



**FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

WIFI MODULE

MODEL NUMBER: DWM-W052

FCC ID: EW4DWMW052

IC: 4250A-DWMW052

REPORT NUMBER: 33BE0378-HO-B

ISSUE DATE: October 24, 2012

Prepared for
**MITSUMI ELECTRIC CO., LTD.
1601, SAKAI, ATSUGI-SHI,
KANAGAWA, 243-8533 JAPAN**

Prepared by
**UL Japan, Inc.
Head Office EMC Lab.
4383-326 Asama-cho, Ise-shi
Mie-ken 516-0021 JAPAN
TEL: +81 596 24 8116
FAX: +81 596 24 8124**



NVLAP LAB CODE: 200572-0

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/abou/mark1/index.jsp#nvlap>

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/24/12	Initial Issue	T. Hatakeda

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. MEASURING INSTRUMENT CALIBRATION	6
4.2. SAMPLE CALCULATION	6
4.3. MEASUREMENT UNCERTAINTY	7
5. EQUIPMENT UNDER TEST	8
5.1. DESCRIPTION OF EUT	8
5.2. MAXIMUM OUTPUT POWER	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	8
5.4. SOFTWARE AND FIRMWARE	8
5.5. WORST-CASE CONFIGURATION AND MODE	9
5.6. DESCRIPTION OF TEST SETUP	10
6. TEST AND MEASUREMENT EQUIPMENT	12
7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS	14
7.1.1. ON TIME AND DUTY CYCLE RESULTS	14
7.1.2. MEASUREMENT METHOD FOR POWER AND PPSD	14
7.1.3. MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz	14
7.1.4. DUTY CYCLE PLOTS	15
8. ANTENNA PORT TEST RESULTS	16
8.1. 802.11n HT20 SISO MODE IN THE 5.2 GHz BAND	16
8.1.1. 26 dB BANDWIDTH	16
8.1.2. 99% BANDWIDTH	18
8.1.3. AVERAGE POWER	20
8.1.4. OUTPUT POWER AND PPSD	22
8.1.5. PEAK EXCURSION	26
8.2. 802.11n HT20 MIMO MODE IN THE 5.2 GHz BAND	28
8.2.1. 26 dB BANDWIDTH	28
8.2.2. 99% BANDWIDTH	30
8.2.3. AVERAGE POWER	32
8.2.4. OUTPUT POWER AND PPSD	34
8.2.5. PEAK EXCURSION	38
9. RADIATED TEST RESULTS	40
9.1. LIMITS AND PROCEDURE	40

9.2.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND</i>	<i>41</i>
9.2.1.	802.11n HT20 SISO MODE IN THE LOWER 5.2 GHz BAND.....	41
9.2.2.	802.11n HT20 MIMO MODE IN THE LOWER 5.2 GHz BAND.....	47
9.3.	<i>WORST-CASE BELOW 1 GHz</i>	<i>50</i>
10.	AC POWER LINE CONDUCTED EMISSIONS.....	51
11.	MAXIMUM PERMISSIBLE EXPOSURE.....	58
12.	SETUP PHOTOS.....	62

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MITSUMI ELECTRIC CO., LTD.
1601, SAKAI, ATSUGI-SHI,
KANAGAWA, 243-8533 JAPAN

EUT DESCRIPTION: WIFI MODULE

MODEL: DWM-W052

SERIAL NUMBER: 40F407325FD9

DATE TESTED: September 10 to October 22, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Japan, Inc. By:

Tested By:



Takahiro Hatakeda
Leader of WiSE Japan
UL Verification Services
UL Japan, Inc.



Satofumi Matsuyama
Engineer of WiSE Japan
UL Verification Services
UL Japan, Inc.



2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0
The full scope of accreditation can be viewed at
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT 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 (10m*)(±dB)		
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz
No.1	4.2dB	5.0dB	4.8dB
No.2	-	-	-
No.3	-	-	-
No.4	-	-	-

*10m = Measurement distance

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

Antenna terminal conducted emission and Power density (±dB)			Antenna terminal conducted emission (+dB)		Channel power (±dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11n (HT20) transceiver module.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11n SISO HT20 (MCS0 – MCS7)	14.44	27.80
5180 - 5240	802.11n MIMO HT20 (MCS8 – MCS15)	14.41	27.61

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of 1.23 dBi (Ant 0/Ant 1).

5.4. SOFTWARE AND FIRMWARE

The software/firmware version is BCM43237_5_91_100_35_XP.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11n SISO 20MHz mode were made at MCS3 (Antenna 1) & MCS2 (Antenna 0).

All final tests in the 802.11n MIMO 20MHz mode were made at MCS8.

For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z, it was determined that the following orientation was worst-case; therefore, all final radiated testing was performed with the following orientation:

- Module: Horizontal X-orientation, Vertical X-orientation
- Antenna: Horizontal Z-orientation, Vertical X-orientation

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude E6500	37534964973	DoC
AC Adapter	Dell	DA90PE0-00	CX-0NN236-48661-8C2-816V-A01	DoC
Test Jig	Mitsumi	N/A	N/A	N/A

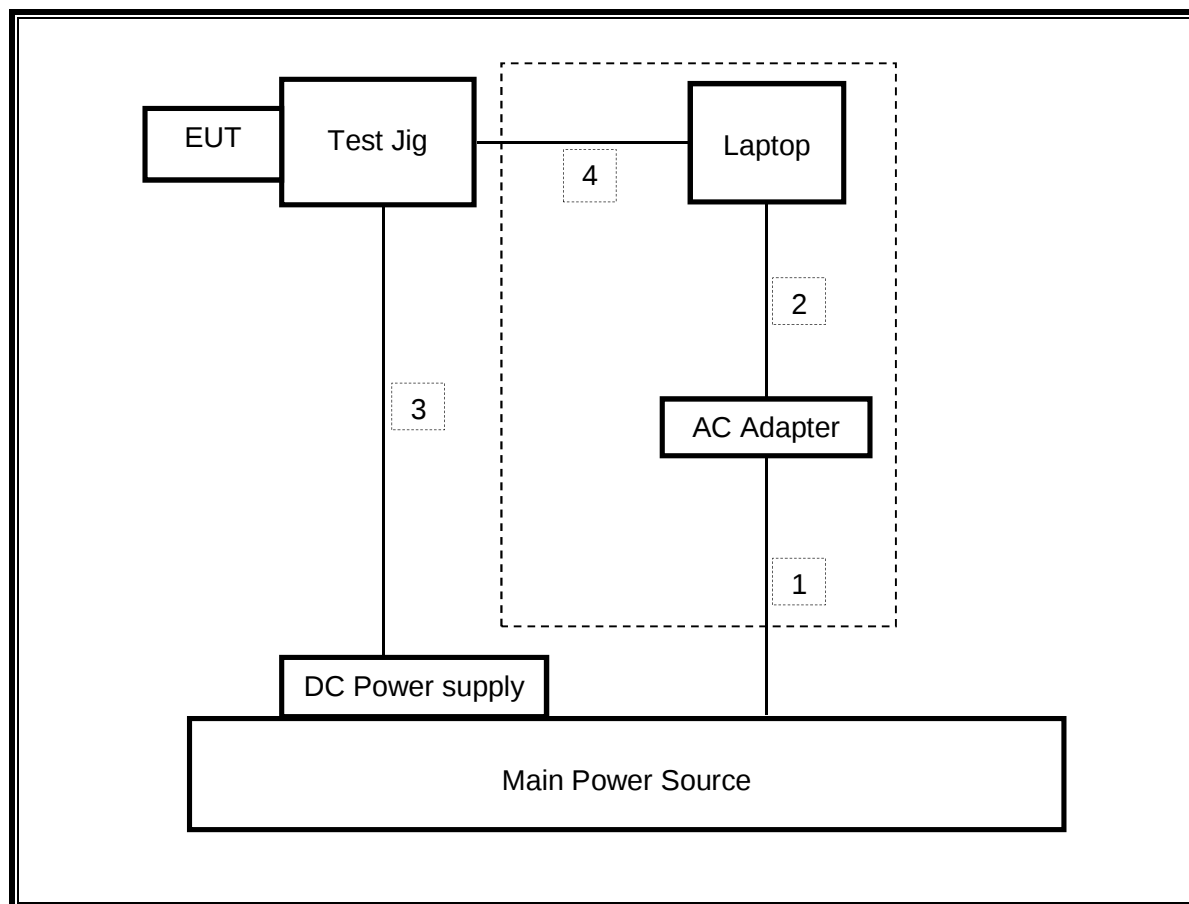
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2 Pong	Un-Shielded	0.9m	N/A
2	DC	1	DC	Un-Shielded	1.8m	Ferrite Core at one End
3	DC	1	DC	Un-Shielded	2.0m	N/A
4	Data	1	20 Pins	Un-Shielded	0.5m	Ribbon Cable

TEST SETUP

The EUT is attached to a host laptop computer via ribbon cable during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



 = These were connected only when the EUT was activated.

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

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/CE	-
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	2012/09/05 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2012/05/21 * 12
MHF-16	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCA	7001	RE	2012/09/06 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2011/12/08 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2012/02/29 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2012/04/06 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170307	RE	2012/06/27 * 12
MCC-54	Microwave Cable	Suhner	SUCOFLEX101	2873(1m) / 2876(5m)	RE	2012/03/21 * 12
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2012/06/22 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2011/11/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	CE	2012/04/05 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2012/02/06 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	CE	2012/07/12 * 12

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2011/12/09 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2012/04/06 * 12
MCC-35	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2011/10/28 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2012/01/12 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05 * 12
MAT-23	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2012/03/27 * 12
MTA-09	Terminator	HP	HP 909D	03745	AT	2012/08/09 * 12
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2011/11/07 * 12
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2011/11/07 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2011/09/12 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2011/09/12 * 12
MCC-76	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278967/4	RE	2011/12/08 * 12
MHF-22	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCB	602	RE	2012/01/28 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/AT	2012/02/03 * 12

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

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

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

Test Item:

CE: Conducted emission

RE: Radiated emission

AT: Antenna terminal conducted test

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11n HT20(SISO, Ant 0)	0.4539	0.5468	0.8301	83.01	0.81	2.203
802.11n HT20(SISO, Ant 1)	0.3480	0.4418	0.7877	78.77	1.04	2.874
802.11n HT20(MIMO)	0.6708	0.7627	0.8795	87.95	0.56	1.491

7.1.2. MEASUREMENT METHOD FOR POWER AND PPSD

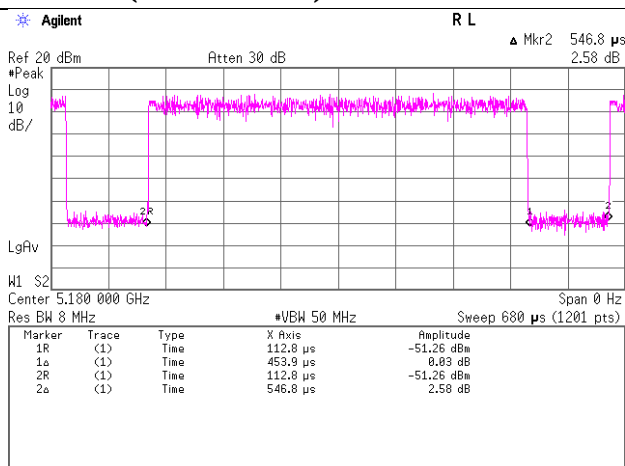
The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-1 with a video trigger is used.

