TEST REPORT

Test Report No. : UL-RPT-RP-14208157-516-FCC

Applicant	:	SECO S.p.A.
Model No.	:	SYS-C31-DMV-01-IO
FCC ID	:	Contains FCC ID: 2ALZB-AW276
Technology	:	WLAN 5 GHz (802.11 a, n)
Test Standard(s)	:	FCC Parts 15.207, 15.209(a) & 15.407
		For details of applied tests refer to test result summary

1. This test report shall not be reproduced in full or partial, without the written approval of UL International Germany GmbH.
2. The results in this report apply only to the sample tested.
3. The test results in this report are traceable to the national or international standards.
4. Test Report Version 1.0
5. Result of the tested sample: **PASS**

Prepared by: Sercan, Usta
Title: Project Engineer
Date: 01 December 2022

Approved by: Rachid, Acharkaoui
Title: Operations Manager
Date: 01 December 2022

This laboratory is accredited by DAkkS.
The tests reported herein have been performed in accordance with its' terms of accreditation.

UL INTERNATIONAL GERMANY GMBH
Hedelfinger Str. 61
70327 Stuttgart, Germany
STU.CTECHLab@ul.com

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1. Customer Information

1.1. Applicant Information

Company Name:	SECO S.p.A.
Company Address:	Via Achille Grandi 20, 52100 Arezzo AR, Italy
Contact Person:	Giacomo Nucci / Giacomo Martini
Contact E-Mail Address:	giacomo.nucci@seco.com / giacomo.martini@seco.com
Contact Phone No.:	+39 0575 26979

1.2. Manufacturer Information

Company Name:	SECO S.p.A.
Company Address:	Via Achille Grandi 20, 52100 Arezzo AR, Italy
Contact Person:	Giacomo Nucci / Giacomo Martini
Contact E-Mail Address:	giacomo.nucci@seco.com / giacomo.martini@seco.com
Contact Phone No.:	+39 0575 26979

2. Summary of Testing

2.1. General Information

Applied Standards

Specification Reference:	47CFR15.407 and 47CFR15.403
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart E (Unlicensed National Information Infrastructure Devices) – Sections 15.403 and 15.407
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209

Location

Location of Testing:	UL International Germany GmbH Hedelfinger Str. 61 70327 Stuttgart Germany
Test Firm Registration:	399704

Date information

Order Date:	09 February 2022
EUT arrived:	19 April 2022
Test Dates:	12 May 2022 to 19 May 2022
EUT returned:	-/-

2.2. Summary of Test Results

Clause	Measurement	Complied	Did not comply	Not performed	Not applicable
Part 15.207	Transmitter AC Conducted Emissions	☒	☐	☐	☐
Part 15.403(i)	Transmitter 26 dB Emission Bandwidth(2)	☐	☐	☒	☐
Part 15.407(e)	Transmitter Minimum 6 dB Bandwidth (5.725-5.85 GHz band) (2)	☐	☐	☒	☐
Part 15.35(c)	Transmitter Duty Cycle(1)	☒	☐	☐	☐
Part 15.407(a)(1)(iv)	Transmitter Maximum Conducted Output Power (5.15-5.25 GHz band) (2)	☐	☐	☒	☐
Part 15.407(a)(2)	Transmitter Maximum Conducted Output Power (5.25-5.35 GHz & 5.47-5.725 GHz bands) (2)	☐	☐	☒	☐
Part 15.407(a)(3)	Transmitter Maximum Conducted Output Power (5.725-5.85 GHz band) (2)	☐	☐	☒	☐
Part 15.407(a)(1)(iv)	Transmitter Peak Power Spectral Density (5.15-5.25 GHz band) (2)	☐	☐	☒	☐
Part 15.407(a)(2)	Transmitter Peak Power Spectral Density (5.25-5.35 GHz & 5.47-5.725 GHz bands) (2)	☐	☐	☒	☐
Part 15.407(a)(3)	Transmitter Peak Power Spectral Density (5.725-5.85 GHz band) (2)	☐	☐	☒	☐
Part 15.407(b)/15.209(a)	Transmitter Out of Band Radiated Emissions(2)	☒	☐	☐	☐
Part 15.407(b)/15.209(a)	Transmitter Band Edge Radiated Emissions(2)	☒	☐	☐	☐
Part 15.407(g)	Transmitter Frequency Stability (Temperature & Voltage Variation) (3)	☐	☐	☒	☐
Part 15.407(h)(1)	Transmitter Power Control(4)	☐	☐	☒	☐

Note(s):

1. The measurement was performed to assist in the calculation of the average measurements.
2. At the clients request, only partial testing was performed as the EUT is a host product that contains a pre-certified radio module

2.3. Methods and Procedures

Reference:	ANSI C63.10-2013
Title:	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Reference:	FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 December 14, 2017
Title:	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E
Reference:	KDB 174176 D01 Line Conducted FAQ v01r01 June 3, 2015
Title:	AC Power-Line Conducted Emissions Frequently Asked Questions

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	SECO
Model Name or Number:	SYS-C31-DMV-01-IO
Test Sample Serial Number:	220405435 (RF Test Sample)
Hardware Version Number:	IO
Firmware Version Number:	C31DMVYY.BBB
FCC ID:	Contains FCC ID: 2ALZB-AW276

3.2. Description of EUT

The equipment under test was an industrial PC gateway Model: SYS-C31-DMV-01-IO that contains a pre-certified radio module which supports 2.4 GHz WLAN, 5 GHz WLAN, Bluetooth BR/EDR and Bluetooth Low Energy RF technologies.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11a / ac) / U-NII – 1 / 2A / 2C / 3			
Type of Unit:	Transceiver			
Modulation:	BPSK, QPSK, 16QAM & 64QAM			
Data rates:	802.11a	6 Mbps (Note 1)		
	802.11ac	MCS0 (Note 1)		
Power Supply Requirement(s):	Nominal	12 V DC via External supply		
Declared Antenna Gain:	Blue channel: 1.6 dBi Red channel: 0.7 dBi			
Antenna Type:	OEM Multifunctional Antenna Board			
Maximum Conducted Power:	20 MHz	19.96 dBm (Note 2)		
	40 MHz	19.79 dBm (Note 2)		
	80 MHz	15.34 dBm (Note 2)		
Nominal Channel Bandwidths:	20 / 40 / 80 MHz			
Transmit Frequency Band:	5150 MHz to 5250 MHz [U-NII-1]			
Transmit Channels Tested:	**Data rate**	**Bandwidth (MHz)**	**Channel Number**	**Channel Frequency (MHz)**
	802.11a	20	48	5240
	802.11ac	40	46	5230
	802.11ac	80	42	5210
Transmit Frequency Band:	5250 MHz to 5350 MHz [U-NII-2A]			
Transmit Channels Tested:	**Data rate**	**Bandwidth (MHz)**	**Channel Number**	**Channel Frequency (MHz)**
	802.11ac	20	52	5260
	802.11ac	40	54	5270
	802.11ac	80	58	5290
Transmit Frequency Band:	5470 MHz to 5725 MHz [U-NII-2C]			
Transmit Channels Tested:	**Data rate**	**Bandwidth (MHz)**	**Channel Number**	**Channel Frequency (MHz)**
	802.11ac	20	116	5580
	802.11ac	40	110	5550
	802.11ac	80	122	5610
Transmit Frequency Band:	5470 MHz to 5725 MHz [U-NII-3]			
Transmit Channels Tested:	**Data rate**	**Bandwidth (MHz)**	**Channel Number**	**Channel Frequency (MHz)**
	802.11ac	20	149	5745
	802.11ac	40	151	5755
	802.11ac	80	155	5775

(Note 1) In accordance with FCC KDB 996369 D04 Section 3.4 (b) the Host Product testing has been performed on unwanted (spurious) radiated emissions on the worst-case modulation and channel per frequency range as shown in test report, serial number RF161216E08-1,-M1216 for FCC ID: UAY-W8997-M1216.
(Note 2) Value taken from test report, serial number RF161216E08-1, for pre-certified radio module FCC ID: UAY-W8997-M1216

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

A. Support Equipment (In-house)

Item	Description	Brand Name	Model Name or Number	Serial Number
1	Laboratory DC Power Supply	GW	GPS-1850D	7662217
2	Test Laptop with Test software: Tera Term	HP	ProBook 650	5CG6143YWB

B. Support Equipment (Manufacturer supplied)

Item	Description	Brand Name	Model Name or Number	Serial Number
1	-/-	-/-	-/-	-/-

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes / Worst Case Identification

The EUT was tested in the following operating mode(s):
☒ Transmitter / Modulated Carrier Continuous Transmissions Mode WLAN 5 GHz, Worst Cases*: 802.11a I 6 Mbps: I UNII-1 I Top Channel I 20 MHz I Power Level 35 802.11ac I MCS0: I UNII-1 I Top Channel I 40 MHz I Power Level 35 802.11ac I MCS0: I UNII-1 I Single Channel I 80 MHz I Power Level 35 802.11ac I MCS0: I UNII-2A I Bottom Channel I 20 MHz I Power Level 35 802.11ac I MCS0: I UNII-2A I Bottom Channel I 40 MHz I Power Level 35 802.11ac I MCS0: I UNII-2A I Single Channel I 80 MHz I Power Level 35 802.11ac I MCS0: I UNII-2C I Middle Channel I 20 MHz I Power Level 35 802.11ac I MCS0: I UNII-2C I Middle Channel I 40 MHz I Power Level 35 802.11ac I MCS0: I UNII-2C I Middle Channel I 80 MHz I Power Level 35
* These worst-case data rates were taken from test report, serial number RF161216E08-1, for pre-certified radio module FCC ID: UAY-W8997-M1216

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- The applicant or manufacturer supplied test setup instructions "SYS-C31-DMV___Test_Radio_guidance_00" issued on 22 April 2022 was used to configure the EUT.

EUT Power Supply:

- The EUT was powered with 12V DC via an external AC/DC power supply

Test Mode Activation:

- The EUT can be connected with the Test laptop via USB-UART cables supplied by the customer. The cable was used only for configuration and was removed during the measurement.
- The test modes were activated by the terminal software ''Tera Term''. The commands to setup the respective modes and power were defined by the customer in the setup instructions.

AC Conducted Emissions Measurements:

- The EUT radiated sample was used for AC conducted emissions measurements.
- The measurements were carried out with 120 VAC/60Hz & 240 VAC/60Hz.
- The Toyo EMI Software EP5/CE Ver 4.0.1. was used for these measurements.

Radiated Measurements:

- For radiated measurements were performed with the radiated test sample.
- As per the applicant's declaration &/operational description of the EUT, the EUT is a tabletop equipment for its intended application. Therefore, EUT's test setup placement was performed in accordance with ANSI C63.10 section 6.2.3.2 & section 6.12 Figure 4.
- The EUT with its integrated antenna was evaluated for its worst-case position w.r.t to maximum radiated power measured and it was found that EUT in Standing position is the worst-case. Therefore, this report includes relevant results.
- The position of the Antenna was 0° Horizontal in the z-axis from the EUT.
- Radiated measurements below 30 MHz were performed with the EUT positioned on the turn table and rotating 360 degrees while the loop antenna height was set at 80 cm.
- Radiated measurements above 30 MHz were performed with the EUT positioned on the turn table and rotating 360° while the antenna height varies from 1 to 4 m over the measurement frequency range.
- R&S® EMC32 V11.30 Software was used for the Radiated spurious emission measurements.

Duty Cycle Correction Details:

- As the continuous transmission of the EUT ($D \geq 98\%$) cannot be achieved and EUT was transmitting continuously at Duty Cycles of 82.91% and 70.77% (duty cycle variations are less than ±2% at the respective data rate). Therefore, Duty Cycle Correction Factor of 0.81 and 1.5 dB was added to all average measurements, to compute the corrected average values of the emissions that would have been measured had the test been performed at 100% Duty Cycle.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 6 *Measurement Uncertainty* for details.

In accordance with DAkkS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	19 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 7/8		

FCC Reference:	Part 15.207
Test Method Used:	ANSI C63.10 Section 6.2 / FCC KDB 174176 and notes below

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	33

Settings of the Instrument

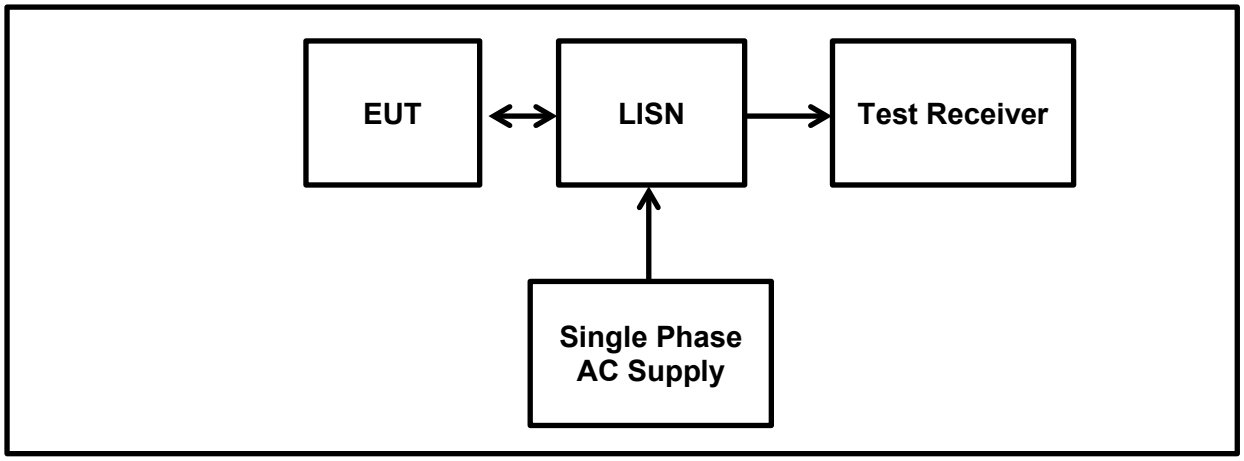
Detector	Quasi Peak/ Average Peak

Note(s):

1. Measurements were performed in shielded room (SR7/ 8 Asset Number 1603671). The EUT was placed at a height of 10 cm above the reference ground plane and in a distance of 40 cm from the vertical ground plane at the edge of the table.
2. Measurement software used: Toyo EMI Software; CE measurement software EP5/CE Ver 4.0.1.
3. The EUT was powered via 120 VAC 60 Hz or 240 V AC / 60 Hz single phase supply via a LISN.
4. In accordance with FCC KDB 174176 Q4, tests were performed with a 240 VAC 60 Hz single phase supply as this was within the voltage range marked on the 100-240 VAC~50/60 Hz power supply.
5. The EUT was configured on middle channel with the power setting of 30.
6. All other emissions shown on the pre-scan plot were investigated. Only the highest 6 emissions have been reported in the tables below in accordance with ANSI C63.10 section 6.2.5.
7. The final measured value, for the given emission, in the table below incorporates the cable loss. Calculation: Level = test receiver reading + path loss (cable attenuation + correction LISN).

Transmitter AC Conducted Spurious Emissions (continued)

Test setup:



Transmitter AC Conducted Spurious Emissions (continued)

Results: UNII-2A / 802.11ac / 20 MHz / PWR 35 / Bottom Channel / MCS0

Results: 120 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.151140	Live	33.50	65.90	32.40	Complied
0.614080	Live	17.70	56.00	38.30	Complied
0.885520	Live	16.70	56.00	39.30	Complied
9.791800	Live	31.00	60.00	29.00	Complied
12.348550	Live	31.40	60.00	28.60	Complied
14.057170	Live	40.00	60.00	20.00	Complied

Results: 120 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.151140	Live	14.20	55.90	41.70	Complied
0.614080	Live	6.00	46.00	40.00	Complied
0.885520	Live	4.40	46.00	41.60	Complied
9.791800	Live	26.20	50.00	23.80	Complied
12.348550	Live	26.00	50.00	24.00	Complied
14.057170	Live	33.30	50.00	16.70	Complied

Results: 120 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.151600	Neutral	33.00	65.90	32.90	Complied
0.189060	Neutral	28.10	64.10	36.00	Complied
0.821330	Neutral	17.50	56.00	38.50	Complied
9.813530	Neutral	30.00	60.00	30.00	Complied
12.448040	Neutral	31.10	60.00	28.90	Complied
13.848350	Neutral	38.50	60.00	21.50	Complied

Transmitter AC Conducted Spurious Emissions (continued)

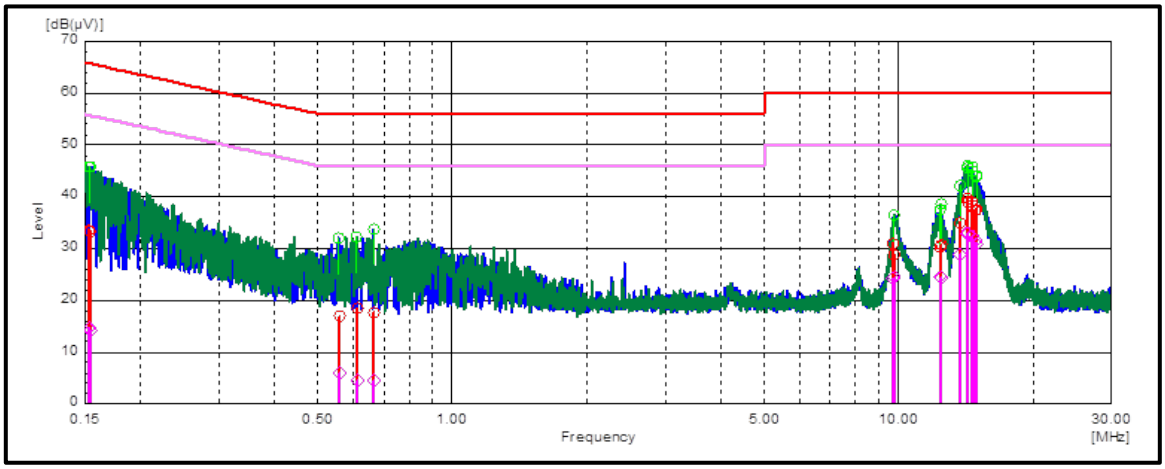
Results: UNII-2A / 802.11ac / 20 MHz / PWR 35 / Bottom Channel / MCS0

