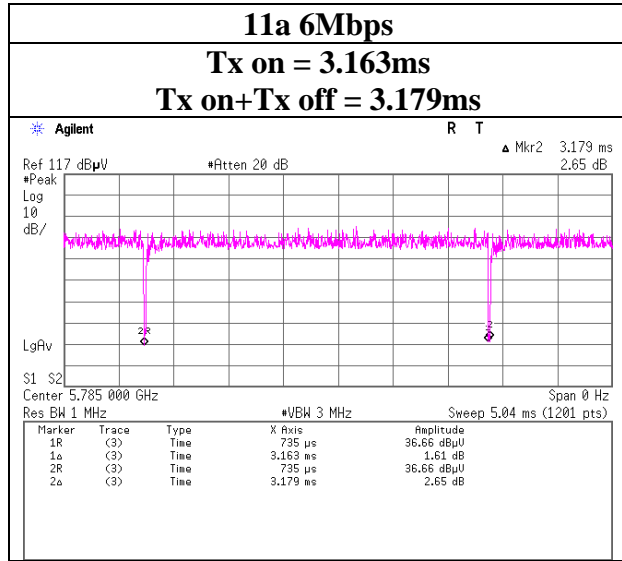
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Duty Cycle



Duty Cycle



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2012/04/06 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2012/01/25 * 12
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2011/09/06 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	RE	2012/03/27 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2011/12/08 * 12
MHF-16	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	RE	2011/09/08 * 12
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22 * 12
MCC-54	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	RE	2012/03/21 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2012/06/27 * 12
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2012/06/22 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2012/04/03 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2011/10/23 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2011/10/23 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2012/02/16 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2011/09/26 * 12
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2012/06/19 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	CE	2012/02/24 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	CE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	CE	
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	CE	2011/11/23 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	CE	2011/08/11 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(AE)	2012/02/06 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2012/02/09 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2012/01/11 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2012/07/12 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12

The expiration date of the calibration is the end of the expired month.

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

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission
RE: Radiated Emission

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