TEST REPORT

Test Report No.: UL-RPT-RP-13831825-516-FCC

Applicant	:	InFarm Indoor Urban Farming GmbH
Model No.	:	Infarm Gateway
FCC ID	:	Contains 2A2CI-INF001-WF & Contains 2A2CI-INF001-CL
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 1.1 supersede Version 1.0 with immediate effect**
   Test Report No. UL-RPT-RP-13831825-516-FCC Version 1.1, Issue Date 08 APRIL 2022 replaces
   Test Report No. UL-RPT-RP-13831825-516-FCC Version 1.0, Issue Date 31 MARCH 2022, which is no longer valid.
5. Result of the tested sample: **PASS**

Prepared by: Sercan, Usta
Title: Laboratory Engineer
Date: 08 April 2022

Approved by: Ajit, Phadtare
Title: Lead Test Engineer
Date: 08 April 2022

Deutsche Akkreditierungsstelle D-PL-19381-02-00

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

UL INTERNATIONAL GERMANY GMBH
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1. Customer Information

1.1. Applicant Information

Company Name:	InFarm Indoor Urban Farming GmbH
Company Address:	Colditzstr. 30 12099 Berlin, Germany
Company Phone No.:	+49 (0) 30991916590
Company E-Mail:	info@infarm.com
Contact Person:	Ibrahim Oguz Yildirim
Contact E-Mail Address:	ibrahimoguz.yildirim@infarm.com
Contact Phone No.:	+49 (0) 30991916590

1.2. Manufacturer Information

Company Name:	InFarm Indoor Urban Farming GmbH
Company Address:	Colditzstr. 30 12099 Berlin, Germany
Company Phone No.:	+49 (0) 30991916590
Company E-Mail:	info@infarm.com
Contact Person:	Ibrahim Oguz Yildirim
Contact E-Mail Address:	ibrahimoguz.yildirim@infarm.com
Contact Phone No.:	+49 (0) 30991916590

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:	17 May 2020
EUT arrived:	11 August 2021
Test Dates:	24 November 2021 to 22 March 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(1)	☒	☐	☐	☐
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. As per applicant's declaration FCC pre-approved radio module is integrated within the EUT therefore, only partial testing is performed.
   For further details refer FCC pre-approved radio module's (Model: v1.1 | FCC ID: 2APW6-FIN0110-CM2) | Report No. CCISE190808004| Ver 00 | Issue Date: 27-Dec-2019 | Centre Testing Shenzhen Zhongjian Nanfang Testing Co., Ltd.
3. For further details refer applicant's Frequency stability declaration which ensures that the signal remains in the allocated bands under all operational conditions stated in the user manual.
4. For further details refer applicant's declaration.

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:	FCC 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:	Infarm
Model Name or Number:	Infarm Gateway
Test Sample Serial Number:	100101000221 (RF Test Sample with External SMA Connectors)
Hardware Version Number:	1.1.0
Firmware Version Number:	W15.68.19.p48-15.26.19.p48
FCC ID:	Contains 2A2CI-INF001-WF & Contains 2A2CI-INF001-CL

Brand Name:	MobileMark
Model:	SMW-414 multiband, 4-cable Global Cellular/LTE, WiFi & GPS
Test Sample Serial Number:	N/A
Additional Info:	External Antenna (Acre)

3.2. Description of EUT

The equipment under test was a host product supporting Bluetooth Low Energy (BLE), WiFi 2.4 GHz operations in 2.4 - 2.4835 GHz ISM band, WiFi 5 GHz operations in U-N-II bands and Cellular operations in UMTS Band 2 & 5, LTE Band 2, 4, 5, 7& 12 bands.

3.3. Modifications Incorporated in the EUT

Following modifications were applied to the EUT during testing.

- In order to avoid unwanted emissions from EUT as part of EUT filtering two ferrites (Manufacturer: Würth Elektronik | Type: 742 717 33 | Passthrough) was placed just outside the EUT's enclosure and near AC/DC power supply on the DC power supply cable.

  Therefore, manufacturer must include these additional ferrites on the AC/DC power supply cable; to ensure compliant results.

3.4. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11a) / U-NII – 1 / 2A / 2C			
Type of Unit:	Transceiver			
Worst Case Data Rates:	802.11a	6 Mbps (Note 1)		
Worst Case Modulation Types:	802.11a	BPSK, QPSK, 16QAM, 64QAM		
Power Supply Requirement(s):	Nominal	6 - 24 (V) DC (Used voltage 12 V DC)		
Declared Antenna Gain:	5 dBi			
Antenna Type:	Multiband External Antenna			
Antenna Details:	4-Cable Multiband| SMW-414 multiband| MobileMark l SMA Connector I Cable 2			
Channel Spacing:	20 MHz			
Transmit Frequency Band:	5150 MHz to 5250 MHz [U-NII-1]			
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**	
	Bottom	36(Note 2)	5180	
	Middle	40	5200	
	Top	48	5240	
Transmit Frequency Band:	5250 MHz to 5350 MHz [U-NII-2A]			
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**	
	Bottom	52(Note 2)	5260	
	Middle	56	5280	
	Top	64	5320	
Transmit Frequency Band:	5470 MHz to 5725 MHz [U-NII-2C]			
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**	
	Bottom	100(Note 2)	5500	
	Middle	116	5580	
	Top	140	5700	
Highest Frequency Generated or Used in the EUT or on which the EUT operates or tunes	5290 MHz (oscillator freq. for RF application) 1200 MHz (oscillator freq. for internal functionality e.g. bus/ CPU clock etc)			
Scope of Partial Host Product Testing:	FCC KDB 996369 D04 Section 3.0			
Has modular transmitter been fully tested by the module grantee on the required number of channels, modulation types, and modes?	☒ Yes	☐ No	☐ Not Known	
Are emissions occurring due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure) checked & measured?	☒ Yes	☐ No	☐ Not Stated	

Frequency Range of Radiated Measurements:	FCC Part 15.33(a)(1): intentional radiator operates below 10 GHz: to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(Note 1) For further details refer FCC pre-approved radio module's (Model: v1.1 | FCC ID: 2APW6-FIN0110-CM2) | Report No. CCISE190808004| Ver 00 | Issue Date: 27-Dec-2019 | Centre Testing Shenzhen Zhongjian Nanfang Testing Co., Ltd.	
(Note 2) 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 original filing (Model: v1.1 | FCC ID: 2APW6-FIN0110-CM2)	

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	Laptop (labtool v2.0.0.93 software installed)	HP	Probook 650 G1	5CG6143YWB
2	Ethernet Cable (2m)	N/A	N/A	N/A

B. Support Equipment (Manufacturer supplied)

Item	Description	Brand Name	Model Name or Number	Serial Number
1	AC/DC Power Supply	Phoenix Contact	UNO-PS/1AC/12DC/100W	290299702051P1207 2020/12/17V

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-case**: 802.11a | 20 MHz | 6 Mbps | Power Settings: 12 (Max) | UNII -1 | Bottom Channel 802.11a | 20 MHz | 6 Mbps | Power Settings: 12 (Max) | UNII -2A | Bottom Channel 802.11a | 20 MHz | 6 Mbps | Power Settings: 12 (Max) | UNII -2C | Bottom Channel
** These worst-case data rates are taken from FCC pre-approved radio module's (Model: v1.1 | FCC ID: 2APW6-FIN0110-CM2) | Report No. CCISE190808004| Ver 00 | Issue Date: 27-Dec-2019 | Centre Testing Shenzhen Zhongjian Nanfang Testing Co., Ltd. **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 original filing

4.2. Configuration and Peripherals

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

- The applicant supplied documents containing the setup instructions and commands

  “Setting up direct test mode (DTM) on the balenaFin.pdf” and ‘’Labtool commands guide.pdf”

EUT Power Supply:

- The EUT was powered by 12 V DC power supply via AC/DC adapter.

Test Mode Activation:

- The test modes were activated using labtool v2.0.0.93 software which supplied by customer.
- The EUTs were configured to transmit test modes continuously with maximum power level.

AC Conducted Emissions Measurements:

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

Radiated Measurements:

- In accordance with ANSI C63.26, the EUT allows for the connection of external accessories, including external electrical control signals; hence EUT has been tested with the listed equipment under section 3.5 B which form part of a system. Therefore, were used for radiated spurious emission, measurements.
- Before starting final radiated spurious emission measurements “worst-case verification” with the EUT in Standing-position & Laying-position and different positions of the antenna was performed by Lab.
- The Test was performed only on Bottom channel in the respective bands for UNII-1, UNII-2A and UNII-2C as it was the worst-case.
- The EUT in Standing-position was found to be the worst-case therefore this report includes relevant results.
- Antenna’s 3 input cables connected to EUT directly. 1 GPS port terminated with 50 Ohm termination.
- The radiated spurious emissions below 30 MHz were performed with the EUT positioned on the turn table and rotating 360 degrees while the loop antenna height was set to 80 cm.
- Radiated spurious emissions were performed with the EUT positioned on the turn table and rotating 360 degrees while the antenna height varies from 1 to 4 m over the measurement frequency range.
- R&S® EMC32 V10.60.10 Software was used for the Radiated spurious emission measurements.

Duty Cycle Correction Details:

- As the EUT continuous transmission of the EUT (D ≥ 98%) cannot be achieved and EUT was transmitting continuously with a constant Duty Cycle (duty cycle variations are less than ±2%). Therefore, a Duty Cycle Correction Factor 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:	Asim Shahzad	**Test Dates:**	26 & 29 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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 & 25
Relative Humidity (%):	33 & 39

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:

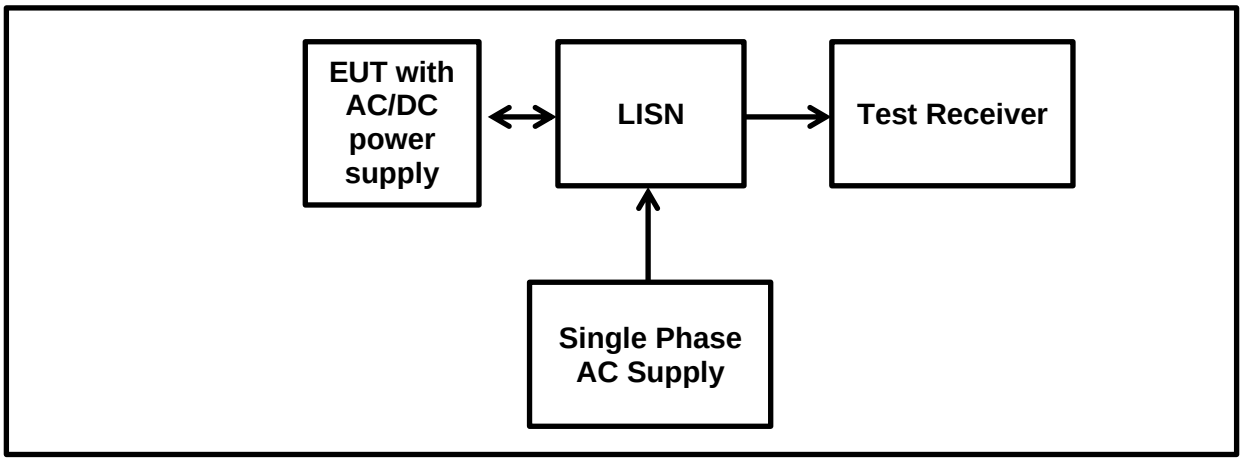
   802.11a | 20 MHz | 6 Mbps | Power Settings: Max | UNII -1 | Bottom Channel

   802.11a | 20 MHz | 6 Mbps | Power Settings: Max | UNII -2A | Bottom Channel

   802.11a | 20 MHz | 6 Mbps | Power Settings: Max | UNII -2C | Bottom Channel
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)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Results: 120 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17253	Live	35.50	64.80	29.30	Complied
0.19482	Live	33.20	63.80	30.60	Complied
0.34763	Live	33.70	59.00	25.30	Complied
1.92319	Live	19.80	56.00	36.20	Complied
9.48455	Live	21.50	60.00	38.50	Complied
11.06749	Live	16.50	60.00	43.50	Complied

Results: 120 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17253	Live	23.10	54.80	31.70	Complied
0.19482	Live	22.30	53.80	31.50	Complied
0.34763	Live	27.20	49.00	21.80	Complied
1.92319	Live	16.80	46.00	29.20	Complied
9.48455	Live	16.00	50.00	34.00	Complied
11.06749	Live	11.70	50.00	38.30	Complied

Results: 120 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17556	Neutral	33.80	64.70	30.90	Complied
0.21223	Neutral	33.30	63.10	29.80	Complied
0.35122	Neutral	33.20	58.90	25.70	Complied
8.98000	Neutral	19.40	60.00	40.60	Complied
9.99317	Neutral	21.70	60.00	38.30	Complied
11.99139	Neutral	28.70	60.00	31.30	Complied

Transmitter AC Conducted Spurious Emissions (continued)

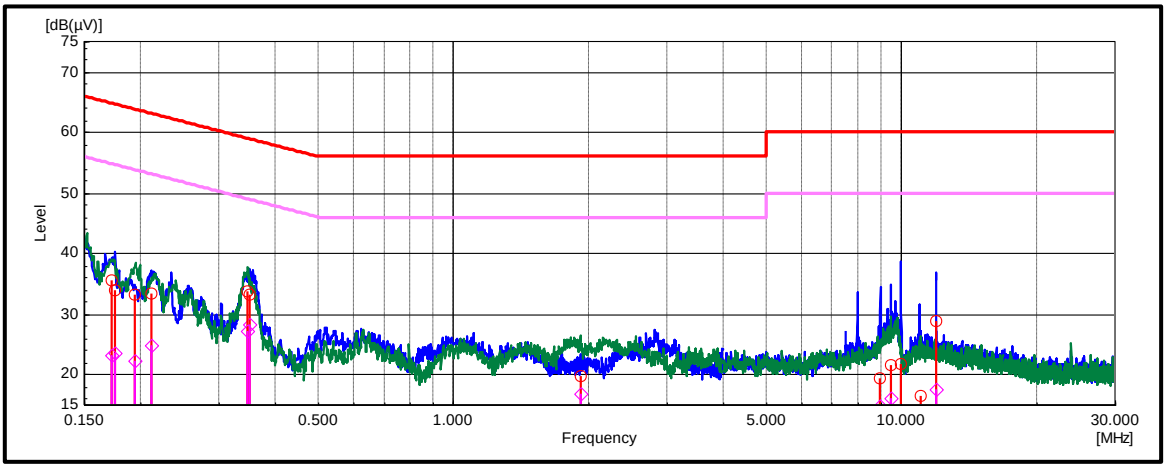
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Results: 120 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17556	Neutral	23.50	54.70	31.20	Complied
0.21223	Neutral	24.80	53.10	28.30	Complied
0.35122	Neutral	28.20	48.90	20.70	Complied
8.98000	Neutral	14.80	50.00	35.20	Complied
9.99317	Neutral	12.40	50.00	37.60	Complied
11.99139	Neutral	17.50	50.00	32.50	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)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Results: 240 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15743	Live	32.40	65.60	33.20	Complied
0.36407	Live	34.50	58.60	24.10	Complied
0.54112	Live	26.50	56.00	29.50	Complied
2.08423	Live	24.20	56.00	31.80	Complied
2.47549	Live	16.80	56.00	39.20	Complied
9.49456	Live	27.90	60.00	32.10	Complied

Results: 240 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15743	Live	18.80	55.60	36.80	Complied
0.36407	Live	31.40	48.60	17.20	Complied
0.54112	Live	21.60	46.00	24.40	Complied
2.08423	Live	20.00	46.00	26.00	Complied
2.47549	Live	17.80	46.00	28.20	Complied
9.49456	Live	17.50	50.00	32.50	Complied

Results: 240 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15743	Neutral	32.40	65.60	33.20	Complied
0.36407	Neutral	34.50	58.60	24.10	Complied
0.54112	Neutral	26.50	56.00	29.50	Complied
2.08423	Neutral	24.20	56.00	31.80	Complied
2.47549	Neutral	16.80	56.00	39.20	Complied
9.49456	Neutral	27.90	60.00	32.10	Complied

Transmitter AC Conducted Spurious Emissions (continued)

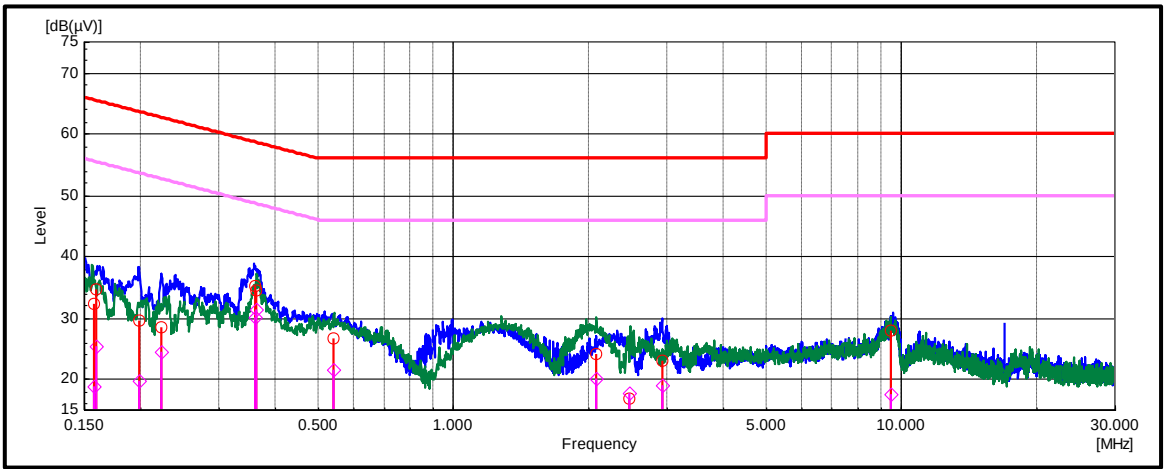
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Results: 240 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.1594	Neutral	25.30	55.50	30.20	Complied
0.19884	Neutral	19.80	53.70	33.90	Complied
0.22277	Neutral	24.40	52.70	28.30	Complied
0.36067	Neutral	30.20	48.70	18.50	Complied
2.92347	Neutral	19.00	46.00	27.00	Complied
17.01368	Neutral	8.10	50.00	41.90	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.