Results: 120 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.151600	Neutral	13.30	55.90	42.60	Complied
0.189060	Neutral	12.60	54.10	41.50	Complied
0.821330	Neutral	5.30	46.00	40.70	Complied
9.813530	Neutral	25.80	50.00	24.20	Complied
12.448040	Neutral	25.40	50.00	24.60	Complied
13.848350	Neutral	32.00	50.00	18.00	Complied

Result: Pass

Plot: 120 VAC 60 Hz / Live and Neutral Line



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter AC Conducted Spurious Emissions (continued)

Results: UNII-2A / 802.11ac / 20 MHz / PWR 35 / Bottom Channel / MCS0

Results: 240 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.157730	Live	32.70	65.60	32.90	Complied
0.191470	Live	28.30	64.00	35.70	Complied
0.633230	Live	18.40	56.00	37.60	Complied
9.806950	Live	29.60	60.00	30.40	Complied
12.373090	Live	31.50	60.00	28.50	Complied
14.094640	Live	43.10	60.00	16.90	Complied

Results: 240 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.157730	Live	14.70	55.60	40.90	Complied
0.191470	Live	12.60	54.00	41.40	Complied
0.633230	Live	6.00	46.00	40.00	Complied
9.806950	Live	25.50	50.00	24.50	Complied
12.373090	Live	26.60	50.00	23.40	Complied
14.094640	Live	36.30	50.00	13.70	Complied

Results: 240 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.156740	Neutral	14.20	55.60	41.40	Complied
0.170880	Neutral	12.60	54.90	42.30	Complied
0.605800	Neutral	5.30	46.00	40.70	Complied
9.780170	Neutral	25.80	50.00	24.20	Complied
12.071290	Neutral	25.50	50.00	24.50	Complied
12.427300	Neutral	27.10	50.00	22.90	Complied

Transmitter AC Conducted Spurious Emissions (continued)

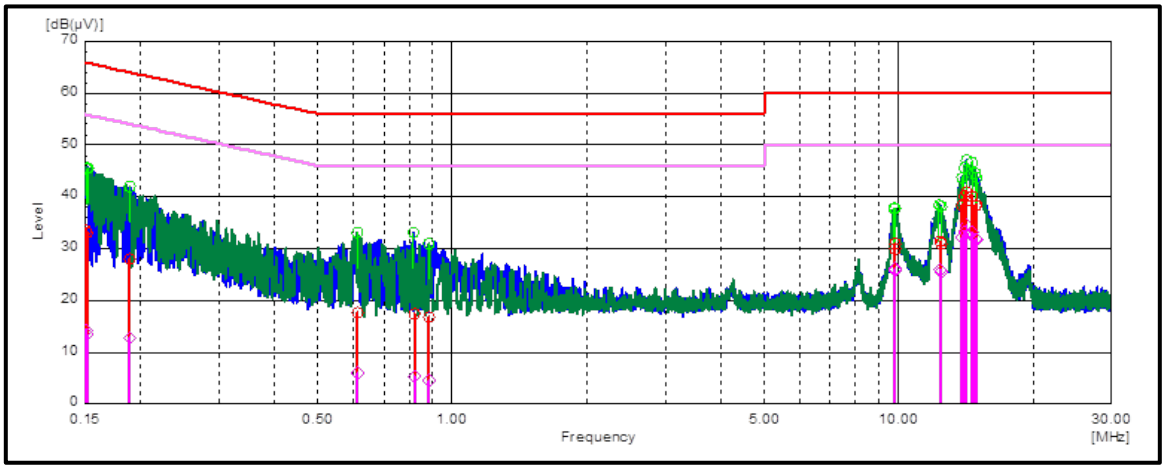
Results: UNII-2A / 802.11ac / 20 MHz / PWR 35 / Bottom Channel / MCS0

Results: 240 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.156740	Neutral	32.90	65.60	32.70	Complied
0.170880	Neutral	29.40	64.90	35.50	Complied
0.605800	Neutral	16.90	56.00	39.10	Complied
9.780170	Neutral	29.90	60.00	30.10	Complied
12.071290	Neutral	30.50	60.00	29.50	Complied
12.427300	Neutral	32.40	60.00	27.60	Complied

Result: Pass

Plot: 240 VAC 60 Hz / Live and Neutral Line



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.2. Transmitter Duty Cycle

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	17 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Part 15.35(c)
Test Method Used:	FCC KDB 789033 D02 Section II.B.2.b)

Environmental Conditions:

Temperature (°C):	24.2
Relative Humidity (%):	41.4

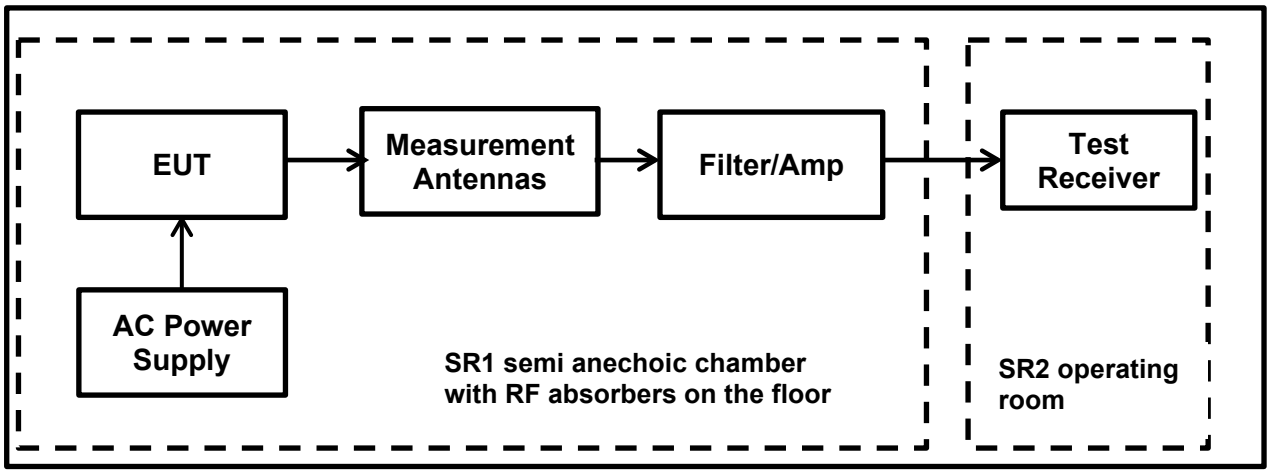
Notes:

1. The transmitter duty cycle was measured using a spectrum analyser in the time domain and calculated by using the following calculation:

   Duty Cycle (%) = 100 X [On Time (T_{ON})] / [Period(T_{ON}+ T_{OFF}) or 100ms whichever is the lesser]

   Duty Cycle Correction Factor= 10 log 1 / [On Time (T_{ON})] / [Period(T_{ON}+ T_{OFF}) or 100ms whichever is the lesser]

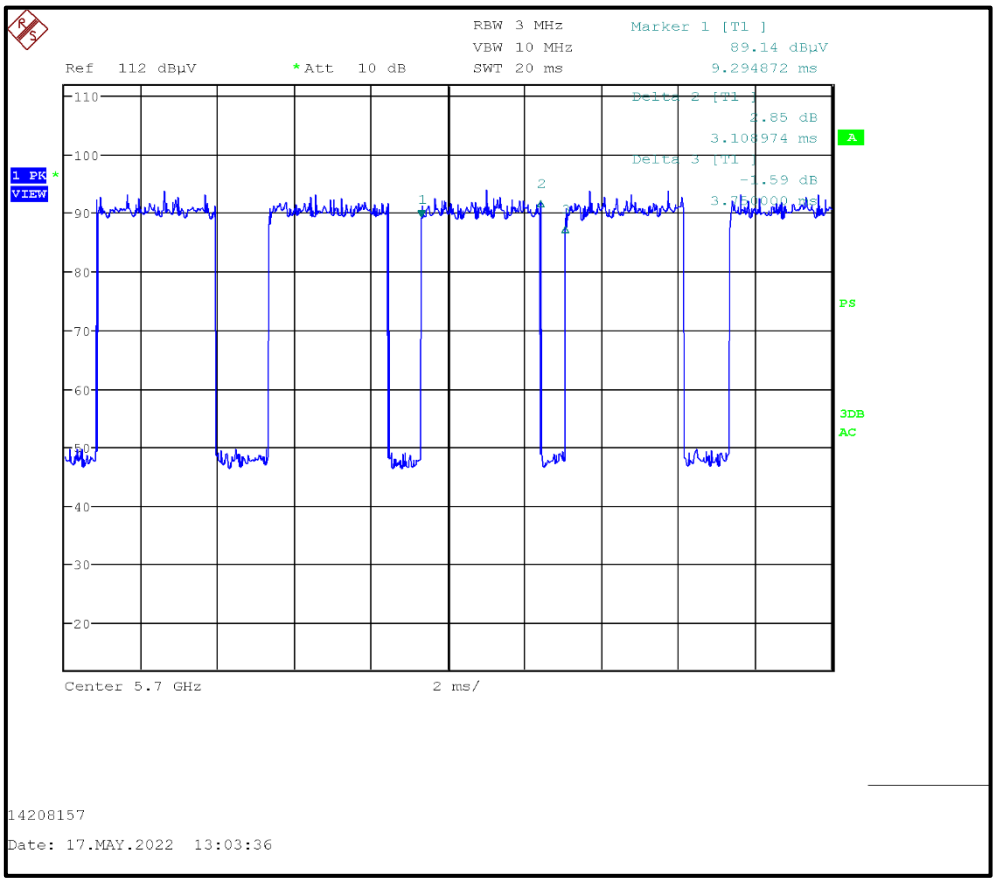
Test Setup:



Transmitter Duty Cycle (continued)

Results: UNII-1 / 802.11a / PWR35 / 6 Mbps

Pulse On Time (T_{ON}) (ms)	Pulse Period (T_{ON} +T_{OFF}) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
3.109	3.750	82.91	0.81

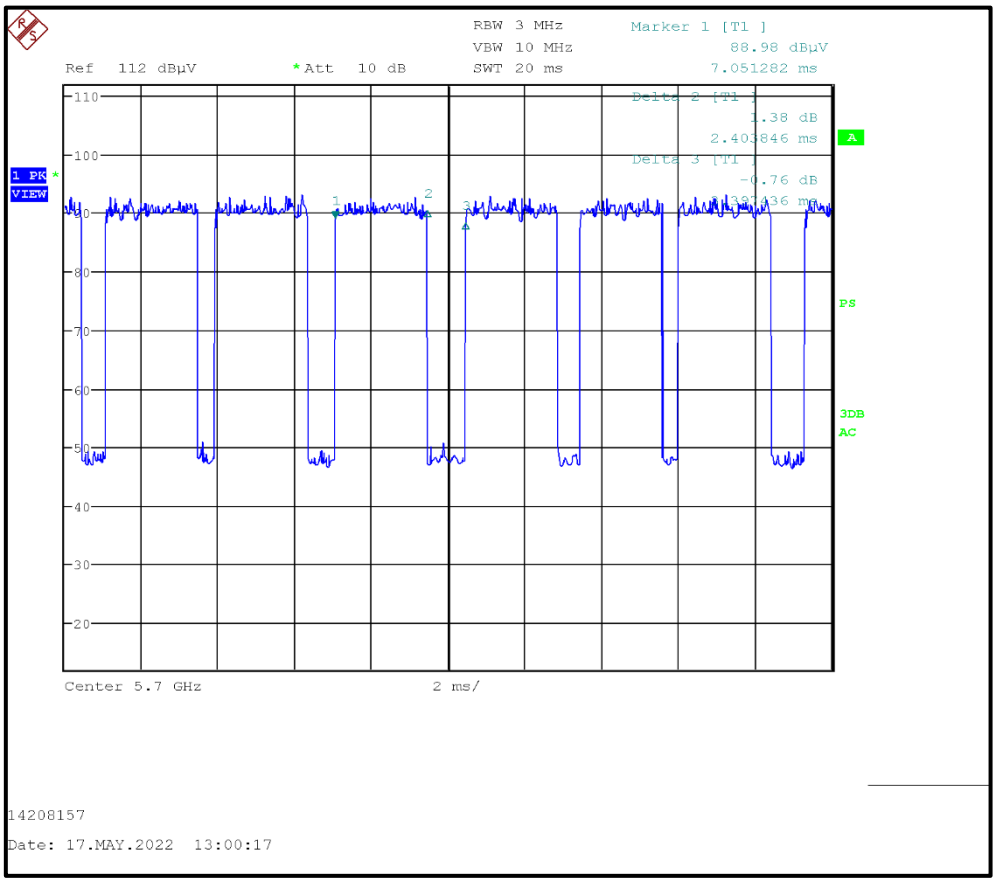


Result: Pass

Transmitter Duty Cycle (continued)

Results: UNII-1 / 802.11ac / PWR35 / MCS0

Pulse On Time (T_{ON}) (ms)	Pulse Period (T_{ON} +T_{OFF}) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
2.404	3.397	70.77	1.50



Result: Pass

Transmitter Out of Band Radiated Emissions

5.2.3. Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	16 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(1), (9) & 15.209(a)
Test Method Used:	FCC KDB 789033 II.G.1, II.G.2, II G.3 & II.G.4. & ANSI C63.10 Sections 6.3 and 6.4
Frequency Range:	9 kHz to 30 MHz

Environmental Conditions:

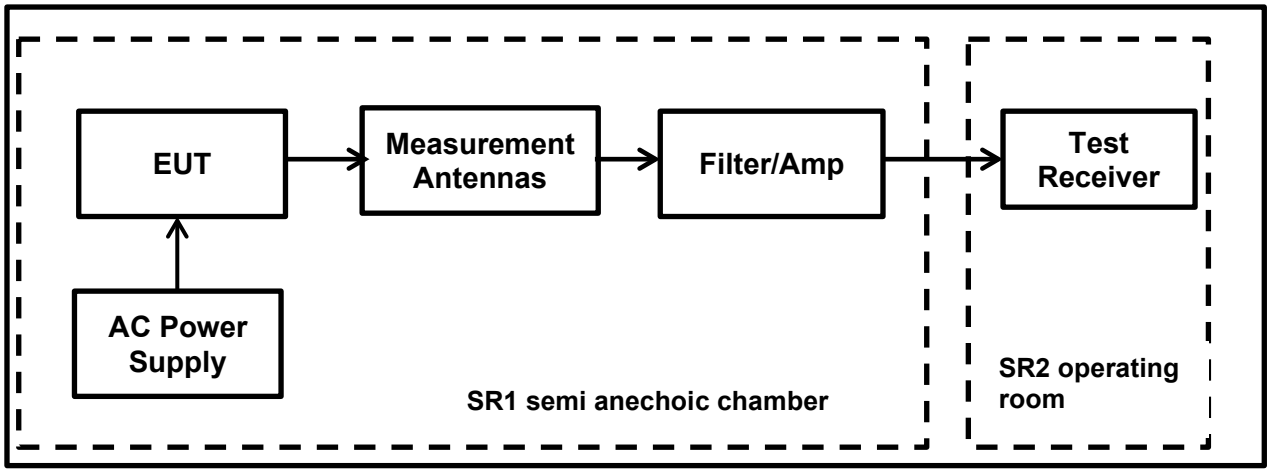
Temperature (°C):	25.1
Relative Humidity (%):	46.9

Note(s):

1. In accordance with FCC KDB 414788 D01 Radiated Test Site & ANSI C63.10 clause 5.2 an alternative test site that can demonstrate equivalence to a open area test site may be used. Therefore, the measurement was performed in a Semi Anechoic Chamber. (The OATS / SAC comparison data is available upon request).
2. The limits are specified at a test distances of 30 and 300 metres. However, as specified in FCC Section 15.31 (f)(2) & ANSI C63.10 clause 6.4.3, measurements may be performed at a closer distance and the measured level extrapolated to the specified measurement distance using the method described in clauses 6.4.4, specifically sub-clause 6.4.4.1 which specifies that the measured level shall be extrapolated to the specified distance by conservatively presuming that the field strength decays at 40 dB/decade.
3. Therefore, the limit values are extrapolated to a measurement distance of 3 m.
   - 9 kHz- 490 kHz: limits extrapolated from 300 m to 3 m by adding 80 dB at 40 dB/decade.
   - 490 kHz-1705 kHz: limits extrapolated from 30 m to 3 m by adding 40 dB /decade.
4. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(1) which states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
5. The preliminary scans showed similar emission levels below 30 MHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the middle channel only.
6. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
7. Measurements below 30 MHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The measurement loop antenna height was 80 cm.

