



RADIO TEST REPORT

Test Report No. : 11922902S-C-R2

Applicant : PIONEER CORPORATION
Type of Equipment : MULTIMEDIA NAVIGATION RECEIVER
Model No. : AVIC-W8400NEX
FCC ID : AJDK103
Test regulation : FCC Part 15 Subpart E: 2017
(*Wireless LAN part)
Test items : Other than radiated emission tests
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. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11922902S-C-R1. 11922902S-C-R1 is replaced with this report.

Date of test: September 4, 2017

Representative test engineer:

Makoto Hosaka

Engineer

Consumer Technology Division

Approved by:

Akio Hayashi

Leader

Consumer Technology Division



The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
 There is no testing item of "Non-accreditation".

**UL Japan, Inc.
Shonan EMC Lab.**

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

13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11922902S-C

CONTENTS	PAGE
SECTION 1: Customer information.....	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results.....	6
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Antenna Terminal Conducted Tests.....	9
APPENDIX 1: Test data	10
6 dB Bandwidth and 99 % Occupied Bandwidth.....	10
Maximum Conducted Output Power	17
Maximum Power Spectral Density	29
Conducted Spurious Emission	37
APPENDIX 2: Test instruments	38
APPENDIX 3: Photographs of test setup	39

SECTION 1: Customer information

Company Name : PIONEER CORPORATION
Address : 25-1, Yamada, Kawagoe-shi, Saitama, 350-8555, Japan
Telephone Number : +81-49-228-7787
Facsimile Number : +81-49-228-6493
Contact Person : Hiroshi Fuse

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

2.1 Identification of E.U.T.

Type of Equipment : MULTIMEDIA NAVIGATION RECEIVER
Model No. : AVIC-W8400NEX
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 14.4 V
Receipt Date of Sample : August 23, 2017
Country of Mass-production : Thailand
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: AVIC-W8400NEX (referred to as the EUT in this report) is a MULTIMEDIA NAVIGATION RECEIVER.

General Specification

Clock frequency(ies) in the system : Bluetooth Wi-Fi module: 37.4 MHz
LPO clock for Bluetooth Wi-Fi module: 32.768 kHz
DC-DC CONVERTER: 1000 kHz/ 700.5 kHz/ 2.29 MHz/ 2.17 MHz/
767.25 kHz/ 699.05 kHz/ 767.25 kHz/ 699.05 kHz/ 436.907 kHz/
383.625 kHz/ 436.907 kHz/ 383.625 kHz
FM/AM TUNER: 9.216 MHz (VCO: 5.9904 GHz/ 6.2208 GHz)
TMC TUNER: 9.216 MHz (VCO: 5.9904 GHz/ 6.2208 GHz)
MAIN PROCESSER: 24 MHz/ 32.768 kHz/ 11.2896 MHz
SYSTEM MICRO COMPUTER: 3.93216 MHz
DVD DRIVER: 27 MHz/ 121.5 MHz/ 36.864 MHz/ 33.8688 MHz
LCD BACK LIGHT: 436.907 kHz/ 383.625 kHz
ELECTRONIC VOLUME: 18.432 MHz
FPGA: 14.7456 MHz
ECHO CANCELLER: 12.288 MHz
HDMI RECEIVER: 27 MHz
DISPLAY CONTROLLER: 32 MHz
VIDEO DECORDER: 32 MHz
MICRO COMPUTER: 10 MHz
WWR UNIT: 24 MHz
GPS: 26 MHz

Radio Specification

Radio Type : Transceiver
Frequency of Operation : 2.4 GHz: 2402 MHz - 2480 MHz (Bluetooth BDR/EDR)
2412 MHz - 2462 MHz (IEEE 802.11b/g/n)
W58: 5745 MHz - 5825 MHz (IEEE 802.11a/n)
5755 MHz - 5795 MHz (IEEE 802.11n/ac)
5775 MHz (IEEE 802.11ac)
Modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11g/n/a/ac)
FHSS (Bluetooth BDR/EDR)
Power Supply (inner) : DC 3.3 V/1.8 V
Antenna type : Monopole Antenna
Antenna Gain : 2.4 GHz: -8.0 dBi (Bluetooth BDR/EDR)
-4.7 dBi (IEEE 802.11b/g/n)
5 GHz: -3.0 dBi
Operating Temperature : -10 deg. C to +60 deg. C

Remarks: This Wireless Module consists of 1 chip each of 5 GHz band.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
 FCC Part 15 final revised on September 20, 2017 and effective October 20, 2017

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 September 20, 2017, does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item *3)	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 IC: RSS-Gen 8.8	FCC: 15.407 (b) (6) / 15.207 IC: RSS-Gen 8.8	N/A	N/A	*1)
26 dB Emission Bandwidth	FCC: KDB Publication Number 789033 IC: -	FCC: 15.407 (a) (1) (2) (3) IC: -			
Maximum Conducted Output Power	FCC: KDB Publication Number 789033 IC: -	FCC: 15.407 (a) (1) (2) (3) IC: RSS-247 6.2.1 (1) 6.2.2 (1) 6.2.3 (1) 6.2.4 (1)	See data	Complied	Conducted
Maximum Power Spectral Density	FCC: KDB Publication Number 789033 IC: -	FCC : 15.407 (a) (1) (2) (3) IC: RSS-247 6.2.1 (1) 6.2.2 (1) 6.2.3 (1) 6.2.4 (1)		Complied	Conducted
Spurious Emission Restricted Band Edge	FCC: ANSI C63.10-2013 KDB Publication Number 789033 IC: -	FCC: 15.407 (b), 15.205 and 15.209 IC: RSS-247 6.2.1 (2) 6.2.2 (2) 6.2.3 (2) 6.2.4 (2)	N/A	N/A	Conducted (< 30 MHz) / Radiated (> 30 MHz) *2)
6 dB Emission Bandwidth	FCC: ANSI C63.10-2013 IC: -	FCC: 15.407 (e) IC: RSS-247 6.2.4 (1)		Complied	

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

*1) The test is not applicable since the EUT does not have AC power ports.

*2) For the Radiated spurious emission test, refer to test report No 11922904M-C-R2

*3) DFS test is not applicable since the EUT does not operate in the 5.25 GHz - 5.35 GHz and 5.47 GHz - 5.725 GHz bands.

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)

This EUT provides stable voltage (DC 3.3 V / 1.8 V) constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, Therefore this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Faxsimile : +81 463 50 6401

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

Other than above, 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 $k=2$.
 Shonan EMC Lab.

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.72 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

3.5 Test Location

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

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

UL Japan, Inc.

Shonan EMC Lab.

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

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 and also was judged the necessity of 802.11ac mode by the pre-test.

Mode	Power setting	Remarks*
IEEE 802.11a (11a)	11	6 Mbps, PN9
IEEE 802.11n 20 MHz BW (11n-20)	11	MCS 2, SGI:OFF, PN9
IEEE 802.11n 40 MHz BW (11n-40)	10	MCS 0, SGI:OFF, PN9
IEEE 802.11ac 40 MHz BW (11ac-40)	9	MCS 5, SGI:OFF, PN9
IEEE 802.11ac 80 MHz BW (11ac-80)	8	MCS 3, SGI:OFF, PN9

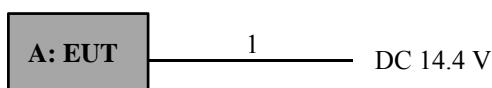
*Power of the EUT was set by the software as follows;
 Software: SoC: Ver0.041100
 System uCom: Ver7.07
 *This setting of software is the worst case.
 Any conditions under the normal use do not exceed the condition of setting.
 In addition, end users cannot change the settings of the output power of the product.

