RADIO TEST REPORT

Test Report No. : 12804674H-C-R2

Applicant	:	**DENSO Corporation**
Type of Equipment	:	**Control Box**
Model No.	:	**DNNS097**
FCC ID	:	**HYQDNNS097**
Test regulation	:	**FCC Part 15 Subpart E: 2019 (Except for DFS)**
Test Result	:	**Complied (Refer to SECTION 3.2)**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 12804674H-C-R1. 12804674H-C-R1 is replaced with this report.

Date of test: July 30 to November 15, 2019

Representative test engineer:
Junki Nagatomi
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Approved by:
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Engineer
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☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 12804674H-C

Revision History

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12804674H-C	October 10, 2019	-	-
1	12804674H-C-R1	November 19, 2019	P.6	- Deletion of Clock frequency(ies) in the system - Addition of Clock frequency (maximum) in Radio Specification
1	12804674H-C-R1	November 19, 2019	P.8	Update the Uncertainty table.
1	12804674H-C-R1	November 19, 2019	P.10, 11	Addition of Tested Frequency at Additional band: - 20 MHz band: 5720 MHz - 40 MHz band: 5710 MHz - 80 MHz band: 5690 MHz
1	12804674H-C-R1	November 19, 2019	P.12	Correction of Cable No. 5 and 12 information: - Cable's shield: from Shielded to Unshielded
1	12804674H-C-R1	November 19, 2019	P.17, 18, 50 to 55, 62 to 67, 74 to 79, 115, 131, 144,	Addition of Test data following frequencies: - 20 MHz band: 5720 MHz - 40 MHz band: 5710 MHz - 80 MHz band: 5690 MHz
1	12804674H-C-R1	November 19, 2019	P.18	Correction of test data -11n-40 26 dB Emission Bandwidth (5310 MHz to 5670 MHz) -11ac-40 26 dB Emission Bandwidth (5310 MHz to 5670 MHz)
1	12804674H-C-R1	November 19, 2019	P.20, 22, 24 to 27, 30, 33, 36, 38, 40, 41, 81, 84, 87, 90, 93, 96, 98, 100, 102 to 104	Addition of Wave forms following frequencies: - 20 MHz band: 5720 MHz - 40 MHz band: 5710 MHz - 80 MHz band: 5690 MHz
1	12804674H-C-R1	November 19, 2019	P.27	Correction of Antenna number: From Antenna 1 to Antenna 2
1	12804674H-C-R1	November 19, 2019	P.40	Correction of 11n-40 6 dB Bandwidth data at 5795 MHz
1	12804674H-C-R1	November 19, 2019	P.62 to 67	Addition of Result (Burst power average)
1	12804674H-C-R1	November 19, 2019	P.68 to 70	Deletion of SISO Wave forms
1	12804674H-C-R1	November 19, 2019	P.71 to 73	Addition of Burst rate confirmation (SAR Power)
1	12804674H-C-R1	November 19, 2019	P.79	Correction of Antenna 1+2 table: PSD (Conducted and e.i.r.p.) value at 5290 MHz
1	12804674H-C-R1	November 19, 2019	P.105, 107, 108, 110, 112, 113, 116, 118, 119, 121, 123, 124, 126, 128, 129, 132, 134	Correction of Distance factor for 1 GHz to 10 GHz
1	12804674H-C-R1	November 19, 2019	P.124	Deletion of 5250 MHz data
1	12804674H-C-R1	November 19, 2019	P.132, 134, 140, 142	Correction of Limit
1	12804674H-C-R1	November 19, 2019	P151, 152	Addition of Test instruments used on October 26 to November 15, 2019
2	12804674H-C-R2	November 28, 2019	P.12	Correction of Name of Cable No.12 from Signal Cable to Signal and DC Cable

Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation
AC	Alternating Current
AFH	Adaptive Frequency Hopping
AM	Amplitude Modulation
Amp, AMP	Amplifier
ANSI	American National Standards Institute
Ant, ANT	Antenna
AP	Access Point
ASK	Amplitude Shift Keying
Atten., ATT	Attenuator
AV	Average
BPSK	Binary Phase-Shift Keying
BR	Bluetooth Basic Rate
BT	Bluetooth
BT LE	Bluetooth Low Energy
BW	BandWidth
Cal Int	Calibration Interval
CCK	Complementary Code Keying
Ch., CH	Channel
CISPR	Comite International Special des Perturbations Radioelectriques
CW	Continuous Wave
DBPSK	Differential BPSK
DC	Direct Current
D-factor	Distance factor
DFS	Dynamic Frequency Selection
DQPSK	Differential QPSK
DSSS	Direct Sequence Spread Spectrum
EDR	Enhanced Data Rate
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EN	European Norm
ERP, e.r.p.	Effective Radiated Power
EU	European Union
EUT	Equipment Under Test
Fac.	Factor
FCC	Federal Communications Commission
FHSS	Frequency Hopping Spread Spectrum
FM	Frequency Modulation
Freq.	Frequency
FSK	Frequency Shift Keying
GFSK	Gaussian Frequency-Shift Keying
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
Hori.	Horizontal
ICES	Interference-Causing Equipment Standard
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IF	Intermediate Frequency
ILAC	International Laboratory Accreditation Conference
ISED	Innovation, Science and Economic Development Canada
ISO	International Organization for Standardization
JAB	Japan Accreditation Board
LAN	Local Area Network
LIMS	Laboratory Information Management System
MCS	Modulation and Coding Scheme
MRA	Mutual Recognition Arrangement
N/A	Not Applicable
NIST	National Institute of Standards and Technology
NS	No signal detect.
NSA	Normalized Site Attenuation
NVLAP	National Voluntary Laboratory Accreditation Program
OBW	Occupied Band Width
OFDM	Orthogonal Frequency Division Multiplexing
P/M	Power meter
PCB	Printed Circuit Board
PER	Packet Error Rate
PHY	Physical Layer
PK	Peak
PN	Pseudo random Noise
PRBS	Pseudo-Random Bit Sequence
PSD	Power Spectral Density
QAM	Quadrature Amplitude Modulation
QP	Quasi-Peak
QPSK	Quadri-Phase Shift Keying
RBW	Resolution Band Width
RDS	Radio Data System
RE	Radio Equipment
RF	Radio Frequency
RMS	Root Mean Square
RSS	Radio Standards Specifications
Rx	Receiving
SA, S/A	Spectrum Analyzer
SG	Signal Generator
SVSWR	Site-Voltage Standing Wave Ratio
TR	Test Receiver
Tx	Transmitting
VBW	Video BandWidth
Vert.	Vertical
WLAN	Wireless LAN

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SECTION 1: Customer information

Company Name	:	DENSO Corporation
Address	:	1-1 Showa-cho, Kariya-shi, Aichi-ken 448-8661, Japan
Telephone Number	:	+81-566-26-5919
Facsimile Number	:	+81-566-25-4920
Contact Person	:	Isamu Suzuki

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No., FCC ID on the cover and other relevant pages
- Operating/Test Mode(s) (Mode(s)) on all the relevant pages
- SECTION 1: Customer information
- SECTION 2: Equipment under test (E.U.T.)
- SECTION 4: Operation of E.U.T. during testing

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

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

2.1 Identification of E.U.T.

Type of Equipment	:	Control Box
Model No.	:	DNNS097
Serial No.	:	Refer to SECTION 4.2
Rating	:	DC 12.0 V
Receipt Date of Sample (Information from test lab.)	:	July 24, 2019
Country of Mass-production	:	United States of America
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: DNNS097 (referred to as the EUT in this report) is a Control Box.

Feature of EUT:
Operating Temperature : -30 deg. C to +70 deg. C

Radio Specification

Clock frequency (Maximum) : 37.4 MHz (Bluetooth and Wi-Fi Module IC)

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n/ac (20 M band) *1)	IEEE802.11n/ac (40 M band) *1)	IEEE802.11ac (80 M band) *1)
Frequency of operation	2412 MHz - 2462 MHz	2412 MHz - 2462 MHz	(USA) 5180 MHz - 5825 MHz (CANADA) 5280 MHz - 5580 MHz 5660 MHz - 5825 MHz	(USA) 5190 MHz - 5795 MHz (CANADA) 5310 MHz - 5550 MHz 5670 MHz - 5795 MHz	(USA) 5210 MHz - 5775 MHz (CANADA) 5530 MHz 5690 MHz - 5775 MHz
Type of modulation	DSSS/CCK (DQPSK, DBPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM(IEEE802.11ac only))		
Channel spacing	5 MHz		20 MHz	40 MHz	80 MHz
Antenna type	ASSEMBLY WiFi Antenna				
Antenna Connector type	MHF PLUG				
Antenna Gain	-2.9 dBi (max.)				

	GPS/GLONASS	Bluetooth Ver.4.2 with EDR function
Frequency of operation	GPS: 1575.42 MHz GLONASS: 1598.0625 MHz - 1605.375 MHz	2402 MHz - 2480 MHz
Type of modulation	GPS: BPSK GLONASS: FDMA	BT: FHSS (GFSK, π/4-DQPSK, 8-DPSK) LE: GFSK
Channel spacing	-	BT: 1 MHz LE: 2 MHz
Antenna type	External Antenna	ASSEMBLY BT Antenna
Antenna Connector type	FAKRA	MHF PLUG
Antenna Gain	26.5 dBic	-2.9 dBi (max.)

*1) This test report applies to WLAN (5 GHz band).

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart E FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices Section 15.407 General technical requirements

* The revisions made after testing date do not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013	**FCC:** 15.407 (b) (6) / 15.207	N/A	N/A	*1)
	ISED: RSS-Gen 8.8	**ISED:** RSS-Gen 8.8			
26 dB Emission Bandwidth	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1) (2) (3)	See data	Complied a)	Conducted
	ISED: -	**ISED:** -			
Maximum Conducted Output Power	**FCC:** KDB Publication Number 789033	**FCC:** 15.407 (a) (1) (2) (3)		Complied b)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1			
Maximum Power Spectral Density	**FCC:** KDB Publication Number 789033	**FCC :** 15.407 (a) (1) (2) (3)		Complied c)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.1.1 6.2.2.1 6.2.3.1 6.2.4.1			
Spurious Emission Restricted Band Edge	**FCC:** ANSI C63.10-2013 KDB Publication Number 789033	**FCC:** 15.407 (b), 15.205 and 15.209	5.9 dB 160.4170 MHz QP, Vert.	Complied d) / e)	Conducted (< 30 MHz)/ Radiated (> 30 MHz) *2)
	ISED: -	**ISED:** RSS-247 6.2.1.2 6.2.2.2 6.2.3.2 6.2.4.2			
6 dB Emission Bandwidth	**FCC:** ANSI C63.10-2013	**FCC:** 15.407 (e)	See data	Complied f)	Conducted
	ISED: -	**ISED:** RSS-247 6.2.4.1			

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
* For DFS tests, please see the test report number 12804674H-E issued by UL Japan, Inc.
*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.
*2) Radiated test was selected over 30 MHz based on section FCC 15.407 (b) and KDB 789033 D02 G.3.b).

a) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)
b) Refer to APPENDIX 1 (data of Maximum Conducted Output Power)
c) Refer to APPENDIX 1 (data of Maximum Power Spectral Density)
d) Refer to APPENDIX 1 (data of Radiated Spurious Emission)
e) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
f) Refer to APPENDIX 1 (data of 6 dB Bandwidth)

Symbols:

Complied	The data of this test item has enough margin, more than the measurement uncertainty.
Complied#	The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

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

FCC 15.31 (e)
The EUT provides stable voltage 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 the 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 vehicle. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Band Width	RSS-Gen 6.7	**IC:** -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 26 dB Emission Bandwidth and 99 % Occupied Bandwidth)					
Symbols:					
Complied	The data of this test item has enough margin, more than the measurement uncertainty.				
Complied#	The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.				

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the following results are derived depending on whether or not laboratory uncertainty is applied.

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

Radiated emission

Measurement distance	Frequency range		Uncertainty (+/-)	
			Before Sepmber 30, 2019	After October 1, 2019
3 m	9 kHz to 30 MHz		3.3 dB	3.3 dB
10 m			3.2 dB	3.2 dB
3 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB	4.8 dB
		(Vertical)	5.0 dB	5.0 dB
	200 MHz to 1000 MHz	(Horizontal)	5.2 dB	5.2 dB
		(Vertical)	6.3 dB	6.3 dB
10 m	30 MHz to 200 MHz	(Horizontal)	4.8 dB	4.8 dB
		(Vertical)	4.9 dB	4.8 dB
	200 MHz to 1000 MHz	(Horizontal)	5.0 dB	5.0 dB
		(Vertical)	5.0 dB	5.0 dB
3 m	1 GHz to 6 GHz		5.0 dB	4.9 dB
	6 GHz to 18 GHz		5.3 dB	5.2 dB
1 m	10 GHz to 26.5 GHz		5.8 dB	5.5 dB
	26.5 GHz to 40 GHz		5.8 dB	5.5 dB
10 m	1 GHz to 18 GHz		5.2 dB	5.2 dB

Antenna Terminal test

Test Item	Uncertainty (+/-)	
	Before Sepmber 30, 2019	After October 1, 2019
26 dB Emission Bandwidth / 6 dB Emission Bandwidth / 99 % Occupied Bandwidth	0.96 %	0.96%
Maximum Conducted Output Power / Average Output Power	1.3 dB	1.4 dB
Burst Rate	0.10 %	0.10%
Maximum Power Spectral Density	2.7 dB	2.6 dB
Spurious Emission (Conducted)	1.9 dB	2.6 dB

3.5 Test Location

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NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Test operating mode was determined as follows according to "Section 1 of 6 802.11 a/b/g/n testing - Managing Complex Regulatory Approvals -" of TCB Council Workshop October 2009 and also was judged the necessity of 802.11ac mode by the pre-test.

Mode	Remarks*
IEEE 802.11a SISO (11a)	48 Mbps, PN9
IEEE 802.11n SISO 20 MHz BW (11n-20) IEEE 802.11n MIMO 20 MHz BW (11n-20)	MCS 3 (1 Tx), PN9 MCS 15 (2 Tx), PN9
IEEE 802.11n SISO 40 MHz BW (11n-40) IEEE 802.11n MIMO 40 MHz BW (11n-40)	MCS 4 (1 Tx), PN9 MCS 14 (2 Tx), PN9
IEEE 802.11ac SISO 20 MHz BW (11ac-20) IEEE 802.11ac MIMO 20 MHz BW (11ac-20)	MCS 4 (1 Tx), PN9 MCS 7 (2 Tx), PN9
IEEE 802.11ac SISO 40 MHz BW (11ac-40) IEEE 802.11ac MIMO 40 MHz BW (11ac-40)	MCS 7 (1 Tx), PN9 MCS 1 (2 Tx), PN9
IEEE 802.11ac SISO 80 MHz BW (11ac-80) IEEE 802.11ac MIMO 80 MHz BW (11ac-80)	MCS 8 (1 Tx), PN9 MCS 1 (2 Tx), PN9
*The worst condition was determined based on the test result of Maximum Conducted Output Power.	
*Power of the EUT was set by the software as follows; Power settings: 11a: 11 dBm 11n-20: SISO 11 dBm / MIMO 11 dBm 11n-40: SISO 9 dBm / MIMO 9 dBm 11ac-20: SISO 10 dBm / MIMO 10 dBm 11ac-40: SISO 9 dBm / MIMO 9 dBm 11ac-80: SISO 8 dBm / MIMO 8 dBm Software: TYAA WiFi Validation V1.1.2.67 *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.	

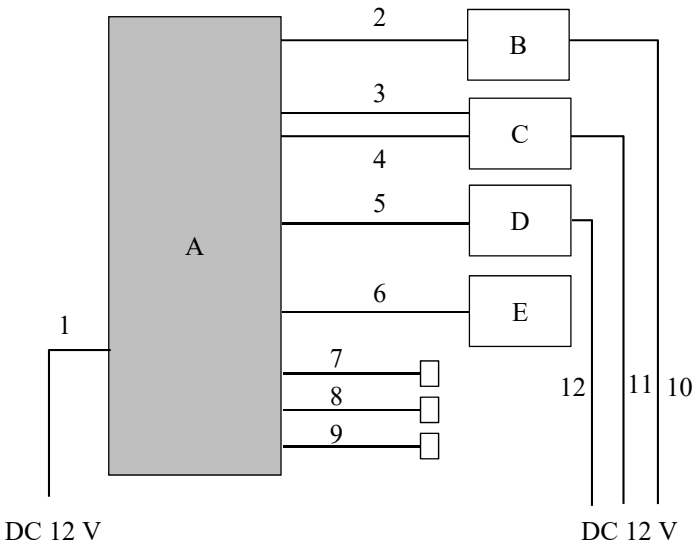
*The details of Operation mode(s)-1/2

Test Item	Operating Mode	Tested Antenna	Tested Frequency			
			Lower Band	Middle Band	Additional Band	Upper Band
26 dB Emission Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx	1	-	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	-
	11n-40 Tx 11ac-40 Tx		-	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	-
	11ac-80 Tx		-	5290 MHz	5530 MHz 5610 MHz 5690 MHz	-

*The details of Operation mode(s)-2/2

Test Item	Operating Mode	Tested Antenna	Tested Frequency			
			Lower Band	Middle Band	Additional Band	Upper Band
99 % Occupied Bandwidth,	11a Tx 11n-20 Tx 11ac-20 Tx	1	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	5755 MHz 5795 MHz
	11ac-80 Tx		5210 MHz	5290 MHz	5530 MHz 5610 MHz 5690 MHz	5775 MHz
Maximum Conducted Output Power, Maximum Power Spectral Density	11a Tx	1	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-20 Tx 11ac-20 Tx	1+2, 1, 2	5180 MHz 5220 MHz 5240 MHz	5260 MHz 5300 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx		5190 MHz 5230 MHz	5270 MHz 5310 MHz	5510 MHz 5550 MHz 5670 MHz 5710 MHz	5755 MHz 5795 MHz
	11ac-80 Tx		5210 MHz	5290 MHz	5530 MHz 5610 MHz 5690 MHz	5775 MHz
20 dB Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx	1	5240 MHz	-	-	-
	11n-40 Tx 11ac-40 Tx		5230 MHz	-	-	-
	11ac-80 Tx		5210 MHz	-	-	-
6 dB Bandwidth	11a Tx 11n-20 Tx 11ac-20 Tx	1	-	-	-	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx 11ac-40 Tx		-	-	-	5855 MHz 5795 MHz
	11ac-80 Tx		-	-	-	5775 MHz
Radiated Spurious Emission (Below 1 GHz)	11n-20 Tx	1+2	5180 MHz	-	-	-
Radiated Spurious Emission (Above 1 GHz)	11n-20 Tx	1+2	5180 MHz	5260 MHz 5320 MHz	5500 MHz 5580 MHz 5700 MHz 5720 MHz	5745 MHz 5785 MHz 5825 MHz
	11n-40 Tx	1+2	5190 MHz	5270 MHz 5310 MHz	5500 MHz 5670 MHz 5710 MHz	5755 MHz 5795 MHz
	11ac-80 Tx	1+2	5210 MHz	5290 MHz	5530 MHz 5610 MHz 5690 MHz	5775 MHz
Conducted Spurious Emission	11n-20 Tx	1	5180 MHz	-	-	-

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Control Box	DNNS097	No.1 for AT* No.2 for RE*	DENSO CORPORATION	EUT
B	Display	39710-TYAA-A010-M1	M17007A-ES1	Panasonic Corporation	-
C	Jig	cPhy	No.6	MICROCHIP	-
D	Touch Pad	-	-	VISTEON CORPORATION	-
E	GPS Antenna	V3-000624	No.6	Yokowo Co.,Ltd	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.0	Unshielded	Unshielded	-
2	Display Cable	1.0	Shielded	Shielded	-
3	Signal Cable	1.0	Shielded	Shielded	-
4	Signal Cable	1.0	Shielded	Shielded	-
5	Signal Cable	2.0	Unshielded	Unshielded	-
6	GPS Antenna Cable	2.0	Shielded	Shielded	-
7	USB Cable	1.0	Shielded	Shielded	-
8	USB Cable	1.0	Shielded	Shielded	-
9	USB Cable	1.0	Shielded	Shielded	-
10	DC Cable	2.0	Unshielded	Unshielded	-
11	DC Cable	2.0	Unshielded	Unshielded	-
12	Signal and DC Cable	2.0	Unshielded	Unshielded	-

*AT: Antenna Terminal Conducted tests, RE: Radiated Spurious Emission

SECTION 5: Radiated Spurious Emission and Band Edge Compliance

Test Procedure

< Below 1GHz >
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

< Above 1GHz >
EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

< Below 1GHz >
The result also satisfied with the general limits specified in section 15.209 (a).

< Above 1GHz >
Inside of restricted bands (Section 15.205):
Apply to limit in the Section 15.209 (a).

Outside of the restricted bands:
Apply to limit 68.2 dBuV/m, 3 m (-27 dBm e.i.r.p.*) in the Section 15.407 (b) (1) (2) (3).

For W58 Bandedge
-27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge in the section 15.407(b)(4)(i).

Restricted band edge:
Apply to limit in the Section 15.209 (a).
Since this limit is severer than the limit of the inside of restricted bands.

*Electric field strength to e.i.r.p. conversion:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ (uV/m)}$$:P is the e.i.r.p. (Watts)

Test Antennas are used as below;

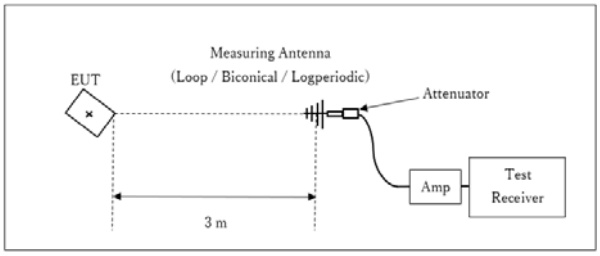
Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

Frequency	Below 1 GHz	Above 1 GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	Peak	Average
IF Bandwidth	BW: 120 kHz	RBW: 1 MHz VBW: 3 MHz	Method AD *1) RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: ≥ 100 traces If duty cycle was less than 98%, a duty factor was added to the results.

*1) The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

Figure 2: Test Setup

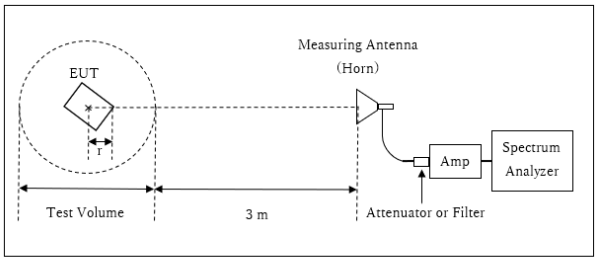
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



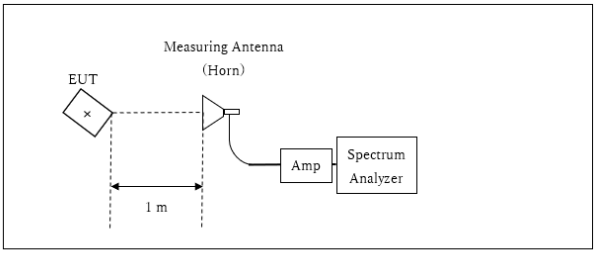
r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (4.0 m / 3.0 m) = 2.5 dB
* Test Distance: (3 + Test Volume /2) - r = 4.0 m

Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.0 m *

* The test was performed with r = 0.0 m since EUT is small and it was the rather conservative condition.

10 GHz - 40 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.5 dB
*Test Distance: 1 m

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

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

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

SECTION 6: 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
26 dB Bandwidth	Enough to capture the emission	Close to 1 % of EBW	> RBW	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 % to 5 % of OBW	≥ 3 RBW	Auto	Peak	Max Hold	Spectrum Analyzer
20 dB Bandwidth	Enough to capture the emission	100 kHz	300 kHz	Auto	Peak	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	1 MHz or 470 kHz *2)	≥ 3 RBW	Auto	RMS Power Averaging (200 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	9.1 kHz	27 kHz				

* The test method was also referred to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 "Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E".

