




# TEST REPORT

Report Number: C21T00132-SRD10-V00

Applicant	Toast, Incorporated
Product Name	Data Processing machine
Model Name	TT204W, T204, TT202W, TT203, TK200, TT203W, TK300
Brand Name	Toast
FCC ID	2AMNG-TT200B
IC	23177-TT200B

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part15, ANSI C63.10, KDB 789033, KDB 905462, RSS-247, RSS-Gen.

Prepared by		Reviewed by	
Approved by		Issue Date	2021-12-30

**Industrial Internet Innovation Center (Shanghai) Co., Ltd.**



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### **Test Laboratory:**

Industrial Internet Innovation Center (Shanghai) Co., Ltd.  
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### Revision Version

Report Number	Revision	Date	Memo
C21T00132-SRD10-V00	00	2021-12-30	Initial creation of test report



## CONTENTS

1. TEST LABORATORY.....	5
1.1. TESTING LOCATION .....	5
1.2. TESTING ENVIRONMENT .....	5
1.3. PROJECT INFORMATION .....	5
2. CLIENT INFORMATION.....	6
2.1. APPLICANT INFORMATION .....	6
2.2. MANUFACTURER INFORMATION.....	6
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE).....	7
3.1. ABOUT EUT.....	7
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....	7
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST.....	8
4. REFERENCE DOCUMENTS .....	9
4.1. REFERENCE DOCUMENTS FOR TESTING .....	9
4.2. REFERENCE INFORMATION FROM CLIENT .....	9
5. TEST SUMMARY .....	10
5.1. SUMMARY OF TEST RESULTS .....	10
6. MEASUREMENT RESULTS.....	12
6.1. TRANSMITTER SPURIOUS EMISSION .....	15
7. TEST EQUIPMENT LIST .....	26
7.1. RADIATED EMISSION TEST SYSTEM .....	26
ANNEX A: MEASUREMENT UNCERTAINTY .....	27
ANNEX B: ACCREDITATION CERTIFICATE .....	28



## 1. Test Laboratory

### 1.1. Testing Location

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	CN1177

### 1.2. Testing Environment

Normal Temperature	15°C~35°C
Relative Humidity	25%RH~75%RH
Supply Voltage	230V/50Hz

### 1.3. Project Information

Project Leader	Wang Wenwen
Testing Start Date	2021-11-17
Testing End Date	2021-12-28



## 2. Client Information

### 2.1. Applicant Information

Company Name	Toast, Incorporated
Address	401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone	5625462272

### 2.2. Manufacturer Information

Company Name	Toast, Incorporated
Address	401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone	5625462272

### 3. Equipment under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Product Name	Data Processing machine
Model name	TT204W, TT204, TT202W, TT203, TK200, TT203W, TK300
Supported Radio Technology and Bands	BT 4.2 WLAN 802.11b,g,n WLAN 802.11a,n,ac
Hardware Version	CT541MB80C 20210430
Software Version	Sunmi-ct541-v3.0.33p033
WLAN Frequency	UNII 1: 5150MHz-5250MHz
WLAN type of modulation	OFDM
FCC ID	2AMNG-TT200B
IC	23177-TT200B
Nominal Voltage	230V
Extreme High Voltage	253V
Extreme Low Voltage	207V

#### 3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
N01 (Mainly Supply)	N/A	CT541MB80C 20210430	Sunmi-ct541-v3.0.3 3p033	2021/11/17
N02 (Thirdly Supply)	N/A	CT541MB80C 20210430	Sunmi-ct541-v3.0.3 3p033	2021/11/17
N04 (Secondary Supply)	N/A	CT541MB80C 20210430	Sunmi-ct541-v3.0.3 3p033	2021/11/17

\*EUT ID: is internally used to identify the test sample in the lab.



### 3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
AE1	RF cable	N/A	N/A

\*AE ID: is internally used to identify the test sample in the lab.



## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2020
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
KDB 789033 D02	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2017
KDB 905462 D02	COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION	2016
RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	2017
RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus	2019

### 4.2. Reference Information from client

Information of the test sample provided by the client.

## 5. Test Summary

### 5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Output Power	15.407(a)	RSS-247 6.2	N/A
Power Spectral Density	15.407(a)	RSS-247 6.2	N/A
99% Occupied Bandwidth	N/A	RSS-Gen 6.7	N/A
-26dB	15.407(a)	RSS-247 6.2	N/A
Band edge compliance	15.407(b)	RSS-247 6.2	Pass
Transmitter spurious emissions radiated	15.407(b)	RSS-247 6.2	Pass
Spurious emissions radiated < 30 MHz	15.209 & 15.407(b)	RSS-247 6.2 RSS-Gen 8.9,8.10	N/A
Spurious emissions conducted < 30 MHz	15.407(b)	RSS-247 6.2	N/A
Frequency Stability	15.407(g)	RSS-Gen 8.11	N/A
Transmit Power Control	15.407(h)	RSS-247 6.2	N/A

Note: All the test data for each data were verified, but only the worst case was reported.

#### Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25°C
Voltage	Vnom	230V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa



## 5.2. Statements

The TT204W,TT204,TT202W,TT203,TK200,TT203W,TK300 supporting BT/WLAN, manufactured by Toast, Incorporated are variant products for testing.

This project is a variant project based on the original report C21T00056-SRD04-V02, We tested the worst case radiation data, and the test data of the worst mode was recorded in the report. The rest of the data are reference prototype report data.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

The description of the differences between the models is updated as follows:

Mainly Supply	TT204	Main LCD panel Terminal + Sub LCD panel Terminal + Attached base support
	TT204W	The same with TT204, just the color is White
Secondary Supply	TT203	Main LCD panel Terminal + Attached base support
	TT202W, TT203W	The same with TT203, just the color is White
Thirdly Supply	TK200	Main LCD panel Terminal + Add POE module + Add one speaker
Fourth Supply	TK300	Main LCD panel Terminal + Add POE module + Add one speaker + Add one bracket

## 6. Measurement Results

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω

**Control room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber1** (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

## 6.1. Band Edges - Radiated

### Measurement Limit:

Standard	Limit (dB $\mu$ V/m)	
	FCC 47 CFR Part 15.209	Peak
	Average	54

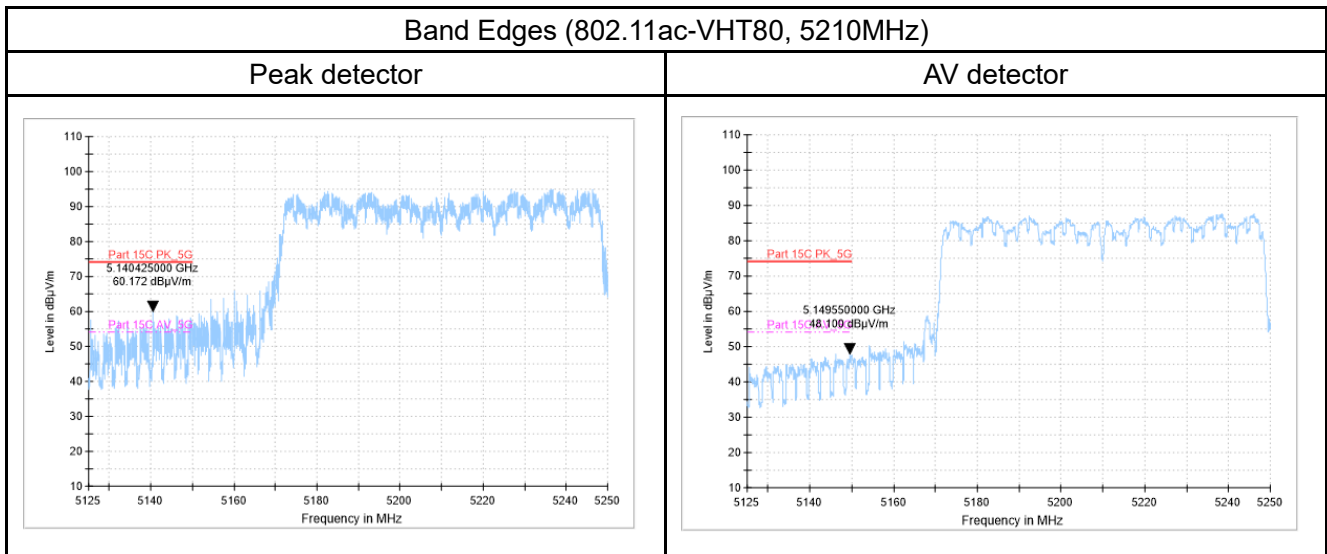
The measurement is made according to KDB 789033.

