

Prüfbericht-Nr.: Test report no.:	60431077-004	Auftrags-Nr.: Order no.:	23870469 030	Seite 1 von 60 Page 1 of 60
Kunden-Referenz-Nr.: Client reference no.:	1288983	Auftragsdatum: Order date:	2020.11.29	
Auftraggeber: Client:	IKEA of Sweden AB			
Prüfgegenstand: Test item:	Hub for smart products			
Bezeichnung / Typ-Nr.: Identification / Type no.:	DIRIGERA / E2003 / FCC ID: FHO-E2003			
Auftrags-Inhalt: Order content:	Accredited testing according to FCC Part 15E			
Prüfgrundlage: Test specification:	FCC 47 CFR Part 15.407 with parts 15.207 & 15.209 ANSI C63.10: 2013			
Wareneingangsdatum: Date of sample receipt:	2020.11.30			
Prüfmuster-Nr.: Test sample no.:	See section 2.3			
Prüfzeitraum: Testing period:	2020.12.10 – 2021.03.30			
Ort der Prüfung: Place of testing:	Lund, Sweden			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland Sweden			
Prüfergebnis*: Test result*:	Pass			
überprüft von: reviewed by:	genehmigt von: authorized by:			
Datum: 2022.02.14 Date:	Datum: 2022.02.14 Date:			
Stellung / Position:	Senior Technical Expert	Stellung / Position:	Lab Manager	
Sonstiges / Other:	This report contains measurements for the WLAN 5GHz radio interface only			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend 3 = satisfactory	4 = ausreichend N/A = nicht anwendbar 4 = sufficient N/A = not applicable
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory 3 = satisfactory	4 = sufficient N/A = not applicable 4 = sufficient N/A = not applicable
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.</i>				

Revision History60431077-00460431077-004

REVISION	DATE	REMARKS	AUTHOR
001	2021.04.30	First Release	Niall Forrester
002	2021.09.28	Corrected gain figures, updated module name.	Niall Forrester
003	2021.12.06	Replaced gain with module figure	Niall Forrester
004	2022.02.14	Corrected U-NII band for CH 144 and ac maximum power reference	Niall Forrester
Note: Latest revision report will replace all previous reports			
This report based on FCC Part 15.407 Template version 1.0			

Summary of Test Results

FCC 47 CFR Rule Part	Test Description	Applicability	Report Section	RESULT	REMARKS
15.207 15.407 (b)	AC Power Line Conducted Emissions (Intentional Radiators)	YES	4.1	PASS	
15.209 15.407 (b)	Radiated Emissions (Intentional Radiators)	YES	4.2	PASS	
15.407 (a)	Maximum Conducted Output Power	YES	4.3	N.P	See Note 1
15.407 (a)	Maximum Power Spectral Density	YES	4.4	N.P	See Note 1
15.407 (a)(2)	26 dB bandwidth	YES	4.5	N.P.	See Note 1
15.407 (e)	6 dB bandwidth	YES	4.6	N.P	See Note 1
15.407 (g)	Frequency Stability	YES	4.7	N.P	See Note 1
15.407 (h)(1)	Transmit Power Control	YES	4.8	N.P	See Note 1
-	Conducted Power Comparison	YES	4.9	Comparison Only	Comparing with certified module

Possible test case verdicts:

- Test case does not apply to the test object: N/A
- Test object complies with the requirement: PASS or COMPLIANT
- Test object does not meet the requirement: FAIL or NOT COMPLIANT
- Test case not performed on the test object: N.P.

Note 1: the device includes pre-certified modules as described in section 2.1 below

Table of Contents

1. GENERAL INFORMATION	4
1.1 Test Site.....	4
1.2 Client Information	4
2. PRODUCT INFORMATION.....	5
2.1 General Description.....	5
2.2 Device Characteristics.....	5
2.3 Test Samples	5
2.4 Wireless Technologies and Bands Supported by the EUT.....	6
2.5 Antenna Information.....	6
2.6 Simultaneous Transmission Capabilities	6
2.7 Wireless Technology Details	7
2.8 U-NII Details.....	7
2.9 Ancillary Equipment.....	7
2.10 EUT Diagrams.....	7
3. TEST METHODS	8
3.1 Test Standards.....	8
3.2 Additional references.....	8
3.3 Limits	9
3.4 Description of Test Methods and Equipment Setup	10
3.5 EUT Configuration During Test.....	14
3.6 EUT Operation Modes.....	14
3.7 Deviations from the Test Standard	14
3.8 Environmental Conditions.....	15
4. TEST RESULTS	16
4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter).....	16
4.2 Test Results – 4.2.2 Radiated Emissions (Intentional Transmitter)	19
4.3 Test Results – Maximum Conducted Output Power.....	54
4.4 Test Results – Maximum Power Spectral Density	54
4.5 Test Results – 26 dB bandwidth	54
4.6 Test Results – 6dB Bandwidth.....	54
4.7 Test Results – Frequency Stability	54
4.8 Test Results – Transmit Power Control	54
4.9 Test Results – Conducted Power Comparison	55
5. TEST EQUIPMENT STATUS.....	59
5.1 List of Hardware with Calibration Dates	59
5.2 Software / Firmware Versions.....	60
6. MEASUREMENT UNCERTAINTY	60
6.1 Measurement Uncertainty for Conducted Power Measurements	60
6.2 Measurement Uncertainty for Conducted Emissions	60
6.3 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)	60
7. PHOTOGRAPHS.....	60

1. GENERAL INFORMATION

1.1 Test Site

Test Facility:	TÜV Rheinland Sweden AB
Address:	Mobilvägen 10
	223 62 Lund
	Sweden
Swedac Registration Number:	10325
FCC Test Firm Registration Number:	517458
ISED Test Site Registration Number:	24753

1.2 Client Information

Company Name:	IKEA
Address:	Tulpanvägen 8
	343 34 Älmhult
	Sweden
Contact Person:	Jeton Salihu
Contact e-Mail / Telephone	Jeton.salihu@inter.ikea.com +46 701443175

2. PRODUCT INFORMATION

2.1 General Description

Model name:	DIRIGERA
Manufacturer:	IKEA of Sweden AB, SE-343 81 Älmhult
Model number / Marketing name:	E2003
FCC ID:	FHO-E2003
Description:	Electronic product acting as central hub for IKEA's Home Smart products.
Ancillary Equipment:	See section 2.8

The device incorporates three separate pre-certified modules:

- Murata LBEE5ZZ2AW (FCC ID: VPYLBEE5HY1MW) for WLAN 2.4 GHz 802.11 b/g/n, WLAN 5GHz 802.11 a/n/ac and Bluetooth Low Energy
- Silicon Labs MGM210L "No. 1" (FCC ID: QOQMGM210L) for ZigBee 802.15.4
- Silicon Labs MGM210L "No. 2" (FCC ID: QOQMGM210L) for Thread 802.15.4

Each module uses its own built-in antenna

2.2 Device Characteristics

Type of Power Supply	USB Power Supply (via AC/DC Adapter)
Nominal Supply Voltage	120V or 230V AC (Adapter) / 5V DC (USB)
Supply Voltage Range	100-240V AC
Operating Temperature Range	0°C - 40 °C
Operating Air Humidity Range	-
Highest Internal Frequency Source	5825 MHz

2.3 Test Samples

EUT #	EUT ID	Description	Used For:
1	A002959287-010	Standard Sample	Conducted Emissions Radiated Emissions
2	A002959287-013	Standard Sample	Radiated Emissions
3	A002959287-001	Modified with semi-rigid cable in place of each antenna	Conducted Power Measurements

2.4 Wireless Technologies and Bands Supported by the EUT

Technology	Band	Frequency Range (Tx)	Evaluation Performed*
WiFi 802.11 b/g/n (LBEE5ZZ2AW)	2.4 GHz	2412 MHz - 2462 MHz	NO
WiFi 802.11 a/n/ac (LBEE5ZZ2AW)	5 GHz	5180 MHz - 5240 MHz 5260 MHz - 5320 MHz 5500 MHz - 5720 MHz 5745 MHz - 5825 MHz	YES
BlueTooth Low Energy (LBEE5ZZ2AW)	2.4 GHz	2402 MHz – 2480 MHz	NO
ZigBee 802.15.4 (MGM210L No.1)	2.4 GHz	2400 MHz – 2483.5 MHz	NO
Thread 802.15.4 (MGM210L No.2)	2.4 GHz	2400 MHz – 2483.5 MHz	NO

*This statement refers only to this report. Other wireless technologies may be covered by other reports.

2.5 Antenna Information

Technology	Band	Number of Antennas	Antenna Type(s)	Gain
WiFi 802.11 a/b/g/n/ac BlueTooth Low Energy (LBEE5ZZ2AW)	2.4 GHz	1	Monopole	0.10
	5 GHz			-0.40
ZigBee 802.15.4 (MGM210L No.1)	2.4 GHz	1	Inverted F PCB Trace	0.50
Thread 802.15.4 (MGM210L No.2)	2.4 GHz	1	Inverted F PCB Trace	0.50

2.6 Simultaneous Transmission Capabilities

Active Technologies	Bands	Active Modules
WiFi 802.11 a/n/ac + ZigBee 802.15.4	5 GHz	(LBEE5ZZ2AW) +
	2.4 GHz	(MGM210L No.1)
WiFi 802.11 a/n/ac + Thread 802.15.4	5 GHz	(LBEE5ZZ2AW) +
	2.4 GHz	(MGM210L No.2)

Except for the two cases listed above, no other simultaneous transmission capabilities are supported by the device. It is not possible for the device to send on any two 2.4GHz technologies simultaneously, and there is no situation where all three modules are active simultaneously. The LBEE5ZZ2AW module cannot transmit for Bluetooth simultaneously with any WLAN configuration.

2.7 Wireless Technology Details

Technology	Band	Modulation Type(s)	No. of Channels	Channel Spacing	Adaptivity
WiFi 802.11 b/g/n (LBEE5ZZ2AW)	2.4 GHz	CCK / BPSK / QPSK / 16-QAM / 64-QAM	11	5 MHz	N/A
WiFi 802.11 a/n/ac (LBEE5ZZ2AW)	5 GHz	BPSK / QPSK / 16-QAM / 64-QAM	As per 802.11	5 MHz	N/A
BlueTooth Low Energy (LBEE5ZZ2AW)	2.4 GHz	GFSK	40	2 MHz	N/A
ZigBee 802.15.4 (MGM210L No.1)	2.4 GHz	O-QPSK	16	5 MHz	N/A
Thread 802.15.4 (MGM210L No.2)	2.4 GHz	O-QPSK	16	5 MHz	N/A

2.8 U-NII Details

Technology	Band	Usage	TPC Support	DFS Support
WiFi 802.11 a/n/ac (LBEE5ZZ2AW)	5 GHz	Indoor	NO	NO

2.9 Ancillary Equipment

ID	Description	Manufacturer / Model	Hardware & Software Versions
A002959287-017	AC/DC Power Supply	IKEA ICPWS5	-
A002959287-018	USB Cable	-	-
A002959287-020	LAN Cable (UTP)	-	-

2.10 EUT Diagrams

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3. TEST METHODS

3.1 Test Standards

Testing was performed according to the following standards / references

Standard	Version	Description
FCC 47 CFR 15.407	-	Unlicensed National Information Infrastructure Devices – General technical requirements
FCC 47 CFR 15.207	-	Conducted limits
FCC 47 CFR 15.209	-	Radiated emission limits; general requirements

3.2 Additional references

The following standards / references were also considered for the testing

Standard	Version	Description
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 789033 D02	V02r01	Guidelines for compliance testing of Unlicensed National information Infrastructure (U-NII) devices. Part 15, Subpart E

3.3 Limits

FCC 47 CFR Rule Part	Test Description	Limit Reference (FCC 47 CFR Reference)
15.207 15.407 (b)	AC Power Line Conducted Emissions (Intentional Radiators)	15.207 (a)
15.209 15.407 (b)	Radiated Emissions (Intentional Radiators)	15.209 (a), 15.407 (b) *See Notes 1 & 2
15.407 (a)	Maximum Conducted Output Power	15.407 (a)
15.407 (a)	Maximum Power Spectral Density	15.407 (a)
15.407 (a)(2)	26 dB bandwidth	No limit specified
15.407 (e)	6 dB bandwidth	15.407 (e)
15.407 (g)	Frequency Stability	15.407 (g)
15.407 (h)(1)	Transmit Power Control	15.407 (h)(1)

Interpretation of the measurement results has been performed in accordance with ANSI C63.10 section 1.3

Compliance with the requirements has been based on the results of the measurements compared to the specified limits, not taking into account measurement instrumentation uncertainty.

Measurement Uncertainty figures are stated in section 6

Note 1

Radiated Emissions limits in the tables from 47 CFR sections 15.109 & 15.209 are presented in $\mu\text{V}/\text{m}$. Measurements on the test system are made in $\text{dB}\mu\text{V}/\text{m}$. To convert between these, the following adjustment is used:

$$\text{New Limit} = 20 \log \left(\frac{\text{Original Limit}}{10^6} \right) + 120$$

Example: from 15.209(a) the limit for 30MHz – 88MHz is $100\mu\text{V}/\text{m}$ at 3m. This gives:

$$\text{New Limit} = 20 \log \left(\frac{100}{10^6} \right) + 120 = 40\text{dB}\mu\text{V}/\text{m} \text{ at } 3\text{m}$$

Additionally, in some cases testing has been performed at distances other than those specified in the tables. When this has occurred, the limits have been adjusted in accordance with the requirements in 47 CFR 15.31, using an extrapolation factor of 40dB/decade at frequencies below 30MHz and 20dB/decade at or above 30MHz

Example: from 15.209(a) the limit for 1.705MHz – 30MHz is $30\mu\text{V}/\text{m}$ (=29.54 $\text{dB}\mu\text{V}/\text{m}$) at 30m

$$\text{Limit}@3\text{m} = \text{Limit}@30\text{m} + 40 \log \left(\frac{30}{3} \right) = 29.54 + 40.00 = 69.54 \text{ dB}\mu\text{V}/\text{m} \text{ at } 3\text{m}$$

Example: from 15.209(a) the limit for 1GHz – 18GHz is $500\mu\text{V}/\text{m}$ (=53.98 $\text{dB}\mu\text{V}/\text{m}$) at 3m

$$\text{Limit}@1\text{m} = \text{Limit}@3\text{m} + 20 \log \left(\frac{3}{1} \right) = 53.98 + 9.54 = 63.52 \text{ dB}\mu\text{V}/\text{m} \text{ at } 1\text{m}$$

Note 2

Where emission limits are specified in dBm/MHz , a detector bandwidth of 1MHz has been used (unless otherwise stated) to allow for direct conversion from dBm to dBm/MHz . Conversion from dBm to $\text{dB}\mu\text{V}/\text{m}$ has been performed according to the equation below and adjustment based on test distances is performed as above.

$$\text{Limit}(\text{dB}\mu\text{V} @ 3\text{m}) = \text{Limit}(\text{dBm}) + 95.23$$

3.4 Description of Test Methods and Equipment Setup

3.4.1 General Description

Testing was performed in accordance with the various requirements of ANSI C63.4 and ANSI C63.10. Any deviations from the test methods are described in section 3.7

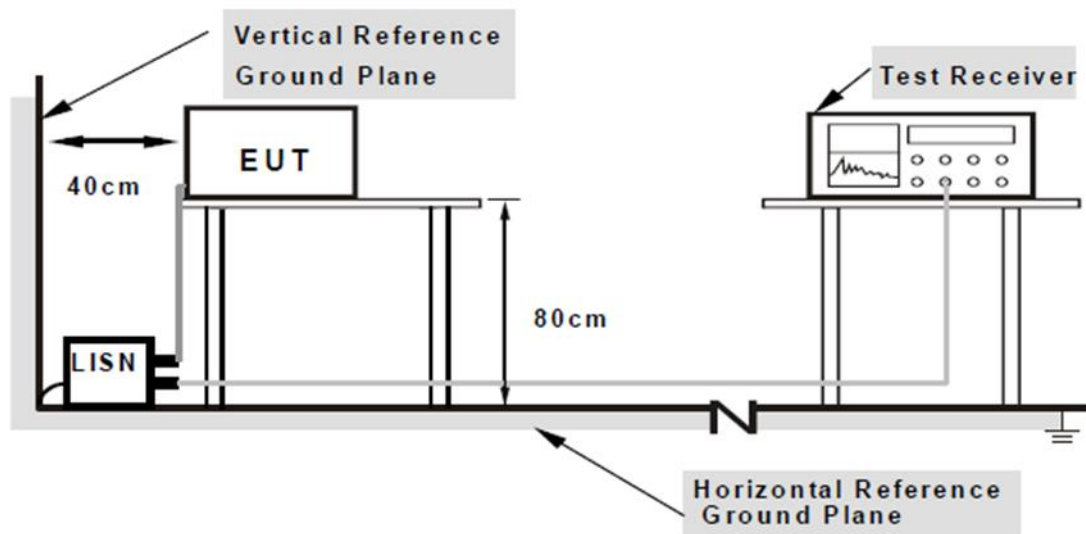
Where different arrangements of equipment were used for different types of measurements, these are tabulated in section 3.4.2 and details of each arrangement are included in subsequent sections

3.4.2 Test Equipment Setup Used by Test Type

FCC 47 CFR Rule Part	Test Description	Test Equipment Used
15.207 15.407 (b)	AC Power Line Conducted Emissions (Intentional Radiators)	Conducted Emissions
15.209 15.407 (b)	Radiated Emissions (Intentional Radiators)	SAC5
15.407 (a)	Maximum Conducted Output Power	N.P.
15.407 (a)	Maximum Power Spectral Density	N.P.
15.407 (a)(2)	26 dB bandwidth	N.P.
15.407 (e)	6 dB bandwidth	N.P.
15.407 (g)	Frequency Stability	N.P.
15.407 (h)(1)	Transmit Power Control	N.P.

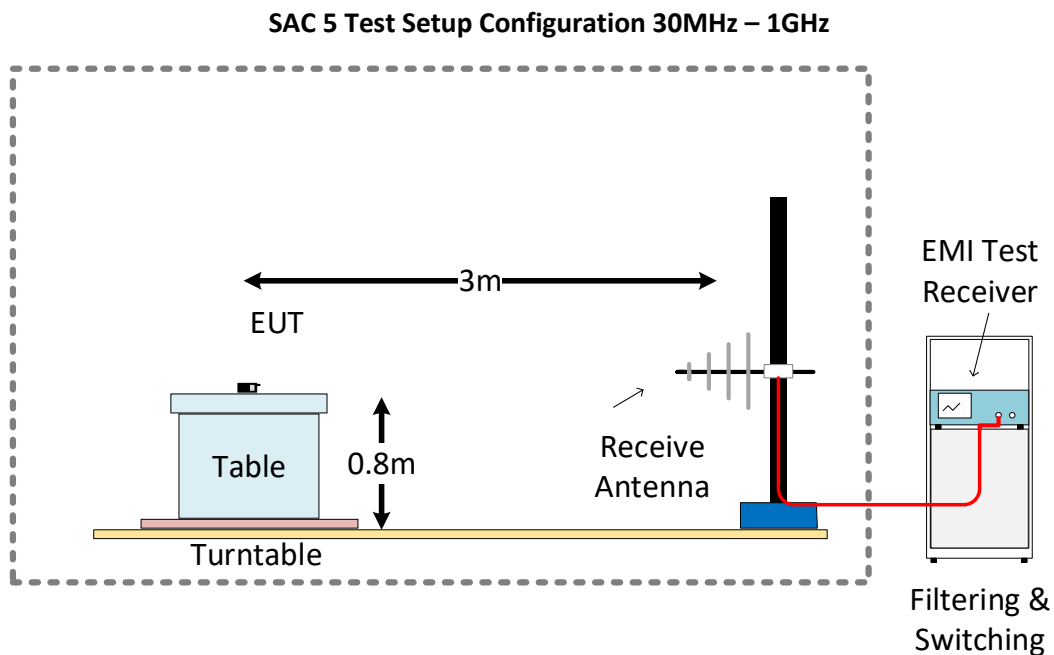
3.4.3 Test Equipment Setup – Conducted Emissions

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The LISNs provide $50\Omega/50\mu\text{H}$ of coupling impedance for the measuring instrument.
- The lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10 dB under the prescribed limits could not be reported.