*The details of Operation mode(s)

Test Item	Operating Mode	Tested Frequency
		Upper Band
6 dB Bandwidth	11a Tx	5745 MHz
99 % Occupied Bandwidth, Maximum Conducted Output Power,	11n-20 Tx	5785 MHz
Maximum Power Spectral Density		5825 MHz
11n-40 Tx		5755 MHz
11ac-40 Tx		5795 MHz
11ac-80 Tx		5775 MHz
Conducted Spurious Emission	11a Tx *1)	5785 MHz

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

4.2 Configuration and peripherals



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

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	MULTIMEDIA NAVIGATION RECEIVER	AVIC-W8400NEX	QFTM000026UC	Pioneer Corporation	EUT

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Power Supply Cable	0.3 + 1.5	Unshielded	Unshielded	-

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

SECTION 5: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used and Test method
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Sample	Max Hold	Spectrum Analyzer
6 dB Bandwidth	Enough to capture the emission	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Conducted Output Power	-	-	-	Auto	Average	-	Power Meter (Sensor: 80 MHz BW) (Method PM)
Maximum Power Spectral Density	Encompass the entire EBW	100 kHz *2)	≥ 3 RBW	Auto	RMS Power Averaging (100 times)	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9 kHz – 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz – 30 MHz	10 kHz	30 kHz				

* The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v01r04 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*1) Max hold was applied as Worst-case measurement.

*2) KDB 789033 D02 says that RBW is set to be 500 kHz for 5.725 GHz-5.850 GHz, but it is not possible with spectrum analyzer, so RBW Correction Factor ($10 \log(500 \text{ kHz} / 100 \text{ kHz})$) was added to the test result.

*3) In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz-150 kHz: RBW = 200 Hz, 150 kHz-30 MHz: RBW = 10 kHz)

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data**6 dB Bandwidth and 99 % Occupied Bandwidth**

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx

11a

Tested Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Occupied Bandwidth [MHz]	Limit (6dB BW) [MHz]
5745	16.464	17.571	>0.5
5785	16.425	17.543	>0.5
5825	16.397	17.584	>0.5

11n-20

Tested Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Occupied Bandwidth [MHz]	Limit (6dB BW) [MHz]
5745	17.687	18.300	>0.5
5785	17.612	18.287	>0.5
5825	17.733	18.258	>0.5

11n-40

Tested Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Occupied Bandwidth [MHz]	Limit (6dB BW) [MHz]
5755	36.342	36.604	>0.5
5795	36.357	36.552	>0.5

11ac-40

Tested Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Occupied Bandwidth [MHz]	Limit (6dB BW) [MHz]
5755	36.445	36.549	>0.5
5795	36.420	36.554	>0.5

11ac-80

Tested Frequency [MHz]	6 dB Bandwidth [MHz]	99 % Occupied Bandwidth [MHz]	Limit (6dB BW) [MHz]
5775	76.151	76.315	>0.5