7.1.3. MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz

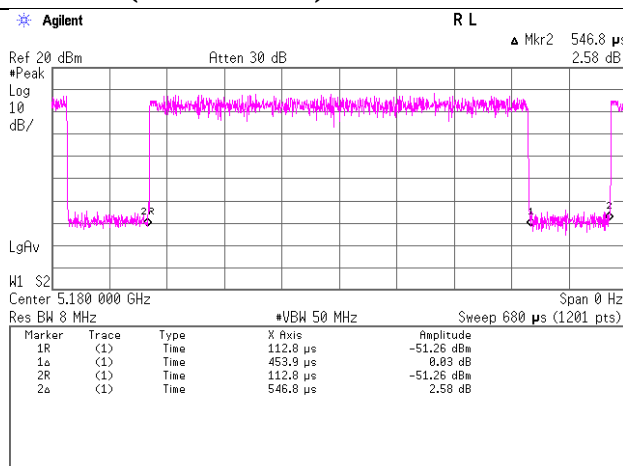
The Duty Cycle is less than 98% and consistent, KDB 789033 Method VB with Minimum VBW is used.

7.1.4. DUTY CYCLE PLOTS

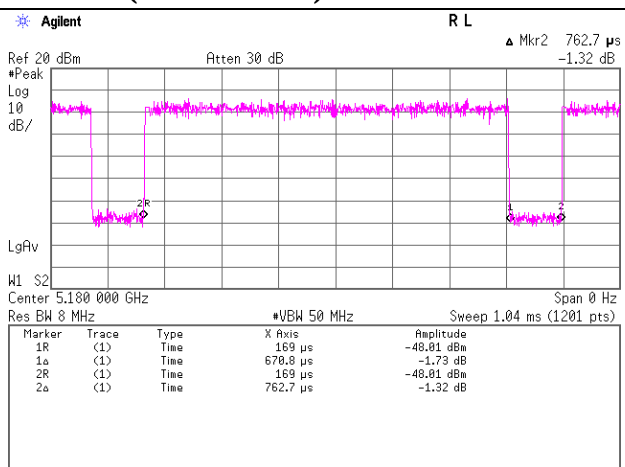
11n-20(SISO) , MCS 2, Antenna 0
Duty Cycle = 453.9/546.8 = 83.0%
Duty factor: $10\log(1/x)=0.81$
x:Tx on/(Tx on+Tx off)=453.9/546.8



11n-20(SISO) , MCS 3, Antenna 1
Duty Cycle = 348/441.8 = 78.8%
Duty factor: $10\log(1/x)=1.04$
x:Tx on/(Tx on+Tx off)=348/441.8



11n-20(MIMO) , MCS 8
Duty Cycle = 670.8/762.7 = 88.0%
Duty factor: $10\log(1/x)=0.56$
x:Tx on/(Tx on+Tx off)=670.8/762.7



8. ANTENNA PORT TEST RESULTS

8.1. 802.11n HT20 SISO MODE IN THE 5.2 GHz BAND

8.1.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only (this was measured just to determine the limit value of the output power)

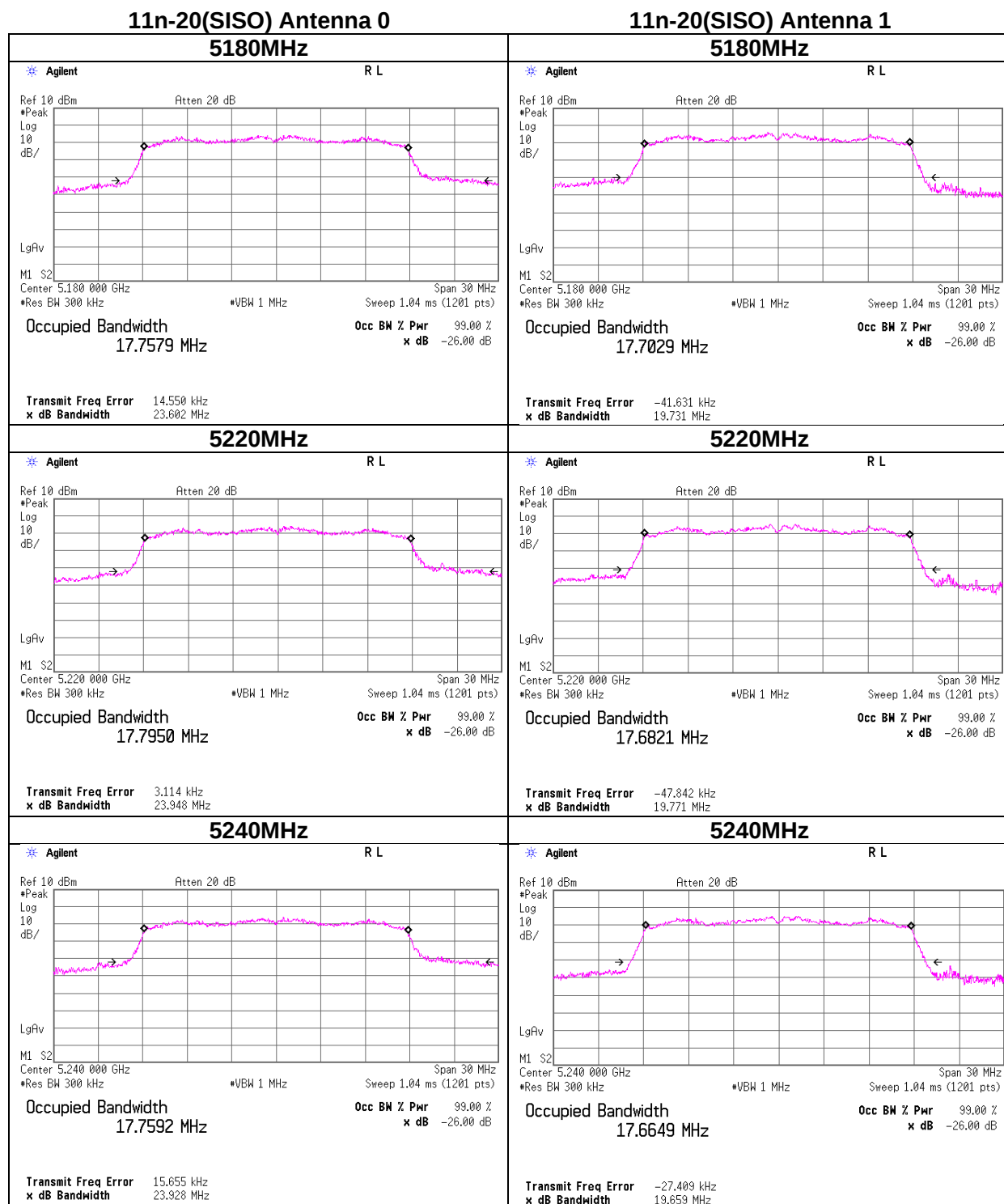
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Antenna	Frequency [MHz]	26dB Emission Bandwidth [MHz]	99% Occupied Bandwidth [MHz]	Limit [MHz]
0	5180	23.602	17.758	-
	5220	23.948	17.795	-
	5240	23.928	17.759	-
1	5180	19.731	17.703	-
	5220	19.771	17.682	-
	5240	19.659	17.665	-

26 dB BANDWIDTH



8.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only (this was measured just to determine the limit value of the output power)

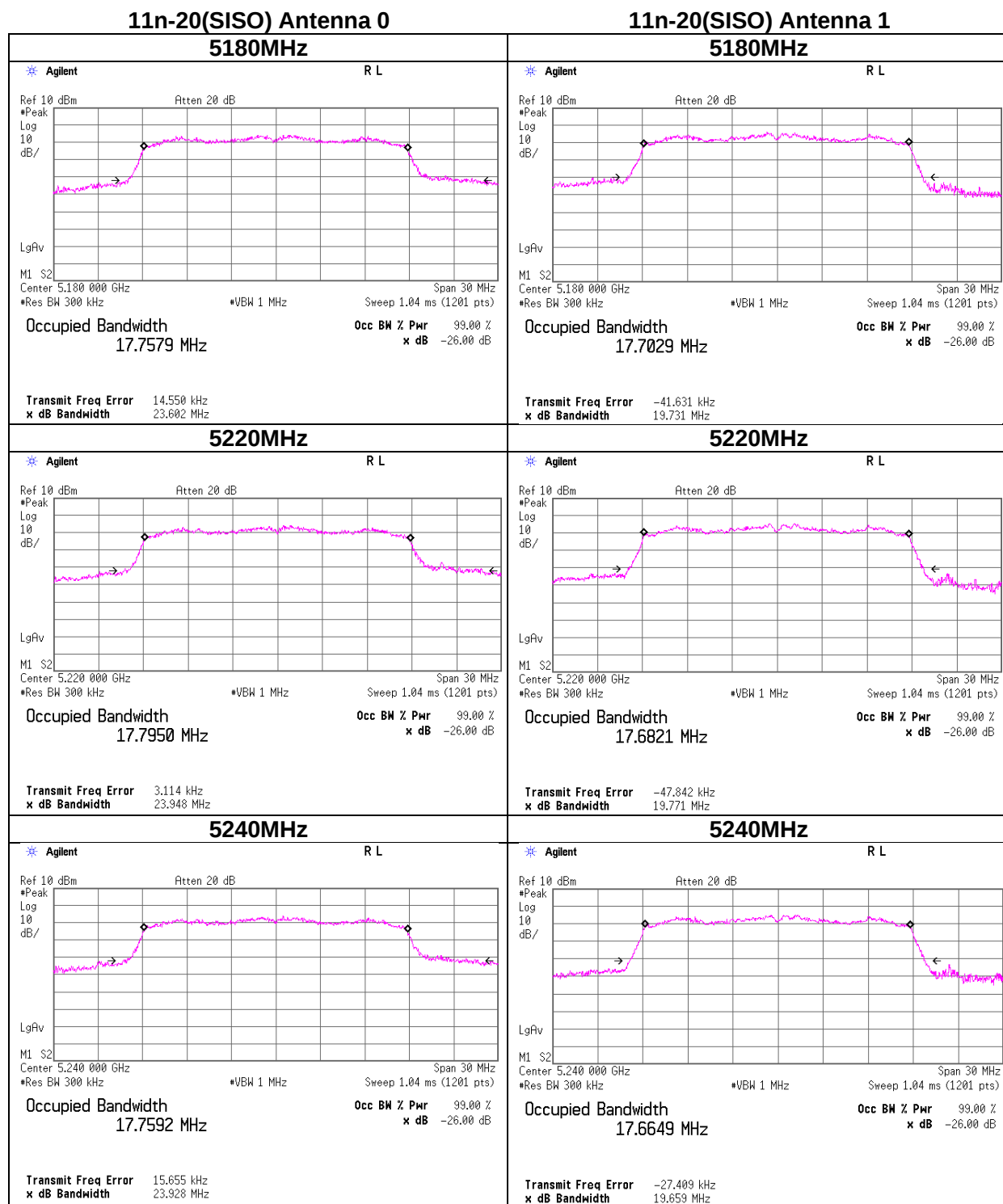
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Antenna	Frequency [MHz]	26dB Emission Bandwidth [MHz]	99% Occupied Bandwidth [MHz]	Limit [MHz]
0	5180	23.602	17.758	-
	5220	23.948	17.795	-
	5240	23.928	17.759	-
1	5180	19.731	17.703	-
	5220	19.771	17.682	-
	5240	19.659	17.665	-

99% BANDWIDTH



8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 33BE0378-HO
Date 09/28/2012
Temperature/ Humidity 23deg. C / 72% RH
Engineer Yutaka Yoshida
Mode 11n-20(SISO), Tx

Antenna 0						
Freq.	P/M	Cable	Atten.	Antenna	Result	Result
	Reading	Loss	Loss	Gain	(Cond.)	(e.i.r.p.)
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]
5180.0	1.24	1.25	10.10	1.23	12.59	13.82
5220.0	1.26	1.26	10.10	1.23	12.62	13.85
5240.0	1.25	1.27	10.10	1.23	12.62	13.85
Result(Cond.) = Reading + Cable Loss + Atten.Loss						
Result(e.i.r.p.) = Reading + Cable Loss + Atten.Loss + Antenna Gain						

Antenna 1

Freq.	P/M	Cable	Atten.	Antenna	Result	Result
	Reading	Loss	Loss	Gain	(Cond.)	(e.i.r.p.)
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]
5180.0	1.74	1.25	10.10	1.23	13.09	14.32
5220.0	1.13	1.26	10.10	1.23	12.49	13.72
5240.0	0.98	1.27	10.10	1.23	12.35	13.58
Result(Cond.) = Reading + Cable Loss + Atten.Loss						
Result(e.i.r.p.) = Reading + Cable Loss + Atten.Loss + Antenna Gain						

8.1.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 99% emission bandwidth for IC (26dB emission bandwidth for FCC) in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with KDB 789033 D01 UNII General Test Procedures v01 r01, and Method SA-1 was used.