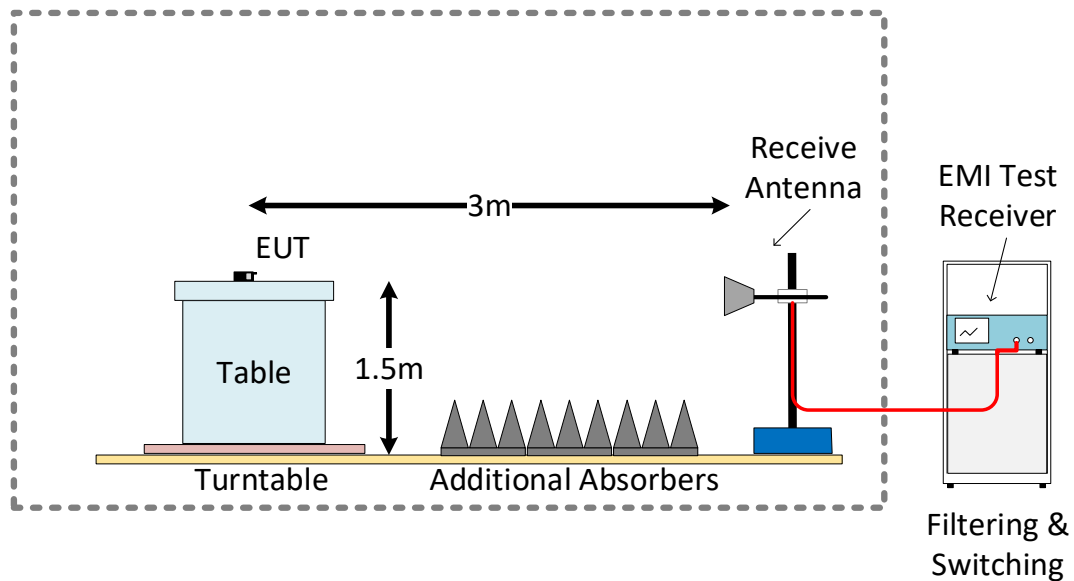


3.4.4 Test Equipment Setup – SAC 5 (Radiated Emissions)

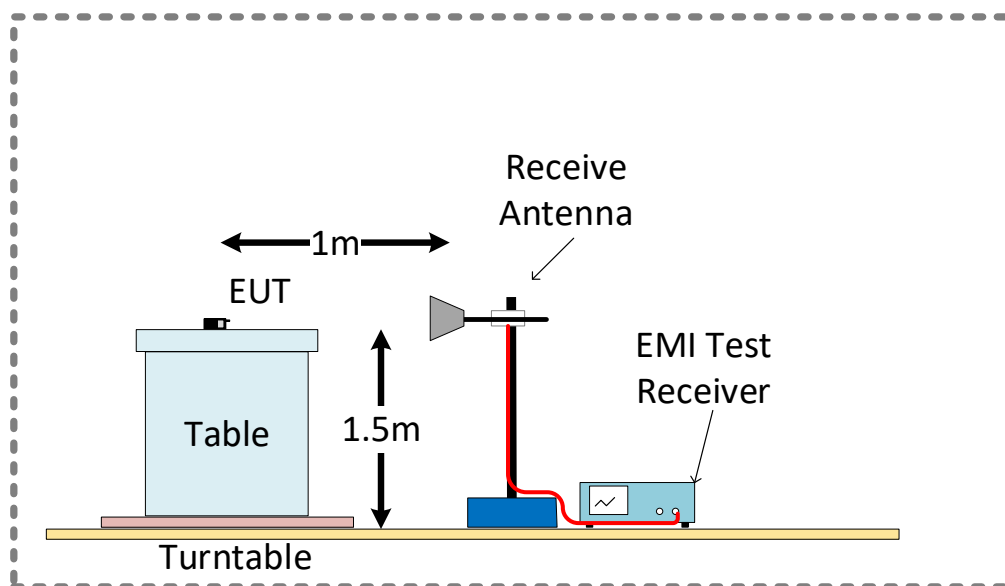
- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.
- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to 150 cm from floor, and 1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.
- For all frequency ranges the turntable was rotated 360° for obtaining the maximum emission.



SAC 5 Test Setup Configuration 1GHz – 18GHz



SAC 5 Test Setup Configuration 18GHz – 40GHz



3.5 EUT Configuration During Test

AC Power Line Conducted Emissions

For AC power line conducted emissions testing, the device was connected to the USB Charger and set to continuous transmit mode on the mid channel with appropriate modulation. A LAN cable was connected between the device and a laptop PC placed outside of the test area. Conducted emissions tests were run on the Mains AC connection to the charger. See test setup photographs for more detail.

Radiated Emissions

For radiated emissions testing, the device was connected to the USB Charger and set to continuous transmit mode on an appropriate channel, with appropriate modulation. A LAN cable was connected between the device and a laptop PC placed outside of the test area.

Conducted Power Measurements

For conducted power measurements, the RF output of the device was connected to the test equipment via an RF cable. The device was connected to the USB Charger and set to continuous transmit mode on an appropriate channel, with appropriate modulation. A LAN cable was connected between the device and a laptop PC placed outside of the test area.

3.6 EUT Operation Modes

Operation mode	Description
Continuous Tx	The device was set to transmit continuously with an appropriate frequency and modulation.

3.7 Deviations from the Test Standard

This product is based on pre-certified modules as described in section 2.1, hence a limited test scope has been verified.

Measurement data from certification reports for the modules was used in determining which tests to include or exclude from the scope. A comparison of conducted output power between the module and the device covered by this report is included in section 4.9

For radiated emissions testing, in some cases the more stringent FCC part 15.209 limit has been applied instead of the limit specified in 15.407

3.8 Environmental Conditions

3.8.1 Environmental Conditions – Conducted Power measurements

Date	Time	Temperature (°C)	Relative Humidity (%)
2020.12.10	07:36	19.7	31

3.8.2 Environmental Conditions – Conducted Emissions System

Date	Time	Temperature (°C)	Relative Humidity (%)
2020.12.21	09:00	24.2	33

3.8.3 Environmental Conditions – SAC5 (Radiated Emissions)

Date	Time	Temperature (°C)	Relative Humidity (%)
2020.12.14	10:38	18.5	39
2020.12.15	07:57	18.5	31
2020.12.16	08:23	18.5	43
2021.01.18	07:56	18.5	29
2021.01.20	08:00	18.2	34
2021.03.30	17:30	21.3	40

4. TEST RESULTS

4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter)

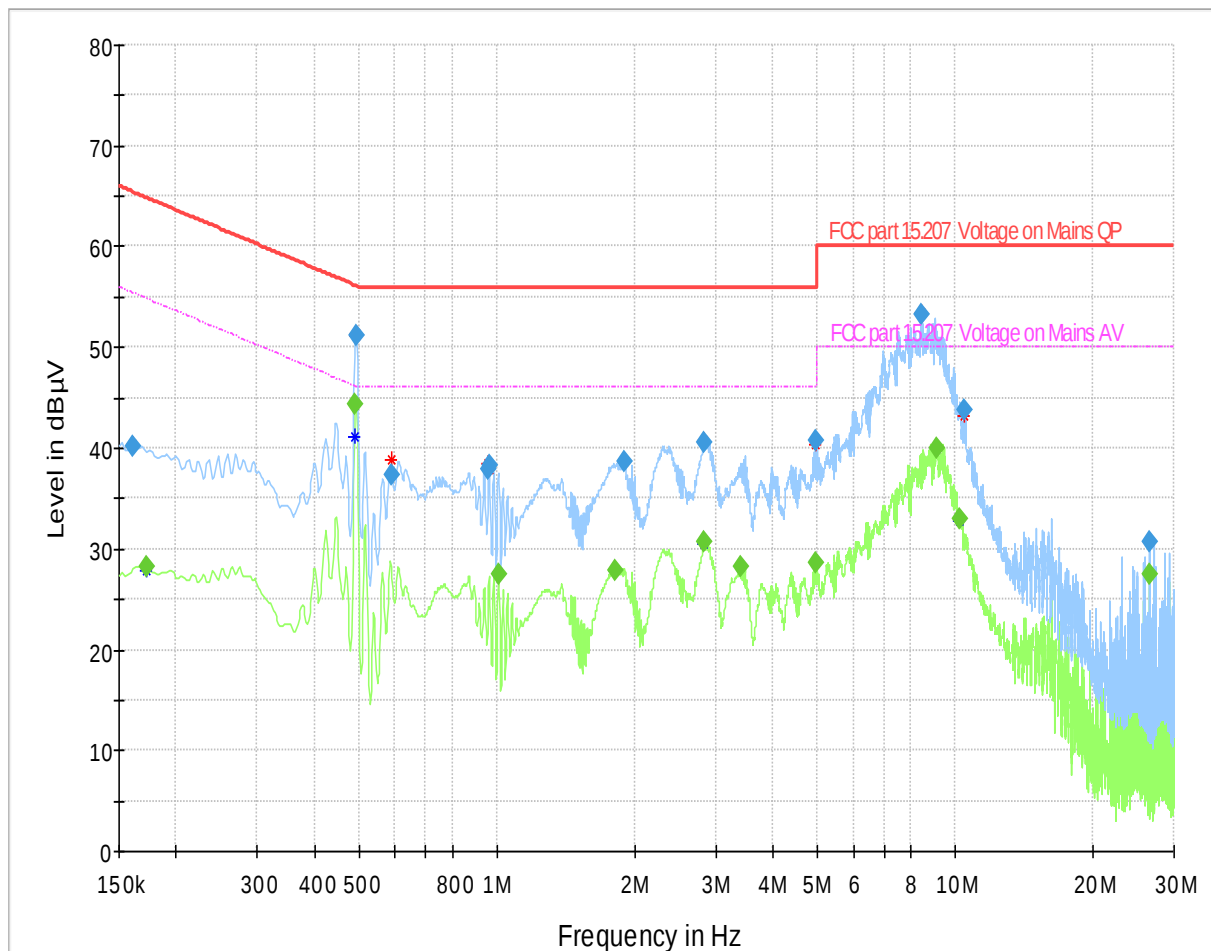
4.1.1 AC Power Line Conducted Emissions (Intentional) – Test Summary

Test Specification	FCC 47 CFR 15.207 (Part 15 Subpart C)		
Test Engineer & Date	Fariborz Abasi	2020.12.21	
EUT and Ancillary Equipment IDs	A002959287-010	A002959287-017	A002959287-018
		A002959287-020	
EUT Operation Mode(s)	Continuous Tx		
EUT Wireless Configuration(s)	WLAN 802.11 ac (see below for details)		
EUT Hardware Configuration(s)	Power from USB Power Supply		
Overall Result	PASS		
Test Parameter	Wireless Configuration	Frequency Range	Result*
AC Conducted Power Line Emissions – “N” Line	WLAN 802.11ac MCS0 CH44 (BPSK 5220 MHz)	150 kHz – 30 MHz	PASS
AC Conducted Power Line Emissions – “L1” Line	WLAN 802.11ac MCS0 CH44 (BPSK 5220 MHz)	150 kHz – 30 MHz	PASS

* For detailed measurements, see tables and graphs in sections below

4.1.2 AC Power Line Conducted Emissions (Intentional) – Test Details

Test	Conducted Emission	
Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Standard	47 CFR Part 15.207	
EUT	A002959287-010	
Ancillary Equipment	A002959287-020 Ethernet cable A002959287-018 USB cable A002959287-017 AC / DC power supply	
Test Engineer	Fariborz Abasi	Date: 2020-12-21



- Preview Result 2-CAV
- Preview Result 1-QPK
- Critical_Freqs CAV
- Critical_Freqs QPK
- FCC part 15.207 Voltage on Mains QP
- FCC part 15.207 Voltage on Mains AV
- Final_Result QPK
- Final_Result CAV

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.161250	40.26	---	65.40	25.14	1000.0	9.000	N	ON	9.7
0.172500	---	28.21	54.84	26.63	1000.0	9.000	L1	ON	9.7
0.492000	---	44.41	46.13	1.72	1000.0	9.000	L1	ON	9.6
0.494250	51.22	---	56.10	4.87	1000.0	9.000	L1	ON	9.6
0.591000	37.32	---	56.00	18.68	1000.0	9.000	L1	ON	9.6
0.960000	38.00	---	56.00	18.00	1000.0	9.000	L1	ON	9.7
0.962250	38.26	---	56.00	17.74	1000.0	9.000	L1	ON	9.7
1.009500	---	27.54	46.00	18.46	1000.0	9.000	L1	ON	9.7
1.806000	---	27.91	46.00	18.09	1000.0	9.000	L1	ON	9.7
1.900500	38.75	---	56.00	17.25	1000.0	9.000	L1	ON	9.7
2.838750	40.54	---	56.00	15.46	1000.0	9.000	L1	ON	9.8
2.841000	---	30.63	46.00	15.37	1000.0	9.000	L1	ON	9.8
3.396750	---	28.19	46.00	17.81	1000.0	9.000	L1	ON	9.8
4.956000	40.71	---	56.00	15.29	1000.0	9.000	L1	ON	9.8
4.956000	---	28.55	46.00	17.45	1000.0	9.000	L1	ON	9.8
8.454750	53.26	---	60.00	6.74	1000.0	9.000	N	ON	9.8
9.114000	---	39.98	50.00	10.02	1000.0	9.000	L1	ON	9.9
10.230000	---	32.96	50.00	17.04	1000.0	9.000	N	ON	9.9
10.473000	43.77	---	60.00	16.23	1000.0	9.000	L1	ON	9.9
26.610000	---	27.40	50.00	22.60	1000.0	9.000	N	ON	10.1
26.610000	30.77	---	60.00	29.23	1000.0	9.000	N	ON	10.1

4.2 Test Results – 4.2.2 Radiated Emissions (Intentional Transmitter)

4.2.1 Radiated Emissions (Intentional) – Test Summary

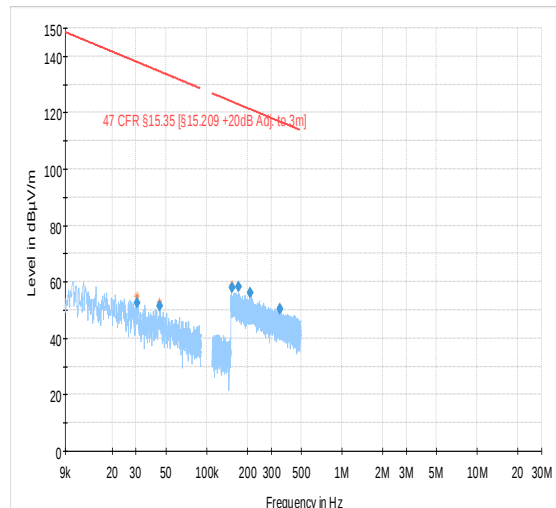
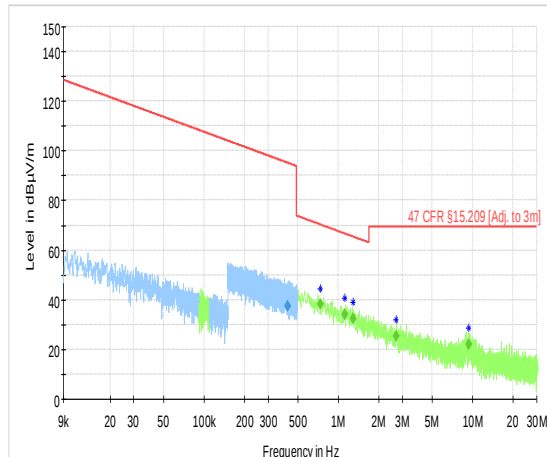
Test Specification		FCC 47 CFR 15.209 (Part 15 Subpart C)	
Test Engineer & Date		Niall Forrester/Simon Palmhager / Joel Efraimsson	2020.12.14 – 2021.03.30
EUT and Ancillary Equipment IDs		A002959287-010 / A002959287-013	A002959287- 011/012/25
EUT Operation Mode(s)		Continuous Tx	
EUT Wireless Configuration(s)		WLAN 802.11 a/ac (see below for details)	
EUT Hardware Configuration(s)		Power from USB Power Supply	
Overall Result		PASS	
Test Parameter	Wireless Configuration	Frequency Range	Result
Radiated Emissions	WLAN 802.11ac MCS0 CH 44 (BPSK 5220 MHz)	9 kHz – 30 MHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 44 (BPSK 5220 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 44 (BPSK 5220 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 44 (BPSK 5220 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 44 (BPSK 5220 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 44 (BPSK 5220 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 44 (BPSK 5220 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 60 (BPSK 5300 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 60 (BPSK 5300 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 60 (BPSK 5300 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 60 (BPSK 5300 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 120 (BPSK 5600 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 120 (BPSK 5600 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 120 (BPSK 5600 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 120 (BPSK 5600 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 157(BPSK 5785 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 157 (BPSK 5785 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions	WLAN 802.11a 6Mbps CH 157 (BPSK 5785 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions	WLAN 802.11ac MCS0 CH 157 (BPSK 5785 MHz)	18 GHz – 40 GHz	PASS

Test Parameter	Wireless Configuration	Frequency Range	Result
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 36 (BPSK 5180 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 36 (BPSK 5180 MHz)	30 MHz – 1 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 64 (BPSK 5320 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 64 (BPSK 5320 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 100 (BPSK 5500 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 100 (BPSK 5500 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 140 (BPSK 5700 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 140 (BPSK 5700 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 149 (BPSK 5745 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 149 (BPSK 5745 MHz)	18 GHz – 40 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11a 6Mbps CH 165 (BPSK 5825 MHz)	1 GHz – 18 GHz	PASS
Radiated Emissions at Band Edge	WLAN 802.11ac MCS0 CH 165 (BPSK 5825 MHz)	18 GHz – 40 GHz	PASS

4.2.2 Radiated Emissions (Intentional) – Test Details

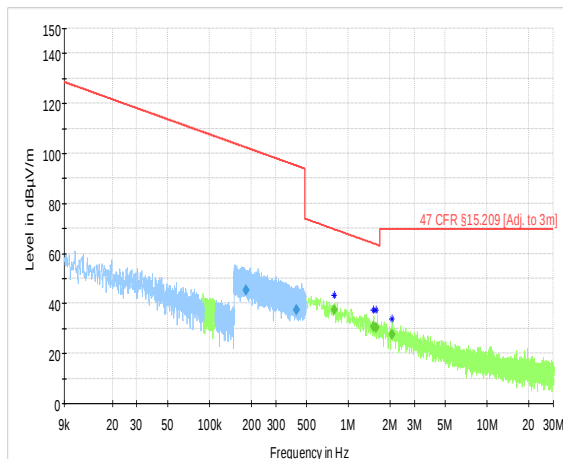
Channel 44 (5180 MHz): 9 KHz – 30 MHz

Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Loop Antenna Parallel to Axis	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2021-01-20
Chamber details	Chamber: SAC 5	