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Test Setup:

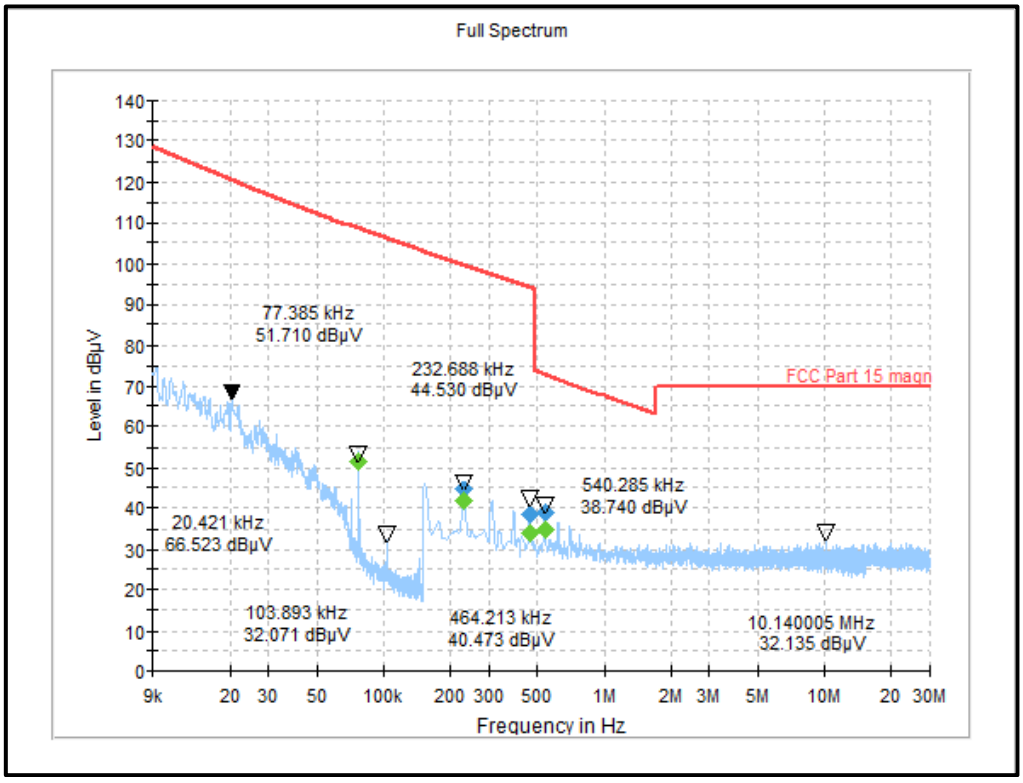


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
0.08	Horizontal	51.71	108.47	56.76	Complied
0.23	Vertical	44.53	99.47	54.94	Complied
0.46	Horizontal	38.45	94.25	55.80	Complied
0.54	Horizontal	38.74	72.89	34.15	Complied

Plot: 9 kHz – 30 MHz: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps



Result: Pass

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	16 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(1),(9) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3 & II .G.4 & ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

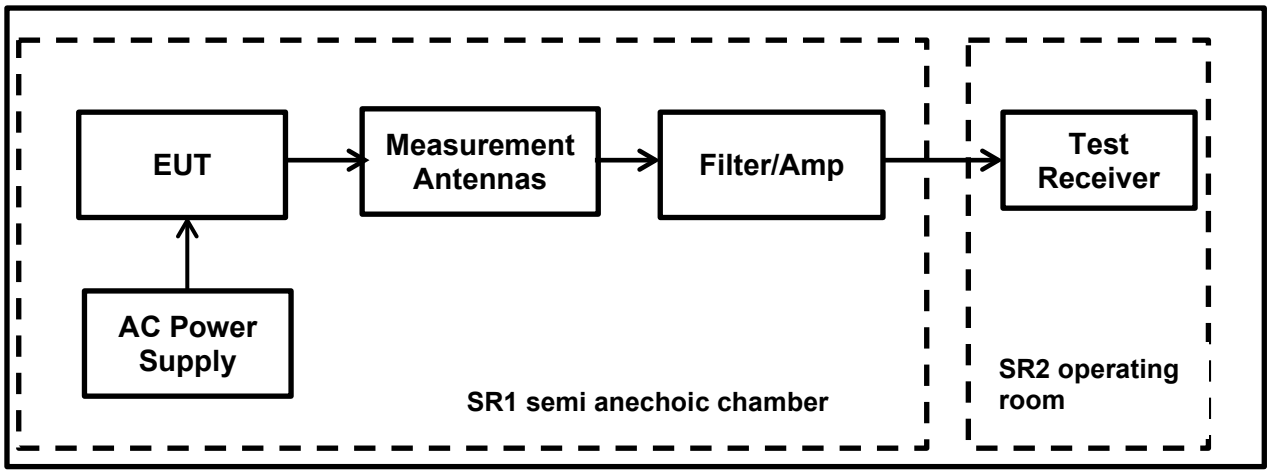
Temperature (°C):	24.4
Relative Humidity (%):	44.1

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the middle channel only.
2. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
3. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
4. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(1) which states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m.

Transmitter Out of Band Radiated Emissions (continued)

Test Setup:

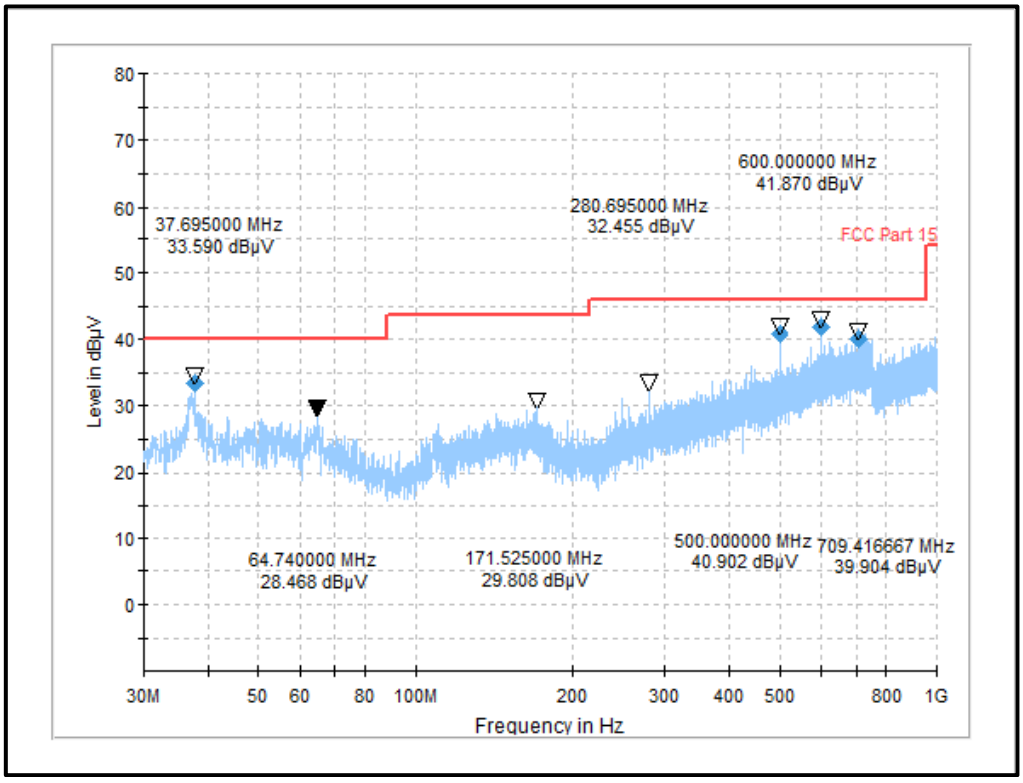


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
37.70	Vertical	33.59	40.00	6.41	Complied
500.00	Vertical	40.90	46.00	5.10	Complied
600.00	Vertical	41.87	46.00	4.13	Complied
709.42	Horizontal	39.90	46.00	6.10	Complied

Plot: 30 MHz – 1GHz: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps



Result: Pass

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	12 & 13 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(1),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

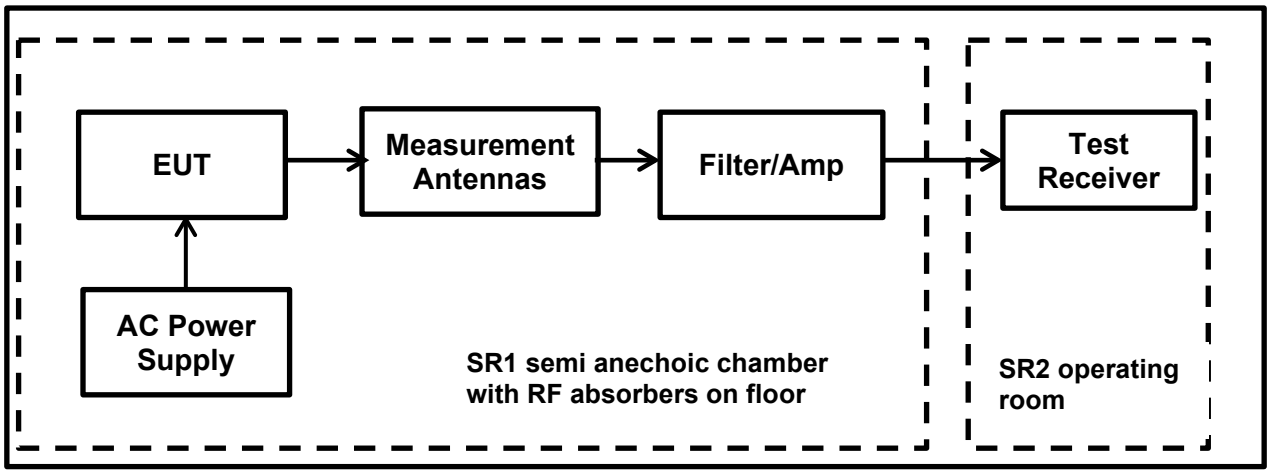
Temperature (°C):	24.6
Relative Humidity (%):	43.9

Note(s):

1. The emissions shown at frequencies approximately 5.15-5.25 GHz on the 1 GHz to 18 GHz plots are the EUT fundamental for the tested channel.
2. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(1) which states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz Part(b)(7) states the provisions of 15.205 apply, e.g., restricted bands of operation.
3. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
4. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
5. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. For unwanted emissions measured with Peak detector there are two limit possibilities:
   - According to FCC 15.209
     - peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
     - average limit (above 1 GHz) is 54 dBµV/m (restricted band limit)
   - According to FCC 15.407(b)(1) peak limit is 68.2 dBµV/m (non-restricted band limit)
7. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector & lowest average limit (above 1 GHz) is 54 dBµV/m (restricted band limit) has been applied.
8. * In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.

Transmitter Out of Band Radiated Emissions Test setup

Test Setup:

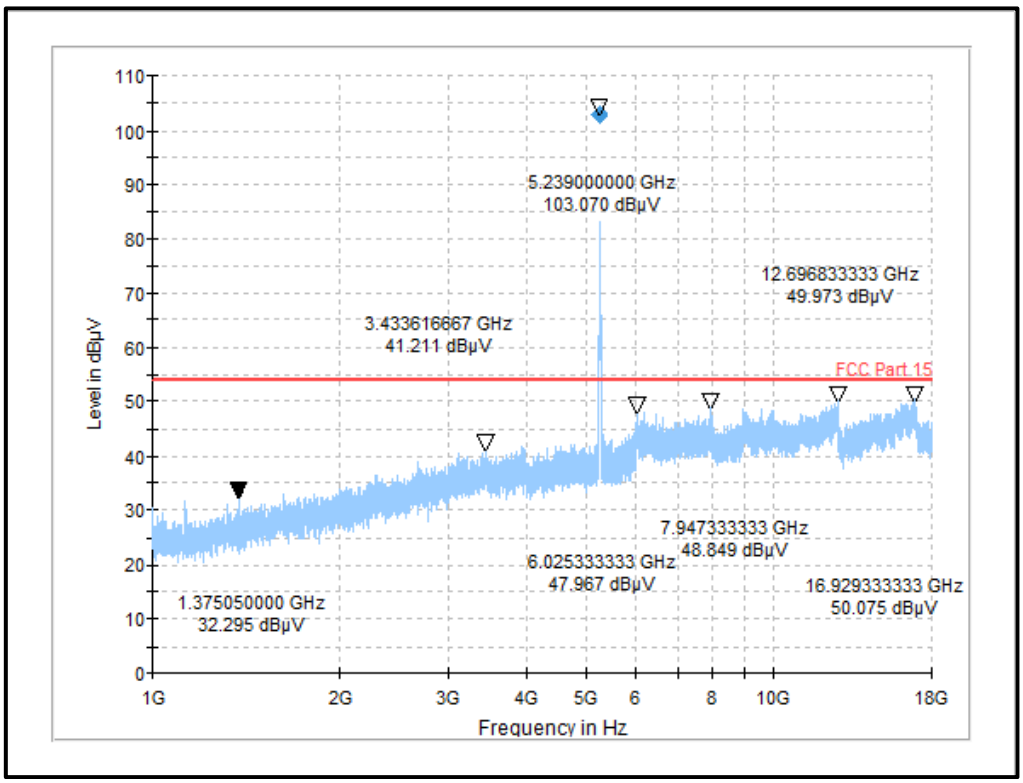


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
No spurious emissions were found					

Plot: 1 GHz – 18 GHz: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps



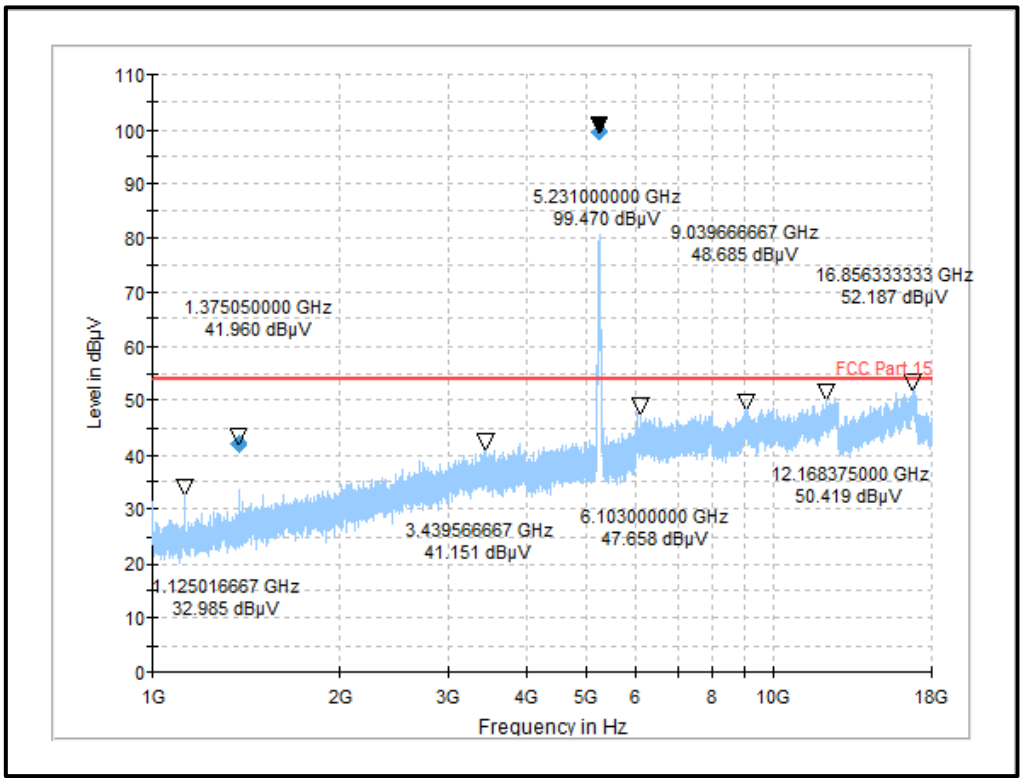
Result: Pass

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11ac / 40 MHz / PWR 35 / Top Channel / MCS0

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1375.05	Horizontal	41.96	54.00	12.04	Complied

Plot: 1 GHz – 18 GHz: UNII-1 / 802.11ac / 40 MHz / PWR 35 / Top Channel / MCS0



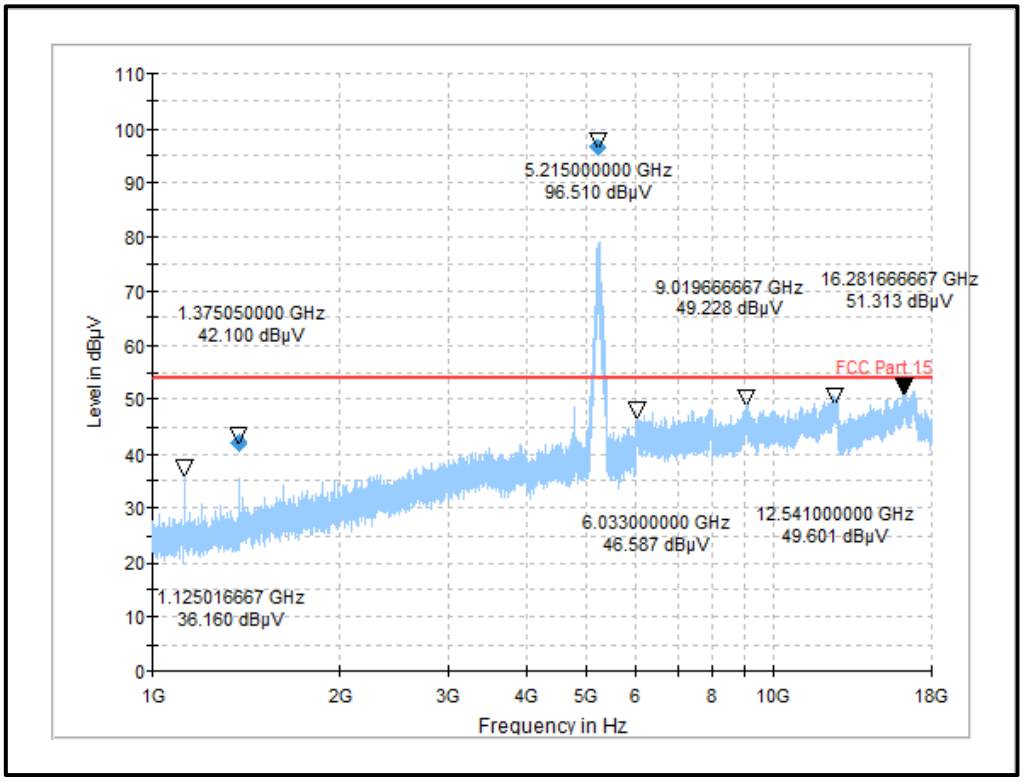
Result: Pass

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11ac / 80 MHz / PWR30 / Single Channel / MCS0

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1375.05	Horizontal	42.10	54.00	11.90	Complied

Plot: 1 GHz – 18 GHz: UNII-1 / 802.11ac / 80 MHz / PWR30 / Single Channel / MCS0



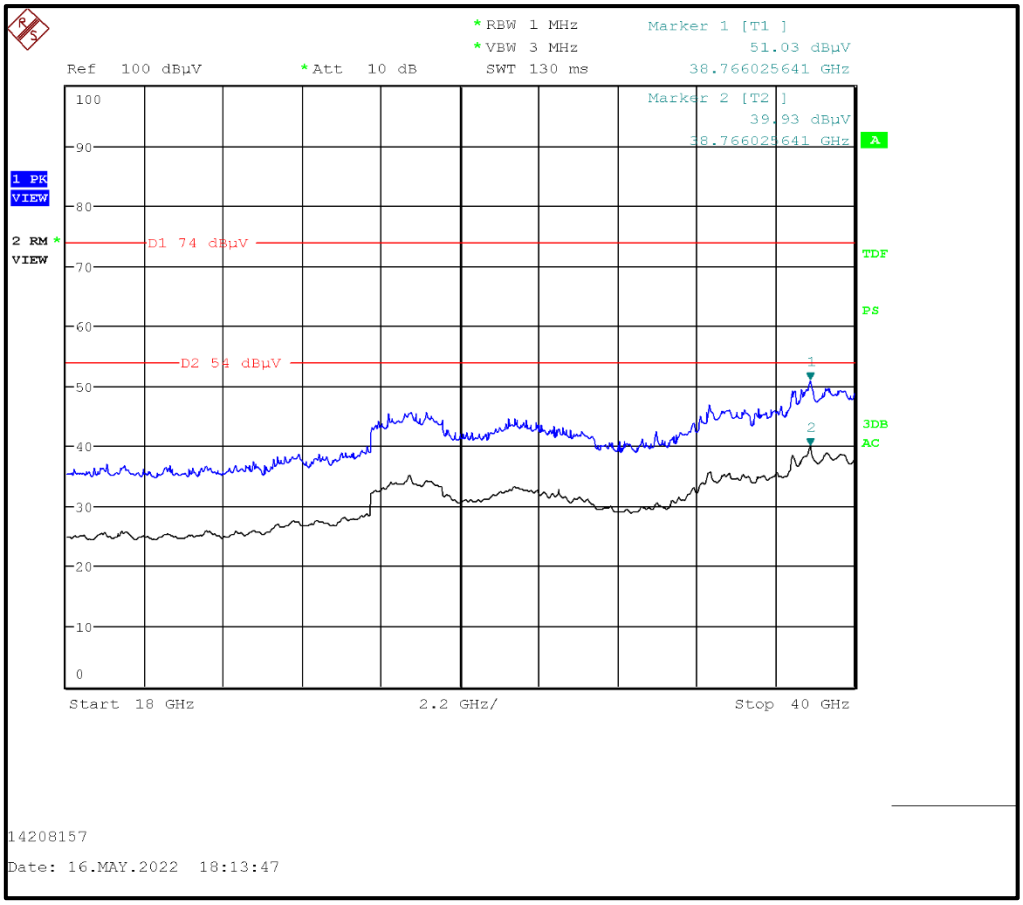
Result: Pass

Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
No spurious emissions were found					