*1) Peak 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 kHz / 470 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 = 9.1 kHz)

The test results and limit are rounded off to two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test data : **APPENDIX**
Test result : **Pass**

APPENDIX 1: Test data

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No.	12804674H	
Test place	Ise EMC Lab. No.6 Measurement Room / Shielded Room	
Date	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya
Mode	Tx	

11a

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	17062.9
	5220	-	16962.0
	5240	-	16940.6
	5260	20.777	17057.7
	5300	20.675	16988.6
	5320	20.785	17032.7
	5500	20.881	17048.1
	5580	20.766	17006.8
	5700	20.808	17061.6
	5720	20.891	17127.1
	5745	-	17105.7
	5785	-	17023.0
	5825	-	17037.7

11n-20

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	18000.8
	5220	-	18052.3
	5240	-	18090.0
	5260	21.057	18090.1
	5300	21.237	18092.1
	5320	21.002	18133.1
	5500	21.368	18101.9
	5580	21.029	18100.2
	5700	20.862	18103.4
	5720	21.386	18165.7
	5745	-	18063.6
	5785	-	18115.2
	5825	-	18134.3

11ac-20

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5180	-	18038.1
	5220	-	18049.0
	5240	-	18080.0
	5260	21.188	18108.0
	5300	21.247	18141.6
	5320	21.271	18105.1
	5500	21.301	18142.6
	5580	21.012	18141.5
	5700	21.280	18170.5
	5720	21.399	18187.4
	5745	-	18155.5
	5785	-	18125.3
	5825	-	18153.5

26 dB Emission Bandwidth and 99 % Occupied Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room / Shielded Room
Date	September 2, 2019
Temperature / Humidity	24 deg. C / 63 % RH
Engineer	Takumi Shimada
Mode	Tx

11n-40

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5190	-	36384.3
	5230	-	36406.2
	5270	39.518	36577.5
	5310	39.185	36449.7
	5510	39.531	36421.4
	5550	39.301	36466.6
	5670	39.387	36464.1
	5710	39.631	36506.0
	5755	-	36499.3
	5795	-	36357.5

11ac-40

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 1	5190	-	36929.8
	5230	-	36420.8
	5270	39.841	36540.7
	5310	39.848	36640.0
	5510	39.871	36582.8
	5550	39.816	36615.7
	5670	39.878	36656.1
	5710	40.098	36666.7
	5755	-	36399.0
	5795	-	36494.4

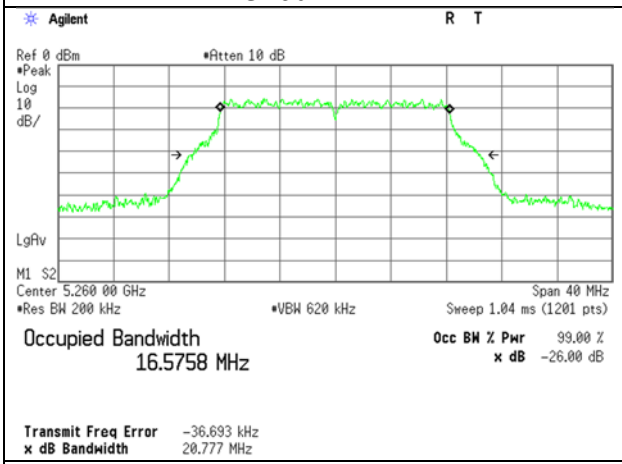
11ac-80

Antenna	Tested Frequency [MHz]	26 dB Emission Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]
Antenna 2	5210	-	75870.9
	5290	80.816	75732.3
	5530	80.961	75742.5
	5610	81.182	75744.3
	5690	81.301	76119.8
	5775	-	75936.5

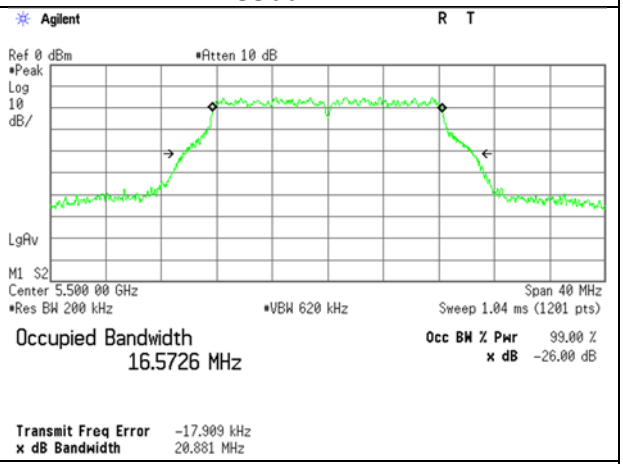
26 dB Emission Bandwidth

11a, Antenna 1

5260 MHz



5500 MHz



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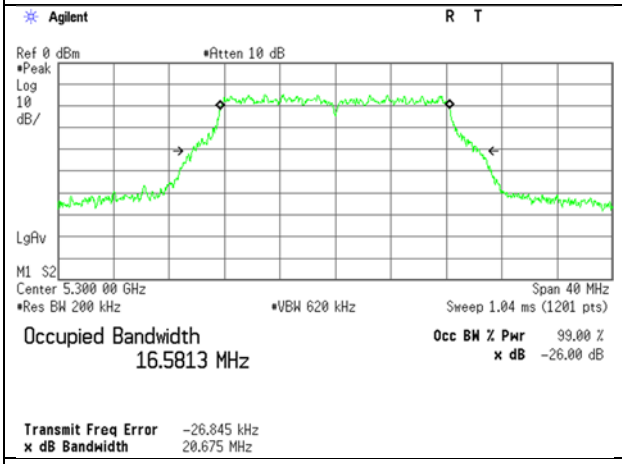
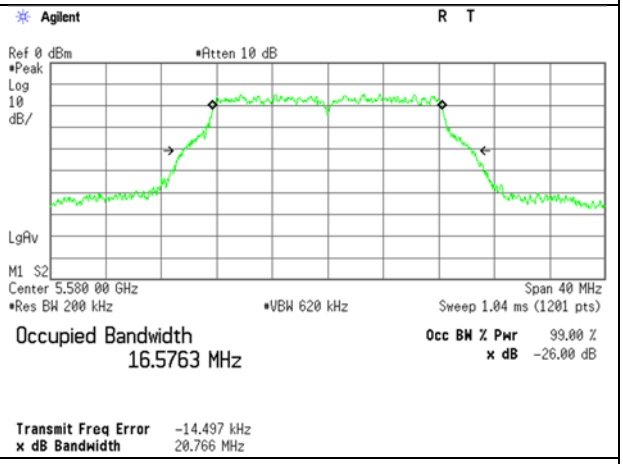


5580 MHz



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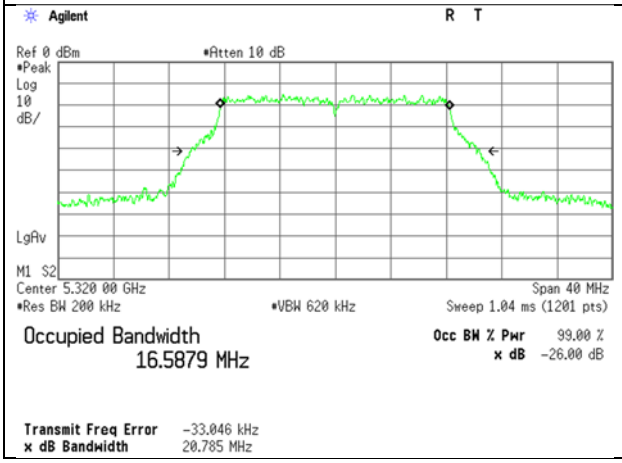

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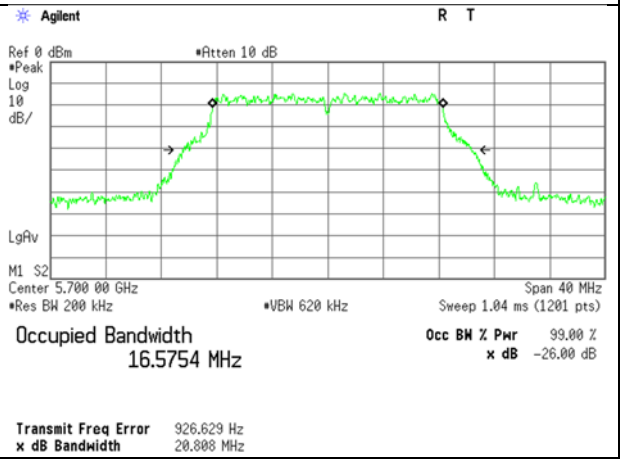
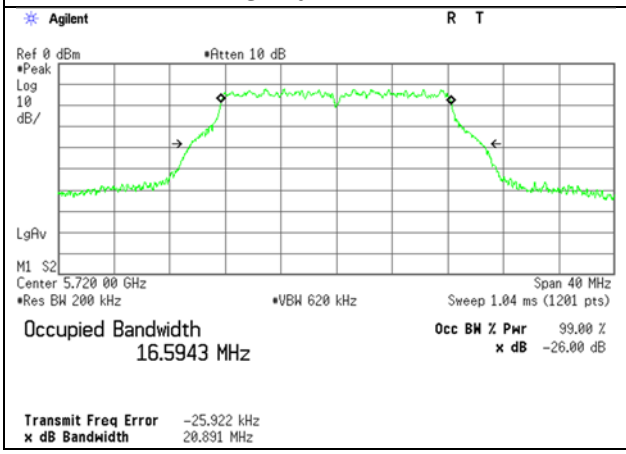


26 dB Emission Bandwidth

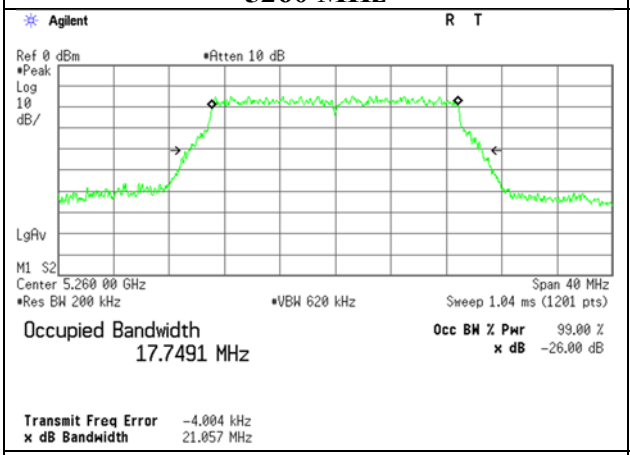
11a, Antenna 1

5720 MHz	
	

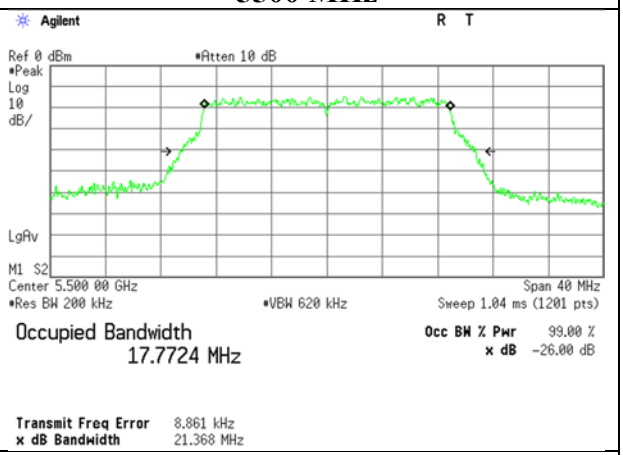
26 dB Emission Bandwidth

11n-20, Antenna 1

5260 MHz



5500 MHz



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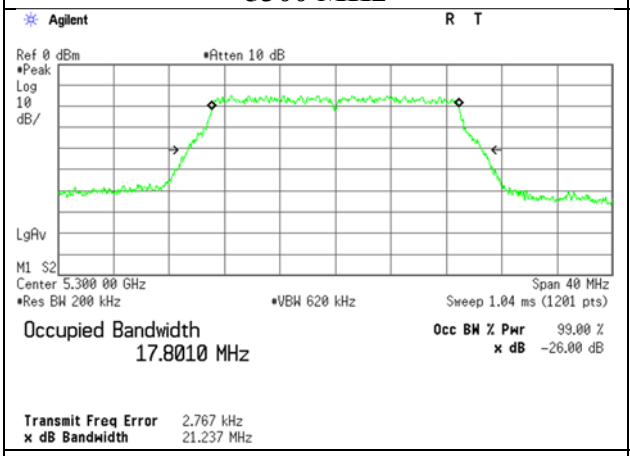

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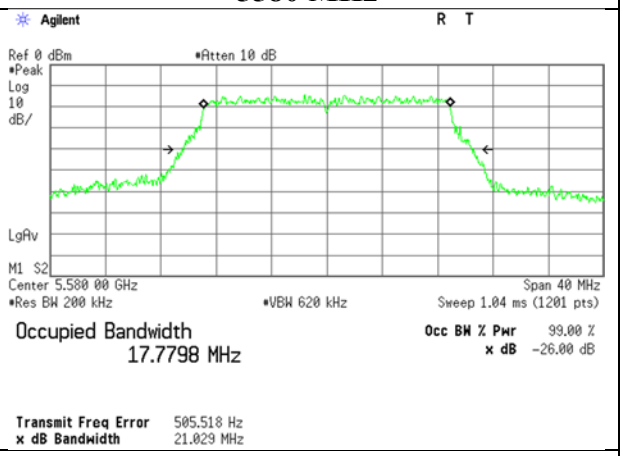
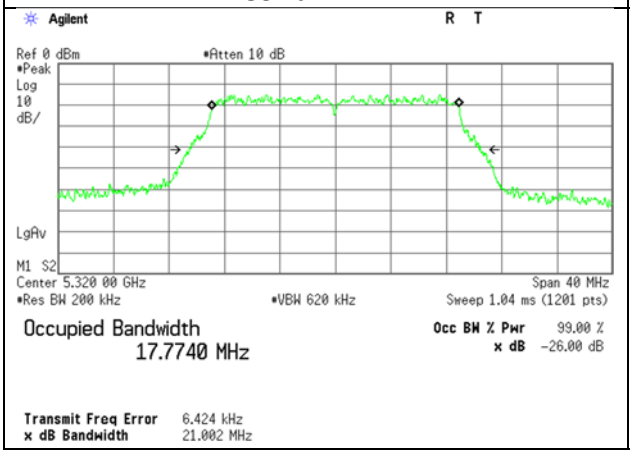
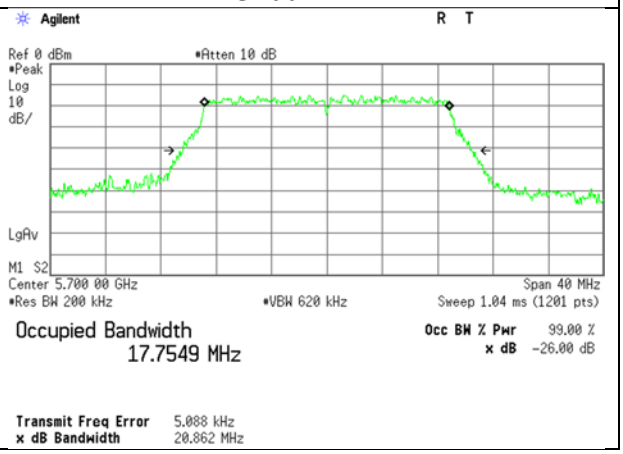


5320 MHz

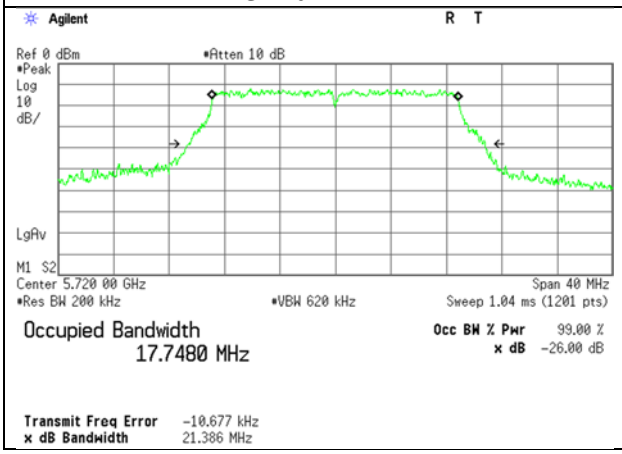


5700 MHz



26 dB Emission Bandwidth

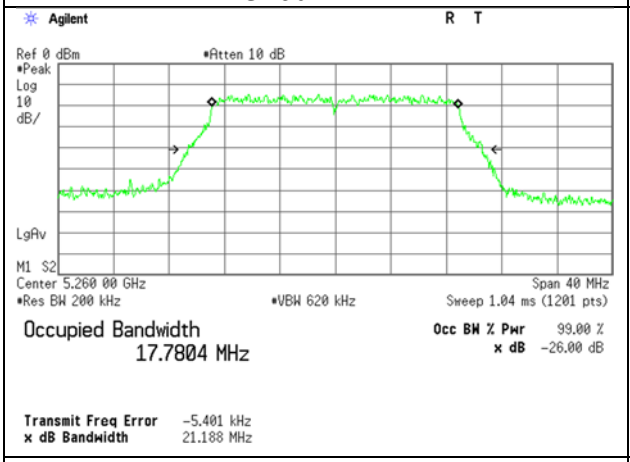
11n-20, Antenna 1

5720 MHz	
	

26 dB Emission Bandwidth

11ac-20, Antenna 1

5260 MHz



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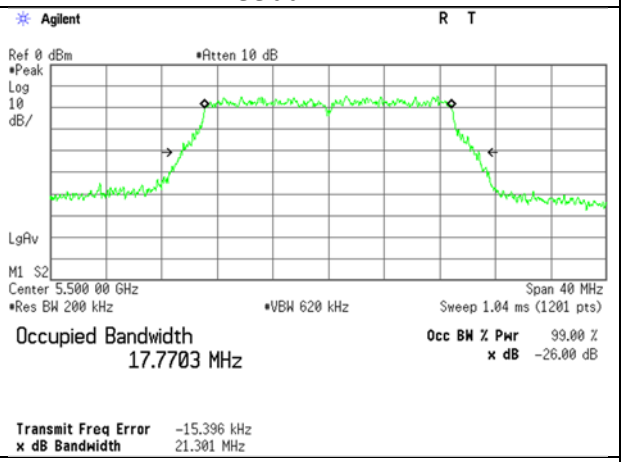

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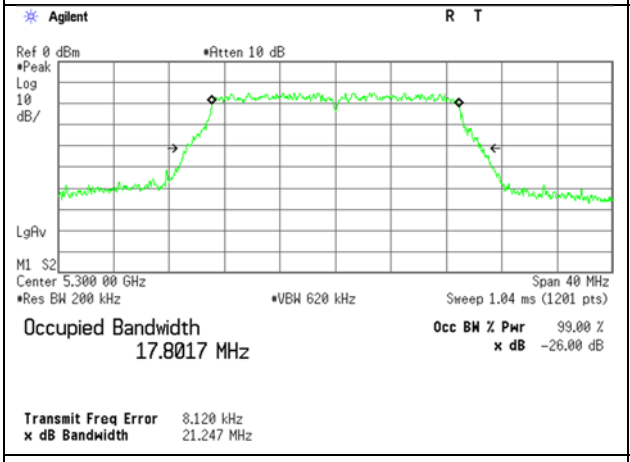

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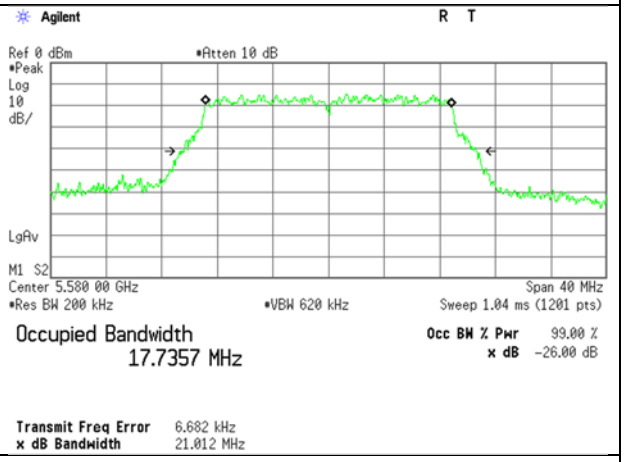
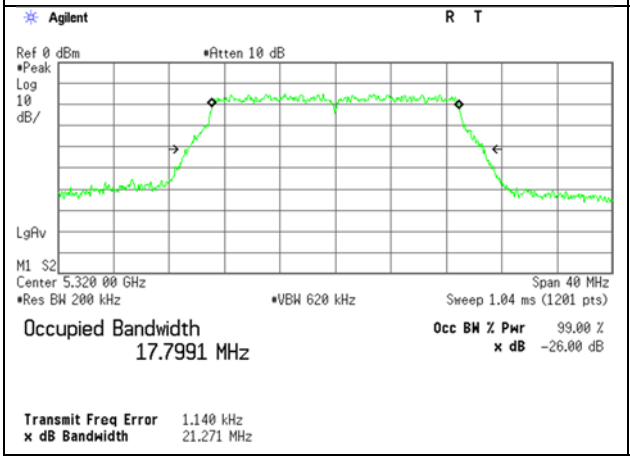


5320 MHz



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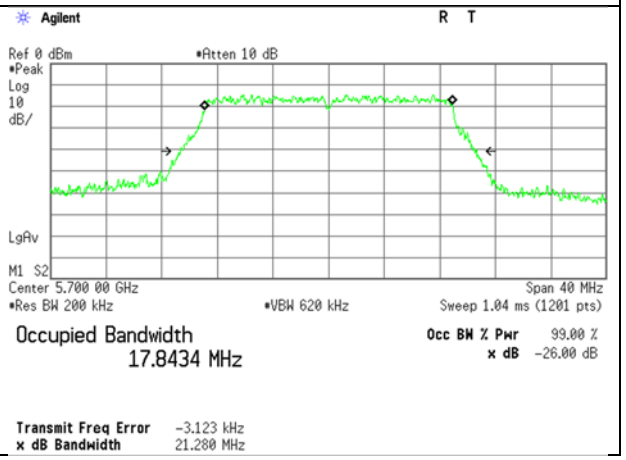
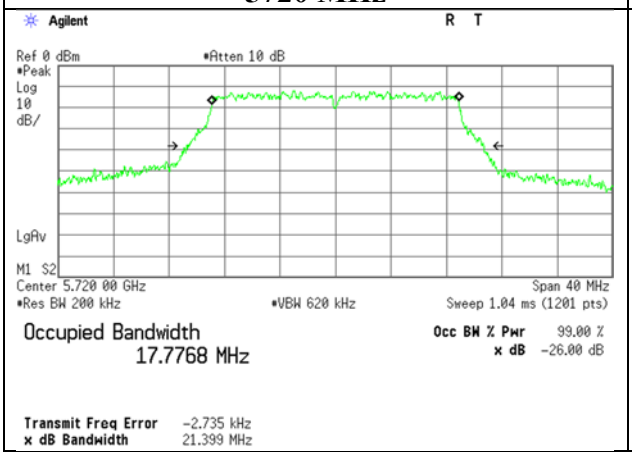


26 dB Emission Bandwidth

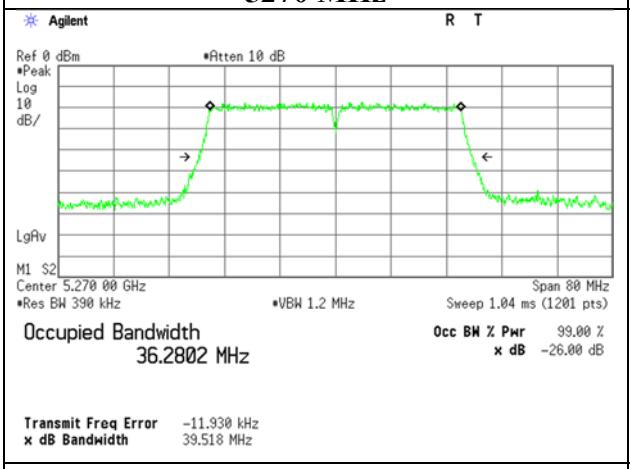
11ac-20, Antenna 1

5720 MHz	
	

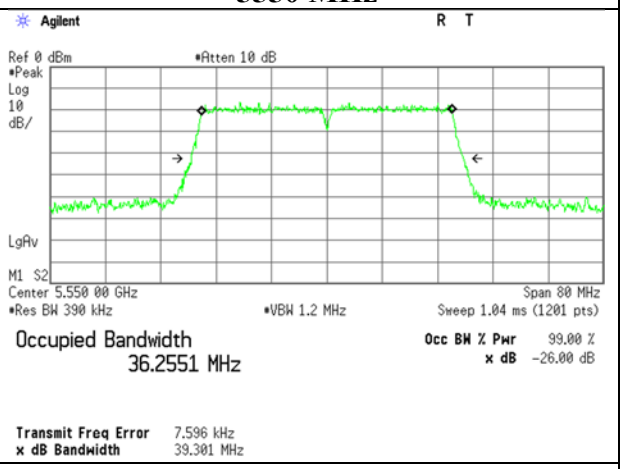
26 dB Emission Bandwidth

11n-40, Antenna 1

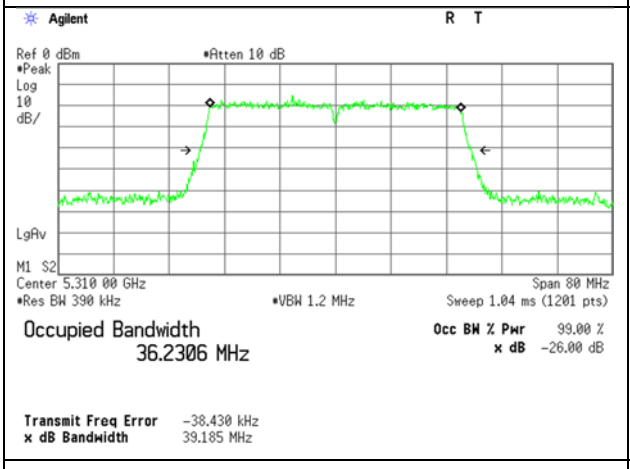
5270 MHz



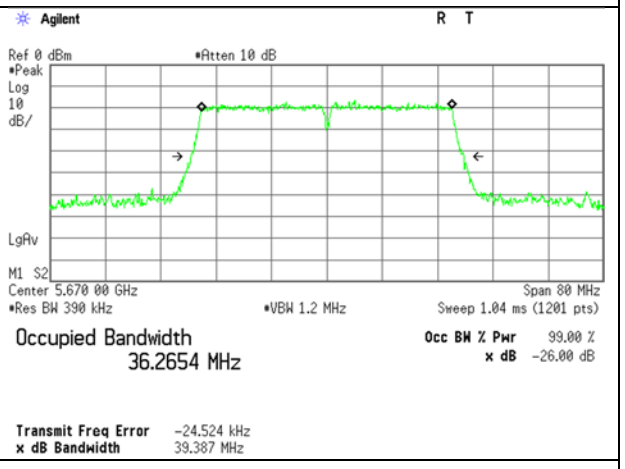
5550 MHz



5310 MHz



5670 MHz



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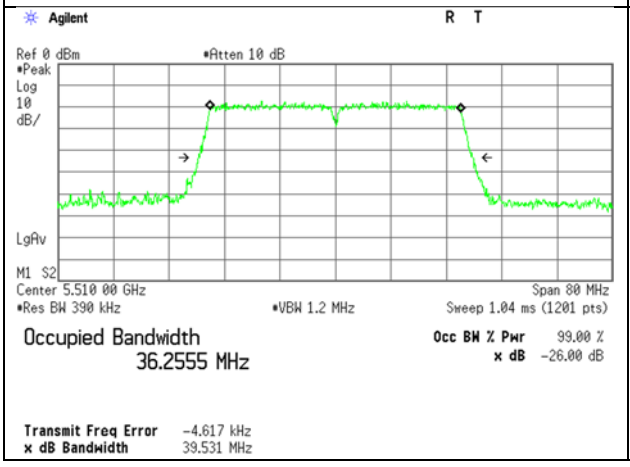