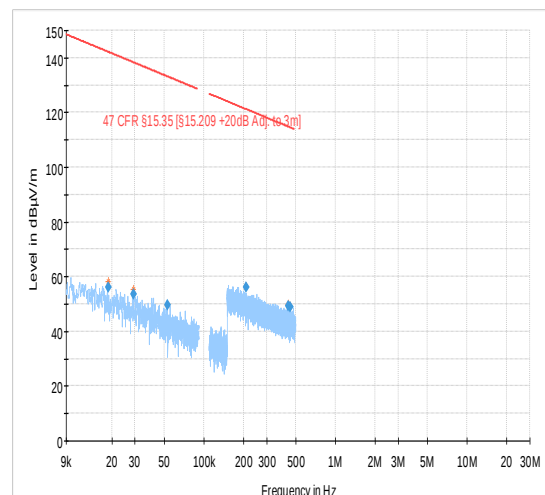


Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.420742	37.59	---	---	95.12	57.53	1000.0	9.000	100.0	H	225.0
0.732175	---	38.07	---	70.31	32.24	1000.0	9.000	100.0	H	205.0
1.111520	---	34.22	---	66.69	32.46	1000.0	9.000	100.0	H	295.0
1.292212	---	32.58	---	65.38	32.80	1000.0	9.000	100.0	H	315.0
2.682466	---	25.16	---	69.54	44.38	1000.0	9.000	100.0	H	11.0
9.358594	---	21.84	---	69.54	47.71	1000.0	9.000	100.0	H	89.0
0.030525	---	---	52.65	137.91	85.27	1000.0	0.200	100.0	H	202.0
0.045057	---	---	51.36	134.53	83.17	1000.0	0.200	100.0	H	-3.0
0.153210	---	---	57.78	123.90	66.11	1000.0	9.000	100.0	H	124.0
0.171926	---	---	58.18	122.90	64.71	1000.0	9.000	100.0	H	292.0
0.209361	---	---	56.09	121.19	65.10	1000.0	9.000	100.0	H	178.0
0.348687	---	---	50.35	116.76	66.40	1000.0	9.000	100.0	H	268.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Loop Antenna Perpendicular to Axis	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-20
Chamber details	Chamber: SAC 5	



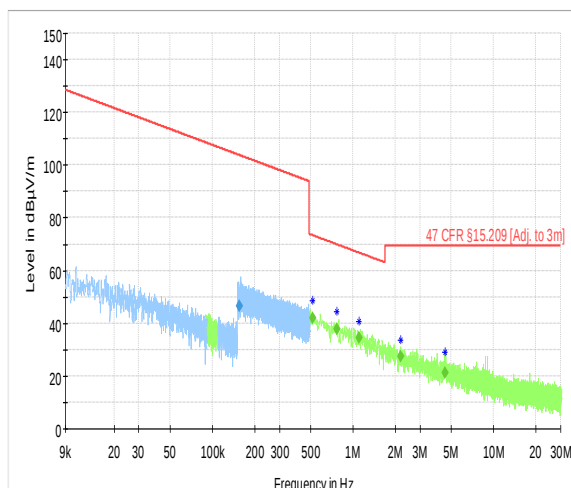
Preview Result 2-PK+
 Critical_Freqs PK+
 47 CFR §15.209 (Adj. to 3m)
 Final_Result QPK



Preview Result 1-PK+
 47 CFR §15.35 (S15.209 +20dB Adj. to 3m)
 Critical_Freqs PK+
 Final_Result PK+

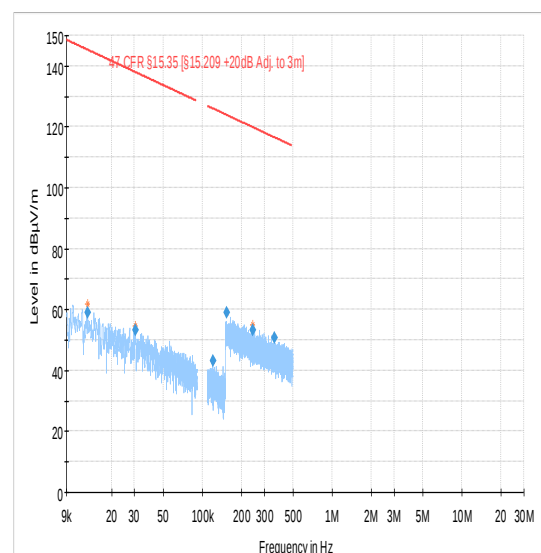
Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.183853	45.12	---	---	102.32	57.19	1000.0	9.000	100.0	H	45.0
0.425036	37.54	---	---	95.04	57.50	1000.0	9.000	100.0	H	178.0
0.791275	---	37.45	---	69.64	32.19	1000.0	9.000	100.0	H	154.0
1.516063	---	30.82	---	63.99	33.17	1000.0	9.000	100.0	H	88.0
1.593590	---	30.45	---	63.56	33.11	1000.0	9.000	100.0	H	-1.0
2.066861	---	27.72	---	69.54	41.82	1000.0	9.000	100.0	H	-41.0
0.018858	---	---	55.97	142.09	86.13	1000.0	0.200	100.0	H	10.0
0.029376	---	---	53.47	138.24	84.77	1000.0	0.200	100.0	H	280.0
0.053226	---	---	49.60	133.08	83.48	1000.0	0.200	100.0	H	139.0
0.210557	---	---	55.99	121.14	65.15	1000.0	9.000	100.0	H	202.0
0.438195	---	---	49.30	114.77	65.47	1000.0	9.000	100.0	H	76.0
0.452291	---	---	48.75	114.50	65.75	1000.0	9.000	100.0	H	-45.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Loop Antenna Parallel to Floor	
Sweep frequency	9 KHz – 30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-20
Chamber details	Chamber: SAC 5	



Preview Result 2-PK+
 Critical_Freqs PK+
 47 CFR §15.209 (Adj. to 3m)
 Final_Result QPK
 QuasiPeak-QPK (Single)

Preview Result 1-AVG
 Critical_Freqs AVG
 Final_Result AVG
 MaxPeak-PK+ (Single)
 Average-AVG (Single)

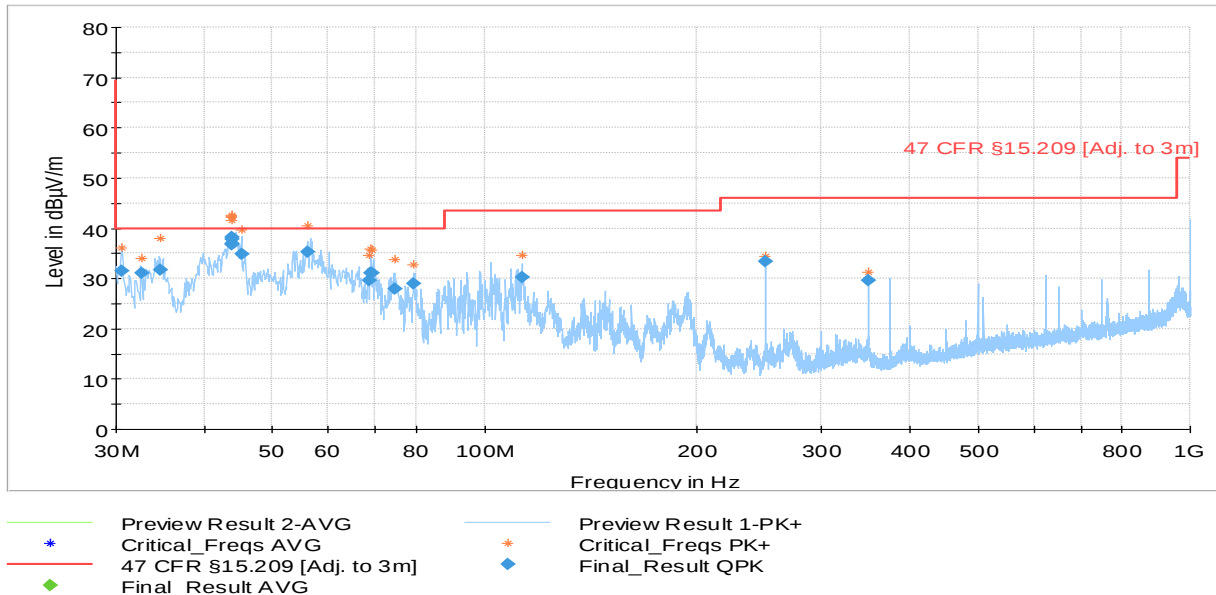


Preview Result 1-PK+
 47 CFR §15.35 (Adj. to 3m)
 Critical_Freqs PK+
 Final_Result PK+

Frequency (MHz)	Average (dBµV/m)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.155035	46.50	---	---	103.80	57.29	1000.0	9.000	100.0	H	166.0
0.514821	---	41.91	---	73.37	31.46	1000.0	9.000	100.0	H	191.0
0.769653	---	37.75	---	69.88	32.13	1000.0	9.000	100.0	H	-1.0
1.104419	---	34.41	---	66.74	32.34	1000.0	9.000	100.0	H	-14.0
2.191525	---	27.30	---	69.54	42.25	1000.0	9.000	100.0	H	307.0
4.525280	---	21.06	---	69.54	48.48	1000.0	9.000	100.0	H	63.0
0.013050	---	---	58.87	145.29	86.42	1000.0	0.200	100.0	H	315.0
0.030622	---	---	53.40	137.88	84.48	1000.0	0.200	100.0	H	225.0
0.120463	---	---	43.08	125.99	82.91	1000.0	0.200	100.0	H	315.0
0.153850	---	---	59.09	123.86	64.77	1000.0	9.000	100.0	H	-45.0
0.245776	---	---	53.41	119.79	66.38	1000.0	9.000	100.0	H	100.0
0.357978	---	---	50.75	116.53	65.78	1000.0	9.000	100.0	H	242.0

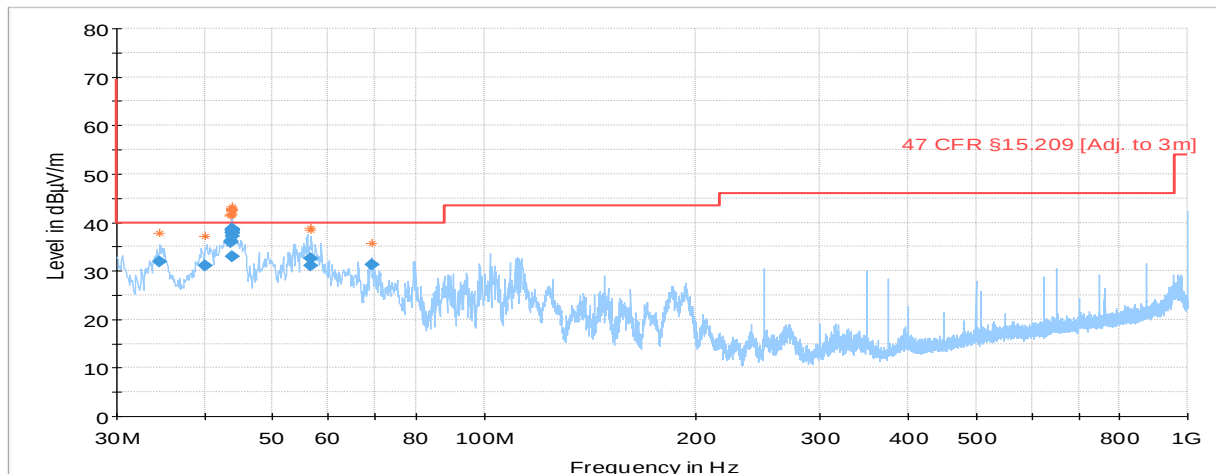
Channel 44 (5180 MHz): 30 MHz – 1 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-013	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-29
Chamber details	Chamber: SAC 5	



Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.595728	31.58	40.00	8.42	1000.0	120.000	108.0	V	292.0
32.596640	31.14	40.00	8.86	1000.0	120.000	100.0	V	292.0
34.645760	31.71	40.00	8.29	1000.0	120.000	125.0	V	292.0
43.773080	36.81	40.00	3.19	1000.0	120.000	100.0	V	296.0
43.802920	36.94	40.00	3.06	1000.0	120.000	100.0	V	202.0
43.815760	38.25	40.00	1.75	1000.0	120.000	100.0	V	-18.0
43.818120	37.78	40.00	2.22	1000.0	120.000	100.0	V	26.0
45.249400	34.81	40.00	5.19	1000.0	120.000	100.0	V	8.0
56.022760	35.30	40.00	4.70	1000.0	120.000	125.0	V	-22.0
68.466680	29.63	40.00	10.37	1000.0	120.000	225.0	V	153.0
69.015000	31.14	40.00	8.86	1000.0	120.000	183.0	V	112.0
69.106120	31.09	40.00	8.91	1000.0	120.000	204.0	V	158.0
74.542840	27.82	40.00	12.18	1000.0	120.000	108.0	V	116.0
79.236800	29.03	40.00	10.97	1000.0	120.000	125.0	V	98.0
113.100520	30.34	43.52	13.18	1000.0	120.000	108.0	V	199.0
250.005960	33.39	46.02	12.63	1000.0	120.000	100.0	V	8.0
350.005720	29.68	46.02	16.34	1000.0	120.000	100.0	V	-18.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-013	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-29
Chamber details	Chamber: SAC 5	



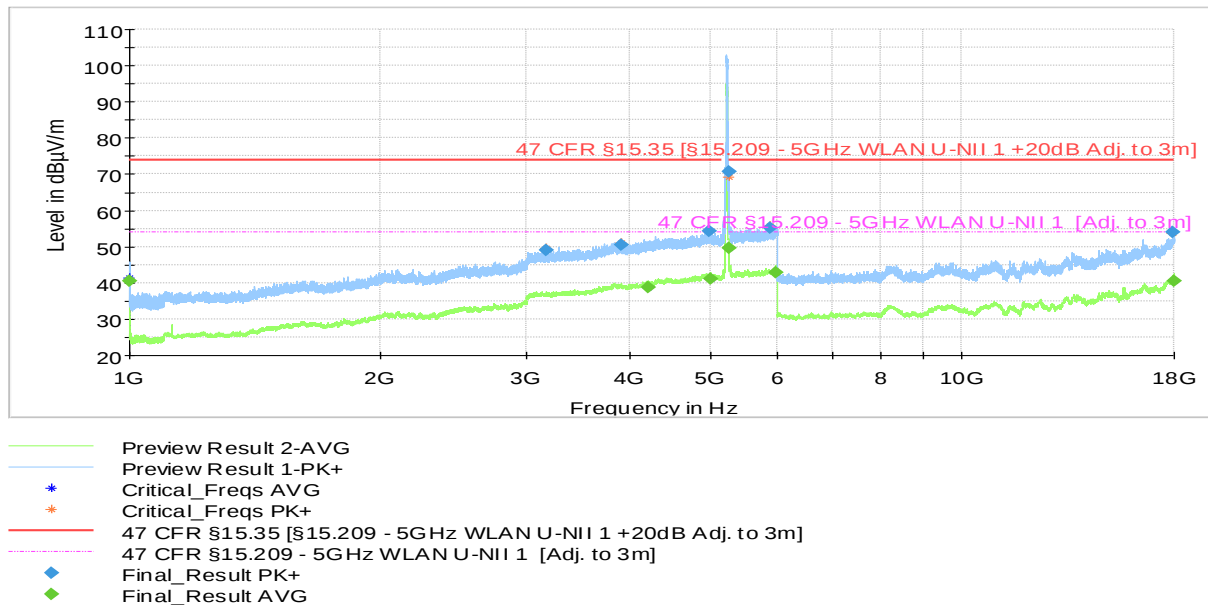
* Preview Result 2-AVG
* Critical_Freqs AVG
* 47 CFR §15.209 [Adj. to 3m]
♦ Final_Result AVG

* Preview Result 1-PK+
* Critical_Freqs PK+
♦ Final_Result QPK

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.571000	31.82	40.00	8.18	1000.0	120.000	100.0	V	40.0
40.103680	31.05	40.00	8.95	1000.0	120.000	100.0	V	72.0
43.485400	35.86	40.00	4.14	1000.0	120.000	100.0	V	202.0
43.495800	36.05	40.00	3.95	1000.0	120.000	100.0	V	-18.0
43.773400	38.34	40.00	1.66	1000.0	120.000	100.0	V	199.0
43.783840	32.90	40.00	7.10	1000.0	120.000	125.0	V	176.0
43.789000	37.87	40.00	2.13	1000.0	120.000	100.0	V	-22.0
43.789440	38.70	40.00	1.30	1000.0	120.000	100.0	V	22.0
43.793520	38.49	40.00	1.51	1000.0	120.000	100.0	V	-22.0
43.796240	38.20	40.00	1.80	1000.0	120.000	100.0	V	-18.0
43.818680	38.65	40.00	1.35	1000.0	120.000	100.0	V	26.0
43.820240	37.73	40.00	2.27	1000.0	120.000	100.0	V	72.0
43.820880	38.14	40.00	1.86	1000.0	120.000	100.0	V	22.0
43.827040	37.14	40.00	2.86	1000.0	120.000	125.0	V	-22.0
43.832280	37.73	40.00	2.27	1000.0	120.000	100.0	V	72.0
56.545120	31.16	40.00	8.84	1000.0	120.000	275.0	V	289.0
56.563240	32.49	40.00	7.51	1000.0	120.000	154.0	V	292.0
69.112240	31.21	40.00	8.79	1000.0	120.000	175.0	V	112.0

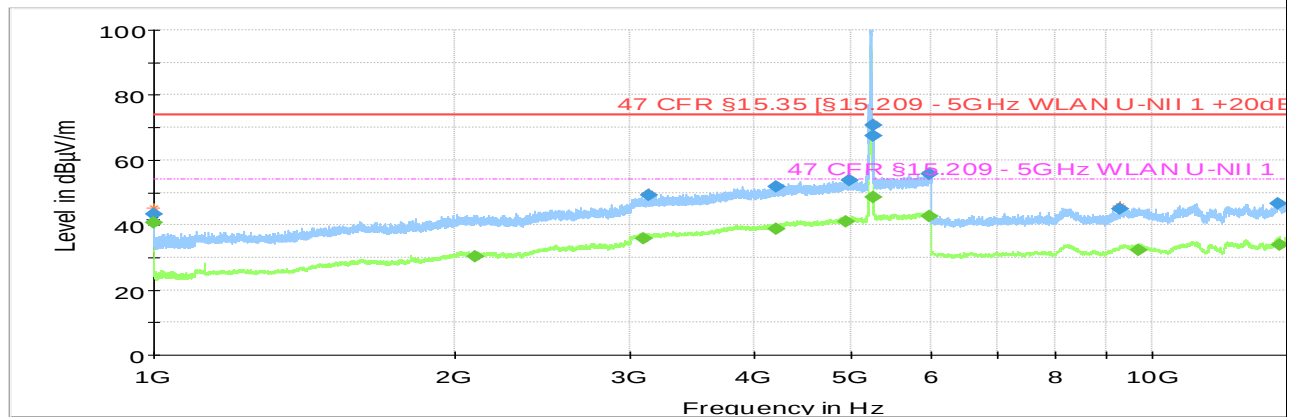
Channel 44 (5180 MHz): 1 GHz – 18 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.011569	---	40.62	53.98	13.36	1000.0	1000.000	148.0	H	222.0
3171.811000	49.09	---	73.99	24.91	1000.0	1000.000	125.0	H	206.0
3903.558000	50.59	---	74.00	23.41	1000.0	1000.000	198.0	V	202.0
4199.300000	---	38.77	53.98	15.20	1000.0	1000.000	197.0	H	87.0
4978.852000	54.18	---	74.00	19.82	1000.0	1000.000	137.0	H	26.0
4988.320000	---	41.00	53.98	12.98	1000.0	1000.000	100.0	V	64.0
5245.226000	70.71	---	---	---	1000.0	1000.000	127.0	H	131.0
5245.725000	---	49.47	---	---	1000.0	1000.000	127.0	H	131.0
5875.647000	55.32	---	74.00	18.67	1000.0	1000.000	137.0	H	68.0
5975.233000	---	42.96	53.98	11.02	1000.0	1000.000	127.0	V	10.0
17945.942000	53.90	---	73.99	20.09	1000.0	1000.000	125.0	H	206.0
17976.254000	---	40.60	53.98	13.38	1000.0	1000.000	110.0	V	278.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 MHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-14
Chamber details	Chamber: SAC 5	