Transmitter AC Conducted Spurious Emissions (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

Results: 120 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17342	Live	34.70	64.80	30.10	Complied
0.2378	Live	31.30	62.20	30.90	Complied
0.34616	Live	34.80	59.10	24.30	Complied
9.50971	Live	21.30	60.00	38.70	Complied
9.98614	Live	15.80	60.00	44.20	Complied
15.99745	Live	15.70	60.00	44.30	Complied

Results: 120 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17342	Live	22.50	54.80	32.30	Complied
0.2378	Live	22.50	52.20	29.70	Complied
0.34616	Live	31.80	49.10	17.30	Complied
9.50971	Live	16.00	50.00	34.00	Complied
9.98614	Live	11.30	50.00	38.70	Complied
15.99745	Live	9.60	50.00	40.40	Complied

Results: 120 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15956	Neutral	30.40	65.50	35.10	Complied
0.2057	Neutral	29.50	63.40	33.90	Complied
0.35696	Neutral	34.80	58.80	24.00	Complied
2.91136	Neutral	20.60	56.00	35.40	Complied
9.54903	Neutral	22.20	60.00	37.80	Complied
11.99554	Neutral	21.90	60.00	38.10	Complied

Transmitter AC Conducted Spurious Emissions (continued)

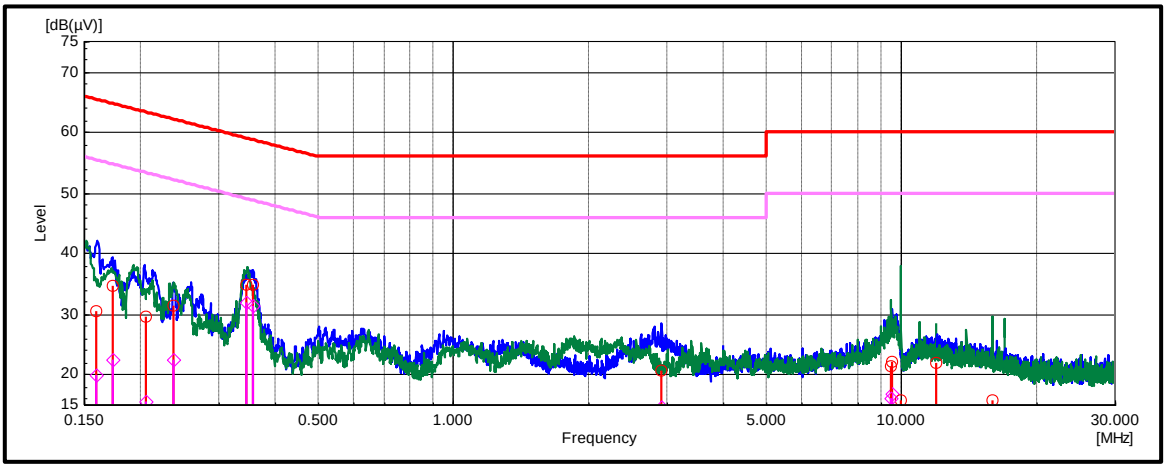
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

Results: 120 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15956	Neutral	19.90	55.50	35.60	Complied
0.2057	Neutral	15.50	53.40	37.90	Complied
0.35696	Neutral	31.40	48.80	17.40	Complied
2.91136	Neutral	14.70	46.00	31.30	Complied
9.54903	Neutral	16.90	50.00	33.10	Complied
11.99554	Neutral	13.10	50.00	36.90	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)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

Results: 240 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15952	Live	31.50	65.50	34.00	Complied
0.18694	Live	28.90	64.20	35.30	Complied
0.35725	Live	33.00	58.80	25.80	Complied
1.26973	Live	25.50	56.00	30.50	Complied
9.47797	Live	22.50	60.00	37.50	Complied
11.01239	Live	19.60	60.00	40.40	Complied

Results: 240 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.15952	Live	18.30	55.50	37.20	Complied
0.18694	Live	16.60	54.20	37.60	Complied
0.35725	Live	30.20	48.80	18.60	Complied
1.26973	Live	22.00	46.00	24.00	Complied
9.47797	Live	19.10	50.00	30.90	Complied
11.01239	Live	13.70	50.00	36.30	Complied

Results: 240 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.1979	Neutral	27.20	63.70	36.50	Complied
0.36088	Neutral	35.30	58.70	23.40	Complied
0.47865	Neutral	27.60	56.40	28.80	Complied
2.84202	Neutral	24.00	56.00	32.00	Complied
9.55399	Neutral	23.50	60.00	36.50	Complied
13.11738	Neutral	15.90	60.00	44.10	Complied

Transmitter AC Conducted Spurious Emissions (continued)

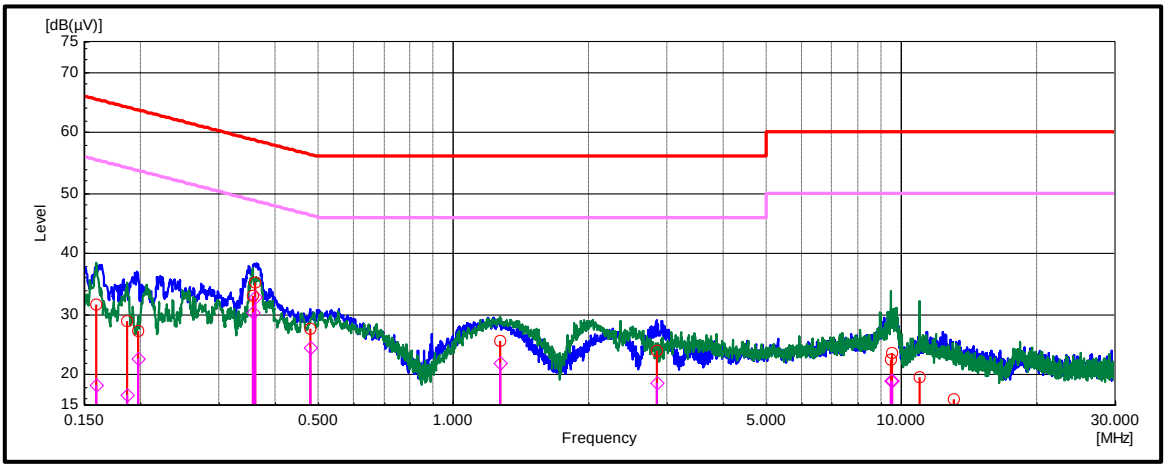
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

Results: 240 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.1979	Neutral	22.70	53.70	31.00	Complied
0.36088	Neutral	32.80	48.70	15.90	Complied
0.47865	Neutral	24.40	46.40	22.00	Complied
2.84202	Neutral	18.70	46.00	27.30	Complied
9.55399	Neutral	18.90	50.00	31.10	Complied
13.11738	Neutral	11.80	50.00	38.20	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.

Transmitter AC Conducted Spurious Emissions (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Results: 120 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17409	Live	33.60	64.80	31.20	Complied
0.195	Live	33.40	63.80	30.40	Complied
0.34813	Live	33.50	59.00	25.50	Complied
2.19814	Live	20.50	56.00	35.50	Complied
4.9907	Live	15.90	56.00	40.10	Complied
9.60621	Live	21.50	60.00	38.50	Complied

Results: 120 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.17409	Live	21.80	54.80	33.00	Complied
0.195	Live	22.30	53.80	31.50	Complied
0.34813	Live	29.40	49.00	19.60	Complied
2.19814	Live	17.20	46.00	28.80	Complied
4.9907	Live	9.90	46.00	36.10	Complied
9.60621	Live	15.60	50.00	34.40	Complied

Results: 120 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16993	Neutral	36.20	65.00	28.80	Complied
0.21328	Neutral	33.10	63.10	30.00	Complied
0.34581	Neutral	35.20	59.10	23.90	Complied
2.6128	Neutral	19.80	56.00	36.20	Complied
5.9836	Neutral	13.90	60.00	46.10	Complied
9.78413	Neutral	22.20	60.00	37.80	Complied

Transmitter AC Conducted Spurious Emissions (continued)

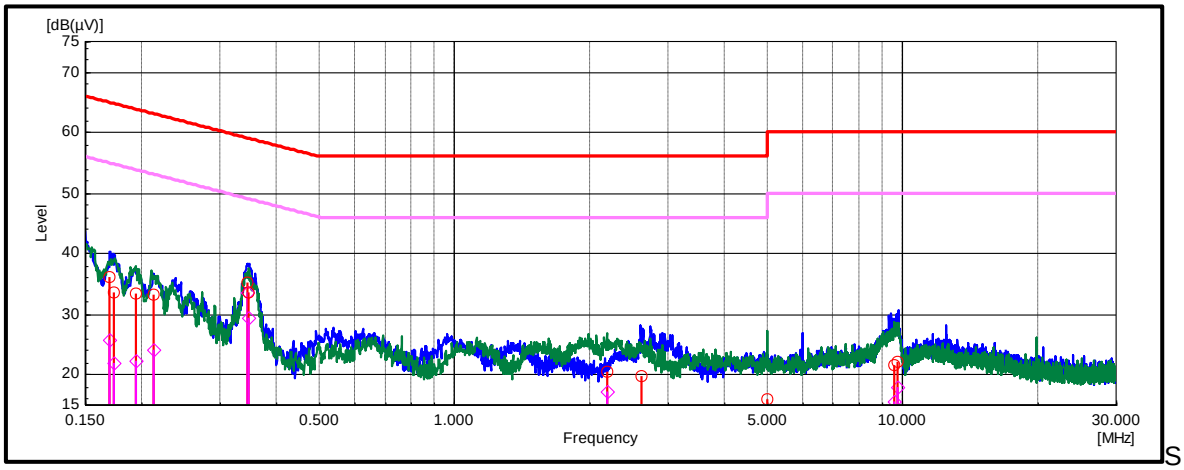
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Results: 120 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16993	Neutral	25.70	55.00	29.30	Complied
0.21328	Neutral	24.10	53.10	29.00	Complied
0.34581	Neutral	33.50	49.10	15.60	Complied
2.6128	Neutral	12.60	46.00	33.40	Complied
5.9836	Neutral	9.40	50.00	40.60	Complied
9.78413	Neutral	17.90	50.00	32.10	Complied

Result: Pass

Plot: 120 VAC 60 Hz / Live and Neutral Line



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

Transmitter AC Conducted Spurious Emissions (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Results: 240 VAC 60 Hz / Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16345	Live	30.50	65.30	34.80	Complied
0.25326	Live	26.30	61.60	35.30	Complied
0.36861	Live	32.70	58.50	25.80	Complied
1.33933	Live	25.20	56.00	30.80	Complied
1.96016	Live	23.10	56.00	32.90	Complied
9.77457	Live	22.50	60.00	37.50	Complied

Results: 240 VAC 60 Hz / Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16345	Live	15.20	55.30	40.10	Complied
0.25326	Live	22.70	51.60	28.90	Complied
0.36861	Live	26.00	48.50	22.50	Complied
1.33933	Live	20.90	46.00	25.10	Complied
1.96016	Live	19.80	46.00	26.20	Complied
9.77457	Live	17.10	50.00	32.90	Complied

Results: 240 VAC 60 Hz / Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16186	Neutral	32.30	65.40	33.10	Complied
0.22424	Neutral	29.10	62.70	33.60	Complied
0.36062	Neutral	35.40	58.70	23.30	Complied
1.28488	Neutral	24.90	56.00	31.10	Complied
2.78908	Neutral	23.00	56.00	33.00	Complied
9.49556	Neutral	23.30	60.00	36.70	Complied

Transmitter AC Conducted Spurious Emissions (continued)

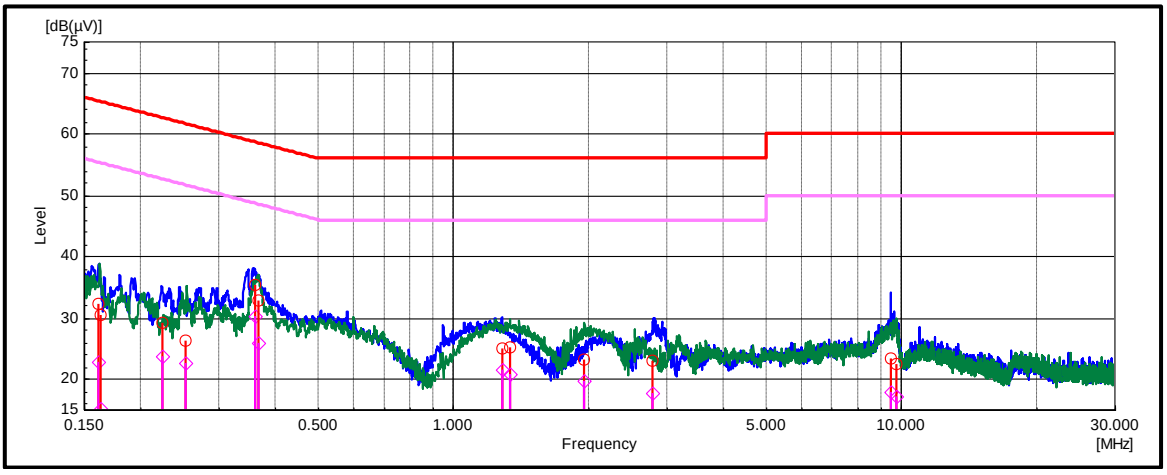
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Results: 240 VAC 60 Hz / Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.16186	Neutral	22.80	55.40	32.60	Complied
0.22424	Neutral	23.70	52.70	29.00	Complied
0.36062	Neutral	30.20	48.70	18.50	Complied
1.28488	Neutral	21.50	46.00	24.50	Complied
2.78908	Neutral	17.80	46.00	28.20	Complied
9.49556	Neutral	17.90	50.00	32.10	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:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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):	24.9
Relative Humidity (%):	57.0

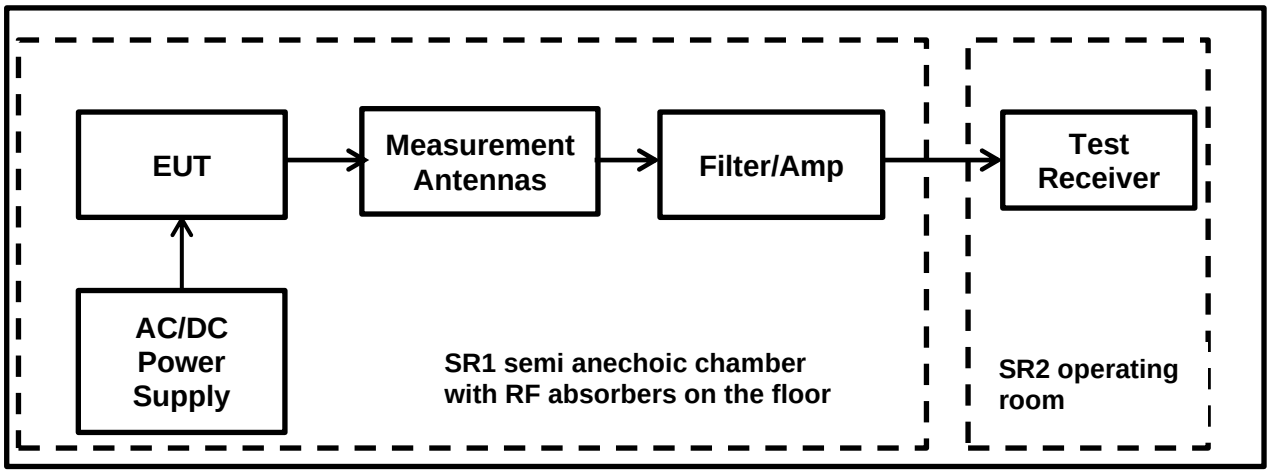
Notes:

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]

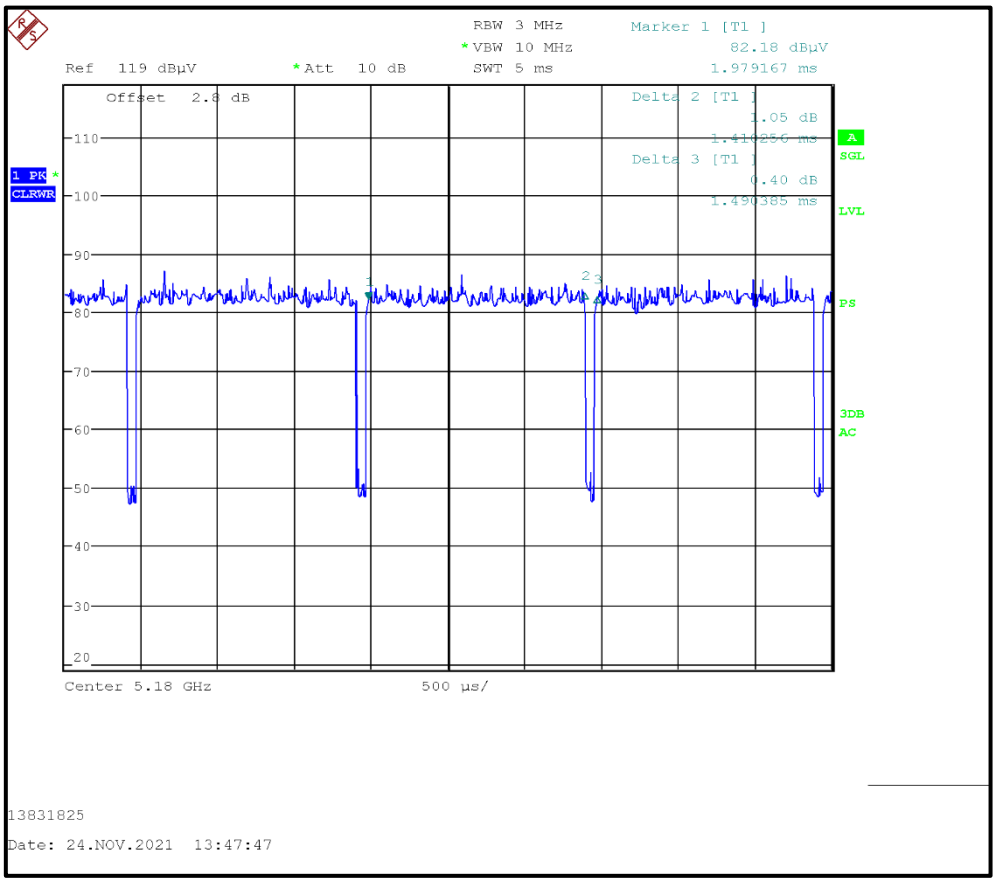
Test Setup:



Transmitter Duty Cycle (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Pulse On Time (T_{ON}) (ms)	Pulse Period (T_{ON} +T_{OFF}) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1.41	1.49	94.63	0.24

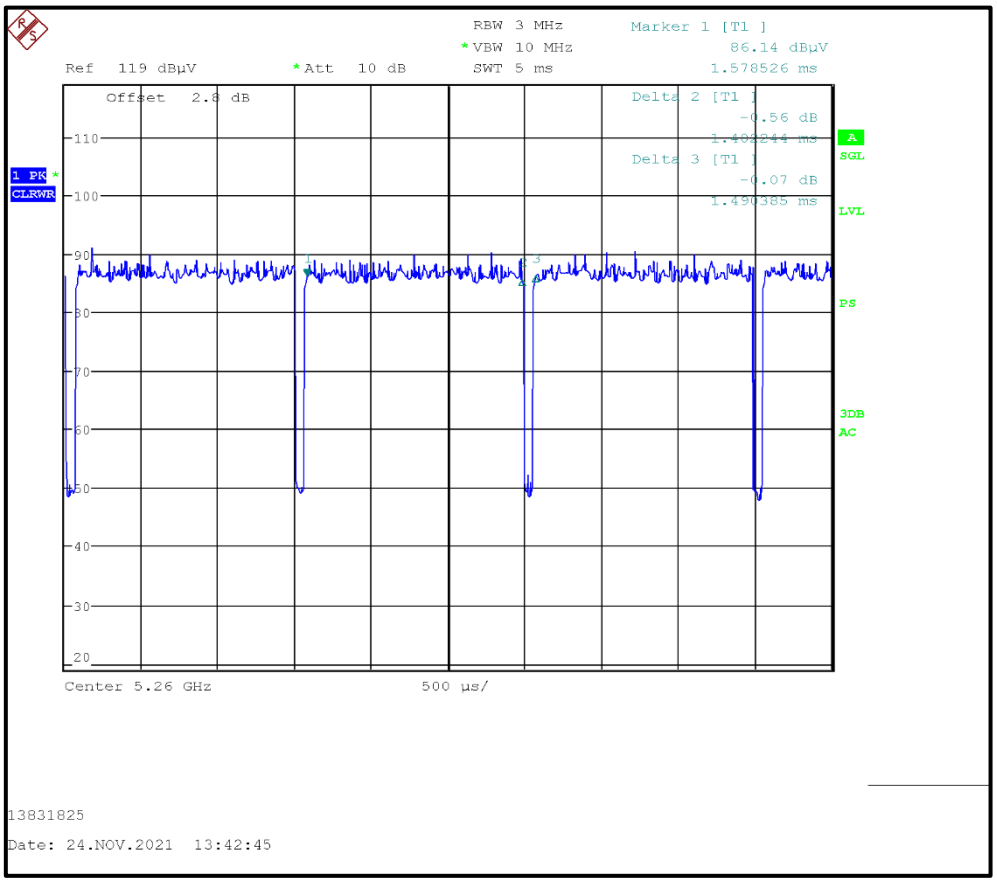


Result: Pass

Transmitter Duty Cycle (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

Pulse On Time (T_{ON}) (ms)	Pulse Period (T_{ON} +T_{OFF}) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1.40	1.49	93.95	0.27

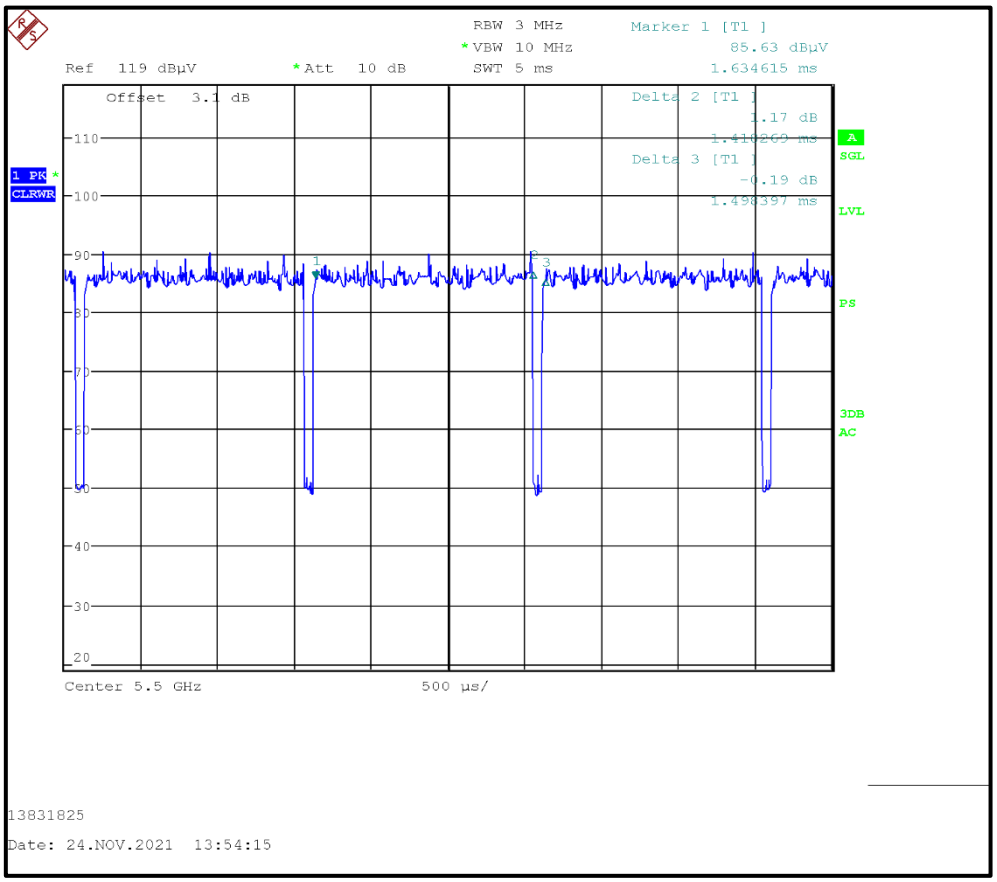


Result: Pass

Transmitter Duty Cycle (continued)

802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Pulse On Time (T_{ON}) (ms)	Pulse Period (T_{ON} +T_{OFF}) (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
1.42	1.49	95.30	0.21



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:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

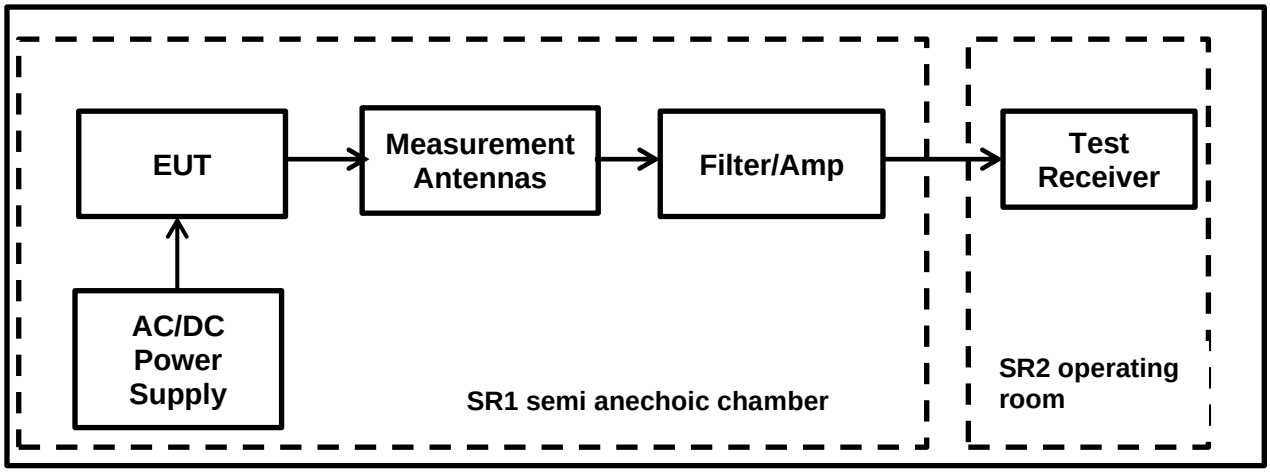
Temperature (°C):	24.9
Relative Humidity (%):	57.0

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 at 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)(10) 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 bottom channel only.
6. All emissions shown on the pre-scan plots were investigated and found to be below system noise floor.
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.
8. Pre-scans were performed and markers placed on the highest measured levels. The test receiver was set to:
   - Frequency range: 9 kHz-150 kHz : RBW: 300 Hz /VBW: 1 kHz
     150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
   - Detector: Max-Peak detector | Trace Mode: Max Hold

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

Test Setup:

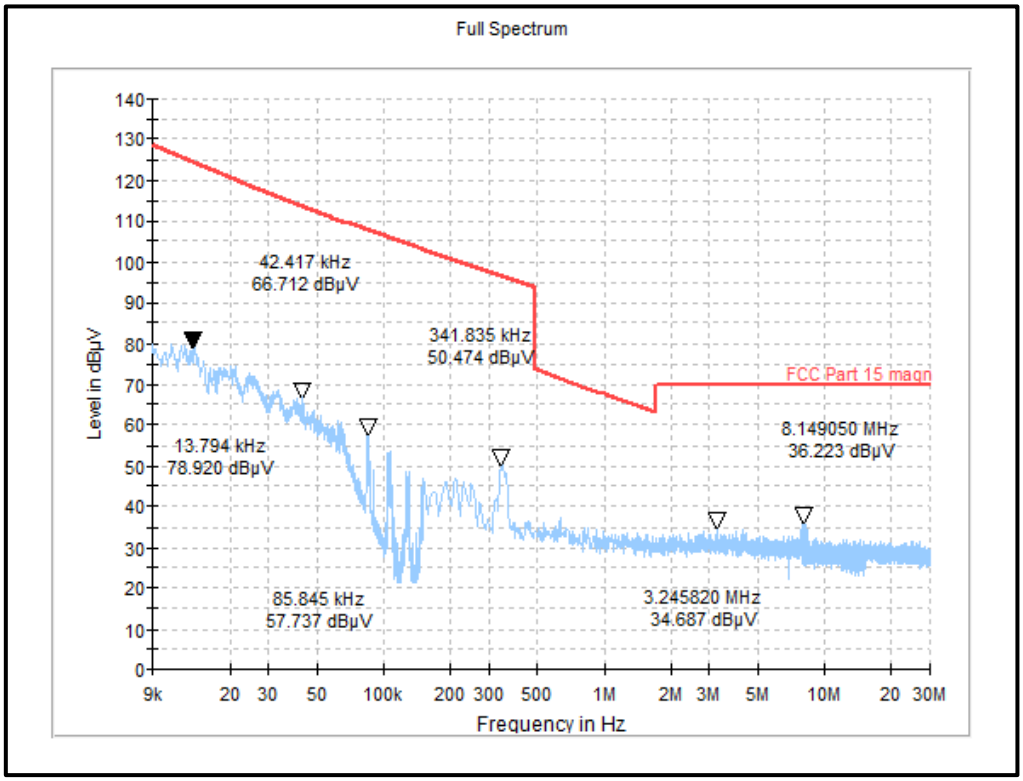


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Frequency (MHz)	Loop Antenna Orientation	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
All emissions were below the level of the measurement system noise floor.					

Plot: 9 kHz – 30 MHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel



Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021 & 22 March 2022
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

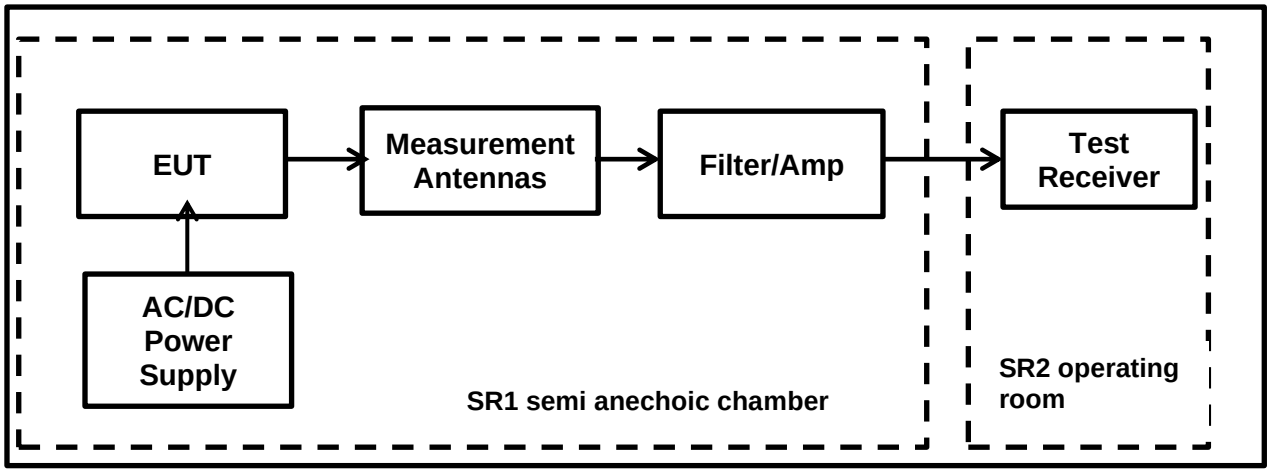
Temperature (°C):	23.2 & 25
Relative Humidity (%):	29.9 & 34

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 bottom channel only.
2. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
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.
5. 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)(10) states the provisions of 15.205 apply, e.g. restricted bands of operation.
6. Measurements below 1 GHz 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. 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 (5.15-5.25 GHz band operation) (continued)

Test Setup:

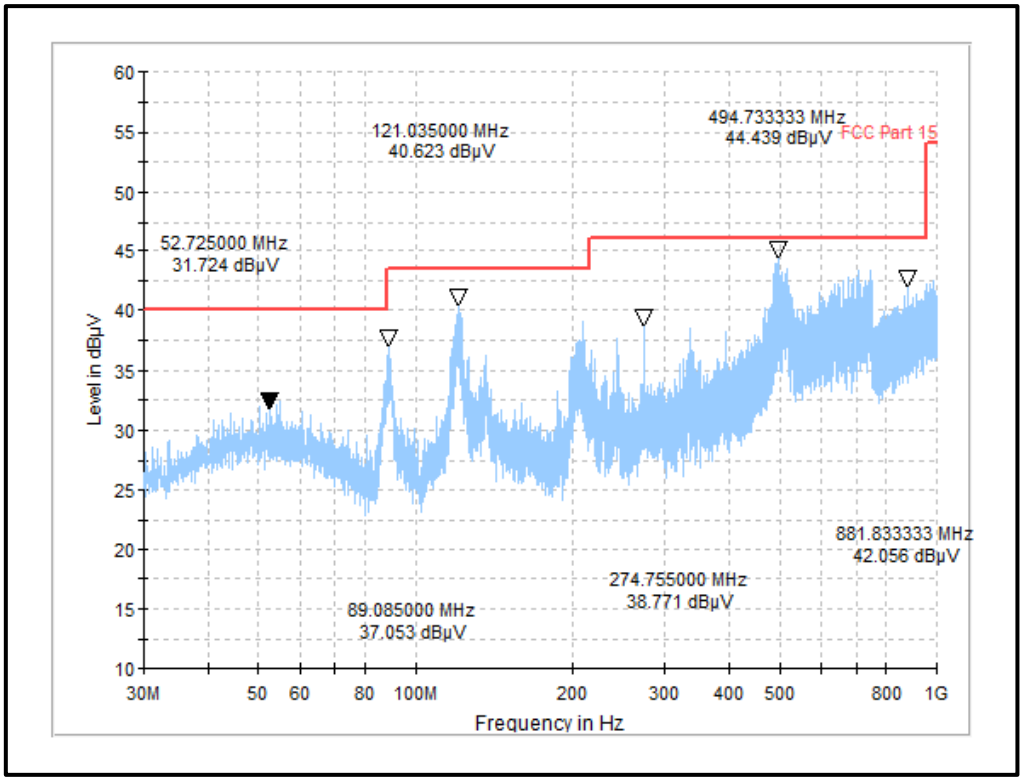


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Max-Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
121.22	Vertical	34.04	40.00	5.96	Complied
495.98	Vertical	40.52	46.02	5.50	Complied