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

### Measurement Result:

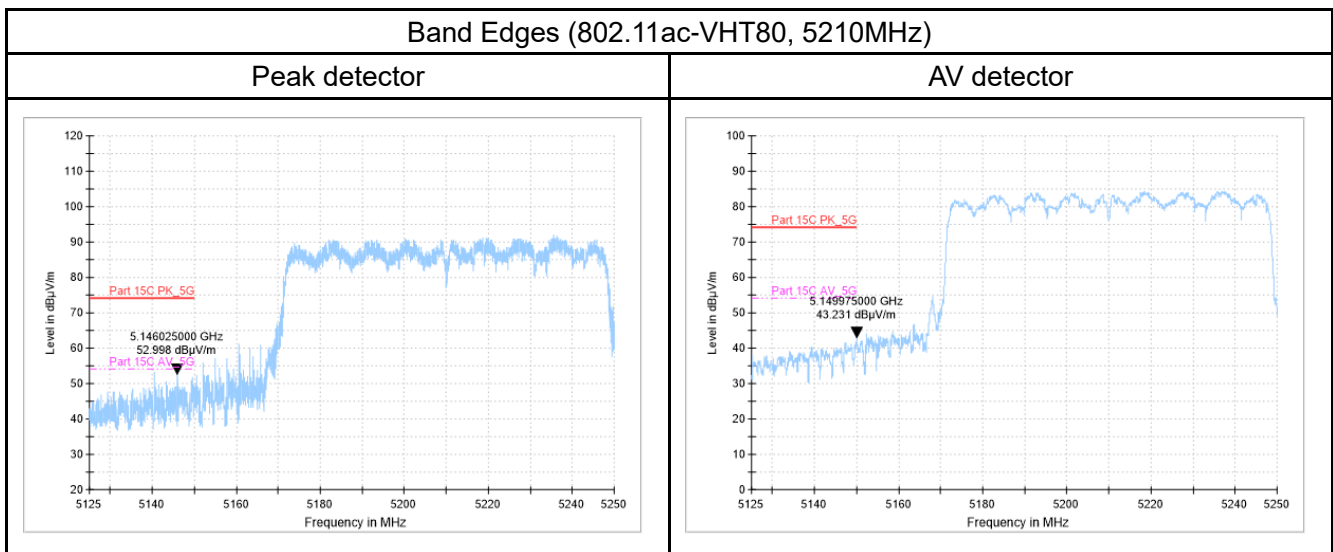
#### N01 Mainly Supply

##### U-NII-1:



#### N04 Secondary Supply

##### U-NII-1:

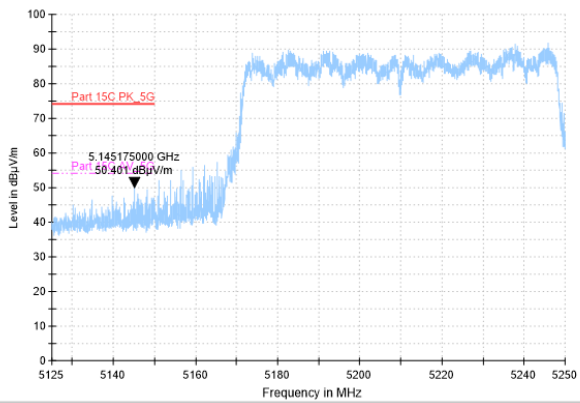


#### N02 Thirdly Supply

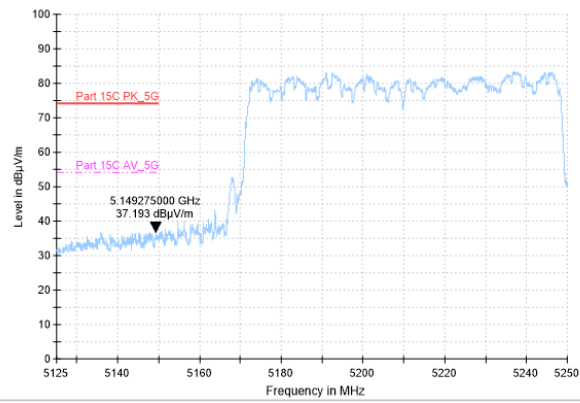
U-NII-1:

Band Edges (802.11ac-VHT80, 5210MHz)

Peak detector



AV detector



## 6.2. Transmitter Spurious Emission

### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

The measurement is made according to KDB 789033

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz (detector: Peak):

(a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep= AUTO

### Limit in restricted band:

Frequency of emission (MHz)	Field strength(dBμV/m)	Measurement distance(m)
0.009-0.490	129-94	3
0.490-1.705	74-63	3
1.705-30	70	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m

Modulation type and data rate tested (Only worst case result is given below):