Plot: 18 GHz – 40 GHz: UNII-1 / 802.11a / 20 MHz / PWR 35 / Top Channel / 6 Mbps



Result: Pass

5.2.4. Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	16 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(2),(9) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3 & II .G.4. & ANSI C63.10 Sections 6.3 and 6.4
Frequency Range:	9 kHz to 30 MHz

Environmental Conditions:

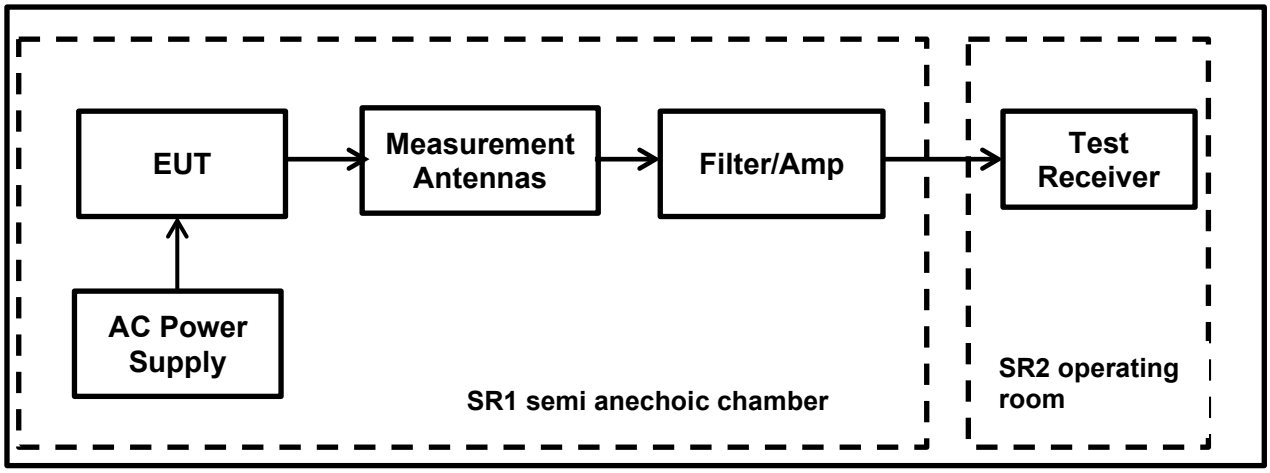
Temperature (°C):	25.1
Relative Humidity (%):	46.9

Note(s):

1. In accordance with FCC KDB 414788 D01 Radiated Test Site & ANSI C63.10 clause 5.2 an alternative test site that can demonstrate equivalence to a open area test site may be used. Therefore, the measurement was performed in a Semi Anechoic Chamber. (The OATS / SAC comparison data is available upon request).
2. The limits are specified at a test distances of 30 and 300 metres. However, as specified in FCC Section 15.31 (f)(2) & ANSI C63.10 clause 6.4.3, measurements may be performed at a closer distance and the measured level extrapolated to the specified measurement distance using the method described in clauses 6.4.4, specifically sub-clause 6.4.4.1 which specifies that the measured level shall be extrapolated to the specified distance by conservatively presuming that the field strength decays at 40 dB/decade.
3. Therefore, the limit values are extrapolated to a measurement distance of 3 m.
4. 9 kHz- 490 kHz: limits extrapolated from 300 m to 3 m by adding 80 dB at 40 dB/decade.
5. 490 kHz-1705 kHz: limits extrapolated from 30 m to 3 m by adding 40 dB /decade.
6. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(2) which states for transmitters operating in the band 5.25 to 5.35 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
7. The preliminary scans showed similar emission levels below 30 MHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the bottom channel only.
8. All emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient.
9. Measurements below 30 MHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. The measurement loop antenna height was 80 cm.

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Test Setup:

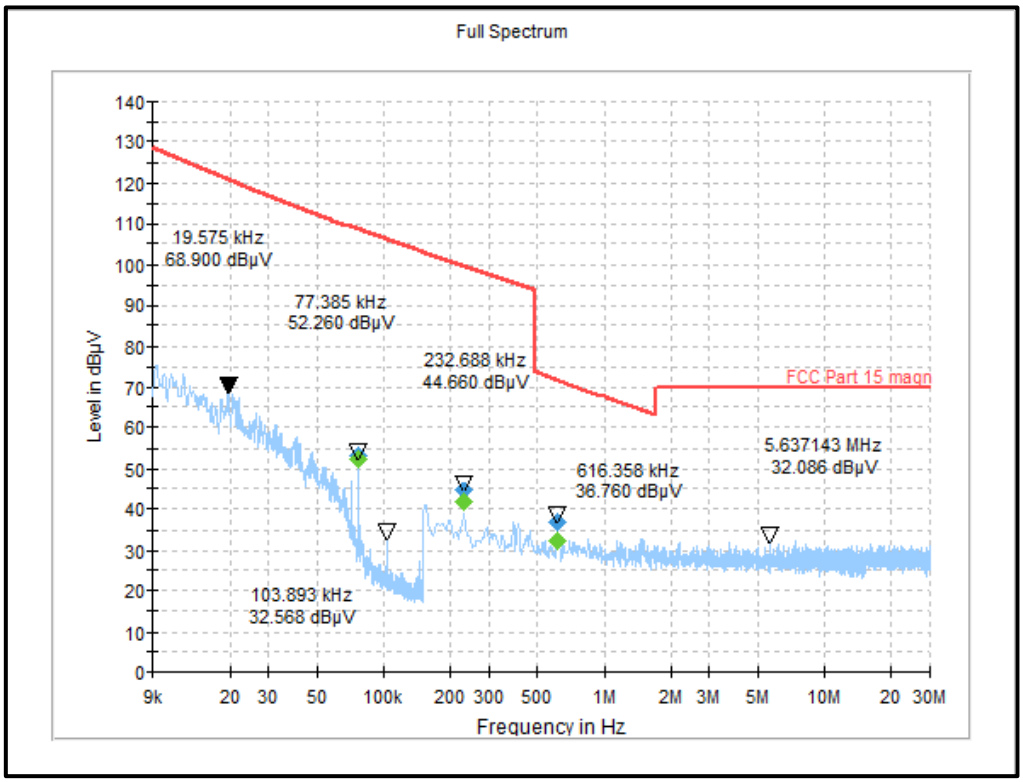


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
0.08	Horizontal	53.31	108.47	55.16	Complied
0.23	Vertical	44.66	99.47	54.81	Complied
0.62	Horizontal	36.76	71.68	34.92	Complied

Plot: 9 kHz – 30 MHz: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	16 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(2),(9) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3 & II .G.4 & ANSI C63.10 Sections 6.3 and 6.5
Frequency Range:	30 MHz to 1 GHz

Environmental Conditions:

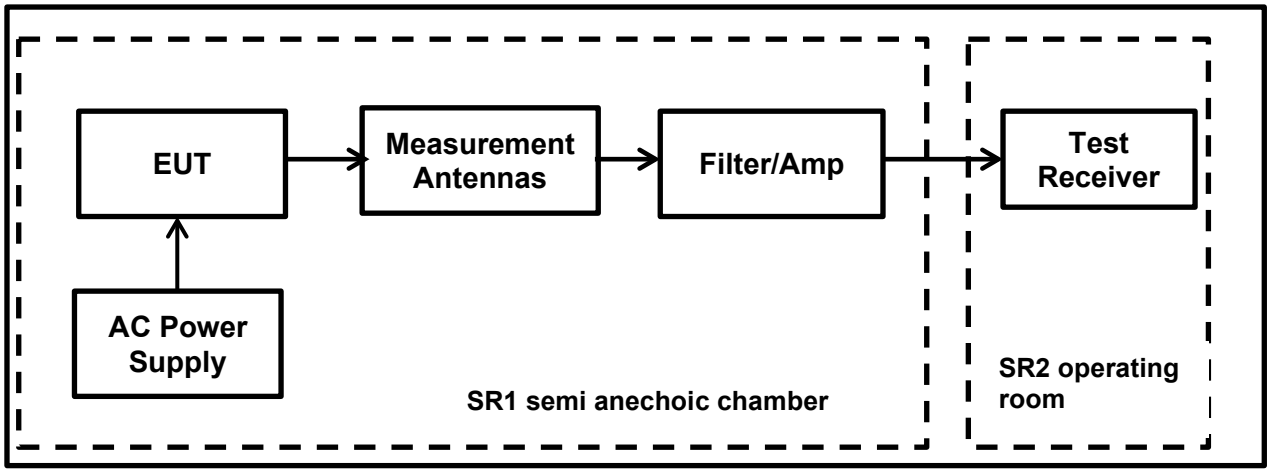
Temperature (°C):	24.4
Relative Humidity (%):	44.1

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the middle channel only.
2. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
3. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
4. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(2) which states for transmitters operating in the band 5.15 to 5.25 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m.

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Test Setup:

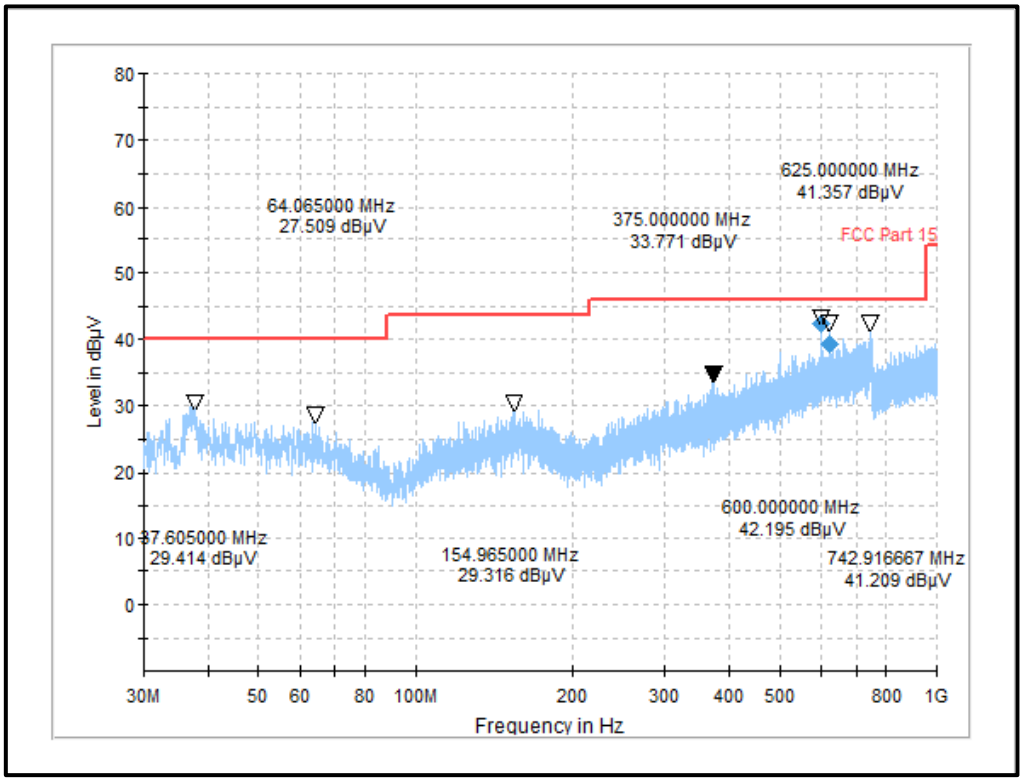


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
600.00	Horizontal	42.20	46.00	3.81	Complied
625.04	Horizontal	39.19	46.00	6.81	Complied

Plot: 30 MHz – 1 GHz: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Dates:**	12 & 13 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(2),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	24.6 & 24.5
Relative Humidity (%):	43.9 & 49.4

Note(s):

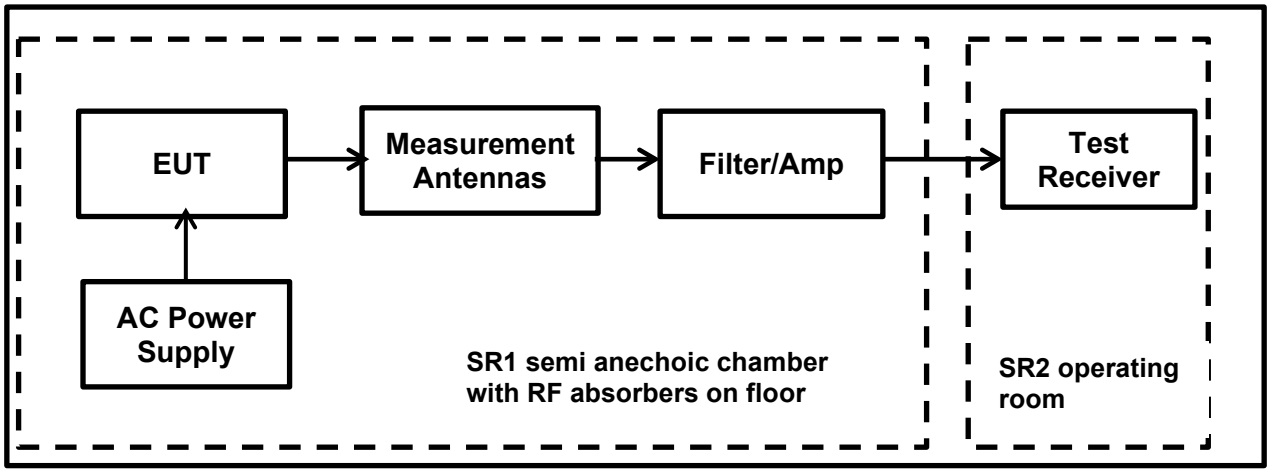
1. The emissions shown at frequencies approximately 5.25-5.35 GHz on the 1 GHz to 18 GHz plots are the EUT fundamental for the tested channel.
2. The preliminary scans showed similar emission levels above 1 GHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the bottom channel only.
3. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(2) which states for transmitters operating in the band 5.25 to 5.35 GHz: all emissions outside of the band 5.15-5.35 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
5. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
6. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. For unwanted emissions measured with Peak detector there are two limit possibilities:

- According to FCC 15.209
    - peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
    - average limit (above 1 GHz) is 54 dBµV/m (restricted band limit)
- According to FCC 15.407(b)(2) peak limit is 68.2 dBµV/m (non-restricted band limit)

8. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector & lowest average limit (above 1 GHz) is 54 dBµV/m (restricted band limit) has been applied.
9. * In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Test Setup:

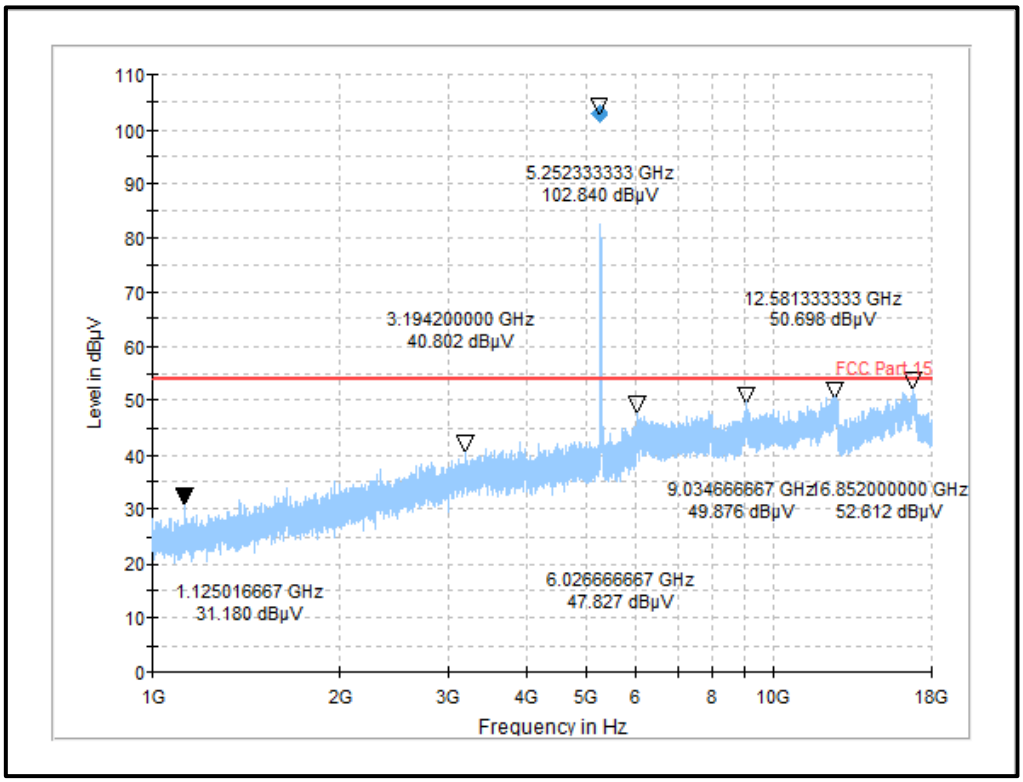


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
No spurious emissions were found					