RESULTS for Output Power

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	33BE0378-HO
Date	09/27/2012
Temperature/ Humidity	24deg. C / 70% RH
Engineer	Yutaka Yoshida
Mode	11n-20(SISO), Tx

For FCC

Antenna 0

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	2.18	1.25	10.10	1.23	13.53	14.76	16.98	-	3.45	-
5220.0	1.77	1.26	10.10	1.23	13.13	14.36	16.98	-	3.85	-
5240.0	1.63	1.27	10.10	1.23	13.00	14.23	16.98	-	3.98	-

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

15.407(a)(1) Limit(Cond.) = 16.98dBm(50mW) or 4 + 10log(26dB BW) dBm

15.407(a)(2) Limit(Cond.) = 23.97dBm(250mW) or 11 + 10log(26dB BW) dBm

Antenna 1

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	3.09	1.25	10.10	1.23	14.44	15.67	16.95	-	2.51	-
5220.0	2.61	1.26	10.10	1.23	13.97	15.20	16.96	-	2.99	-
5240.0	2.45	1.27	10.10	1.23	13.82	15.05	16.93	-	3.11	-

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

15.407(a)(1) Limit(Cond.) = 16.98dBm(50mW) or 4 + 10log(26dB BW) dBm

15.407(a)(2) Limit(Cond.) = 23.97dBm(250mW) or 11 + 10log(26dB BW) dBm

For IC

Antenna 0

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	2.18	1.25	10.10	1.23	13.53	14.76	-	22.49	-	7.73
5220.0	1.77	1.26	10.10	1.23	13.13	14.36	-	22.50	-	8.14
5240.0	1.63	1.27	10.10	1.23	13.00	14.23	-	22.49	-	8.26

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

A9.2(1) Limit(e.i.r.p.) = 23.01dBm(200mW) or 10 + 10log(99%OBW) dBm

A9.2(2) Limit(Cond.) = 23.97dBm(250mW) or 11 + 10log(99%OBW) dBm

A9.2(2) Limit(e.i.r.p.) = 30dBm(1W) or 17 + 10log(99%OBW) dBm

Antenna 1

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	3.09	1.25	10.10	1.23	14.44	15.67	-	22.48	-	6.81
5220.0	2.61	1.26	10.10	1.23	13.97	15.20	-	22.47	-	7.27
5240.0	2.45	1.27	10.10	1.23	13.82	15.05	-	22.47	-	7.42

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

A9.2(1) Limit(e.i.r.p.) = 23.01dBm(200mW) or 10 + 10log(99%OBW) dBm

A9.2(2) Limit(Cond.) = 23.97dBm(250mW) or 11 + 10log(99%OBW) dBm

A9.2(2) Limit(e.i.r.p.) = 30dBm(1W) or 17 + 10log(99%OBW) dBm

RESULTS for PPSPD

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	33BE0378-HO
Date	09/27/2012
Temperature/ Humidity	24deg. C / 70%
Engineer	Yutaka Yoshida
Mode	11n-20(SISO), Tx

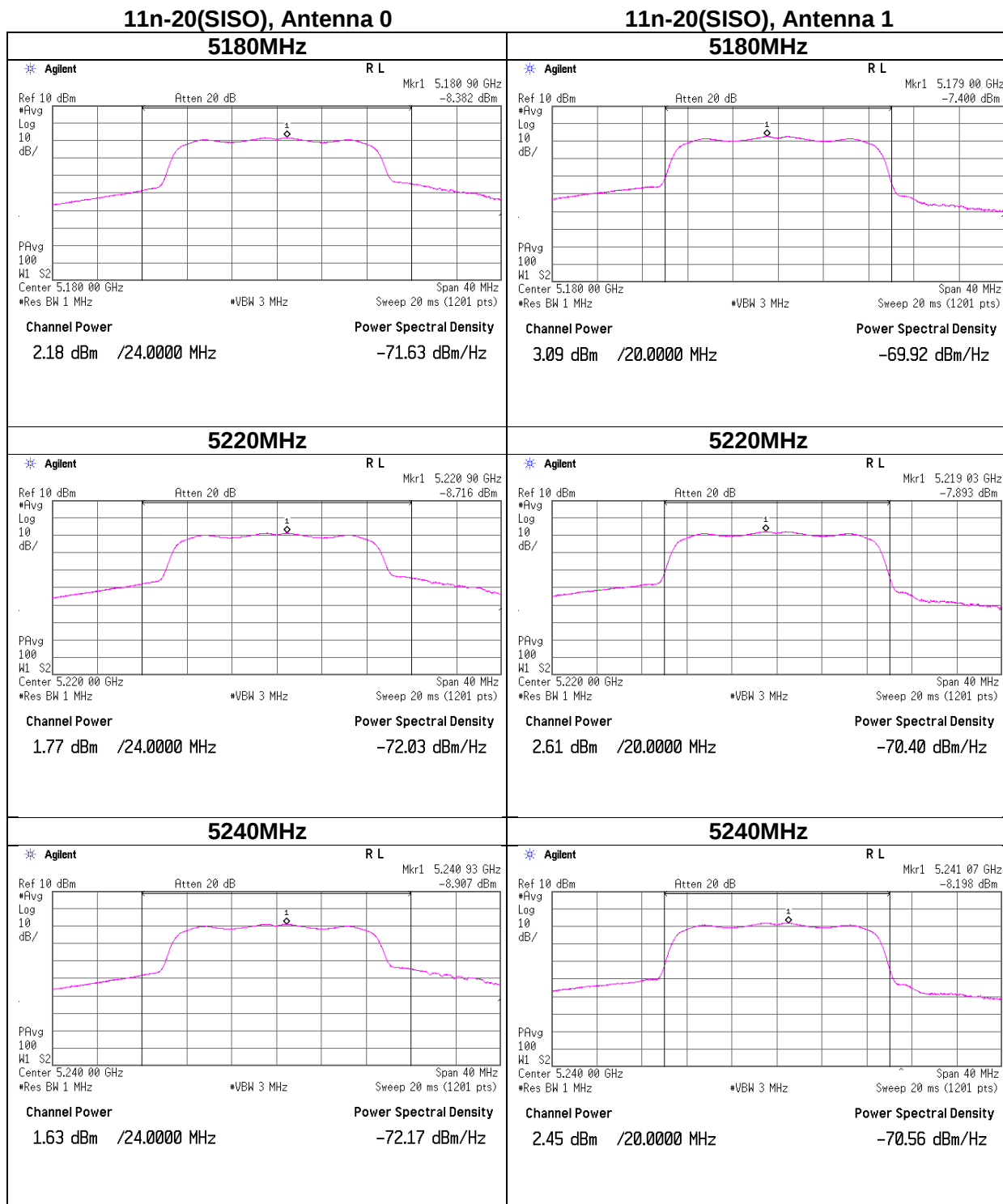
For FCC

Antenna 0						
Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss	Loss	(Cond.)	(Cond.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5180.0	-8.38	1.25	10.10	2.97	4.00	1.03
5220.0	-8.72	1.26	10.10	2.64	4.00	1.36
5240.0	-8.91	1.27	10.10	2.46	4.00	1.54
Result = Reading + Cable Loss + Attenuator						
Antenna 1						
Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss	Loss	(Cond.)	(Cond.)	
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5180.0	-7.40	1.25	10.10	3.95	4.00	0.05
5220.0	-7.89	1.26	10.10	3.47	4.00	0.53
5240.0	-8.20	1.27	10.10	3.17	4.00	0.83
Result = Reading + Cable Loss + Attenuator						

For IC

Antenna 0							
Freq.	Reading	Cable	Atten.	Antenna	Result	Limit	Margin
		Loss	Loss	Gain	(e.i.r.p.)	(e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]	[dB]
5180.0	-8.38	1.25	10.10	1.23	4.20	10.00	5.80
5220.0	-8.72	1.26	10.10	1.23	3.87	10.00	6.13
5240.0	-8.91	1.27	10.10	1.23	3.69	10.00	6.31
Result = Reading + Cable Loss + Attenuator + Antenna Gain(W52 only)							
Antenna 1							
Freq.	Reading	Cable	Atten.	Antenna	Result	Limit	Margin
		Loss	Loss	Gain	(e.i.r.p.)	(e.i.r.p.)	
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]	[dB]
5180.0	-7.40	1.25	10.10	1.23	5.18	10.00	4.82
5220.0	-7.89	1.26	10.10	1.23	4.70	10.00	5.30
5240.0	-8.20	1.27	10.10	1.23	4.40	10.00	5.60
Result = Reading + Cable Loss + Attenuator + Antenna Gain(W52 only)							

OUTPUT POWER AND PPSD



8.1.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The test is performed in accordance with KDB 789033 D01 UNII General Test Procedures v01 r01.

Since Method SA-1 was used for peak power measurements, Method SA-1 settings are used for the second PPSD trace.

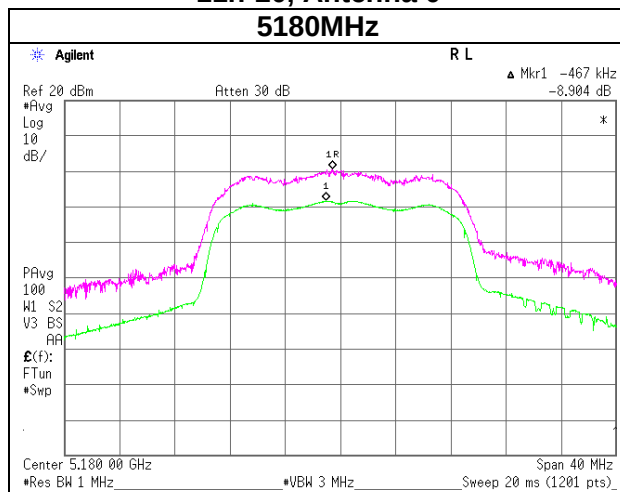
RESULTS

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	33BE0378-HO
Date	09/27/2012
Temperature/ Humidity	24deg. C / 70%
Engineer	Yutaka Yoshida
Mode	11n-20(SISO), Tx

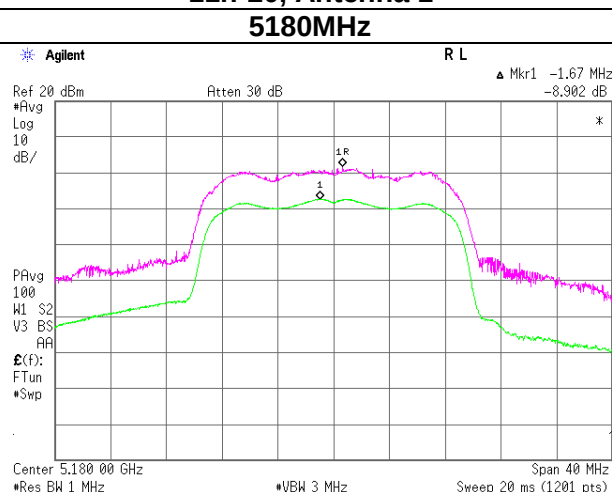
Antenna	Frequency [MHz]	Peak Power Excursion [dB]	Limit [dB]
0	5180	8.904	13.00
	5220	8.860	13.00
	5240	9.258	13.00
1	5180	8.902	13.00
	5220	9.348	13.00
	5240	8.746	13.00