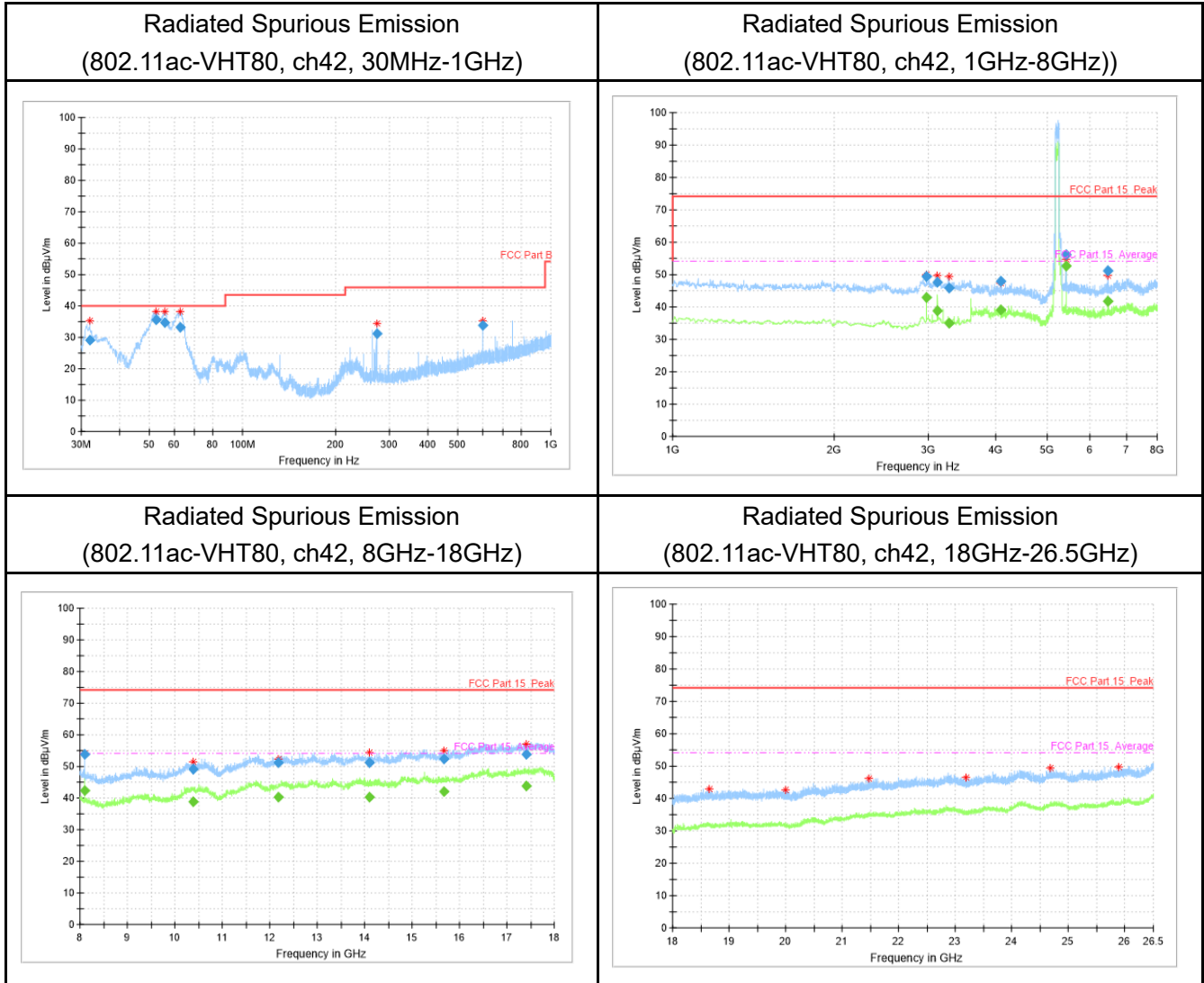
**U-NII-1:**

Mode	Data rate	Channel
802.11ac-VHT80	MCS0	42(5210MHz)

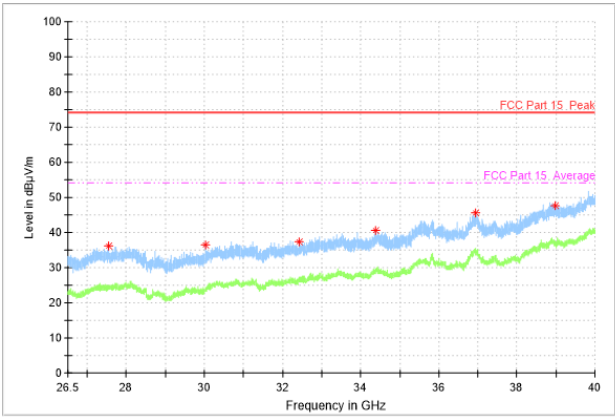
**Measurement Results:**

**N01 Mainly Supply**

**U-NII-1:**





<p style="text-align: center;">Radiated Spurious Emission (802.11ac-VHT80, ch42, 26.5GHz-40GHz)</p>	/
 <p>The graph displays the radiated spurious emission level in dBμV/m on the y-axis (ranging from 0 to 100) against frequency in GHz on the x-axis (ranging from 26.5 to 40). Two horizontal lines represent FCC Part 15 limits: a red line for 'FCC Part 15 Peak' at approximately 75 dBμV/m and a purple line for 'FCC Part 15 Average' at approximately 55 dBμV/m. The measured emission is shown as a blue line with red asterisks, which remains below the peak limit and fluctuates around the average limit. A green line at the bottom of the graph represents a lower-level signal or noise floor.</p>	/