Plot: 30 MHz – 1GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

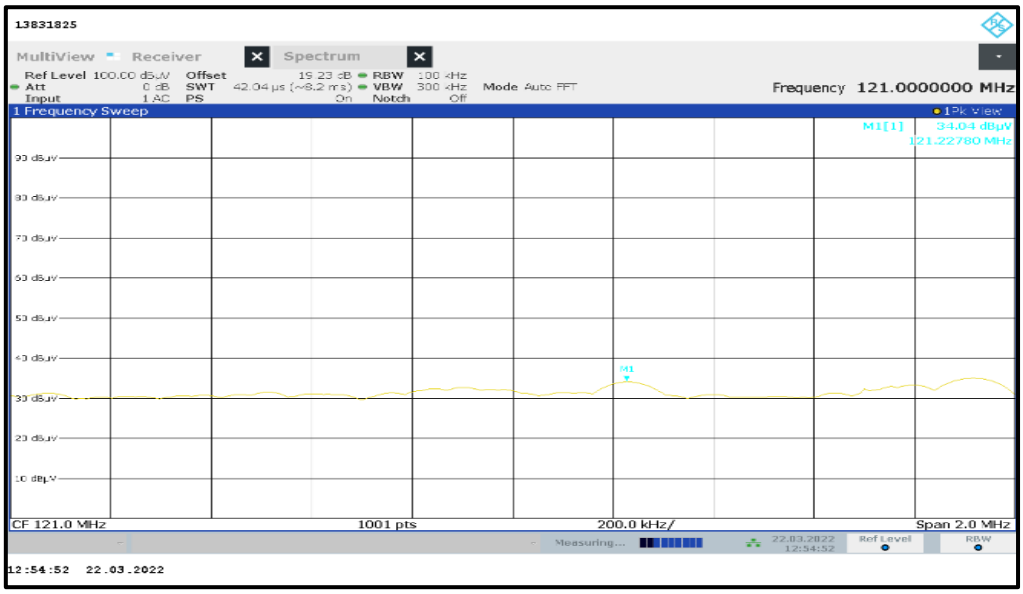


Pre-scan with MaxPeak Detector

Result: Pass

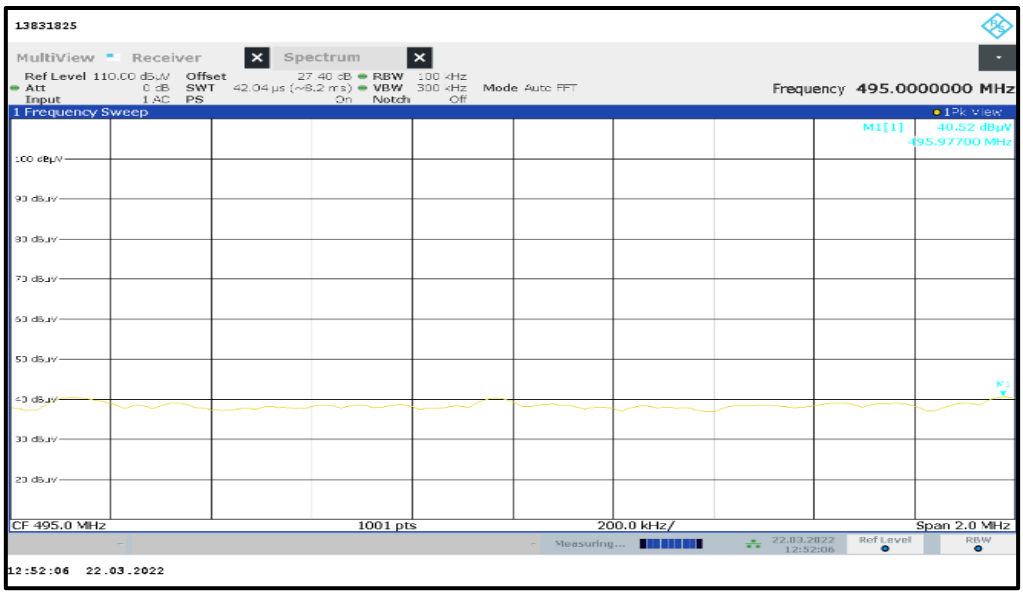
Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Plot: Final Measurment @ 121 MHz :
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel



Final Measurment @ 121 MHz with MaxPeak Detector

Plot: Final Measurment @ 495 MHz :
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel



Final Measurment @ 495 MHz with MaxPeak Detector

Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	23 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

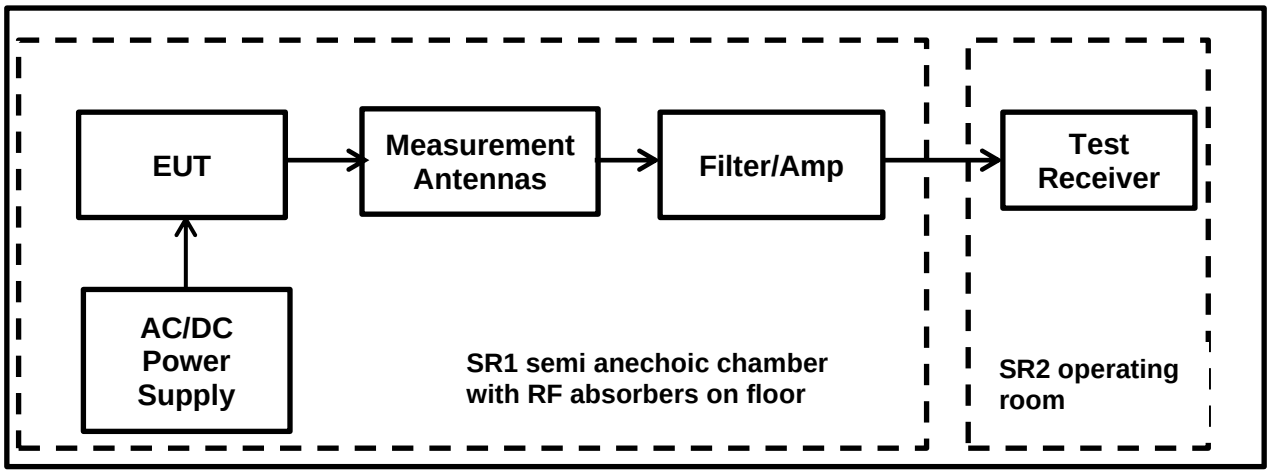
Temperature (°C):	23.0
Relative Humidity (%):	54.8

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)(10) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. Pre-scans above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 m above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. 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 m to 4 m.
4. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.
5. For frequency range between 1 GHz to 18 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.
6. The preliminary scans showed similar emission levels above 18 GHz, for each channel & modes of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the bottom channel only.
7. In accordance with ANSI C63.10-2013 Section 5.3.3 & 6.5.3 measurements above 18 GHz were performed at closer distance (1 m); because at specified measurement distance (3m) for compliance the instrumentation noise floor was typically close to the radiated emission limit.
8. For frequency range between 18 GHz and 40 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.

Transmitter Out of Band Radiated Emissions Test setup

Test Setup:

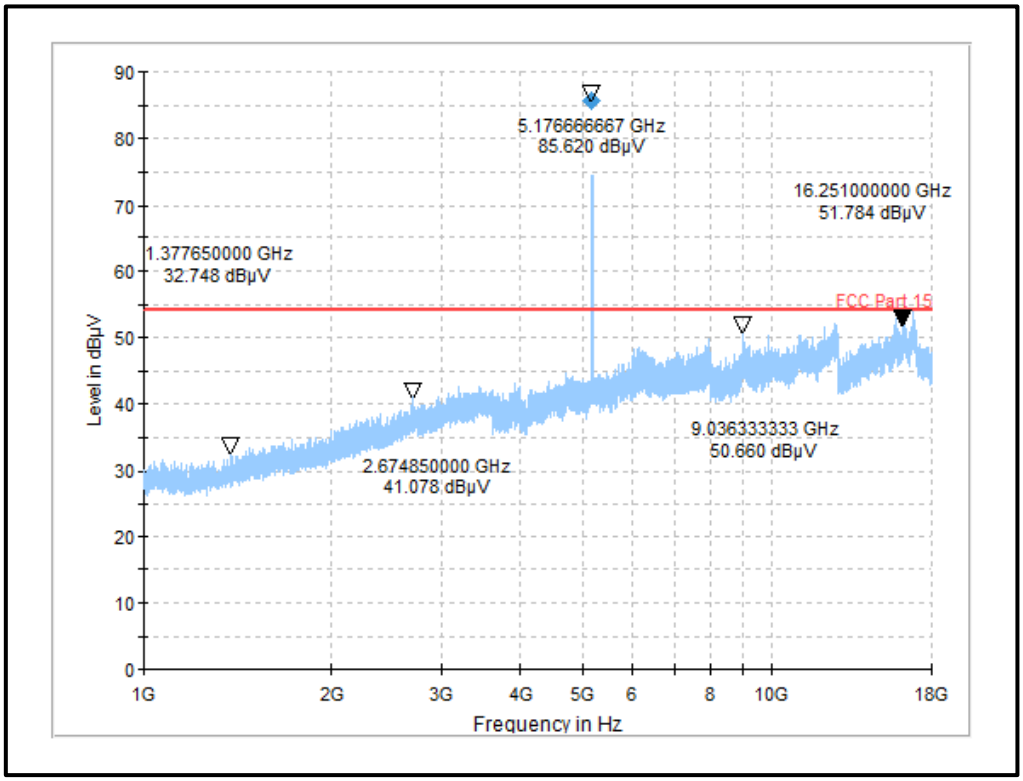


Transmitter Out of Band Radiated Emissions (5.15-5.25 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel



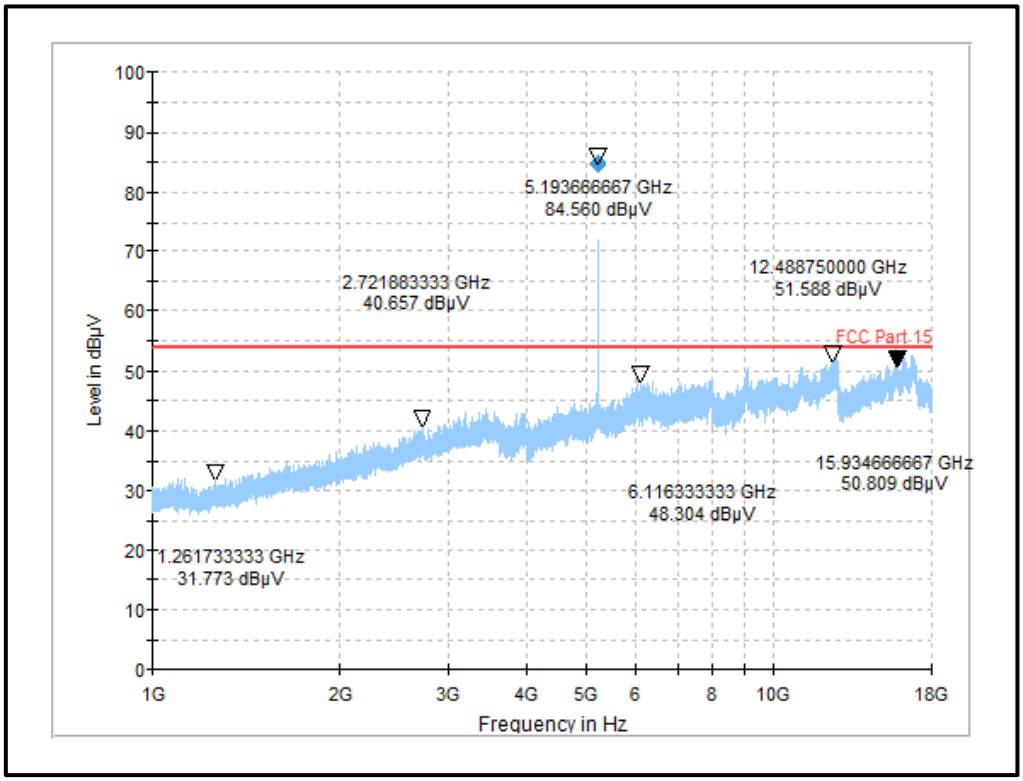
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Middle Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Middle Channel



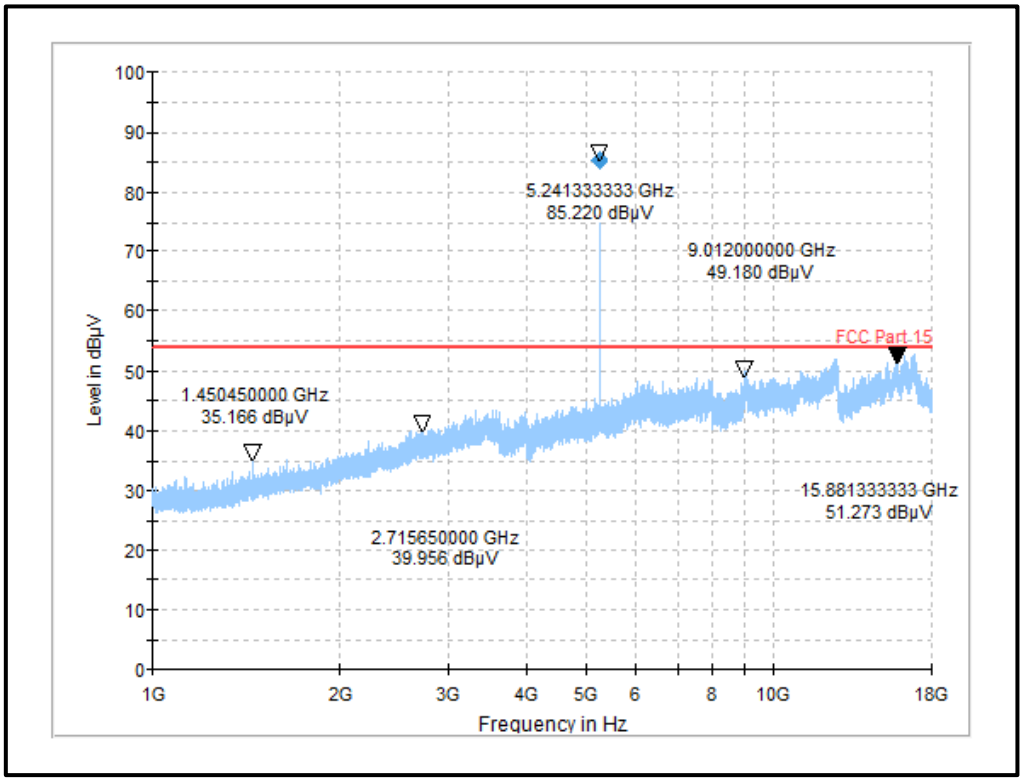
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Top Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Top Channel



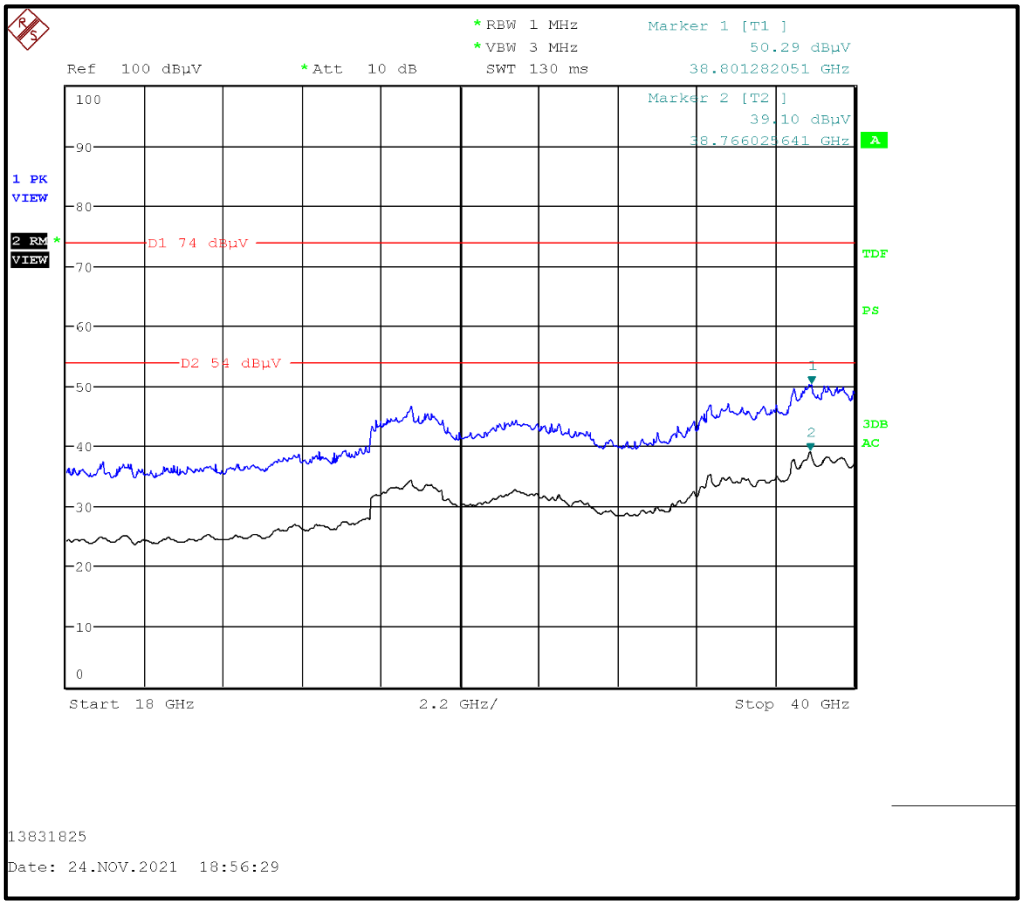
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel

Frequency (MHz)	Antenna Polarization	Peak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
All emissions were below the level of the measurement system noise floor.					