PEAK EXCURSION

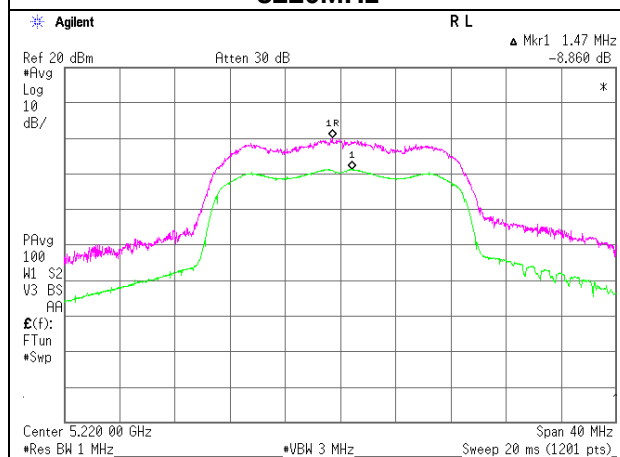
11n-20, Antenna 0
5180MHz



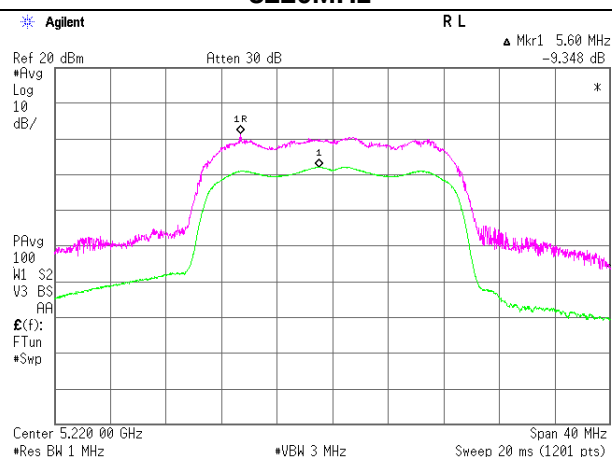
11n-20, Antenna 1
5180MHz



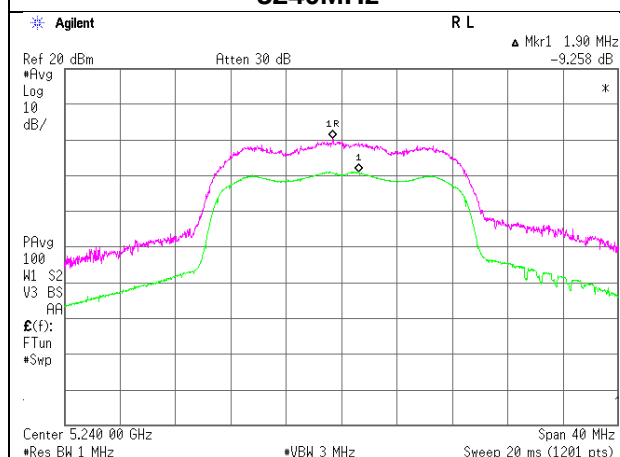
5220MHz



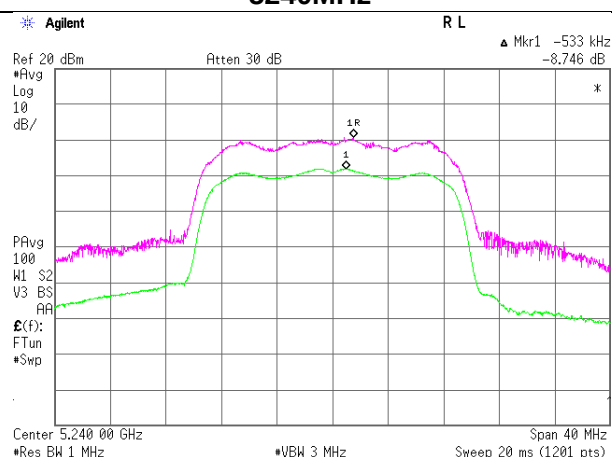
5220MHz



5240MHz



5240MHz



8.2. 802.11n HT20 MIMO MODE IN THE 5.2 GHz BAND

8.2.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only (this was measured just to determine the limit value of the output power)

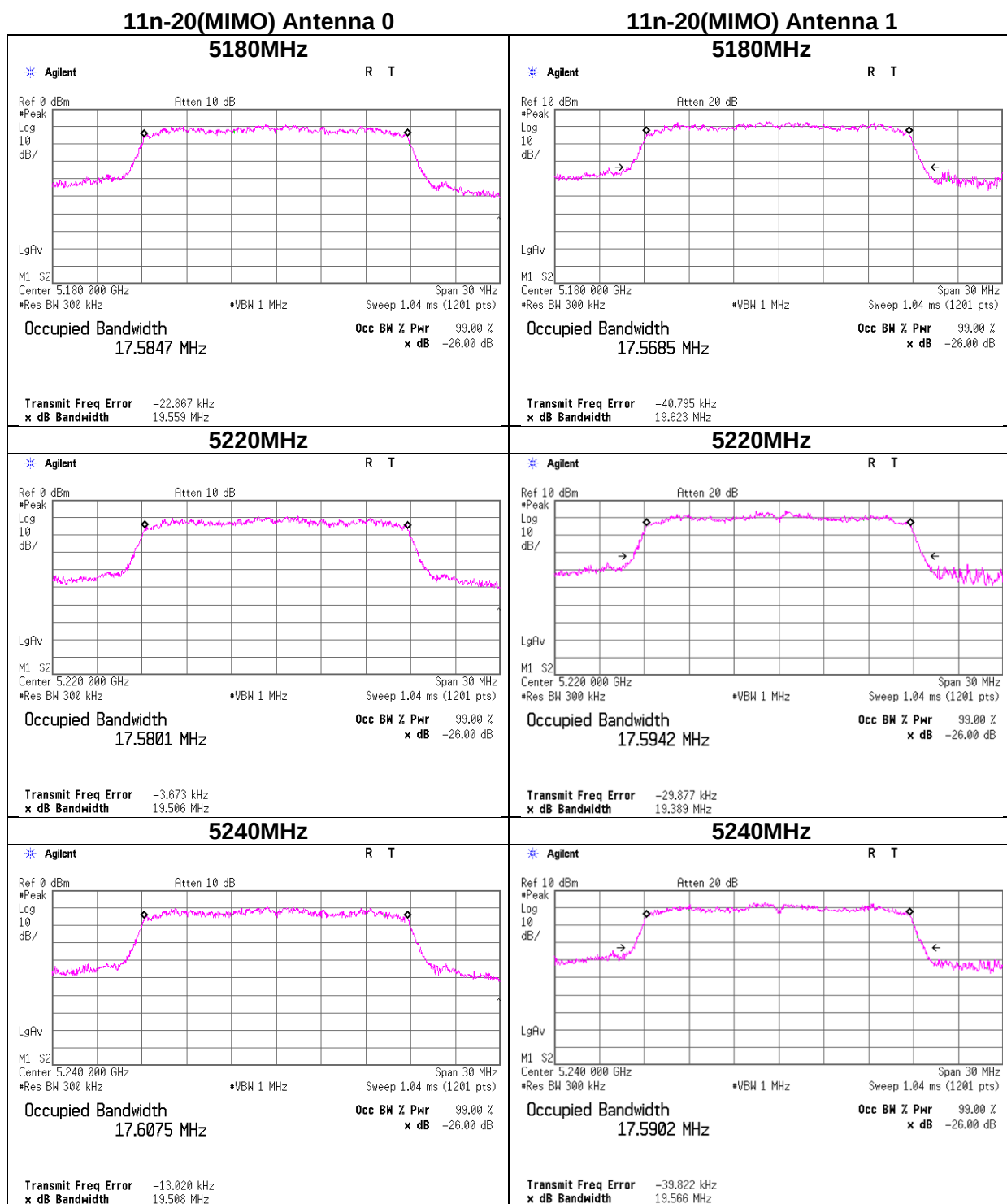
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Antenna	Frequency [MHz]	26dB Emission Bandwidth [MHz]	99% Occupied Bandwidth [MHz]	Limit [MHz]
0	5180	19.559	17.585	-
	5220	19.506	17.580	-
	5240	19.508	17.608	-
	5180	19.623	17.569	-
1	5220	19.389	17.594	-
	5240	19.566	17.590	-

26 dB BANDWIDTH



8.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only (this was measured just to determine the limit value of the output power)

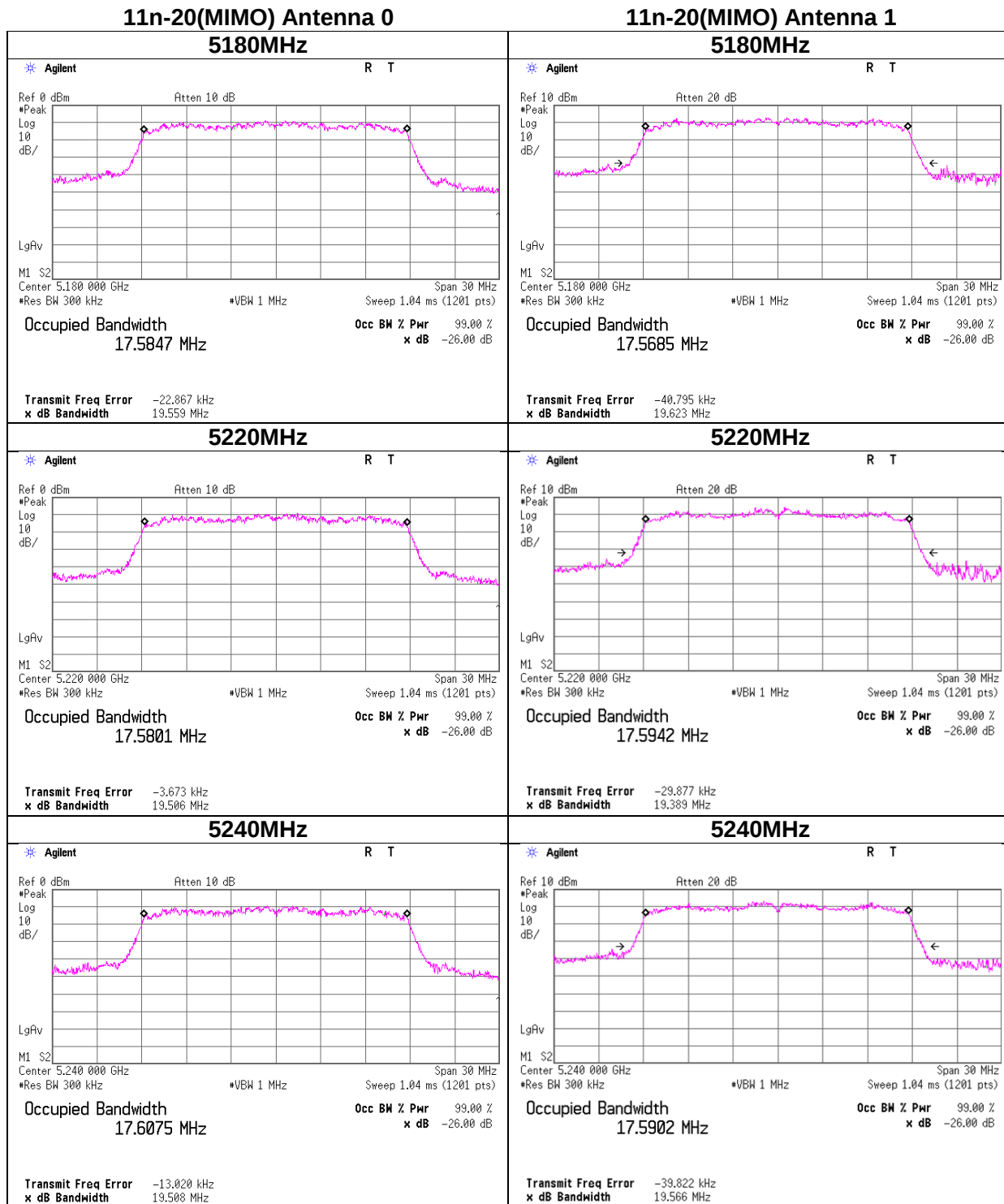
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