Plot: 1 GHz – 18 GHz: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

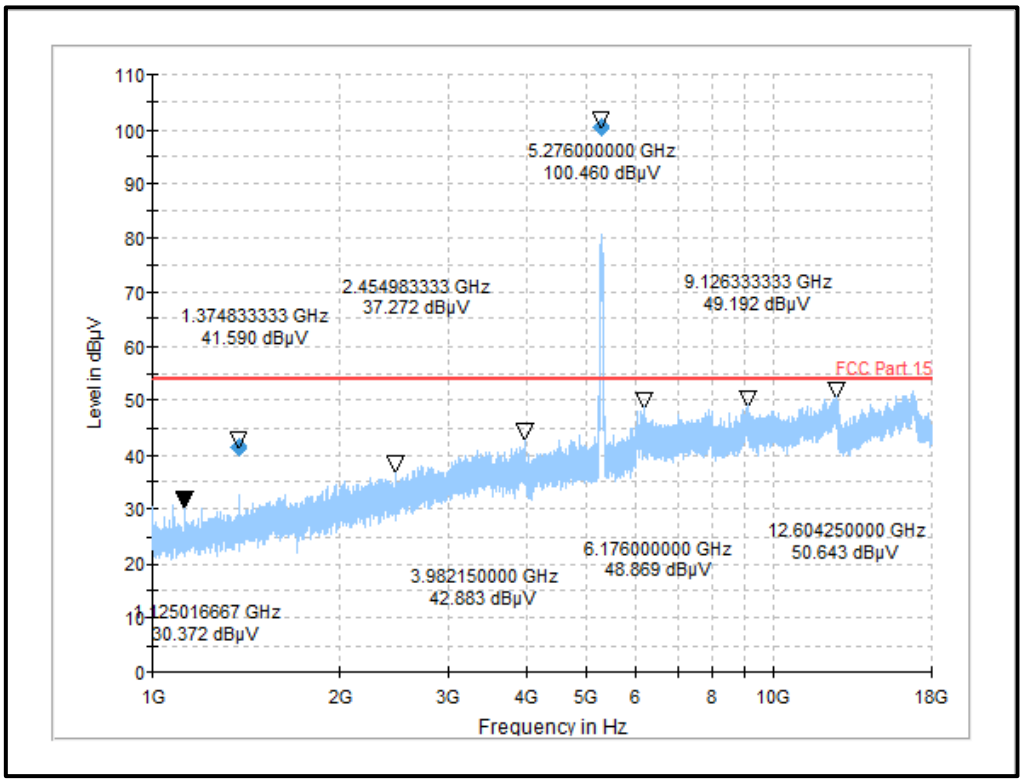
Result: Pass

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 40 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1374.83	Horizontal	41.59	54.00	12.41	Complied

Plot: 1 GHz – 18 GHz: UNII-2A / 802.11ac / 40 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

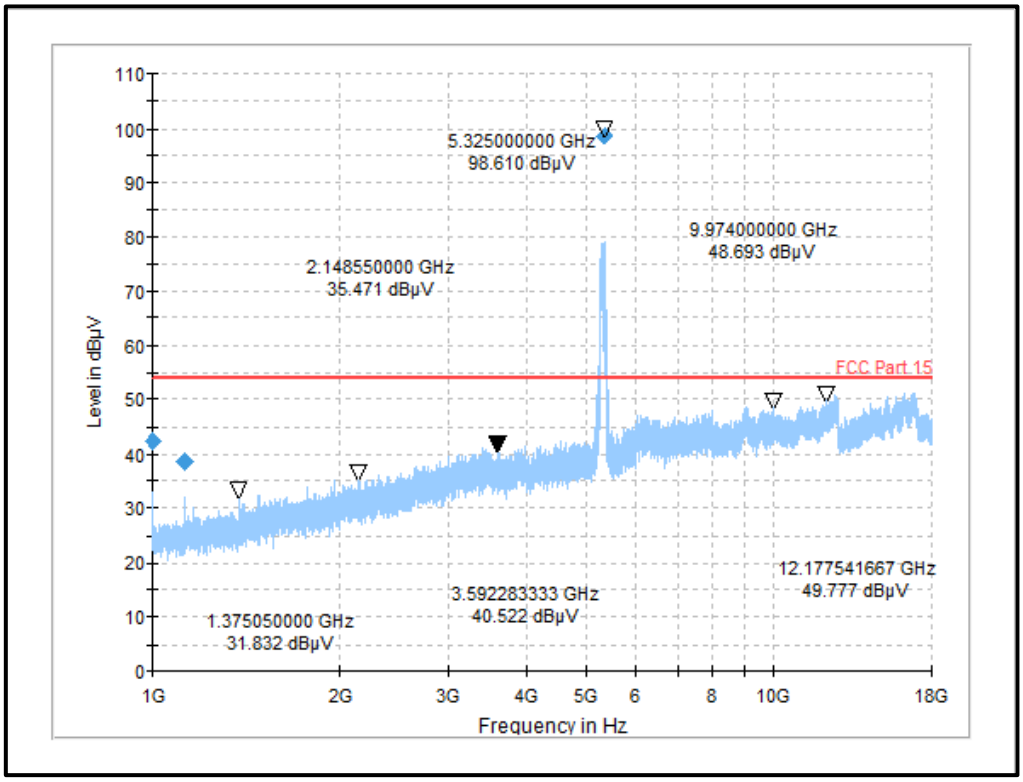
Result: Pass

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 80 MHz / MCS0 / PWR 35 / Single Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1000.00	Vertical	42.46	54.00	11.54	Complied
1125.02	Vertical	38.69	54.00	15.31	Complied

Plot: 1 GHz – 18 GHz: UNII-2A / 802.11ac / 80 MHz / MCS0 / PWR 35 / Single Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

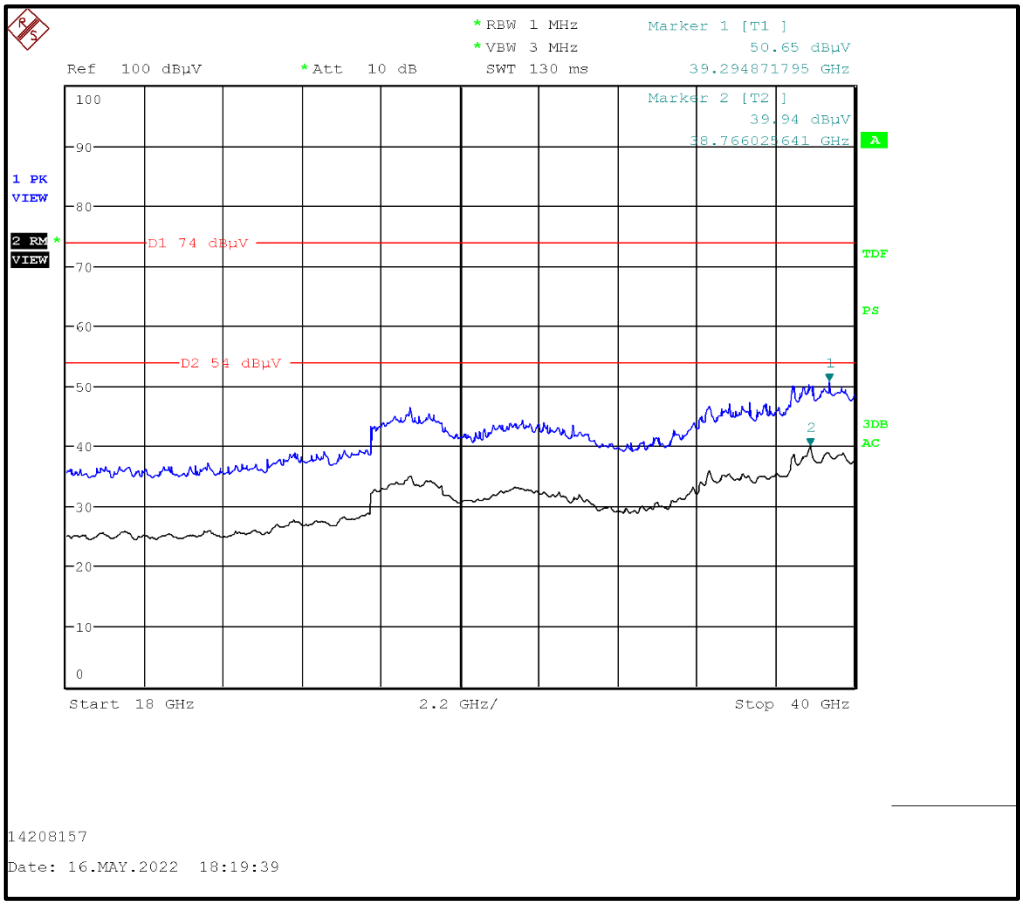
Result: Pass

Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
No spurious emissions were found					

Plot: 18 GHz – 40 GHz: UNII-2A / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

5.2.5. Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Dates:**	12 & 13 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(3),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	24.6 & 24.5
Relative Humidity (%):	43.9 & 49.4

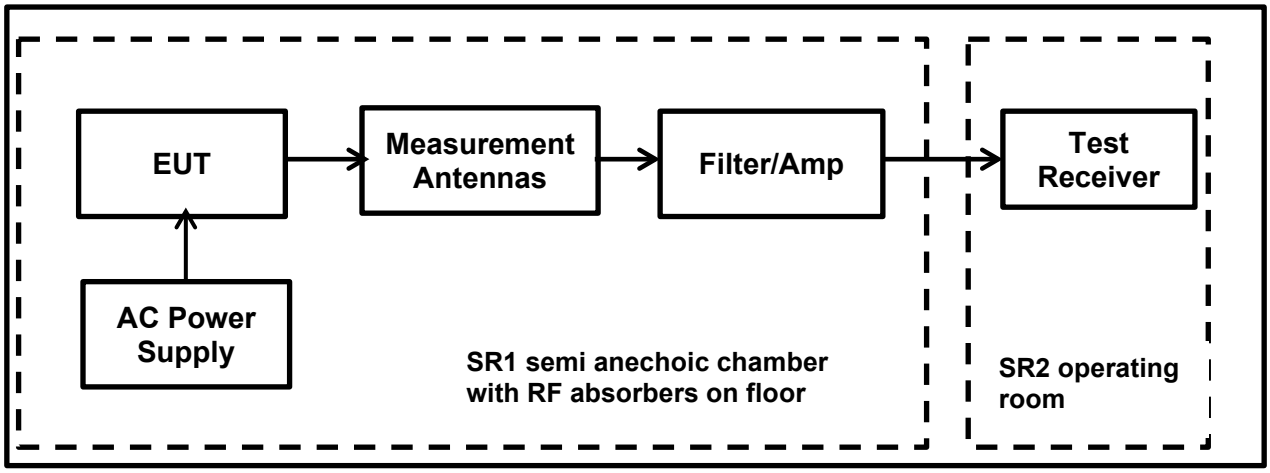
Note(s):

1. The emissions shown at frequencies approximately 5.47-5.725 GHz on the 1 GHz to 18 GHz plots are the EUT fundamental for the tested channel.
2. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(3) which states for transmitters operating in the band 5.47 to 5.725 GHz: all emissions outside of the band 5.47-5.725 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. The preliminary scans showed similar emission levels above 1 GHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the middle channel only.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
5. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
6. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. For unwanted emissions measured with Peak detector there are two limit possibilities:
   - According to FCC 15.209
     - peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
     - average limit (above 1 GHz) is 54 dBµV/m (restricted band limit)
   - According to FCC 15.407(b)(3) peak limit is 68.2 dBµV/m (non-restricted band limit)
8. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector & lowest average limit (above 1 GHz) is 54 dBµV/m (restricted band limit) has been applied.

* In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Test Setup:

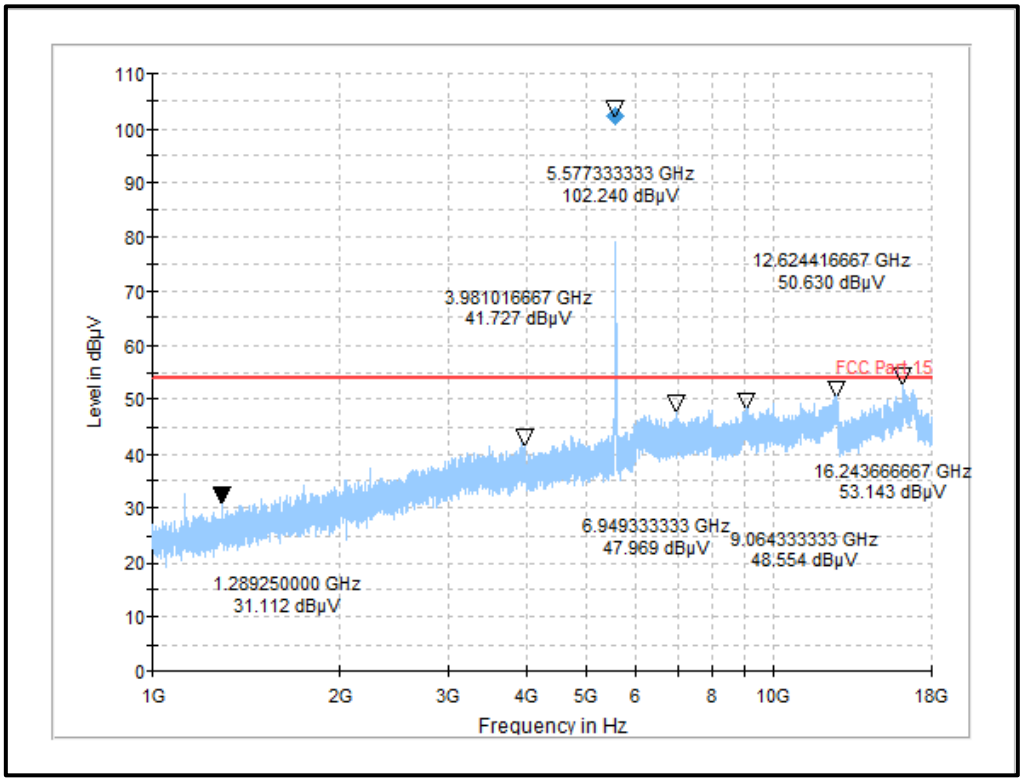


Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: UNII-2C / 802.11ac / 20 MHz / MCS0 / PWR 35 / Middle Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
No spurious emissions were found					

Plot: 1 GHz – 18 GHz: UNII-2C / 802.11ac / 20 MHz / MCS0 / PWR 35 / Middle Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

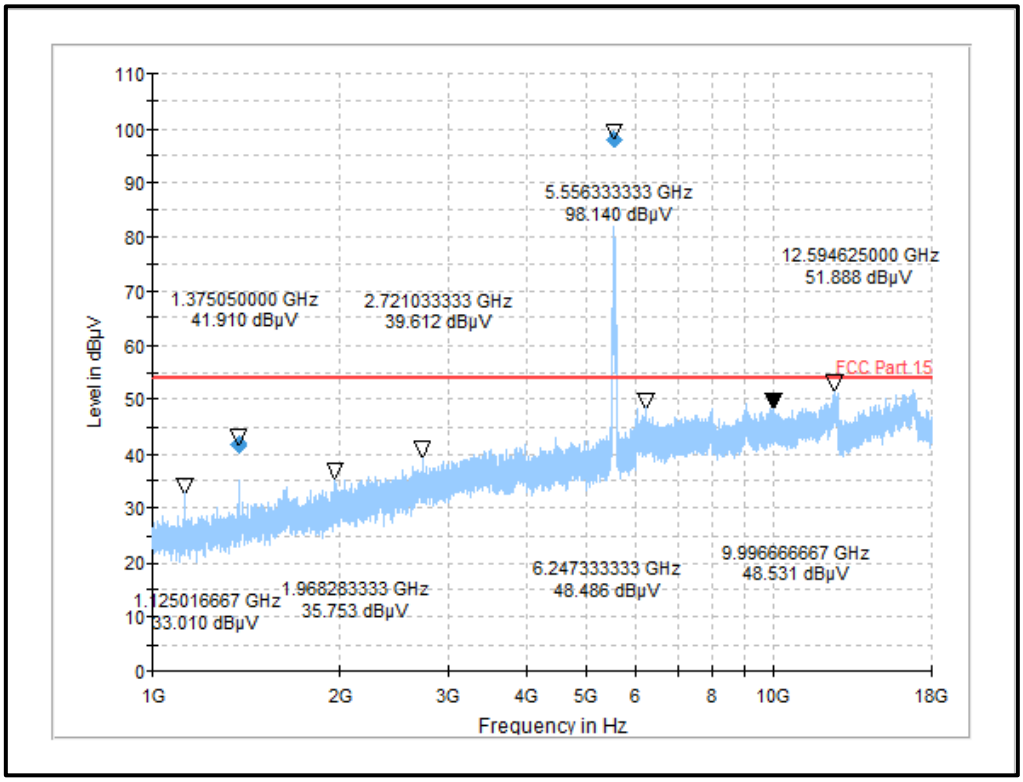
Result: Pass

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: UNII-2C / 802.11ac / 40 MHz / MCS0 / PWR 35 / Middle Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1375.05	Horizontal	41.91	54.00	12.09	Complied

Plot: 1 GHz – 18 GHz: UNII-2C / 802.11ac / 40 MHz / MCS0 / PWR 35 / Middle Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