Plot: 18 GHz – 40 GHz : 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1 / Bottom Channel



Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

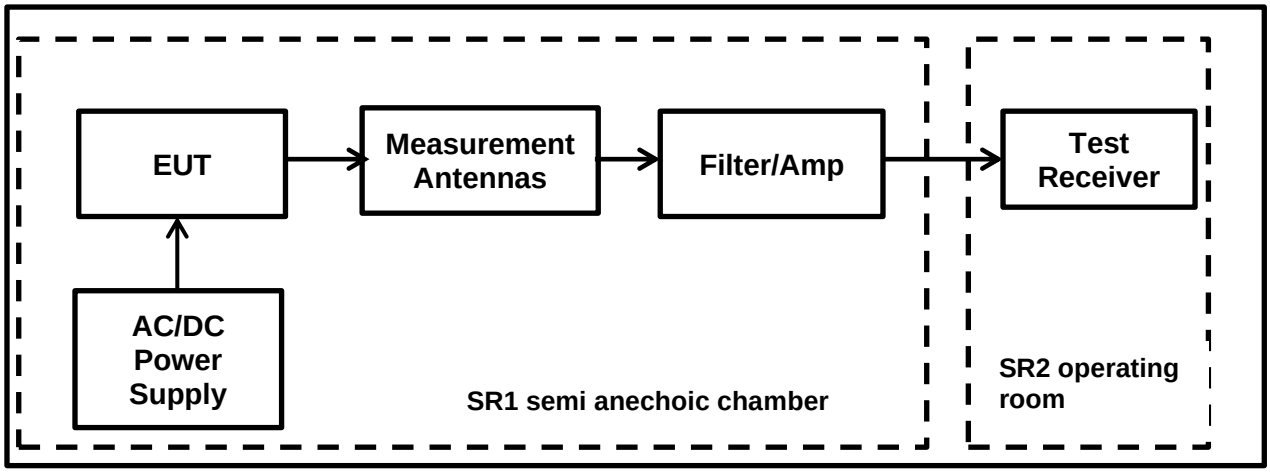
Temperature (°C):	23.2
Relative Humidity (%):	29.9

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)(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)(10) 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 bottom channel only.
6. All emissions shown on the pre-scan plots were found to be below the measurement system noise floor.
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.
8. Pre-scans were performed and markers placed on the highest measured levels. The test receiver was set to:
    - Frequency range: 9 kHz-150kHz : RBW: 300 Hz /VBW: 1 kHz
    - Frequency range: 150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
    - Detector: Max-Peak detector
    - Trace Mode: Max Hold

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

Test Setup:

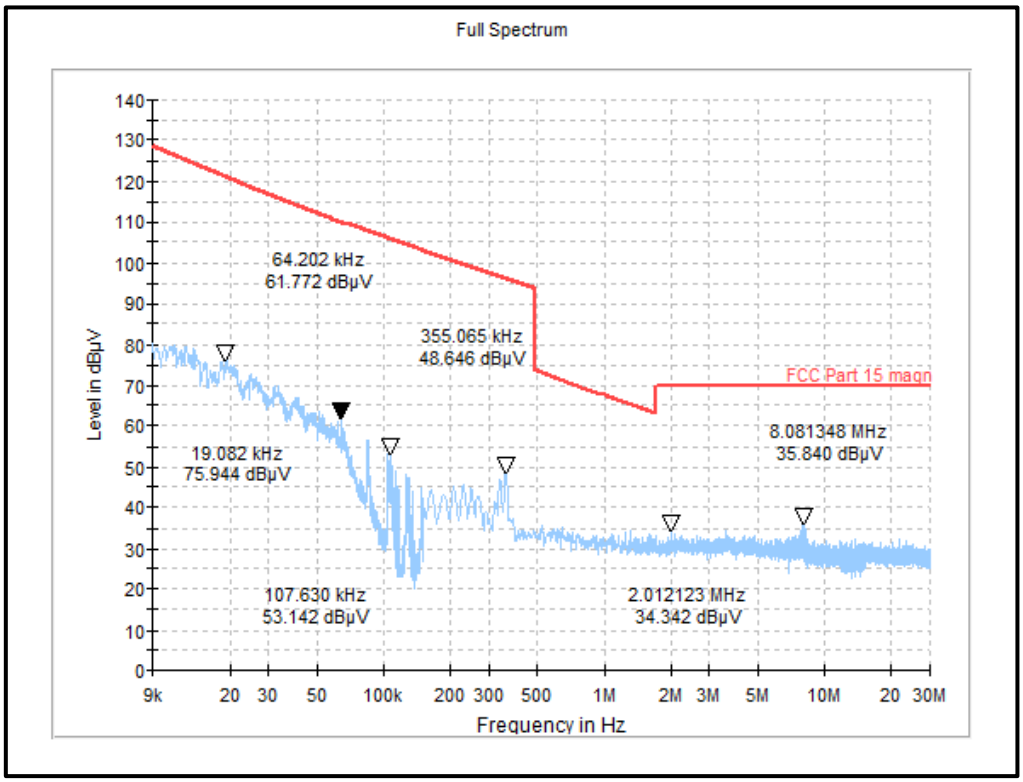


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

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

Plot: 9 kHz – 30 MHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / 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:	Sercan Usta	**Test Date:**	24 November 2021 & 22 March 2022
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

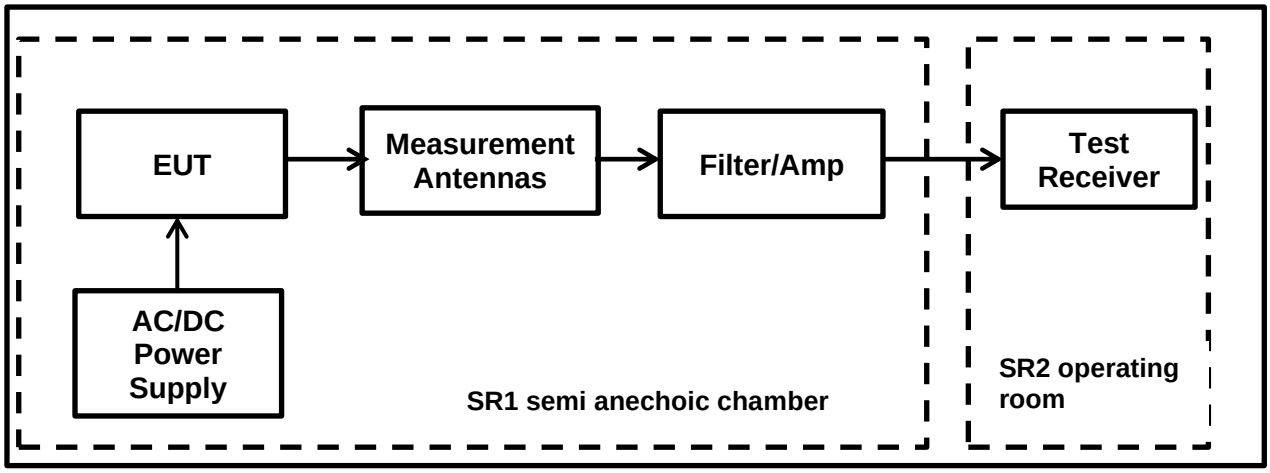
Temperature (°C):	23.2 & 25
Relative Humidity (%):	29.9 & 34

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 bottom channel only.
2. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
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.
5. 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)(10) states the provisions of 15.205 apply, e.g. restricted bands of operation.
6. Measurements below 1 GHz 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. 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:

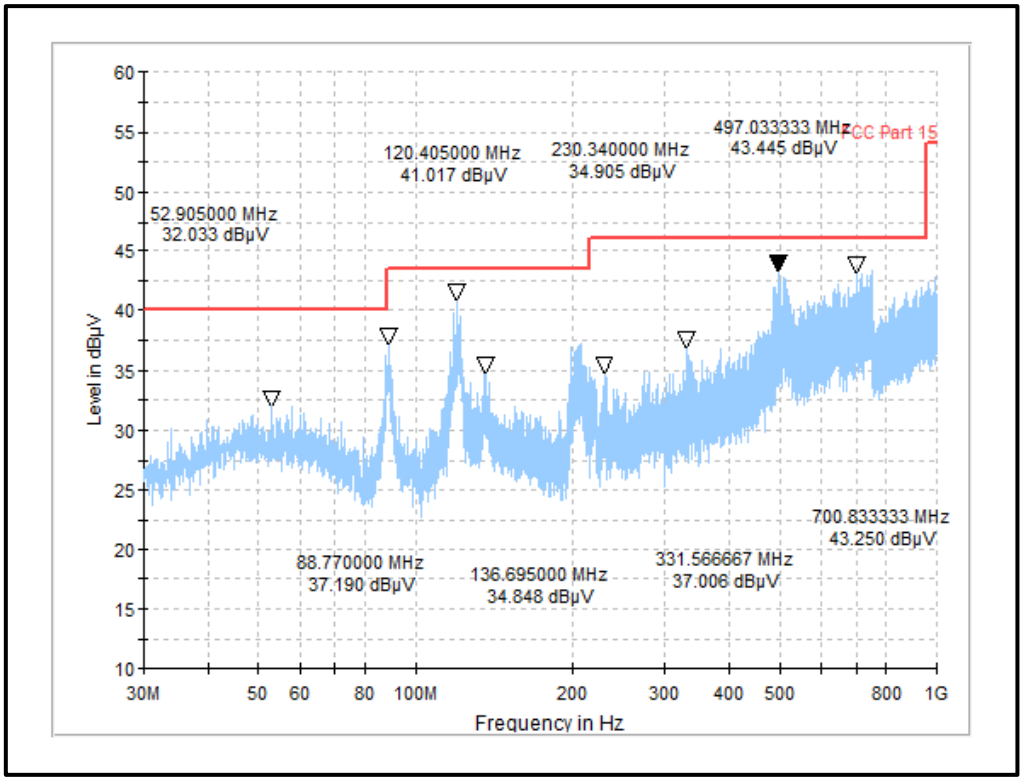


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max | UNII-2A / Bottom Channel

Frequency (MHz)	Antenna Polarization	MaxPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
119.77	Vertical	36.39	40.00	3.61	Complied
496.85	Vertical	42.22	46.02	3.80	Complied

Plot: 30 MHz – 1 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

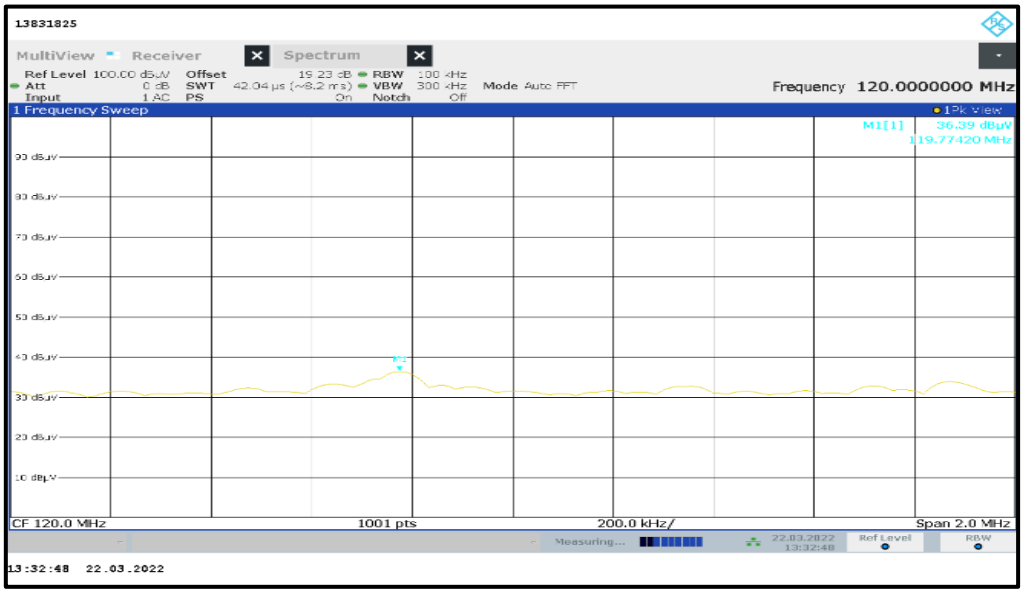


Pre-scan with MaxPeak Detector

Result: Pass

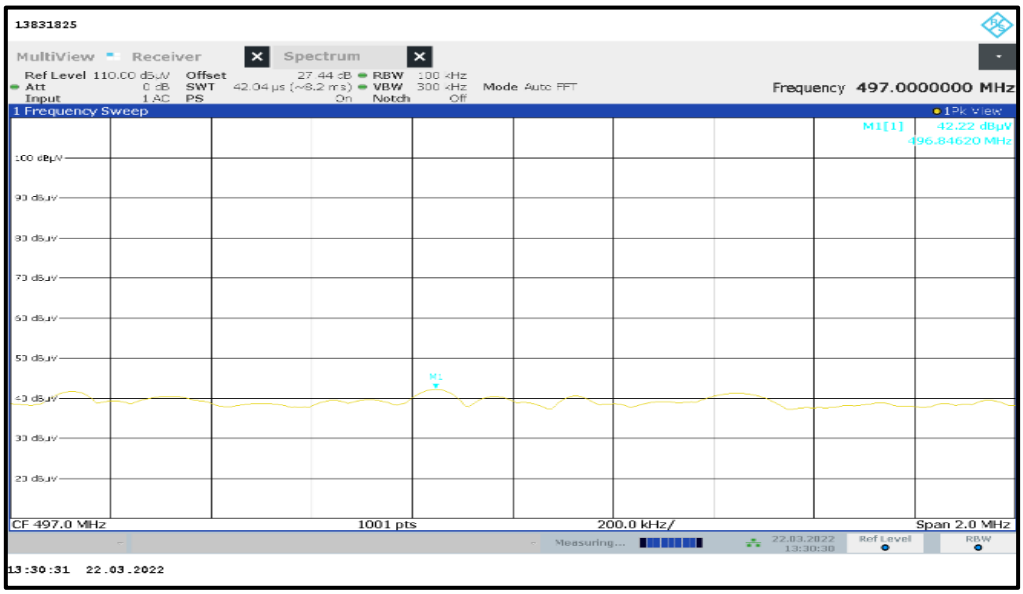
Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Plot: Final Measurment @ 120 MHz :
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel



Final Measurment with MaxPeak Detector

Plot: Final Measurment @ 497 MHz :
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel



Final Measurment with MaxPeak Detector

Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Dates:**	23 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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:

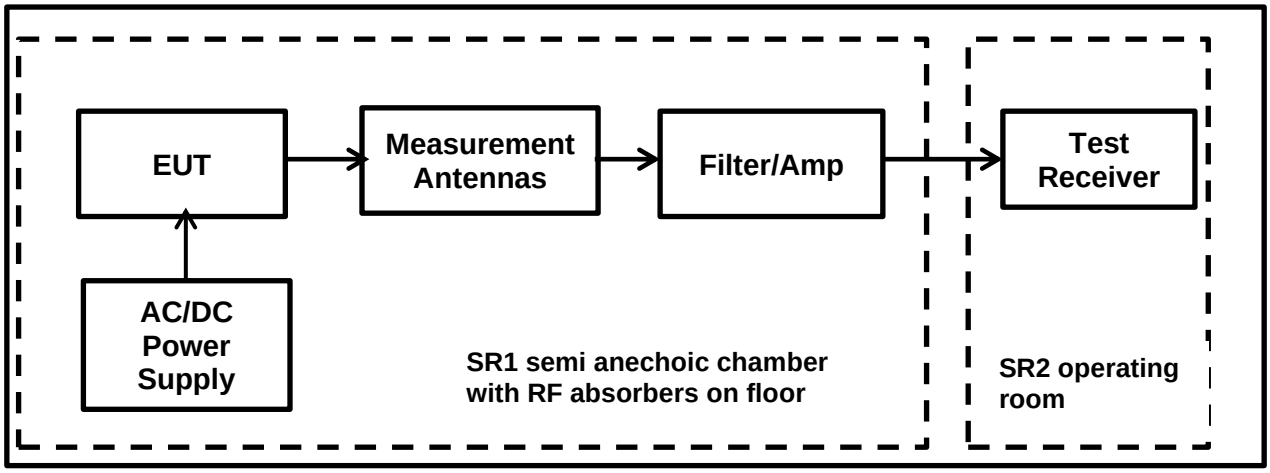
Temperature (°C):	23.0
Relative Humidity (%):	54.8

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. 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)(10) 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.
5. Pre-scans above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 m above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. 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 m to 4 m.
6. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.
7. For frequency range between 1 GHz to 18 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.
8. The preliminary scans showed similar emission levels above 18 GHz, for each channel & modes of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the bottom channel only.
9. In accordance with ANSI C63.10-2013 Section 5.3.3 & 6.5.3 measurements above 18 GHz were performed at closer distance (1 m); because at specified measurement distance (3m) for compliance the instrumentation noise floor was typically close to the radiated emission limit.
10. For frequency range between 18 GHz and 40 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.