Antenna	Frequency [MHz]	26dB Emission Bandwidth [MHz]	99% Occupied Bandwidth [MHz]	Limit [MHz]
0	5180	19.559	17.585	-
	5220	19.506	17.580	-
	5240	19.508	17.608	-
1	5180	19.623	17.569	-
	5220	19.389	17.594	-
	5240	19.566	17.590	-

99% BANDWIDTH



8.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Test place	Head Office EMC Lab. No.11 Shielded Room
Report No.	33BE0378-HO
Date	10/22/2012
Temperature/ Humidity	22deg.C. / 57% RH
Engineer	Takumi Shimada
Mode	11n-20(MIMO) Tx, MCS 8

Antenna 0+1

Freq. [MHz]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	13.67	14.90
5220.0	13.80	15.03
5240.0	13.86	15.09

Result [dBm] = $10 \times \log(10^{\wedge}(\text{Antenna 1 Result [dBm]} / 10) + 10^{\wedge}(\text{Antenna 2 Result [dBm]} / 10))$

Antenna 0

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	-0.76	1.25	10.10	1.23	10.59	11.82
5220.0	-0.72	1.26	10.10	1.23	10.64	11.87
5240.0	-0.76	1.27	10.10	1.23	10.61	11.84

Antenna 1

Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]
5180.0	-0.62	1.25	10.10	1.23	10.73	11.96
5220.0	-0.42	1.26	10.10	1.23	10.94	12.17
5240.0	-0.29	1.27	10.10	1.23	11.08	12.31

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

8.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 99% emission bandwidth for IC (26dB emission bandwidth for FCC) in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with KDB 789033 D01 UNII General Test Procedures v01 r01, and Method SA-1 was used.

RESULTS for Output power

Test place Head Office EMC Lab. No.11 Measurement Room
Report No. 33BE0378-HO
Date 10/22/2012
Temperature/ Humidity 22deg.C. / 57% RH
Engineer Takumi Shimada
Mode 11n-20(MIMO) Tx

For FCC

Antenna 0+1

Freq. [MHz]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	14.33	15.56	16.96	-	2.63	-
5220.0	14.34	15.57	16.96	-	2.62	-
5240.0	14.41	15.64	16.96	-	2.55	-

Result [dBm] = $10 \times \log(10^{\wedge}(\text{Antenna 1 Result [dBm]} / 10) + 10^{\wedge}(\text{Antenna 2 Result [dBm]} / 10))$

Antenna 0

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	-0.10	1.25	10.10	1.23	11.25	12.48	16.96	-	5.71	-
5220.0	-0.18	1.26	10.10	1.23	11.18	12.41	16.96	-	5.78	-
5240.0	-0.11	1.27	10.10	1.23	11.26	12.49	16.96	-	5.70	-

Antenna 1

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	0.04	1.25	10.10	1.23	11.39	12.62	16.96	-	5.57	-
5220.0	0.11	1.26	10.10	1.23	11.47	12.70	16.96	-	5.49	-
5240.0	0.16	1.27	10.10	1.23	11.53	12.76	16.96	-	5.43	-

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

15.407(a)(1) Limit(Cond.) = 16.98dBm(50mW) or $4 + 10\log(26\text{dB BW})$ dBm

15.407(a)(2) Limit(Cond.) = 23.97dBm(250mW) or $11 + 10\log(26\text{dB BW})$ dBm

For IC

Antenna 0+1

Freq. [MHz]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	14.33	15.56	-	22.58	-	7.02
5220.0	14.34	15.57	-	22.59	-	7.02
5240.0	14.41	15.64	-	22.59	-	6.95

Result [dBm] = $10 \times \log(10^{\wedge}(\text{Antenna 1 Result [dBm]} / 10) + 10^{\wedge}(\text{Antenna 2 Result [dBm]} / 10))$

Antenna 0

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	-0.10	1.25	10.10	1.23	11.25	12.48	-	22.58	-	10.10
5220.0	-0.18	1.26	10.10	1.23	11.18	12.41	-	22.59	-	10.18
5240.0	-0.11	1.27	10.10	1.23	11.26	12.49	-	22.59	-	10.10

Antenna 1

Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (e.i.r.p.) [dBm]	Limit (Cond.) [dBm]	Limit (e.i.r.p.) [dBm]	Margin (Cond.) [dB]	Margin (e.i.r.p.) [dB]
5180.0	0.04	1.25	10.10	1.23	11.39	12.62	-	22.58	-	9.96
5220.0	0.11	1.26	10.10	1.23	11.47	12.70	-	22.59	-	9.89
5240.0	0.16	1.27	10.10	1.23	11.53	12.76	-	22.59	-	9.83

Result(Cond.) = Reading + Cable Loss + Atten.Loss

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

A9.2(1) Limit(e.i.r.p.) = 23.01dBm(200mW) or $10 + 10\log(99\%OBW)$ dBm

A9.2(2) Limit(Cond.) = 23.97dBm(250mW) or $11 + 10\log(99\%OBW)$ dBm

A9.2(2) Limit(e.i.r.p.) = 30dBm(1W) or $17 + 10\log(99\%OBW)$ dBm

RESULTS for PPST

Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 33BE0378-HO
Date 09/10/2012
Temperature/ Humidity 25deg. C / 67% RH
Engineer Takayuki Shimada
Mode 11n-20(MIMO), Tx

For FCC

Antenna 0+1

Freq.	Result	Limit	Margin
[MHz]	[dBm]	[dBm]	[dB]
5180.0	3.81	4.00	0.19
5220.0	3.79	4.00	0.21
5240.0	3.88	4.00	0.12

Result [dBm] = $10 \times \log(10^{\wedge}(\text{Antenna 0 Result [dBm]} / 10) + 10^{\wedge}(\text{Antenna 1 Result [dBm]} / 10))$

Antenna 0

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5180.0	-10.62	1.25	10.10	0.73	4.00	3.27
5220.0	-10.69	1.26	10.10	0.67	4.00	3.33
5240.0	-10.64	1.27	10.10	0.73	4.00	3.27

Antenna 1

Freq.	Reading	Cable Loss	Atten.	Result	Limit	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5180.0	-10.48	1.25	10.10	0.87	4.00	3.13
5220.0	-10.47	1.26	10.10	0.89	4.00	3.11
5240.0	-10.36	1.27	10.10	1.01	4.00	2.99

Result = Reading + Cable Loss + Attenuator

For IC

Antenna 0+1

Freq.	Result (e.i.r.p.)	Limit (e.i.r.p.)	Margin
[MHz]	[dBm]	[dBm]	[dB]
5180.0	5.04	10.00	4.96
5220.0	5.02	10.00	4.98
5240.0	5.11	10.00	4.89

Result [dBm] = Antenna 0 Result(Cond.) + Antenna 1 Result(Cond.) + Antenna Gain

Antenna 0

Freq.	Reading	Cable Loss	Atten.	Antenna Gain	Result (Cond.)	Result (e.i.r.p.)	Limit (e.i.r.p.)	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]	[dBm]	[dB]
5180.0	-10.62	1.25	10.10	1.23	0.73	1.96	10.00	8.04
5220.0	-10.69	1.26	10.10	1.23	0.67	1.90	10.00	8.10
5240.0	-10.64	1.27	10.10	1.23	0.73	1.96	10.00	8.04

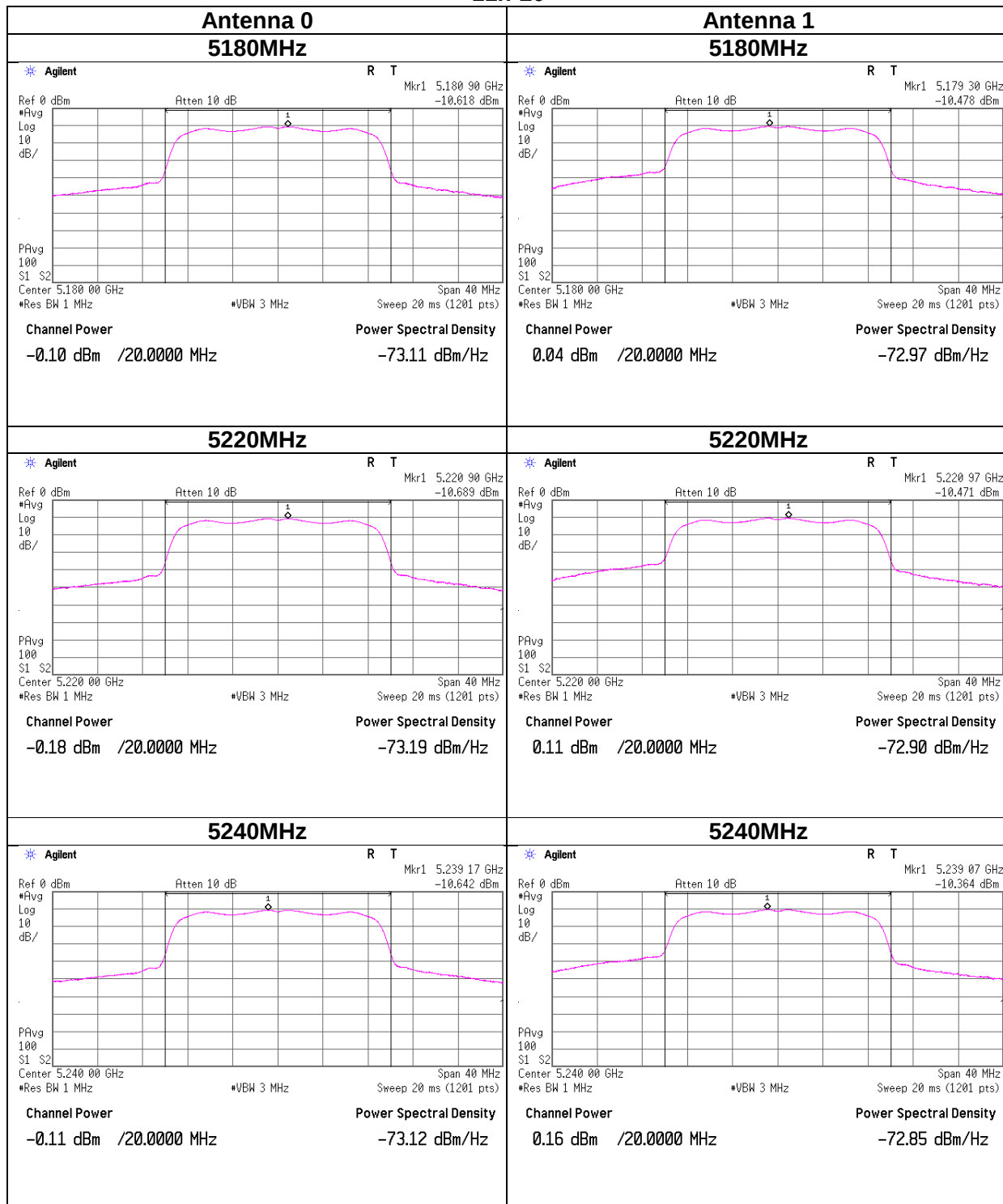
Antenna 1

Freq.	Reading	Cable Loss	Atten.	Antenna Gain	Result (Cond.)	Result (e.i.r.p.)	Limit (e.i.r.p.)	Margin
[MHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[dBm]	[dBm]	[dB]
5180.0	-10.48	1.25	10.10	1.23	0.87	2.10	10.00	7.90
5220.0	-10.47	1.26	10.10	1.23	0.89	2.12	10.00	7.88
5240.0	-10.36	1.27	10.10	1.23	1.01	2.24	10.00	7.76

Result = Reading + Cable Loss + Attenuator + Antenna Gain(W52 only)

*ON time was only measured using Gate function.

11n-20



8.2.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The test is performed in accordance with KDB 789033 D01 UNII General Test Procedures v01 r01.