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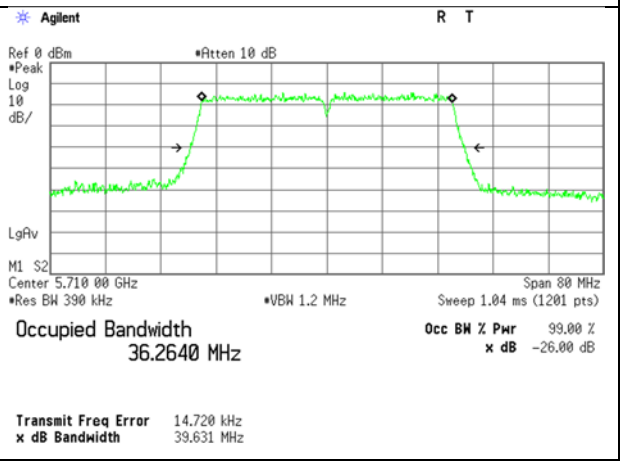
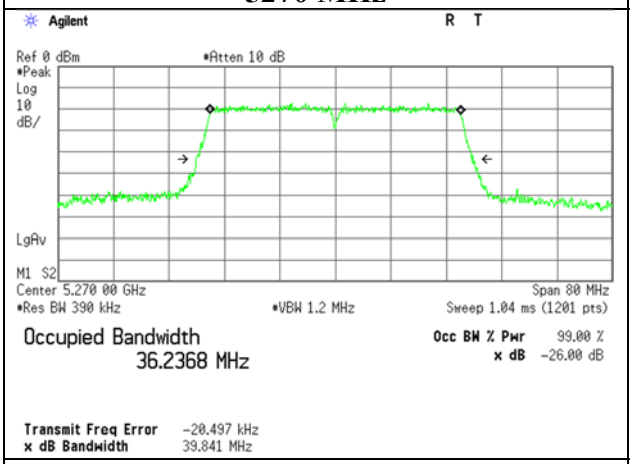


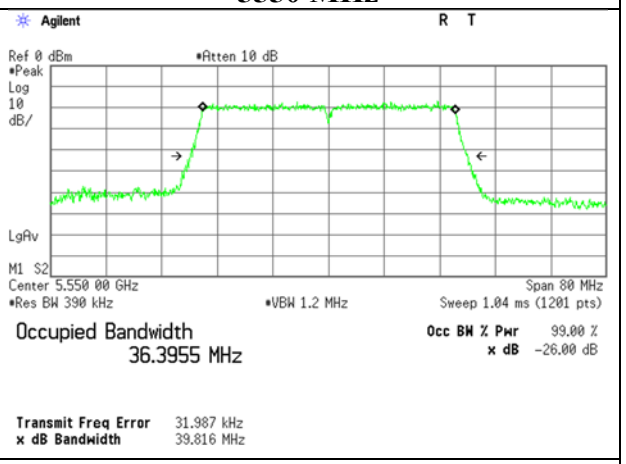
26 dB Emission Bandwidth

11ac-40, Antenna 1

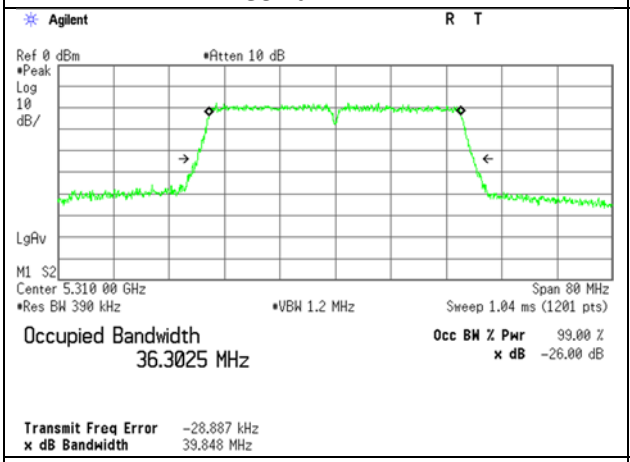
5270 MHz



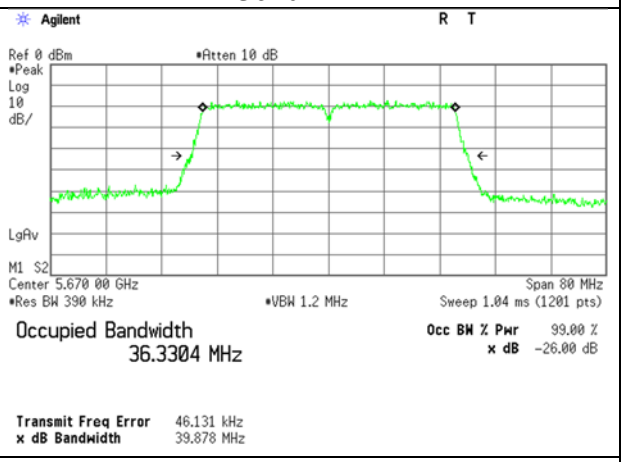
5550 MHz



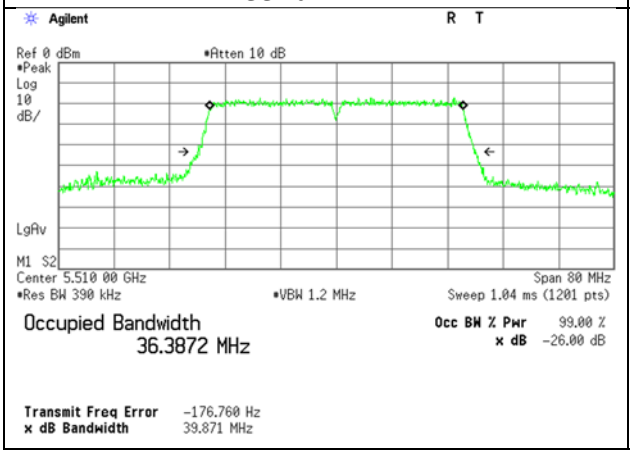
5310 MHz



5670 MHz



5510 MHz



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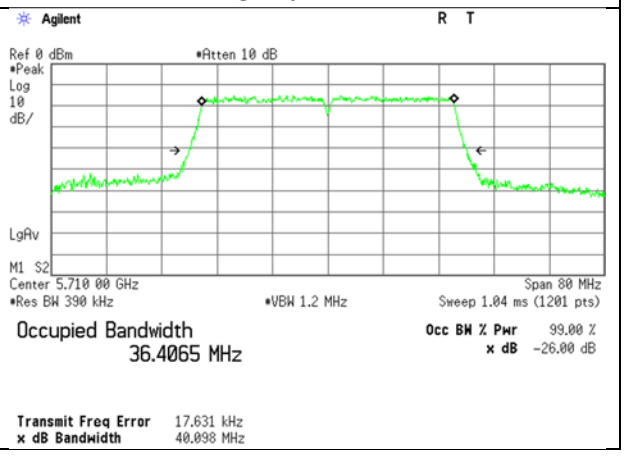
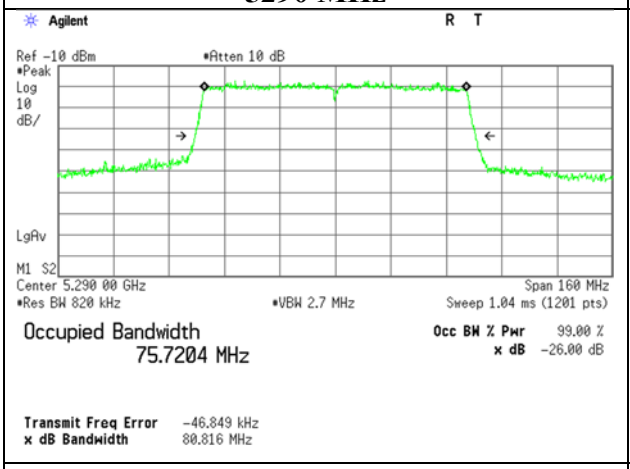


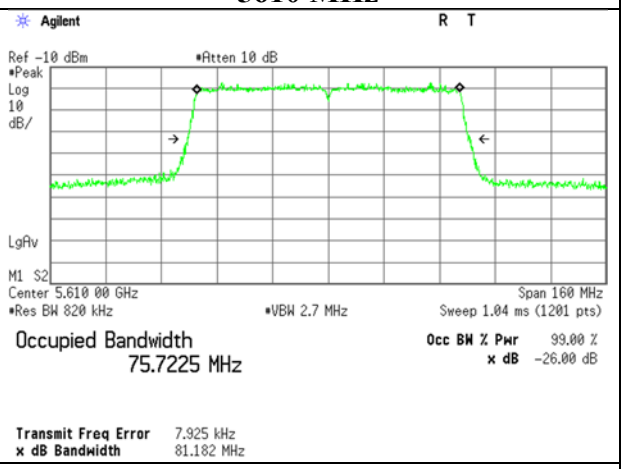
26 dB Emission Bandwidth

11ac-80, Antenna 2

5290 MHz



5610 MHz



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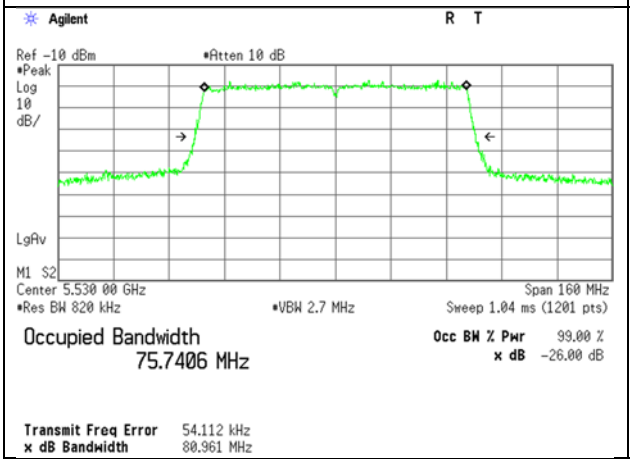
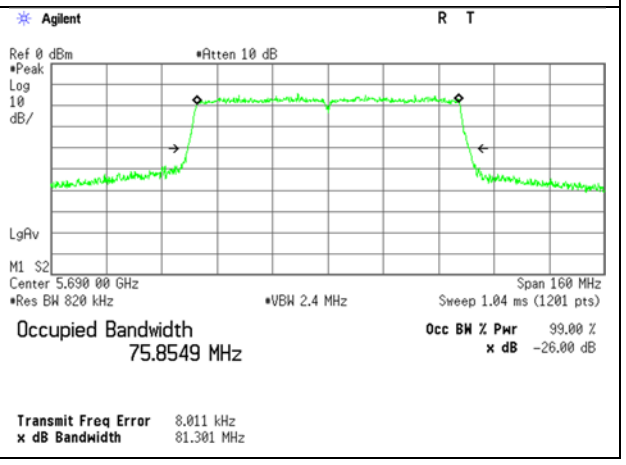


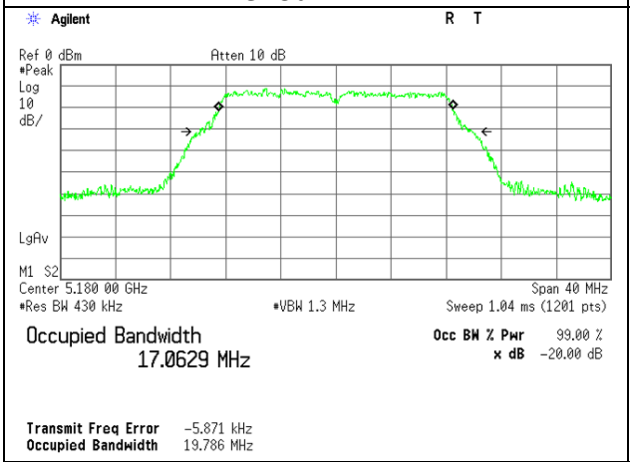
5690 MHz



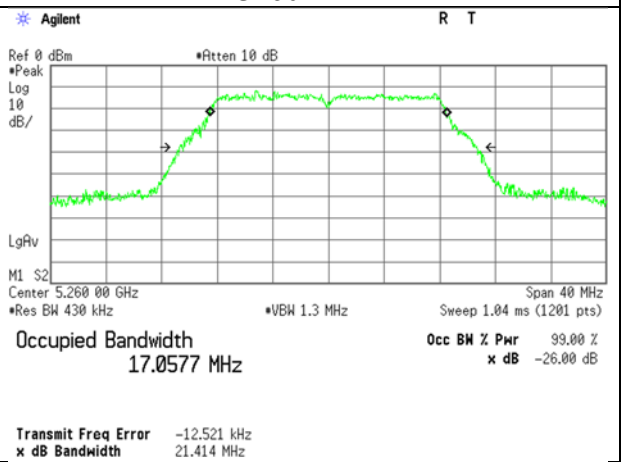
99 % Occupied Bandwidth

11a, Antenna 1

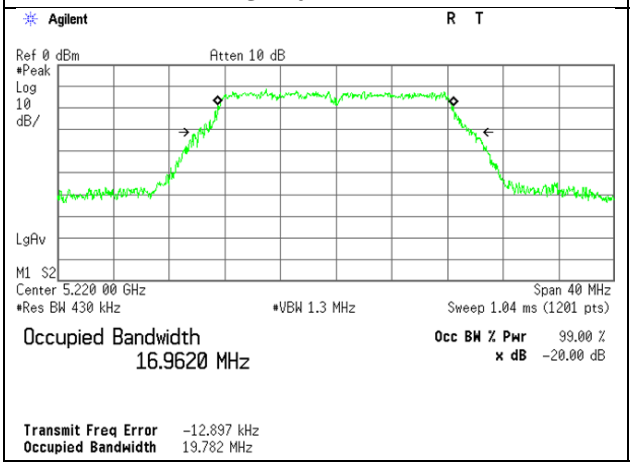
5180 MHz



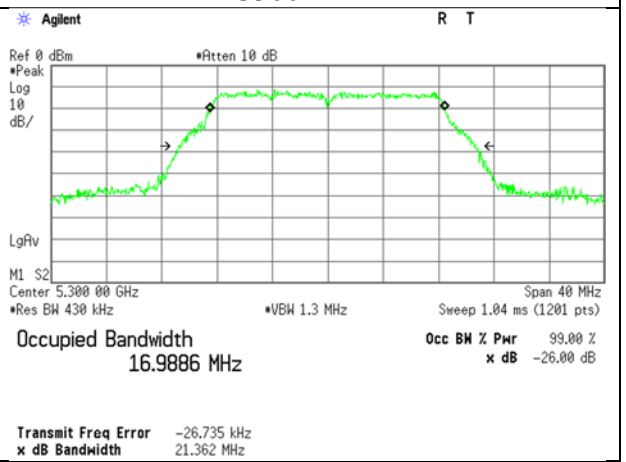
5260 MHz



5220 MHz



5300 MHz



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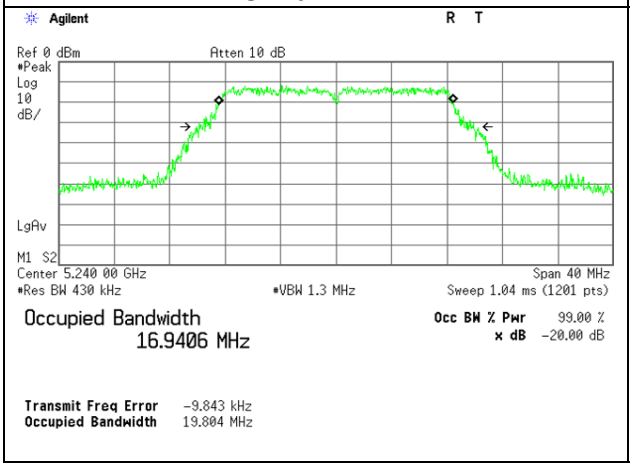

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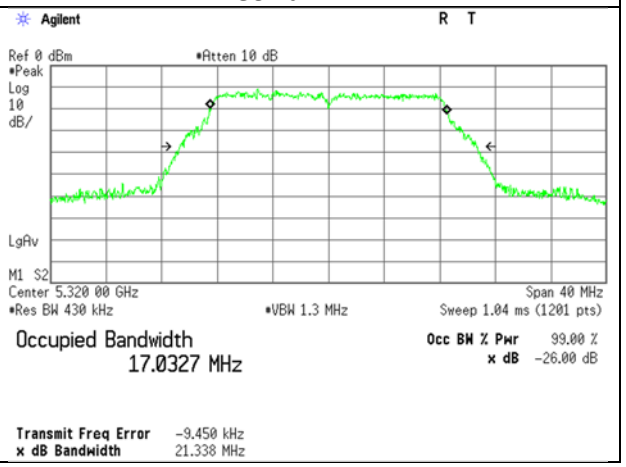
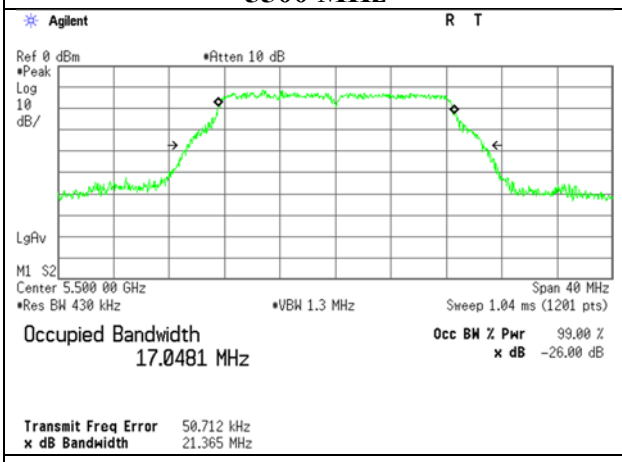


99 % Occupied Bandwidth

11a, Antenna 1

5500 MHz



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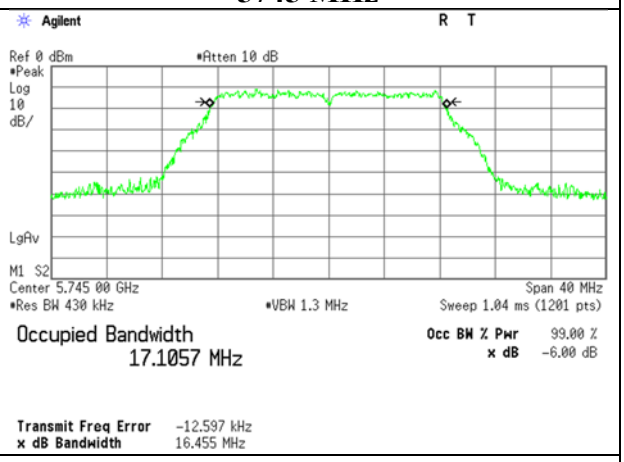
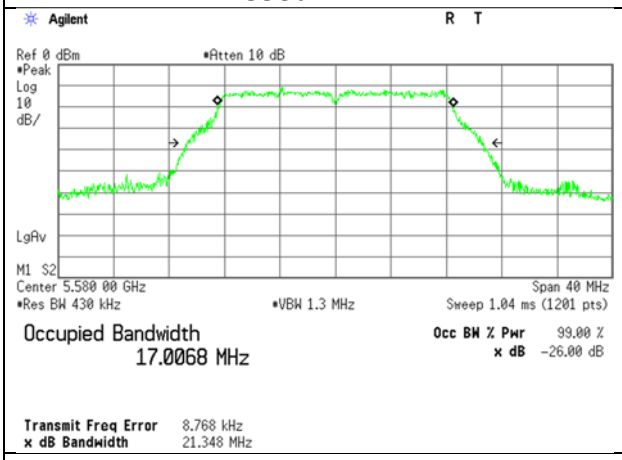
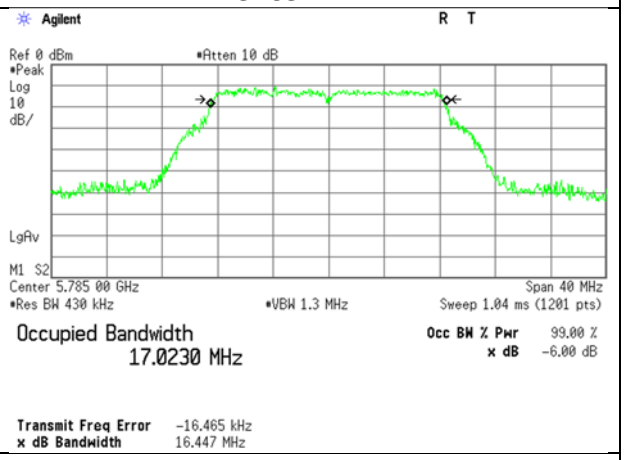


5580 MHz



5785 MHz



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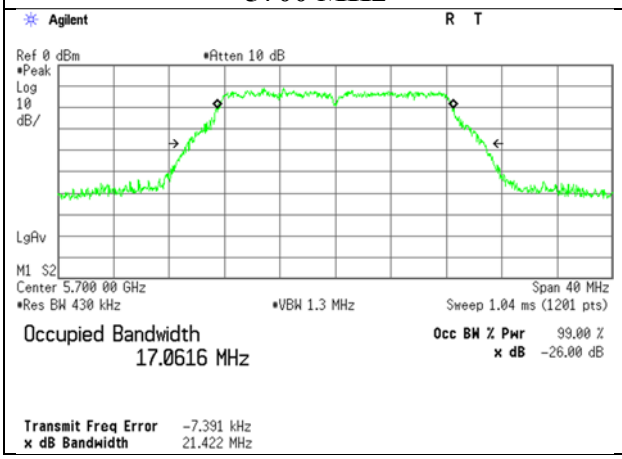
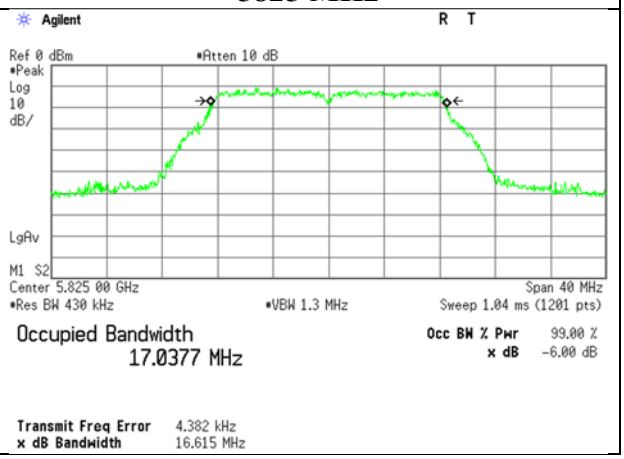
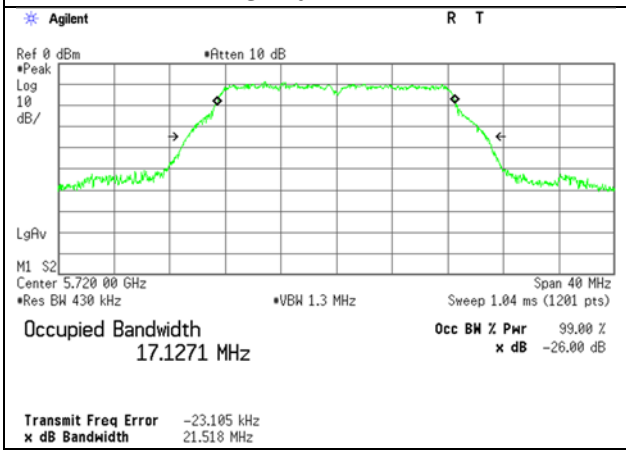


