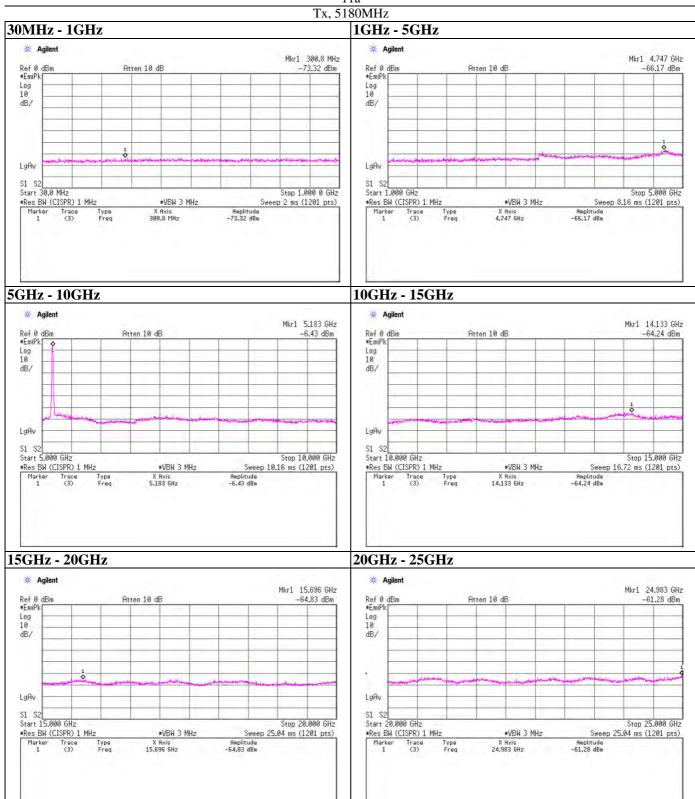
Test Report No.: 31CE0283-HO-01-A Page : 58 / 92

## **Spurious emission (Conducted)**

11a



UL Japan, Inc. Shonan EMC Lab.

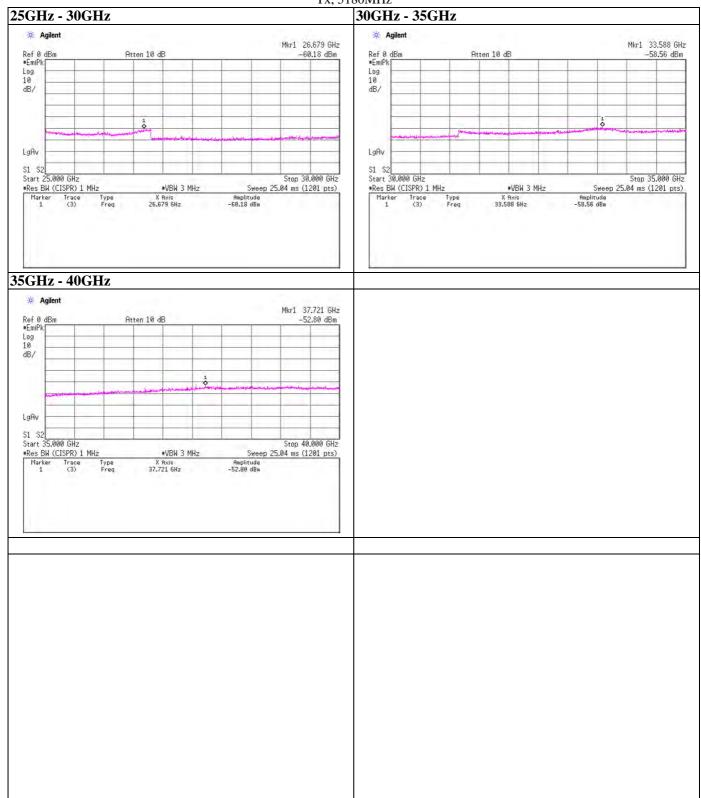
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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## **Spurious emission (Conducted)**

11a

Tx, 5180MHz

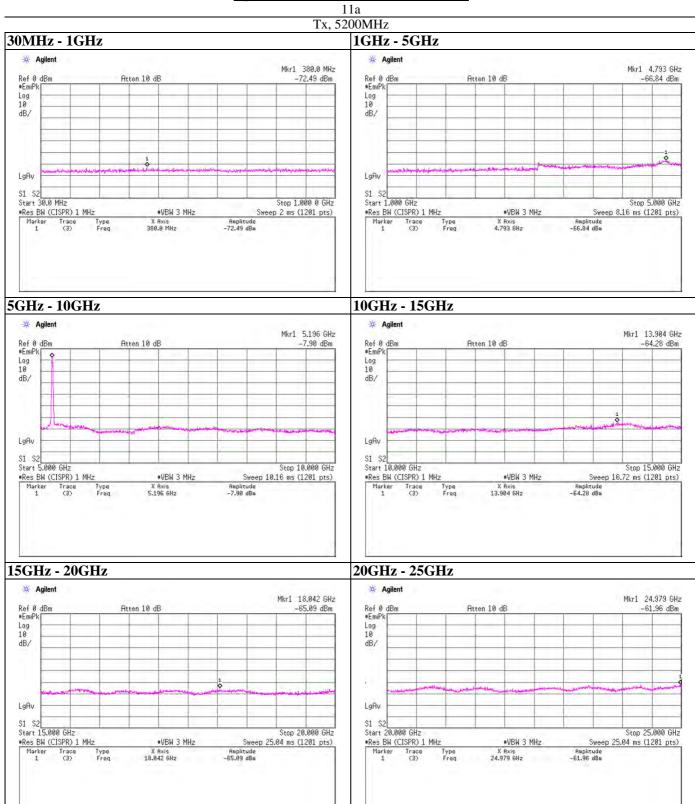


UL Japan, Inc. Shonan EMC Lab.

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

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## **Spurious emission (Conducted)**



UL Japan, Inc. Shonan EMC Lab.

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

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## **Spurious emission (Conducted)**

11a Tx, 5200MHz

Mkr1 26.775 GHz -59.97 dBm

\*VBW 3 MHz. Sweep 25.04 ms (1201 pts)