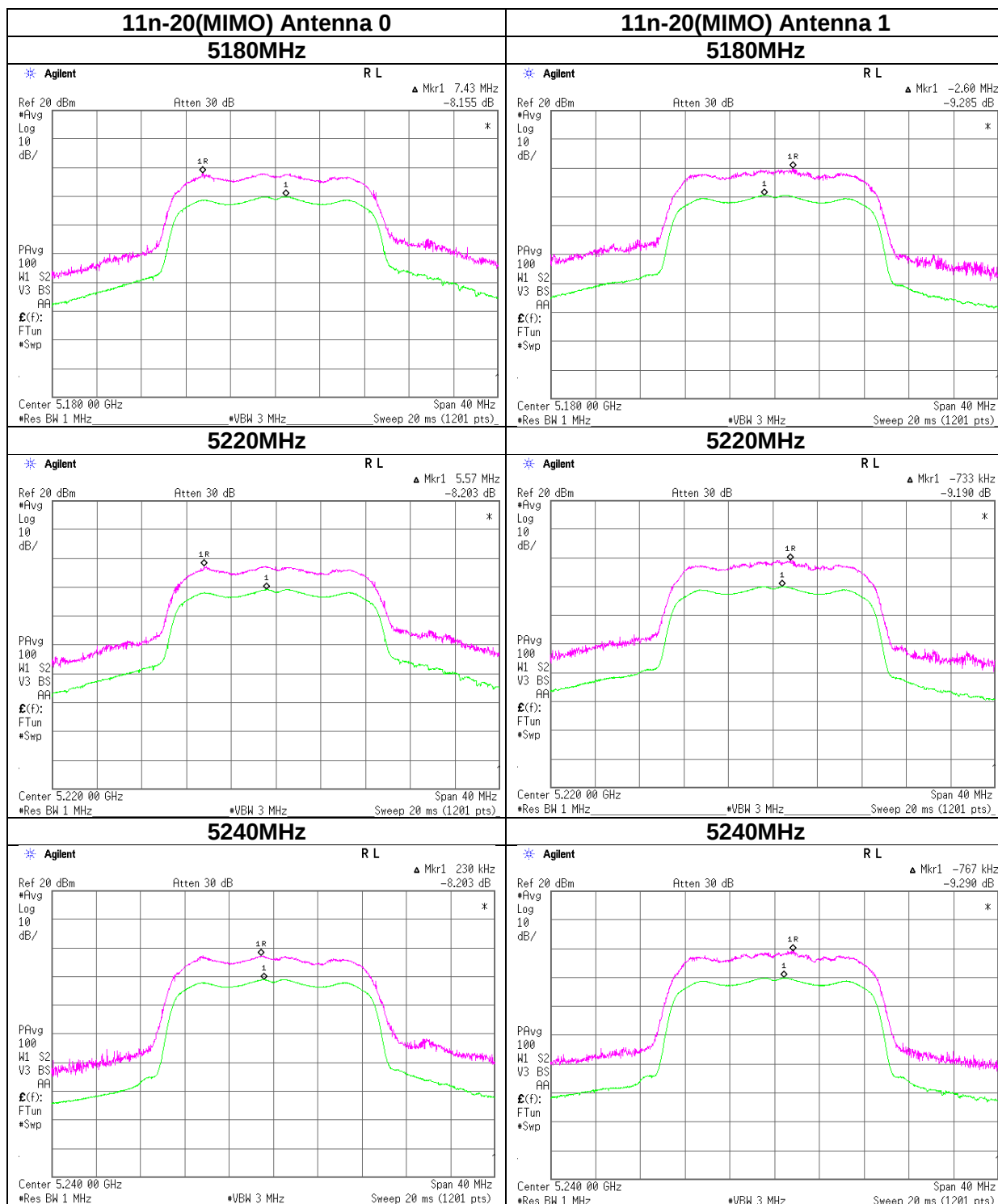
Since Method SA-1 was used for peak power measurements, Method SA-1 settings are used for the second PPSD trace.

RESULTS

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	33BE0378-HO
Date	09/27/2013
Temperature/ Humidity	24deg. C / 70% RH
Engineer	Yutaka Yoshida
Mode	11n-20(MIMO) Tx, MCS 8

Antenna	Frequency [MHz]	Peak Power Excursion [dB]	Limit [dB]
0	5180	8.155	13.00
	5220	8.203	13.00
	5240	8.203	13.00
1	5180	9.285	13.00
	5220	9.190	13.00
	5240	9.290	13.00

PEAK EXCURSION



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 7.2.5 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (μ V/m) at 3 m	Field Strength Limit (dB μ V/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and to minimum VBW for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

9.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

9.2.1. 802.11n HT20 SISO MODE IN THE LOWER 5.2 GHz BAND

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5180MHz ANT0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	1595.383	PK	59.0	25.4	1.8	33.4	0.0	52.8	73.9	21.1	Inside	
Hori	3453.360	PK	50.3	28.7	2.7	31.9	0.0	49.8	68.2	18.4	Outside	
Hori	5150.000	PK	58.6	32.4	3.4	31.4	0.0	63.0	68.2	5.2	Bandedge	
Hori	10360.000	PK	50.0	39.7	-2.2	34.4	0.0	53.1	68.2	15.1	Outside	
Hori	15540.000	PK	52.3	38.7	-0.6	33.1	0.0	57.3	73.9	16.6	Inside	
Hori	1595.383	AV	33.5	25.4	1.8	33.4	0.0	27.3	53.9	26.6	Inside	
Hori	5150.000	AV	42.2	32.4	3.4	31.4	0.0	46.6	53.9	7.3	Bandedge	
Hori	15540.000	AV	42.6	38.7	-0.6	33.1	0.0	47.6	53.9	6.3	Inside	
Vert	1595.385	PK	62.9	25.4	1.8	33.4	0.0	56.7	73.9	17.2	Inside	
Vert	3453.319	PK	47.3	28.7	2.7	31.9	0.0	46.8	68.2	21.4	Outside	
Vert	5150.000	PK	57.8	32.4	3.4	31.4	0.0	62.2	68.2	6.0	Bandedge	
Vert	10360.000	PK	55.6	39.7	-2.2	34.4	0.0	58.7	68.2	9.5	Outside	
Vert	15540.000	PK	52.1	38.7	-0.6	33.1	0.0	57.1	73.9	16.8	Inside	
Vert	1595.385	AV	34.7	25.4	1.8	33.4	0.0	28.5	53.9	25.4	Inside	
Vert	5150.000	AV	42.4	32.4	3.4	31.4	0.0	46.8	53.9	7.1	Bandedge	
Vert	15540.000	AV	42.6	38.7	-0.6	33.1	0.0	47.6	53.9	6.3	Inside	

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 have 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

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5220MHz ANT0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	1595.700	PK	53.2	25.4	1.8	33.4	0.0	47.0	73.9	26.9	Inside	
Hori	3480.087	PK	47.3	28.7	2.7	31.9	0.0	46.8	68.2	21.4	Outside	
Hori	10440.000	PK	51.4	39.7	-2.2	34.3	0.0	54.6	68.2	13.6	Outside	
Hori	1595.700	AV	32.4	25.4	1.8	33.4	0.0	26.2	53.9	27.7	Inside	
Vert	1595.674	PK	60.2	25.4	1.8	33.4	0.0	54.0	73.9	19.9	Inside	
Vert	3480.090	PK	45.6	28.7	2.7	31.9	0.0	45.1	68.2	23.1	Outside	
Vert	10440.000	PK	53.2	39.7	-2.2	34.3	0.0	56.4	68.2	11.8	Outside	
Vert	1595.674	AV	36.3	25.4	1.8	33.4	0.0	30.1	53.9	23.8	Inside	

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 have 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

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5240MHz ANT0

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	1596.458	PK	59.4	25.4	1.8	33.4	0.0	53.2	73.9	20.7	Inside	
Hori	3493.268	PK	47.5	28.7	2.8	31.9	0.0	47.1	68.2	21.1	Outside	
Hori	5350.000	PK	46.1	32.5	3.4	31.4	0.0	50.6	68.2	17.6	Bandedge	
Hori	10480.000	PK	55.1	39.8	-2.2	34.3	0.0	58.4	68.2	9.8	Outside	
Hori	15720.000	PK	53.6	38.2	-0.5	33.3	0.0	58.0	73.9	15.9	Inside	
Hori	1596.458	AV	32.8	25.4	1.8	33.4	0.0	26.6	53.9	27.3	Inside	
Hori	5350.000	AV	35.8	32.5	3.4	31.4	0.0	40.3	53.9	13.6	Bandedge	
Hori	15720.000	AV	42.0	38.2	-0.5	33.3	0.0	46.4	53.9	7.5	Inside	
Vert	1595.039	PK	61.4	25.4	1.8	33.4	0.0	55.2	73.9	18.7	Inside	
Vert	3493.883	PK	43.2	28.7	2.8	31.9	0.0	42.8	68.2	25.4	Outside	
Vert	5350.000	PK	43.4	32.5	3.4	31.4	0.0	47.9	68.2	20.3	Bandedge	
Vert	10480.000	PK	52.5	39.8	-2.2	34.3	0.0	55.8	68.2	12.4	Outside	
Vert	15720.000	PK	49.0	38.2	-0.5	33.3	0.0	53.4	73.9	20.5	Inside	
Vert	1595.039	AV	37.0	25.4	1.8	33.4	0.0	30.8	53.9	23.1	Inside	
Vert	5350.000	AV	31.4	32.5	3.4	31.4	0.0	35.9	53.9	18.0	Bandedge	
Vert	15720.000	AV	39.2	38.2	-0.5	33.3	0.0	43.6	53.9	10.3	Inside	

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 have 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

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5180MHz ANT1

Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
1596.250	PK	59.5	25.4	1.8	33.4	0.0	53.3	73.9	20.6	Inside	
3453.405	PK	47.5	28.7	2.7	31.9	0.0	47.0	68.2	21.2	Outside	
5150.000	PK	58.3	32.4	3.4	31.4	0.0	62.7	68.2	5.5	Bandedge	
10360.000	PK	51.5	39.7	-2.2	34.4	0.0	54.6	68.2	13.6	Outside	
1596.250	AV	32.7	25.4	1.8	33.4	0.0	26.5	53.9	27.4	Inside	
5150.000	AV	41.7	32.4	3.4	31.4	0.0	46.1	53.9	7.8	Bandedge	
1595.152	PK	56.4	25.4	1.8	33.4	0.0	50.2	73.9	23.7	Inside	
3453.300	PK	44.7	28.7	2.7	31.9	0.0	44.2	68.2	24.0	Outside	
5150.000	PK	56.7	32.4	3.4	31.4	0.0	61.1	68.2	7.1	Bandedge	
10360.000	PK	54.1	39.7	-2.2	34.4	0.0	57.2	68.2	11.0	Outside	
1595.152	AV	33.9	25.4	1.8	33.4	0.0	27.7	53.9	26.2	Inside	
5150.000	AV	40.7	32.4	3.4	31.4	0.0	45.1	53.9	8.8	Bandedge	

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

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

i harmonic was not seen so the result was its base noise level.