5825 MHz



99 % Occupied Bandwidth

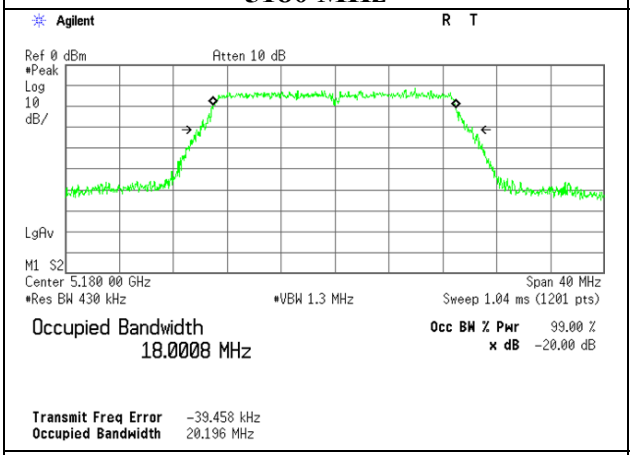
11a, Antenna 1

5720 MHz	
	

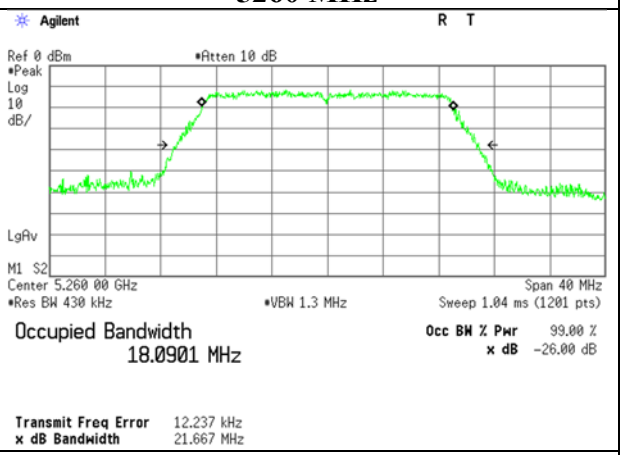
99 % Occupied Bandwidth

11n-20, Antenna 1

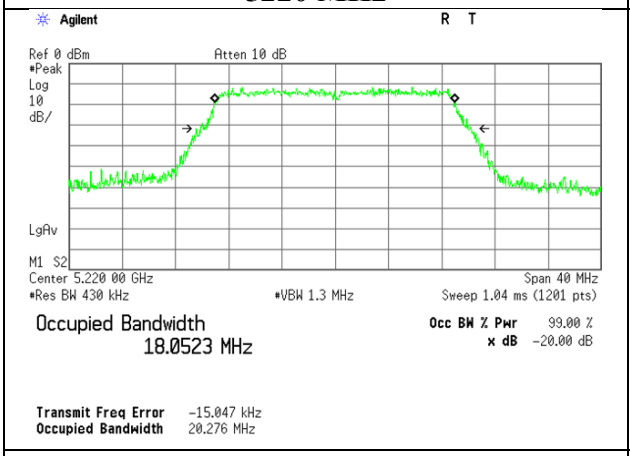
5180 MHz



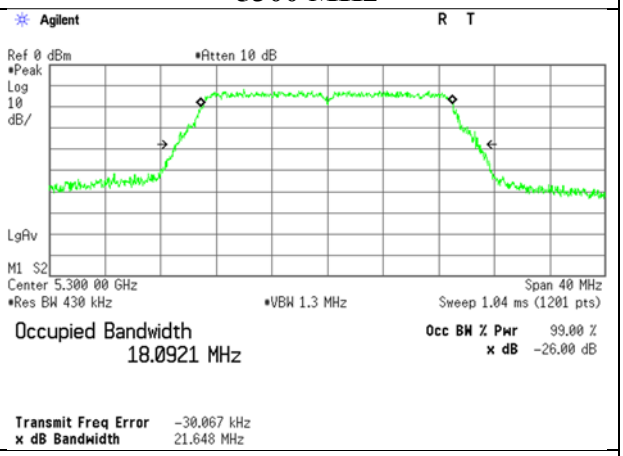
5260 MHz



5220 MHz



5300 MHz



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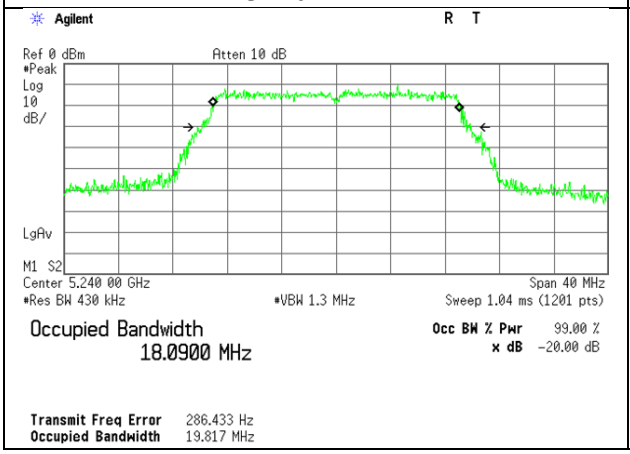

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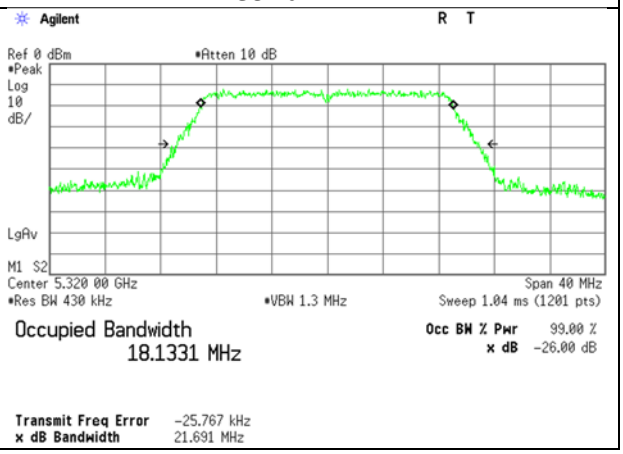
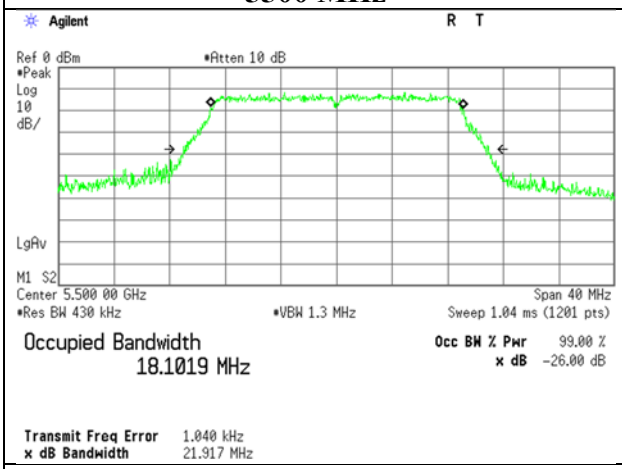


99 % Occupied Bandwidth

11n-20, Antenna 1

5500 MHz



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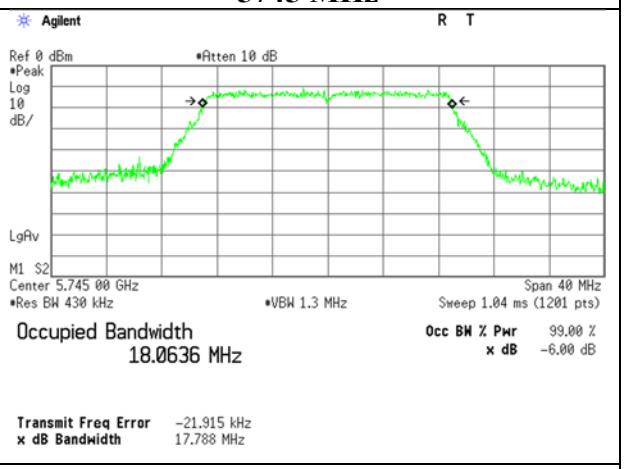

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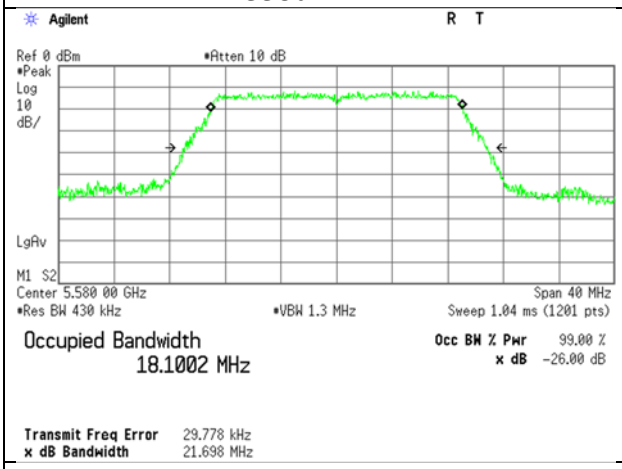
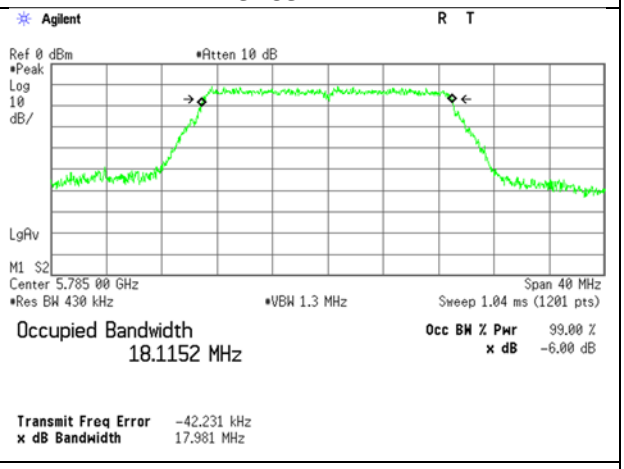


5785 MHz



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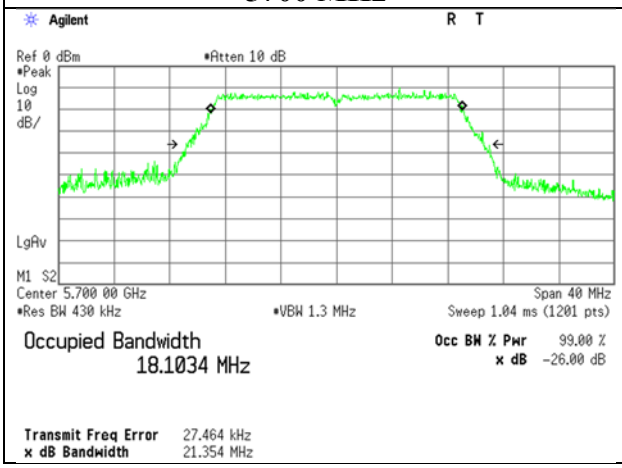
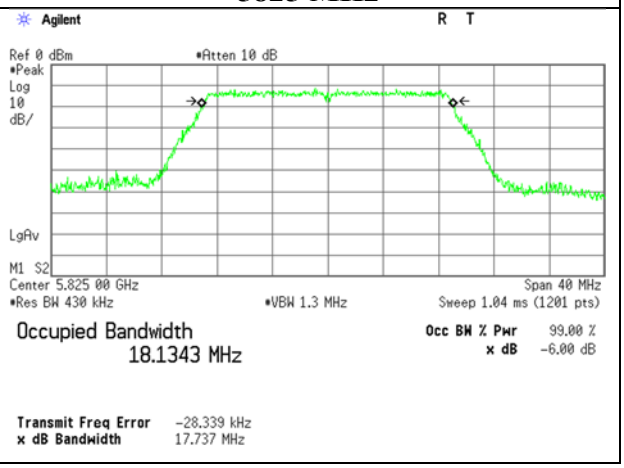
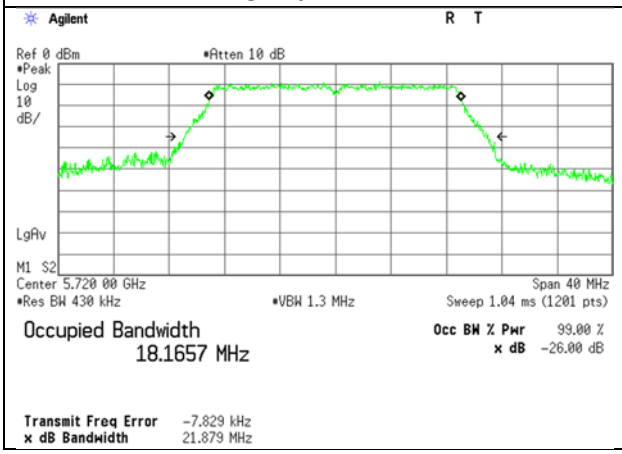


5825 MHz



99 % Occupied Bandwidth

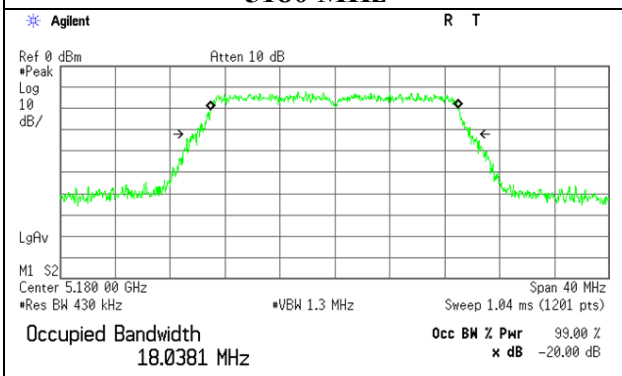
11n-20, Antenna 1

5720 MHz	
	

99 % Occupied Bandwidth

11ac-20, Antenna 1

5180 MHz



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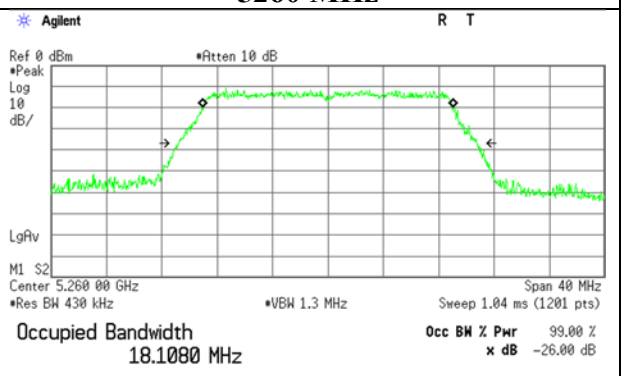

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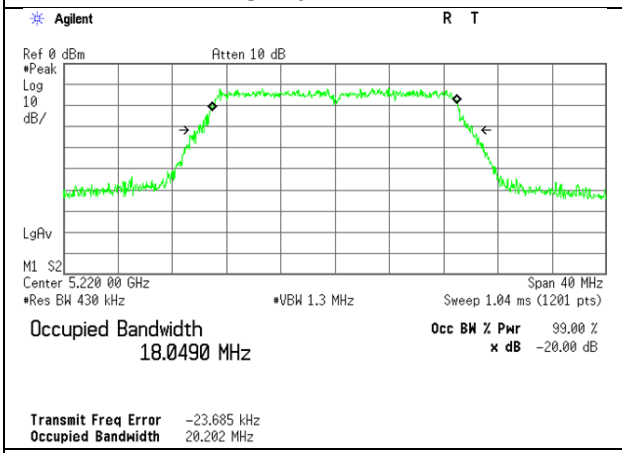

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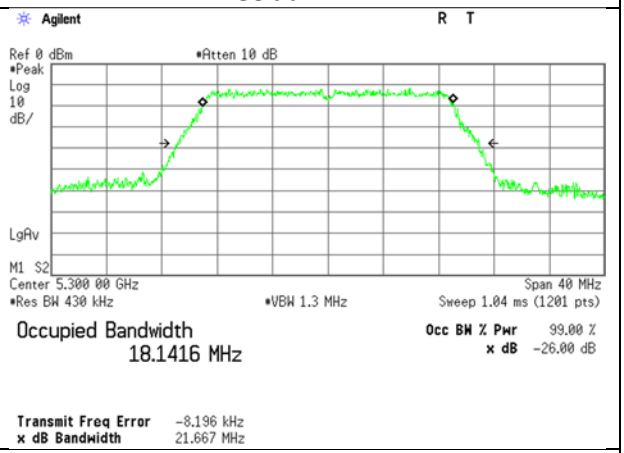
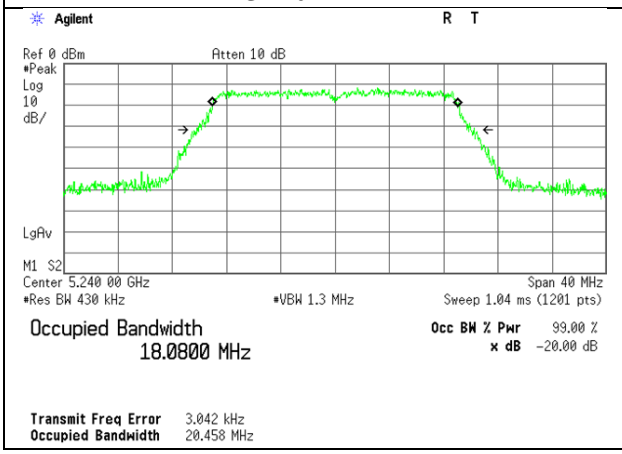


5240 MHz



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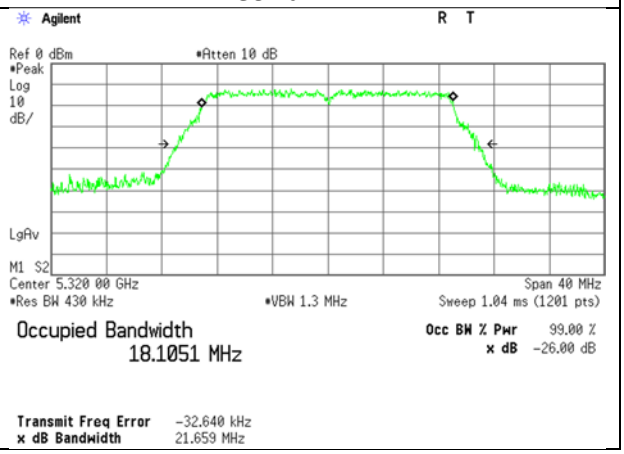
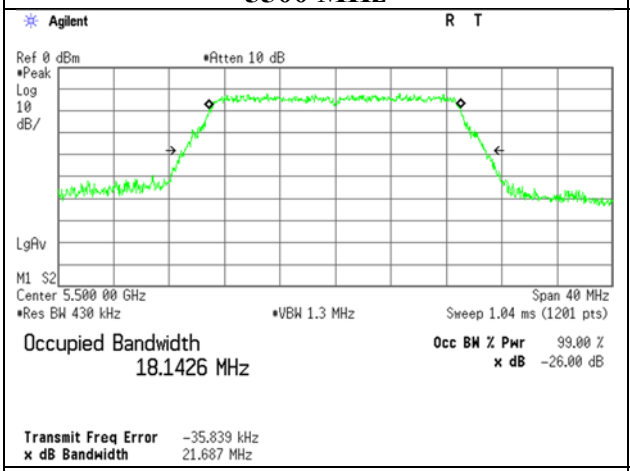


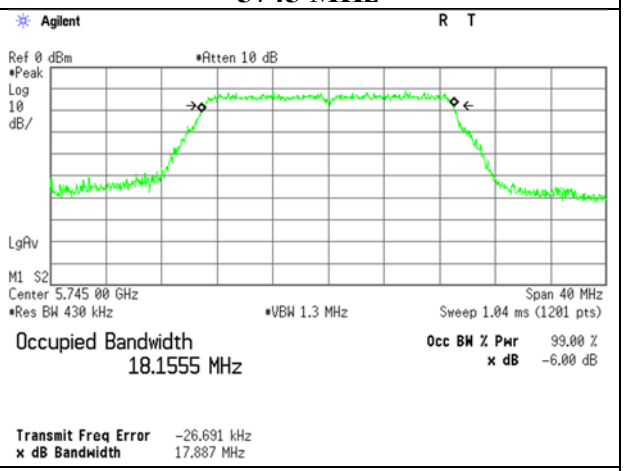
99 % Occupied Bandwidth

11ac-20, Antenna 1

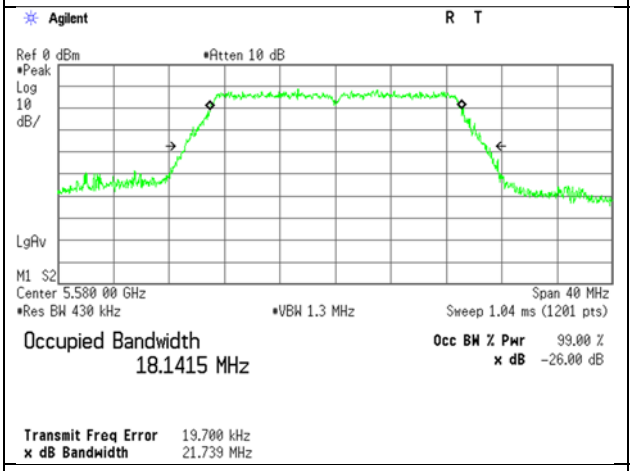
5500 MHz



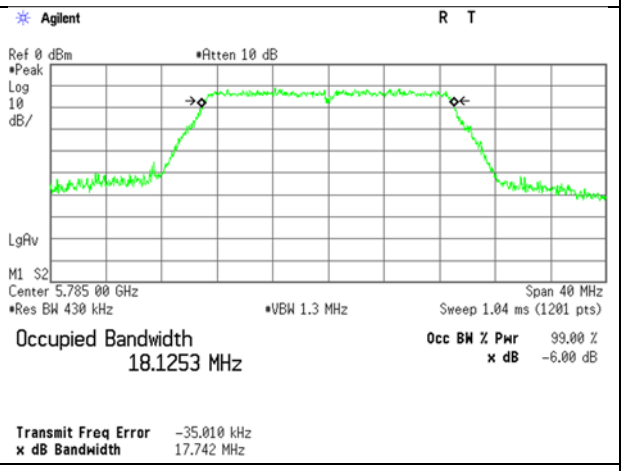
5745 MHz



5580 MHz



5785 MHz



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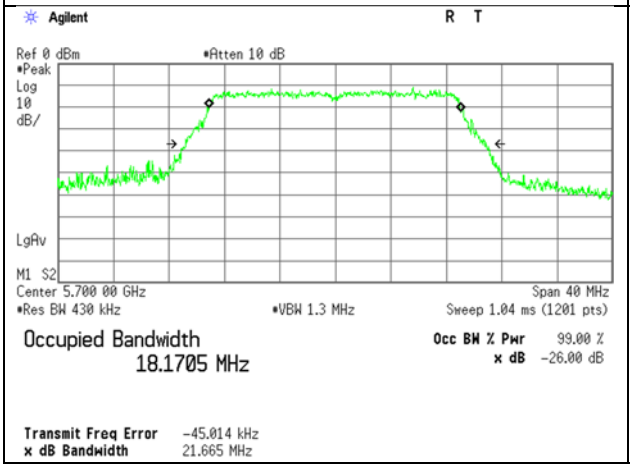
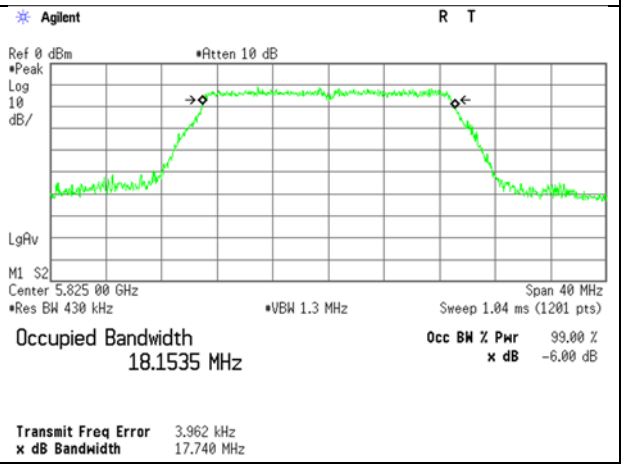
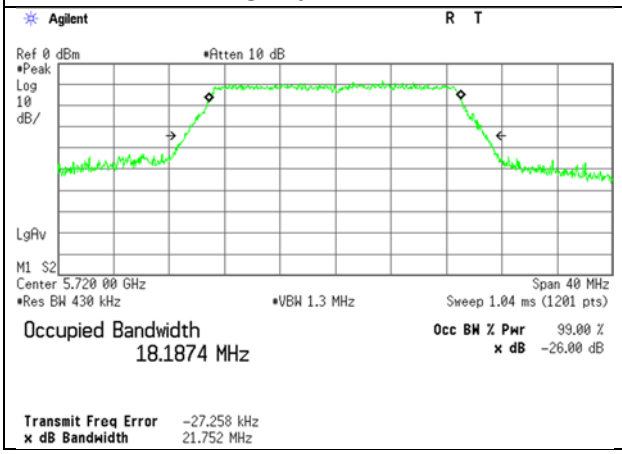