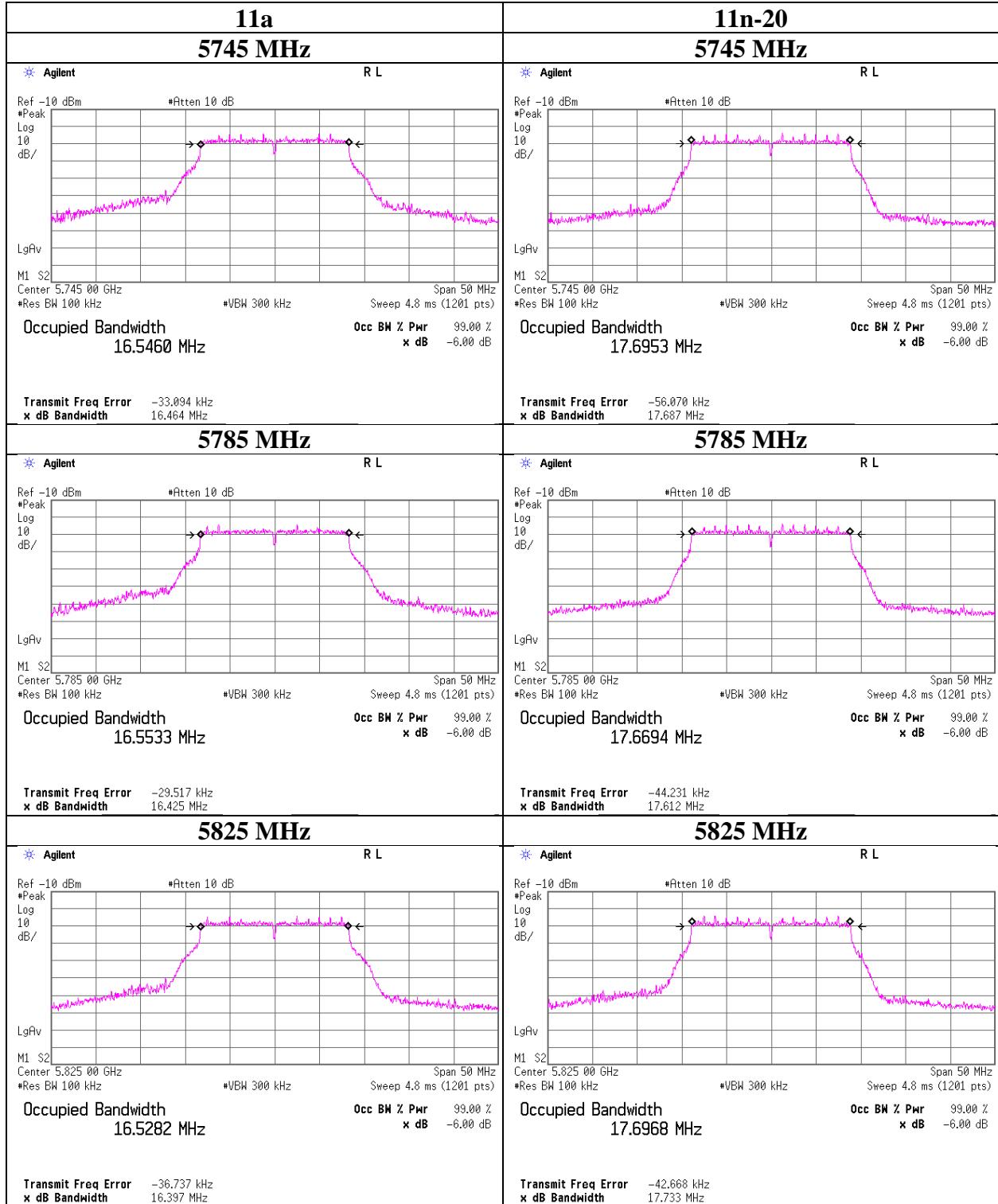
UL Japan, Inc.**Shonan EMC Lab.**

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

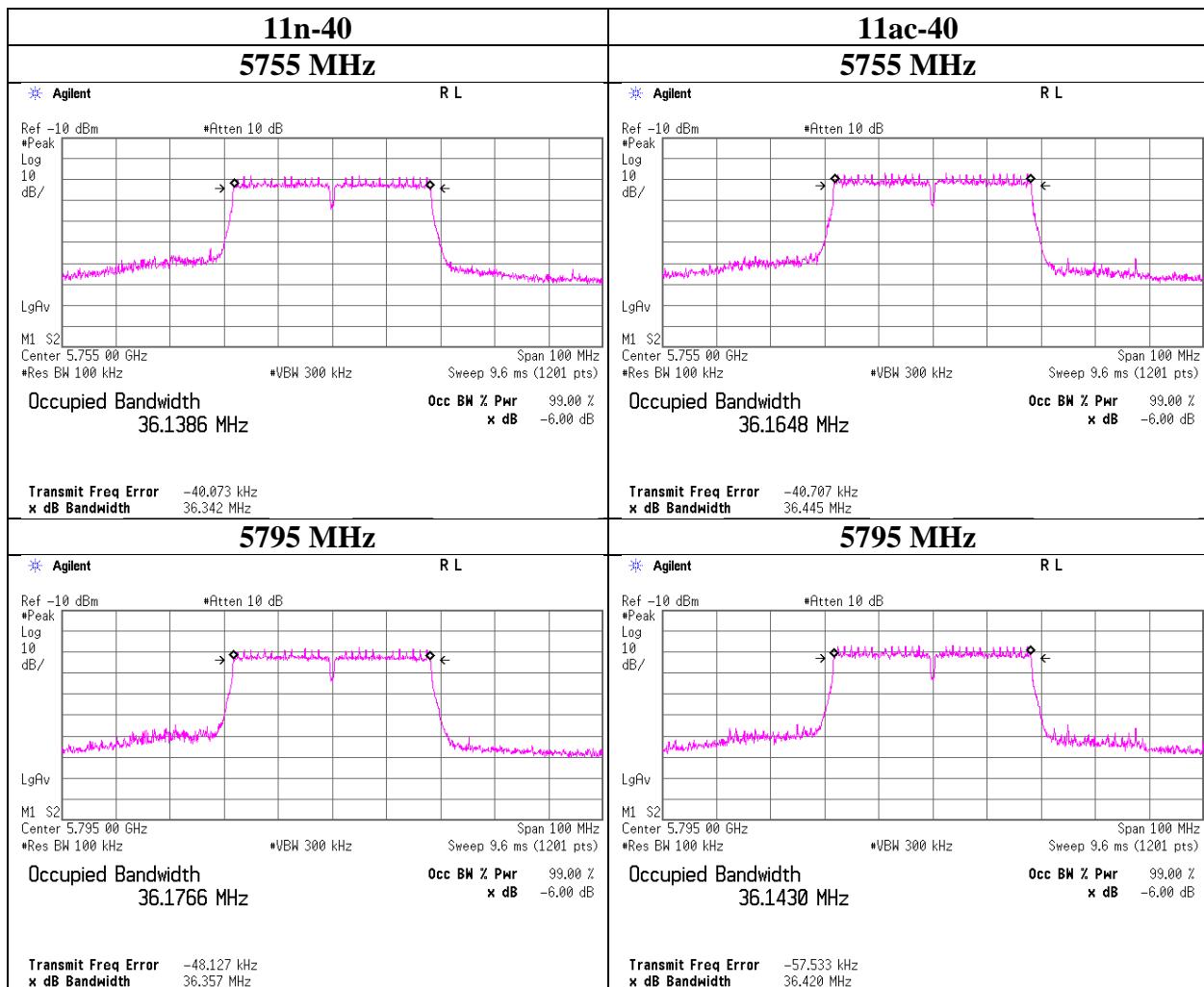
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