X Rxis Amplitude
26,775 6Hz -59.97 dBm

30GHz - 35GHz

35GHz - 40GHz

\$1 \$2 | Start 25,000 GHz

\*Res BW (CISPR) 1 MHz

Marker Trace Type
1 (3) Freq

25GHz - 30GHz

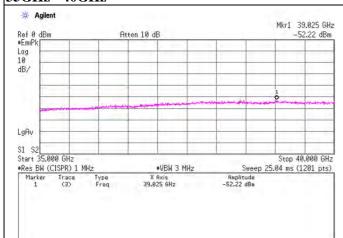
Atten 10 dB

# Agilent

Ref 0 dBm #EmiPk

Leg 10 dB/

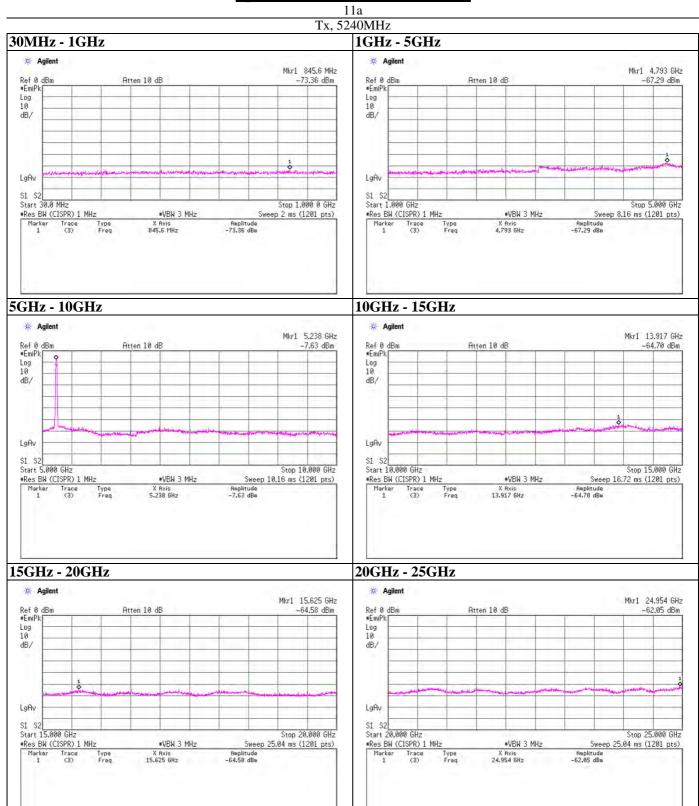
LgAv



UL Japan, Inc. Shonan EMC Lab.

Test Report No.: 31CE0283-HO-01-A Page : 62 / 92

## **Spurious emission (Conducted)**



UL Japan, Inc. Shonan EMC Lab.

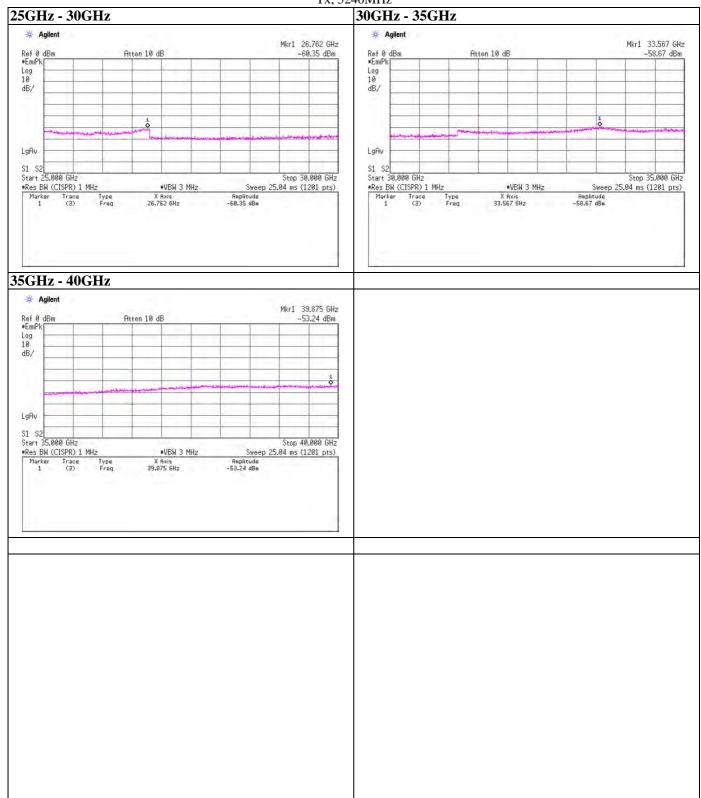
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Test Report No.: 31CE0283-HO-01-A Page : 63 / 92

## **Spurious emission (Conducted)**

11a

Tx, 5240MHz



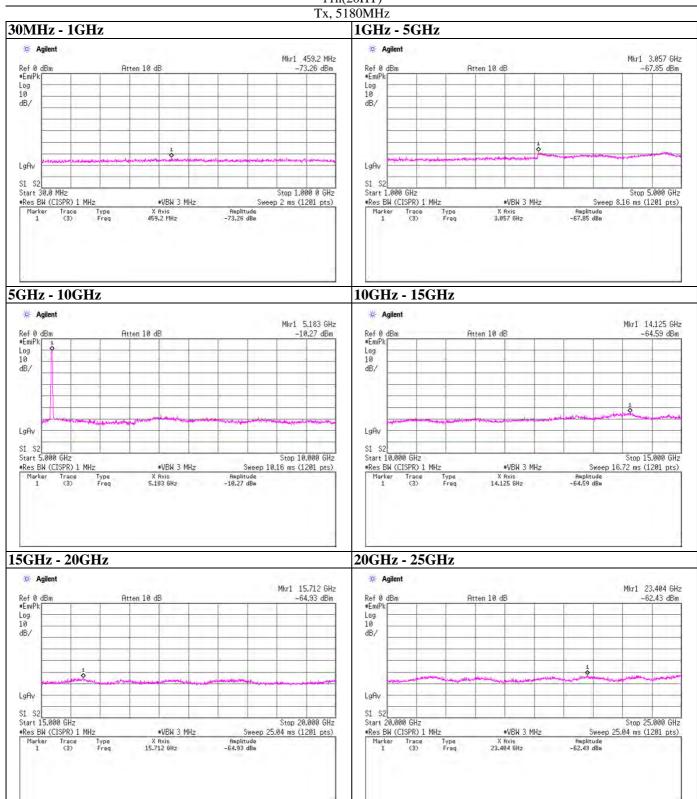
UL Japan, Inc. Shonan EMC Lab.

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

Test Report No.: 31CE0283-HO-01-A Page : 64 / 92

## **Spurious emission (Conducted)**

11n(20HT)



UL Japan, Inc. Shonan EMC Lab.

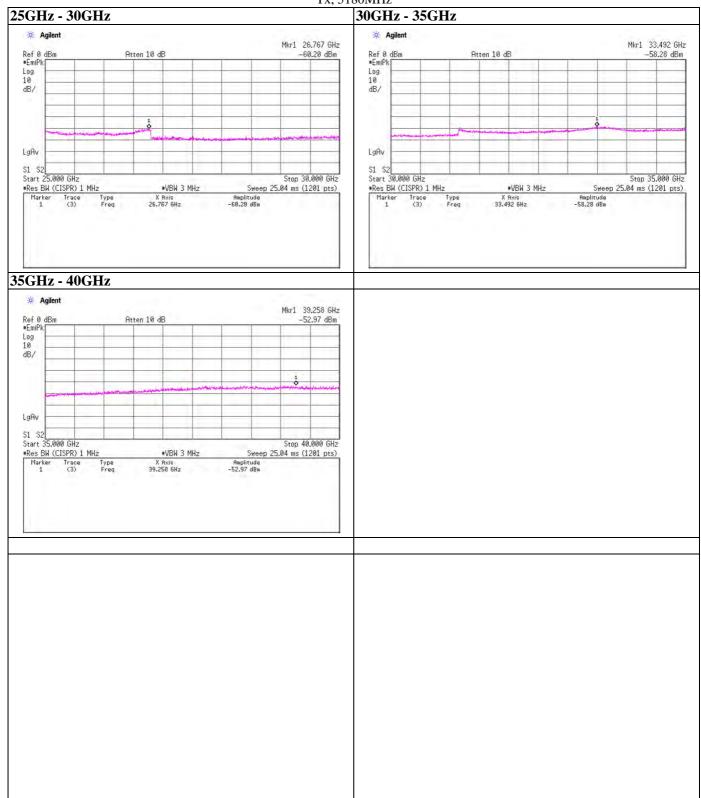
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

Test Report No.: 31CE0283-HO-01-A Page : 65 / 92

## **Spurious emission (Conducted)**

11n(20HT)