5825 MHz



99 % Occupied Bandwidth

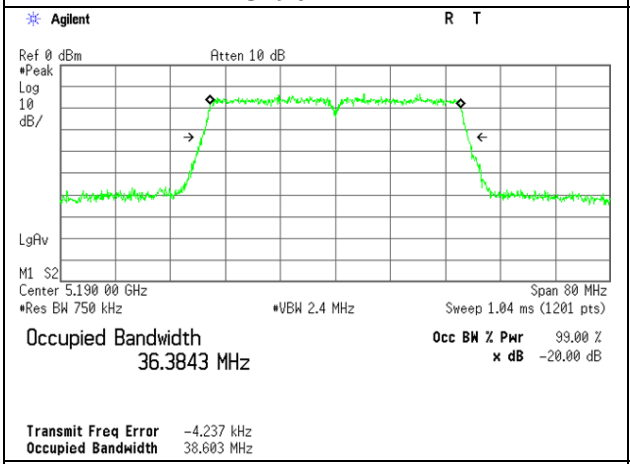
11ac-20, Antenna 1

5720 MHz	
	

99 % Occupied Bandwidth

11n-40, Antenna 1

5190 MHz



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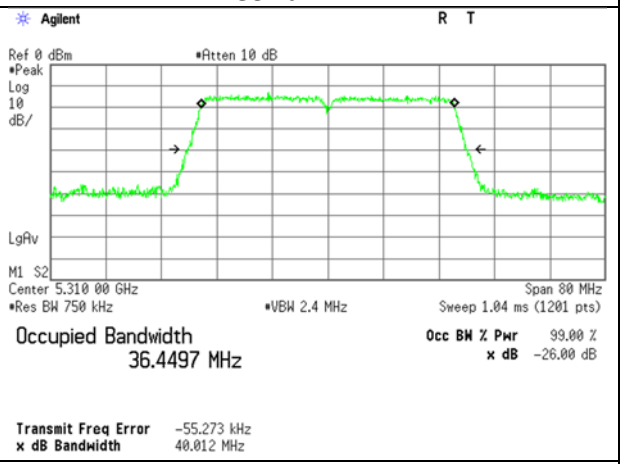
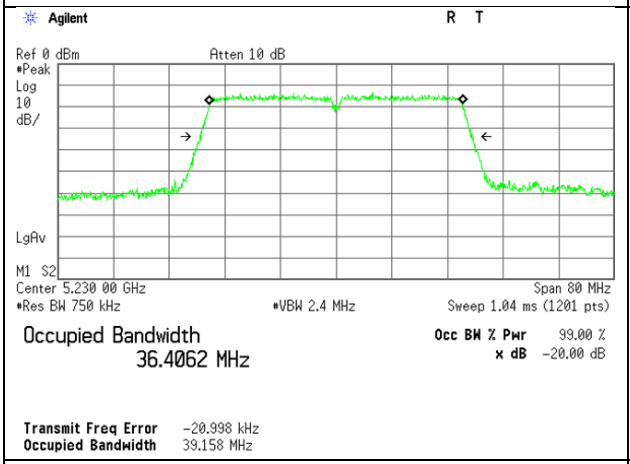


5230 MHz



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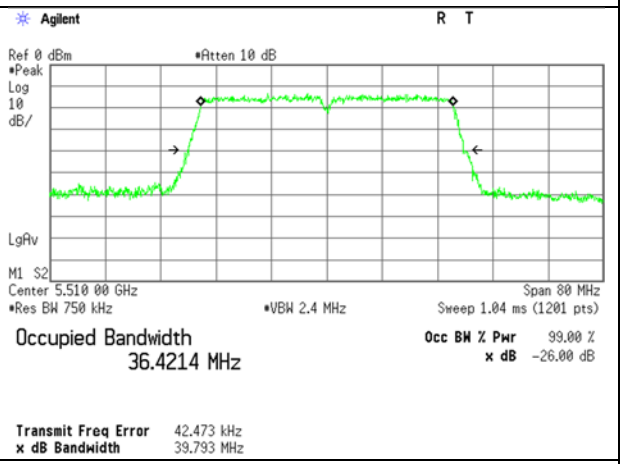

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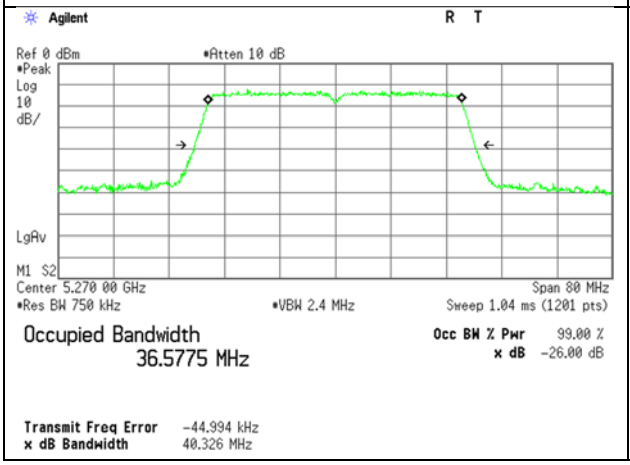

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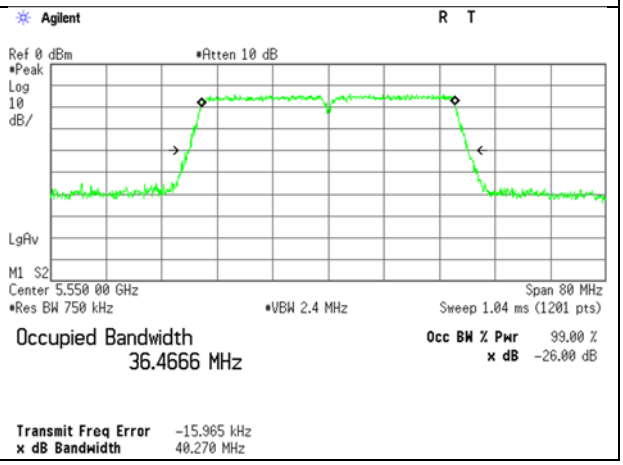
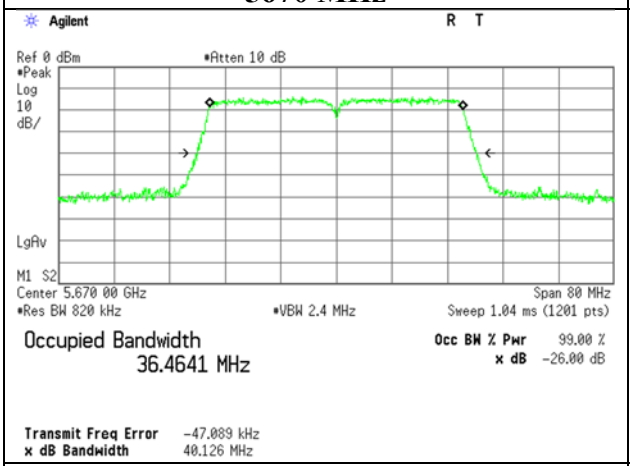


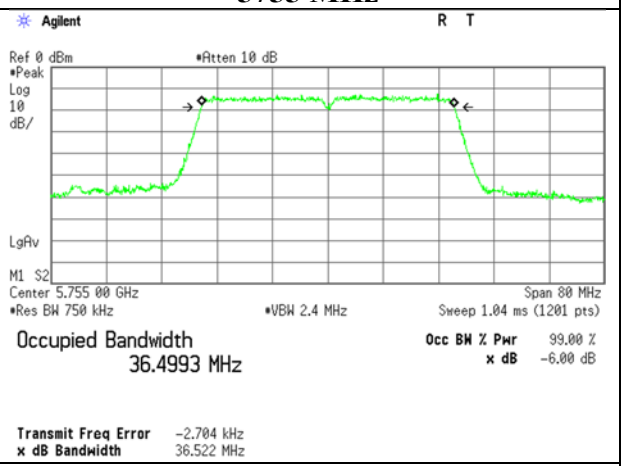
99 % Occupied Bandwidth

11n-40, Antenna 1

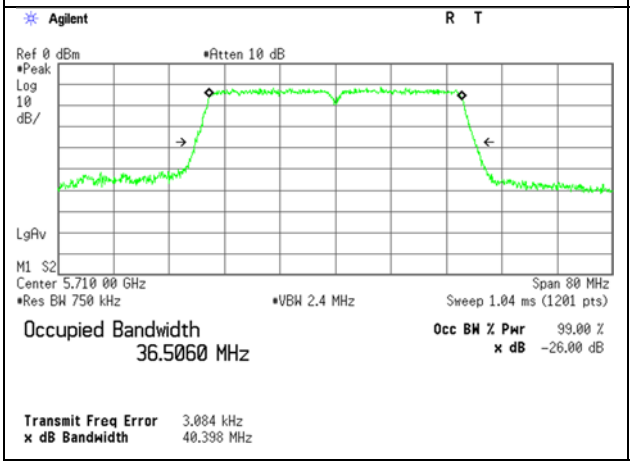
5670 MHz



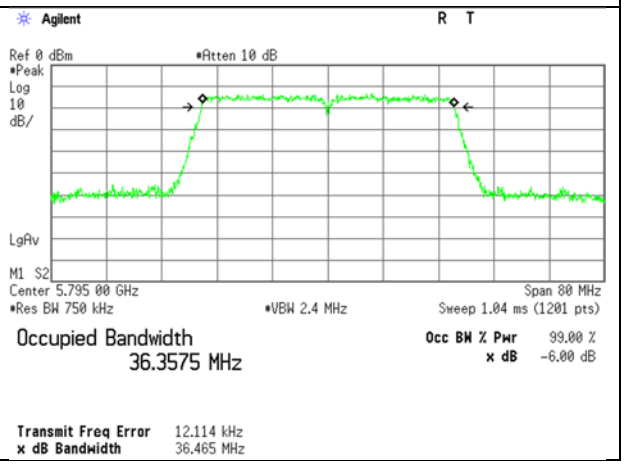
5755 MHz



5710 MHz



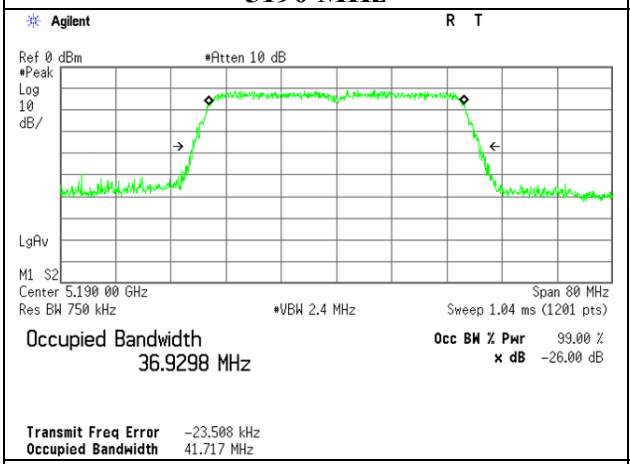
5795 MHz



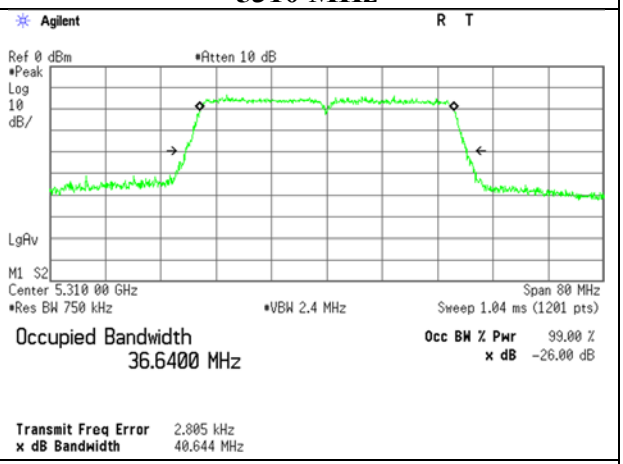
99 % Occupied Bandwidth

11ac-40, Antenna 1

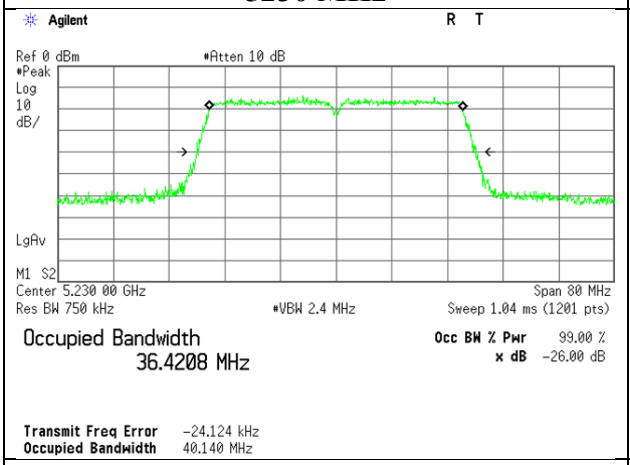
5190 MHz



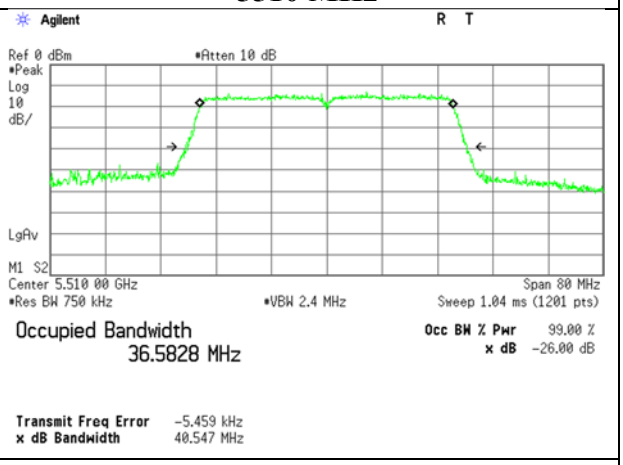
5310 MHz



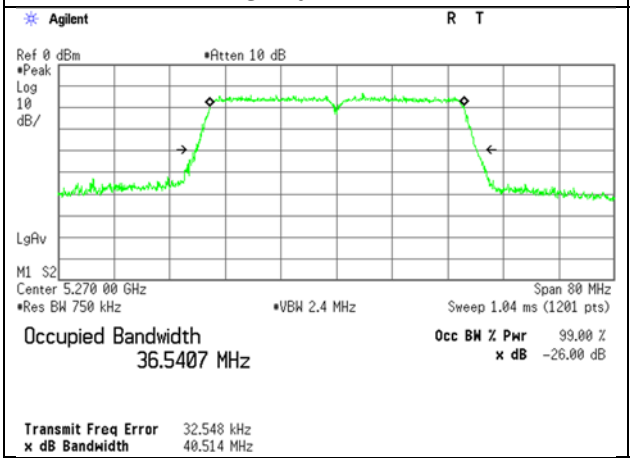
5230 MHz



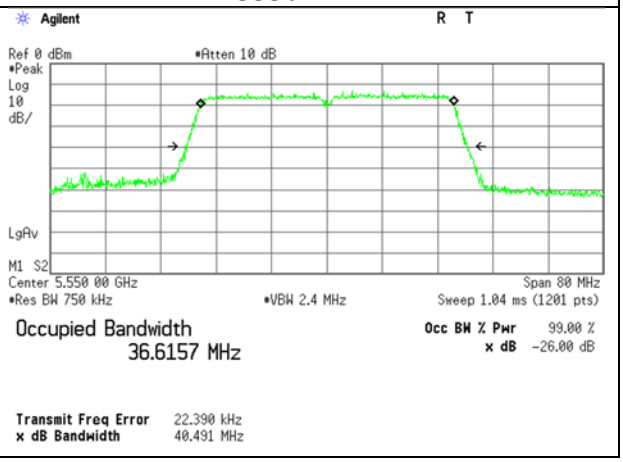
5510 MHz



5270 MHz



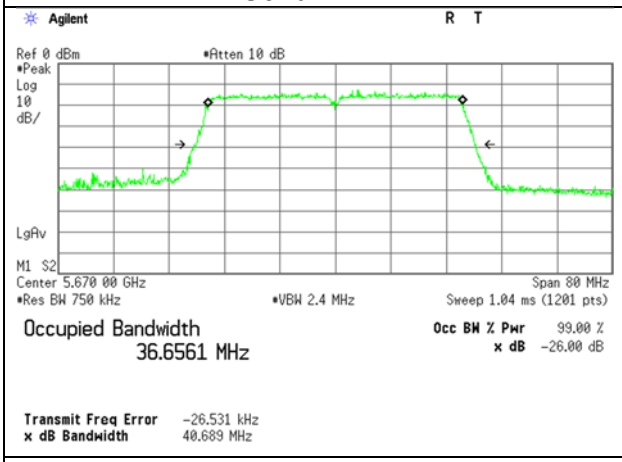
5550 MHz



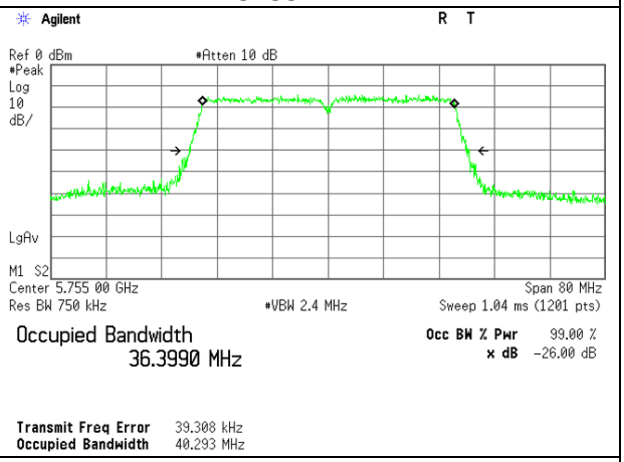
99 % Occupied Bandwidth

11ac-40, Antenna 1

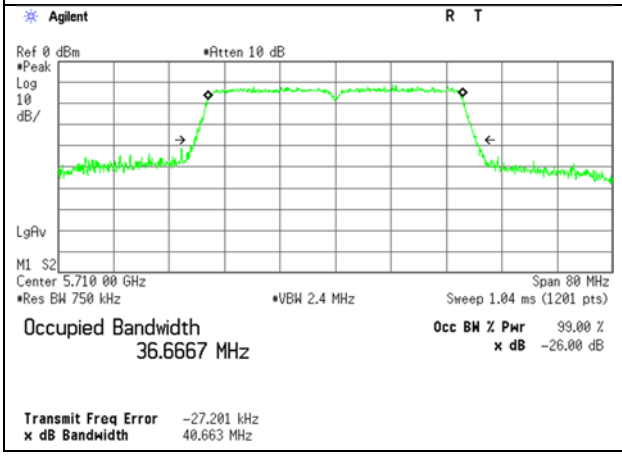
5670 MHz



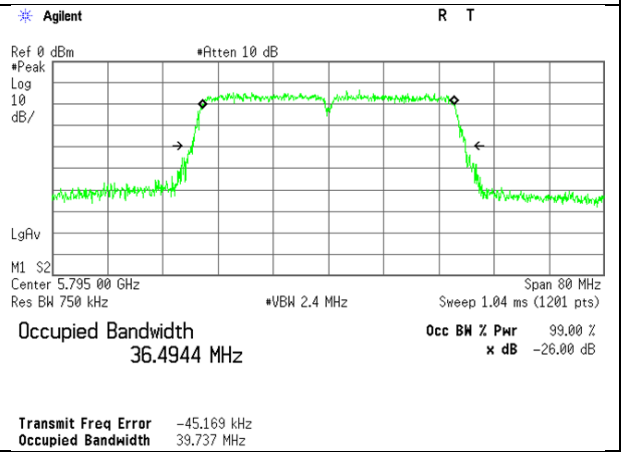
5755 MHz



5710 MHz



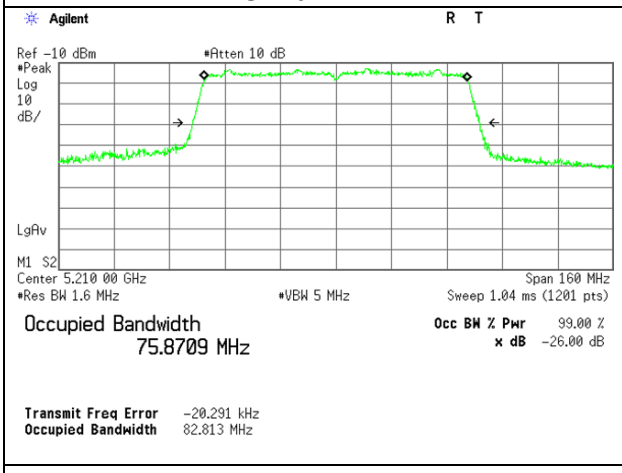
5795 MHz



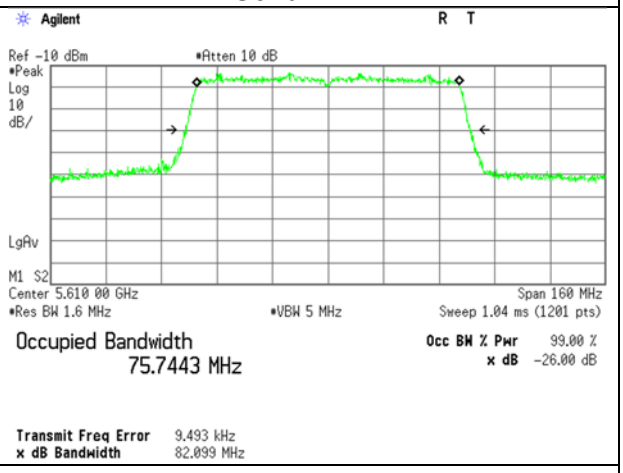
99 % Occupied Bandwidth

11ac-80, Antenna 2

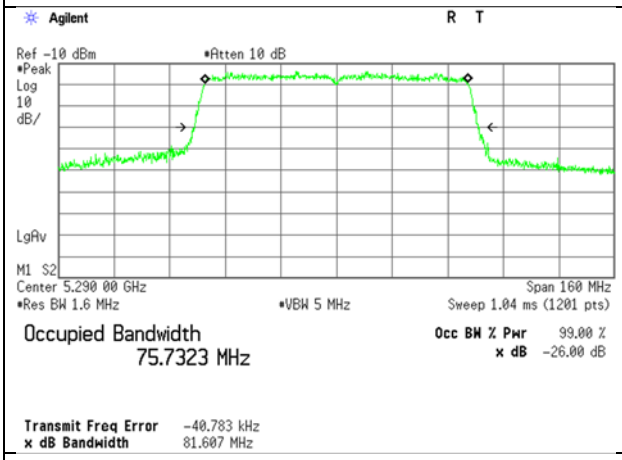
5210 MHz



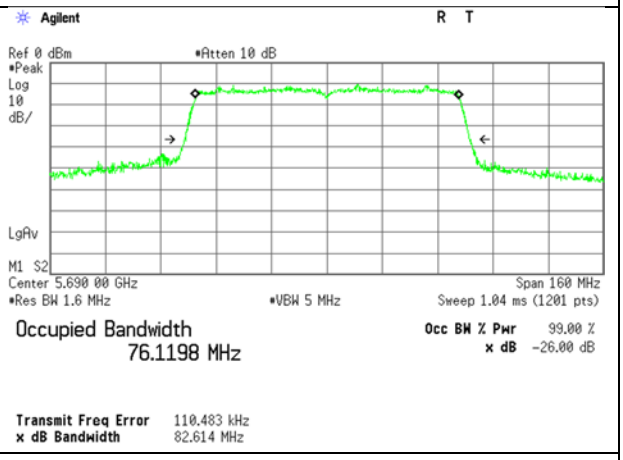
5610 MHz



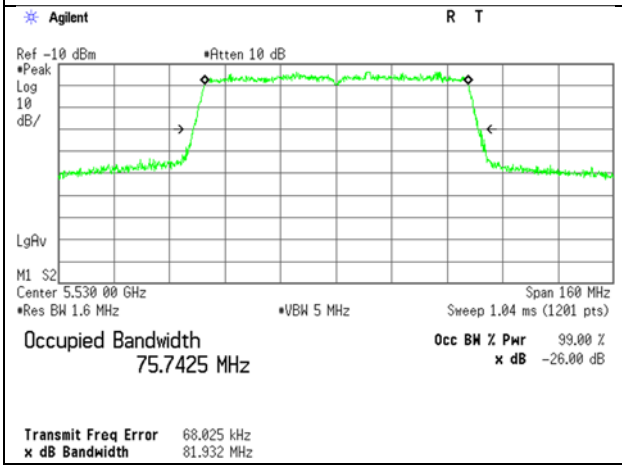
5290 MHz



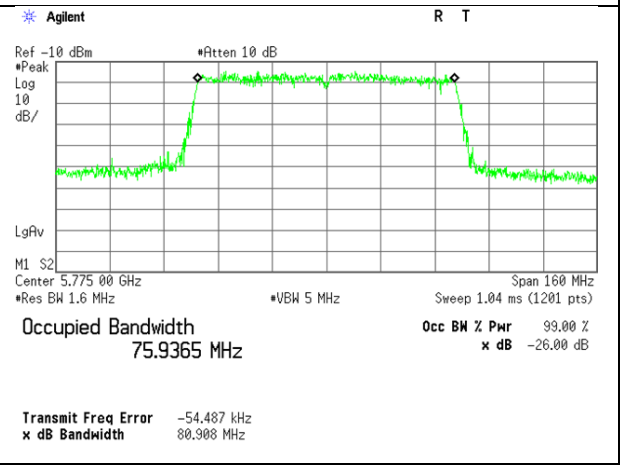
5690 MHz



5530 MHz



5775 MHz



20 dB Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

11a

Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 1	5240	17.668

11n-20

Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 1	5240	18.824

11ac-20

Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 1	5240	18.532

11n-40

Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 1	5230	37.518

11ac-40

Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 1	5230	37.585

11ac-80

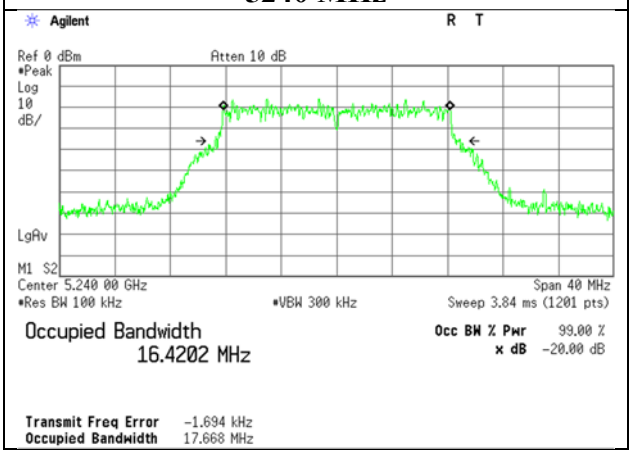
Antenna	Tested Frequency [MHz]	20 dB Emission Bandwidth [MHz]
Antenna 2	5210	77.243