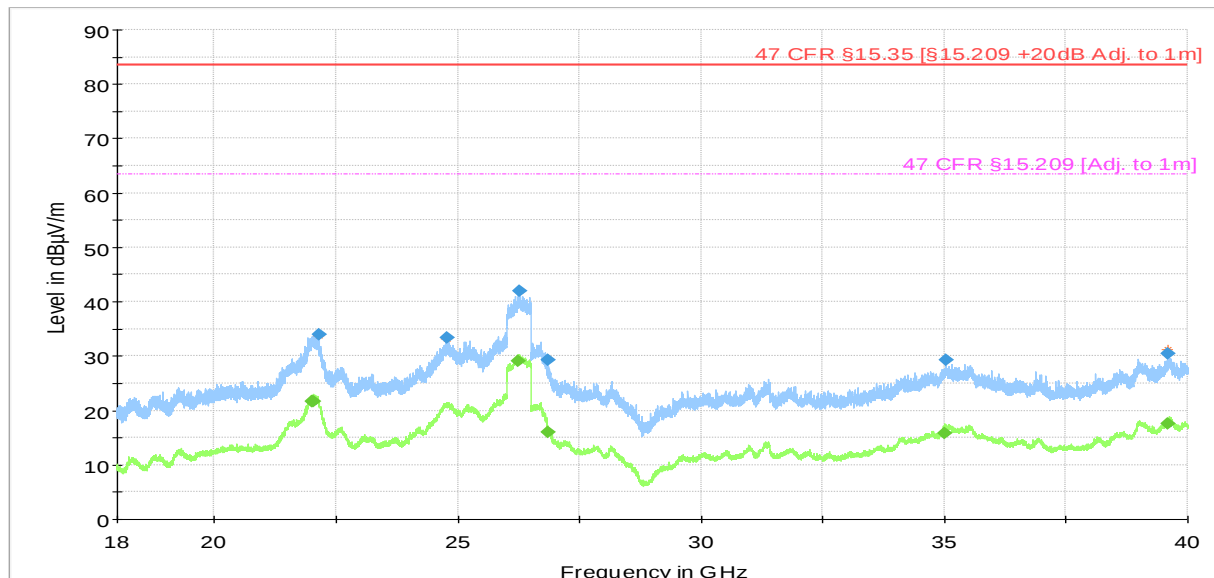


Preview Result 2-AVG
 Preview Result 1-PK+
 Critical_Freqs AVG
 Critical_Freqs PK+
 47 CFR §15.35 [§15.209 - 5GHz WLAN U-NII 1 +20dB Adj. to 3m]
 47 CFR §15.209 - 5GHz WLAN U-NII 1 [Adj. to 3m]
 Final_Result PK+
 Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.002012	---	40.73	53.98	13.25	1000.0	1000.000	147.0	H	222.0
1000.013716	43.21	---	73.98	30.77	1000.0	1000.000	148.0	H	222.0
2096.638000	---	30.44	53.98	23.54	1000.0	1000.000	187.0	H	292.0
3091.745000	---	35.74	53.98	18.24	1000.0	1000.000	100.0	V	206.0
3133.359000	49.10	---	73.99	24.89	1000.0	1000.000	120.0	V	87.0
4196.888000	---	38.85	53.98	15.13	1000.0	1000.000	175.0	V	158.0
4200.345000	51.74	---	74.00	22.26	1000.0	1000.000	125.0	V	292.0
4933.114000	---	40.96	53.98	13.02	1000.0	1000.000	148.0	H	42.0
4963.677000	53.81	---	74.00	20.19	1000.0	1000.000	175.0	V	72.0
5245.900000	70.83	---	---	---	1000.0	1000.000	127.0	H	143.0
5246.640000	---	48.54	---	---	1000.0	1000.000	110.0	H	131.0
5251.398000	67.53	---	74.00	6.47	1000.0	1000.000	127.0	H	131.0
5977.155000	55.73	---	74.00	18.27	1000.0	1000.000	125.0	H	26.0
5988.926000	---	42.81	53.98	11.17	1000.0	1000.000	210.0	H	233.0
9294.707000	45.09	---	73.99	28.90	1000.0	1000.000	126.0	H	19.0
9699.860000	---	32.40	53.98	21.58	1000.0	1000.000	175.0	V	232.0
13370.934000	46.66	---	73.99	27.33	1000.0	1000.000	175.0	H	244.0
13414.714000	---	33.84	53.98	20.14	1000.0	1000.000	100.0	V	112.0

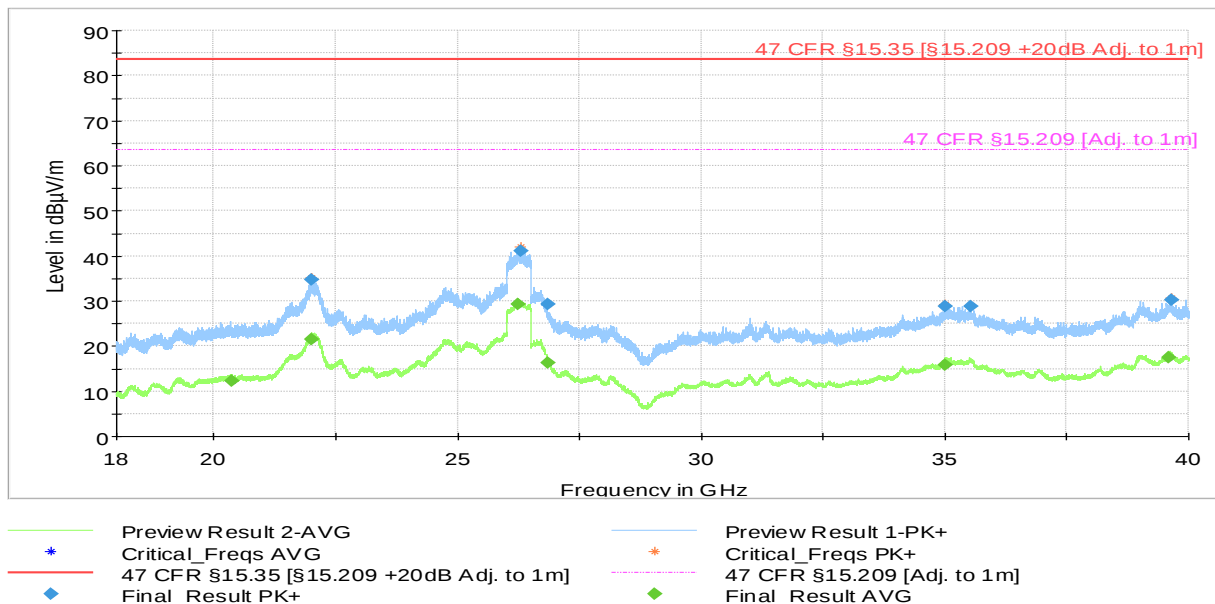
Channel 44 (5180 MHz): 18 GHz – 40 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
22014.647000	---	21.59	63.52	41.94	1000.0	1000.000	155.0	H	322.0
22018.349000	---	21.60	63.52	41.92	1000.0	1000.000	155.0	H	322.0
22135.333000	33.93	---	83.52	49.59	1000.0	1000.000	155.0	H	142.0
24783.800000	33.42	---	83.52	50.10	1000.0	1000.000	155.0	H	142.0
26243.095000	---	29.00	63.52	34.52	1000.0	1000.000	155.0	H	26.0
26259.990000	42.04	---	83.52	41.48	1000.0	1000.000	155.0	V	38.0
26844.465000	29.21	---	83.52	54.31	1000.0	1000.000	155.0	V	322.0
26849.521000	---	15.97	63.52	47.55	1000.0	1000.000	155.0	V	142.0
35006.483000	---	15.83	63.52	47.69	1000.0	1000.000	155.0	V	276.0
35034.646000	29.24	---	83.52	54.28	1000.0	1000.000	155.0	H	26.0
39596.007000	30.42	---	83.52	53.10	1000.0	1000.000	155.0	H	158.0
39604.994000	---	17.55	63.52	45.97	1000.0	1000.000	155.0	H	216.0

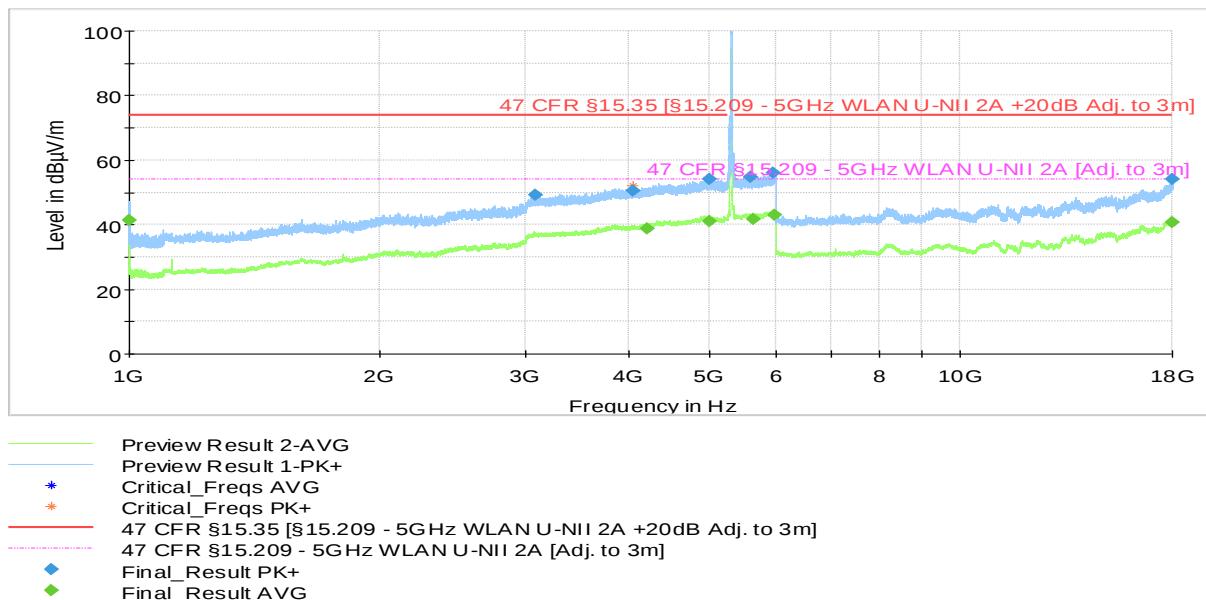
Test mode condition	WLAN 5 GHz 802.11ac (CH 44 – 5220 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20375.600000	---	12.35	63.52	51.17	1000.0	1000.000	155.0	H	158.0
21997.046000	---	21.47	63.52	42.06	1000.0	1000.000	155.0	V	352.0
22005.220000	34.63	---	83.52	48.89	1000.0	1000.000	155.0	V	142.0
26252.064000	---	29.25	63.52	34.27	1000.0	1000.000	155.0	H	176.0
26285.441000	41.19	---	83.52	42.33	1000.0	1000.000	155.0	V	312.0
26838.500000	---	16.19	63.52	47.33	1000.0	1000.000	155.0	V	202.0
26848.172000	29.33	---	83.52	54.19	1000.0	1000.000	155.0	V	222.0
34997.290000	28.85	---	83.52	54.67	1000.0	1000.000	155.0	H	248.0
35009.272000	---	15.89	63.52	47.64	1000.0	1000.000	155.0	V	38.0
35521.365000	28.91	---	83.52	54.61	1000.0	1000.000	155.0	V	276.0
39602.296000	---	17.53	63.52	45.99	1000.0	1000.000	155.0	V	128.0
39640.718000	30.35	---	83.52	53.18	1000.0	1000.000	155.0	V	82.0

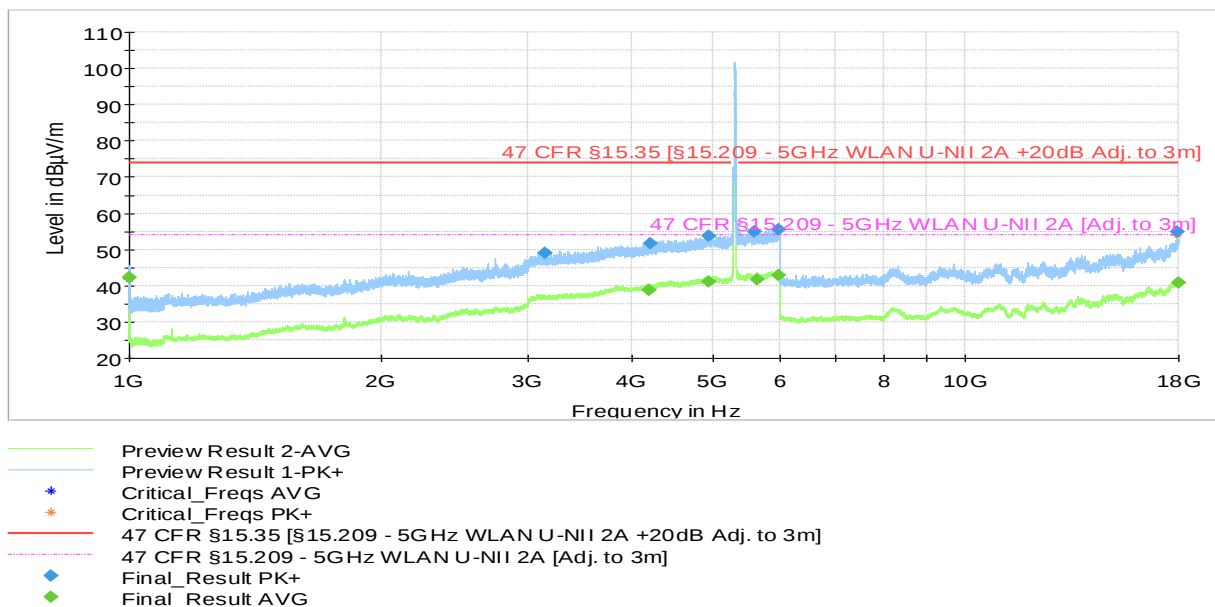
Channel 60 (5300 MHz): 1 GHz – 18 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 60 – 5300 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.001000	---	41.29	53.98	12.69	1000.0	1000.000	137.0	H	22.0
3084.261000	49.04	---	73.99	24.96	1000.0	1000.000	187.0	H	110.0
4040.855000	50.64	---	74.00	23.36	1000.0	1000.000	125.0	V	100.0
4205.049000	---	38.77	53.98	15.21	1000.0	1000.000	125.0	V	177.0
4985.034000	---	41.00	53.98	12.98	1000.0	1000.000	125.0	H	72.0
4998.949000	54.02	---	74.00	19.98	1000.0	1000.000	210.0	H	22.0
5591.825000	54.57	---	74.00	19.43	1000.0	1000.000	159.0	V	243.0
5646.055000	---	41.76	53.98	12.22	1000.0	1000.000	187.0	H	72.0
5961.635000	56.16	---	74.00	17.83	1000.0	1000.000	102.0	V	100.0
5986.322000	---	42.91	53.98	11.07	1000.0	1000.000	177.0	V	233.0
17978.896000	54.23	---	73.99	19.76	1000.0	1000.000	125.0	V	39.0
17997.645320	---	40.59	53.98	13.39	1000.0	1000.000	210.0	V	292.0

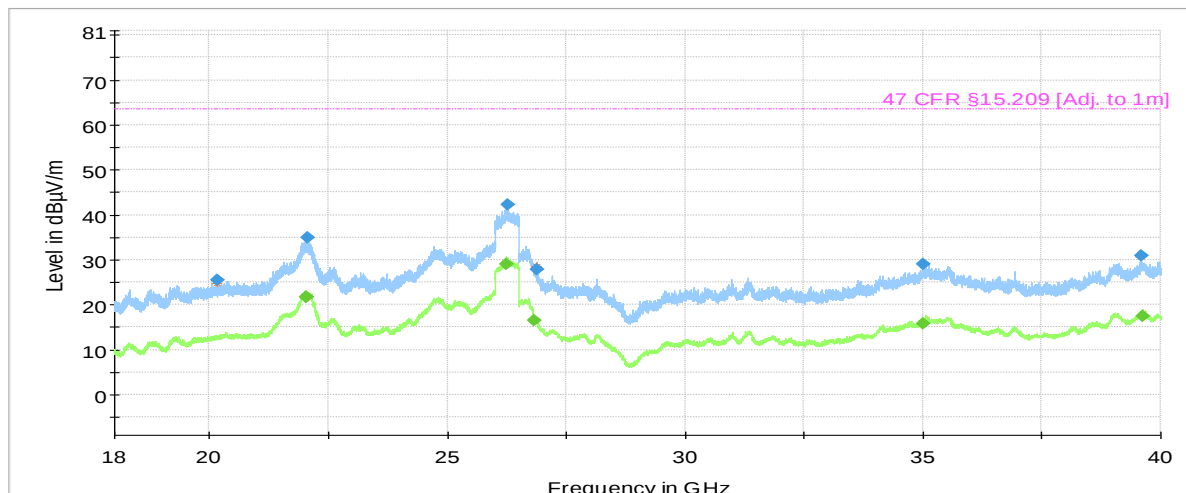
Test mode condition	WLAN 5 GHz 802.11ac (CH 60 – 5300 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.033500	---	42.15	53.98	11.83	1000.0	1000.000	148.0	H	234.0
3148.872000	48.97	---	73.99	25.02	1000.0	1000.000	149.0	V	248.0
4187.068000	---	38.84	53.98	15.14	1000.0	1000.000	177.0	V	280.0
4201.279000	51.54	---	74.00	22.45	1000.0	1000.000	125.0	H	221.0
4925.102000	---	41.00	53.98	12.98	1000.0	1000.000	125.0	H	87.0
4930.685000	53.67	---	74.00	20.32	1000.0	1000.000	100.0	H	290.0
5587.849000	54.75	---	74.00	19.25	1000.0	1000.000	100.0	V	87.0
5630.078000	---	41.69	53.98	12.29	1000.0	1000.000	210.0	H	42.0
5979.865000	55.56	---	74.00	18.44	1000.0	1000.000	100.0	V	248.0
5980.217000	---	42.96	53.98	11.02	1000.0	1000.000	175.0	H	292.0
17907.897000	54.79	---	73.99	19.19	1000.0	1000.000	120.0	H	338.0
17985.962000	---	40.69	53.98	13.29	1000.0	1000.000	120.0	V	244.0

Channel 60 (5300 MHz): 18 GHz – 40 GHz

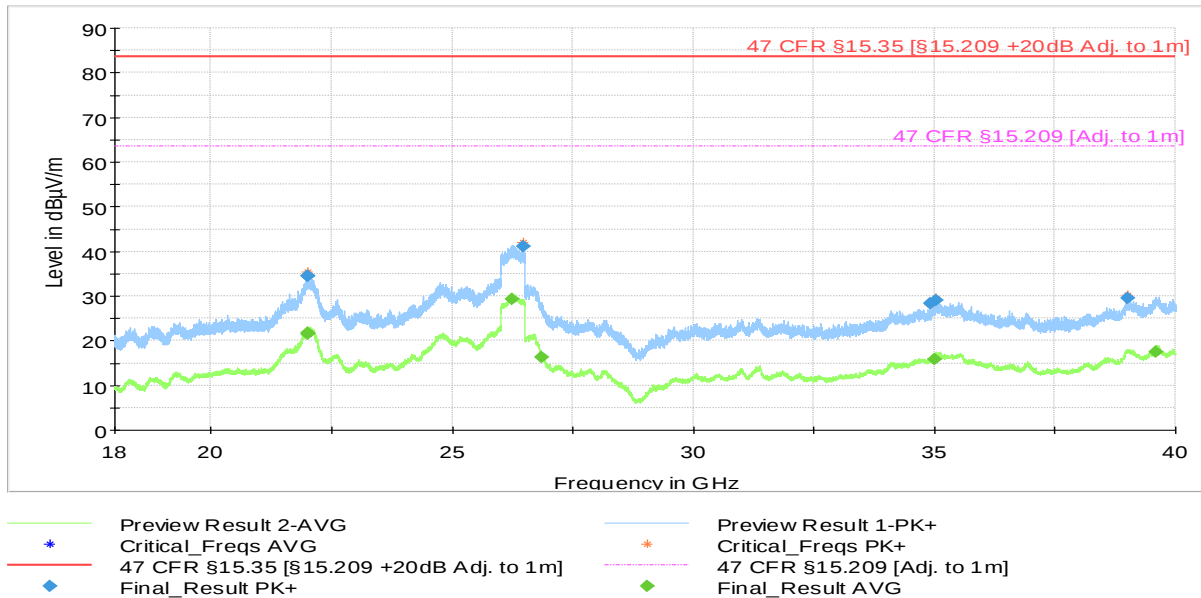
Test mode condition	WLAN 5 GHz 802.11a (CH 60 – 5300 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