Tx, 5180MHz



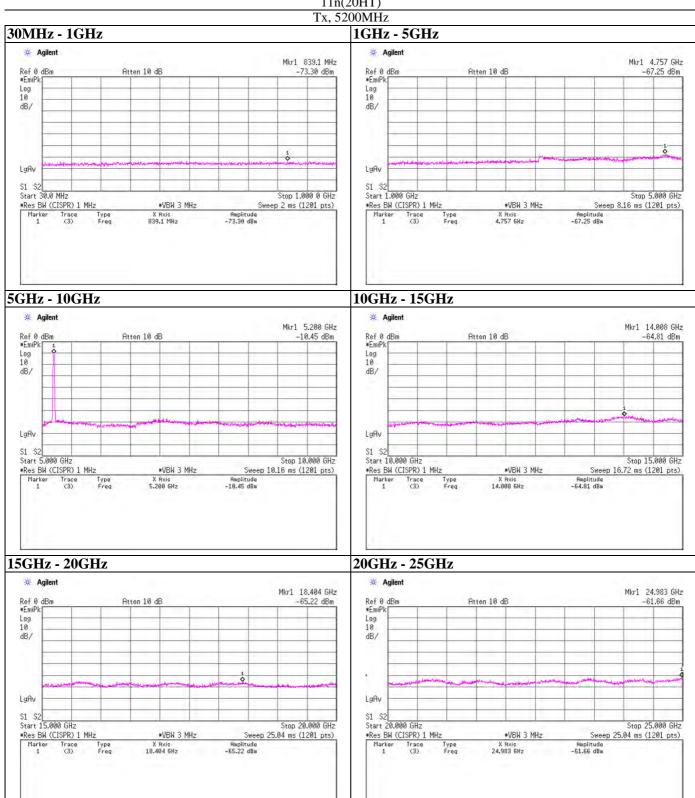
UL Japan, Inc. Shonan EMC Lab.

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

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# **Spurious emission (Conducted)**

11n(20HT)



UL Japan, Inc. Shonan EMC Lab.

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

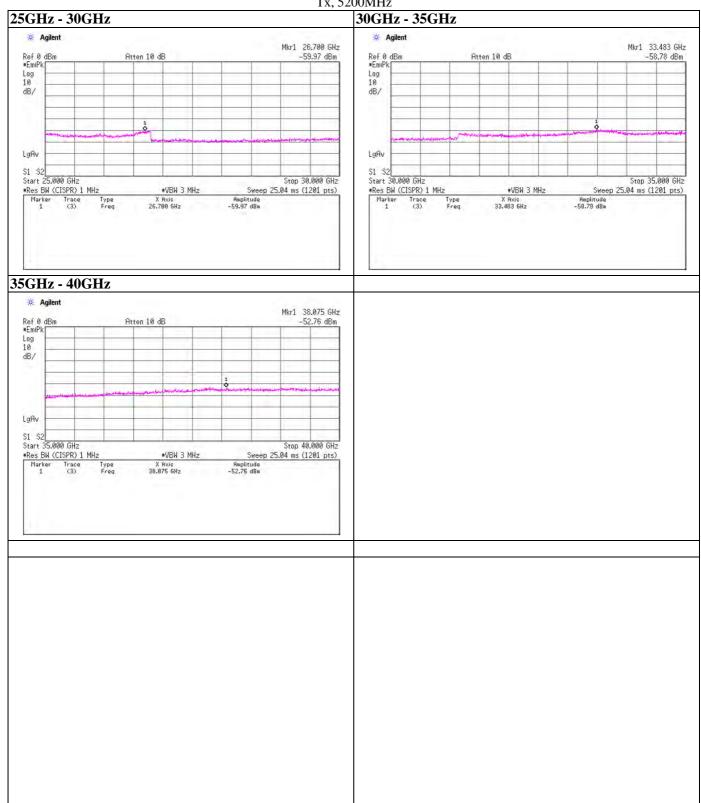
: +81 463 50 6400 Telephone Facsimile : +81 463 50 6401

31CE0283-HO-01-A Test Report No.: 67 / 92 Page

## **Spurious emission (Conducted)**

11n(20HT)

Tx, 5200MHz



UL Japan, Inc. Shonan EMC Lab.

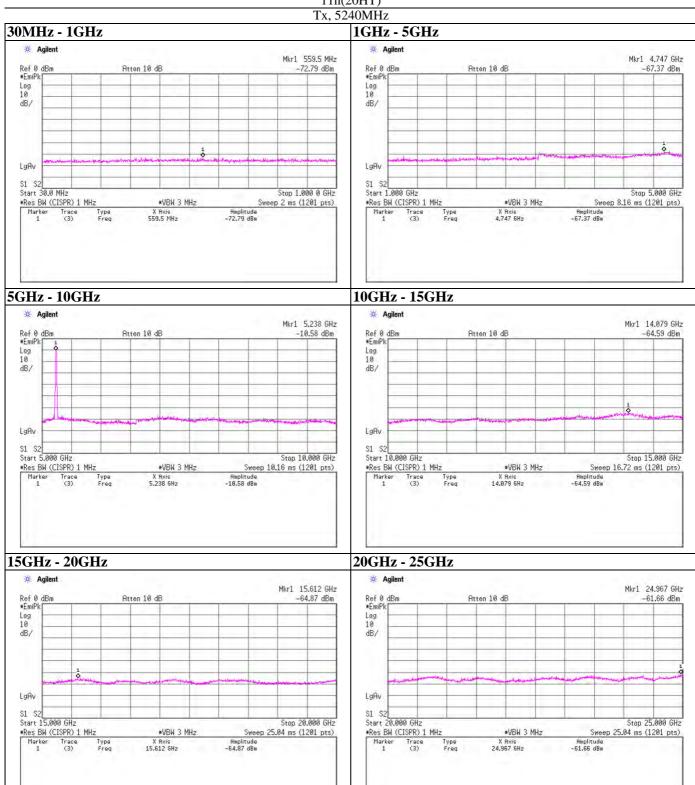
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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

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# **Spurious emission (Conducted)**

11n(20HT)



UL Japan, Inc. Shonan EMC Lab.

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

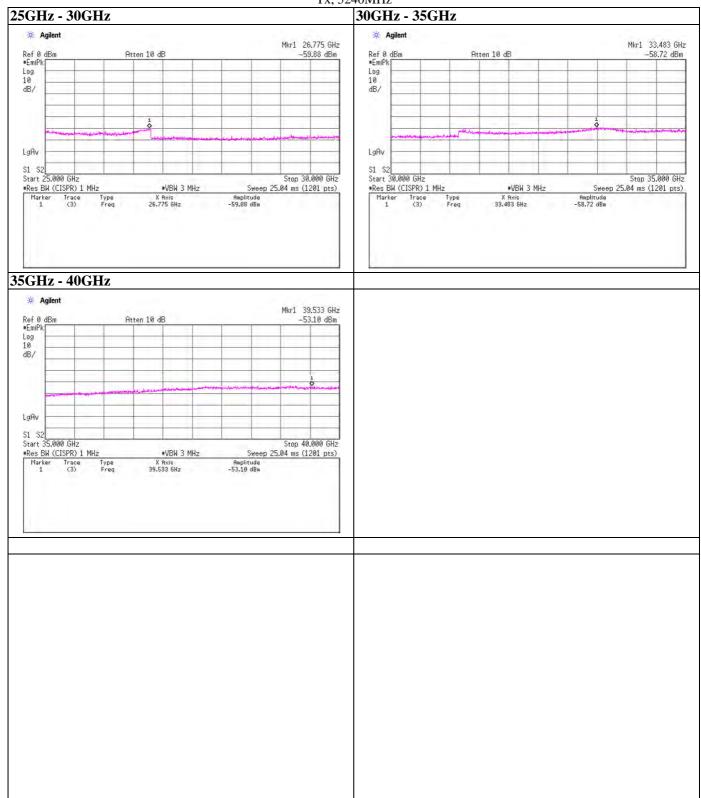
: +81 463 50 6400 Telephone Facsimile : +81 463 50 6401