20 dB Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

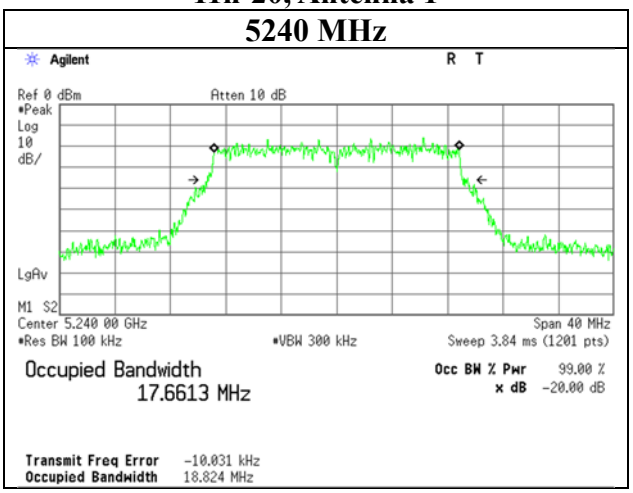
11a, Antenna 1

5240 MHz



11n-20, Antenna 1

5240 MHz

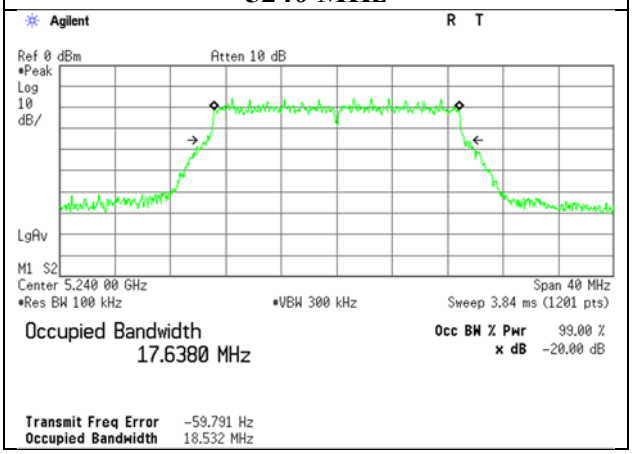


20 dB Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

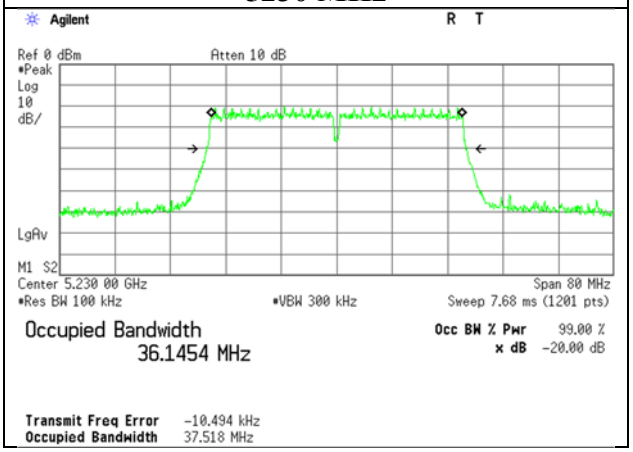
11ac-20, Antenna 1

5240 MHz



11n-40, Antenna 1

5230 MHz

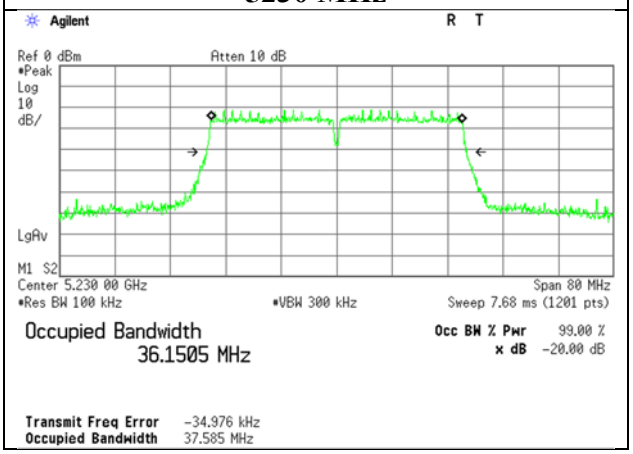


20 dB Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

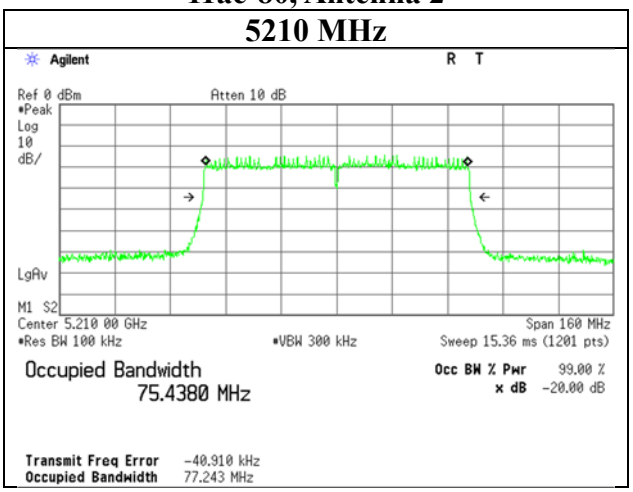
11ac-40, Antenna 1

5230 MHz



11ac-80, Antenna 2

5210 MHz



6 dB Bandwidth

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room / Shielded Room
Date	September 2, 2019
Temperature / Humidity	24 deg. C / 63 % RH
Engineer	Takumi Shimada
Mode	Tx

11a

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 1	5745	16.472	> 0.500
	5785	16.470	> 0.500
	5825	16.453	> 0.500

11n-20

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 1	5745	17.714	> 0.500
	5785	17.705	> 0.500
	5825	17.718	> 0.500

11ac-20

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 1	5745	17.605	> 0.500
	5785	17.647	> 0.500
	5825	17.736	> 0.500

11n-40

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 1	5755	36.406	> 0.500
	5795	36.385	> 0.500

11ac-40

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 1	5755	36.387	> 0.500
	5795	36.364	> 0.500

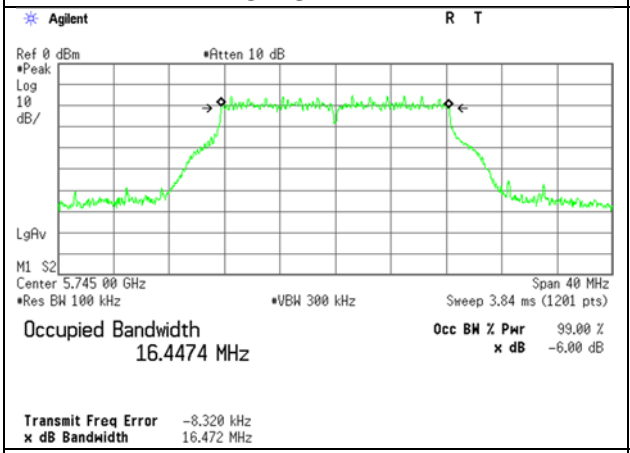
11ac-80

Antenna	Tested Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
Antenna 2	5775	75.817	> 0.500

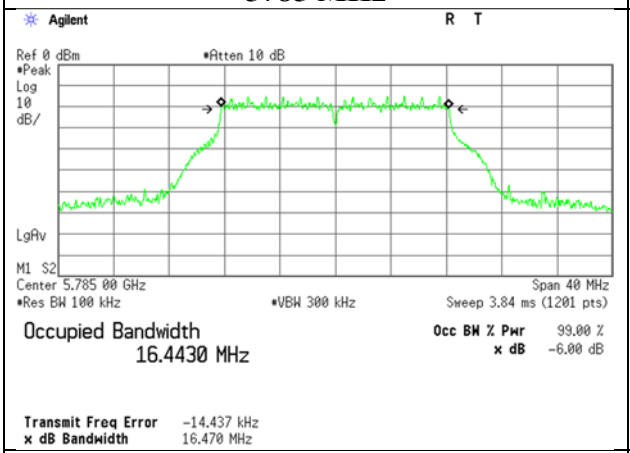
6 dB Bandwidth

11a, Antenna 1

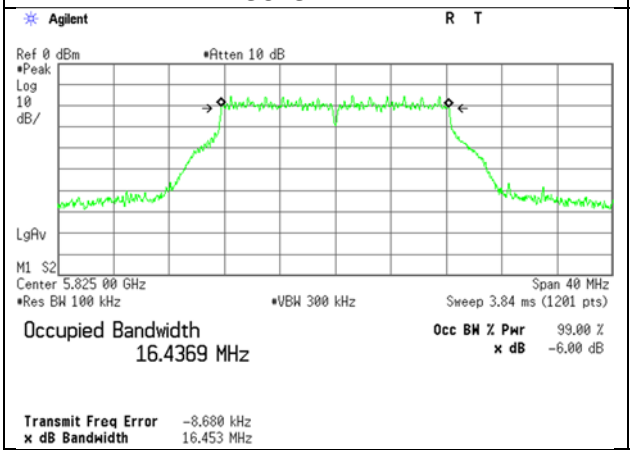
5745 MHz



5785 MHz

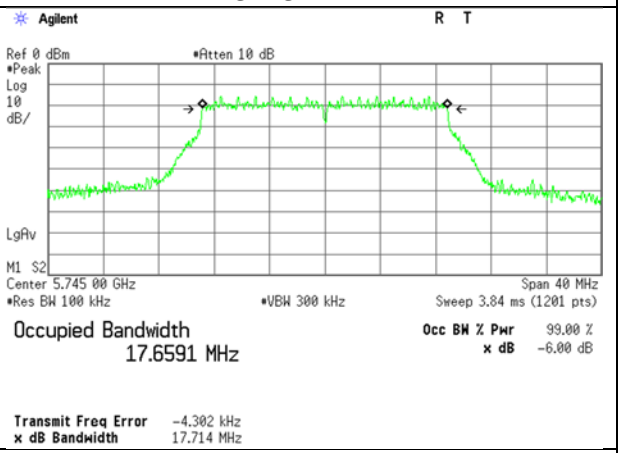


5825 MHz

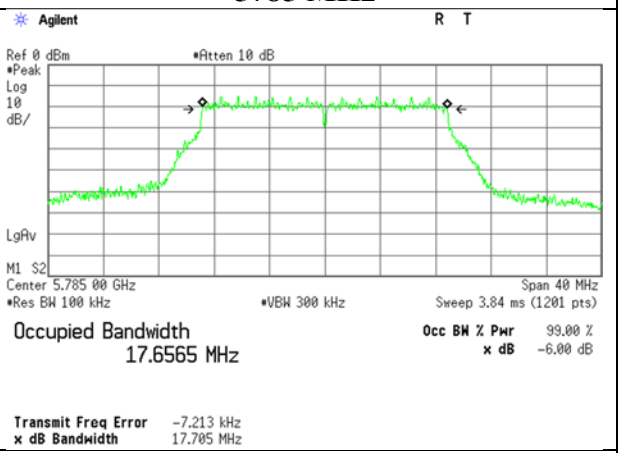


11n-20, Antenna 1

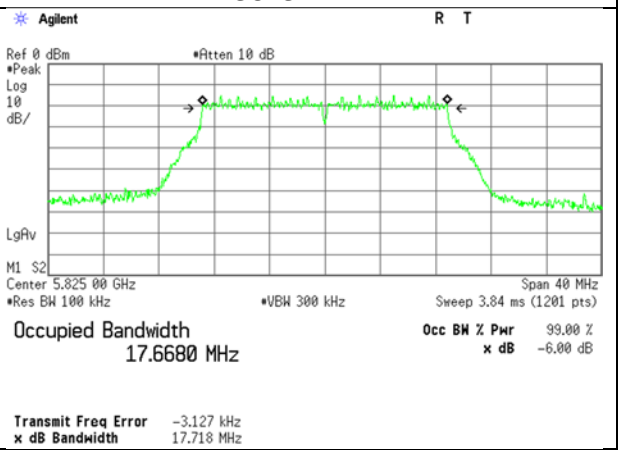
5745 MHz



5785 MHz



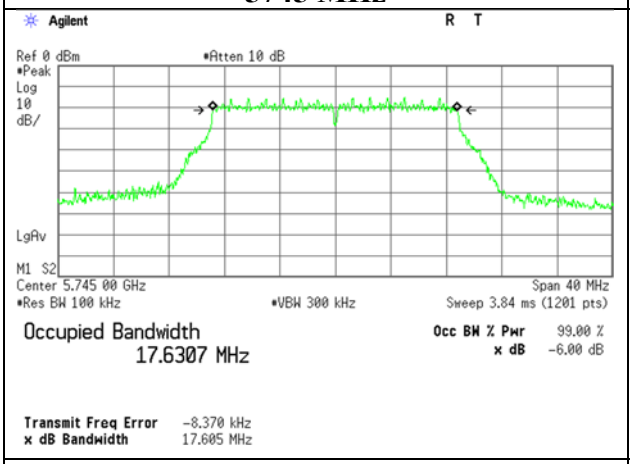
5825 MHz



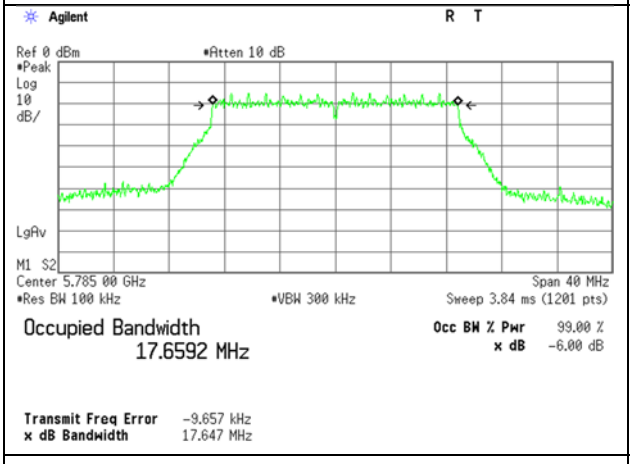
6 dB Bandwidth

11ac-20, Antenna 1

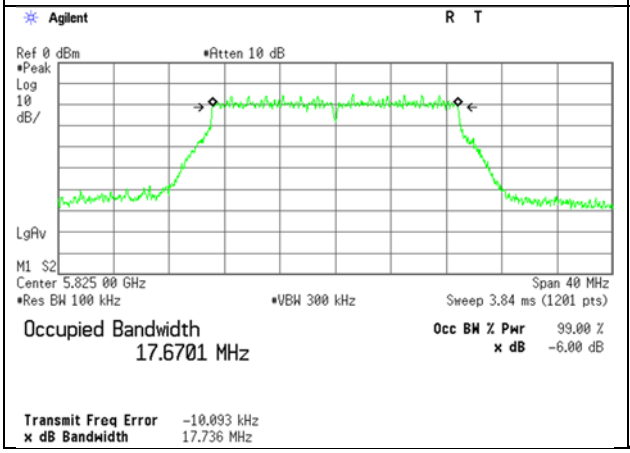
5745 MHz



5785 MHz

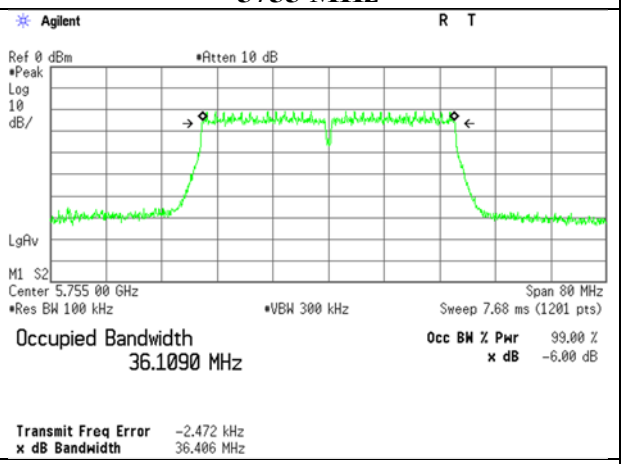


5825 MHz

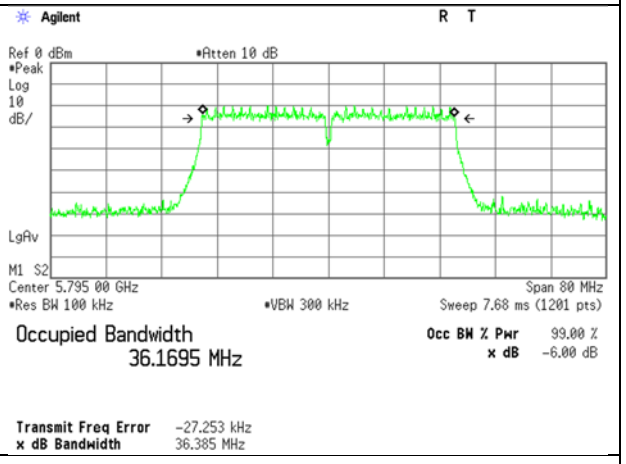


11n-40, Antenna 1

5755 MHz



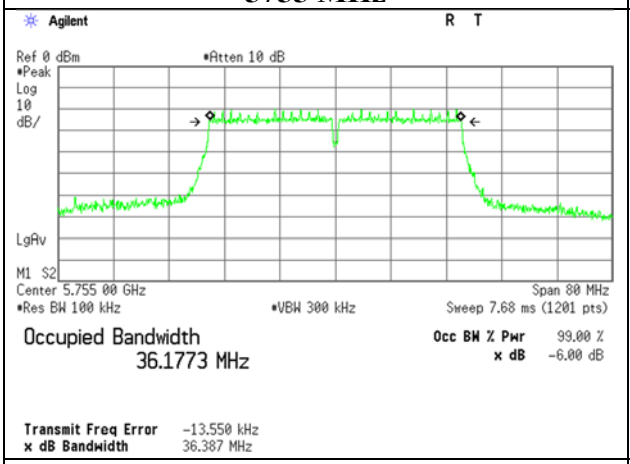
5795 MHz



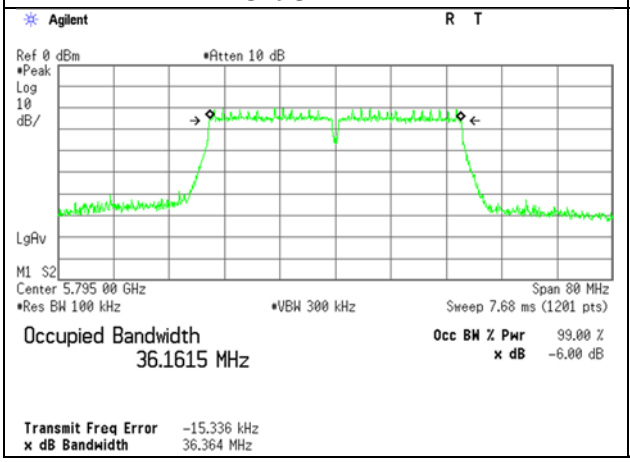
6 dB Bandwidth

11ac-40, Antenna 1

5755 MHz

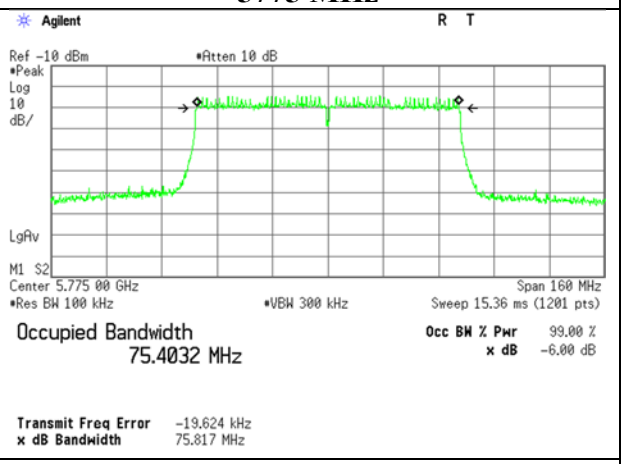


5795 MHz



11ac-80, Antenna 2

5775 MHz



Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11a		

11a

Applied limit: 15.407, mobile and portable client device

Tested Frequency	Power Meter Reading	Cable Loss	Atten. Loss	Duty Factor	Antenna Gain	26 dB EBW (B for FCC)	99% OBW (B for IC)	Conducted Power Result		Conducted Power Limit	Conducted Power Margin	e.i.r.p. Result		e.i.r.p. Limit	e.i.r.p. Margin
[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBi]	[MHz]	[MHz]	[dBm]	[mW]	[dBm]	[dB]	[dBm]	[mW]	[dBm]	[dB]
5180	-4.88	2.90	10.13	1.72	-2.9	-	17.063	9.87	9.71	23.97	14.10	6.97	4.98	29.97	23.00
5220	-4.43	2.90	10.13	1.72	-2.9	-	16.962	10.32	10.76	23.97	13.65	7.42	5.52	29.97	22.55
5240	-4.21	2.90	10.13	1.72	-2.9	-	16.941	10.54	11.32	23.97	13.43	7.64	5.81	29.97	22.33
5260	-4.50	2.90	10.14	1.72	-2.9	20.777	17.058	10.26	10.62	23.97	13.71	7.36	5.45	29.97	22.61
5300	-4.81	2.90	10.14	1.72	-2.9	20.675	16.989	9.95	9.89	23.97	14.02	7.05	5.07	29.97	22.92
5320	-4.93	2.90	10.14	1.72	-2.9	20.785	17.033	9.83	9.62	23.97	14.14	6.93	4.93	29.97	23.04
5500	-4.99	2.90	10.14	1.72	-2.9	20.881	17.048	9.77	9.48	23.97	14.20	6.87	4.86	29.97	23.10
5580	-4.25	2.90	10.15	1.72	-2.9	20.766	17.007	10.52	11.27	23.97	13.45	7.62	5.78	29.97	22.35
5700	-4.43	2.90	10.16	1.72	-2.9	20.808	17.062	10.35	10.84	23.97	13.62	7.45	5.56	29.97	22.52
5720	-4.51	2.90	10.12	1.72	-2.9	20.891	17.127	10.23	10.54	23.97	13.74	7.33	5.41	29.97	22.64
5745	-4.20	2.90	10.16	1.72	-2.9	-	17.106	10.58	11.43	30.00	19.42	7.68	5.86	36.00	28.32
5785	-4.25	2.90	10.16	1.72	-2.9	-	17.023	10.53	11.30	30.00	19.47	7.63	5.79	36.00	28.37
5825	-4.52	2.90	10.16	1.72	-2.9	-	17.038	10.26	10.62	30.00	19.74	7.36	5.45	36.00	28.64

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11n-20		

Antenna 1+2

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted power Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]	e.i.r.p. Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]
5180	-	18.001	9.91	9.44	19.35	12.87	23.97	11.10	5.08	4.84	9.92	9.97	29.97	20.00
5220	-	18.052	10.91	10.00	20.91	13.20	23.97	10.77	5.60	5.13	10.73	10.30	29.97	19.67
5240	-	18.090	11.14	10.30	21.45	13.31	23.97	10.66	5.71	5.28	11.00	10.41	29.97	19.56
5260	21.057	18.090	10.79	10.00	20.79	13.18	23.97	10.79	5.53	5.13	10.66	10.28	29.97	19.69
5300	21.237	18.092	10.00	9.53	19.53	12.91	23.97	11.06	5.13	4.89	10.02	10.01	29.97	19.96
5320	21.002	18.133	9.93	9.31	19.24	12.84	23.97	11.13	5.09	4.78	9.87	9.94	29.97	20.03
5500	21.368	18.102	9.91	9.08	18.99	12.78	23.97	11.19	5.08	4.66	9.74	9.88	29.97	20.09
5580	21.029	18.100	11.40	10.26	21.66	13.36	23.97	10.61	5.85	5.26	11.11	10.46	29.97	19.51
5700	20.862	18.103	10.94	10.05	20.99	13.22	23.97	10.75	5.61	5.15	10.76	10.32	29.97	19.65
5720	21.386	18.166	10.79	9.75	20.54	13.13	23.97	10.84	5.53	5.00	10.53	10.23	29.97	19.74
5745	-	18.064	11.69	9.73	21.42	13.31	30.00	16.69	6.00	4.99	10.99	10.41	36.00	25.59
5785	-	18.115	11.35	10.00	21.35	13.29	30.00	16.71	5.82	5.13	10.95	10.39	36.00	25.61
5825	-	18.134	10.89	9.42	20.31	13.08	30.00	16.92	5.58	4.83	10.42	10.18	36.00	25.82