— Preview Result 2-AVG
— Preview Result 1-PK+
* Critical_Freqs AVG
— 47 CFR §15.35 [§15.209 +20dB Adj. to 1m]
◆ Final_Result PK+
* Critical_Freqs PK+
— 47 CFR §15.209 [Adj. to 1m]
◆ Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20152.957000	25.48	---	83.52	58.04	1000.0	1000.000	155.0	V	43.0
22018.413000	---	21.65	63.52	41.87	1000.0	1000.000	155.0	V	72.0
22019.407000	---	21.63	63.52	41.89	1000.0	1000.000	155.0	V	82.0
22059.710000	34.91	---	83.52	48.62	1000.0	1000.000	155.0	H	262.0
26246.009000	---	29.05	63.52	34.47	1000.0	1000.000	155.0	H	222.0
26260.594000	42.16	---	83.52	41.36	1000.0	1000.000	155.0	V	206.0
26830.367000	---	16.43	63.52	47.09	1000.0	1000.000	155.0	H	338.0
26894.633000	27.94	---	83.52	55.58	1000.0	1000.000	155.0	H	128.0
35010.601000	28.98	---	83.52	54.55	1000.0	1000.000	155.0	V	98.0
35018.214000	---	15.89	63.52	47.63	1000.0	1000.000	155.0	V	22.0
39588.527000	30.91	---	83.52	52.61	1000.0	1000.000	155.0	H	282.0
39613.920000	---	17.55	63.52	45.97	1000.0	1000.000	155.0	V	156.0

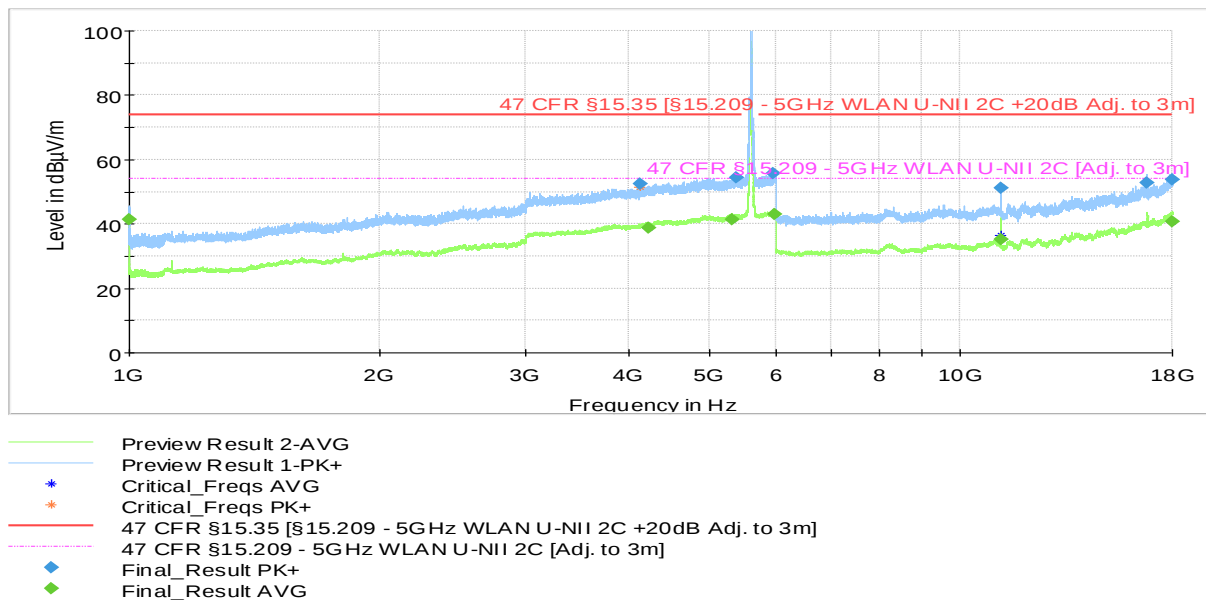
Test mode condition	WLAN 5 GHz 802.11ac (CH 60 – 5300 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
22002.283000	34.39	---	83.52	49.13	1000.0	1000.000	155.0	H	82.0
22008.158000	34.56	---	83.52	48.96	1000.0	1000.000	155.0	H	98.0
22008.619000	---	21.60	63.52	41.92	1000.0	1000.000	155.0	V	22.0
22009.993000	---	21.62	63.52	41.90	1000.0	1000.000	155.0	V	22.0
26253.358000	---	29.19	63.52	34.34	1000.0	1000.000	155.0	H	282.0
26460.823000	41.17	---	83.52	42.35	1000.0	1000.000	155.0	H	102.0
26838.374000	---	16.21	63.52	47.31	1000.0	1000.000	155.0	V	252.0
34925.563000	28.37	---	83.52	55.15	1000.0	1000.000	155.0	H	142.0
35002.475000	---	15.81	63.52	47.71	1000.0	1000.000	155.0	V	202.0
35043.352000	29.12	---	83.52	54.41	1000.0	1000.000	155.0	V	8.0
39011.695000	29.52	---	83.52	54.00	1000.0	1000.000	155.0	H	216.0
39598.537000	---	17.53	63.52	45.99	1000.0	1000.000	155.0	H	8.0

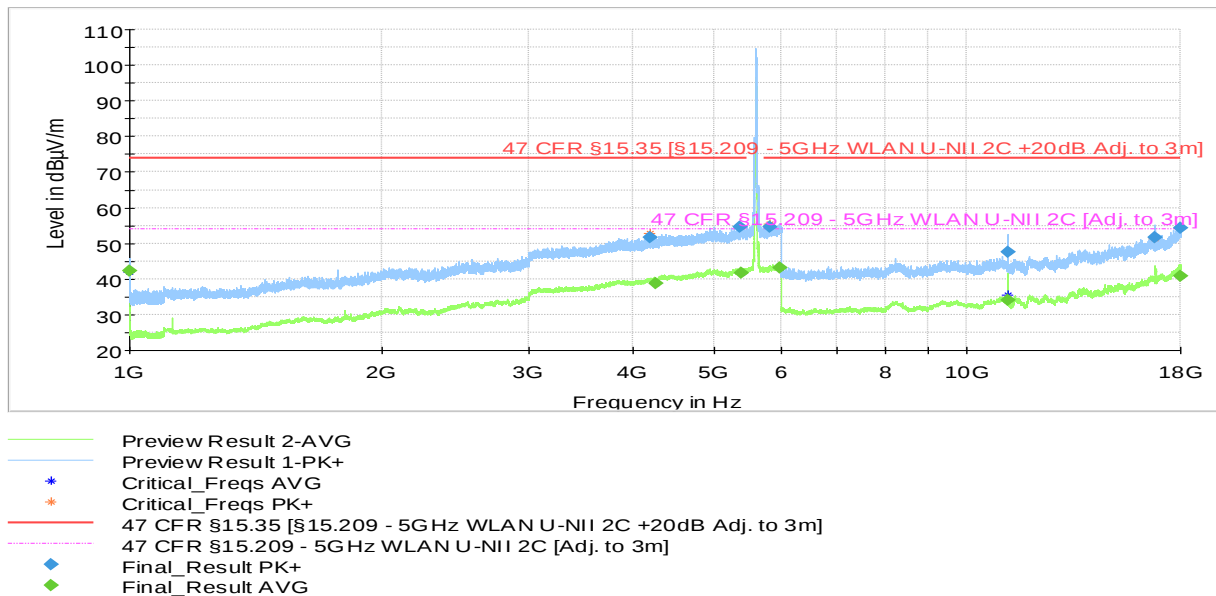
Channel 120 (5600 MHz): 1 GHz – 18 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 120 – 5600 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.040480	---	41.26	53.98	12.72	1000.0	1000.000	148.0	H	221.0
4115.073000	52.39	---	74.00	21.60	1000.0	1000.000	127.0	H	290.0
4225.103000	---	38.64	53.98	15.34	1000.0	1000.000	121.0	H	221.0
5317.759000	---	41.26	53.98	12.72	1000.0	1000.000	210.0	V	221.0
5387.133000	54.45	---	74.00	19.55	1000.0	1000.000	125.0	H	311.0
5964.341000	55.69	---	74.00	18.31	1000.0	1000.000	175.0	V	292.0
5979.704000	---	43.01	53.98	10.96	1000.0	1000.000	100.0	V	155.0
11201.974000	---	35.14	53.98	18.84	1000.0	1000.000	146.0	H	129.0
11202.681000	51.05	---	73.99	22.95	1000.0	1000.000	149.0	H	129.0
16803.101000	52.65	---	73.99	21.34	1000.0	1000.000	110.0	H	112.0
17971.167000	---	40.72	53.98	13.26	1000.0	1000.000	210.0	H	142.0
17993.883700	53.77	---	73.99	20.22	1000.0	1000.000	171.0	H	162.0

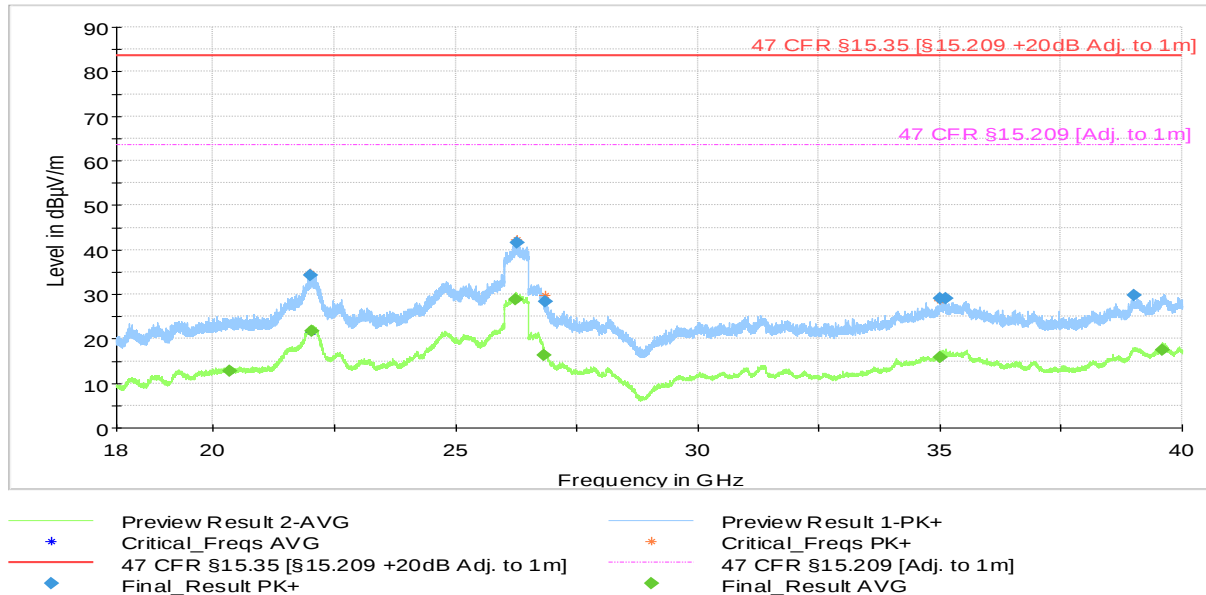
Test mode condition	WLAN 5 GHz 802.11ac (CH 120 – 5600 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.012072	---	42.27	53.98	11.71	1000.0	1000.000	148.0	H	233.0
4180.416000	51.68	---	74.00	22.32	1000.0	1000.000	158.0	V	292.0
4243.059000	---	38.83	53.98	15.15	1000.0	1000.000	127.0	V	162.0
5359.885000	54.57	---	74.00	19.43	1000.0	1000.000	100.0	V	244.0
5372.083000	---	41.60	53.98	12.38	1000.0	1000.000	206.0	H	68.0
5825.465000	54.71	---	74.00	19.29	1000.0	1000.000	206.0	V	87.0
5977.710000	---	43.02	53.98	10.96	1000.0	1000.000	127.0	H	292.0
11199.572000	---	34.21	53.98	19.77	1000.0	1000.000	147.0	H	129.0
11202.066000	47.45	---	73.99	26.55	1000.0	1000.000	175.0	H	158.0
16803.918000	51.62	---	73.99	22.37	1000.0	1000.000	148.0	H	112.0
17971.093000	54.20	---	73.99	19.79	1000.0	1000.000	100.0	H	162.0
17993.275240	---	40.67	53.98	13.31	1000.0	1000.000	206.0	H	116.0

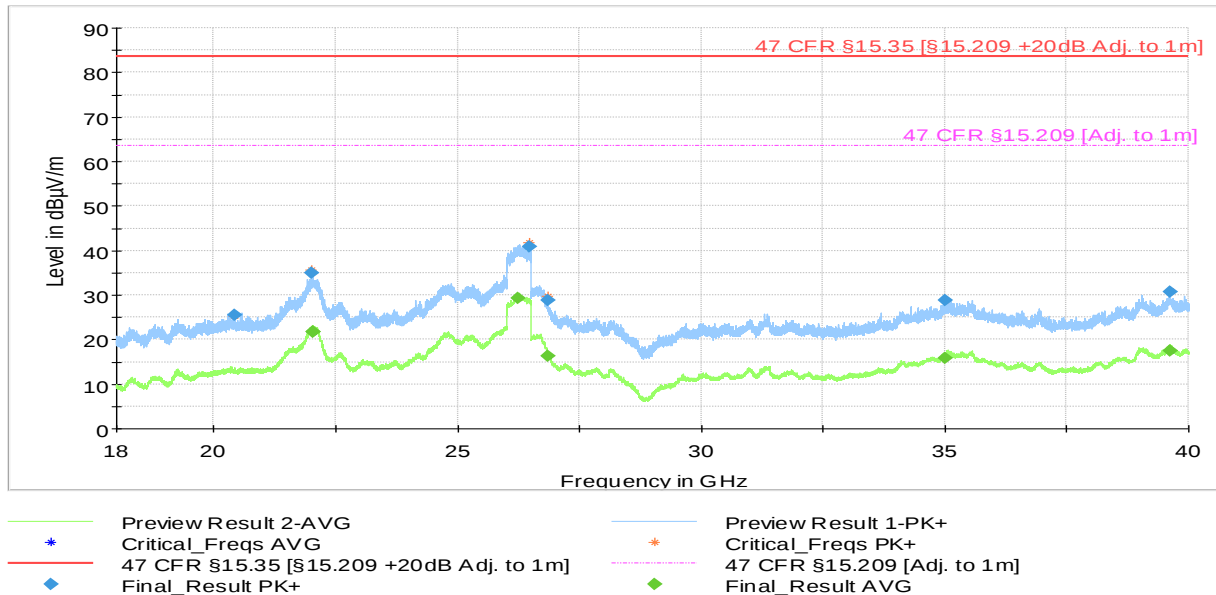
Channel 120 (5600 MHz): 18 GHz – 40 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 120 – 5600 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20348.072000	---	12.70	63.52	50.82	1000.0	1000.000	155.0	V	22.0
21988.753000	34.36	---	83.52	49.16	1000.0	1000.000	155.0	V	126.0
22029.085000	---	21.62	63.52	41.90	1000.0	1000.000	155.0	H	172.0
26239.863000	---	28.91	63.52	34.61	1000.0	1000.000	155.0	V	112.0
26260.806000	41.52	---	83.52	42.01	1000.0	1000.000	155.0	V	116.0
26832.860000	---	16.36	63.52	47.17	1000.0	1000.000	155.0	V	82.0
26846.902000	28.43	---	83.52	55.09	1000.0	1000.000	155.0	H	22.0
34997.708000	29.01	---	83.52	54.51	1000.0	1000.000	155.0	V	292.0
35010.044000	---	15.84	63.52	47.68	1000.0	1000.000	155.0	H	232.0
35116.395000	28.99	---	83.52	54.54	1000.0	1000.000	155.0	H	6.0
38995.141000	29.79	---	83.52	53.73	1000.0	1000.000	155.0	V	308.0
39602.004000	---	17.56	63.52	45.96	1000.0	1000.000	155.0	V	308.0

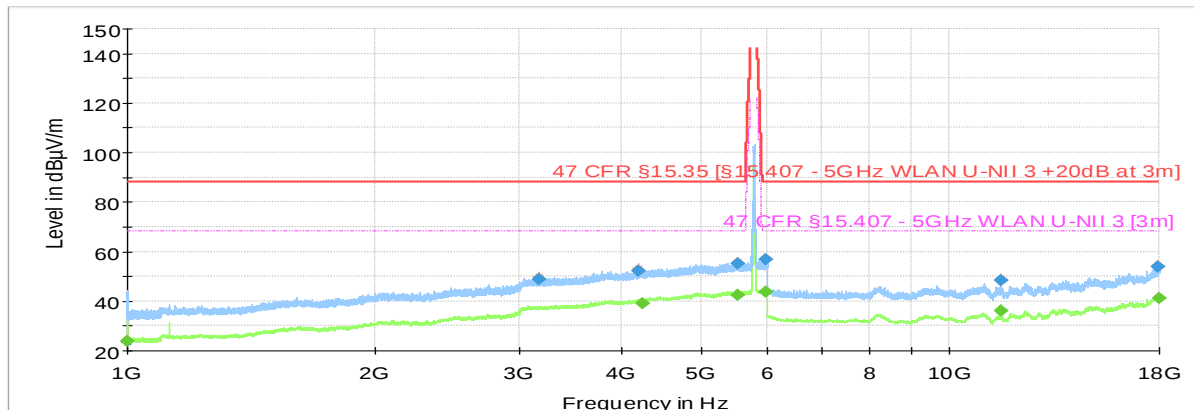
Test mode condition	WLAN 5 GHz 802.11ac (CH 120 – 5600 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20431.963000	25.53	---	83.52	57.99	1000.0	1000.000	155.0	V	26.0
22013.741000	34.98	---	83.52	48.54	1000.0	1000.000	155.0	V	38.0
22034.650000	---	21.67	63.52	41.85	1000.0	1000.000	155.0	V	188.0
22036.145000	---	21.64	63.52	41.89	1000.0	1000.000	155.0	V	192.0
26253.112000	---	29.23	63.52	34.29	1000.0	1000.000	155.0	H	128.0
26466.773000	40.94	---	83.52	42.58	1000.0	1000.000	155.0	H	158.0
26839.777000	---	16.23	63.52	47.29	1000.0	1000.000	155.0	V	248.0
26852.030000	28.81	---	83.52	54.72	1000.0	1000.000	155.0	H	112.0
35013.061000	28.80	---	83.52	54.72	1000.0	1000.000	155.0	V	206.0
35015.252000	---	15.87	63.52	47.65	1000.0	1000.000	155.0	V	252.0
39614.654000	30.63	---	83.52	52.89	1000.0	1000.000	155.0	H	38.0
39625.116000	---	17.59	63.52	45.93	1000.0	1000.000	155.0	V	266.0