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

Test Setup:

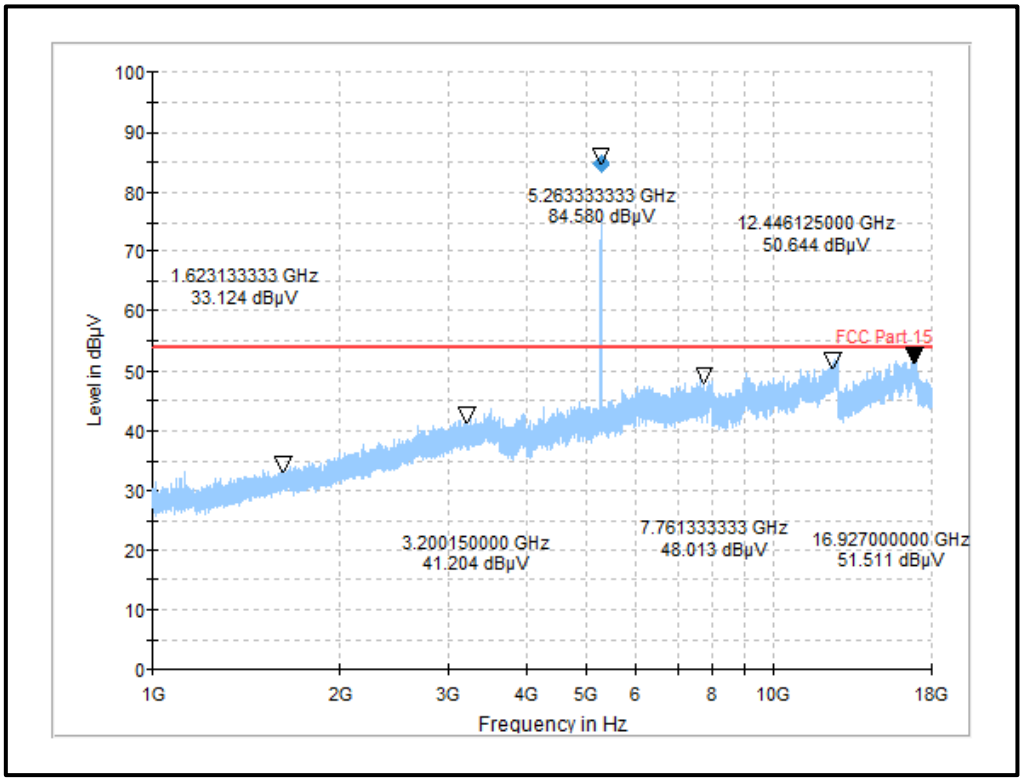


Transmitter Out of Band Radiated Emissions (5.25-5.35 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Bottom Channel



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

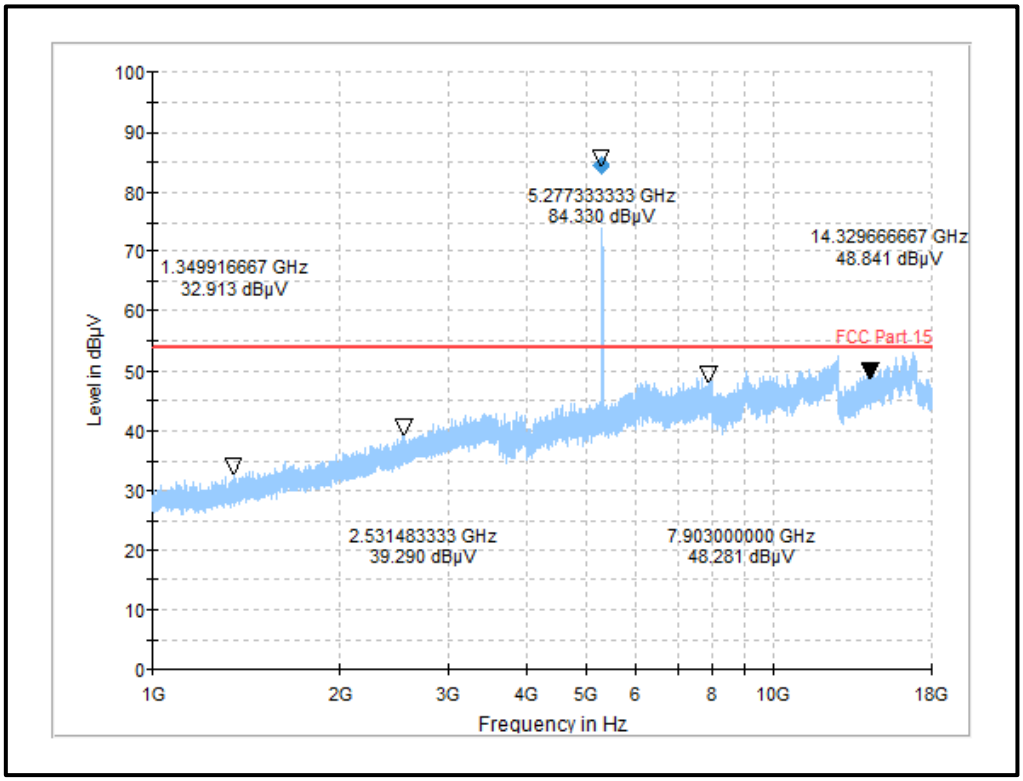
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Middle Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Middle Channel



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

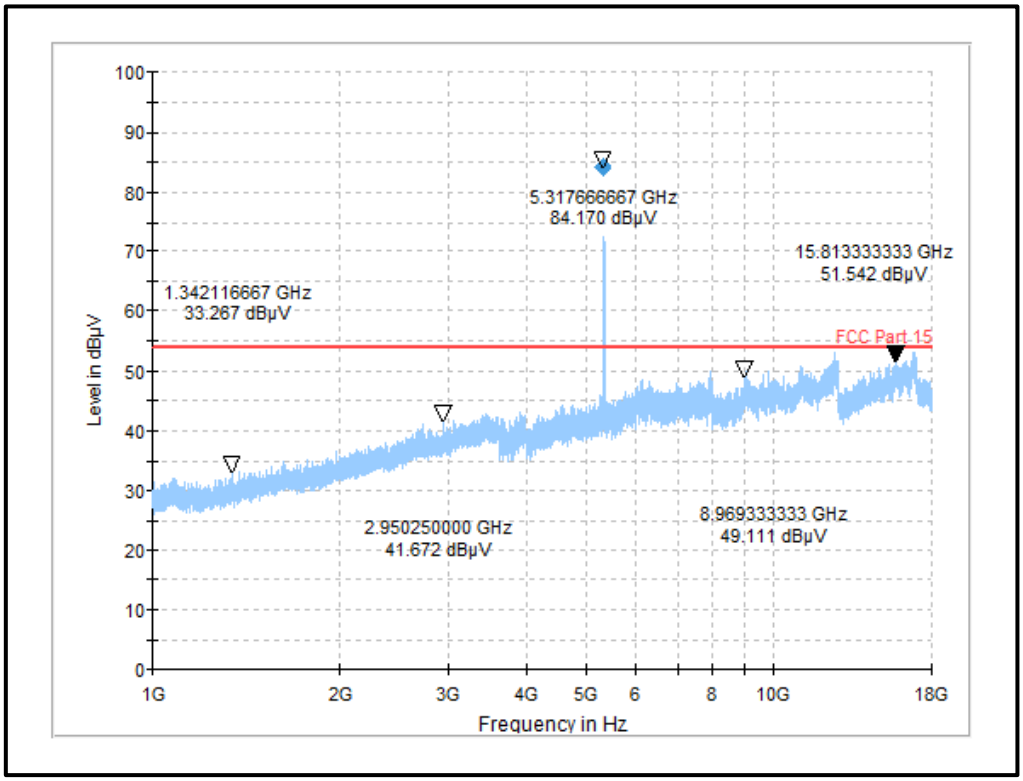
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Top Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / Top Channel



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

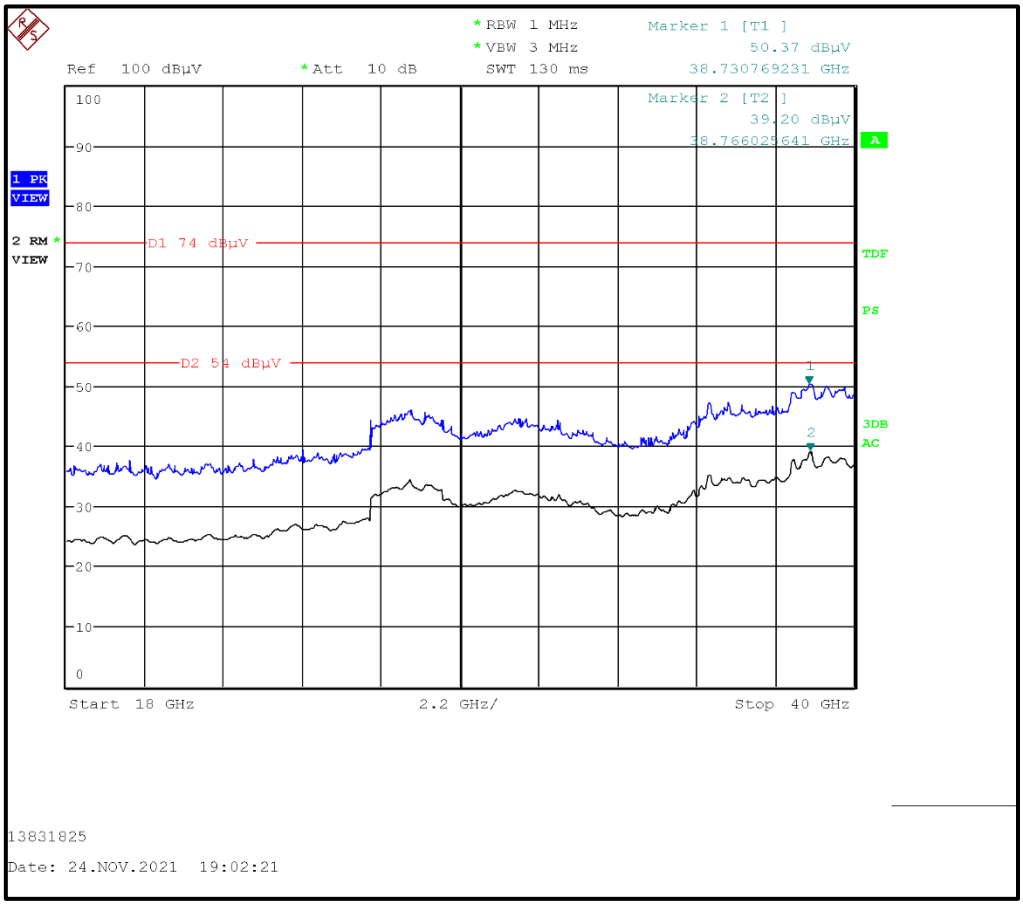
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / 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: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A / 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:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(3),(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:

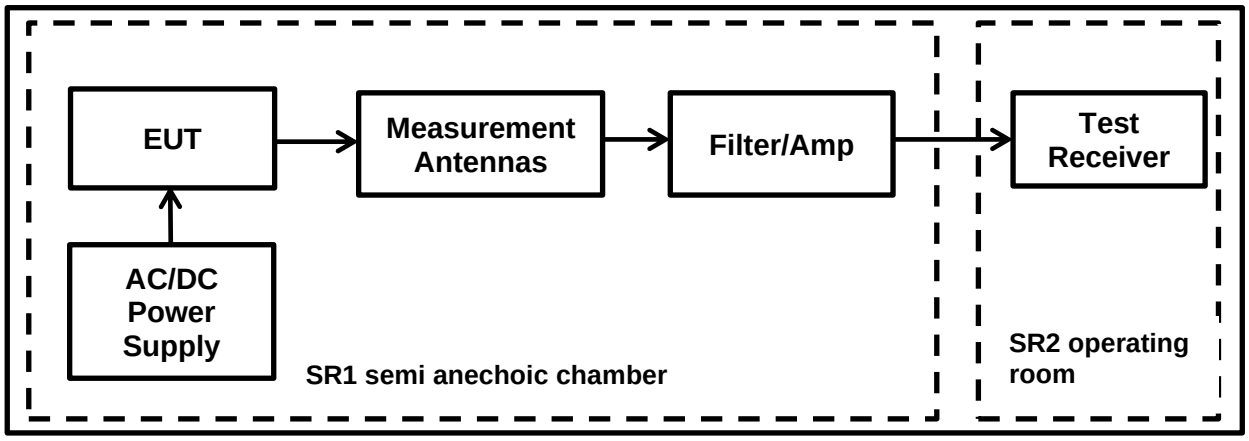
Temperature (°C):	23.2
Relative Humidity (%):	29.9

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)(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)(10) 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 investigated and found to be below system noise floor.
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.
9. Pre-scans were performed and markers placed on the highest measured levels. The test receiver was set to:
    - Frequency range: 9 kHz-150kHz : RBW: 300 Hz /VBW: 1 kHz
    - Frequency range: 150 kHz – 30 MHz: RBW: 10 kHz /VBW: 30 kHz
    - Detector: Max-Peak detector
    - Trace Mode: Max Hold

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

Test Setup:

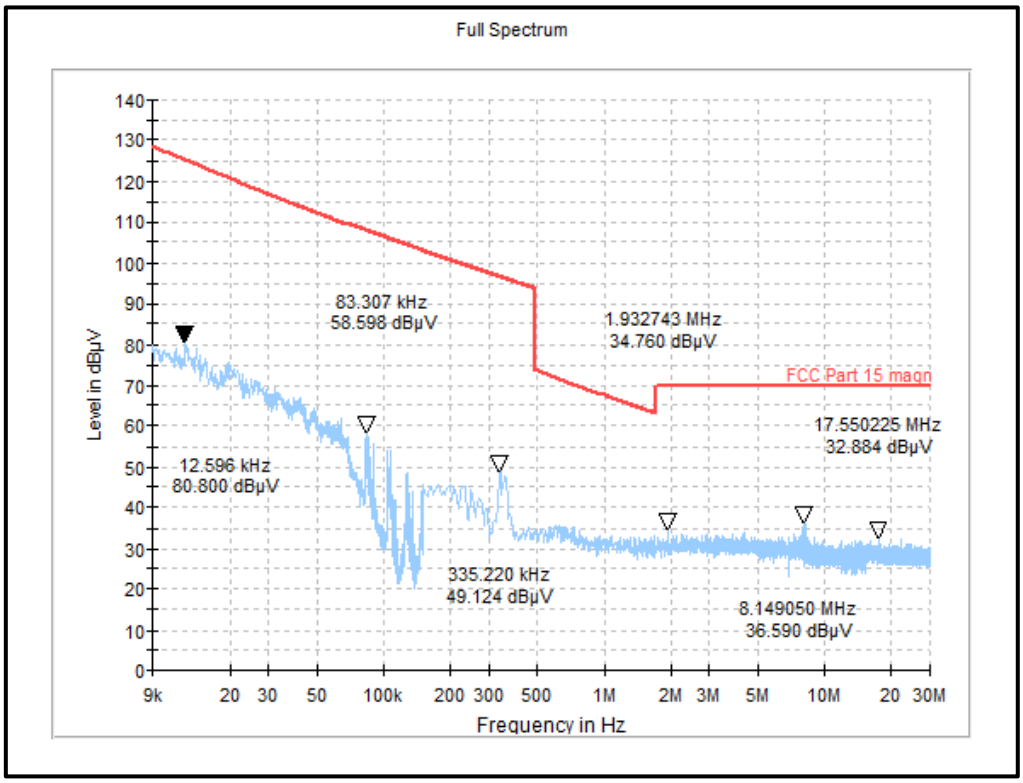


Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

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

Plot: 9 kHz – 30 MHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / 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 (5.47-5.725 GHz band operation) (continued)

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021 & 22 March 2022
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
Test Site Identification	SR 1/2		

FCC Reference:	Parts 15.407(b)(3),(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:

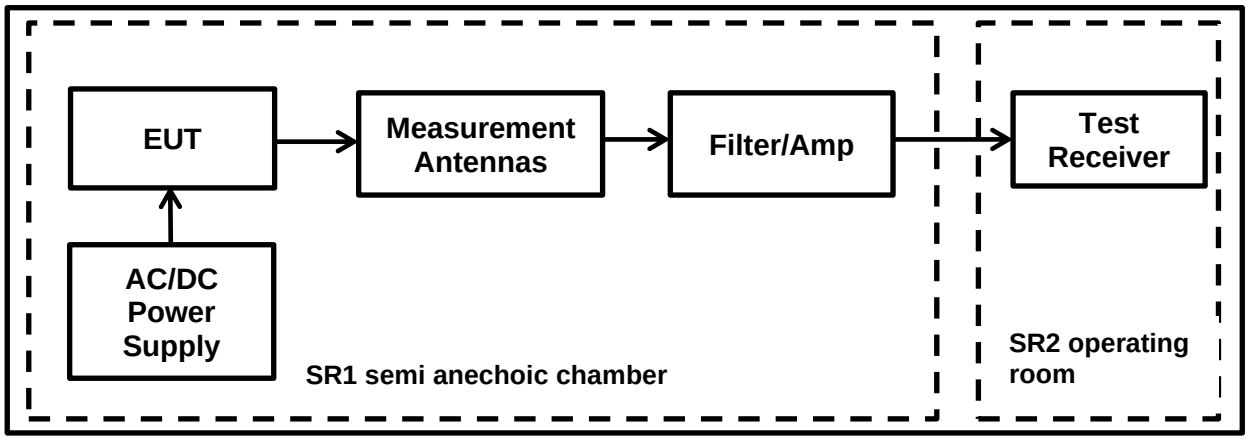
Temperature (°C):	23.2 & 25
Relative Humidity (%):	29.9 & 34

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 bottom channel only.
2. Pre-scans were performed and markers placed on the highest measured levels. The test receiver resolution bandwidth was set to 100 kHz and video bandwidth 300 kHz. A peak detector was used, sweep time was set to auto and trace mode was Max Hold.
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.
5. 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)(10) states the provisions of 15.205 apply, e.g. restricted bands of operation.
6. Measurements below 1 GHz 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. 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 (5.47-5.725 GHz band operation) (continued)

Test Setup:

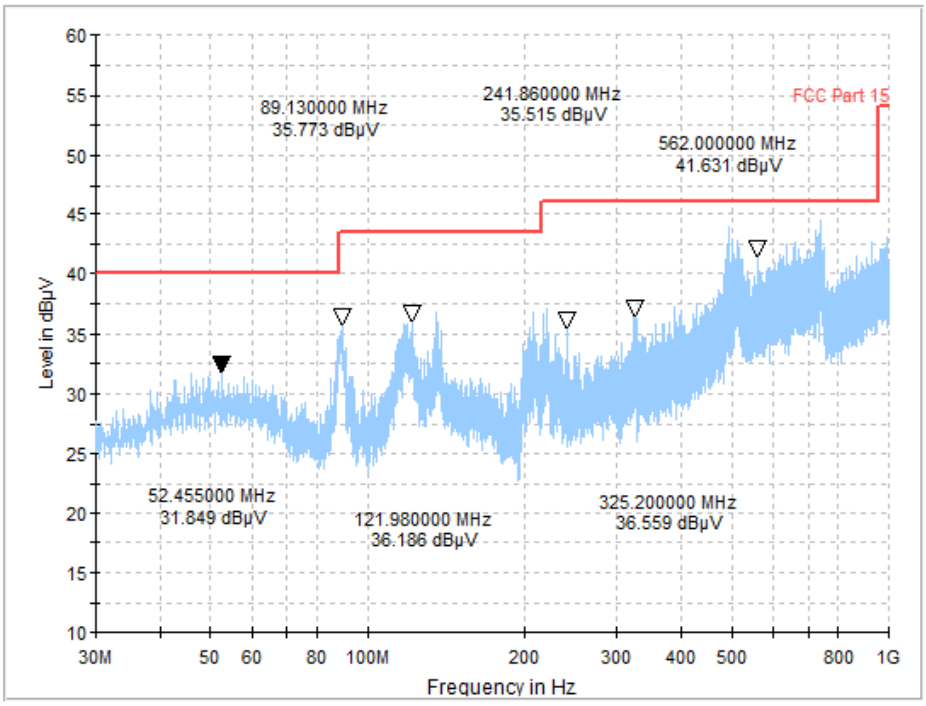


Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

Frequency (MHz)	Antenna Polarization	MaxPeak Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
491.48	Vertical	42.23	46.02	3.79	Complied