Test Report No.: 31CE0283-HO-01-A Page : 69 / 92

## **Spurious emission (Conducted)**

11n(20HT)

Tx, 5240MHz



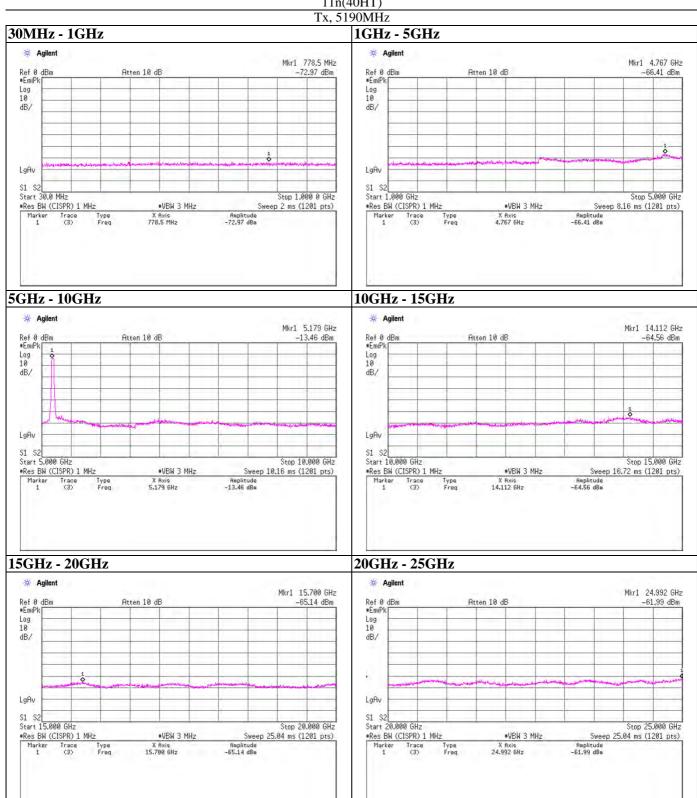
UL Japan, Inc. Shonan EMC Lab.

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

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## **Spurious emission (Conducted)**

11n(40HT)



UL Japan, Inc. Shonan EMC Lab.

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

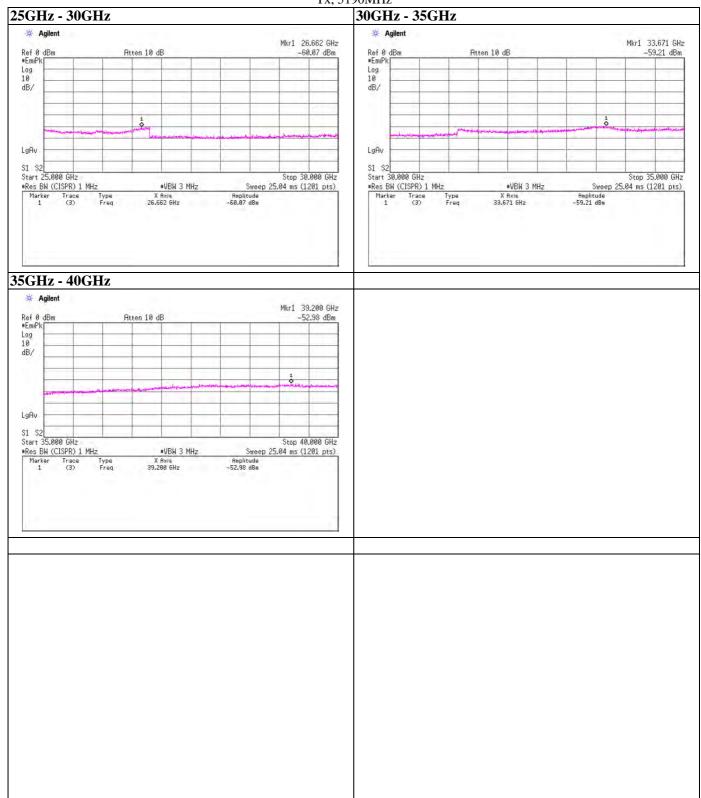
: +81 463 50 6400 Telephone Facsimile : +81 463 50 6401

Test Report No.: 31CE0283-HO-01-A Page : 71 / 92

## **Spurious emission (Conducted)**

11n(40HT)

Tx, 5190MHz



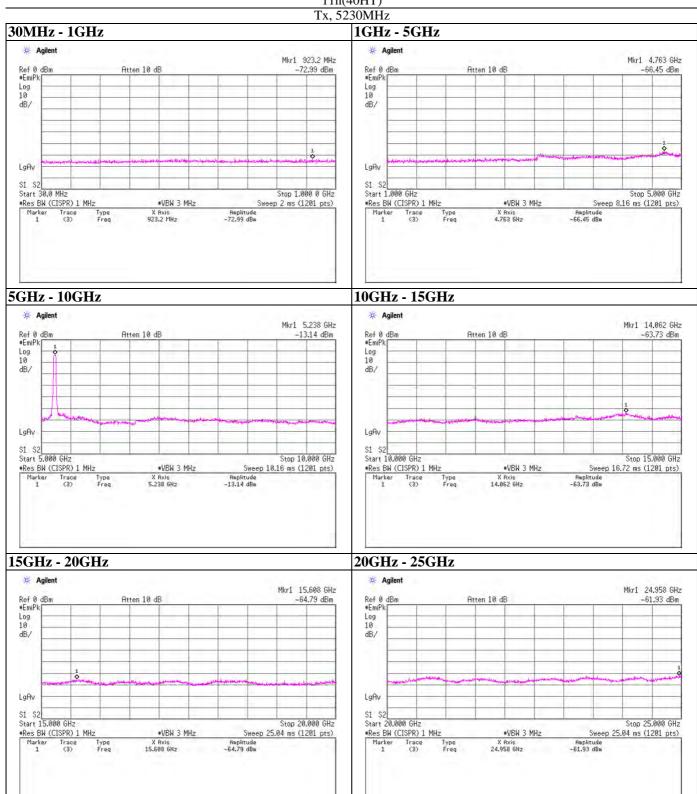
UL Japan, Inc. Shonan EMC Lab.

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

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# **Spurious emission (Conducted)**

11n(40HT)



UL Japan, Inc. Shonan EMC Lab.