**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

$P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

**U-NII-1:****RSE-11AC(80M)-CH42-30M-1G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
31.9	29.19	-14.3	43.49	V
52.4	35.7	-12	47.7	V
56.1	34.73	-12.1	46.83	V
63.0	33.28	-13.3	46.58	V
272.2	31.12	-11.1	42.22	H
600.0	33.84	-3.5	37.34	V

**RSE-11AC(80M)-CH42-1G-8G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
2969.8	49.45	1	48.45	V
3118.6	47.63	1.2	46.43	V
3273.0	45.84	1.3	44.54	V
4083.8	47.93	1.2	46.73	H
5400.0	56.3	2	54.3	V
6480.4	51.03	2.9	48.13	V

**RSE-11AC(80M)-CH42-1G-8G(Average)**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
5400.0	52.57	2	50.57	V

**RSE-11AC(80M)-CH42-8G-18G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
8099.0	53.8	4.3	49.5	V
10392.6	48.98	7.7	41.28	V
12179.8	51.28	10.6	40.68	V
14108.0	51.25	12.4	38.85	V
15670.0	52.27	14.5	37.77	H
17404.4	53.86	17.8	36.06	H

**RSE-11AC(80M)-CH42-18G-26.5G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
18644.3	42.92	-4.8	47.72	H

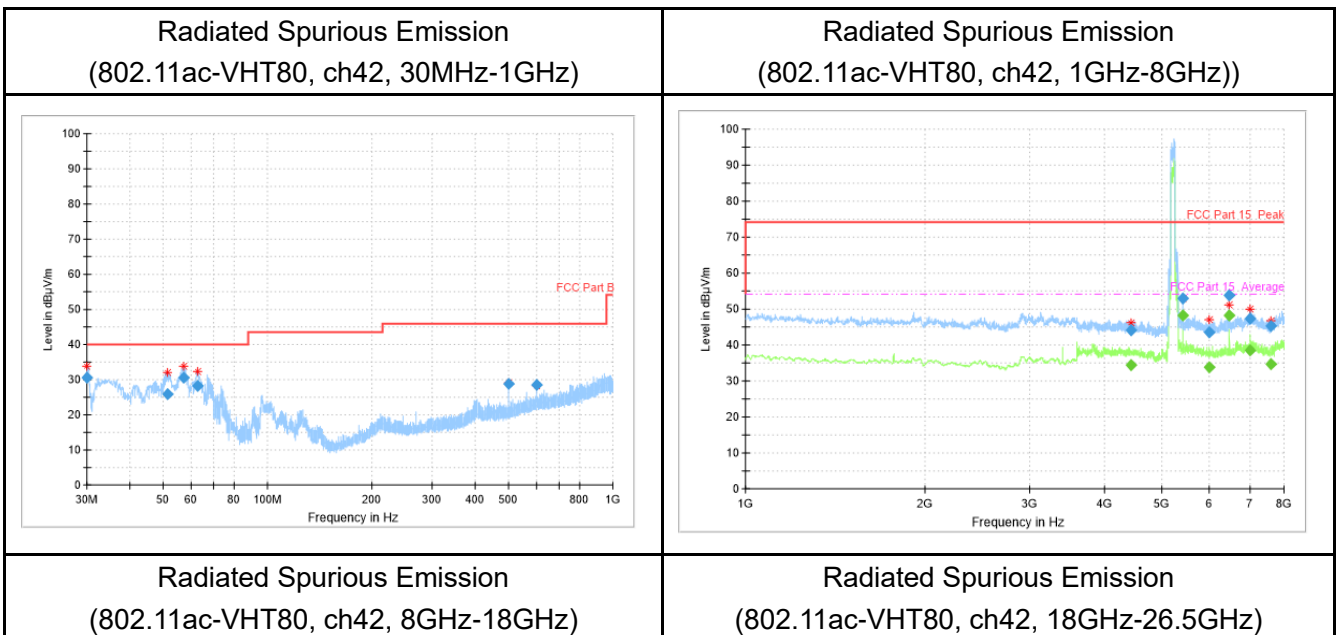
19996.6	42.65	-4.6	47.25	V
21465.4	46.12	-2.2	48.32	H
23179.0	46.53	-1.5	48.03	V
24675.0	49.27	0.3	48.97	H
25881.2	49.65	0	49.65	H