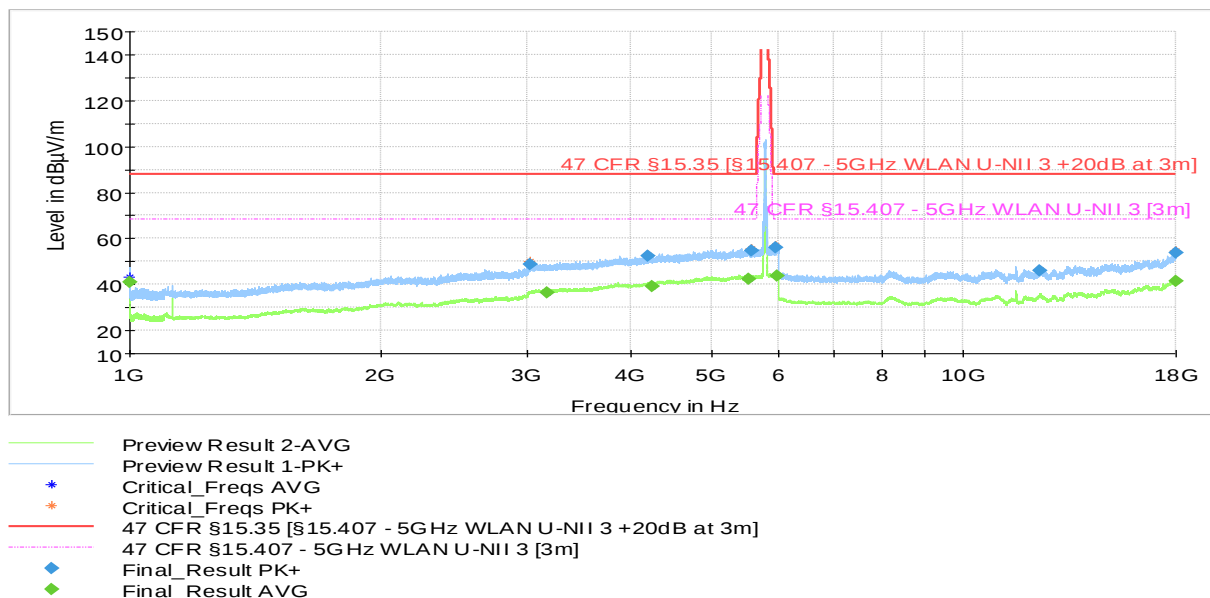
Channel 157 (5785 MHz): 1 GHz – 18 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 157 – 5785 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2021-03-30
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.091043	---	23.64	68.20	44.56	1000.0	1000.000	148.0	V	10.0
3163.019000	48.70	---	88.20	39.50	1000.0	1000.000	175.0	H	22.0
4186.743000	52.05	---	88.20	36.15	1000.0	1000.000	121.0	V	245.0
4229.357000	---	39.24	68.20	28.96	1000.0	1000.000	175.0	V	279.0
5531.018000	55.16	---	88.20	33.04	1000.0	1000.000	148.0	H	-18.0
5533.101000	---	42.55	68.20	25.65	1000.0	1000.000	119.0	V	68.0
5975.084000	56.63	---	88.20	31.57	1000.0	1000.000	100.0	H	54.0
5976.500000	---	43.64	68.20	24.56	1000.0	1000.000	125.0	H	54.0
11572.217000	---	36.24	68.20	31.96	1000.0	1000.000	186.0	H	112.0
11572.824000	48.36	---	88.20	39.84	1000.0	1000.000	101.0	H	116.0
17961.648000	53.92	---	88.20	34.28	1000.0	1000.000	175.0	H	219.0
17976.649000	---	40.97	68.20	27.23	1000.0	1000.000	206.0	V	112.0

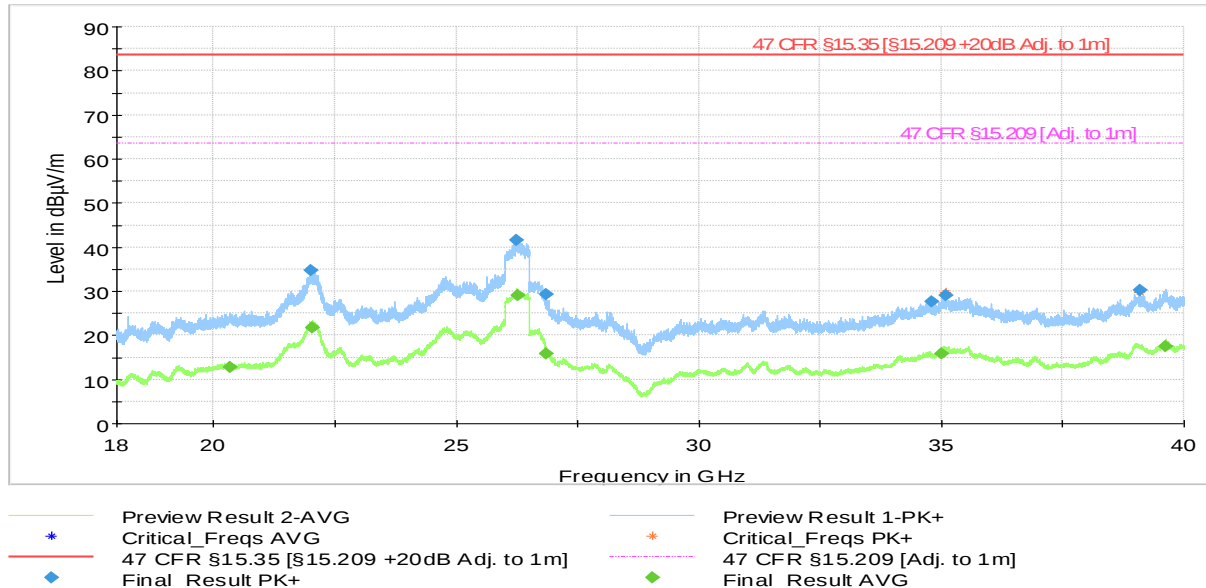
Test mode condition	WLAN 5 GHz 802.11ac (CH 157 – 5785 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2021-03-30
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1000.029232	---	41.10	68.20	27.10	1000.0	1000.000	100.0	H	72.0
3026.253000	48.95	---	88.20	39.25	1000.0	1000.000	138.0	V	65.0
3172.497000	---	36.24	68.20	31.96	1000.0	1000.000	158.0	V	323.0
4184.215000	52.53	---	88.20	35.67	1000.0	1000.000	102.0	V	9.0
4235.379000	---	39.30	68.20	28.90	1000.0	1000.000	125.0	H	206.0
5528.954000	---	42.57	68.20	25.63	1000.0	1000.000	210.0	V	267.0
5566.295000	54.48	---	88.20	33.72	1000.0	1000.000	102.0	H	234.0
5952.823000	56.25	---	88.20	31.95	1000.0	1000.000	125.0	V	158.0
5983.459000	---	43.64	68.20	24.56	1000.0	1000.000	125.0	V	202.0
12352.008000	45.83	---	88.20	42.37	1000.0	1000.000	159.0	V	68.0
17981.773000	54.00	---	88.20	34.20	1000.0	1000.000	175.0	V	-18.0
17991.620000	---	41.28	68.20	26.92	1000.0	1000.000	175.0	H	72.0

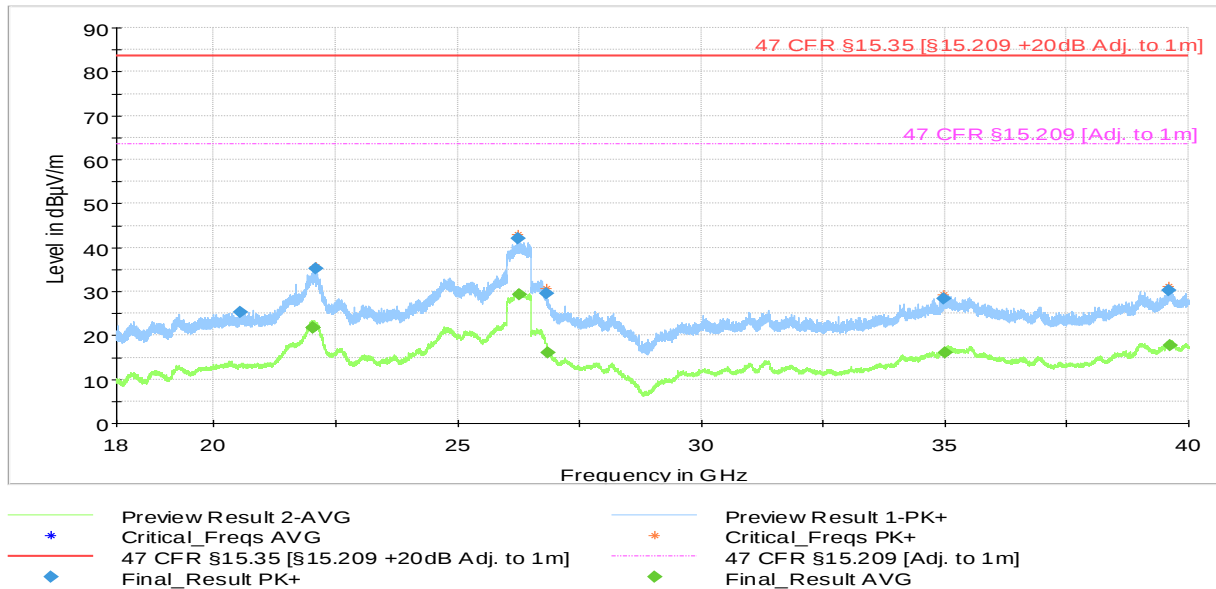
Channel 157 (5785 MHz): 18 GHz – 40 GHz

Test mode condition	WLAN 5 GHz 802.11a (CH 157 – 5785 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20347.535000	---	12.76	63.52	50.76	1000.0	1000.000	155.0	H	142.0
22012.887000	34.76	---	83.52	48.76	1000.0	1000.000	155.0	H	278.0
22017.912000	---	21.69	63.52	41.83	1000.0	1000.000	155.0	V	252.0
26234.894000	41.49	---	83.52	42.03	1000.0	1000.000	155.0	H	308.0
26255.840000	---	29.09	63.52	34.43	1000.0	1000.000	155.0	V	158.0
26846.858000	29.24	---	83.52	54.28	1000.0	1000.000	155.0	V	192.0
26853.961000	---	15.82	63.52	47.70	1000.0	1000.000	155.0	V	352.0
34799.511000	27.75	---	83.52	55.78	1000.0	1000.000	155.0	V	252.0
35004.802000	---	15.86	63.52	47.66	1000.0	1000.000	155.0	V	252.0
35084.569000	29.08	---	83.52	54.44	1000.0	1000.000	155.0	H	98.0
39084.079000	30.32	---	83.52	53.20	1000.0	1000.000	155.0	V	202.0
39618.283000	---	17.59	63.52	45.93	1000.0	1000.000	155.0	V	82.0

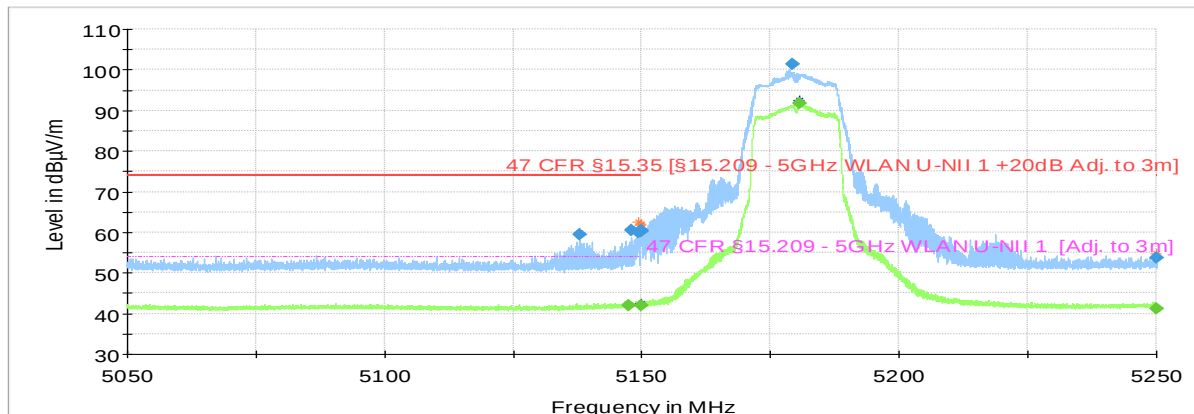
Test mode condition	WLAN 5 GHz 802.11ac (CH 157 – 5785 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Simon Palmhager	Date: 2020-12-29
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
20543.032000	25.20	---	83.52	58.32	1000.0	1000.000	155.0	V	38.0
22042.227000	---	21.76	63.52	41.76	1000.0	1000.000	155.0	V	6.0
22044.292000	---	21.76	63.52	41.77	1000.0	1000.000	155.0	V	6.0
22079.134000	35.18	---	83.52	48.34	1000.0	1000.000	155.0	H	296.0
26249.613000	42.11	---	83.52	41.42	1000.0	1000.000	155.0	H	8.0
26254.871000	---	29.22	63.52	34.30	1000.0	1000.000	155.0	V	68.0
26836.973000	29.56	---	83.52	53.96	1000.0	1000.000	155.0	V	82.0
26844.847000	---	16.13	63.52	47.39	1000.0	1000.000	155.0	V	172.0
34988.560000	28.33	---	83.52	55.19	1000.0	1000.000	155.0	H	112.0
35007.542000	---	15.95	63.52	47.57	1000.0	1000.000	155.0	H	128.0
39581.945000	30.16	---	83.52	53.37	1000.0	1000.000	155.0	V	202.0
39627.893000	---	17.68	63.52	45.84	1000.0	1000.000	155.0	V	276.0

Channel 36 (5180 MHz): Band Edge Detail

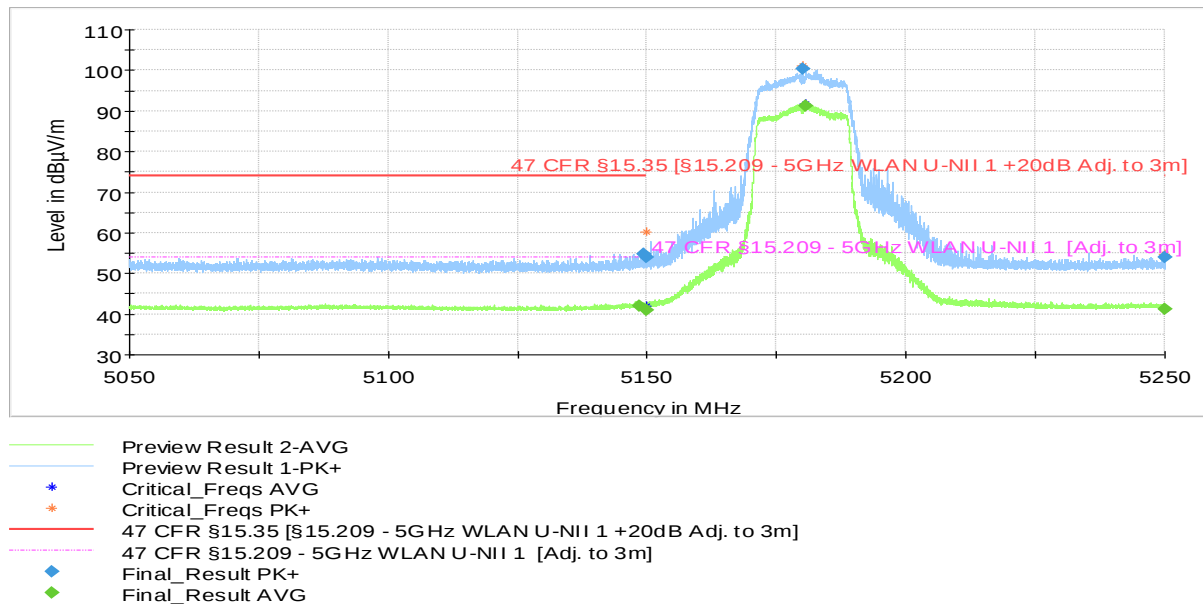
Test mode condition	WLAN 5 GHz 802.11a (CH 36 – 5180 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5050 MHz – 5250 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- Critical_Freqs AVG
- Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 - 5GHz WLAN U-NII 1 +20dB Adj. to 3m]
- 47 CFR §15.209 - 5GHz WLAN U-NII 1 [Adj. to 3m]
- Final_Result PK+
- Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5137.760000	59.39	---	74.00	14.61	1000.0	1000.000	146.0	H	131.0
5147.520000	---	41.91	53.98	12.07	1000.0	1000.000	136.0	H	131.0
5147.920000	60.46	---	74.00	13.54	1000.0	1000.000	175.0	H	177.0
5149.220000	60.07	---	74.00	13.93	1000.0	1000.000	175.0	H	131.0
5149.760000	60.41	---	74.00	13.59	1000.0	1000.000	147.0	H	116.0
5150.000000	---	41.94	53.98	12.04	1000.0	1000.000	136.0	H	128.0
5150.000000	60.35	---	74.00	13.65	1000.0	1000.000	168.0	H	127.0
5179.140000	101.46	---	---	---	1000.0	1000.000	121.0	H	131.0
5180.700000	---	91.87	---	---	1000.0	1000.000	125.0	H	131.0
5250.000000	---	41.14	53.98	12.84	1000.0	1000.000	146.0	H	143.0
5250.000000	53.81	---	74.00	20.19	1000.0	1000.000	166.0	H	233.0

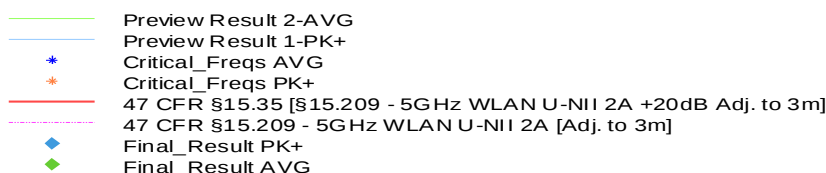
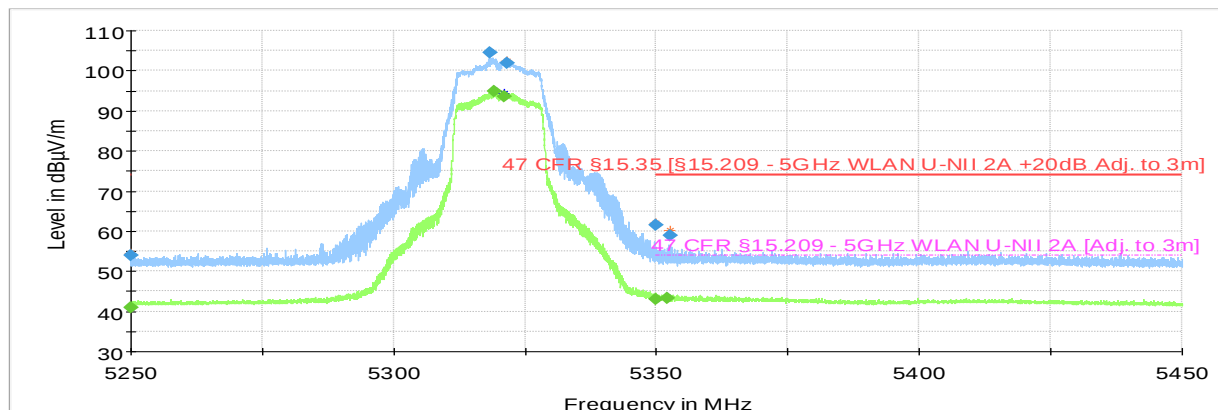
Test mode condition	WLAN 5 GHz 802.11ac (CH 36 – 5180 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5050 MHz – 5250 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5148.440000	---	41.96	53.98	12.02	1000.0	1000.000	111.0	H	143.0
5149.440000	54.77	---	74.00	19.23	1000.0	1000.000	100.0	V	267.0
5150.000000	---	40.86	53.98	13.12	1000.0	1000.000	122.0	H	108.0
5150.000000	53.96	---	74.00	20.04	1000.0	1000.000	210.0	V	251.0
5180.000000	100.47	---	---	---	1000.0	1000.000	111.0	H	131.0
5180.680000	---	91.22	---	---	1000.0	1000.000	111.0	H	131.0
5250.000000	---	41.09	53.98	12.89	1000.0	1000.000	144.0	H	181.0
5250.000000	53.99	---	74.00	20.01	1000.0	1000.000	133.0	H	156.0