Factor: 10GHz-26.5GHz $20\log(3.0\text{m}/1.0\text{m})= 9.5\text{dB}$

26.5GHz-40GHz $20\log(3.0\text{m}/0.5\text{m})=15.6\text{dB}$

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5220MHz ANT1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	1595.933	PK	56.3	25.4	1.8	33.4	0.0	50.1	73.9	23.8	Inside	
Hori	3480.070	PK	46.4	28.7	2.7	31.9	0.0	45.9	68.2	22.3	Outside	
Hori	10440.000	PK	43.3	39.7	-2.2	34.3	0.0	46.5	68.2	21.7	Outside	
Hori	1595.933	AV	33.2	25.4	1.8	33.4	0.0	27.0	53.9	26.9	Inside	
Vert	1594.060	PK	60.6	25.4	1.8	33.4	0.0	54.4	73.9	19.5	Inside	
Vert	3480.033	PK	43.1	28.7	2.7	31.9	0.0	42.6	68.2	25.6	Outside	
Vert	10440.000	PK	48.7	39.7	-2.2	34.3	0.0	51.9	68.2	16.3	Outside	
Vert	1594.060	AV	34.8	25.4	1.8	33.4	0.0	28.6	53.9	25.3	Inside	

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 have 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

Test place Head Office EMC Lab. No.2 and 3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/01/2012 10/10/2012
Temperature/ Humidity 20deg. C / 69% 23deg. C / 47%
Engineer Shinya Watanabe Takumi Shimada
(10-26.5GHz) (1-10GHz)
Mode 11n-20(SISO) Tx 5240MHz ANT1

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	1595.048	PK	61.4	25.4	1.8	33.4	0.0	55.2	73.9	18.7	Inside	
Hori	3493.363	PK	47.0	28.7	2.8	31.9	0.0	46.6	68.2	21.6	Outside	
Hori	5350.000	PK	42.1	32.5	3.4	31.4	0.0	46.6	68.2	21.6	Bandedge	
Hori	10480.000	PK	49.7	39.8	-2.2	34.3	0.0	53.0	68.2	15.2	Outside	
Hori	1595.048	AV	32.9	25.4	1.8	33.4	0.0	26.7	53.9	27.2	Inside	
Hori	5350.000	AV	32.7	32.5	3.4	31.4	0.0	37.2	53.9	16.7	Bandedge	
Vert	1594.505	PK	61.0	25.4	1.8	33.4	0.0	54.8	73.9	19.1	Inside	
Vert	3493.261	PK	44.3	28.7	2.8	31.9	0.0	43.9	68.2	24.3	Outside	
Vert	5350.000	PK	42.0	32.5	3.4	31.4	0.0	46.5	68.2	21.7	Bandedge	
Vert	10480.000	PK	50.6	39.8	-2.2	34.3	0.0	53.9	68.2	14.3	Outside	
Vert	1594.505	AV	34.5	25.4	1.8	33.4	0.0	28.3	53.9	25.6	Inside	
Vert	5350.000	AV	32.5	32.5	3.4	31.4	0.0	37.0	53.9	16.9	Bandedge	

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 have 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

9.2.2. 802.11n HT20 MIMO MODE IN THE LOWER 5.2 GHz BAND

Test place Head Office EMC Lab. No.3 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/22/2012
Temperature/ Humidity 23deg.C. / 47% RH
Engineer Takumi Shimada
(1-26.5GHz)
Mode 11n-20(MIMO) Tx 5180MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	3453.349	PK	51.1	28.7	2.7	31.9	0.0	50.6	68.2	17.6	Outside	
Hori	5150.000	PK	55.9	32.4	3.4	31.4	0.0	60.3	68.2	7.9	Bandedge	
Hori	10360.000	PK	52.8	39.1	-2.5	33.2	0.0	56.2	68.2	12.0	Outside	
Hori	15540.000	PK	43.3	39.1	-0.7	32.3	0.0	49.4	73.9	24.5	Inside	
Hori	5150.000	AV	43.5	32.4	3.4	31.4	0.0	47.9	53.9	6.0	Bandedge	
Hori	15540.000	AV	33.1	39.1	-0.7	32.3	0.0	39.2	53.9	14.7	Inside	
Vert	3452.043	PK	47.6	28.7	2.7	31.9	0.0	47.1	68.2	21.1	Outside	
Vert	5150.000	PK	53.3	32.4	3.4	31.4	0.0	57.7	68.2	10.5	Bandedge	
Vert	10360.000	PK	52.3	39.1	-2.5	33.2	0.0	55.7	68.2	12.5	Outside	
Vert	15540.000	PK	43.3	39.1	-0.7	32.3	0.0	49.4	73.9	24.5	Inside	
Vert	5150.000	AV	40.0	32.4	3.4	31.4	0.0	44.4	53.9	9.5	Bandedge	
Vert	15540.000	AV	33.2	39.1	-0.7	32.3	0.0	39.3	53.9	14.6	Inside	

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 have 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

Test place Head Office EMC Lab. No.2 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/22/2012
Temperature/ Humidity 23deg.C. / 47% RH
Engineer Takumi Shimada
(1-26.5GHz)
Mode 11n-20(MIMO) Tx 5220MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	3480.059	PK	49.0	28.7	2.7	31.9	0.0	48.5	68.2	19.7	Outside	
Hori	10440.000	PK	50.4	39.2	-2.4	33.2	0.0	54.0	68.2	14.2	Outside	
Hori	15660.000	PK	44.3	38.7	-0.8	32.3	0.0	49.9	73.9	24.0	Inside	
Hori	15660.000	AV	32.8	38.7	-0.8	32.3	0.0	38.4	53.9	15.5	Inside	
Vert	3480.037	PK	46.7	28.7	2.7	31.9	0.0	46.2	68.2	22.0	Outside	
Vert	10440.000	PK	49.3	39.2	-2.4	33.2	0.0	52.9	68.2	15.3	Outside	
Vert	15660.000	PK	44.7	38.7	-0.8	32.3	0.0	50.3	73.9	23.6	Inside	
Vert	15660.000	AV	32.7	38.7	-0.8	32.3	0.0	38.3	53.9	15.6	Inside	

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 have enough margin (more than 20dB).

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

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

Test place Head Office EMC Lab. No.2 Anechoic Chamber
Report No. 33BE0378-HO
Date 10/22/2012
Temperature/ Humidity 23deg.C. / 47% RH
Engineer Takumi Shimada
(1-26.5GHz)
Mode 11n-20(MIMO) Tx 5240MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Inside or Outside of Restricted Bands	Remark
Hori	3493.472	PK	53.1	28.7	2.8	31.9	0.0	52.7	68.2	15.5	Outside	
Hori	5350.000	PK	46.8	32.5	3.4	31.4	0.0	51.3	68.2	16.9	Bandedge	
Hori	10480.000	PK	48.9	39.2	-2.4	33.2	0.0	52.5	68.2	15.7	Outside	
Hori	15720.000	PK	44.4	38.6	-0.8	32.3	0.0	49.9	73.9	24.0	Inside	
Hori	5350.000	AV	36.1	32.5	3.4	31.4	0.0	40.6	53.9	13.3	Bandedge	
Hori	15720.000	AV	32.8	38.6	-0.8	32.3	0.0	38.3	53.9	15.6	Inside	
Vert	3493.367	PK	47.4	28.7	2.8	31.9	0.0	47.0	68.2	21.2	Outside	
Vert	5350.000	PK	41.1	32.5	3.4	31.4	0.0	45.6	68.2	22.6	Bandedge	
Vert	10480.000	PK	48.3	39.2	-2.4	33.2	0.0	51.9	68.2	16.3	Outside	
Vert	15720.000	PK	44.6	38.6	-0.8	32.3	0.0	50.1	73.9	23.8	Inside	
Vert	5350.000	AV	29.2	32.5	3.4	31.4	0.0	33.7	53.9	20.2	Bandedge	
Vert	15720.000	AV	32.7	38.6	-0.8	32.3	0.0	38.2	53.9	15.7	Inside	

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 have 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 $20\log(3.0m/0.5m)=15.6dB$

9.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL AND VERTICAL DATA										
SISO Antenna0										
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	128.450	QP	33.1	13.7	8.4	32.0	23.2	43.5	20.3	
Vert	165.460	QP	29.4	15.6	8.7	32.0	21.7	43.5	21.8	
SISO Antenna1										
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	128.620	QP	33.3	13.7	8.4	32.0	23.4	43.5	20.1	
Vert	165.752	QP	29.0	15.6	8.7	32.0	21.3	43.5	22.2	
MIMO Antenna0+1										
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	124.610	QP	34.4	13.7	8.4	32.0	24.1	43.5	19.4	
Vert	164.722	QP	30.5	15.6	8.7	32.0	22.8	43.5	20.7	

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [*]	56 to 46 [*]
0.5-5	56	46
5-30	60	50

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

RESULTS

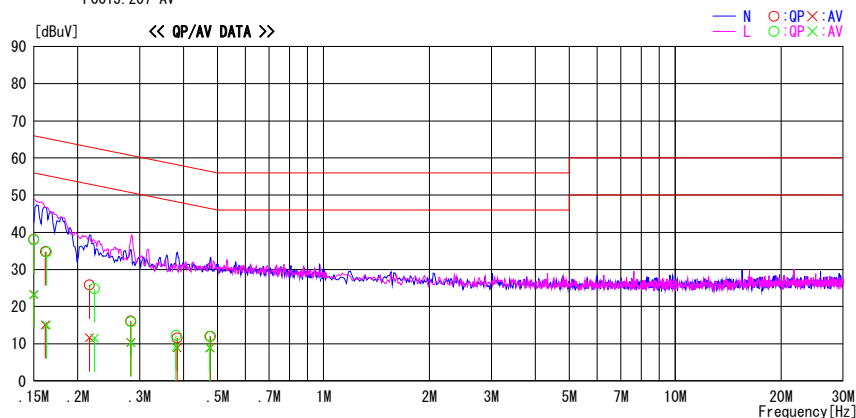
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-HO
Power : AC 120V / 60Hz (DC 3.3V)
Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

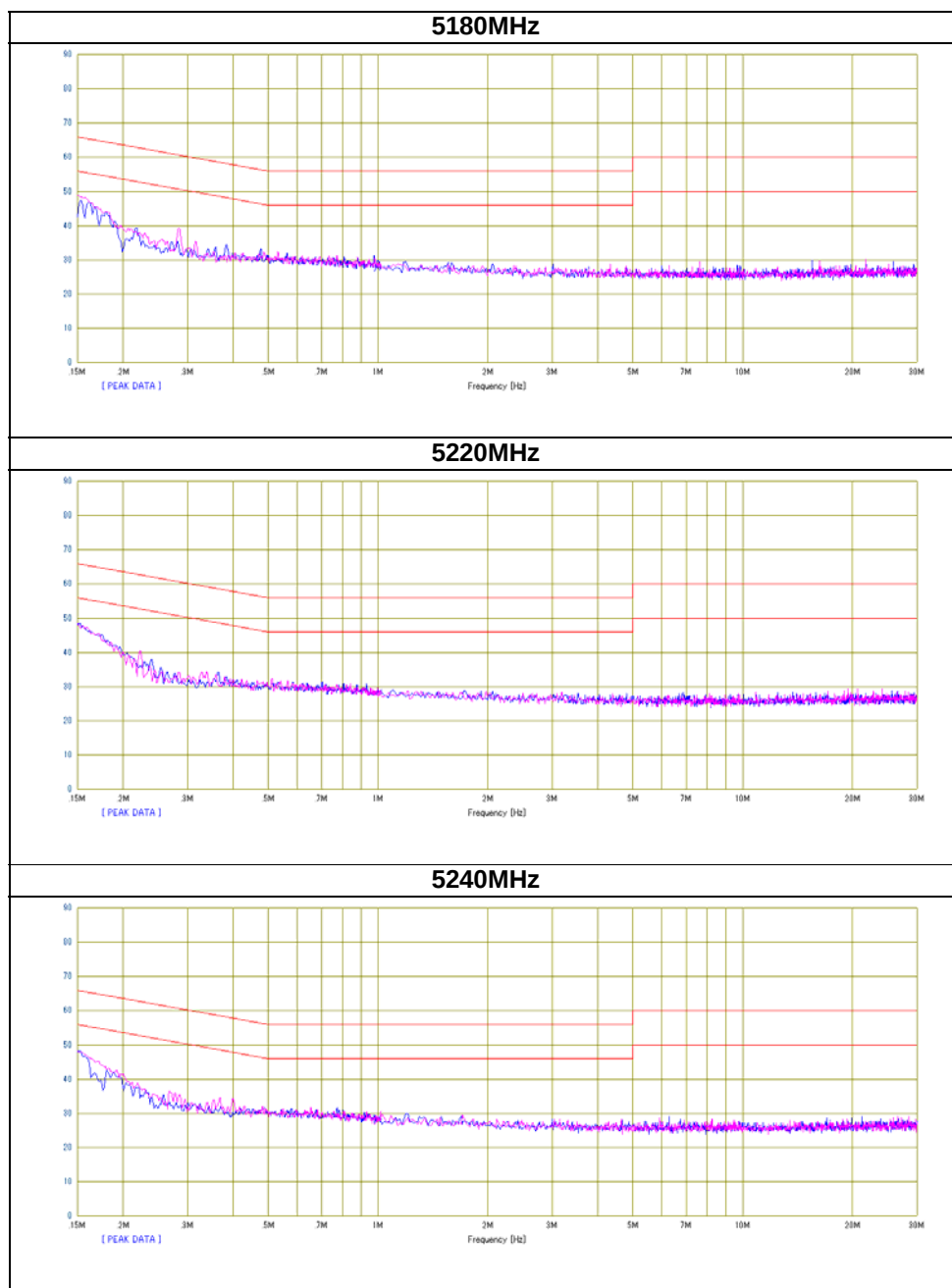
Mode / Remarks : Tx 11n-20 SISO ANTO 5180MHz MCS0