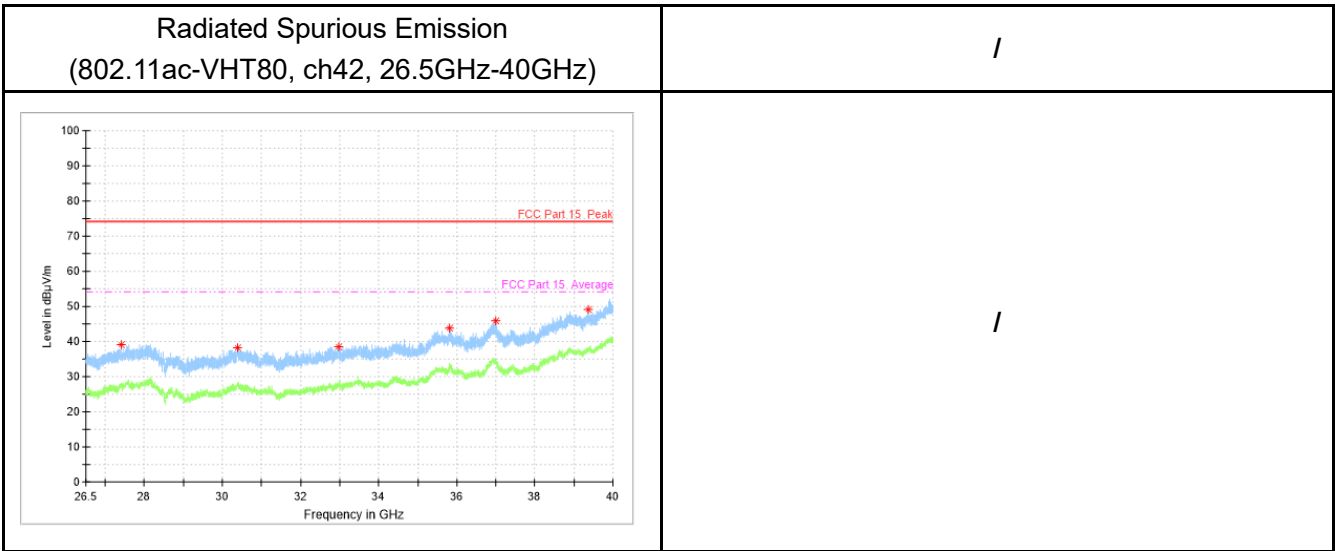
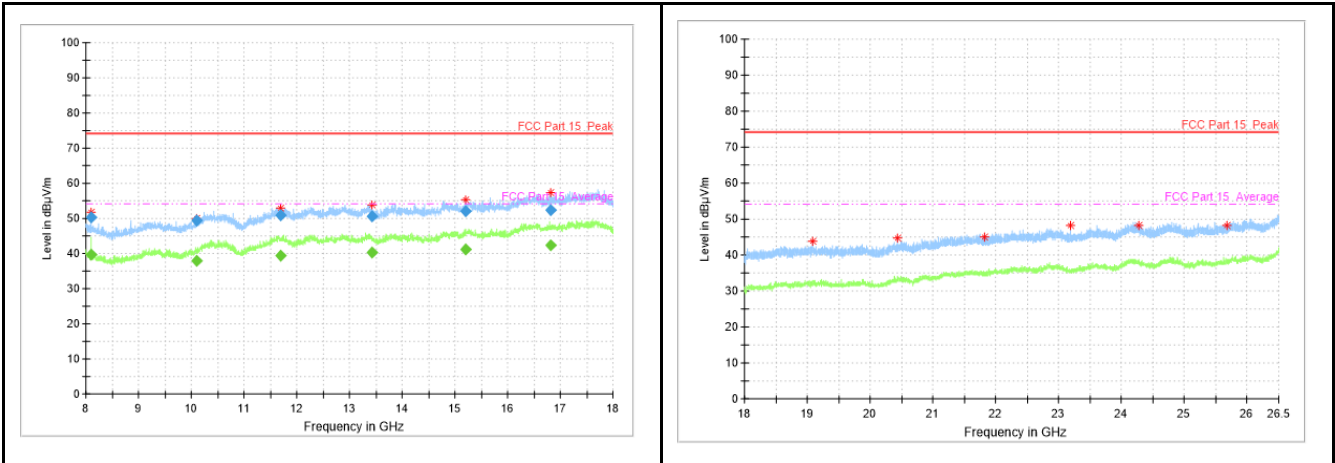
RSE-11AC(80M)-CH42-26.5G-40G