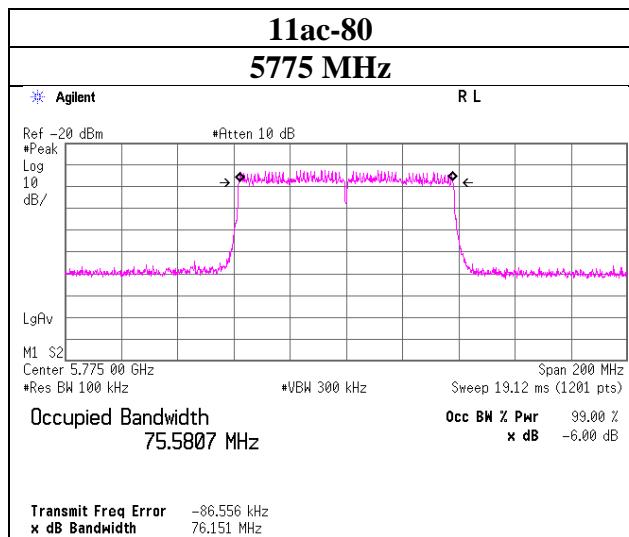
6 dB Bandwidth



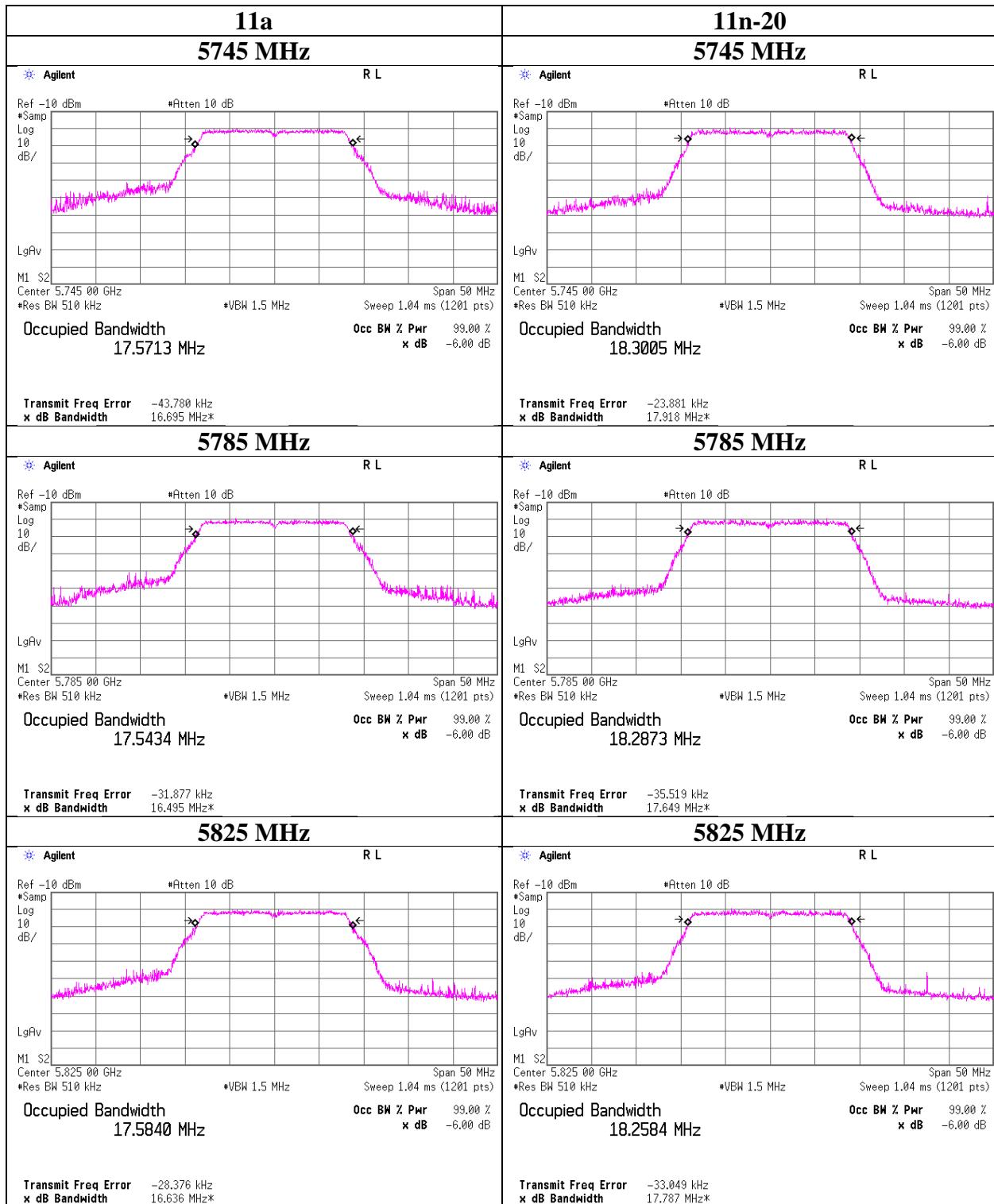
6 dB Bandwidth



6 dB Bandwidth



99 % Occupied Bandwidth



UL Japan, Inc.

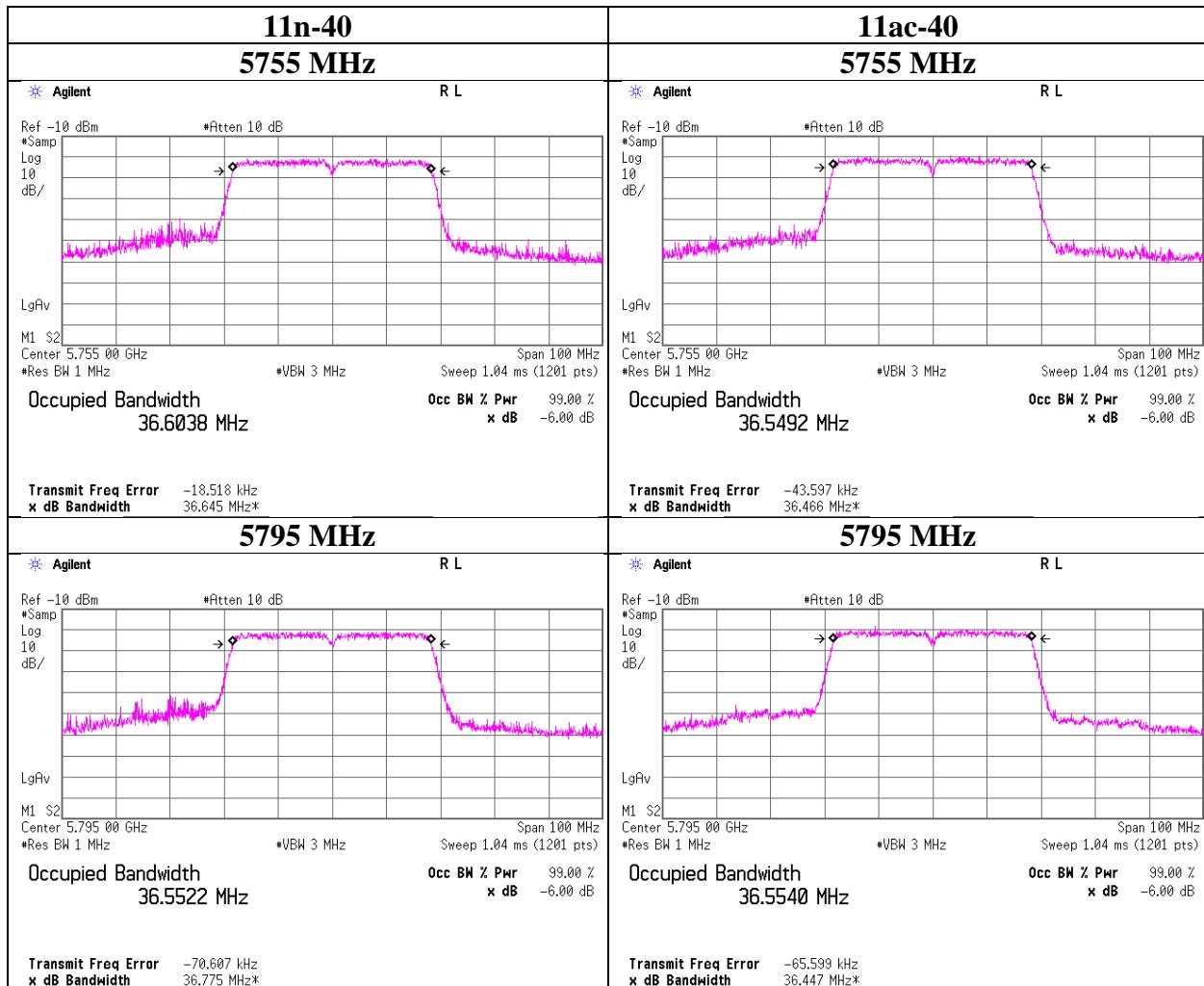
Shonan EMC Lab.

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

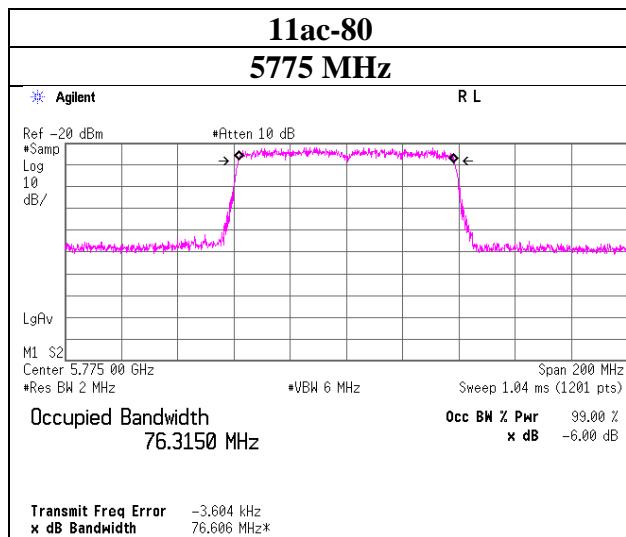
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99 % Occupied Bandwidth



99 % Occupied Bandwidth



Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11a

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted Power			e.i.r.p.				
								Result [dBm]	Limit [mW]	Margin [dB]	Result [dBm]	Limit [mW]	Margin [dB]		
5745	-13.23	4.00	20.01	0.29	-3.0	-	17.571	11.07	12.79	30.00	18.93	8.07	6.41	36.00	27.93
5785	-13.02	4.01	20.01	0.29	-3.0	-	17.543	11.29	13.46	30.00	18.71	8.29	6.75	36.00	27.71
5825	-13.26	4.02	20.00	0.29	-3.0	-	17.584	11.05	12.74	30.00	18.95	8.05	6.38	36.00	27.95

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

The conducted power limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725-5850MHz for IC)

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11n-20

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted Power			e.i.r.p.				
								Result [dBm]	Limit [mW]	Margin [dB]	Result [dBm]	Limit [mW]	Margin [dB]		
5745	-13.42	4.00	20.01	0.84	-3.0	-	18.300	11.43	13.89	30.00	18.57	8.43	6.96	36.00	27.57
5785	-13.58	4.01	20.01	0.84	-3.0	-	18.287	11.27	13.41	30.00	18.73	8.27	6.72	36.00	27.73
5825	-13.69	4.02	20.00	0.84	-3.0	-	18.258	11.17	13.10	30.00	18.83	8.17	6.56	36.00	27.83