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

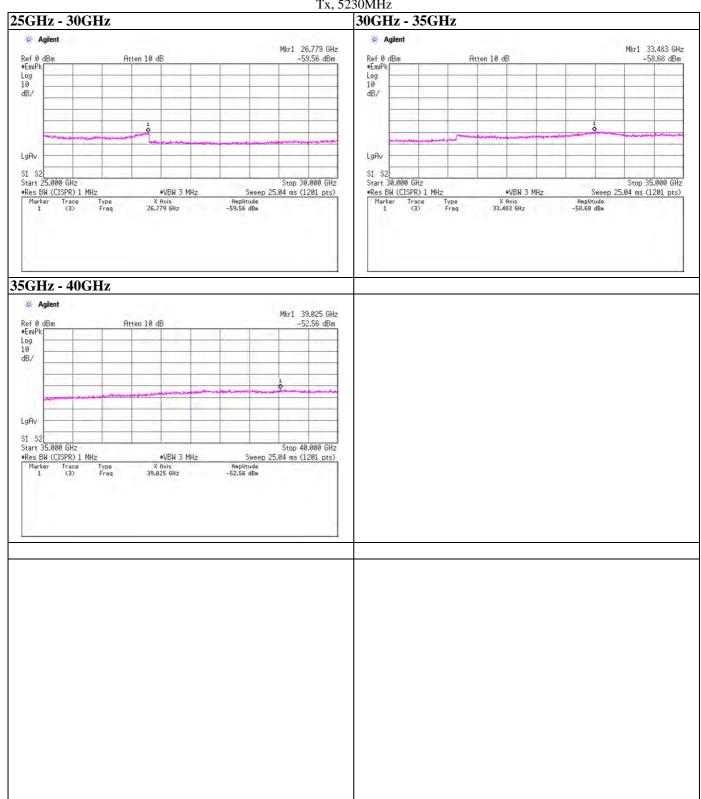
: +81 463 50 6400 Telephone Facsimile : +81 463 50 6401

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## **Spurious emission (Conducted)**

11n(40HT)

Tx, 5230MHz



UL Japan, Inc. Shonan EMC Lab.

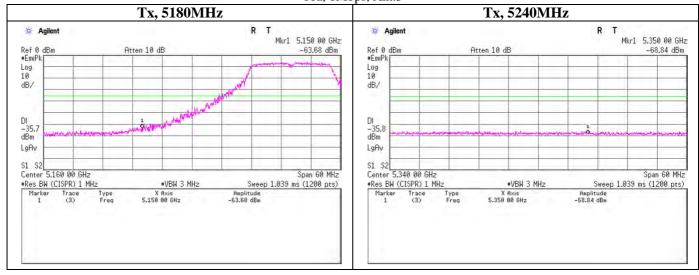
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN

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

31CE0283-HO-01-A Test Report No.: Page 74 / 92

## **Spurious emission (Conducted)**

Band Edge compliance 11a, 6Mbps, Ant.3

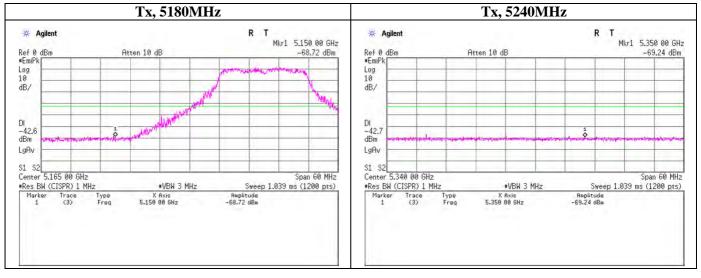


Display Line(Dl) = -27dBm - Cable Loss - Attenuator Loss - Antenna Gain

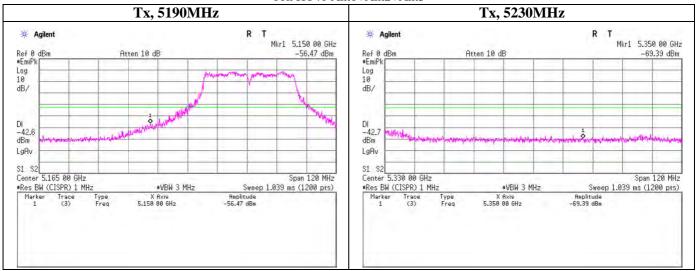
Test Report No.: 31CE0283-HO-01-A Page : 75 / 92

### **Spurious emission (Conducted)**

Band Edge compliance 11n HT20 Ant1+Ant2+Ant3



#### 11n HT40 Ant1+Ant2+Ant3



Display Line(Dl) = -27dBm - Cable Loss - Attenuator Loss - Antenna Gain

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# **Peak Power Spectral Density**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46% Engineer Akio Hayashi Mode 11a, Tx, Antenna3

Ch. Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss				
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
5180	-10.83	2.20	10.00	1.37	4.00	2.63
5200	-11.20	2.19	10.00	0.99	4.00	3.01
5240	-11.75	2.19	10.00	0.44	4.00	3.56

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

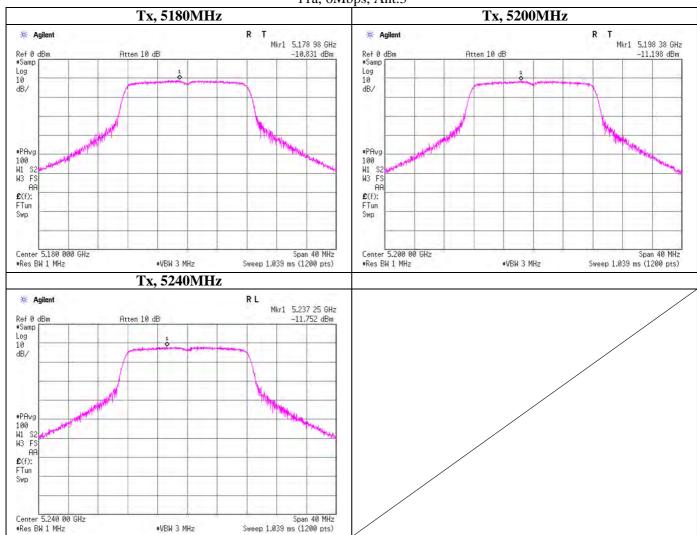
UL Japan, Inc. Shonan EMC Lab.

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

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# **Peak Power Spectral Density**

11a, 6Mbps, Ant.3



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# **Peak Power Spectral Density**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46% Engineer Akio Hayashi Mode 11n-20HT, MCS0

#### [Ant.1+Ant.2+Ant.3]

-	<u>.                                      </u>							
	Ch. Freq.	Ant.1	Ant.2	Ant.3	Re	sult	Limit	Margin
		Result	Result	Result				
	[MHz]	[mW]	[mW]	[mW]	[mW]	[dBm]	[dBm]	[dB]
	5180	0.43	0.44	0.57	1.43	1.54	4.00	2.46
	5200	0.43	0.48	0.58	1.50	1.77	4.00	2.23
	5240	0.47	0.50	0.55	1.53	1.84	4.00	2.16

#### [Ant.1]

[:::::::]							
Ch. Freq.	Reading	Cable	Atten.	Re	sult	Limit	Margin
		Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-15.90	2.20	10.00	-3.70	0.43	4.00	3.57
5200	-15.82	2.19	10.00	-3.63	0.43	4.00	3.57
5240	-15.42	2.19	10.00	-3.23	0.47	4.00	3.53

#### [Ant.2]

Ch. Freq.	Reading	Cable	Atten.	Re	sult	Limit	Margin
		Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-15.81	2.20	10.00	-3.61	0.44	4.00	3.56
5200	-15.34	2.19	10.00	-3.15	0.48	4.00	3.52
5240	-15.16	2.19	10.00	-2.97	0.50	4.00	3.50

#### [Ant.3]

Ch. Freq.	Reading	Cable	Atten.	Res	sult	Limit	Margin
		Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-14.68	2.20	10.00	-2.48	0.57	4.00	3.43
5200	-14.53	2.19	10.00	-2.34	0.58	4.00	3.42
5240	-14.81	2.19	10.00	-2.62	0.55	4.00	3.45