Plot: 30 MHz – 1 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

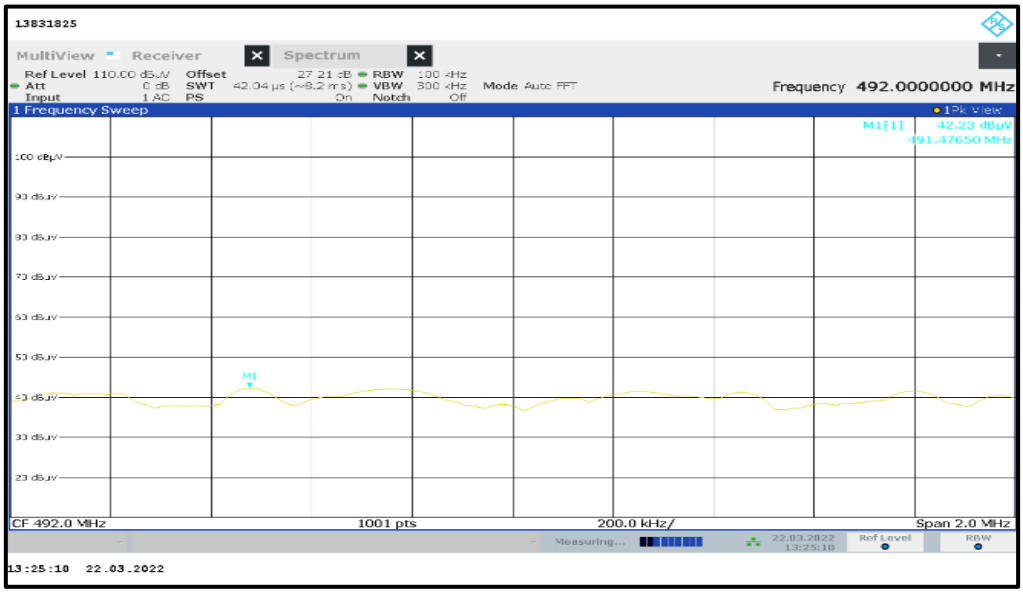


Pre-scan with MaxPeak Detector

Result: Pass

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

Plot: Final Measurment @ 492 MHz :
802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel



Final Measurment with MaxPeak Detector

Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	23 November 2021
Test Sample Serial Number:	100101000221 (RF Test Sample with External SMA Connectors)		
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):	23.0
Relative Humidity (%):	54.8

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)(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)(10) states the provisions of 15.205 apply, e.g. restricted bands of operation.
3. Pre-scans above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 m above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with absorber on the floor at a distance of 3 m. 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 m to 4 m.
4. Pre-scans were performed and a marker placed on the highest measured level of the appropriate plot. The test receiver resolution bandwidth was set to 1 MHz and video bandwidth 3 MHz. The sweep time was set to auto.
5. For frequency range between 1 GHz to 18 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.
6. The preliminary scans showed similar emission levels above 18 GHz, for each channel & modes of operation. Therefore, final radiated emissions measurements were performed with the EUT set to the bottom channel only.
7. In accordance with ANSI C63.10-2013 Section 5.3.3 & 6.5.3 measurements above 18 GHz were performed at closer distance (1 m); because at specified measurement distance (3m) for compliance the instrumentation noise floor was typically close to the radiated emission limit.
8. For frequency range between 18 GHz and 40 GHz, no critical emissions were found. All emissions shown on the pre-scans were investigated and found to be below the noise floor of the measurement system.

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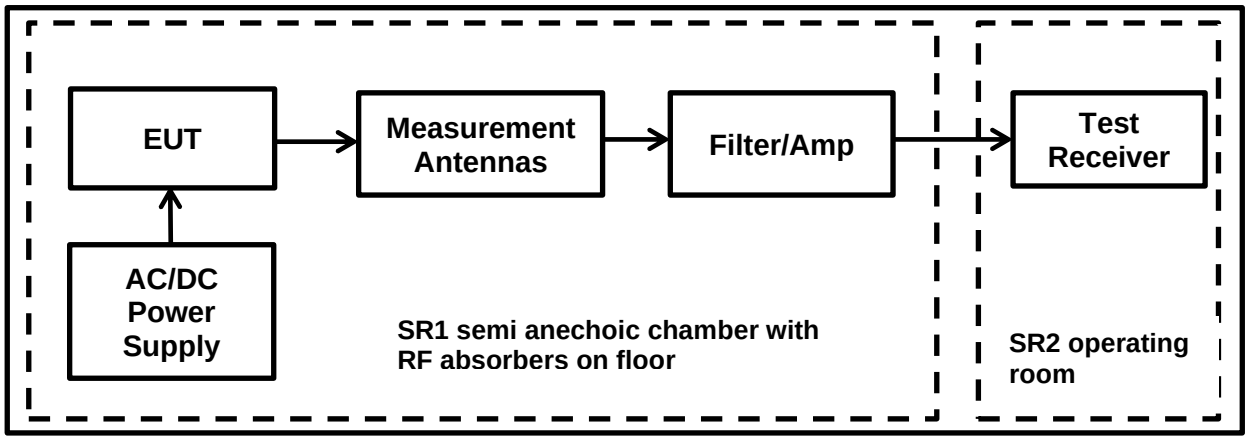
Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Test Setup:

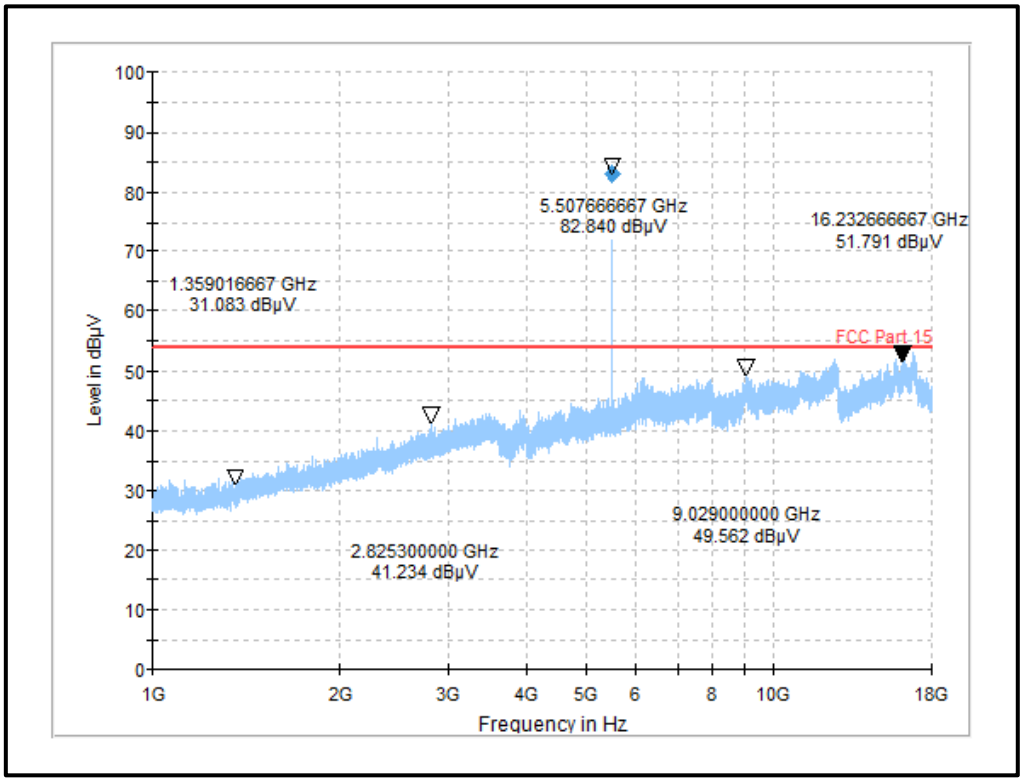


Transmitter Out of Band Radiated Emissions (5.47-5.725 GHz band operation) (continued)

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom Channel



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

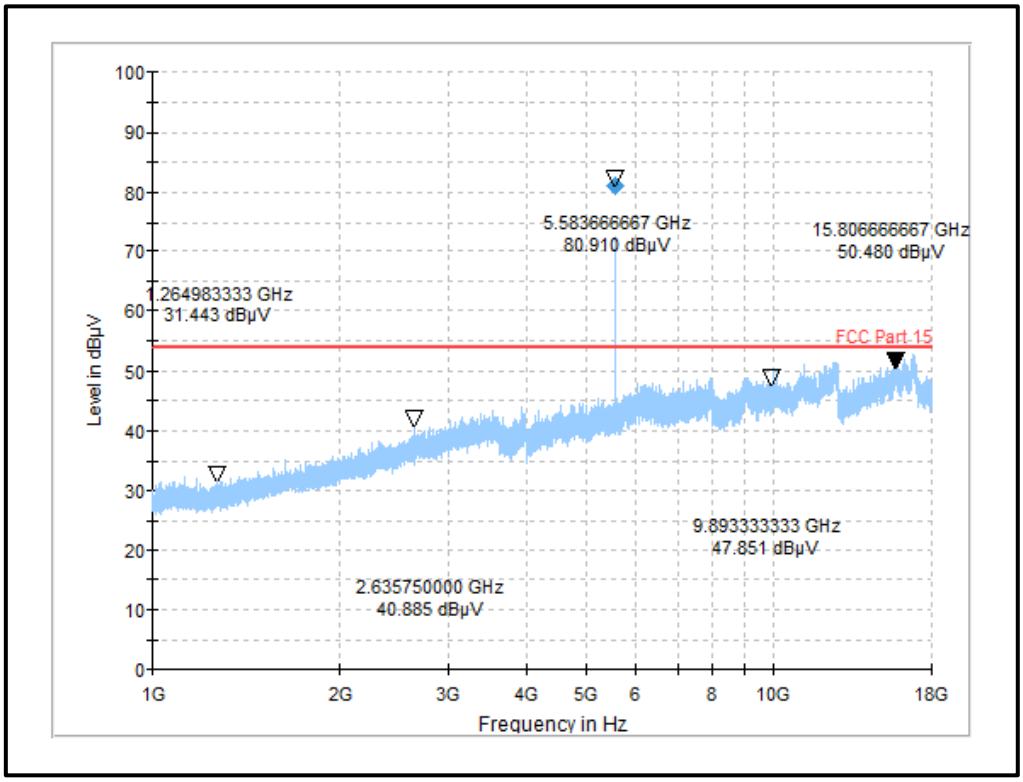
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Middle Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Middle Channel



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

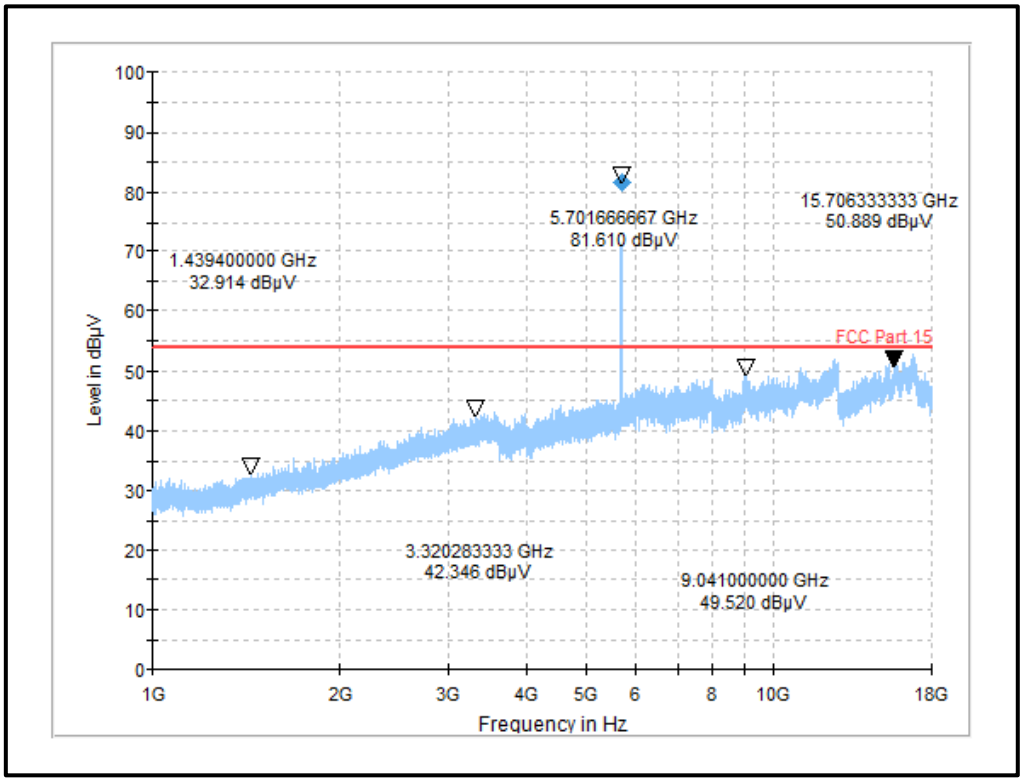
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Top Channel

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

Plot: 1 GHz – 18 GHz: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Top Channel



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

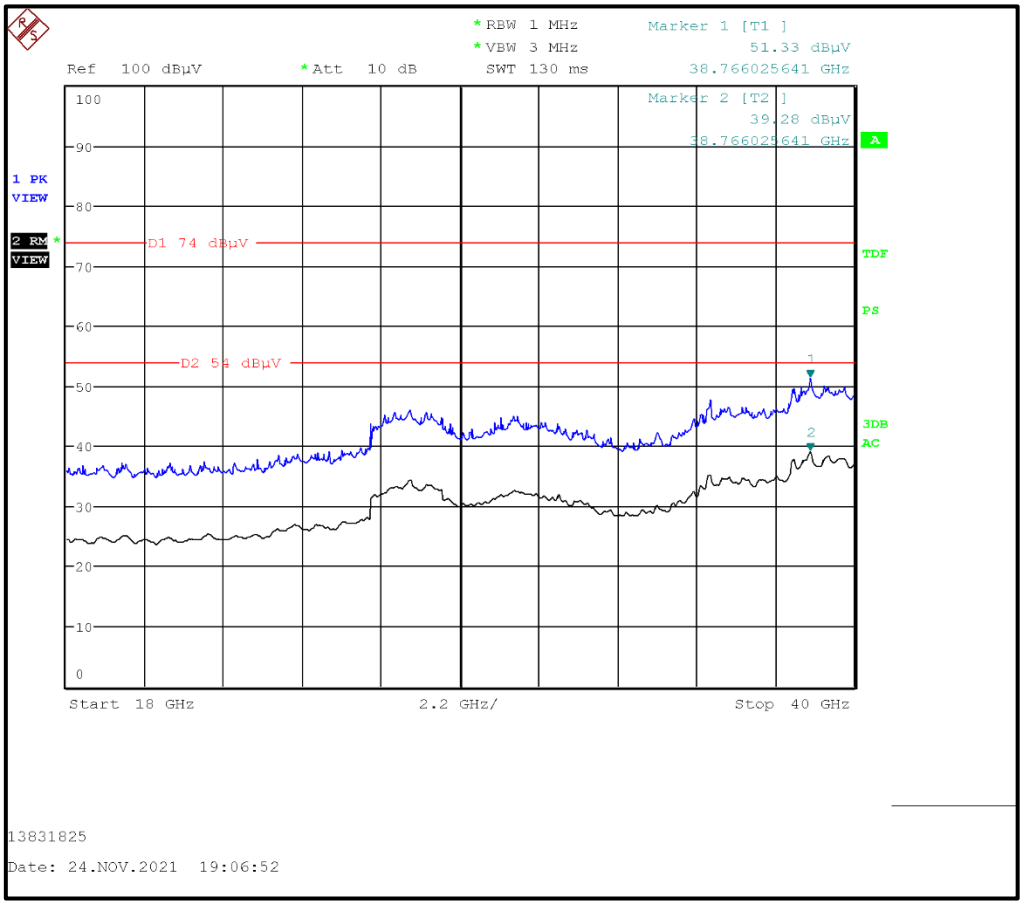
Result: Pass

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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / 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: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C / Bottom 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

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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):	23.2
Relative Humidity (%):	29.9

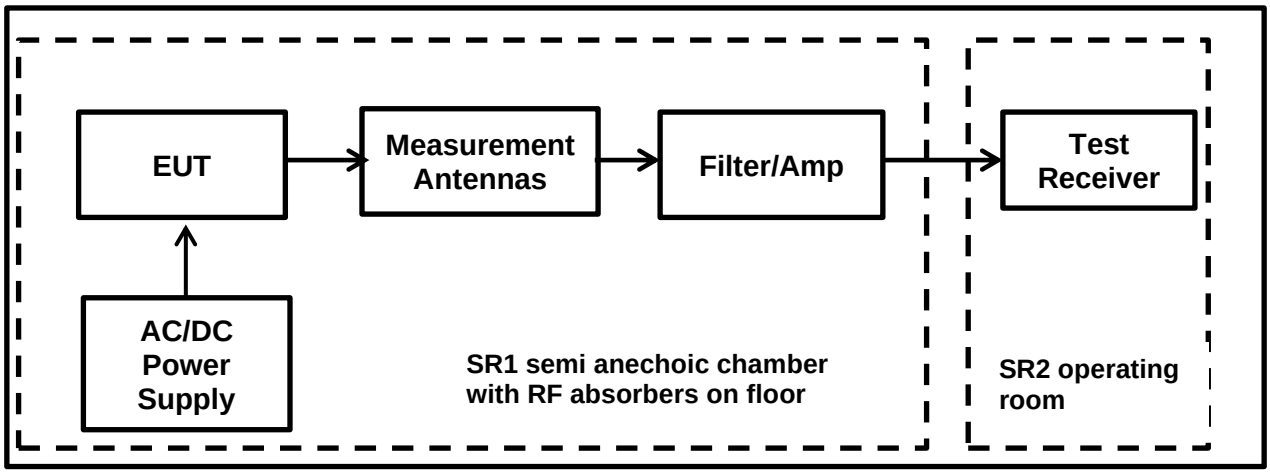
Note(s):