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

The conducted power limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725-5850MHz for IC)

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11922902S-C-R2
Date September 4, 2017
Temperature / Humidity 26 deg. C / 48 % RH
Engineer Makoto Hosaka
Mode Tx 11n-40

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted Power			e.i.r.p.		
								Result [dBm]	Limit [mW]	Margin [dB]	Result [dBm]	Limit [mW]	Margin [dB]
5755	-14.20	4.01	20.01	0.60	-3.0	-	36.604	10.42	11.03	30.00	19.58	7.42	5.53
5795	-14.73	4.02	20.01	0.60	-3.0	-	36.552	9.90	9.78	30.00	20.10	6.90	4.90

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

The conducted power limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725-5850MHz for IC)

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11ac-40

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted Power			e.i.r.p.				
								Result [dBm]	Limit [mW]	Margin [dB]	Result [dBm]	Limit [mW]	Margin [dB]		
5755	-17.49	4.01	20.01	2.68	-3.0	-	36.549	9.21	8.34	30.00	20.79	6.21	4.18	36.00	29.79
5795	-17.68	4.02	20.01	2.68	-3.0	-	36.554	9.03	8.00	30.00	20.97	6.03	4.01	36.00	29.97

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

The conducted power limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725-5850MHz for IC)

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11922902S-C-R2
Date September 4, 2017
Temperature / Humidity 26 deg. C / 48 % RH
Engineer Makoto Hosaka
Mode Tx 11ac-80

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor	Antenna Gain [dBi]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted Power			e.i.r.p.				
								Result [dBm]	Limit [mW]	Margin [dB]	Result [dBm]	Limit [mW]	Margin [dB]		
5775	-18.31	4.01	20.01	2.88	-3.0	-	76.315	8.59	7.23	30.00	21.41	5.59	3.62	36.00	30.41

Sample Calculation:

Conducted Power Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Conducted Power Limit (5250 MHz-5350 MHz, 5470 MHz-5725 MHz) = 250 mW or (11 + 10logB) dBm, whichever is lower

The conducted power limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725-5850MHz for IC)

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11922902S-C-R2
Date September 4, 2017
Temperature / Humidity 26 deg. C / 48 % RH
Engineer Makoto Hosaka
Mode Tx 11a

5785 MHz

Mode	Rate Mbps	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
11a	6	-13.02	4.01	20.01	0.29	11.29	*
	9	-13.17	4.01	20.01	0.43	11.28	
	12	-13.44	4.01	20.01	0.56	11.13	
	18	-13.60	4.01	20.01	0.72	11.14	
	24	-13.98	4.01	20.01	0.92	10.96	
	36	-14.25	4.01	20.01	1.41	11.18	
	48	-14.79	4.01	20.01	1.74	10.97	
	54	-14.71	4.01	20.01	1.86	11.17	

* Worst rate

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11n-20

5785 MHz SGI off

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11n-20	0	-13.10	4.01	20.01	0.31	11.23	
	1	-13.36	4.01	20.01	0.59	11.24	
	2	-13.58	4.01	20.01	0.84	11.27	*
	3	-13.89	4.01	20.01	1.04	11.17	
	4	-14.21	4.01	20.01	1.41	11.22	
	5	-14.65	4.01	20.01	1.76	11.13	
	6	-14.63	4.01	20.01	1.86	11.25	
	7	-14.75	4.01	20.01	1.99	11.26	

5785 MHz SGI on

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11n-20	0	-13.17	4.01	20.01	0.34	11.19	
	1	-13.57	4.01	20.01	0.64	11.09	
	2	-13.70	4.01	20.01	0.91	11.23	
	3	-14.14	4.01	20.01	1.15	11.03	
	4	-14.48	4.01	20.01	1.15	10.69	
	5	-14.72	4.01	20.01	1.84	11.14	
	6	-14.87	4.01	20.01	2.00	11.15	
	7	-15.23	4.01	20.01	2.15	10.94	

* Worst rate

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11n-40

5755 MHz SGI off

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
MCS							
11n-40	0	-13.22	4.01	20.01	0.60	11.40	*
	1	-14.75	4.01	20.01	0.97	10.24	
	2	-15.15	4.01	20.01	1.46	10.33	
	3	-15.57	4.01	20.01	1.76	10.21	
	4	-15.85	4.01	20.01	2.04	10.21	
	5	-16.34	4.01	20.01	2.63	10.31	
	6	-16.40	4.01	20.01	2.75	10.37	
	7	-16.65	4.01	20.01	2.91	10.28	

5755 MHz SGI on

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
MCS							
11n-40	0	-13.88	4.01	20.01	0.66	10.80	
	1	-14.06	4.01	20.01	1.28	11.24	
	2	-15.38	4.01	20.01	1.57	10.21	
	3	-15.45	4.01	20.01	1.92	10.49	
	4	-15.79	4.01	20.01	2.34	10.57	
	5	-15.97	4.01	20.01	2.81	10.86	
	6	-16.00	4.01	20.01	2.96	10.98	
	7	-16.33	4.01	20.01	3.10	10.79	

* Worst rate

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11ac-40

5755 MHz SGI off

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11ac-40	0	-15.48	4.01	20.01	0.66	9.20	
	1	-16.14	4.01	20.01	1.15	9.03	
	2	-16.57	4.01	20.01	1.57	9.02	
	3	-16.77	4.01	20.01	1.84	9.09	
	4	-17.21	4.01	20.01	2.34	9.15	
	5	-17.49	4.01	20.01	2.68	9.21	*
	6	-17.97	4.01	20.01	2.88	8.93	
	7	-18.02	4.01	20.01	3.03	9.03	
	8	-18.12	4.01	20.01	3.25	9.15	
	9	-18.48	4.01	20.01	3.25	8.79	

5755 MHz SGI on

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11ac-40	0	-15.81	4.01	20.01	0.66	8.87	
	1	-16.50	4.01	20.01	1.15	8.67	
	2	-16.67	4.01	20.01	1.57	8.92	
	3	-17.17	4.01	20.01	1.84	8.69	
	4	-17.67	4.01	20.01	2.34	8.69	
	5	-17.78	4.01	20.01	2.71	8.95	
	6	-18.25	4.01	20.01	2.96	8.73	
	7	-18.33	4.01	20.01	3.04	8.73	
	8	-18.50	4.01	20.01	3.25	8.77	
	9	-18.68	4.01	20.01	3.25	8.59	

* Worst rate

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

Maximum Conducted Output Power

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11ac-80

5775 MHz SGI off

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11ac-80	0	-16.84	4.01	20.01	1.11	8.29	
	1	-17.52	4.01	20.01	1.92	8.42	
	2	-18.06	4.01	20.01	2.48	8.44	
	3	-17.40	4.01	20.01	2.88	9.50	*
	4	-18.78	4.01	20.01	3.25	8.49	
	5	-19.14	4.01	20.01	3.52	8.40	
	6	-19.27	4.01	20.01	3.71	8.46	
	7	-19.36	4.01	20.01	3.83	8.49	
	8	-19.53	4.01	20.01	3.85	8.34	
	9	-19.73	4.01	20.01	4.52	8.81	