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

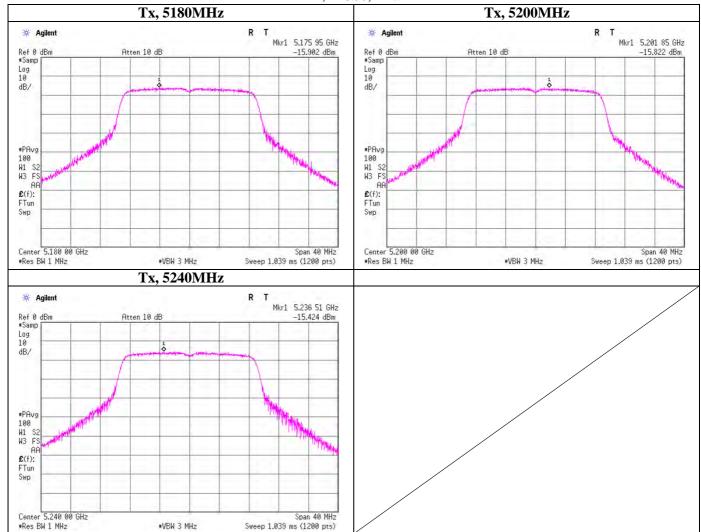
## UL Japan, Inc. Shonan EMC Lab.

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

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# **Peak Power Spectral Density**

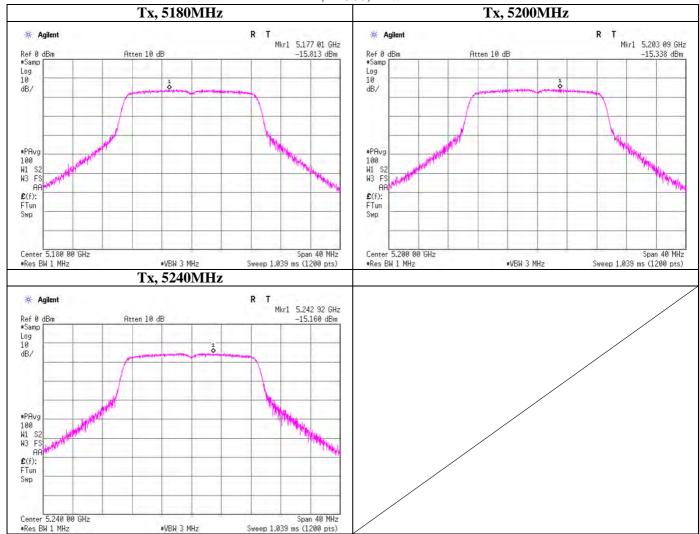
11n, MCS0, Ant.1



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# **Peak Power Spectral Density**

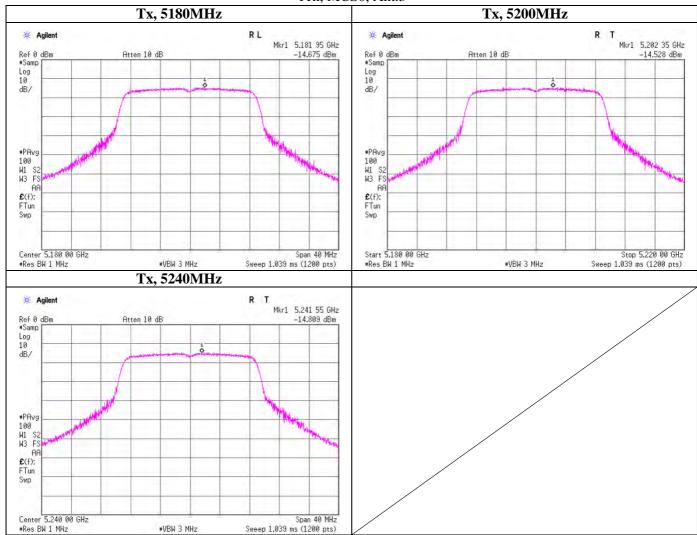
11n, MCS0, Ant.2



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# **Peak Power Spectral Density**

11n, MCS0, Ant.3



Test Report No.: 31CE0283-HO-01-A Page : 82 / 92

# **Peak Power Spectral Density**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46% Engineer Akio Hayashi Mode 11n-40HT, MCS0

#### [Ant.1+Ant.2+Ant.3]

Ch. Freq.	Ant.1	Ant.2	Ant.3	Re	sult	Limit	Margin
	Result	Result	Result		! !		
[MHz]	[mW]	[mW]	[mW]	[mW]	[dBm]	[dBm]	[dB]
5190	0.23	0.26	0.30	0.80	-0.99	4.00	4.99
5230	0.27	0.29	0.29	0.85	-0.70	4.00	4.70

[Ant.1]

[/1110-1]							
Ch. Freq.	Reading	Cable	Atten.	Re	sult	Limit	Margin
		Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5190	-18.56	2.20	10.00	-6.36	0.23	4.00	3.77
5230	-17.93	2.19	10.00	-5.74	0.27	4.00	3.73

[Ant.2]

Ch. Freq.	Reading	Cable	Atten.	Res	sult	Limit	Margin
		Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5190	-17.98	2.20	10.00	-5.78	0.26	4.00	3.74
5230	-17.52	2.19	10.00	-5.33	0.29	4.00	3.71

[Ant.3]

Ch. Freq.	Reading	Cable	Atten.	Re	sult	Limit	Margin
		Loss			! !		
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5190	-17.43	2.20	10.00	-5.23	0.30	4.00	3.70
5230	-17.54	2.19	10.00	-5.35	0.29	4.00	3.71

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

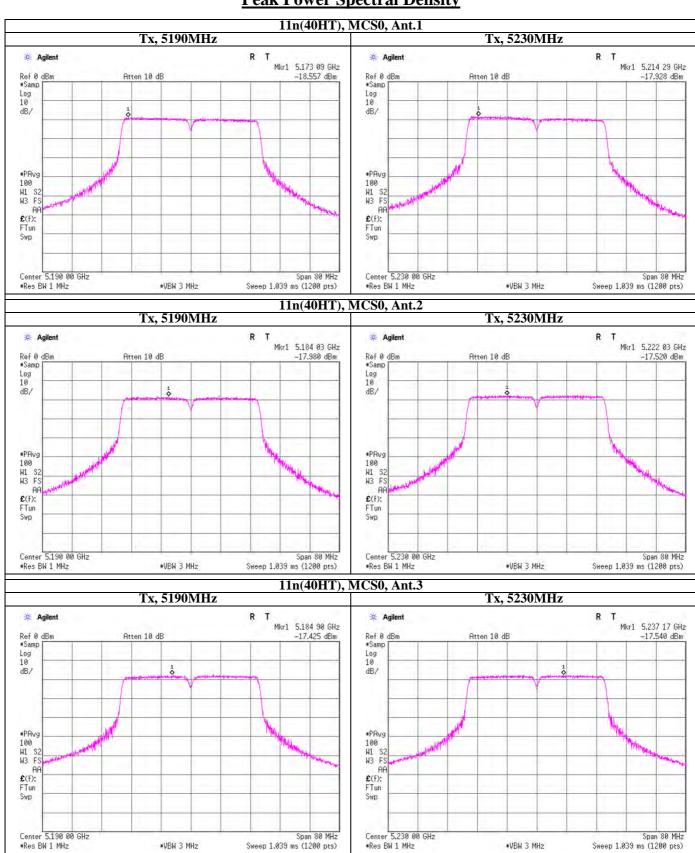
### UL Japan, Inc.