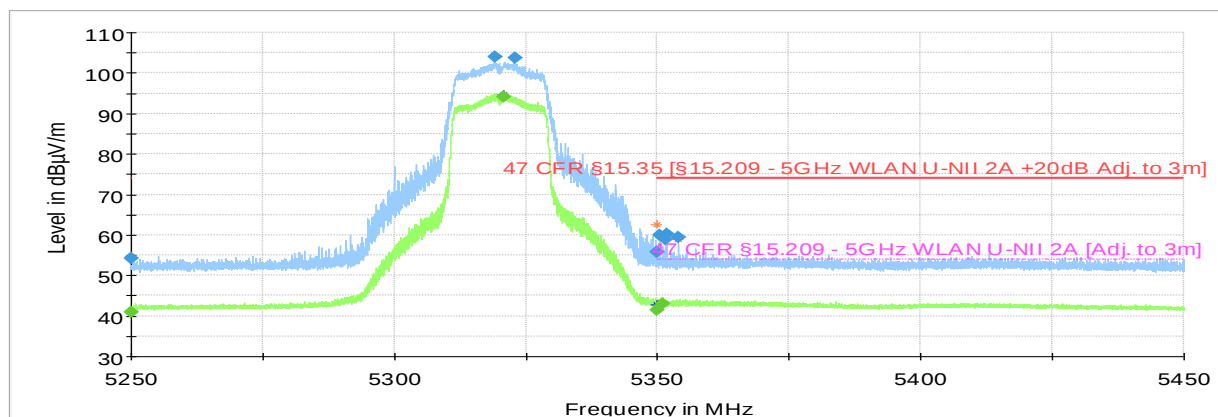
Channel 64 (5320 MHz): Band Edge Detail

Test mode condition	WLAN 5 GHz 802.11a (CH 64 – 5320 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5250 MHz – 5450 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5250.000000	---	40.98	53.98	13.00	1000.0	1000.000	195.0	H	307.0
5250.000000	53.85	---	74.00	20.15	1000.0	1000.000	203.0	H	181.0
5318.360000	104.61	---	---	---	1000.0	1000.000	110.0	H	131.0
5319.100000	---	94.87	---	---	1000.0	1000.000	111.0	H	130.0
5320.900000	---	93.60	---	---	1000.0	1000.000	126.0	H	131.0
5321.480000	101.79	---	---	---	1000.0	1000.000	126.0	H	131.0
5350.000000	61.45	---	74.00	12.55	1000.0	1000.000	127.0	H	148.0
5350.000000	---	43.00	53.98	10.98	1000.0	1000.000	147.0	H	136.0
5351.920000	---	43.24	53.98	10.74	1000.0	1000.000	111.0	H	130.0
5352.520000	58.97	---	74.00	15.03	1000.0	1000.000	127.0	H	154.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 64 – 5320 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5250 MHz – 5450 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-14
Chamber details	Chamber: SAC 5	

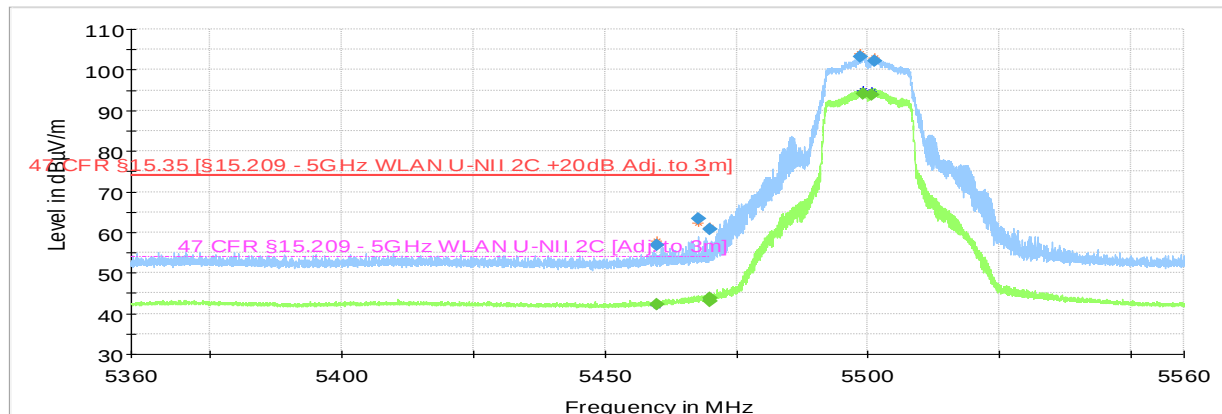


- Preview Result 2-AVG
- Preview Result 1-PK+
- Critical_Freqs AVG
- Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 - 5GHz WLAN U-NII 2A +20dB Adj. to 3m]
- 47 CFR §15.209 - 5GHz WLAN U-NII 2A [Adj. to 3m]
- Final_Result PK+
- Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5250.000000	---	41.07	53.98	12.91	1000.0	1000.000	193.0	H	315.0
5250.000000	54.28	---	74.00	19.73	1000.0	1000.000	157.0	H	64.0
5319.000000	103.93	---	---	---	1000.0	1000.000	171.0	H	132.0
5320.740000	---	94.14	---	---	1000.0	1000.000	169.0	H	131.0
5322.840000	103.76	---	---	---	1000.0	1000.000	169.0	H	133.0
5350.000000	---	41.57	53.98	12.41	1000.0	1000.000	169.0	H	117.0
5350.000000	55.70	---	74.00	18.30	1000.0	1000.000	169.0	H	108.0
5350.300000	59.84	---	74.00	14.16	1000.0	1000.000	210.0	H	130.0
5350.920000	---	43.12	53.98	10.86	1000.0	1000.000	147.0	H	143.0
5351.480000	58.87	---	74.00	15.13	1000.0	1000.000	175.0	H	158.0
5351.740000	60.32	---	74.00	13.68	1000.0	1000.000	175.0	H	153.0
5353.980000	59.45	---	74.00	14.55	1000.0	1000.000	100.0	H	177.0

Channel 100 (5500 MHz): Band Edge Detail

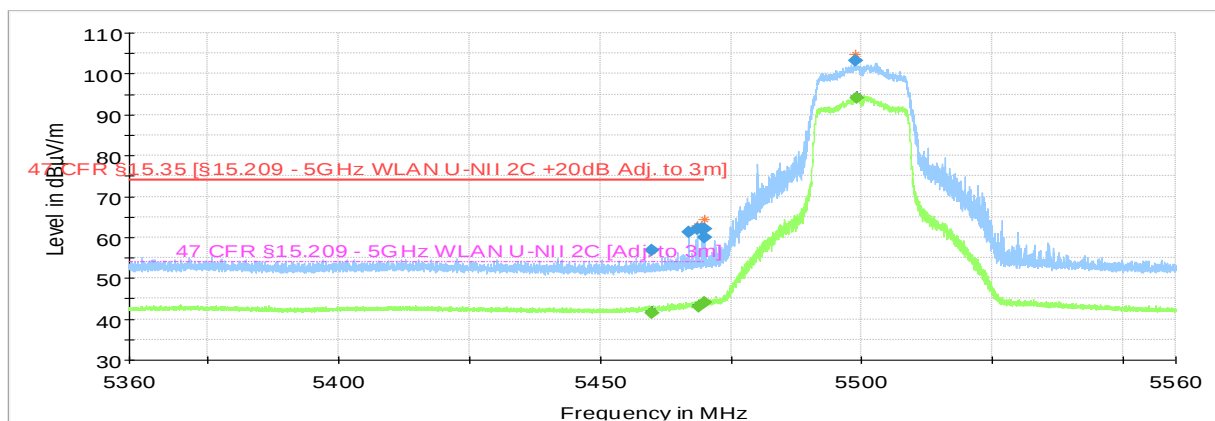
Test mode condition	WLAN 5 GHz 802.11a (CH 100 – 5500 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5360 MHz – 5560 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



Preview Result 2-AVG
 Preview Result 1-PK+
 Critical_Freqs AVG
 Critical_Freqs PK+
 47 CFR §15.35 [§15.209 - 5GHz WLAN U-NII 2C +20dB Adj. to 3m]
 47 CFR §15.209 - 5GHz WLAN U-NII 2C [Adj. to 3m]
 Final_Result PK+
 Final_Result AVG

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5460.000000	---	42.13	53.98	11.85	1000.0	1000.000	168.0	H	136.0
5460.000000	56.75	---	74.00	17.25	1000.0	1000.000	101.0	H	153.0
5467.760000	63.23	---	74.00	10.77	1000.0	1000.000	112.0	H	133.0
5469.800000	---	43.16	53.98	10.82	1000.0	1000.000	147.0	H	131.0
5470.000000	60.80	---	74.00	13.20	1000.0	1000.000	180.0	H	137.0
5470.000000	---	43.83	53.98	10.15	1000.0	1000.000	149.0	H	137.0
5498.380000	103.23	---	---	---	1000.0	1000.000	137.0	H	130.0
5499.000000	---	93.98	---	---	1000.0	1000.000	147.0	H	131.0
5500.800000	---	93.86	---	---	1000.0	1000.000	146.0	H	131.0
5501.160000	102.11	---	---	---	1000.0	1000.000	146.0	H	131.0

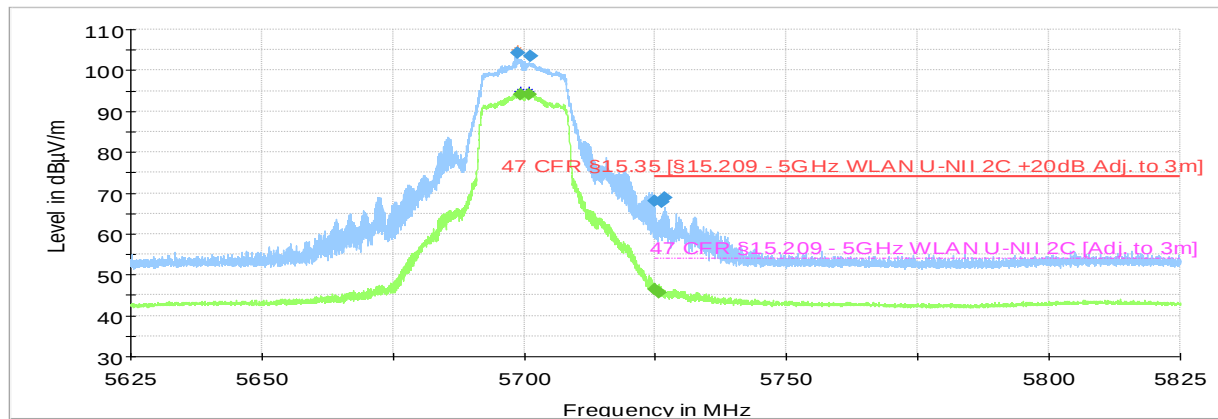
Test mode condition	WLAN 5 GHz 802.11ac (CH 100 – 5500 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5360 MHz – 5560 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5460.000000	---	41.36	53.98	12.62	1000.0	1000.000	146.0	H	107.0
5460.000000	56.72	---	74.00	17.28	1000.0	1000.000	203.0	H	165.0
5467.020000	61.30	---	74.00	12.70	1000.0	1000.000	210.0	H	158.0
5468.520000	62.02	---	74.00	11.98	1000.0	1000.000	197.0	H	143.0
5468.740000	---	43.12	53.98	10.86	1000.0	1000.000	127.0	H	131.0
5469.420000	62.15	---	74.00	11.85	1000.0	1000.000	125.0	H	177.0
5469.840000	60.06	---	74.00	13.94	1000.0	1000.000	100.0	H	-22.0
5470.000000	---	44.02	53.98	9.96	1000.0	1000.000	128.0	H	137.0
5470.000000	62.05	---	74.00	11.95	1000.0	1000.000	111.0	H	115.0
5498.900000	103.22	---	---	---	1000.0	1000.000	125.0	H	130.0
5499.000000	---	94.06	---	---	1000.0	1000.000	128.0	H	133.0

Channel 140 (5700 MHz): Band Edge Detail

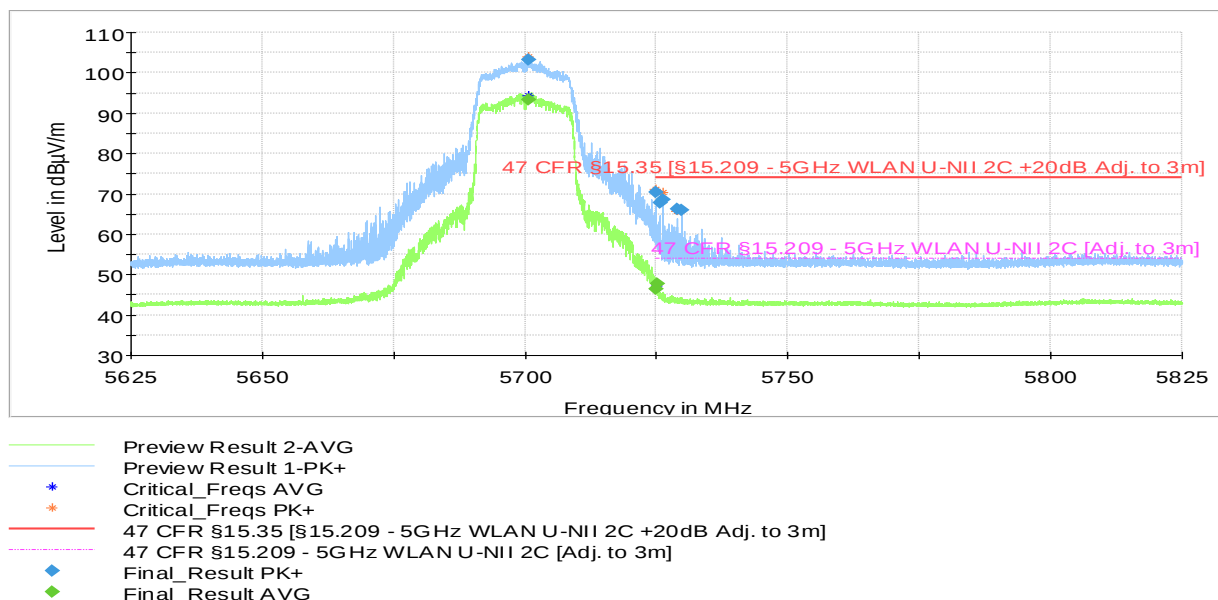
Test mode condition	WLAN 5 GHz 802.11a (CH 140 – 5700 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5625 MHz – 5825 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Joel Efraimsson	Date: 2020-12-15
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- Critical_Freqs AVG
- Critical_Freqs PK+
- 47 CFR §15.35 [§15.209 - 5GHz WLAN U-NII 2C +20dB Adj. to 3m]
- 47 CFR §15.209 - 5GHz WLAN U-NII 2C [Adj. to 3m]
- Final_Result PK+
- Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5698.620000	104.37	---	---	---	1000.0	1000.000	125.0	H	130.0
5699.360000	---	94.23	---	---	1000.0	1000.000	125.0	H	130.0
5700.920000	---	94.20	---	---	1000.0	1000.000	125.0	H	130.0
5701.120000	103.51	---	---	---	1000.0	1000.000	125.0	H	142.0
5725.000000	68.08	---	74.00	5.92	1000.0	1000.000	125.0	H	136.0
5725.000000	---	46.43	53.98	7.55	1000.0	1000.000	125.0	H	136.0
5725.720000	---	45.67	53.98	8.31	1000.0	1000.000	125.0	H	131.0
5726.260000	67.66	---	74.00	6.34	1000.0	1000.000	125.0	H	158.0
5726.700000	68.95	---	74.00	5.05	1000.0	1000.000	125.0	H	158.0

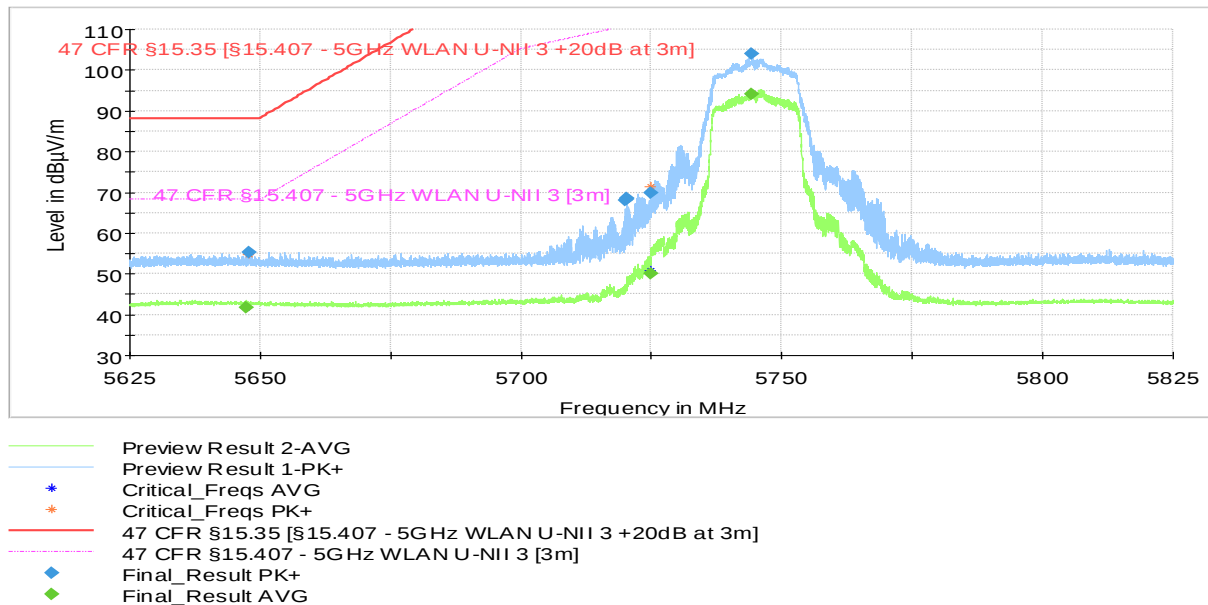
Test mode condition	WLAN 5 GHz 802.11ac (CH 140 – 5700 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5625 MHz – 5825 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2020-12-14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5700.700000	---	93.41	---	---	1000.0	1000.000	125.0	H	130.0
5700.700000	103.11	---	---	---	1000.0	1000.000	125.0	H	131.0
5725.000000	---	46.29	53.98	7.68	1000.0	1000.000	136.0	H	148.0
5725.000000	70.37	---	74.00	3.63	1000.0	1000.000	125.0	H	136.0
5725.040000	---	47.82	53.98	6.16	1000.0	1000.000	125.0	H	142.0
5725.560000	67.91	---	74.00	6.09	1000.0	1000.000	175.0	H	142.0
5726.320000	68.57	---	74.00	5.43	1000.0	1000.000	125.0	H	131.0
5728.920000	66.17	---	74.00	7.83	1000.0	1000.000	100.0	H	158.0
5729.660000	65.97	---	74.00	8.03	1000.0	1000.000	100.0	H	142.0

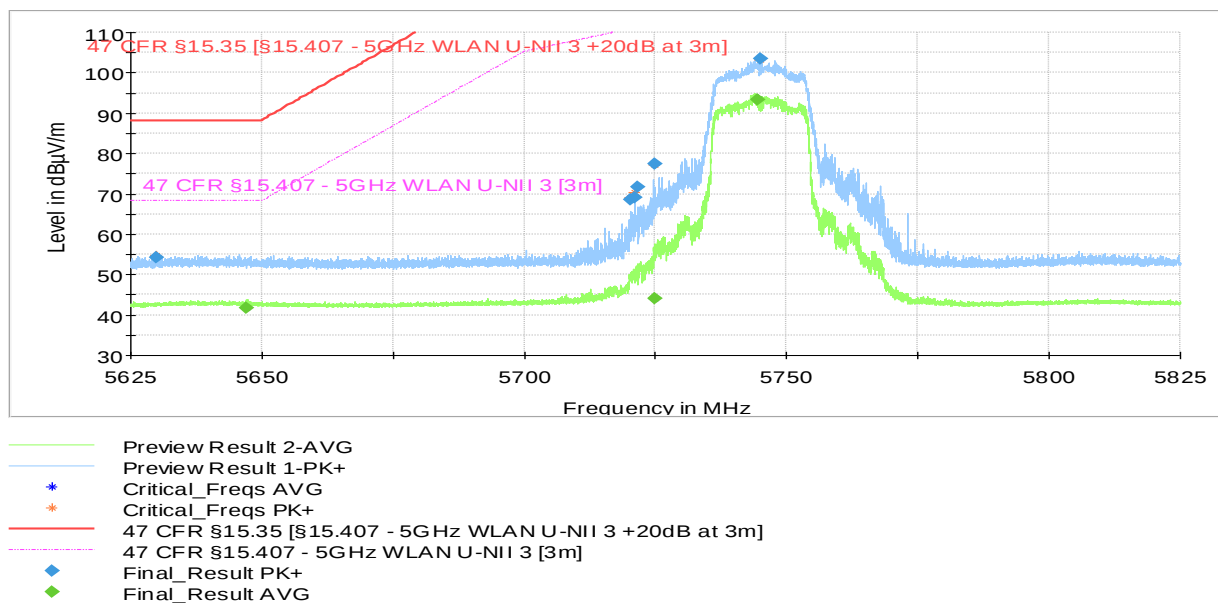
Channel 149 (5745 MHz): Band Edge Detail