		Antenna 1						Antenna 2					
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]
5180	1.94	-5.01	2.90	10.13	-2.90	9.96	7.06	-5.25	2.90	10.16	-2.90	9.75	6.85
5220	1.94	-4.59	2.90	10.13	-2.90	10.38	7.48	-5.00	2.90	10.16	-2.90	10.00	7.10
5240	1.94	-4.50	2.90	10.13	-2.90	10.47	7.57	-4.87	2.90	10.16	-2.90	10.13	7.23
5260	1.94	-4.65	2.90	10.14	-2.90	10.33	7.43	-5.00	2.90	10.16	-2.90	10.00	7.10
5300	1.94	-4.98	2.90	10.14	-2.90	10.00	7.10	-5.21	2.90	10.16	-2.90	9.79	6.89
5320	1.94	-5.01	2.90	10.14	-2.90	9.97	7.07	-5.31	2.90	10.16	-2.90	9.69	6.79
5500	1.94	-5.02	2.90	10.14	-2.90	9.96	7.06	-5.43	2.90	10.17	-2.90	9.58	6.68
5580	1.94	-4.42	2.90	10.15	-2.90	10.57	7.67	-4.90	2.90	10.17	-2.90	10.11	7.21
5700	1.94	-4.61	2.90	10.16	-2.90	10.39	7.49	-4.99	2.90	10.17	-2.90	10.02	7.12
5720	1.94	-4.63	2.90	10.12	-2.90	10.33	7.43	-5.07	2.90	10.12	-2.90	9.89	6.99
5745	1.94	-4.32	2.90	10.16	-2.90	10.68	7.78	-5.13	2.90	10.17	-2.90	9.88	6.98
5785	1.94	-4.45	2.90	10.16	-2.90	10.55	7.65	-5.01	2.90	10.17	-2.90	10.00	7.10
5825	1.94	-4.63	2.90	10.16	-2.90	10.37	7.47	-5.26	2.90	10.16	-2.90	9.74	6.84

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11ac-20		

Antenna 1+2

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted power Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]	e.i.r.p. Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]
5180	-	18.038	9.98	9.35	19.33	12.86	23.97	11.11	5.12	4.80	9.91	9.96	29.97	20.01
5220	-	18.049	10.94	9.98	20.92	13.20	23.97	10.77	5.61	5.12	10.73	10.30	29.97	19.67
5240	-	18.080	11.19	10.26	21.45	13.31	23.97	10.66	5.74	5.26	11.00	10.41	29.97	19.56
5260	21.188	18.108	10.62	10.16	20.78	13.18	23.97	10.79	5.45	5.21	10.66	10.28	29.97	19.69
5300	21.247	18.142	10.09	9.40	19.49	12.90	23.97	11.07	5.18	4.82	10.00	10.00	29.97	19.97
5320	21.271	18.105	9.93	9.27	19.20	12.83	23.97	11.14	5.09	4.75	9.85	9.93	29.97	20.04
5500	21.301	18.143	9.82	9.08	18.90	12.76	23.97	11.21	5.04	4.66	9.69	9.86	29.97	20.11
5580	21.012	18.142	11.40	10.28	21.68	13.36	23.97	10.61	5.85	5.27	11.12	10.46	29.97	19.51
5700	21.280	18.171	10.69	10.09	20.78	13.18	23.97	10.79	5.48	5.18	10.66	10.28	29.97	19.69
5720	21.399	18.187	10.91	10.14	21.05	13.23	23.97	10.74	5.60	5.20	10.80	10.33	29.97	19.64
5745	-	18.156	11.40	10.05	21.45	13.31	30.00	16.69	5.85	5.15	11.00	10.41	36.00	25.59
5785	-	18.125	11.22	9.86	21.08	13.24	30.00	16.76	5.75	5.06	10.81	10.34	36.00	25.66
5825	-	18.154	10.79	9.42	20.21	13.06	30.00	16.94	5.53	4.83	10.36	10.16	36.00	25.84

		Antenna 1						Antenna 2					
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]
5180	1.91	-4.95	2.90	10.13	-2.90	9.99	7.09	-5.26	2.90	10.16	-2.90	9.71	6.81
5220	1.91	-4.55	2.90	10.13	-2.90	10.39	7.49	-4.98	2.90	10.16	-2.90	9.99	7.09
5240	1.91	-4.45	2.90	10.13	-2.90	10.49	7.59	-4.86	2.90	10.16	-2.90	10.11	7.21
5260	1.91	-4.69	2.90	10.14	-2.90	10.26	7.36	-4.90	2.90	10.16	-2.90	10.07	7.17
5300	1.91	-4.91	2.90	10.14	-2.90	10.04	7.14	-5.24	2.90	10.16	-2.90	9.73	6.83
5320	1.91	-4.98	2.90	10.14	-2.90	9.97	7.07	-5.30	2.90	10.16	-2.90	9.67	6.77
5500	1.91	-5.03	2.90	10.14	-2.90	9.92	7.02	-5.40	2.90	10.17	-2.90	9.58	6.68
5580	1.91	-4.39	2.90	10.15	-2.90	10.57	7.67	-4.86	2.90	10.17	-2.90	10.12	7.22
5700	1.91	-4.68	2.90	10.16	-2.90	10.29	7.39	-4.94	2.90	10.17	-2.90	10.04	7.14
5720	1.91	-4.55	2.90	10.12	-2.90	10.38	7.48	-4.87	2.90	10.12	-2.90	10.06	7.16
5745	1.91	-4.40	2.90	10.16	-2.90	10.57	7.67	-4.96	2.90	10.17	-2.90	10.02	7.12
5785	1.91	-4.47	2.90	10.16	-2.90	10.50	7.60	-5.04	2.90	10.17	-2.90	9.94	7.04
5825	1.91	-4.64	2.90	10.16	-2.90	10.33	7.43	-5.23	2.90	10.16	-2.90	9.74	6.84

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11n-40		

Antenna 1+2

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted power Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]	e.i.r.p. Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]
5190	-	36.384	6.19	6.03	12.22	10.87	23.97	13.10	3.18	3.09	6.27	7.97	29.97	22.00
5230	-	36.406	6.53	6.40	12.93	11.12	23.97	12.85	3.35	3.28	6.63	8.22	29.97	21.75
5270	39.518	36.578	6.41	5.97	12.38	10.93	23.97	13.04	3.29	3.06	6.35	8.03	29.97	21.94
5310	39.185	36.450	5.92	5.58	11.50	10.61	23.97	13.36	3.03	2.86	5.90	7.71	29.97	22.26
5510	39.531	36.421	6.78	5.52	12.30	10.90	23.97	13.07	3.48	2.83	6.31	8.00	29.97	21.97
5550	39.301	36.467	7.26	6.07	13.33	11.25	23.97	12.72	3.72	3.11	6.84	8.35	29.97	21.62
5670	39.387	36.464	7.21	6.05	13.26	11.23	23.97	12.74	3.70	3.10	6.80	8.33	29.97	21.64
5710	39.631	36.506	6.38	5.69	12.07	10.82	23.97	13.15	3.27	2.92	6.19	7.92	29.97	22.05
5755	-	36.499	7.19	6.50	13.70	11.37	30.00	18.63	3.69	3.33	7.02	8.47	36.00	27.53
5795	-	36.358	7.06	6.59	13.65	11.35	30.00	18.65	3.62	3.38	7.00	8.45	36.00	27.55

		Antenna 1						Antenna 2					
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]
5190	2.72	-7.83	2.90	10.13	-2.90	7.92	5.02	-7.98	2.90	10.16	-2.90	7.80	4.90
5230	2.72	-7.60	2.90	10.13	-2.90	8.15	5.25	-7.72	2.90	10.16	-2.90	8.06	5.16
5270	2.72	-7.69	2.90	10.14	-2.90	8.07	5.17	-8.02	2.90	10.16	-2.90	7.76	4.86
5310	2.72	-8.04	2.90	10.14	-2.90	7.72	4.82	-8.31	2.90	10.16	-2.90	7.47	4.57
5510	2.72	-7.45	2.90	10.14	-2.90	8.31	5.41	-8.37	2.90	10.17	-2.90	7.42	4.52
5550	2.72	-7.16	2.90	10.15	-2.90	8.61	5.71	-7.96	2.90	10.17	-2.90	7.83	4.93
5670	2.72	-7.20	2.90	10.16	-2.90	8.58	5.68	-7.97	2.90	10.17	-2.90	7.82	4.92
5710	2.72	-7.69	2.90	10.12	-2.90	8.05	5.15	-8.19	2.90	10.12	-2.90	7.55	4.65
5755	2.72	-7.21	2.90	10.16	-2.90	8.57	5.67	-7.66	2.90	10.17	-2.90	8.13	5.23
5795	2.72	-7.29	2.90	10.16	-2.90	8.49	5.59	-7.59	2.90	10.16	-2.90	8.19	5.29

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11ac-40		

Antenna 1+2

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted power Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]	e.i.r.p. Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]
5190	-	36.930	6.17	6.04	12.21	10.87	23.97	13.10	3.16	3.10	6.26	7.97	29.97	22.00
5230	-	36.421	6.70	6.24	12.94	11.12	23.97	12.85	3.44	3.20	6.63	8.22	29.97	21.75
5270	39.841	36.541	6.15	6.14	12.29	10.90	23.97	13.07	3.16	3.15	6.30	8.00	29.97	21.97
5310	39.848	36.640	5.86	5.55	11.41	10.57	23.97	13.40	3.01	2.84	5.85	7.67	29.97	22.30
5510	39.871	36.583	6.53	5.78	12.31	10.90	23.97	13.07	3.35	2.96	6.31	8.00	29.97	21.97
5550	39.816	36.616	7.13	6.11	13.24	11.22	23.97	12.75	3.66	3.13	6.79	8.32	29.97	21.65
5670	39.878	36.656	6.95	6.31	13.26	11.23	23.97	12.74	3.56	3.24	6.80	8.33	29.97	21.64
5710	40.098	36.667	6.73	5.83	12.56	10.99	23.97	12.98	3.45	2.99	6.44	8.09	29.97	21.88
5755	-	36.399	7.03	6.31	13.34	11.25	30.00	18.75	3.61	3.24	6.84	8.35	36.00	27.65
5795	-	36.494	6.82	6.34	13.16	11.19	30.00	18.81	3.50	3.25	6.75	8.29	36.00	27.71

Tested Frequency [MHz]	Duty Factor [dB]	Antenna 1 Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]	Antenna 2 Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]
5190	1.04	-6.17	2.90	10.13	-2.90	7.90	5.00	-6.29	2.90	10.16	-2.90	7.81	4.91
5230	1.04	-5.81	2.90	10.13	-2.90	8.26	5.36	-6.15	2.90	10.16	-2.90	7.95	5.05
5270	1.04	-6.19	2.90	10.14	-2.90	7.89	4.99	-6.22	2.90	10.16	-2.90	7.88	4.98
5310	1.04	-6.40	2.90	10.14	-2.90	7.68	4.78	-6.66	2.90	10.16	-2.90	7.44	4.54
5510	1.04	-5.93	2.90	10.14	-2.90	8.15	5.25	-6.49	2.90	10.17	-2.90	7.62	4.72
5550	1.04	-5.56	2.90	10.15	-2.90	8.53	5.63	-6.25	2.90	10.17	-2.90	7.86	4.96
5670	1.04	-5.68	2.90	10.16	-2.90	8.42	5.52	-6.11	2.90	10.17	-2.90	8.00	5.10
5710	1.04	-5.78	2.90	10.12	-2.90	8.28	5.38	-6.40	2.90	10.12	-2.90	7.66	4.76
5755	1.04	-5.63	2.90	10.16	-2.90	8.47	5.57	-6.11	2.90	10.17	-2.90	8.00	5.10
5795	1.04	-5.76	2.90	10.16	-2.90	8.34	5.44	-6.08	2.90	10.16	-2.90	8.02	5.12

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	August 11, 2019	September 2, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 63 % RH	24 deg. C / 40 % RH
Engineer	Yuta Moriya	Takumi Shimada	Yuta Moriya
Mode	Tx 11ac-80		

Antenna 1+2

Applied limit: 15.407, mobile and portable client device

Tested Frequency [MHz]	26 dB EBW (B for FCC) [MHz]	99% OBW (B for IC) [MHz]	Conducted power Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]	e.i.r.p. Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Result [dBm]	Limit [dBm]	Margin [dB]
5210	-	75.871	5.38	5.41	10.79	10.33	23.97	13.64	2.76	2.77	5.53	7.43	29.97	22.54
5290	80.816	75.732	5.43	5.00	10.43	10.18	23.97	13.79	2.79	2.56	5.35	7.28	29.97	22.69
5530	80.961	75.743	5.52	5.01	10.53	10.23	23.97	13.74	2.83	2.57	5.40	7.33	29.97	22.64
5610	81.182	75.744	5.89	5.38	11.27	10.52	23.97	13.45	3.02	2.76	5.78	7.62	29.97	22.35
5690	81.301	76.120	5.64	5.14	10.78	10.32	23.97	13.65	2.89	2.64	5.53	7.42	29.97	22.55
5775	-	75.937	5.90	5.26	11.16	10.48	30.00	19.52	3.03	2.70	5.72	7.58	36.00	28.42

		Antenna 1						Antenna 2					
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result Cond. Power [dBm]	Result e.i.r.p. [dBm]
5210	1.79	-7.51	2.90	10.13	-2.90	7.31	4.41	-7.52	2.90	10.16	-2.90	7.33	4.43
5290	1.79	-7.48	2.90	10.14	-2.90	7.35	4.45	-7.86	2.90	10.16	-2.90	6.99	4.09
5530	1.79	-7.41	2.90	10.14	-2.90	7.42	4.52	-7.86	2.90	10.17	-2.90	7.00	4.10
5610	1.79	-7.15	2.90	10.16	-2.90	7.70	4.80	-7.55	2.90	10.17	-2.90	7.31	4.41
5690	1.79	-7.30	2.90	10.12	-2.90	7.51	4.61	-7.70	2.90	10.12	-2.90	7.11	4.21
5775	1.79	-7.14	2.90	10.16	-2.90	7.71	4.81	-7.64	2.90	10.16	-2.90	7.21	4.31

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
Conducted Power Limit (5725 MHz-5850 MHz) = 1W

Maximum Conducted Output Power

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH
Engineer	Junki Nagatomi
Mode	Tx 11a

5180 MHz Ant1 On time

Mode	Rate Mbps	[At1]Reading (timed average) [dBm]	[AT2]Reading (timed average) [dBm]	Duty factor [dB]	Burst power [dBm]	Remarks
11a	6	-14.93		0.00	-14.93	
	9	-14.89		0.00	-14.89	
	12	-14.86		0.00	-14.86	
	18	-14.70		0.00	-14.70	
	24	-14.72		0.00	-14.72	
	36	-14.60		0.00	-14.60	
	48	-14.46	-14.51	0.00	-14.46	* 1Tx
	54	-14.50		0.00	-14.50	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

All comparison were carried out on same frequency and measurement factors.

Maximum Conducted Output Power

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH
Engineer	Junki Nagatomi
Mode	Tx 11n-20

5180 MHz

Mode	MCS Number	Reading (timed average) Antenna						Burst power Antenna			Remarks
		1 [dBm]	2 [dBm]	1 [mW]	2 [mW]	1+2 [mW]	1+2 [dBm]	1 [dBm]	2 [dBm]	1+2 [dBm]	
11n-20	0	-15.80		-	-	-	-	-	-	-	
	1	-15.66		-	-	-	-	-	-	-	
	2	-14.45		-	-	-	-	-	-	-	
	3	-14.40	-15.15	-	-	-	-	-	-	-	* 1 TX
	4	-14.82		-	-	-	-	-	-	-	
	5	-14.79		-	-	-	-	-	-	-	
	6	-14.68		-	-	-	-	-	-	-	
	7	-14.60		-	-	-	-	-	-	-	
	8	-14.73	-14.90	0.03	0.03	0.07	-11.80	-	-	-11.80	
	9	-14.75	-15.01	0.03	0.03	0.07	-11.87	-	-	-11.87	
	10	-14.62	-14.85	0.03	0.03	0.07	-11.72	-	-	-11.72	
	11	-14.43	-14.84	0.04	0.03	0.07	-11.62	-	-	-11.62	
	12	-14.78	-15.04	0.03	0.03	0.06	-11.90	-	-	-11.90	
	13	-14.56	-14.93	0.03	0.03	0.07	-11.73	-	-	-11.73	
	14	-14.60	-14.86	0.03	0.03	0.07	-11.72	-	-	-11.72	
	15	-14.42	-14.77	0.04	0.03	0.07	-11.58	-	-	-11.58	* 2 TX

* Worst rate

Sample Calculation:

Burst power = Reading (timed average)

All comparison were carried out on same frequency and measurement factors.

Maximum Conducted Output Power

Report No.	12804674H	
Test place	Ise EMC Lab. No.6 Measurement Room	
Date	July 30, 2019	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH	23 deg. C / 62 % RH
Engineer	Junki Nagatomi	Junki Nagatomi
Mode	Tx 11ac-20	

5180 MHz

Mode	MCS Number	Reading (timed average)						Burst power	Remarks
		Antenna 1 [dBm]	Antenna 2 [dBm]	Antenna 1 [mW]	Antenna 2 [mW]	Sum [mW]	Sum [dBm]	[dBm]	
11ac-20 SISO	0	-14.88		-	-	-	-	-	
	1	-14.57		-	-	-	-	-	
	2	-14.55		-	-	-	-	-	
	3	-14.45		-	-	-	-	-	
	4	-14.32	-15.05	-	-	-	-	-	*1Tx
	5	-14.71		-	-	-	-	-	
	6	-14.7		-	-	-	-	-	
	7	-14.68		-	-	-	-	-	
	8	-15.77		-	-	-	-	-	
MIMO	0	-14.41	-14.91	0.04	0.03	0.07	-11.64	-11.64	
	1	-14.70	-14.64	0.03	0.03	0.07	-11.66	-11.66	
	2	-14.71	-14.84	0.03	0.03	0.07	-11.76	-11.76	
	3	-14.76	-14.85	0.03	0.03	0.07	-11.79	-11.79	
	4	-14.85	-14.89	0.03	0.03	0.07	-11.86	-11.86	
	5	-14.72	-15.08	0.03	0.03	0.06	-11.89	-11.89	
	6	-14.66	-14.81	0.03	0.03	0.07	-11.72	-11.72	
	7	-14.42	-14.88	0.04	0.03	0.07	-11.63	-11.63	* 2Tx
	8	-15.49	-15.72	0.03	0.03	0.06	-12.59	-12.59	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average)

Maximum Conducted Output Power

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH
Engineer	Junki Nagatomi
Mode	Tx 11n-40

5190 MHz

Mode	MCS Number	Reading (timed average) Antenna						Burst power Antenna			Remarks
		1 [dBm]	2 [dBm]	1 [mW]	2 [mW]	1+2 [mW]	1+2 [dBm]	1 [dBm]	2 [dBm]	1+2 [dBm]	
11n-40	0	-14.66		-	-	-	-	-14.66	0.00	-	
	1	-14.63		-	-	-	-	-14.63	0.00	-	
	2	-14.59		-	-	-	-	-14.59	0.00	-	
	3	-14.42		-	-	-	-	-14.42	0.00	-	
	4	-14.34	-15.13	-	-	-	-	-14.34	-15.13	-	* 1Tx
	5	-14.74		-	-	-	-	-14.74	0.00	-	
	6	-14.65		-	-	-	-	-14.65	0.00	-	
	7	-14.75		-	-	-	-	-14.75	0.00	-	
	8	-15.11	-15.48	0.03	0.03	0.06	-12.28	-	-	-12.28	
	9	-14.61	-14.63	0.03	0.03	0.07	-11.61	-	-	-11.61	
	10	-14.52	-14.80	0.04	0.03	0.07	-11.65	-	-	-11.65	
	11	-14.41	-14.91	0.04	0.03	0.07	-11.64	-	-	-11.64	
	12	-14.41	-15.01	0.04	0.03	0.07	-11.69	-	-	-11.69	
	13	-14.79	-14.59	0.03	0.03	0.07	-11.68	-	-	-11.68	
	14	-14.48	-14.76	0.04	0.03	0.07	-11.61	-	-	-11.61	* 2 Tx
	15	-14.36	-14.92	0.04	0.03	0.07	-11.62	-	-	-11.62	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

All comparison were carried out on same frequency and measurement factors.

Maximum Conducted Output Power

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH
Engineer	Junki Nagatomi
Mode	Tx 11ac-40

5190 MHz

Mode	MCS Number	Reading (timed average)						Burst power	Remarks
		Antenna		Antenna		Sum			
		1 [dBm]	2 [dBm]	1 [mW]	2 [mW]	[mW]	[dBm]	[dBm]	
11ac-40	0	-14.78		-	-	-	-	-	
	1	-15.28		-	-	-	-	-	
	2	-15.27		-	-	-	-	-	
SISO	3	-15.00		-	-	-	-	-	
	4	-14.91		-	-	-	-	-	
	5	-14.83		-	-	-	-	-	
	6	-14.77		-	-	-	-	-	
	7	-14.71	-15.35	-	-	-	-	-	* 1Tx
	8	-14.82		-	-	-	-	-	
	9	-14.82		-	-	-	-	-	
	0	-14.78	-15.03	0.03	0.03	0.06	-11.89	-11.89	
	1	-14.79	-14.82	0.03	0.03	0.07	-11.79	-11.79	* 2Tx
	2	-15.14	-14.89	0.03	0.03	0.06	-12.00	-12.00	
	3	-14.99	-15.24	0.03	0.03	0.06	-12.10	-12.10	
MIMO	4	-14.79	-14.94	0.03	0.03	0.07	-11.85	-11.85	
	5	-15.01	-14.80	0.03	0.03	0.06	-11.89	-11.89	
	6	-15.12	-15.13	0.03	0.03	0.06	-12.11	-12.11	
	7	-14.87	-15.07	0.03	0.03	0.06	-11.96	-11.96	
	8	-15.00	-14.99	0.03	0.03	0.06	-11.98	-11.98	
	9	-14.79	-15.01	0.03	0.03	0.06	-11.89	-11.89	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

Maximum Conducted Output Power

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	July 30, 2019
Temperature / Humidity	23 deg. C / 62 % RH
Engineer	Junki Nagatomi
Mode	Tx 11ac-80

5210 MHz

Mode	MCS Number	Reading (timed average)						Burst power	Remarks
		Antenna		Antenna		Sum			
		1	2	1	2				
		[dBm]	[dBm]	[mW]	[mW]	[mW]	[dBm]	[dBm]	
11ac-80	0	-15.86		-	-	-	-	-	
	1	-16.00		-	-	-	-	-	
	2	-15.87		-	-	-	-	-	
SISO	3	-16.14		-	-	-	-	-	
	4	-15.86		-	-	-	-	-	
	5	-15.83		-	-	-	-	-	
	6	-15.85		-	-	-	-	-	
	7	-15.80		-	-	-	-	-	
	8	-15.65	-16.13	-	-	-	-	-	* 1Tx
	9	-15.73		-	-	-	-	-	
	0	-15.86	-15.70	0.03	0.03	0.05	-12.77	-12.77	
	1	-15.61	-15.56	0.03	0.03	0.06	-12.57	-12.57	* 2Tx
	2	-15.84	-15.54	0.03	0.03	0.05	-12.68	-12.68	
	3	-15.86	-15.82	0.03	0.03	0.05	-12.83	-12.83	
MIMO	4	-16.02	-15.78	0.03	0.03	0.05	-12.89	-12.89	
	5	-16.07	-15.58	0.02	0.03	0.05	-12.81	-12.81	
	6	-15.96	-15.58	0.03	0.03	0.05	-12.76	-12.76	
	7	-15.98	-15.70	0.03	0.03	0.05	-12.83	-12.83	
	8	-15.98	-15.63	0.03	0.03	0.05	-12.79	-12.79	
	9	-15.85	-16.02	0.03	0.03	0.05	-12.92	-12.92	

* Worst rate

Sample Calculation:

Burst power = Reading (timed average) + Duty factor

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	September 3, 2019	September 17, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 53 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya	Yuta Moriya
Mode	Tx 11a		

Antenna 1 SISO 6Mbps

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5180	-3.48	2.90	10.13	9.55	9.02	0.28	9.83	9.62
5220	-3.04	2.90	10.13	9.99	9.98	0.28	10.27	10.64
5240	-2.90	2.90	10.13	10.13	10.30	0.28	10.41	10.99
5260	-3.08	2.90	10.14	9.96	9.91	0.28	10.24	10.57
5300	-3.47	2.90	10.14	9.57	9.06	0.28	9.85	9.66
5320	-3.52	2.90	10.14	9.52	8.95	0.28	9.80	9.55
5500	-3.60	2.90	10.14	9.44	8.79	0.28	9.72	9.38
5580	-2.84	2.90	10.15	10.21	10.50	0.28	10.49	11.19
5700	-3.05	2.90	10.16	10.01	10.02	0.28	10.29	10.69
5720	-2.94	2.90	10.12	10.08	10.19	0.28	10.36	10.86
5745	-2.78	2.90	10.16	10.28	10.67	0.28	10.56	11.38
5785	-2.88	2.90	10.16	10.18	10.42	0.28	10.46	11.12
5825	-3.13	2.90	10.16	9.93	9.84	0.28	10.21	10.50

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	September 3, 2019	September 17, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 53 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya	Yuta Moriya
Mode	Tx 11n-20		

Antenna 1 SISO MCS0

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5180	-3.51	2.90	10.13	9.52	8.95	0.29	9.81	9.57
5220	-3.12	2.90	10.13	9.91	9.79	0.29	10.20	10.47
5240	-3.06	2.90	10.13	9.97	9.93	0.29	10.26	10.62
5260	-3.08	2.90	10.14	9.96	9.91	0.29	10.25	10.59
5300	-3.45	2.90	10.14	9.59	9.10	0.29	9.88	9.73
5320	-3.53	2.90	10.14	9.51	8.93	0.29	9.80	9.55
5500	-3.51	2.90	10.14	9.53	8.97	0.29	9.82	9.59
5580	-2.79	2.90	10.15	10.26	10.62	0.29	10.55	11.35
5700	-3.04	2.90	10.16	10.02	10.05	0.29	10.31	10.74
5720	-3.06	2.90	10.12	9.96	9.91	0.29	10.25	10.59
5745	-2.82	2.90	10.16	10.24	10.57	0.29	10.53	11.30
5785	-2.78	2.90	10.16	10.28	10.67	0.29	10.57	11.40
5825	-3.01	2.90	10.16	10.05	10.12	0.29	10.34	10.81