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27547.6	36.2	0.2	36	V
30031.6	36.55	0.6	35.95	V
32423.8	37.23	3.1	34.13	H
34384.0	40.55	4.6	35.95	H
36928.8	45.63	8.3	37.33	V
38971.3	47.67	11.9	35.77	H

N04 Secondary Supply

U-NII-1:





**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

$P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

**U-NII-1:****RSE-11AC(80M)-CH42-30M-1G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
30.1	30.72	-14.4	45.12	V
51.2	25.8	-12	37.8	V
57.2	30.57	-12.2	42.77	V
62.6	28.22	-13.2	41.42	V
500.0	28.76	-6.4	35.16	H
600.0	28.39	-3.5	31.89	V

**RSE-11AC(80M)-CH42-1G-8G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
4434.2	44.24	1.5	42.74	V
5399.8	52.95	2	50.95	V
5987.6	43.48	1.9	41.58	V
6480.2	53.87	2.9	50.97	H
7019.4	47.41	4.3	43.11	H
7607.6	45.2	3.4	41.8	H

**RSE-11AC(80M)-CH42-8G-18G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
8099.0	50.42	4.3	46.12	V
10107.6	49.51	6.5	43.01	H
11701.2	51	10	41	H
13436.4	50.72	11.4	39.32	H
15204.4	52.09	14	38.09	H
16820.6	52.35	17.1	35.25	H

**RSE-11AC(80M)-CH42-18G-26.5G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
19089.7	43.88	-4.4	48.28	H
20436.1	44.73	-3.2	47.93	V
21819.0	45.07	-2.5	47.57	H
23188.4	48.18	-1.4	49.58	V

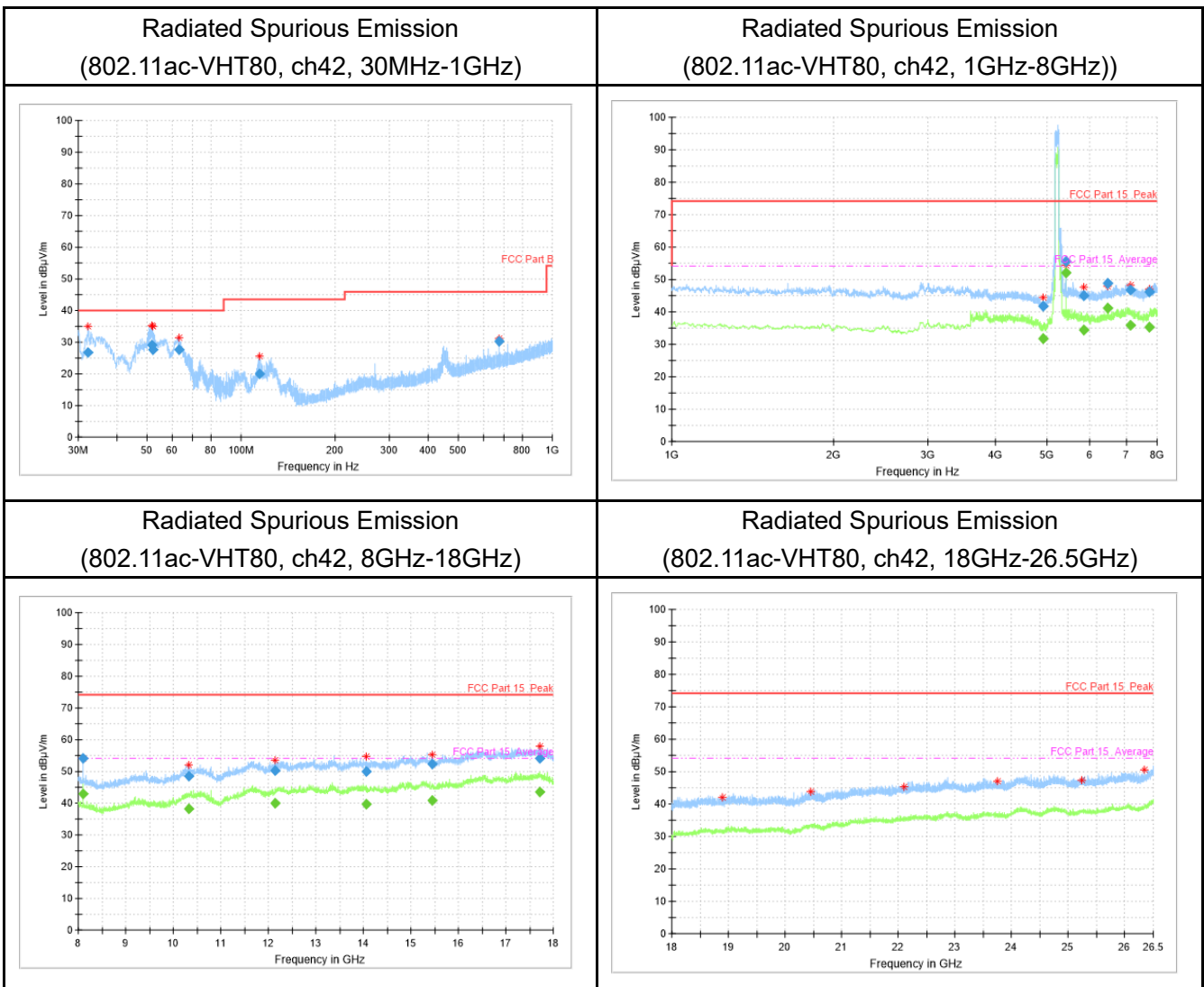
24277.2	48.21	0	48.21	H
25670.4	48.34	0.3	48.04	V