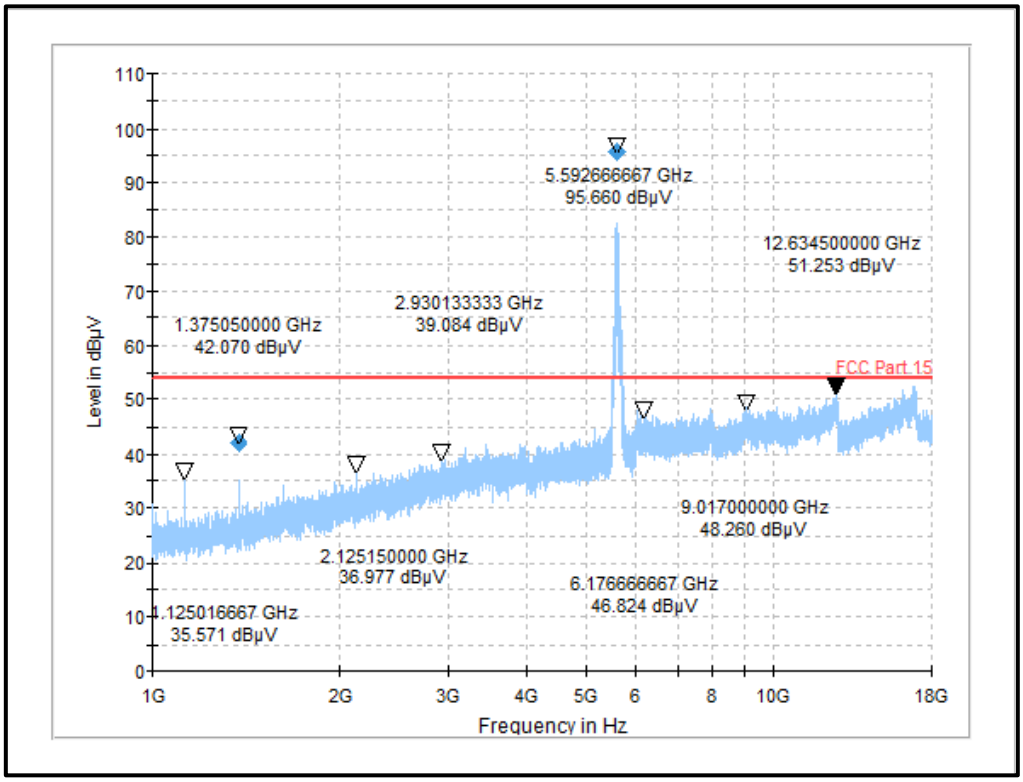
Result: Pass

Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: UNII-2C / 802.11ac / 80 MHz / MCS0 / PWR 35 / Middle Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1375.05	Horizontal	42.07	54.00	11.93	Complied

Plot: 1 GHz – 18 GHz: UNII-2C / 802.11ac / 80 MHz / MCS0 / PWR 35 / Middle Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

5.2.6. Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Dates:**	13 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(4),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6
Frequency Range:	1 GHz to 40 GHz

Environmental Conditions:

Temperature (°C):	24.5
Relative Humidity (%):	49.4

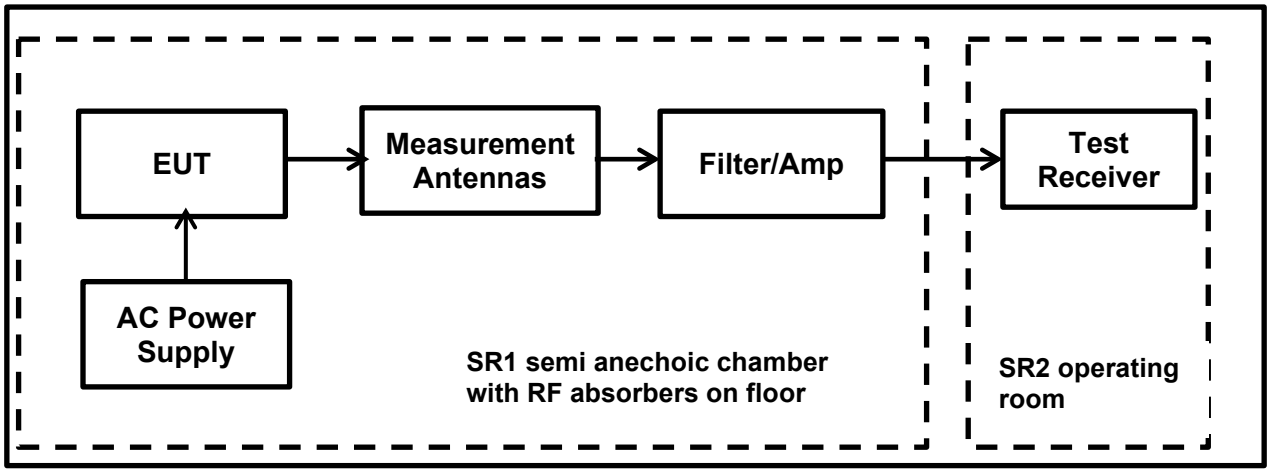
Note(s):

1. The emissions shown at frequencies approximately 5.725-5.85 GHz on the 1 GHz to 18 GHz plots are the EUT fundamental for the tested channel.
2. Pre-scans with the EUT transmitting were measured according to FCC Part 15.407(b)(4) which states for transmitters operating in the band 5.725 to 5.85 GHz: all emissions outside of the band 5.725 to 5.85 GHz band shall not exceed -27 dBm/MHz. Part(b)(7) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. The preliminary scans showed similar emission levels above 1 GHz, for each channel of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the middle channel only.
4. The final measured value, for the given emission in the field strength result tables, incorporates the calibrated antenna factor and cable loss.
5. All other emissions shown on the pre-scan plots were found to be below the measurement system noise floor or ambient, therefore the highest peak noise floor reading of the measuring receiver was recorded in the table below.
6. Pre-scans above 1 GHz were performed in a fully anechoic chamber (Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 1.5 m above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
7. For unwanted emissions measured with Peak detector there are two limit possibilities:
   - According to FCC 15.209
     - peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
     - average limit (above 1 GHz) is 54 dBµV/m (restricted band limit)
   - According to FCC 15.407(b)(3) peak limit is 68.2 dBµV/m (non-restricted band limit)
8. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector & lowest average limit (above 1 GHz) is 54 dBµV/m (restricted band limit) has been applied.

* In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.

Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)

Test Setup:

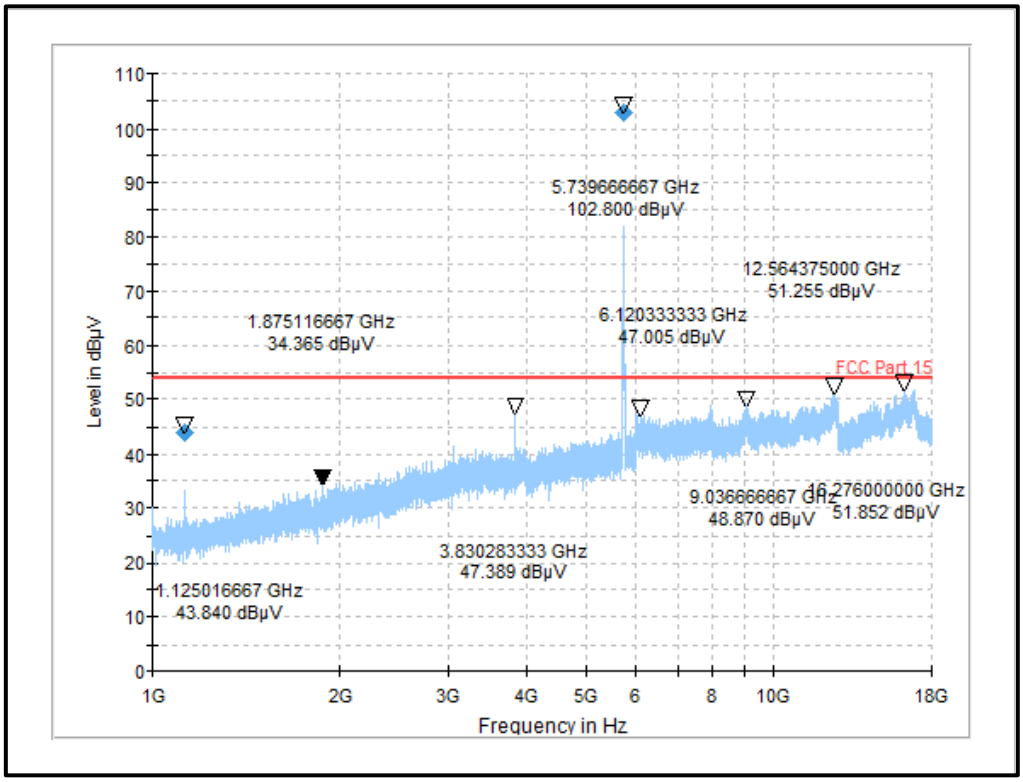


Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)

Results: UNII-3 / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1125.016667	Horizontal	43.84	54.00	10.16	Complied

Plot: 1 GHz – 18 GHz: UNII-3 / 802.11ac / 20 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

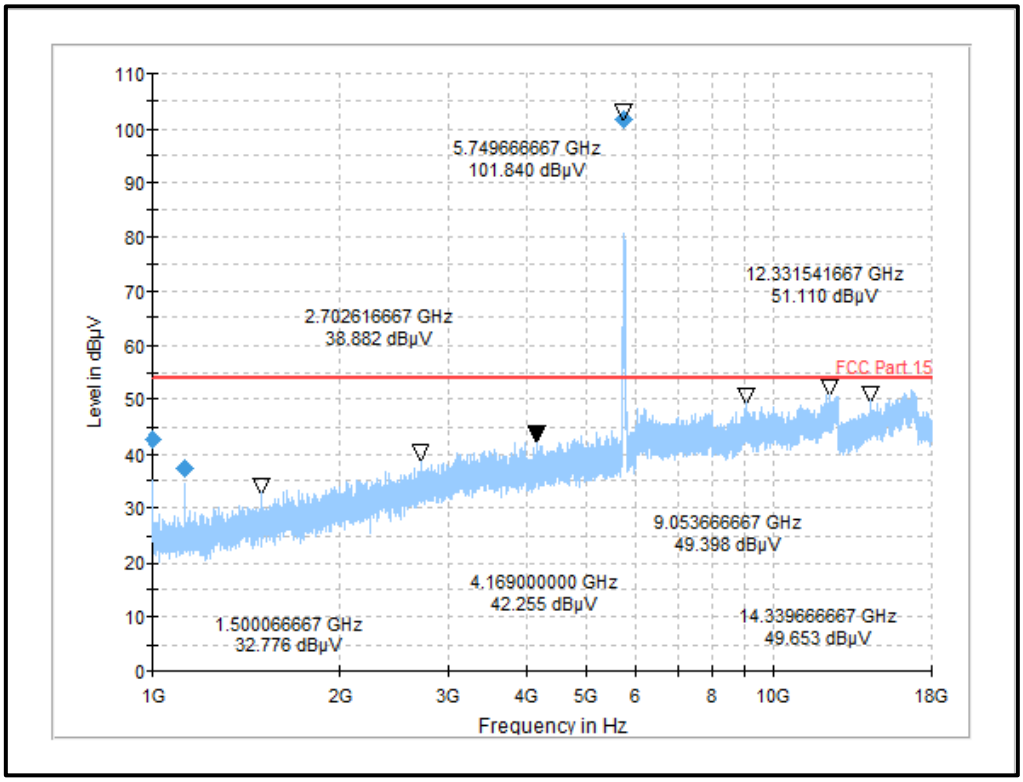
Result: Pass

Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)

Results: UNII-3 / 802.11ac / 40 MHz / MCS0 / PWR 35 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1000.00	Vertical	42.77	54.00	11.23	Complied
1125.02	Vertical	37.41	54.00	16.59	Complied

Plot: 1 GHz – 18 GHz: UNII-3 / 802.11ac / 40 MHz / MCS0 / PWR 35 / Bottom Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

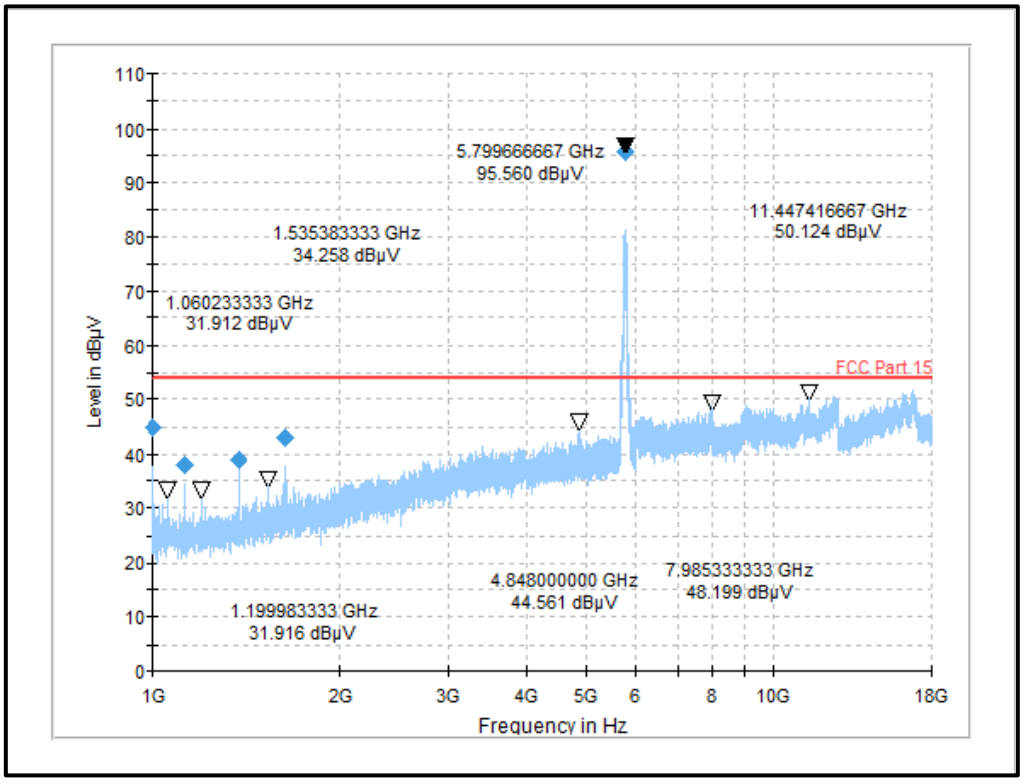
Result: Pass

Transmitter Out of Band Radiated Emissions (5.725-5.85 GHz band operation) (continued)

Results: UNII-3 / 802.11ac / 80 MHz / MCS0 / PWR 35 / Single Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit* (dBµV/m)	Margin (dB)	Result
1000.00	Vertical	44.88	54.00	9.12	Complied
1125.02	Vertical	38.12	54.00	15.88	Complied
1375.05	Vertical	38.92	54.00	15.08	Complied
1635.48	Vertical	42.99	54.00	11.01	Complied

Plot: 1 GHz – 18 GHz: UNII-3 / 802.11ac / 80 MHz / MCS0 / PWR 35 / Single Channel



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Result: Pass

Transmitter Band Edge Radiated Emissions

5.2.7. Transmitter Band Edge Radiated Emissions(5.15-5.25 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	17 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(1),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6

Environmental Conditions:

Temperature (°C):	24.5
Relative Humidity (%):	49.4

Note(s):

1. According to FCC KDB 789033 D02 Section II.G.5 & II.G.6 Transmitter Band Edge Radiated Emissions were performed.
2. The test receiver was set to RBW: 1 MHZ | VBW: 3 MHz | Sweep time: Auto | Trace mode: max hold | Span: large enough to capture unwanted band edge emissions with trace stabilizations.
3. In accordance with KDB 789033 Section II.D.v), Method AD (vi), the average measurements were performed using an increased number of sweeps A value of 300 was used for all measurements as this number ensured that the requirement Sweep ≥ 2 × Span / RBW is met.
4. Transmitter Band Edge Radiated Emissions were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorbers on the ground at a distance of 3 meters. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna with tilting function enabled over the range 1 meter to 4 meters above the test chamber floor, in line with the EUT.
5. The maximum emissions around band edges were searched & are indicated with a marker placed on them. For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply.
6. As all radiated band edge measurements have been performed with R.B.W. 1 MHz; the limits in dBm / MHz can be converted to dBµV/m by adding a conversion factor of 95.2 (in accordance with KDB 789033 G.2.d)(iii)).
7. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz.
8. In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.
9. For unwanted emissions measured with Peak detector there are two limit possibilities:

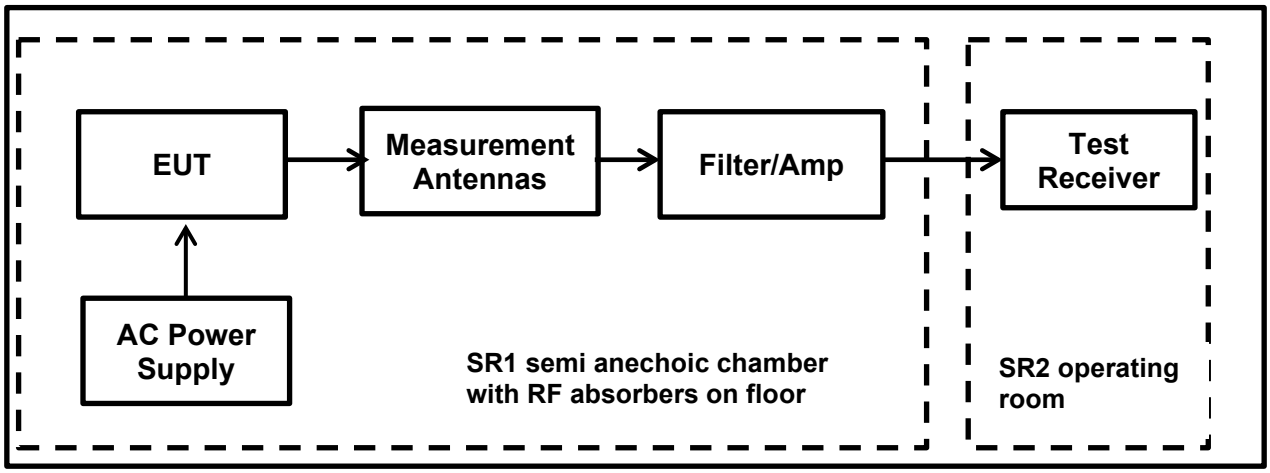
- According to FCC 15.209 peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
- According to FCC 15.407(b)(1) peak limit is 68.2 dBµV/m (non-restricted band limit)

10. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector lowest limit 68.2 dBµV/m has been applied.

Transmitter Band Edge Radiated Emissions(5.15-5.25 GHz band operation) (continued)
Note(s) (continued):

11. In accordance with ANSI C63.10 Section 12.7.7.2 Method AD g), for average measurements, data rates where the EUT was transmitting < 98% duty cycle, the duty cycle correction factor calculated in section 5.2.3 was added to the measured result.
12. **Therefore, Duty Cycle Correction factor of 0.81 and 1.5 dB was added to all average measurements, to compute the corrected average values of the emissions that would have been measured had the test been performed at 100% Duty Cycle.