5775 MHz SGI on

Mode	Rate	P/M (AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Duty factor [dB]	Result [dBm]	Remarks
	MCS						
11ac-80	0	-16.72	4.01	20.01	1.21	8.51	
	1	-17.56	4.01	20.01	1.92	8.38	
	2	-17.99	4.01	20.01	2.48	8.51	
	3	-18.17	4.01	20.01	2.83	8.68	
	4	-18.56	4.01	20.01	3.25	8.71	
	5	-18.85	4.01	20.01	3.52	8.69	
	6	-19.56	4.01	20.01	3.69	8.15	
	7	-19.79	4.01	20.01	3.83	8.06	
	8	-19.93	4.01	20.01	3.85	7.94	
	9	-20.20	4.01	20.01	4.52	8.34	

* Worst rate

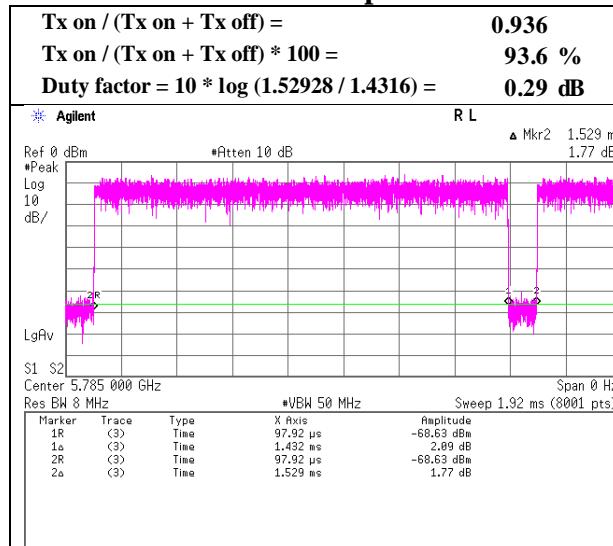
Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

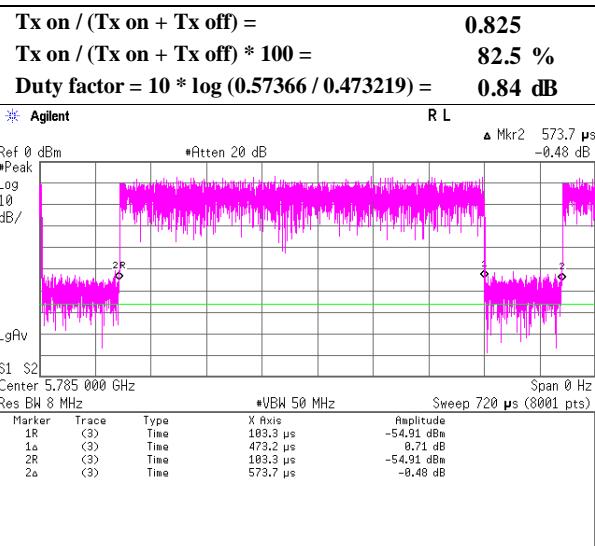
Burst rate confirmation

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx

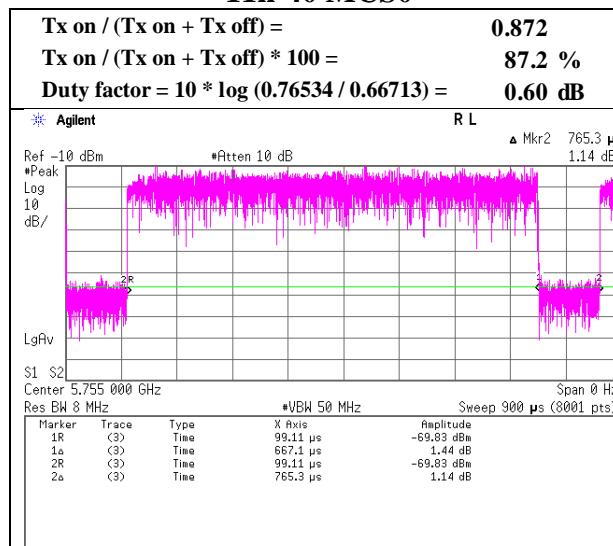
11a 6Mbps



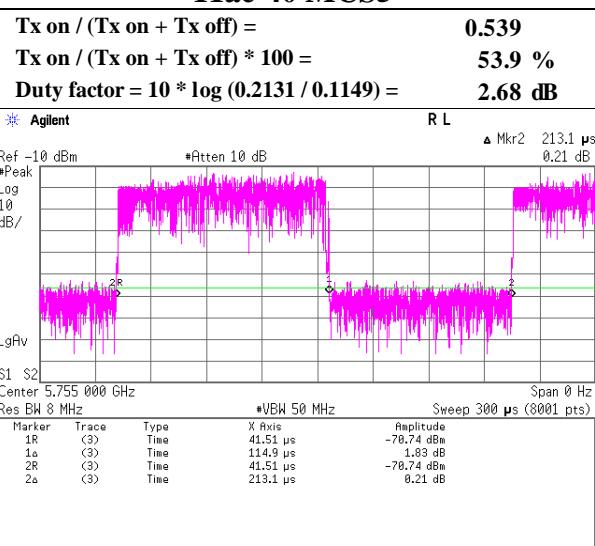
11n-20 MCS2



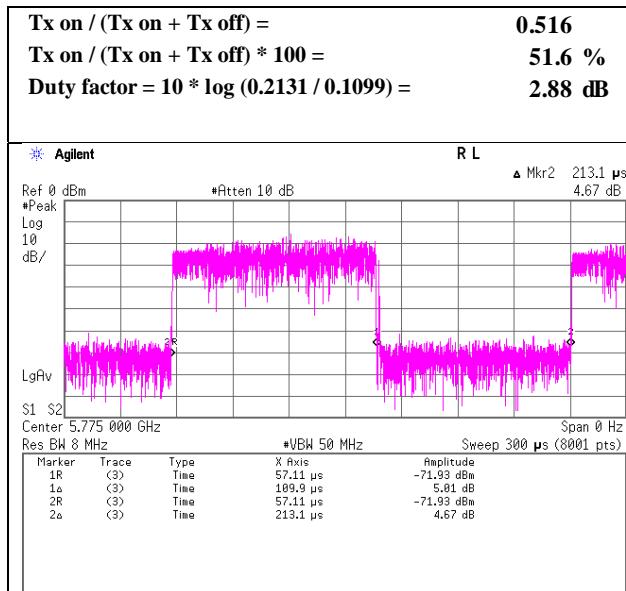
11n-40 MCS0



11ac-40 MCS5



11n-80 MCS3



Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11a

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted)			PSD (e.i.r.p.)		
							Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]	Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]
5745	-32.38	4.00	20.01	0.29	-3.0	6.99	-1.09	30.00	31.09	-4.09	36.00	40.09
5785	-32.77	4.01	20.01	0.29	-3.0	6.99	-1.47	30.00	31.47	-4.47	36.00	40.47
5825	-32.74	4.02	20.00	0.29	-3.0	6.99	-1.44	30.00	31.44	-4.44	36.00	40.44

Sample Calculation:

PSD: Power Spectral Density

The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.

RBW Correction Factor = $10 * \log(\text{Specified bandwidth} / \text{Measured bandwidth})$

PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor

PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11n-20

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted)			PSD (e.i.r.p.)		
							Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]	Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]
5745	-33.17	4.00	20.01	0.84	-3.0	6.99	-1.33	30.00	31.33	-4.33	36.00	40.33
5785	-33.49	4.01	20.01	0.84	-3.0	6.99	-1.64	30.00	31.64	-4.64	36.00	40.64
5825	-33.07	4.02	20.00	0.84	-3.0	6.99	-1.22	30.00	31.22	-4.22	36.00	40.22

Sample Calculation:

PSD: Power Spectral Density

The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.