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

MIMO MCS0

		Antenna 1				Antenna 2				Antenna 1+2			
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Result (Burst average) Antenna 1 [mW]	Result (Burst average) Antenna 2 [mW]	Result (Burst average) Sum 1+2 [mW]	Result (Burst average) Sum 1+2 [dBm]
5180	0.3	-3.36	2.90	10.13	9.97	-3.65	2.90	10.16	9.71	9.93	9.35	19.29	12.85
5220	0.3	-3.09	2.90	10.13	10.24	-3.35	2.90	10.16	10.01	10.57	10.02	20.59	13.14
5240	0.3	-2.97	2.90	10.13	10.36	-3.30	2.90	10.16	10.06	10.86	10.14	21.00	13.22
5260	0.3	-3.05	2.90	10.14	10.29	-3.33	2.90	10.16	10.03	10.69	10.07	20.76	13.17
5300	0.3	-3.39	2.90	10.14	9.95	-3.57	2.90	10.16	9.79	9.89	9.53	19.41	12.88
5320	0.3	-3.48	2.90	10.14	9.86	-3.68	2.90	10.16	9.68	9.68	9.29	18.97	12.78
5500	0.3	-3.48	2.90	10.14	9.86	-3.86	2.90	10.17	9.51	9.68	8.93	18.62	12.70
5580	0.3	-2.91	2.90	10.15	10.44	-3.23	2.90	10.17	10.14	11.07	10.33	21.39	13.30
5700	0.3	-3.08	2.90	10.16	10.28	-3.44	2.90	10.17	9.93	10.67	9.84	20.51	13.12
5720	0.3	-3.00	2.90	10.12	10.32	-3.13	2.90	10.12	10.19	10.76	10.45	21.21	13.27
5745	0.3	-2.94	2.90	10.16	10.42	-3.36	2.90	10.17	10.01	11.02	10.02	21.04	13.23
5785	0.3	-2.88	2.90	10.16	10.48	-3.41	2.90	10.17	9.96	11.17	9.91	21.08	13.24
5825	0.3	-3.18	2.90	10.16	10.18	-3.63	2.90	10.16	9.73	10.42	9.40	19.82	12.97

Sample Calculation:
Result (Burst poer average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	September 3, 2019	September 17, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 53 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya	Yuta Moriya
Mode	Tx 11ac-20		

Antenna 1 SISO MCS0

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5180	-3.56	2.90	10.13	9.47	8.85	0.29	9.76	9.46
5220	-3.26	2.90	10.13	9.77	9.48	0.29	10.06	10.14
5240	-3.07	2.90	10.13	9.96	9.91	0.29	10.25	10.59
5260	-3.13	2.90	10.14	9.91	9.79	0.29	10.20	10.47
5300	-3.44	2.90	10.14	9.60	9.12	0.29	9.89	9.75
5320	-3.45	2.90	10.14	9.59	9.10	0.29	9.88	9.73
5500	-3.51	2.90	10.14	9.53	8.97	0.29	9.82	9.59
5580	-2.93	2.90	10.15	10.12	10.28	0.29	10.41	10.99
5700	-3.05	2.90	10.16	10.01	10.02	0.29	10.30	10.72
5720	-3.15	2.90	10.12	9.87	9.71	0.29	10.16	10.38
5745	-2.92	2.90	10.16	10.14	10.33	0.29	10.43	11.04
5785	-2.88	2.90	10.16	10.18	10.42	0.29	10.47	11.14
5825	-3.08	2.90	10.16	9.98	9.95	0.29	10.27	10.64

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

MIMO MCS0

		Antenna 1				Antenna 2				Antenna 1+2			
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Result (Burst power average) Antenna 1 [mW]	Antenna 2 [mW]	Sum 1+2 [mW]	[dBm]
5180	0.3	-3.39	2.90	10.13	9.94	-3.61	2.90	10.16	9.75	9.86	9.44	19.30	12.86
5220	0.3	-2.96	2.90	10.13	10.37	-3.35	2.90	10.16	10.01	10.89	10.02	20.91	13.20
5240	0.3	-2.91	2.90	10.13	10.42	-3.19	2.90	10.16	10.17	11.02	10.40	21.41	13.31
5260	0.3	-3.01	2.90	10.14	10.33	-3.35	2.90	10.16	10.01	10.79	10.02	20.81	13.18
5300	0.3	-3.31	2.90	10.14	10.03	-3.61	2.90	10.16	9.75	10.07	9.44	19.51	12.90
5320	0.3	-3.48	2.90	10.14	9.86	-3.70	2.90	10.16	9.66	9.68	9.25	18.93	12.77
5500	0.3	-3.56	2.90	10.14	9.78	-3.94	2.90	10.17	9.43	9.51	8.77	18.28	12.62
5580	0.3	-2.82	2.90	10.15	10.53	-3.36	2.90	10.17	10.01	11.30	10.02	21.32	13.29
5700	0.3	-3.02	2.90	10.16	10.34	-3.39	2.90	10.17	9.98	10.81	9.95	20.77	13.17
5720	0.3	-2.91	2.90	10.12	10.41	-3.42	2.90	10.12	9.90	10.99	9.77	20.76	13.17
5745	0.3	-2.77	2.90	10.16	10.59	-3.38	2.90	10.17	9.99	11.46	9.98	21.43	13.31
5785	0.3	-2.86	2.90	10.16	10.50	-3.47	2.90	10.17	9.90	11.22	9.77	20.99	13.22
5825	0.3	-3.09	2.90	10.16	10.27	-3.57	2.90	10.16	9.79	10.64	9.53	20.17	13.05

Sample Calculation:
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H		
Test place	Ise EMC Lab. No.6 Measurement Room		
Date	September 3, 2019	September 17, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 53 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya	Yuta Moriya
Mode	Tx 11n-40		

Antenna 1 SISO MCS0

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5190	-5.71	2.90	10.13	7.32	5.40	0.58	7.90	6.17
5230	-5.70	2.90	10.13	7.33	5.41	0.58	7.91	6.18
5270	-5.70	2.90	10.14	7.34	5.42	0.58	7.92	6.19
5310	-5.69	2.90	10.14	7.35	5.43	0.58	7.93	6.21
5510	-5.62	2.90	10.14	7.42	5.52	0.58	8.00	6.31
5550	-5.46	2.90	10.15	7.59	5.74	0.58	8.17	6.56
5670	-5.25	2.90	10.16	7.81	6.04	0.58	8.39	6.90
5710	-5.28	2.90	10.12	7.74	5.94	0.58	8.32	6.79
5755	-5.21	2.90	10.16	7.85	6.10	0.58	8.43	6.97
5795	-5.33	2.90	10.16	7.73	5.93	0.58	8.31	6.78

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

MIMO MCS0

		Antenna 1				Antenna 2				Antenna 1+2			
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Result (Burst power average) Antenna 1 [mW]	Antenna 2 [mW]	Sum 1+2 [mW]	[dBm]
5190	0.59	-5.86	2.90	10.13	7.76	-5.93	2.90	10.16	7.72	5.97	5.92	11.89	10.75
5230	0.59	-5.49	2.90	10.13	8.13	-5.58	2.90	10.16	8.07	6.50	6.41	12.91	11.11
5270	0.59	-5.69	2.90	10.14	7.94	-5.76	2.90	10.16	7.89	6.22	6.15	12.37	10.93
5310	0.59	-6.17	2.90	10.14	7.46	-6.28	2.90	10.16	7.37	5.57	5.46	11.03	10.43
5510	0.59	-5.70	2.90	10.14	7.93	-6.21	2.90	10.17	7.45	6.21	5.56	11.77	10.71
5550	0.59	-5.20	2.90	10.15	8.44	-5.87	2.90	10.17	7.79	6.98	6.01	12.99	11.14
5670	0.59	-5.25	2.90	10.16	8.40	-5.94	2.90	10.17	7.72	6.92	5.92	12.83	11.08
5710	0.59	-5.23	2.90	10.12	8.38	-5.77	2.90	10.12	7.84	6.89	6.08	12.97	11.13
5755	0.59	-5.24	2.90	10.16	8.41	-5.64	2.90	10.17	8.02	6.93	6.34	13.27	11.23
5795	0.59	-5.31	2.90	10.16	8.34	-5.83	2.90	10.16	7.82	6.82	6.05	12.88	11.10

Sample Calculation:
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H	
Test place	Ise EMC Lab. No.6 Measurement Room	
Date	September 3, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya
Mode	Tx 11ac-40	

Antenna 1 SISO MCS0

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5190	-5.87	2.90	10.13	7.16	5.20	0.58	7.74	5.94
5230	-5.56	2.90	10.13	7.47	5.58	0.58	8.05	6.38
5270	-5.64	2.90	10.14	7.40	5.50	0.58	7.98	6.28
5310	-5.98	2.90	10.14	7.06	5.08	0.58	7.64	5.81
5510	-5.65	2.90	10.14	7.39	5.48	0.58	7.97	6.27
5550	-5.14	2.90	10.15	7.91	6.18	0.58	8.49	7.06
5670	-5.44	2.90	10.16	7.62	5.78	0.58	8.20	6.61
5710	-5.18	2.90	10.12	7.84	6.08	0.58	8.42	6.95
5755	-5.23	2.90	10.16	7.83	6.07	0.58	8.41	6.93
5795	-5.45	2.90	10.16	7.61	5.77	0.58	8.19	6.59

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

MIMO MCS0

		Antenna 1				Antenna 2				Antenna 1+2			
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Result (Burst power average) Antenna 1 [mW]	Antenna 2 [mW]	Sum 1+2 [mW]	Sum 1+2 [dBm]
5190	0.59	-5.78	2.90	10.13	7.84	-5.96	2.90	10.16	7.69	6.08	5.87	11.96	10.78
5230	0.59	-5.41	2.90	10.13	8.21	-5.70	2.90	10.16	7.95	6.62	6.24	12.86	11.09
5270	0.59	-5.68	2.90	10.14	7.95	-6.01	2.90	10.16	7.64	6.24	5.81	12.04	10.81
5310	0.59	-5.94	2.90	10.14	7.69	-6.29	2.90	10.16	7.36	5.87	5.45	11.32	10.54
5510	0.59	-5.43	2.90	10.14	8.20	-6.12	2.90	10.17	7.54	6.61	5.68	12.28	10.89
5550	0.59	-5.17	2.90	10.15	8.47	-5.73	2.90	10.17	7.93	7.03	6.21	13.24	11.22
5670	0.59	-5.16	2.90	10.16	8.49	-5.80	2.90	10.17	7.86	7.06	6.11	13.17	11.20
5710	0.59	-5.22	2.90	10.12	8.39	-5.95	2.90	10.12	7.66	6.90	5.83	12.74	11.05
5755	0.59	-5.28	2.90	10.16	8.37	-5.55	2.90	10.17	8.11	6.87	6.47	13.34	11.25
5795	0.59	-5.34	2.90	10.16	8.31	-5.61	2.90	10.16	8.04	6.78	6.37	13.14	11.19

Sample Calculation:
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Average Output Power
(Reference data for RF Exposure)

Report No.	12804674H	
Test place	Ise EMC Lab. No.6 Measurement Room	
Date	September 3, 2019	November 15, 2019
Temperature / Humidity	24 deg. C / 64 % RH	24 deg. C / 40 % RH
Engineer	Takumi Shimada	Yuta Moriya
Mode	Tx 11ac-80	

Antenna 1 SISO MCS0

Tested Frequency [MHz]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Timed average) [dBm]	Result (Timed average) [mW]	Duty factor [dB]	Result (Burst power average) [dBm]	Result (Burst power average) [mW]
5210	-6.99	2.90	10.13	6.04	4.02	1.11	7.15	5.19
5290	-7.05	2.90	10.14	5.99	3.97	1.11	7.10	5.13
5530	-6.85	2.90	10.14	6.19	4.16	1.11	7.30	5.37
5610	-6.48	2.90	10.16	6.58	4.55	1.11	7.69	5.87
5690	-6.89	2.90	10.12	6.13	4.10	1.11	7.24	5.30
5775	-6.68	2.90	10.16	6.38	4.35	1.11	7.49	5.61

Sample Calculation:
Result (Timed average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss
Result (Burst power average) = Time average + Duty factor

MIMO MCS0

		Antenna 1				Antenna 2				Antenna 1+2			
Tested Frequency [MHz]	Duty Factor [dB]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Power Meter Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Burst average) [dBm]	Result (Burst power average) Antenna 1 [mW]	Antenna 2 [mW]	Sum 1+2 [mW]	Sum 1+2 [dBm]
5210	1.11	-6.84	2.90	10.13	7.30	-6.85	2.90	10.16	7.32	5.37	5.40	10.77	10.32
5290	1.11	-6.91	2.90	10.14	7.24	-7.22	2.90	10.16	6.95	5.30	4.95	10.25	10.11
5530	1.11	-6.92	2.90	10.14	7.23	-7.17	2.90	10.17	7.01	5.28	5.02	10.31	10.13
5610	1.11	-6.47	2.90	10.16	7.70	-6.88	2.90	10.17	7.30	5.89	5.37	11.26	10.51
5690	1.11	-6.94	2.90	10.12	7.19	-6.66	2.90	10.12	7.47	5.24	5.58	10.82	10.34
5775	1.11	-6.63	2.90	10.16	7.54	-6.92	2.90	10.16	7.25	5.68	5.31	10.98	10.41

Sample Calculation:
Result (Burst power average) = Reading + Cable Loss (including the cable(s) customer supplied) + Atten. Loss + Duty factor

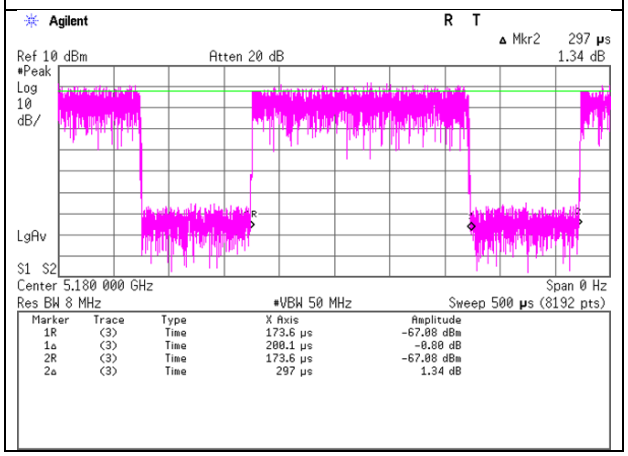
The average output power was measured with the lowest order modulation and lowest data rate configuration in each IEEE 802.11 mode based on KDB 248227 D01.

Burst rate confirmation

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

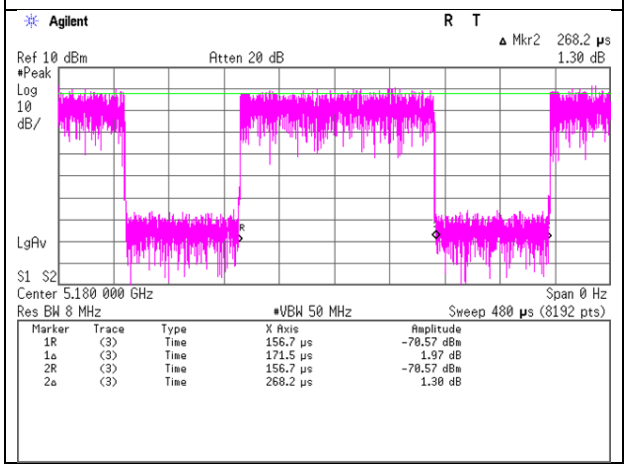
11a 48 Mbps Antenna 1

Tx on / (Tx on + Tx off) =	**0.674**
Tx on / (Tx on + Tx off) * 100 =	**67.4 %**
Duty factor = 10 * log (0.297 / 0.2001) =	**1.72 dB**



11n-20 MCS 15 MIMO Antenna 1

Tx on / (Tx on + Tx off) =	**0.639**
Tx on / (Tx on + Tx off) * 100 =	**63.9 %**
Duty factor = 10 * log (0.2682 / 0.1715) =	**1.94 dB**

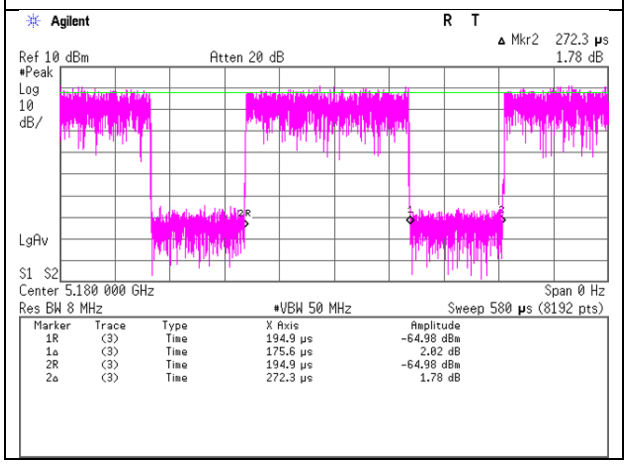


Burst rate confirmation

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

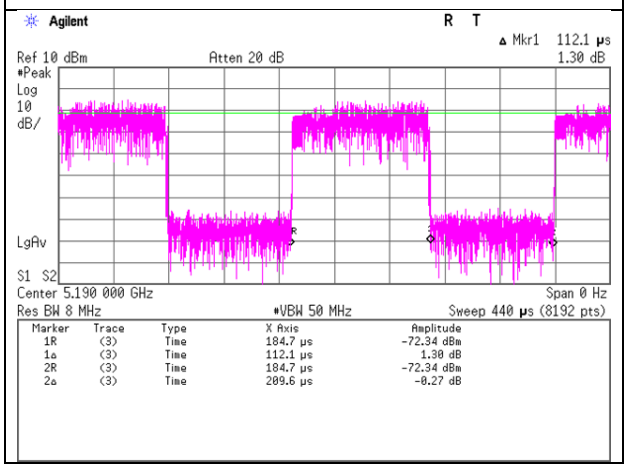
11ac-20 MCS 7 MIMO Antenna 1

Tx on / (Tx on + Tx off) =	**0.645**
Tx on / (Tx on + Tx off) * 100 =	**64.5 %**
Duty factor = 10 * log (0.2723 / 0.1756) =	**1.91 dB**



11n-40 MCS 14 MIMO Antenna 1

Tx on / (Tx on + Tx off) =	**0.535**
Tx on / (Tx on + Tx off) * 100 =	**53.5 %**
Duty factor = 10 * log (0.2096 / 0.1121) =	**2.72 dB**

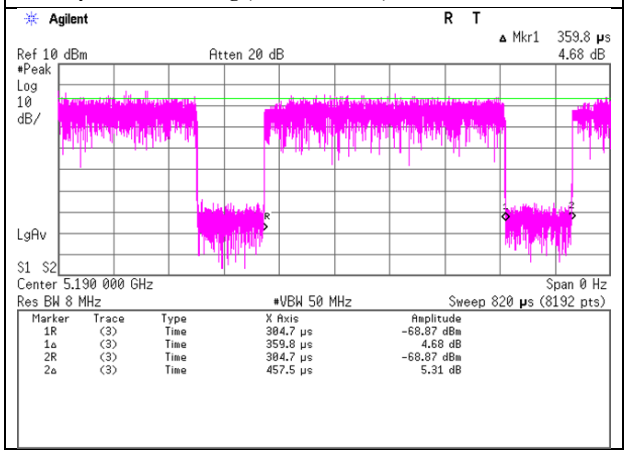


Burst rate confirmation

Report No.	12804674H
Test place	Ise EMC Lab. No.6 Measurement Room
Date	September 4, 2019
Temperature / Humidity	22 deg. C / 60 % RH
Engineer	Takumi Shimada
Mode	Tx

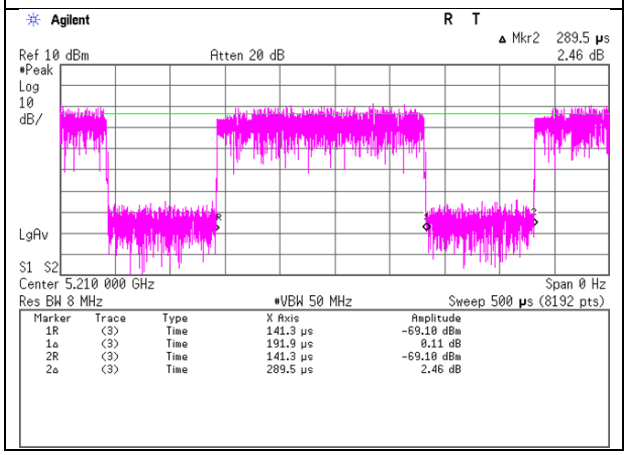
11ac-40 MCS 1 MIMO Antenna 1

Tx on / (Tx on + Tx off) =	0.786
Tx on / (Tx on + Tx off) * 100 =	78.6 %
Duty factor = 10 * log (0.4575 / 0.3598) =	1.04 dB



11ac-80 MCS 1 MIMO Antenna 2

Tx on / (Tx on + Tx off) =	0.663
Tx on / (Tx on + Tx off) * 100 =	66.3 %
Duty factor = 10 * log (0.2895 / 0.1919) =	1.79 dB

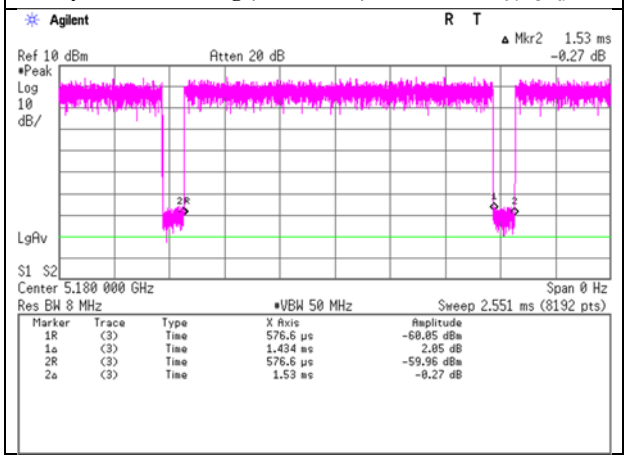


Burst rate confirmation
(SAR Power)

Report No.	12804674H	
Test place	Ise EMC Lab. No.6 Measurement Room	
Date	September 4, 2019	October 26, 2019
Temperature / Humidity	22 deg. C / 60 % RH	22 deg. C / 54 % RH
Engineer	Takumi Shimada	Takafumi Noguchi
Mode	Tx	

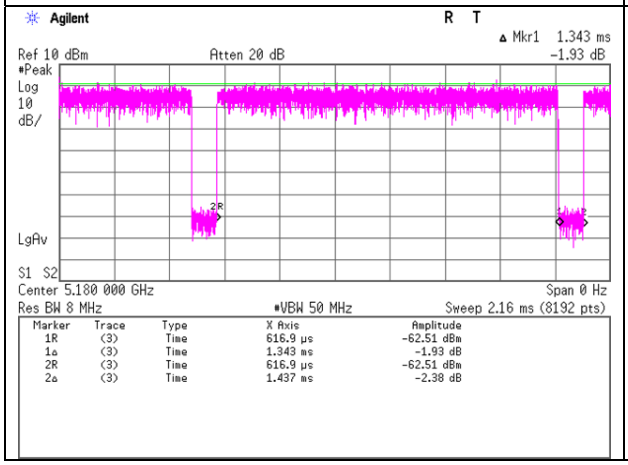
11a 6 Mbps Antenna 1

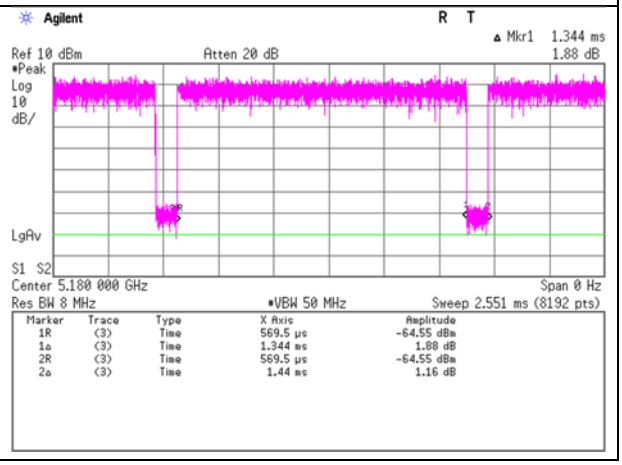
Tx on / (Tx on + Tx off) =	**0.937**
Tx on / (Tx on + Tx off) * 100 =	**93.7 %**
Duty factor = 10 * log (1.53 / 1.434) =	**0.28 dB**



11n-20 MCS 0 SISO Antenna 1

Tx on / (Tx on + Tx off) =	**0.935**
Tx on / (Tx on + Tx off) * 100 =	**93.5 %**
Duty factor = 10 * log (1.437 / 1.343) =	**0.29 dB**



11n-20 MCS 0 MIMO Antenna 1

Tx on / (Tx on + Tx off) =	**0.933**
Tx on / (Tx on + Tx off) * 100 =	**93.3 %**
Duty factor = 10 * log (1.44 / 1.344) =	**0.30 dB**