Test Setup:



Results: UNII-1 / SISO / 802.11a / 20 MHz / 6 Mbps

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5149.42	58.67	68.20	9.53	Complied
5150.00	60.28	68.20	7.92	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5148.46	45.38	0.81	46.19	54.00	7.81	Complied
5150.00	45.40	0.81	46.21	54.00	7.79	Complied

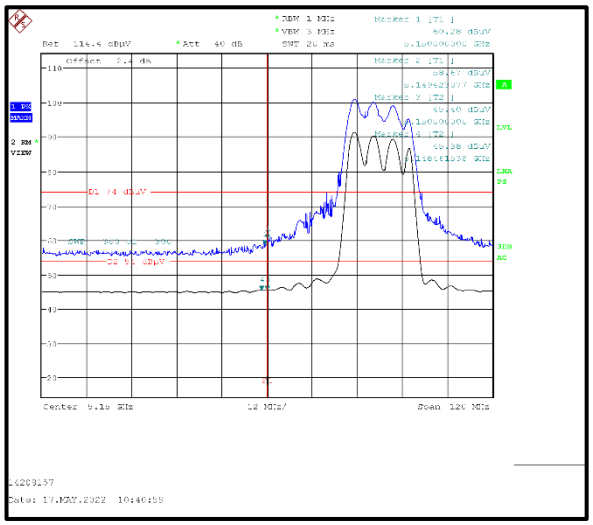
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5350.00	52.53	68.20	15.67	Complied
5367.88	54.25	68.20	13.95	Complied

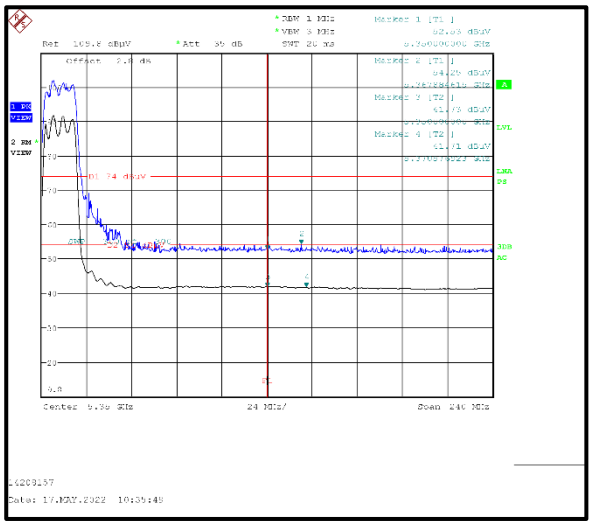
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	41.73	0.81	42.54	54.00	11.46	Complied
5370.58	41.71	0.81	42.52	54.00	11.48	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

Results: UNII-1 / MIMO / 802.11ac / 20 MHz / MCS0

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5147.31	64.14	68.20	4.06	Complied
5150.00	61.70	68.20	6.5	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5148.08	46.12	1.50	47.62	54.00	6.38	Complied
5150.00	46.54	1.50	48.04	54.00	5.96	Complied

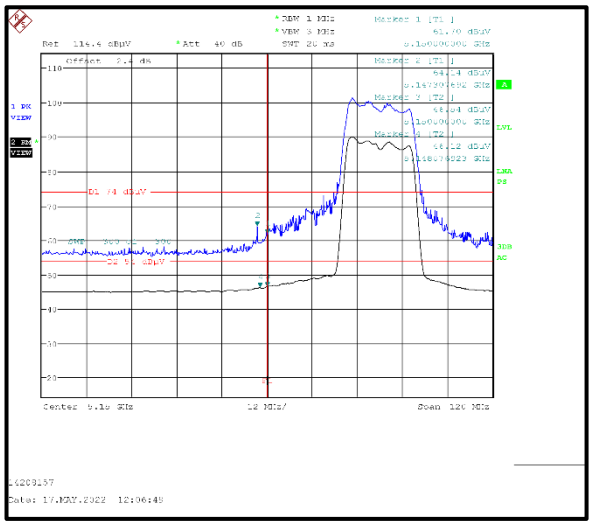
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5350.00	55.74	68.20	12.46	Complied
5367.88	57.19	68.20	11.01	Complied

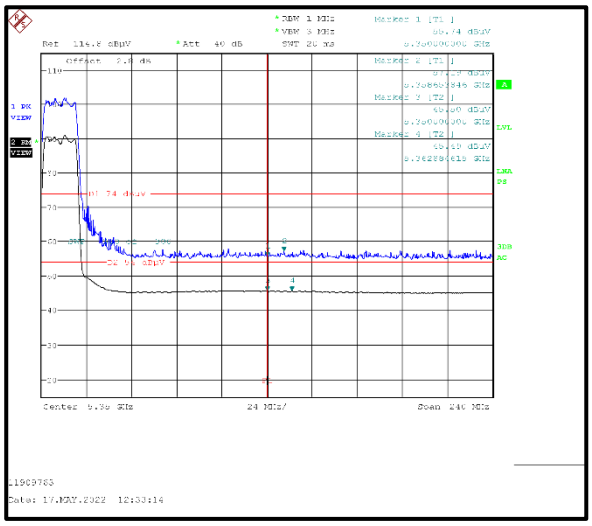
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	45.50	1.50	47	54.00	7	Complied
5370.58	45.49	1.50	46.99	54.00	7.01	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

5.2.8. Transmitter Band Edge Radiated Emissions (5.25-5.35 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	17 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(2),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6

Environmental Conditions:

Temperature (°C):	23.2
Relative Humidity (%):	48

Note(s):

1. According to FCC KDB 789033 D02 Section II.G.5 & II.G.6 Transmitter Band Edge Radiated Emissions were performed.
2. The test receiver was set to RBW: 1 MHZ | VBW: 3 MHz | Sweep time: Auto | Trace mode: max hold | Span: large enough to capture unwanted band edge emissions with trace stabilizations.
3. In accordance with KDB 789033 Section II.D.v), Method AD (vi), the average measurements were performed using an increased number of sweeps A value of 300 was used for all measurements as this number ensured that the requirement Sweep ≥ 2 × Span / RBW is met.
4. Transmitter Band Edge Radiated Emissions were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorbers on the ground at a distance of 3 meters. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna with tilting function enabled over the range 1 meter to 4 meters above the test chamber floor, in line with the EUT.
5. The maximum emissions around band edges were searched & are indicated with a marker placed on them. For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also above the upper band edge at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply. Tests were performed in these restricted bands of operation with the EUT transmitting on the bottom and top channels within 5.25-5.35 GHz band, the results are included in the transmitter 5.25-5.35 GHz band radiated spurious emissions section of this test report.
6. As all radiated band edge measurements have been performed with R.B.W. 1 MHz; the limits in dBm / MHz can be converted to dBµV/m by adding a conversion factor of 95.2 (in accordance with KDB 789033 G.2.d)(iii)).
7. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.15 GHz and above 5.35 GHz.
8. In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.
9. For unwanted emissions measured with Peak detector there are two limit possibilities:

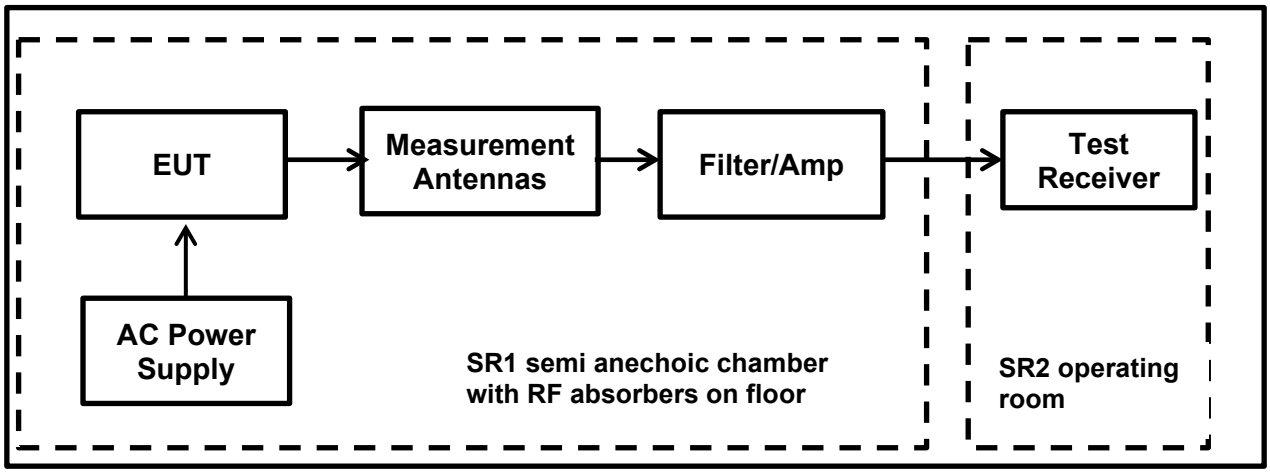
- According to FCC 15.209 peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
- According to FCC 15.407(b)(2) peak limit is 68.2 dBµV/m (non-restricted band limit)

10. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector lowest limit 68.2 dBµV/m has been applied.

Transmitter Band Edge Radiated Emissions(5.25-5.35 GHz band operation) (continued)
Note(s) (continued):

11. In accordance with ANSI C63.10 Section 12.7.7.2 Method AD g), for average measurements, data rates where the EUT was transmitting < 98% duty cycle, the duty cycle correction factor calculated in section 5.2.3 was added to the measured result.
12. **Therefore, Duty Cycle Correction factor of 0.81 and 1.5 dB was added to all average measurements, to compute the corrected average values of the emissions that would have been measured had the test been performed at 100% Duty Cycle.

Test Setup:



Results: UNII-2A / SISO / 802.11a / 20 MHz / 6 Mbps

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5071.73	57.72	68.20	10.48	Complied
5150.00	56.24	68.20	11.96	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5145.00	45.29	0.81	46.1	54.00	7.9	Complied
5150.00	45.26	0.81	46.07	54.00	7.93	Complied

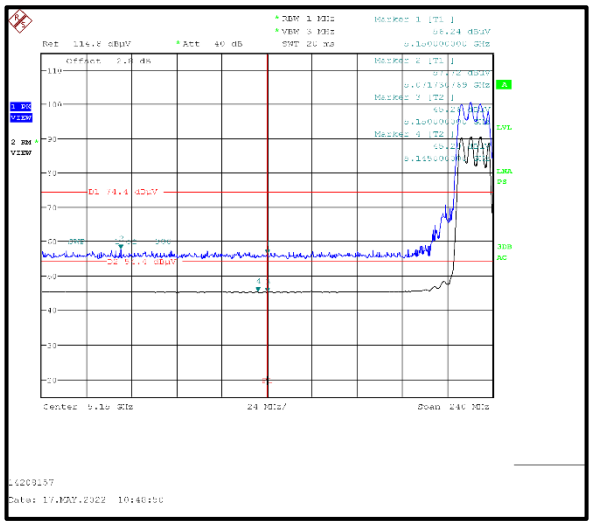
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5350.00	56.59	68.20	11.61	Complied
5350.96	60.11	68.20	8.09	Complied

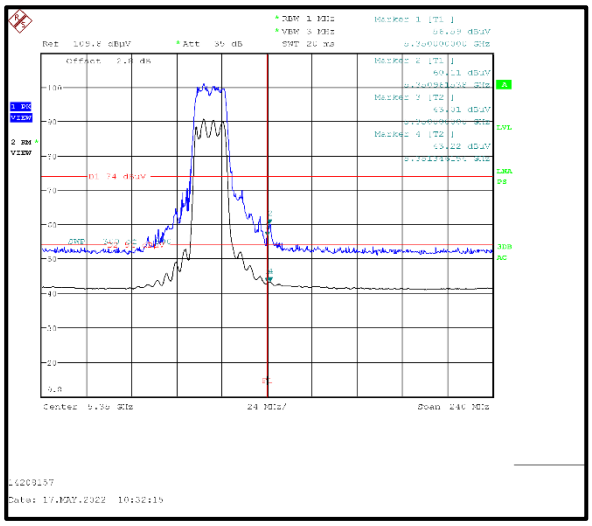
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	43.01	0.81	43.82	54.00	10.18	Complied
5351.35	43.22	0.81	44.03	54.00	9.97	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

Results: UNII-2A / MIMO / 802.11ac / 20 MHz / MCS0

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5111.92	58.21	68.20	9.99	Complied
5150.00	56.18	68.20	12.02	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5145.00	45.27	1.50	46.77	54.00	7.23	Complied
5150.00	45.17	1.50	46.67	54.00	7.33	Complied

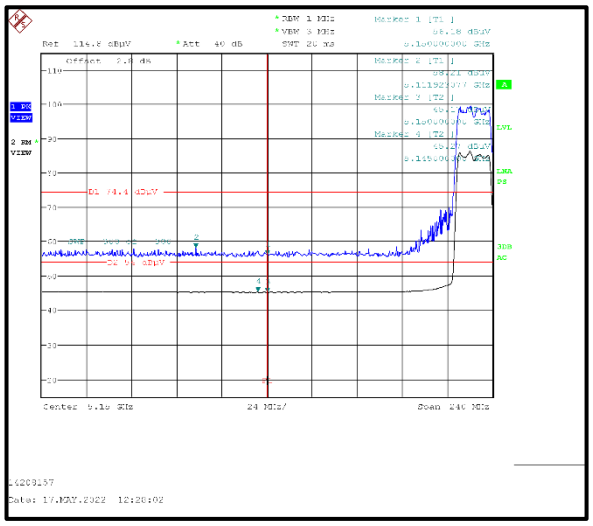
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5350.00	62.28	68.20	5.92	Complied
5350.96	60.18	68.20	8.02	Complied

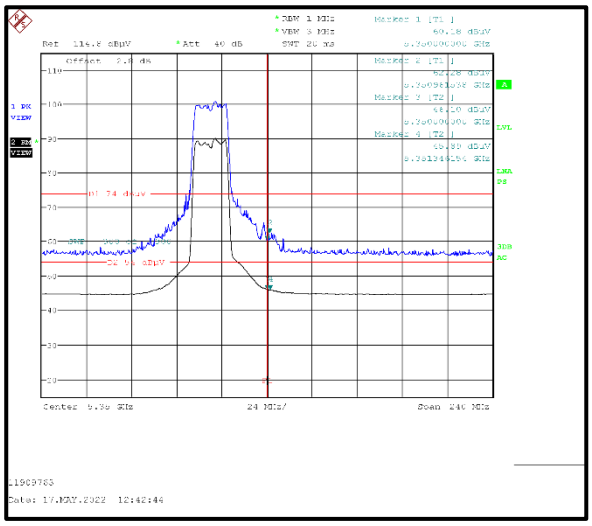
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	46.10	1.50	47.6	54.00	6.4	Complied
5351.35	45.89	1.50	47.39	54.00	6.61	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

5.2.9. Transmitter Band Edge Radiated Emissions (5.47-5.725 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	17 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(3),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6.

Environmental Conditions:

Temperature (°C):	23.2
Relative Humidity (%):	48

Note(s):

1. According to FCC KDB 789033 D02 Section II.G.5 & II.G.6 Transmitter Band Edge Radiated Emissions were performed.
2. The test receiver was set to RBW: 1 MHZ | VBW: 3 MHz | Sweep time: Auto | Trace mode: max hold | Span: large enough to capture unwanted band edge emissions with trace stabilizations.
3. In accordance with KDB 789033 Section II.D.v), Method AD (vi), the average measurements were performed using an increased number of sweeps A value of 300 was used for all measurements as this number ensured that the requirement Sweep ≥ 2 × Span / RBW is met.
4. Transmitter Band Edge Radiated Emissions were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorbers on the ground at a distance of 3 meters. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna with tilting function enabled over the range 1 meter to 4 meters above the test chamber floor, in line with the EUT.
5. The maximum emissions around band edges were searched & are indicated with a marker placed on them. For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply. Tests were performed in these restricted bands of operation with the EUT transmitting on the bottom and top channels within 5.47-5.725 GHz band, the results are included in the transmitter 5.25-5.35 GHz band radiated spurious emissions section of this test report.
6. As all radiated band edge measurements have been performed with R.B.W. 1 MHz; the limits in dBm / MHz can be converted to dBµV/m by adding a conversion factor of 95.2 (in accordance with KDB 789033 G.2.d)(iii)).
7. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.47 GHz and above 5.725 GHz.
8. In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.
9. For unwanted emissions measured with Peak detector there are two limit possibilities:

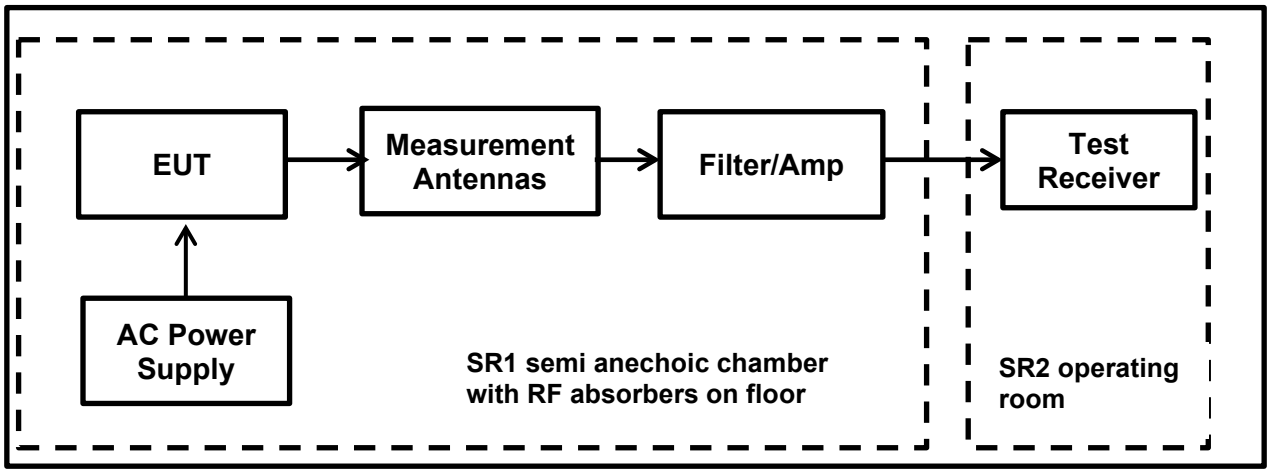
- According to FCC 15.209 peak limit (above 1 GHz) is 74 dBµV/m (restricted band limit)
- According to FCC 15.407(b)(3) peak limit is 68.2 dBµV/m (non-restricted band limit)

10. Therefore, unwanted emissions in restricted as well non restricted bands, measured with Peak detector lowest limit 68.2 dBµV/m has been applied.