Shonan EMC Lab.

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

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### **Peak Power Spectral Density**



UL Japan, Inc. Shonan EMC Lab.

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

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# **Peak Excursion Ratio**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46%

Engineer Akio Hayashi Mode 11a, 6Mbps, Ant3

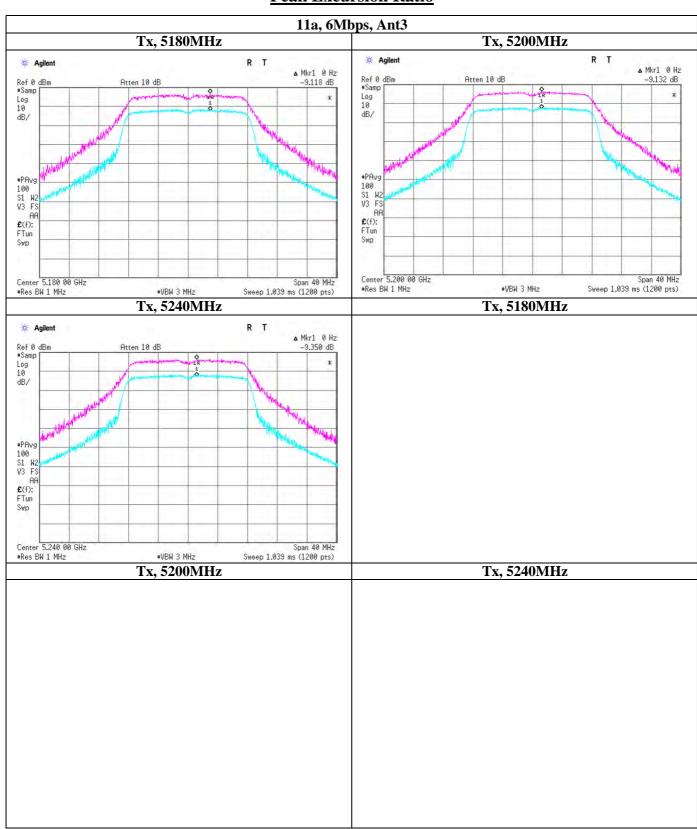
Freq.	Peak Power	Limit
	Excursion	
[MHz]	[dB]	[dB]
5180.0	9.118	=< 13.0
5200.0	9.132	=< 13.0
5240.0	9.350	=< 13.0

UL Japan, Inc. Shonan EMC Lab.

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

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## **Peak Excursion Ratio**



UL Japan, Inc. Shonan EMC Lab.

Test Report No.: 31CE0283-HO-01-A Page : 86 / 92

# **Peak Excursion Ratio**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46%

Engineer Akio Hayashi Mode 11n-20HT, MCS0

#### [Ant.1]

Freq.	Peak Power	Limit
	Excursion	
[MHz]	[dB]	[dB]
5180.0	10.768	=< 13.0
5200.0	10.554	=< 13.0
5240.0	10.564	=< 13.0

[Ant.2]

Freq.	Peak Power	Limit
	Excursion	
[MHz]	[dB]	[dB]
5180.0	10.331	=< 13.0
5200.0	10.389	=< 13.0
5240.0	10.331	=< 13.0

[Ant.3]

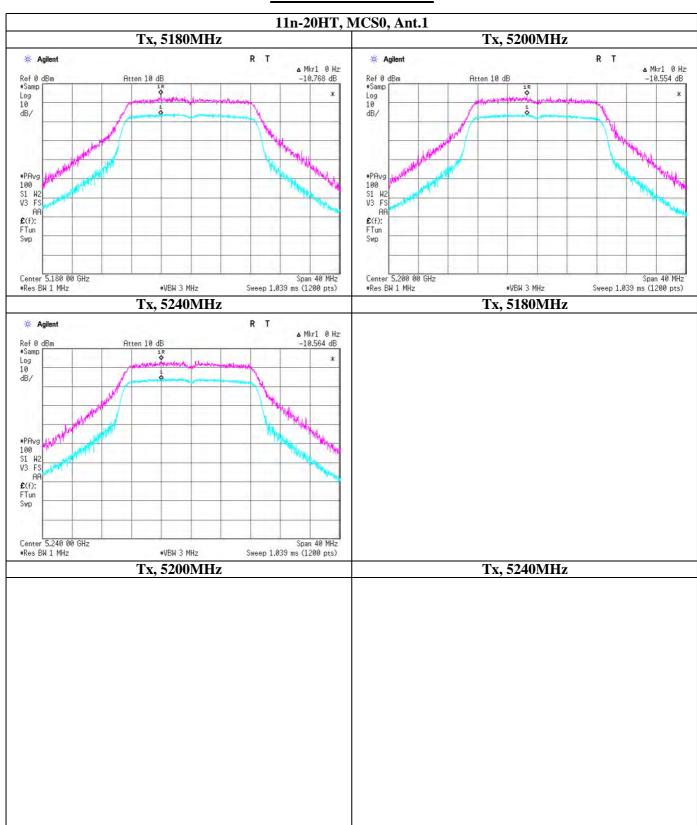
[]				
Freq.	Peak Power	Limit		
	Excursion			
[MHz]	[dB]	[dB]		
5180.0	9.752	=< 13.0		
5200.0	9.749	=< 13.0		
5240.0	10.111	=< 13.0		

## UL Japan, Inc. Shonan EMC Lab.

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

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## **Peak Excursion Ratio**

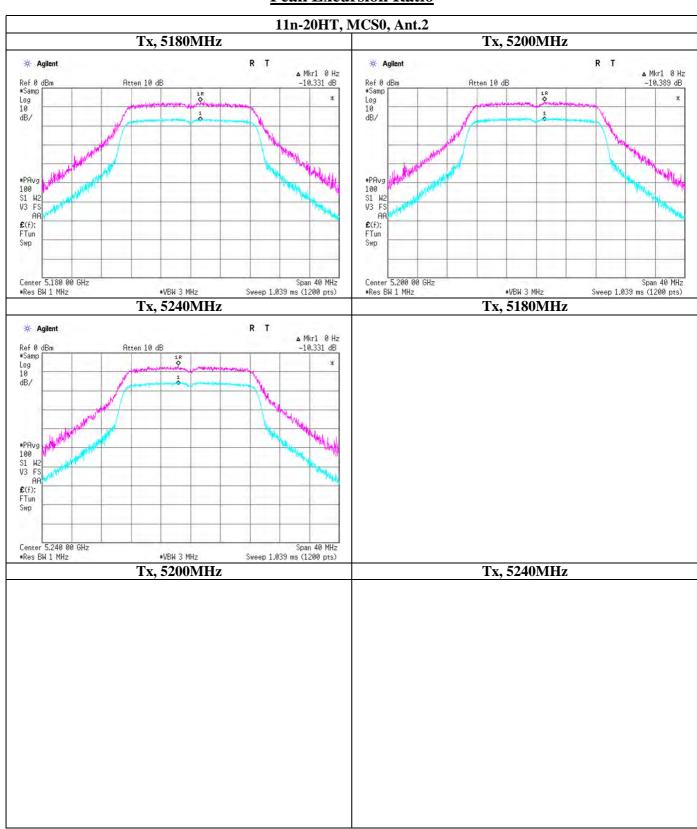


UL Japan, Inc. Shonan EMC Lab.