RBW Correction Factor = $10 * \log(\text{Specified bandwidth} / \text{Measured bandwidth})$

PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor

PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11n-40

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted)			PSD (e.i.r.p.)		
							Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]	Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]
5755	-37.78	4.01	20.01	0.60	-3.0	6.99	-6.17	30.00	36.17	-9.17	36.00	45.17
5795	-37.73	4.02	20.01	0.60	-3.0	6.99	-6.11	30.00	36.11	-9.11	36.00	45.11

Sample Calculation:

PSD: Power Spectral Density

The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.

RBW Correction Factor = $10 * \log(\text{Specified bandwidth} / \text{Measured bandwidth})$

PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor

PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11ac-40

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted)			PSD (e.i.r.p.)		
							Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]	Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]
5755	-36.56	4.01	20.01	2.68	-3.0	6.99	-2.87	30.00	32.87	-5.87	36.00	41.87
5795	-37.60	4.02	20.01	2.68	-3.0	6.99	-3.90	30.00	33.90	-6.90	36.00	42.90

Sample Calculation:

PSD: Power Spectral Density

The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.

RBW Correction Factor = $10 * \log(\text{Specified bandwidth} / \text{Measured bandwidth})$

PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor

PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11922902S-C-R2
Date September 4, 2017
Temperature / Humidity 26 deg. C / 48 % RH
Engineer Makoto Hosaka
Mode Tx 11ac-80

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	PSD Reading [dBm /MHz]	Cable Loss [dB]	Atten. Loss [dB]	Duty Factor [dB]	Antenna Gain [dBi]	RBW Correction Factor [dB]	PSD (Conducted)			PSD (e.i.r.p.)		
							Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]	Result [dBm /MHz]	Limit [dBm /MHz]	Margin [dB]
5775	-43.10	4.01	20.01	2.81	-3.0	6.99	-9.28	30.00	39.28	-12.28	36.00	48.28

Sample Calculation:

PSD: Power Spectral Density

The PSD within 5725 MHz to 5825 MHz are based on any 500 kHz band.

RBW Correction Factor = $10 * \log(\text{Specified bandwidth} / \text{Measured bandwidth})$

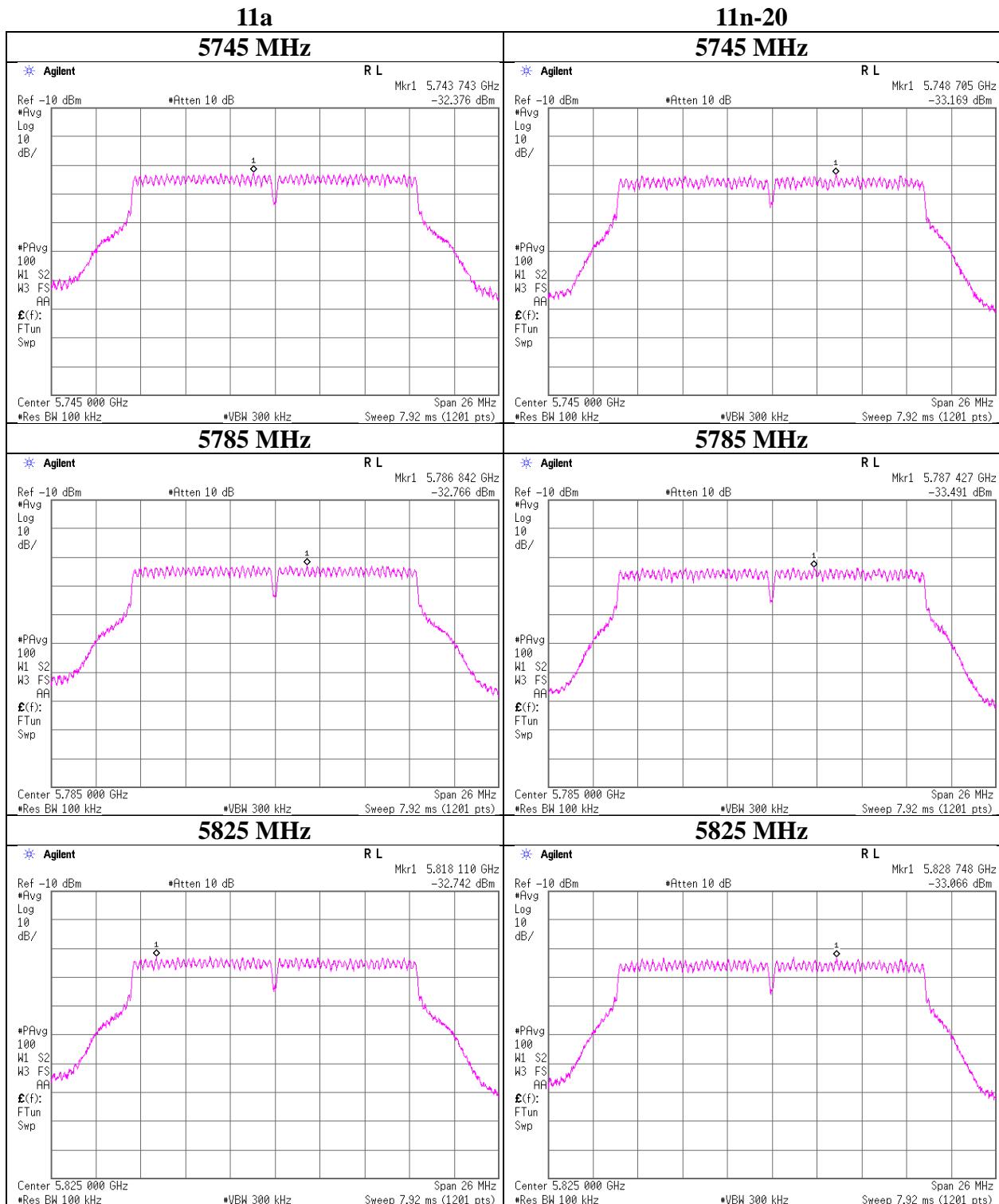
PSD Result (Conducted) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty Factor + RBW Correction Factor

PSD Result (e.i.r.p.) = Conducted PSD Result + Antenna Gain

The conducted PSD limit was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (All frequencies for FCC, 5725 MHz-5850 MHz for IC)

Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx



UL Japan, Inc.

Shonan EMC Lab.