Transmitter Band Edge Radiated Emissions(5.47-5.725 GHz band operation) (continued)
Note(s) (continued):

11. In accordance with ANSI C63.10 Section 12.7.7.2 Method AD g), for average measurements, data rates where the EUT was transmitting < 98% duty cycle, the duty cycle correction factor calculated in section 5.2.3 was added to the measured result.
12. **Therefore, Duty Cycle Correction factor of 0.81 and 1.5 dB was added to all average measurements, to compute the corrected average values of the emissions that would have been measured had the test been performed at 100% Duty Cycle.

Test Setup:



Results: UNII-2C / SISO / 802.11a / 20 MHz / 6 Mbps

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5463.08	59.49	68.20	8.71	Complied
5470.00	59.05	68.20	9.15	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5466.15	45.74	0.81	46.55	54.00	7.45	Complied
5470.00	46.08	0.81	46.89	54.00	7.11	Complied

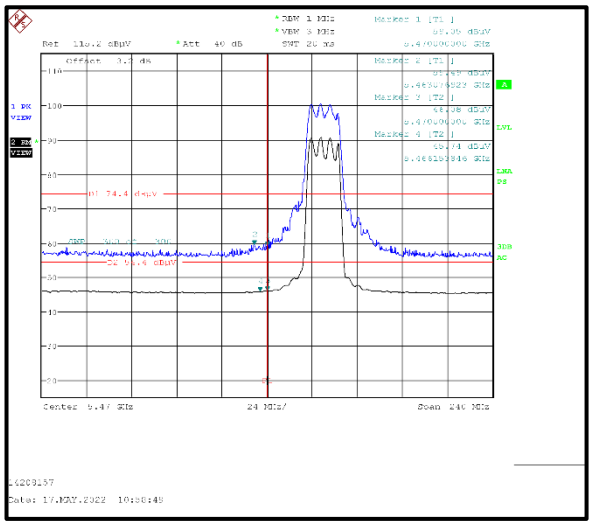
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5725.00	60.36	68.20	7.84	Complied
5726.15	64.07	68.20	4.13	Complied

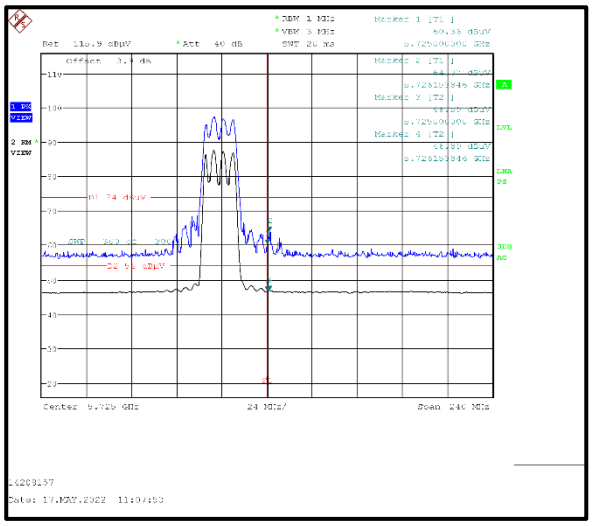
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5725.00	46.59	0.81	47.4	54.00	6.6	Complied
5726.15	46.89	0.81	47.7	54.00	6.3	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

Results: UNII-2C / MIMO / 802.11ac / 20 MHz / MCS0

Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5466.92	61.13	68.20	7.07	Complied
5470.00	59.42	68.20	8.78	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5465.38	45.94	1.50	47.44	54.00	6.56	Complied
5470.00	46.13	1.50	47.63	54.00	6.37	Complied

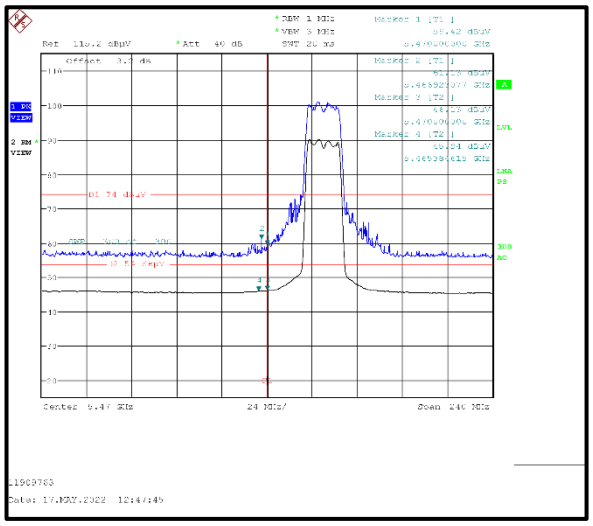
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5725.00	62.93	68.20	5.27	Complied
5725.88	63.95	68.20	4.25	Complied

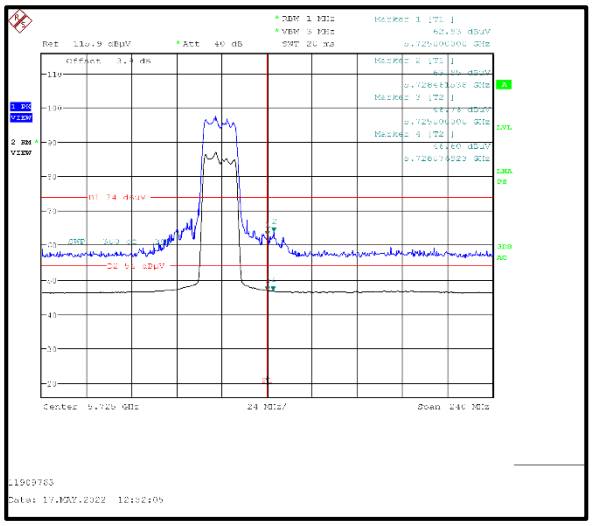
Results: Upper Band Edge / Average / Top Channel / PWR 35

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5725.00	46.76	1.50	48.26	54.00	5.74	Complied
5725.58	46.60	1.50	48.1	54.00	5.9	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

5.2.10. Transmitter Band Edge Radiated Emissions (5.725-5.85 GHz band operation)

Test Summary:

Test Engineer:	Muhammad Faiq Khan	**Test Date:**	17 May 2022
Test Sample Serial Number:	220405435 (RF Test Sample)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(4),(8) & 15.209(a)
Test Method Used:	FCC KDB 789033 II .G.1, II .G.2, II .G.3, II .G.5 &, II .G.6 ANSI C63.10:2013 Sections 6.3 and 6.6.

Environmental Conditions:

Temperature (°C):	23.2
Relative Humidity (%):	48

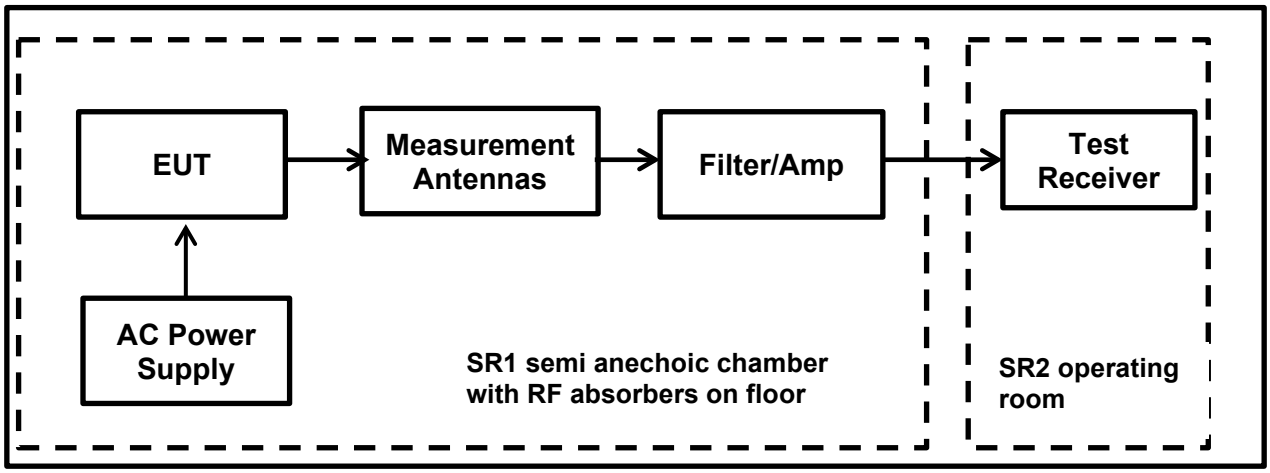
Note(s):

1. According to FCC KDB 789033 D02 Section II.G.5 & II.G.6 Transmitter Band Edge Radiated Emissions were performed.
2. The test receiver was set to RBW: 1 MHZ | VBW: 3 MHz | Sweep time: Auto | Trace mode: max hold | Span: large enough to capture unwanted band edge emissions with trace stabilizations.
3. In accordance with KDB 789033 Section II.D.v), Method AD (vi), the average measurements were performed using an increased number of sweeps A value of 300 was used for all measurements as this number ensured that the requirement Sweep ≥ 2 × Span / RBW is met.
4. Transmitter Band Edge Radiated Emissions were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorbers on the ground at a distance of 3 meters. The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material The EUT was a floor standing equipment which 120 cm height. EUT was placed in the centre of the chamber turntable on 30 cm non-conductive material. Maximum emission levels were determined by height searching the measurement antenna with tilting function enabled over the range 1 meter to 4 meters above the test chamber floor, in line with the EUT.
5. The maximum emissions around band edges were searched & are indicated with a marker placed on them. For transmitters operating in the 5. 725 -5.85 GHz band: all emissions outside of the 5. 725 - 5.85 GHz band shall not exceed an EIRP of -27 dBm/MHz. However, there are restricted bands of operation below the lower band edge at 4.5-5.15 GHz and also at 5.35-5.46 GHz therefore the provisions of FCC Part 15.205 apply. Tests were performed in these restricted bands of operation with the EUT transmitting on the bottom and top channels within 5.47-5.725 GHz band, the results are included in the transmitter 5.25-5.35 GHz band radiated spurious emissions section of this test report.
6. As all radiated band edge measurements have been performed with R.B.W. 1 MHz; the limits in dBm / MHz can be converted to dBµV/m by adding a conversion factor of 95.2 (in accordance with KDB 789033 G.2.d)(iii)).
7. Field strength measurements using peak and average detectors were performed in the restricted bands below 5.725 GHz and above 5.85 GHz.
8. In accordance with KDB 789033 Section II.G.1.c) If all peak measurements satisfy the average limit, then average measurements are not required.
9. For unwanted emissions measured with Peak detector, according to FCC 15.407(b)(4)(i) all emissions shall be limited to a level of −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.

Transmitter Band Edge Radiated Emissions(5.725-5.85 GHz band operation) (continued)
Note(s) (continued):

10. In accordance with ANSI C63.10 Section 12.7.7.2 Method AD g), for average measurements, data rates where the EUT was transmitting < 98% duty cycle, the duty cycle correction factor calculated in section 5.2.3 was added to the measured result.
11. **Therefore, Duty Cycle Correction factor of 0.81 and 1.5 dB was added to all average measurements, to compute the corrected average values of the emissions that would have been measured had the test been performed at 100% Duty Cycle.

Test Setup:



Results: UNII-3 / SISO / 802.11a / 20 MHz / 6 Mbps

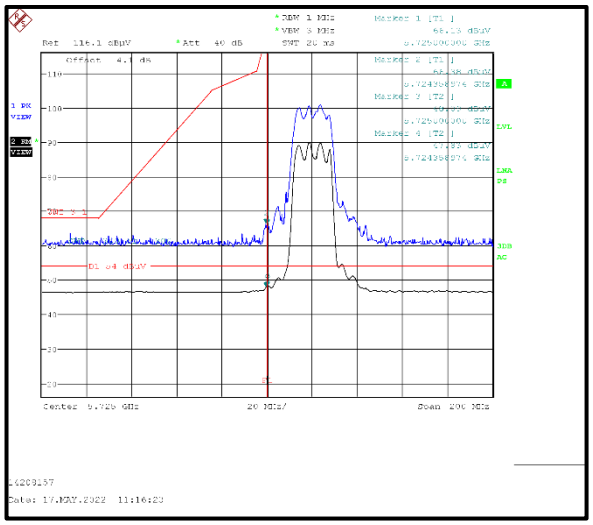
Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5724.36	66.38	120.77	54.39	Complied
5725.00	66.13	122.23	56.1	Complied

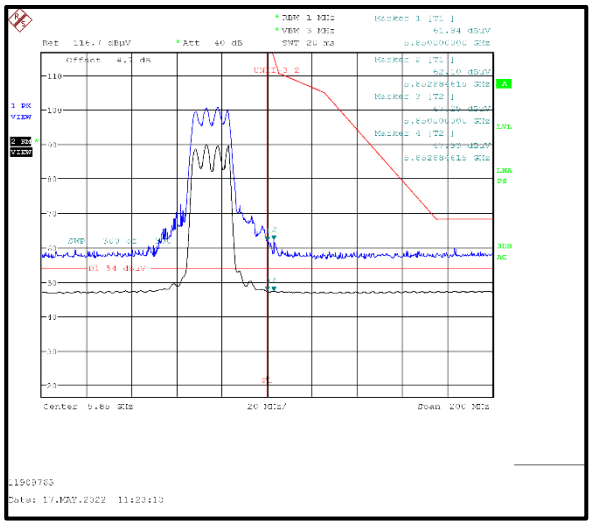
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5850.00	61.84	122.23	60.39	Complied
5852.88	62.10	115.66	53.56	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

Results: UNII-3 / MIMO / 802.11ac / 20 MHz / MCS0

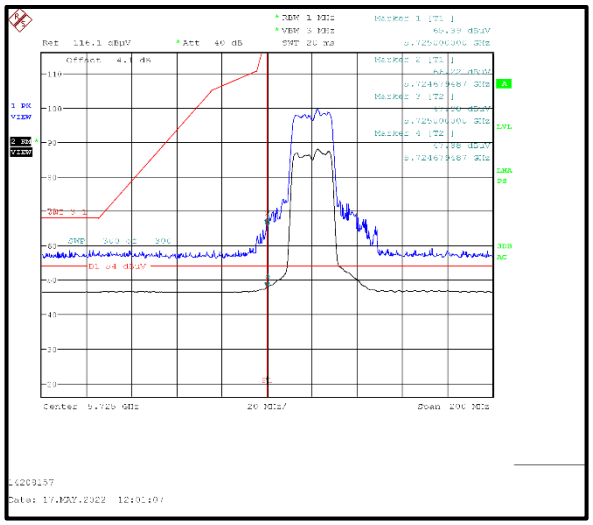
Results: Lower Band Edge / Peak / Bottom Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5724.68	66.22	116.94	50.72	Complied
5725.00	65.39	122.23	56.84	Complied

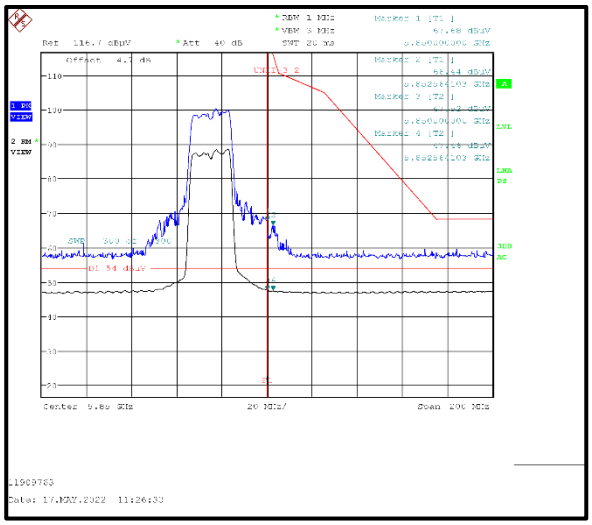
Results: Upper Band Edge / Peak / Top Channel / PWR 35

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Result
5850.00	67.68	122.23	54.55	Complied
5852.56	66.44	116.39	49.95	Complied

Plots:



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

6. Measurement Uncertainty

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	95%	±2.49 dB
Radiated Spurious Emissions	95%	±3.10 dB
Band Edge Radiated Emissions	95%	±3.10 dB
Transmitter Duty Cycle	95%	±3.4%

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Used equipment

Test site: SR 1/2

ID	Manufacturer	Type	Model	Serial	Calibration Date	Cal. Cycle (months)
1	Rohde & Schwarz	Antenna, Loop	HFH2-Z2	831247/012	10/07/2020	36
423	Bonn Elektronik	Amplifier, Low Noise Pre	BLMA 1840-1A	55929	09/07/2020	12
607	Schwarzbeck	Antenna broadband horn antenna	BBHA 9170	9170-561	15/10/2019	24
460	Deisl	Turntable	DT 4250 S	n/a	n/a	n/a
452	Schwarzbeck	Antenna, Trilog Broadband	VULB 9168	9168-240	02/09/2020	24
496	Rohde & Schwarz	Antenna, Log-Periodic Broadband	HL050	100297	05/08/2020	24
587	Maturo	antenna mast, tilting	TAM 4.0-E	011/7180311	n/a	n/a
588	Maturo	Controller	NCD	029/7180311	n/a	n/a
591	Rohde & Schwarz	Receiver	ESU 40	100244/040	07/07/2020	12
608	Rohde & Schwarz	Switch Matrix	OSP 120	101227	lab verification	n/a
628	Maturo	Antenna mast	CAM 4.0-P	224/19590716	n/a	n/a
629	Maturo	Kippeinrichtung	KE 2.5-R-M	MAT002	n/a	n/a
-/-	Testo	Thermo-Hygrometer	608-H1	01	lab verification	n/a
328	SPS	AC/DC power distribution system	PAS 5000	A2464 00/2 0200	lab verification	n/a
1603665	Siemens Matsushita Components	semi-anechoic chamber SR1/ 2	-/-	B83117-A1421-T161	n/a	n/a

Test site: SR 7/8

ID	Manufacturer	Type	Model	Serial	Calibration Date	Cal. Cycle (months)
23	Rohde & Schwarz	Artificial Mains Network	ESH3-Z5	831767/013	07/07/2020	12
349	Rohde & Schwarz	Receiver, EMI Test	ESIB7	836697/009	07/09/2020	12
-/-	Testo	Thermo-Hygrometer	608-H1	08	lab verification	n/a
327	SPS	AC/DC power distribution system	PAS 5000	A2464 00/1 0200	lab verification	n/a

8. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	75	-	Initial Version

--- END OF REPORT ---