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 placed at a height of 1.5 meters above the test chamber floor in the centre of the chamber turntable. 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 dB (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. 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)
9. *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):

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. **As the EUT continuous transmission of the EUT (D ≥ 98%) cannot be achieved and EUT was transmitting continuously with a constant Duty Cycle of 94.63 % (duty cycle variations are less than ±2%). Therefore, a Duty Cycle Correction Factor of 0.24 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:



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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1

Results: Lower Band Edge / Peak / Bottom Channel / PWR 12

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5123.08	52.06	68.20	16.14	Complied
5150.00	49.88	68.20	18.32	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 12

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5036.54	39.81	0.24	40.05	54.00	13.95	Complied
5150.00	39.30	0.24	39.54	54.00	14.46	Complied

Results: Upper Band Edge / Peak / Top Channel / PWR 12

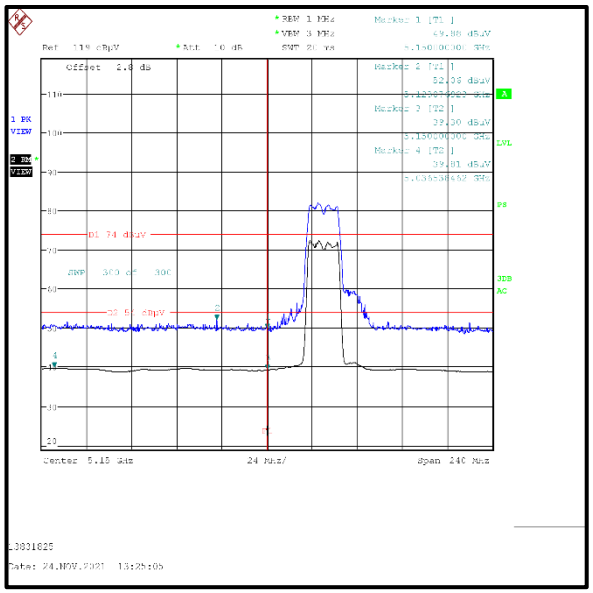
Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5350.00	49.79	68.20	18.41	Complied
5361.15	52.03	68.20	16.17	Complied

Results: Upper Band Edge / Average / Top Channel / PWR 12

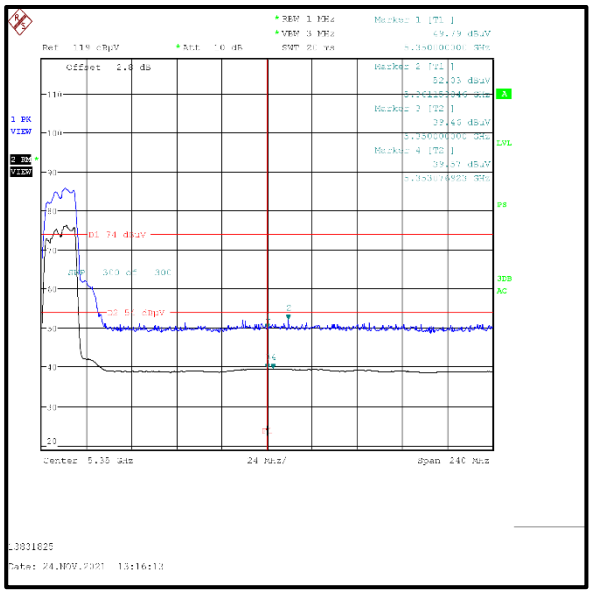
Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	39.46	0.24	39.70	54.00	14.30	Complied
5353.08	39.57	0.24	39.81	54.00	14.19	Complied

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

Plots: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-1



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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 (%):	29.9

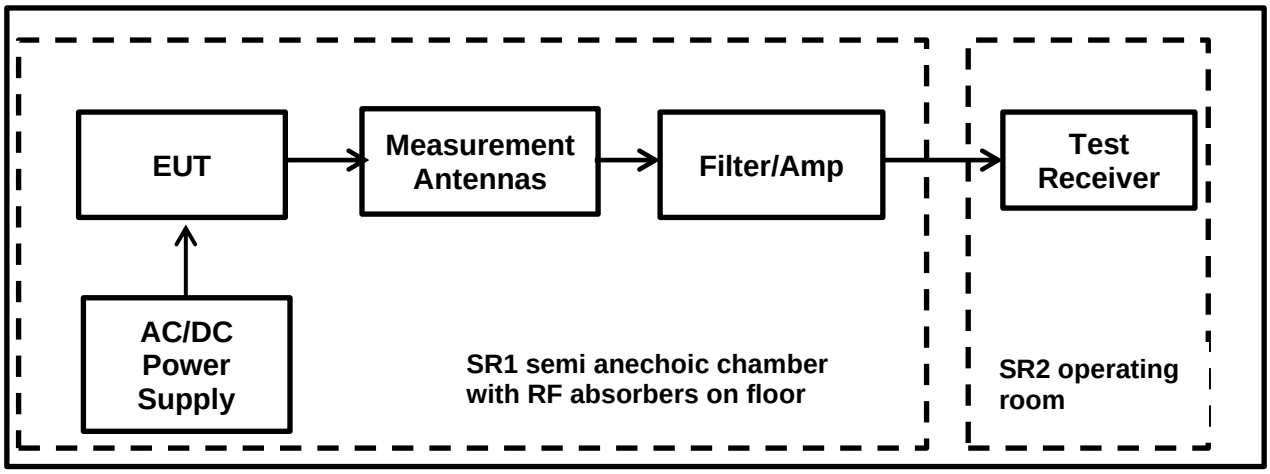
Note(s):

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. The measurements were in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with RF absorbers on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m
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 dB (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. 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)
9. *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):

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. **As the EUT continuous transmission of the EUT (D ≥ 98%) cannot be achieved and EUT was transmitting continuously with a constant Duty Cycle of 93.95 % (duty cycle variations are less than ±2%). Therefore, a Duty Cycle Correction Factor of 0.27 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:



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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A

Results: Lower Band Edge / Peak / Bottom Channel / PWR 12

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5115.00	51.61	68.20	16.59	Complied
5150.00	50.46	68.20	17.74	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 12

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5035.00	39.78	0.27	40.05	54.00	13.95	Complied
5150.00	39.19	0.27	39.46	54.00	14.54	Complied

Results: Upper Band Edge / Peak / Top Channel / PWR 12

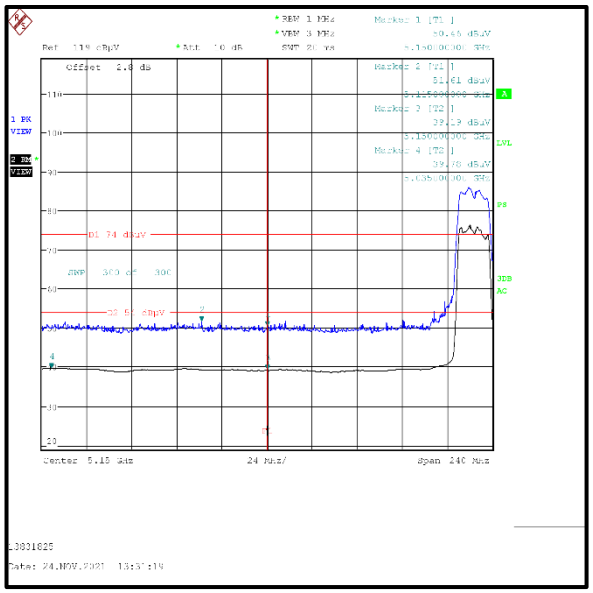
Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5350.00	51.32	68.20	16.88	Complied
5371.92	52.00	68.20	16.20	Complied

Results: Upper Band Edge / Average / Top Channel / PWR 12

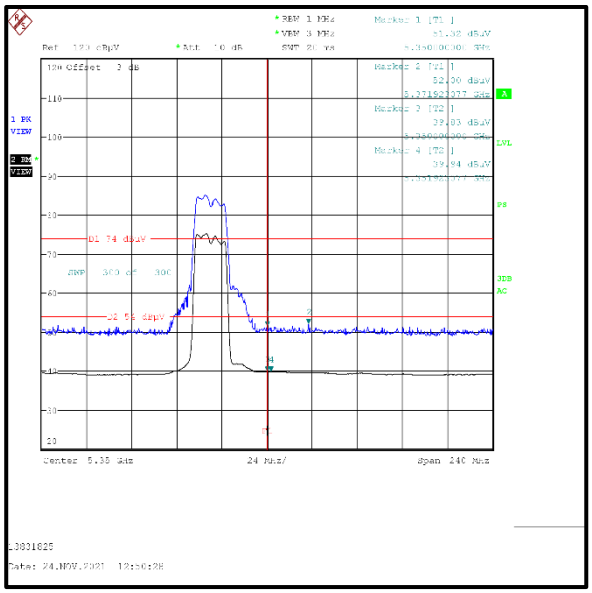
Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5350.00	39.83	0.27	40.10	54.00	13.90	Complied
5351.92	39.94	0.27	40.21	54.00	13.79	Complied

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

Plots: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2A



Lower Band Edge Measurement-Bottom



Upper Band Edge Measurement-Top

Result: Pass

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

Test Summary:

Test Engineer:	Sercan Usta	**Test Date:**	24 November 2021
Test Sample Serial Number:	100101000221(RF Test Sample with External SMA Connectors)		
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 (%):	29.9

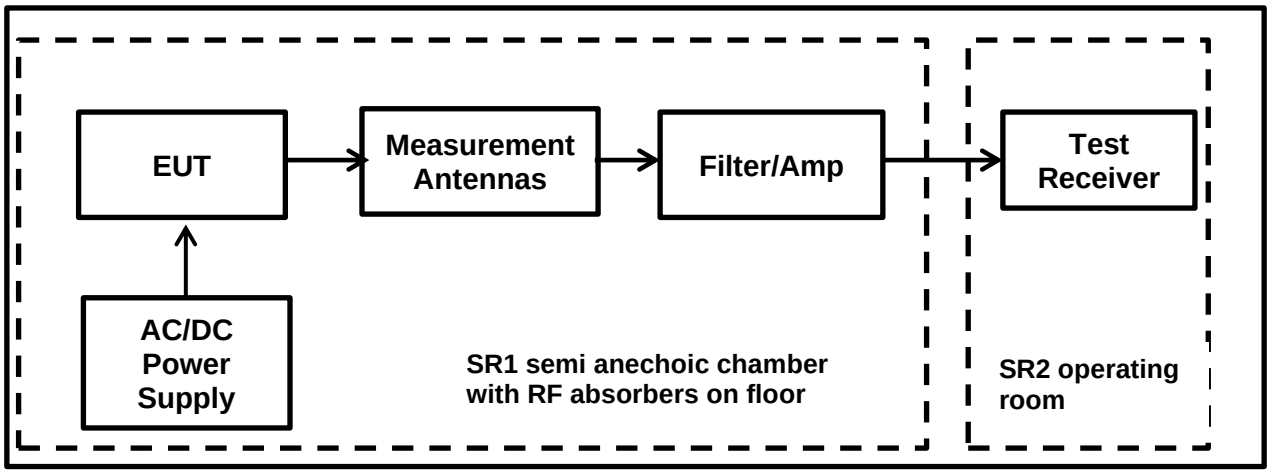
Note(s):

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. The measurements were in a semi-anechoic chamber SR1/ 2 (Asset Number 1603665) with RF absorbers on the floor at a distance of 3 m. The EUT was placed at a height of 1.5 m above the test chamber floor in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 m to 4 m
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 dB (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):

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. **As the EUT continuous transmission of the EUT (D ≥ 98%) cannot be achieved and EUT was transmitting continuously with a constant Duty Cycle of 95.30% (duty cycle variations are less than ±2%). Therefore, a Duty Cycle Correction Factor of 0.21 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:



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

Results: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C

Results: Lower Band Edge / Peak / Bottom Channel / PWR 12

Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5401.54	52.07	68.20	16.13	Complied
5470.00	50.73	68.20	17.47	Complied

Results: Lower Band Edge / Average / Bottom Channel / PWR 12

Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5351.54	39.91	0.21	40.12	54.00	13.88	Complied
5470.00	39.54	0.21	39.75	54.00	14.25	Complied

Results: Upper Band Edge / Peak / Top Channel / PWR 12

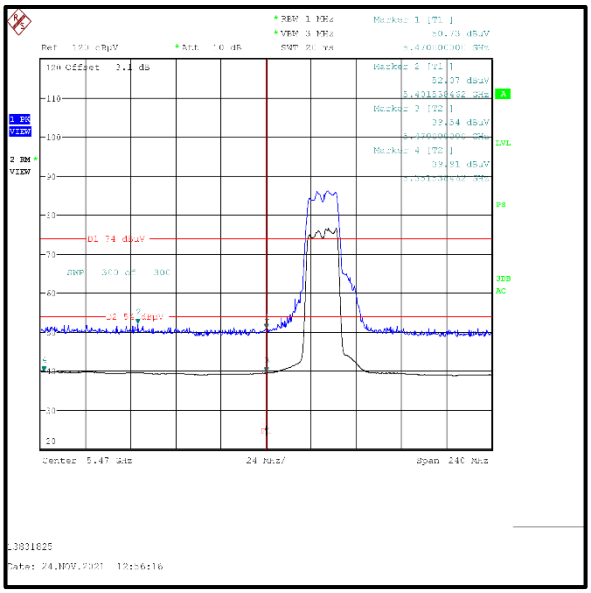
Frequency (MHz)	Peak Level (dBµV/m)	Peak Limit* (dBµV/m)	Margin (dB)	Result
5725.00	50.40	68.20	17.80	Complied
5763.08	51.70	68.20	16.50	Complied

Results: Upper Band Edge / Average / Top Channel / PWR 12

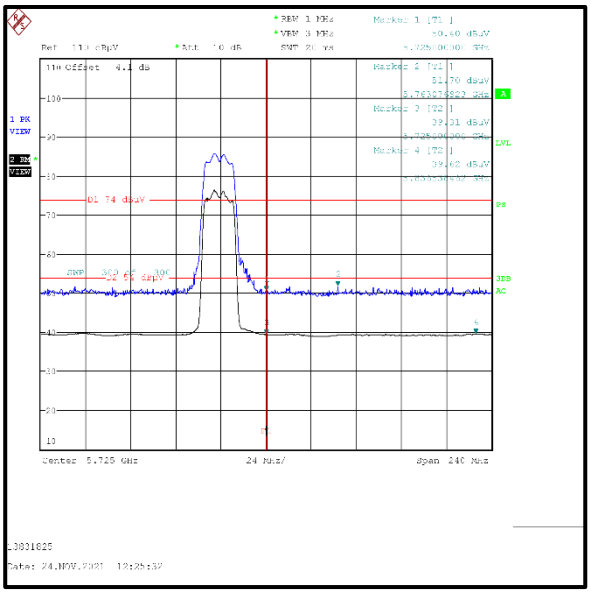
Frequency (MHz)	Average Level (dBµV/m)	Duty Cycle Correction Factor (dB)	Corrected Average Level ** (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
5725.00	39.31	0.21	39.52	54.00	14.48	Complied
5836.54	39.62	0.21	39.83	54.00	14.17	Complied

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

Plots: 802.11a / 20 MHz / 6 Mbps / Power Settings: Max / UNII-2C



Lower Band Edge Peak 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
377	BONN Elektronik	Amplifier, Low Noise Pre	BLMA 0118-1A	025294B	16/07/2021	12
423	Bonn Elektronik	Amplifier, Low Noise Pre	BLMA 1840-1A	55929	16/07/2021	12
460	Deisel	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. - periodical	HL050	100297	05/08/2020	36
607	Schwarzbeck	Antenna broadband horn antenna	BBHA 9170	9170-561	15/10/2019	36
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	28/06/2021	12
669	Rohde & Schwarz	EMI Test Receiver	ESW44	103087	03/02/2022	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
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	14/07/2021	12
349	Rohde & Schwarz	Receiver, EMI Test	ESIB7	836697/009	13/07/2021	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	84	-	Initial Version
Test Report Version 1.1 supersede Version 1.0 with immediate effect Test Report No. UL-RPT-RP-13831825-516-FCC Version 1.1, Issue Date 08 APRIL 2022 replaces Test Report No. UL-RPT-RP-13831825-516-FCC Version 1.0, Issue Date 31 MARCH 2022, which is no longer valid.			
1.1	as below	as below	Current Version
	1	-	“Infarm Gateway WiFI” replaced with “Infarm Gateway”
	1	-	“2A2CI-INF001-WF” replaced with “"Contains 2A2CI-INF001-WF" and "Contains 2A2CI-INF001-CL"”
	8	3.1	“Infarm Gateway WiFI” replaced with “Infarm Gateway” “2A2CI-INF001-WF” replaced with “"Contains 2A2CI-INF001-WF" and "Contains 2A2CI-INF001-CL"”
	8	3.2	Description of EUT updated
	9	3.4	Max power detail deleted
	35-38	5.2.3	Notes updated & plots renamed
	48-51	5.2.3	Notes updated & plots renamed
	61-64	5.2.3	Notes updated & plots renamed

--END of Test Report--