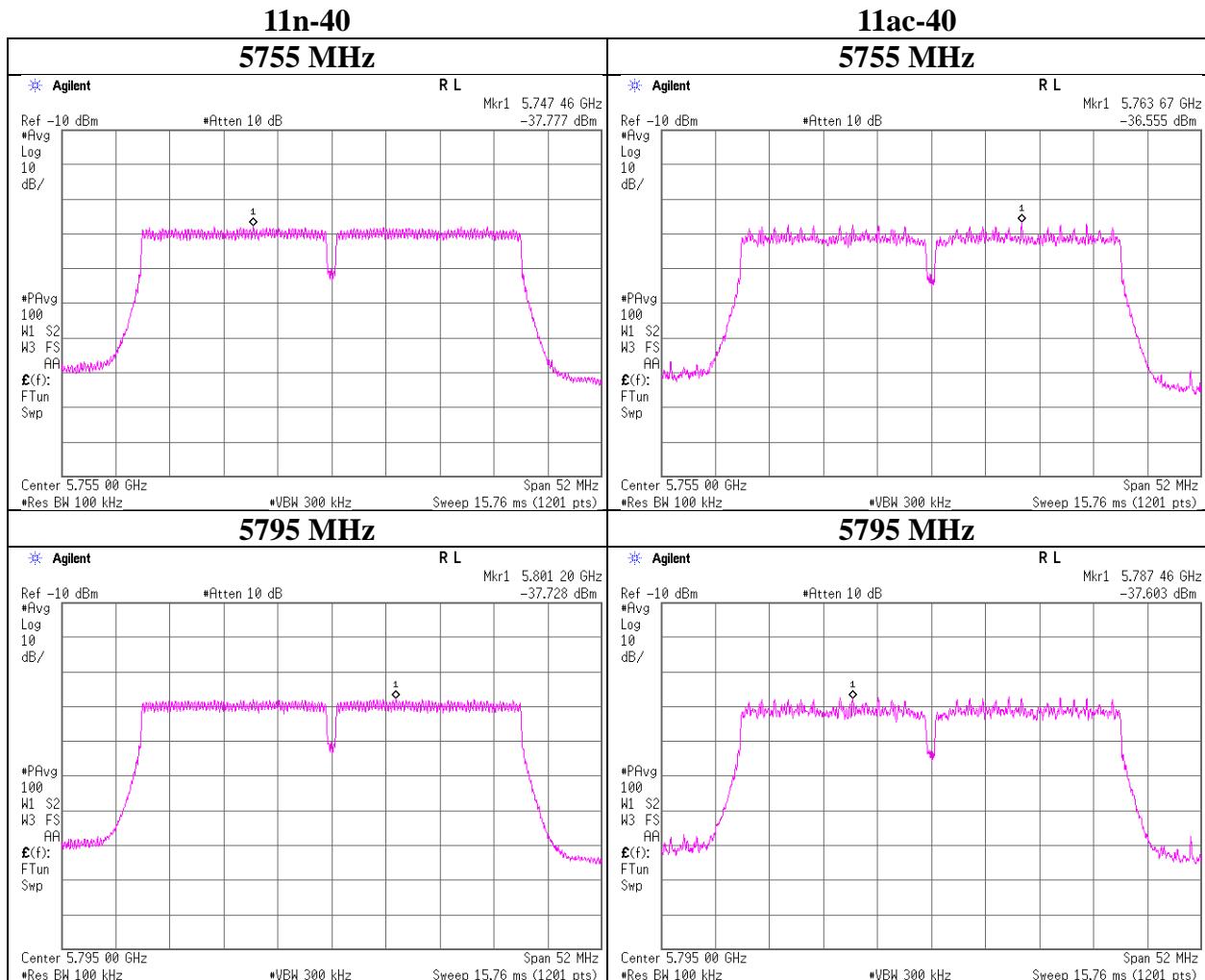
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

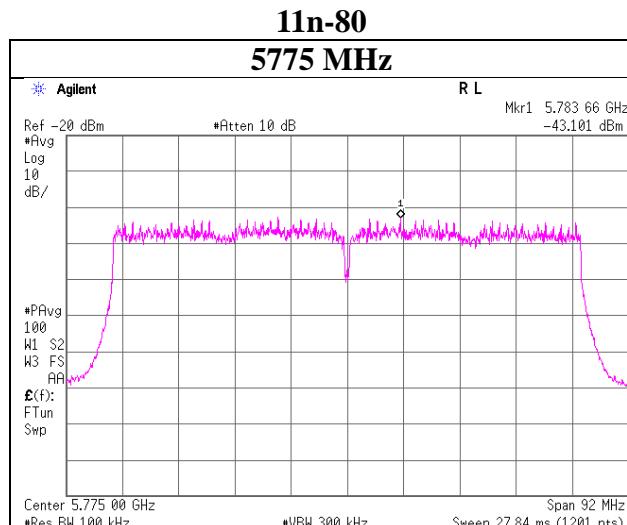
Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx



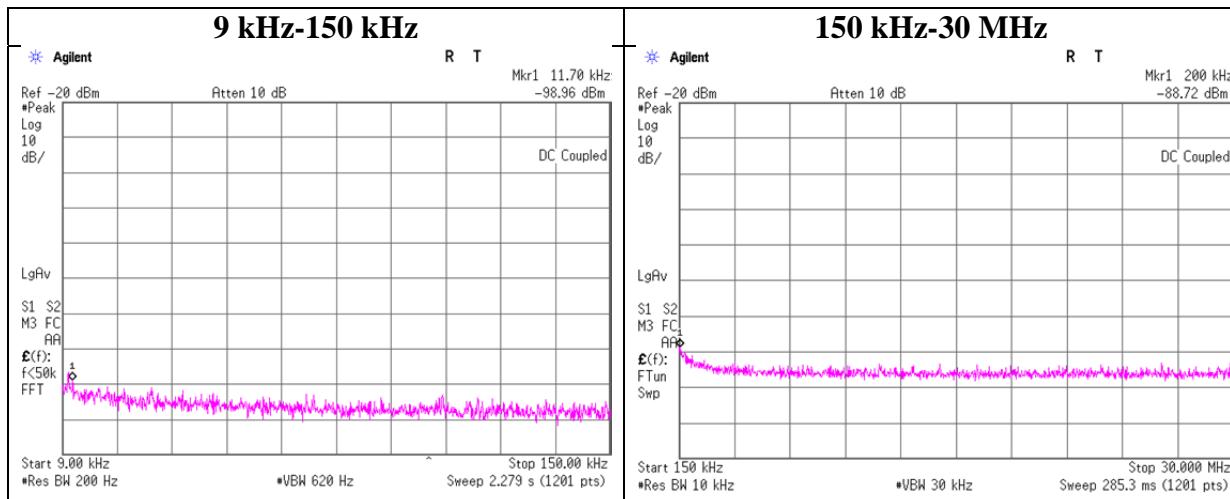
Maximum Power Spectral Density

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 11922902S-C-R2
Date September 4, 2017
Temperature / Humidity 26 deg. C / 48 % RH
Engineer Makoto Hosaka
Mode Tx



Conducted Spurious Emission

Test place Shonan EMC Lab. No.5 Shielded Room
 Report No. 11922902S-C-R2
 Date September 4, 2017
 Temperature / Humidity 26 deg. C / 48 % RH
 Engineer Makoto Hosaka
 Mode Tx 11a 5785 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
11.70	-99.0	1.82	0.0	2.0	1	-95.1	300	6.0	-33.9	46.2	80.1	
200.00	-88.7	1.82	0.0	2.0	1	-84.9	300	6.0	-23.6	21.5	45.1	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

EIRP[dBm] = Reading [dBm] + Cable loss [dB] + Attenuator Loss [dB] + Antenna gain [dBi] + 10 * log (N)

N: Number of output

*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-G32	Coaxial Cable	Junkosha	MWX241-02 000KMSKMS	OCT-09-13-00 5	AT	2016/11/07 * 12
SAT20-06	Attenuator	Weinschel Corp.	54A-20	31506	AT	2017/04/20 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2017/05/01 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2017/05/01 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2016/12/13 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2016/10/17 * 12
SRENT-10	Spectrum Analyzer	Agilent	E4440A	US41421511	AT	2016/12/05 * 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: AT: Antenna Terminal Conducted test

UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401