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]		
0.15000	24.8	9.9	13.3	38.1	23.2	66.0	56.0	27.9	32.8	N	
0.16182	21.5	1.8	13.3	34.8	15.1	65.4	55.4	30.6	40.3	N	
0.21604	12.5	-1.7	13.3	25.8	11.6	63.0	53.0	37.2	41.4	N	
0.28295	2.8	-3.0	13.3	16.1	10.3	60.7	50.7	44.6	40.4	N	
0.38345	-1.8	-4.5	13.4	11.6	8.9	58.2	48.2	46.6	39.3	N	
0.47625	-1.4	-4.5	13.4	12.0	8.9	56.4	46.4	44.4	37.5	N	
0.15000	24.7	9.9	13.3	38.0	23.2	66.0	56.0	28.0	32.8	L	
0.16308	21.4	1.7	13.3	34.7	15.0	65.3	55.3	30.6	40.3	L	
0.22331	11.5	-1.8	13.3	24.8	11.5	62.7	52.7	37.9	41.2	L	
0.28365	2.6	-3.0	13.3	15.9	10.3	60.7	50.7	44.8	40.4	L	
0.38055	-1.2	-4.3	13.4	12.2	9.1	58.3	48.3	46.1	39.2	L	
0.47480	-1.4	-4.5	13.4	12.0	8.9	56.4	46.4	44.4	37.5	L	

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



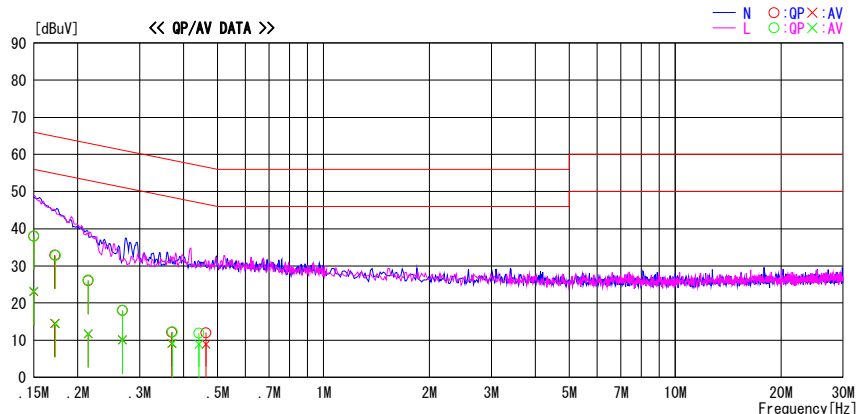
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-HO
Power : AC 120V / 60Hz (DC 3.3V)
Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

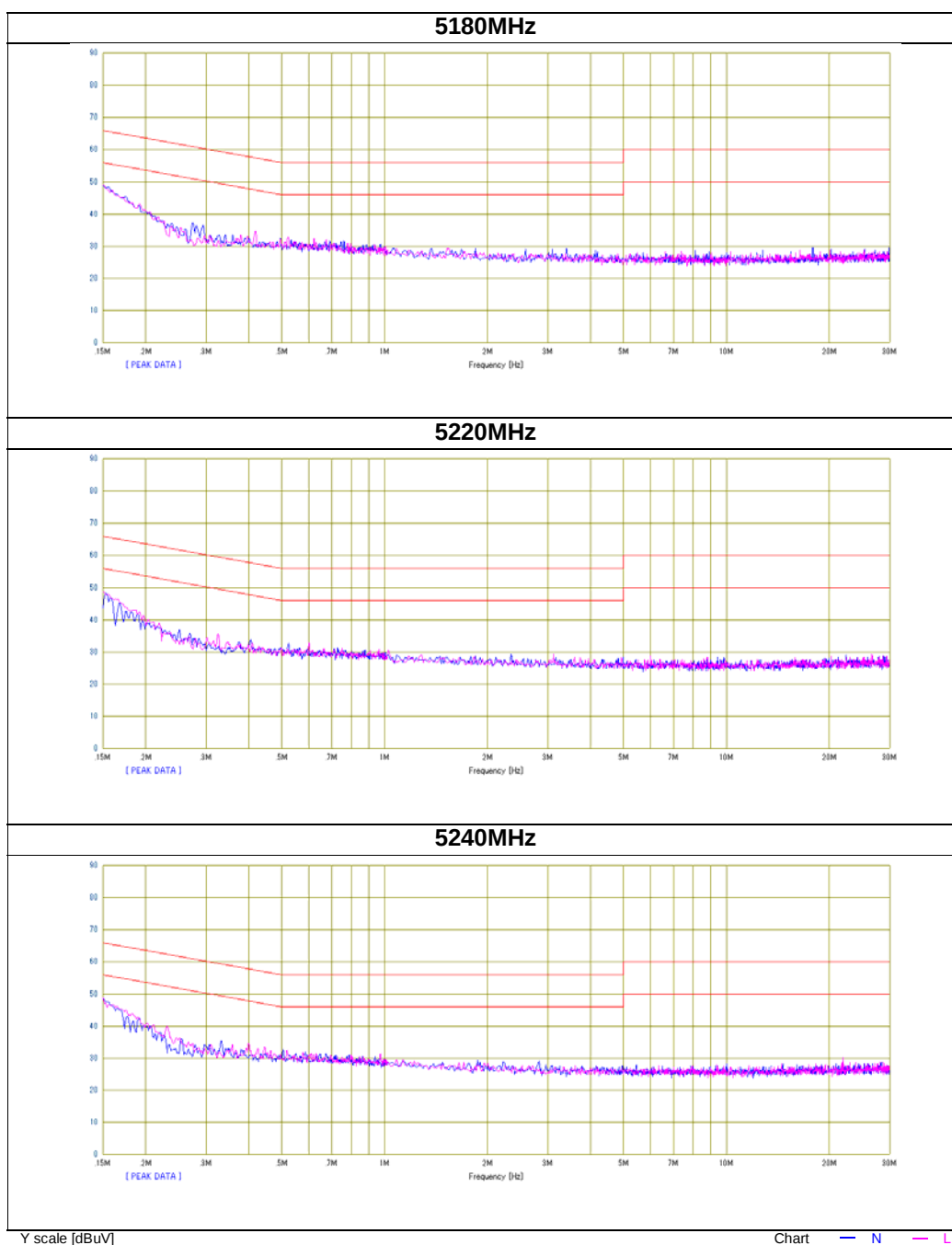
Mode / Remarks : Tx 11n-20 SISO ANT1 5180MHz MCS0

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]		
0.15000	24.7	9.8	13.3	38.0	23.1	66.0	56.0	28.0	32.9	N	
0.17205	19.6	1.2	13.3	32.9	14.5	64.9	54.9	32.0	40.4	N	
0.21434	12.7	-1.6	13.3	26.0	11.7	63.0	53.0	37.0	41.3	N	
0.26805	4.7	-3.2	13.3	18.0	10.1	61.2	51.2	43.2	41.1	N	
0.37040	-1.3	-4.3	13.4	12.1	9.1	58.5	48.5	46.4	39.4	N	
0.46326	-1.4	-4.5	13.4	12.0	8.9	56.6	46.6	44.6	37.7	N	
0.15000	24.7	9.9	13.3	38.0	23.2	66.0	56.0	28.0	32.8	L	
0.17305	19.5	1.2	13.3	32.8	14.5	64.8	54.8	32.0	40.3	L	
0.21423	12.9	-1.6	13.3	26.2	11.7	63.0	53.0	36.8	41.3	L	
0.26794	4.7	-3.2	13.3	18.0	10.1	61.2	51.2	43.2	41.1	L	
0.37185	-1.2	-4.3	13.4	12.2	9.1	58.5	48.5	46.3	39.4	L	
0.44236	-1.5	-4.5	13.4	11.9	8.9	57.0	47.0	45.1	38.1	L	

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



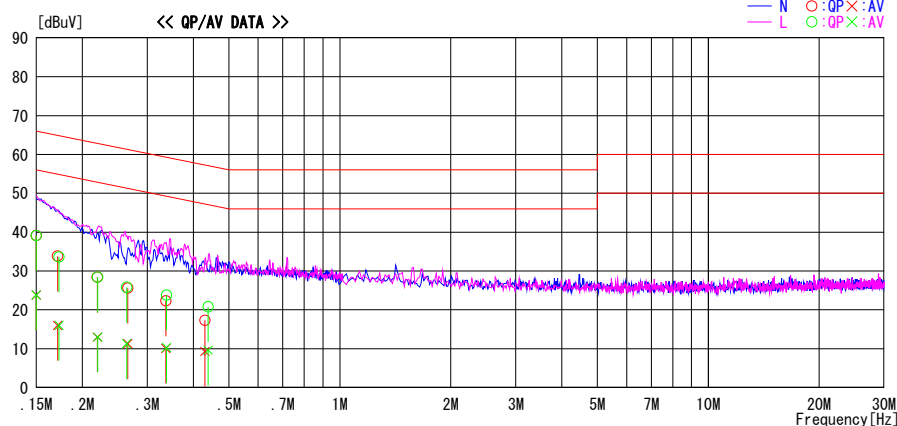
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2012/10/03

Report No. : 33BE0378-HO
Power : AC 120V / 60Hz (DC 3.3V)
Temp./Humi. : 22deg. C / 66% RH
Engineer : Takayuki Shimada

Mode / Remarks : Tx 11n-20 MIMO ANTO+1 5180MHz MCS8

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]		
0.15000	25.8	10.5	13.3	39.1	23.8	66.0	56.0	26.9	32.2	N	
0.17146	20.5	2.7	13.3	33.8	16.0	64.9	54.9	31.1	38.9	N	
0.21968	15.1	-0.3	13.3	28.4	13.0	62.8	52.8	34.4	39.8	N	
0.26581	12.3	-2.0	13.3	25.6	11.3	61.2	51.2	35.6	39.9	N	
0.33705	8.9	-3.3	13.4	22.3	10.1	59.3	49.3	37.0	39.2	N	
0.43045	3.9	-4.1	13.4	17.3	9.3	57.2	47.2	39.9	37.9	N	
0.15000	25.8	10.5	13.3	39.1	23.8	66.0	56.0	26.9	32.2	L	
0.17294	20.3	2.7	13.3	33.6	16.0	64.8	54.8	31.2	38.8	L	
0.22005	15.1	-0.3	13.3	28.4	13.0	62.8	52.8	34.4	39.8	L	
0.26385	12.5	-2.0	13.3	25.8	11.3	61.3	51.3	35.5	40.0	L	
0.33838	10.4	-3.1	13.4	23.8	10.3	59.2	49.2	35.4	38.9	L	
0.43902	7.4	-3.8	13.4	20.8	9.6	57.1	47.1	36.3	37.5	L	

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