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

Test Report No.: 31CE0283-HO-01-A Page : 88 / 92

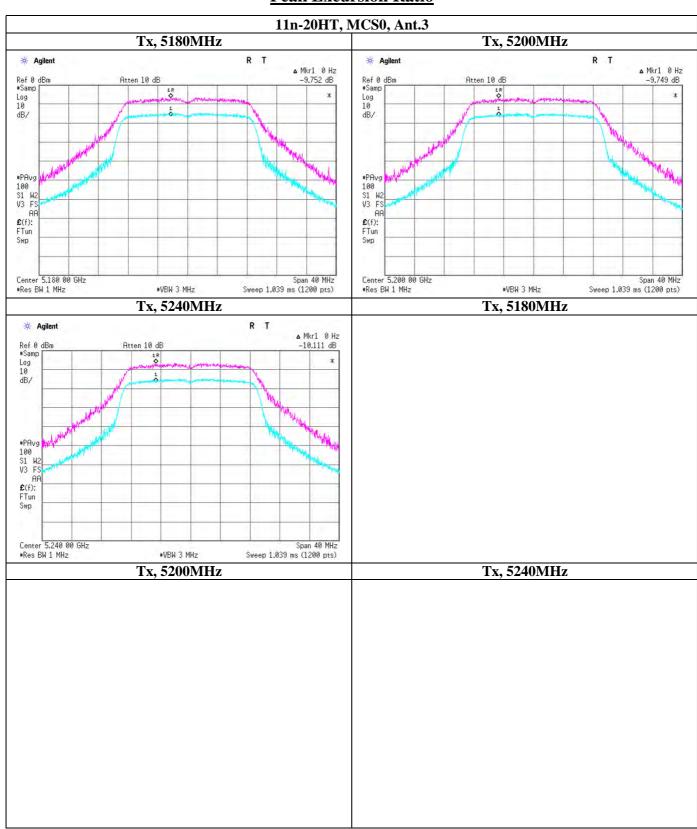
## **Peak Excursion Ratio**



UL Japan, Inc. Shonan EMC Lab.

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## **Peak Excursion Ratio**



UL Japan, Inc. Shonan EMC Lab.

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

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# **Peak Excursion Ratio**

Test place UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room

Date 2010/12/3

Temperature / Humidity 24deg.C. , 46%

Engineer Akio Hayashi Mode 11n-40HT, MCS0

#### [Ant.1]

Freq.	Peak Power	Limit		
	Excursion			
[MHz]	[dB]	[dB]		
5190.0	10.744	=< 13.0		
5230.0	10.484	=< 13.0		

#### [Ant.2]

Freq.	Peak Power	Limit		
	Excursion			
[MHz]	[dB]	[dB]		
5190.0	9.784	=< 13.0		
5230.0	9.899	=< 13.0		

### [Ant.3]

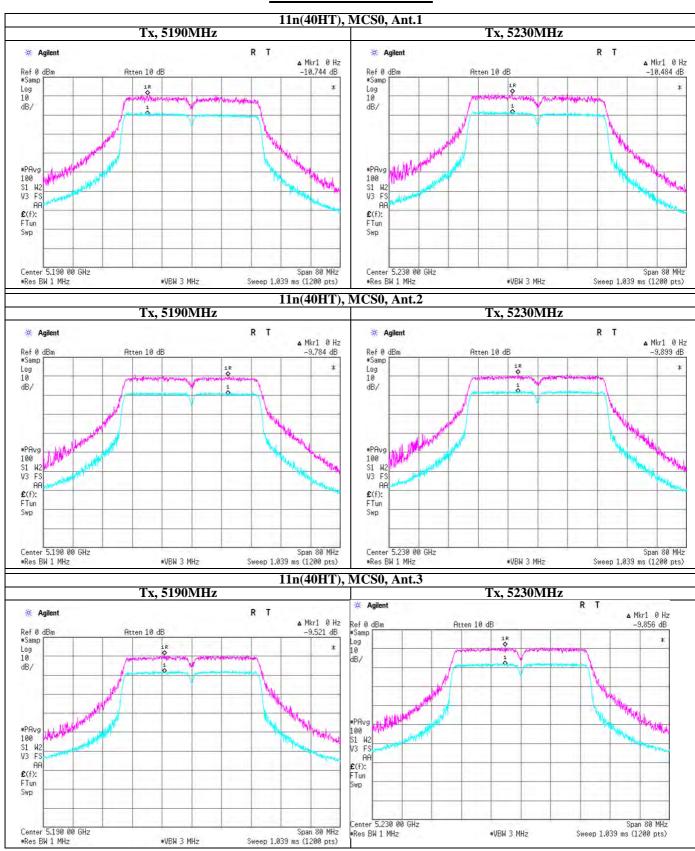
Freq.	Peak Power	Limit		
	Excursion			
[MHz]	[dB]	[dB]		
5190.0	9.521	=< 13.0		
5230.0	9.856	=< 13.0		

UL Japan, Inc. Shonan EMC Lab.

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

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### **Peak Excursion Ratio**



UL Japan, Inc.

Shonan EMC Lab.

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

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### **APPENDIX 3:Test instruments**

**EMI** test equipment

EMI test equipm Control No.	Instrument	Manufacturer	Model No.	Serial No.	Test Item	Calibration Date *
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2010/11/16 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2010/03/09 * 12
SAT10-06	Attenuator(above1GHz)	Agilent	8493C-010	74865	AT	2010/03/05 * 12
SPSC-02	Power Splitters/Combiners		ZFSC-2-10G	-	AT	2010/04/28 * 12
STM-G4	Terminator	Weinschel	M1459A	U6592	AT	2010/07/27 * 12
STM-G5	Terminator	Weinschel	M1459A	U6594	AT	2010/07/27 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2010/02/17 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2010/06/22 * 12
SCC-H1	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
SCC-H2	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
KCC-D23	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
SPSC-05	Power Splitters/Combiners	Mini-Circuit	ZN4PD1-63-S+	-	AT	2010/07/27 * 12
STM-G2	Terminator	Weinschel	M1459A	U6584	AT	2010/07/27 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2010/02/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2010/03/09 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2010/04/16 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2010/05/27 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2010/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2010/02/09 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2010/07/21 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2010/03/05 * 12
SFL-03	Highpass Filter	MICRO-TRONICS	HPM50112	28	RE	2009/12/04 * 12
SHA-04	Horn Antenna	ETS LINDGREN	460451	LM3640	RE	2010/03/29 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	19	RE	2010/03/02 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2010/03/02 * 12
SHA-06	Horn Antenna	ETS LINDGREN	460481	LM3459	RE	2010/04/09 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	10	RE	2010/06/22 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2010/03/09 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2010/02/06 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2010/02/06 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2010/10/15 * 12
SCC-	Coaxial Cable&RF	Fujikura/Fujikura/Suhner/Suhner/	8D2W/12DSFA/141PE/141P		RE	2010/04/02 * 12
C1/C2/C3/C4/C5/C10 /SRSE-03		Suhner/Suhner/TOYO	E/141PE/141PE/NS4906	-/0901-2/1(KI Selector)	KE	2010/04/02 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2010/10/15 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2010/09/13 * 12
21122 32(1:213)			3122 32 (1.313)			

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

 $All\ equipment\ is\ calibrated\ with\ traceable\ calibrations.\ Each\ calibration\ is\ traceable\ to\ the\ national\ or\ international\ standards.$ 

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:

RE: Radiated Emission

AT: Antenna Terminal Conducted test

## UL Japan, Inc. Shonan EMC Lab.

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