Test mode condition	WLAN 5 GHz 802.11a (CH 149 – 5745 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5625 MHz – 5825 MHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-18
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5647.220000	---	41.70	68.20	26.50	1000.0	1000.000	210.0	H	292.0
5647.960000	55.37	---	88.20	32.83	1000.0	1000.000	210.0	H	221.0
5720.060000	68.00	---	130.94	62.93	1000.0	1000.000	125.0	H	131.0
5720.180000	68.48	---	131.21	62.73	1000.0	1000.000	125.0	H	131.0
5720.340000	68.23	---	131.58	63.35	1000.0	1000.000	120.0	H	131.0
5725.000000	---	50.03	122.20	72.17	1000.0	1000.000	210.0	H	139.0
5725.000000	69.79	---	142.20	72.41	1000.0	1000.000	175.0	H	139.0
5744.180000	---	94.03	---	---	1000.0	1000.000	100.0	H	133.0
5744.240000	103.89	---	---	---	1000.0	1000.000	100.0	H	142.0

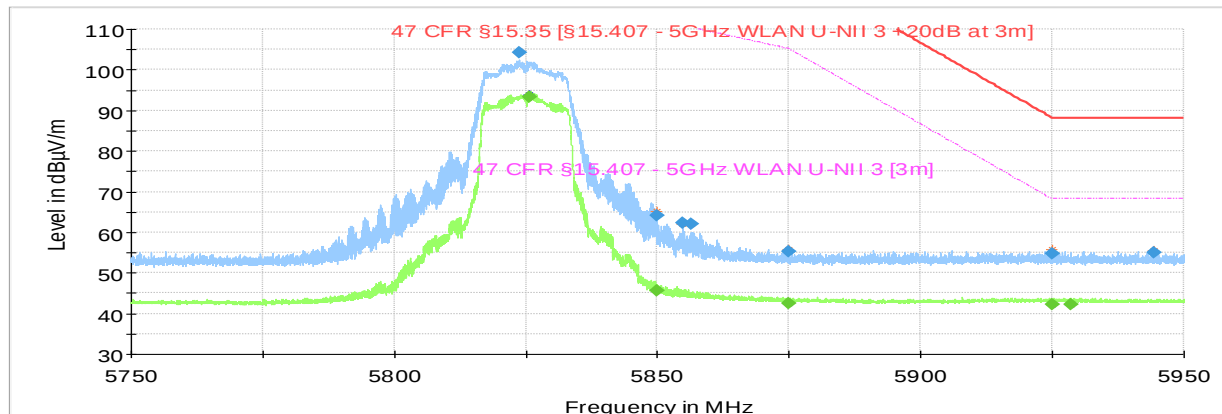
Test mode condition	WLAN 5 GHz 802.11ac (CH 149 – 5745 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5625 MHz – 5825 MHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-18
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5629.980000	54.36	---	88.20	33.84	1000.0	1000.000	176.0	H	143.0
5646.920000	---	41.69	68.20	26.51	1000.0	1000.000	175.0	V	189.0
5720.300000	68.64	---	131.48	62.85	1000.0	1000.000	101.0	H	143.0
5721.100000	69.15	---	133.31	64.16	1000.0	1000.000	101.0	H	131.0
5721.520000	71.60	---	134.27	62.67	1000.0	1000.000	103.0	H	143.0
5725.000000	---	44.19	122.20	78.01	1000.0	1000.000	184.0	V	255.0
5725.000000	77.55	---	142.20	64.65	1000.0	1000.000	105.0	H	144.0
5744.320000	---	93.20	---	---	1000.0	1000.000	100.0	H	131.0
5745.120000	103.37	---	---	---	1000.0	1000.000	100.0	H	143.0

Channel 165 (5825 MHz): Band Edge Detail

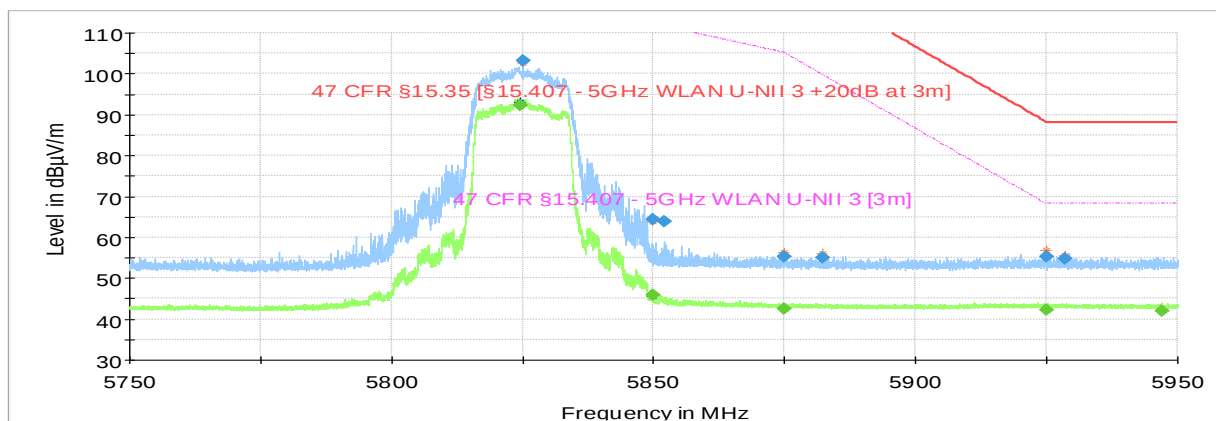
Test mode condition	WLAN 5 GHz 802.11a (CH 165 – 5825 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5750 MHz – 5950 MHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-18
Chamber details	Chamber: SAC 5	



Preview Result 2-AVG
 Preview Result 1-PK+
 Critical_Freqs AVG
 Critical_Freqs PK+
 47 CFR §15.35 [§15.407 - 5GHz WLAN U-NII 3 +20dB at 3m]
 47 CFR §15.407 - 5GHz WLAN U-NII 3 [3m]
 Final_Result PK+
 Final_Result AVG

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5823.780000	104.28	---	---	---	1000.0	1000.000	100.0	H	143.0
5825.620000	---	93.42	---	---	1000.0	1000.000	121.0	H	131.0
5850.000000	---	45.55	122.20	76.65	1000.0	1000.000	121.0	H	132.0
5850.000000	64.22	---	142.20	77.98	1000.0	1000.000	100.0	H	120.0
5854.820000	62.43	---	131.21	68.78	1000.0	1000.000	136.0	H	131.0
5856.400000	62.09	---	130.41	68.32	1000.0	1000.000	127.0	H	162.0
5875.000000	---	42.50	105.20	62.70	1000.0	1000.000	133.0	H	123.0
5875.000000	55.39	---	125.20	69.81	1000.0	1000.000	210.0	H	161.0
5925.000000	---	42.24	68.20	25.96	1000.0	1000.000	210.0	H	352.0
5925.000000	54.81	---	88.20	33.39	1000.0	1000.000	210.0	H	243.0
5928.520000	---	42.19	68.20	26.01	1000.0	1000.000	100.0	H	68.0
5944.160000	55.03	---	88.20	33.17	1000.0	1000.000	136.0	V	162.0

Test mode condition	WLAN 5 GHz 802.11ac (CH 165 – 5825 MHz)	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	5750 MHz – 5950 MHz	
Standard	47 CFR FCC Part 15.407	
EUT	A002959287-010	
Ancillary Equipment	A002959287-011, A002959287-012, A002959287-025	
Test Engineer	Niall Forrester	Date: 2021-01-18
Chamber details	Chamber: SAC 5	



- Preview Result 2-AVG
- Preview Result 1-PK+
- Critical_Freqs AVG
- Critical_Freqs PK+
- 47 CFR §15.35 [§15.407 - 5GHz WLAN U-NII 3 +20dB at 3m]
- 47 CFR §15.407 - 5GHz WLAN U-NII 3 [3m]
- Final_Result PK+
- Final_Result AVG

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5824.500000	---	92.32	---	---	1000.0	1000.000	119.0	H	131.0
5825.100000	103.25	---	---	---	1000.0	1000.000	100.0	H	143.0
5850.000000	---	45.82	122.20	76.38	1000.0	1000.000	119.0	H	135.0
5850.000000	64.39	---	142.20	77.81	1000.0	1000.000	100.0	H	145.0
5852.080000	63.75	---	137.46	73.71	1000.0	1000.000	120.0	H	131.0
5875.000000	---	42.39	105.20	62.81	1000.0	1000.000	131.0	H	158.0
5875.000000	55.26	---	125.20	69.94	1000.0	1000.000	120.0	H	181.0
5882.160000	54.91	---	119.88	64.97	1000.0	1000.000	125.0	H	9.0
5925.000000	---	42.23	68.20	25.97	1000.0	1000.000	207.0	H	256.0
5925.000000	55.30	---	88.20	32.90	1000.0	1000.000	160.0	H	268.0
5928.500000	54.78	---	88.20	33.42	1000.0	1000.000	196.0	V	68.0
5946.880000	---	41.99	68.20	26.21	1000.0	1000.000	175.0	H	64.0

4.3 Test Results – Maximum Conducted Output Power

4.3.1 Maximum Conducted Output Power – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.4 Test Results – Maximum Power Spectral Density

4.4.1 Maximum Power Spectral Density – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.5 Test Results – 26 dB bandwidth

4.5.1 26 dB bandwidth – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.6 Test Results – 6dB Bandwidth

4.6.1 6dB Bandwidth – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.7 Test Results – Frequency Stability

4.7.1 Frequency Stability – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.8 Test Results – Transmit Power Control

4.8.1 Transmit Power Control – Test Summary

This test has not been performed. The device is based on certified modules as described in section 2.1

4.9 Test Results – Conducted Power Comparison

4.9.1 Conducted Power Comparison – Test Summary

Test Specification	ANSI C63.10 clause 11.9.2.2.2	
Test Engineer & Date	Niall Forrester	2020.12.10
EUT and Ancillary Equipment IDs	A002959287-001	A002959287-017 A002959287-018 A002959287-020
EUT Operation Mode(s)	Continuous Tx	
EUT Wireless Configuration(s)	WLAN 802.11 a/n/ac (see below for details)	
EUT Hardware Configuration(s)	Power from USB Power Supply	
Overall Result	Measured power does not exceed the maximum measured power from the module by more than the measurement uncertainty listed in section 6.1	

Test Parameter	Wireless Configuration	Measured Level (dBm) - 6Mbps BPSK	Measured Level (dBm) - 24Mbps 16-QAM	Measured Level (dBm) - 54Mbps 64-QAM	Reference Level (dBm) See Note 1
Average Power (U-NII 1)	WLAN 802.11a CH 36 (5180 MHz)	11.89	-	-	14.82
Average Power (U-NII 1)	WLAN 802.11a CH 44 (5220 MHz)	14.64	-	-	
Average Power (U-NII 1)	WLAN 802.11a CH 48 (5240 MHz)	14.51	13.81	11.11	
Average Power (U-NII 2)	WLAN 802.11a CH 52 (5260 MHz)	14.70	-	-	
Average Power (U-NII 2)	WLAN 802.11a CH 60 (5300 MHz)	12.30	-	-	
Average Power (U-NII 2)	WLAN 802.11a CH 64 (5320 MHz)	12.58	-	-	
Average Power (U-NII 2e)	WLAN 802.11a CH 100 (5500 MHz)	12.16	-	-	
Average Power (U-NII 2e)	WLAN 802.11a CH 116 (5580 MHz)	14.90	-	-	
Average Power (U-NII 2e)	WLAN 802.11a CH 120 (5600 MHz)	14.41	-	-	
Average Power (U-NII 2e)	WLAN 802.11a CH 140 (5700 MHz)	12.47	-	-	
Average Power (U-NII 2e)	WLAN 802.11a CH 144 (5720 MHz)	12.59	-	-	
Average Power (U-NII 3)	WLAN 802.11a CH 149 (5745 MHz)	12.45	-	-	
Average Power (U-NII 3)	WLAN 802.11a CH 157 (5785 MHz)	14.96	-	-	
Average Power (U-NII 3)	WLAN 802.11a CH 165 (5825 MHz)	12.26	-	-	

Note 1: The reference level is the maximum measured power of a given configuration for the pre-certified module. This data is taken from MRT Laboratory report number 1802WSU008-U4

Test Parameter	Wireless Configuration	Measured Level (dBm) – MCS0 BPSK	Measured Level (dBm) – MCS3 16-QAM	Measured Level (dBm) – MCS7 64-QAM	Reference Level (dBm) See Note 1
Average Power (U-NII 1)	WLAN 802.11n CH 36 (5180 MHz)	11.48	-	-	14.26
Average Power (U-NII 1)	WLAN 802.11n CH 44 (5220 MHz)	14.26	-	-	
Average Power (U-NII 1)	WLAN 802.11n CH 48 (5240 MHz)	14.23	13.43	10.86	
Average Power (U-NII 2)	WLAN 802.11n CH 52 (5260 MHz)	14.37	-	-	
Average Power (U-NII 2)	WLAN 802.11n CH 60 (5300 MHz)	11.96	-	-	
Average Power (U-NII 2)	WLAN 802.11n CH 64 (5320 MHz)	12.21	-	-	
Average Power (U-NII 2e)	WLAN 802.11n CH 100 (5500 MHz)	11.72	-	-	
Average Power (U-NII 2e)	WLAN 802.11n CH 116 (5580 MHz)	14.52	-	-	
Average Power (U-NII 2e)	WLAN 802.11n CH 120 (5600 MHz)	14.09	-	-	
Average Power (U-NII 2e)	WLAN 802.11n CH 140 (5700 MHz)	12.06	-	-	
Average Power (U-NII 2e)	WLAN 802.11n CH 144 (5720 MHz)	12.21	-	-	
Average Power (U-NII 3)	WLAN 802.11n CH 149 (5745 MHz)	12.02	-	-	
Average Power (U-NII 3)	WLAN 802.11n CH 157 (5785 MHz)	14.53	-	-	
Average Power (U-NII 3)	WLAN 802.11n CH 165 (5825 MHz)	11.82	-	-	

Note 1: The reference level is the maximum measured power of a given configuration for the pre-certified module. This data is taken from MRT Laboratory report number 1802WSU008-U4

Note 2: From an RF point of view, there is effectively no difference between MCS0 for 802.11n and MCS0 for 802.11ac. Testing was performed for one of these configurations only, so results for MCS0 are identical in these two tables.

Test Parameter	Wireless Configuration	Measured Level (dBm) – MCS0 BPSK	Measured Level (dBm) – MCS4 16-QAM	Measured Level (dBm) – MCS8 256-QAM	Reference Level (dBm) See Note 1
Average Power (U-NII 1)	WLAN 802.11ac CH 36 (5180 MHz)	11.48	-	-	14.33
Average Power (U-NII 1)	WLAN 802.11ac CH 44 (5220 MHz)	14.26	-	-	
Average Power (U-NII 1)	WLAN 802.11ac CH 48 (5240 MHz)	14.23	11.33	10.69	
Average Power (U-NII 2)	WLAN 802.11ac CH 52 (5260 MHz)	14.37	-	-	
Average Power (U-NII 2)	WLAN 802.11ac CH 60 (5300 MHz)	11.96	-	-	
Average Power (U-NII 2)	WLAN 802.11ac CH 64 (5320 MHz)	12.21	-	-	
Average Power (U-NII 2e)	WLAN 802.11ac CH 100 (5500 MHz)	11.72	-	-	
Average Power (U-NII 2e)	WLAN 802.11ac CH 116 (5580 MHz)	14.52	-	-	
Average Power (U-NII 2e)	WLAN 802.11ac CH 120 (5600 MHz)	14.09	-	-	
Average Power (U-NII 2e)	WLAN 802.11ac CH 140 (5700 MHz)	12.06	-	-	
Average Power (U-NII 2e)	WLAN 802.11ac CH 144 (5720 MHz)	12.21	-	-	
Average Power (U-NII 3)	WLAN 802.11ac CH 149 (5745 MHz)	12.02	-	-	
Average Power (U-NII 3)	WLAN 802.11ac CH 157 (5785 MHz)	14.53	-	-	
Average Power (U-NII 3)	WLAN 802.11ac CH 165 (5825 MHz)	11.82	-	-	

Note 1: The reference level is the maximum measured power of a given configuration for the pre-certified module. This data is taken from MRT Laboratory report number 1802WSU008-U4

Note 2: From an RF point of view, there is effectively no difference between MCS0 for 802.11n and MCS0 for 802.11ac. Testing was performed for one of these configurations only, so results for MCS0 are identical in these two tables.

5. TEST EQUIPMENT STATUS

5.1 List of Hardware with Calibration Dates

5.1.1 Hardware List – Conducted RF

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSU26	100308 2704108	14.07.2020	14.07.2021

5.1.2 Hardware List – Conducted Emissions System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
Two-Line V-network	Rohde & Schwarz	ENV216	101090 2704076	2020.07.16	2021.07.16
Test Receiver 9KHz to 3.5 GHz	Rohde & Schwarz	ESR3	101674 2704016	2020.07.17	2021.07.17

5.1.3 Hardware List – SAC5 System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
EMI Test Receiver	Rohde & Schwarz	ESW44	101760 2881044	2020.07.17	2021.07.17
Ultra Broadband Antenna	Rohde & Schwarz	HL562E	100988 2823181	2019.07.23	2021.07.23
Double Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF907	102678 2823164	2019.07.15	2021.07.15
Control Device	Maturo	NCD	NCD/393/2372.01	N/A	N/A
Open Switch & Control Unit	Rohde & Schwarz	OSP150	100081 2884198	2020.08.04	2021.08.04
Open Switch & Control Unit	Rohde & Schwarz	OSP120	100084 2761253	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 1	101333 2761265	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 2	101335 2761266	2020.08.04	2021.08.04
Shielded Filter Unit	Rohde & Schwarz	OSP-F Base Unit	101330 2761262	2020.08.04	2021.08.04
Humidity Temperature	Lufft	OPUS 20	1236.0118.0802.033 2771042	2020.07.31	2022.07.31

5.2 Software / Firmware Versions

Equipment	Software / Firmware Name	Version
Conducted Emissions System	EMC 32	V10.60.10
SAC 5	EMC 32	V10.60.10

6. MEASUREMENT UNCERTAINTY

6.1 Measurement Uncertainty for Conducted Power Measurements

Parameter	Uncertainty (Coverage Factor k=2)
Conducted power	0.51 dB

6.2 Measurement Uncertainty for Conducted Emissions

Parameter	Uncertainty (Coverage Factor k=2)
Conducted emissions with LISN 150KHz to 30 MHz	2.98 dB

6.3 Measurement Uncertainty for SAC 5 (Radiated Emissions & Band Edge)

Parameter	Uncertainty (Coverage Factor k=2)
Field Strength 10 Hz -9 kHz	3.38 dB
Field Strength 9 kHz -30 MHz	3.38 dB
Field Strength 30 MHz -1000 MHz	3.38 dB
Field Strength 1 GHz -18 GHz	4.88 dB
Field Strength 18 GHz - 40 GHz	5.14 dB

7. PHOTOGRAPHS

For photographs, see Appendix 1