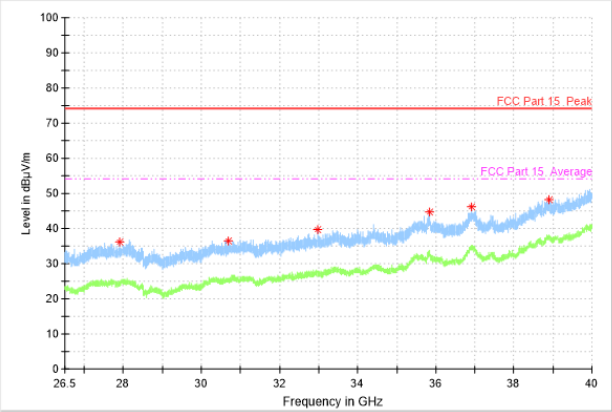
RSE-11AC(80M)-CH42-26.5G-40G

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27401.8	38.99	-0.3	39.29	H
30385.3	38.3	1.2	37.1	H
32962.4	38.64	4.1	34.54	V
35804.2	43.82	6.5	37.32	H
36984.1	45.97	8.2	37.77	V
39368.2	49.08	12.2	36.88	H

N02 Thirdly Supply

U-NII-1:



<p style="text-align: center;"><b>Radiated Spurious Emission</b> (802.11ac-VHT80, ch42, 26.5GHz-40GHz)</p>	/
	/

**Note:**

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

$P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$$Result = P_{Mea} + A_{Rpl} = P_{Mea} + Cable Loss + Antenna Factor$$

**U-NII-1:****RSE-11AC(80M)-CH42-30M-1G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
32.3	26.69	-14.2	40.89	V
51.6	29.22	-12	41.22	V
52.2	27.7	-12	39.7	V
63.2	27.54	-13.4	40.94	V
114.6	20.07	-14.1	34.17	H
672.0	30.22	-2.8	33.02	H

**RSE-11AC(80M)-CH42-1G-8G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
4896.8	41.84	1.6	40.24	H
5400.0	55.55	2	53.55	V
5850.6	45.11	2.2	42.91	V
6480.2	48.93	2.9	46.03	V
7129.8	46.91	4.1	42.81	V
7735.4	46.04	3.9	42.14	H

**RSE-11AC(80M)-CH42-1G-8G(Average)**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
5400.0	52.05	2	50.05	V

**RSE-11AC(80M)-CH42-8G-18G**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
8099.0	54.03	4.3	49.73	V
10316.8	48.46	7.7	40.76	V
12152.2	50.22	10.5	39.72	V
14057.2	49.89	12.4	37.49	H
15441.0	52.4	14.2	38.2	V
17707.4	54.19	17.9	36.29	H

**RSE-11AC(80M)-CH42-8G-18G(Average)**

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
8099.0	43.03	4.3	38.73	V



17707.4	43.42	17.9	25.52	H
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RSE-11AC(80M)-CH42-18G-26.5G

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
18890.8	42.06	-4.7	46.76	H
20447.2	43.69	-3.1	46.79	V
22097.8	45.15	-2	47.15	H
23745.2	47.18	-0.5	47.68	H
25231.0	47.3	0.4	46.9	H
26342.8	50.5	0.3	50.2	V

RSE-11AC(80M)-CH42-26.5G-40G

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27908.0	36.15	-0.8	36.95	V
30691.8	36.34	0	36.34	V
32981.4	39.68	4.1	35.58	V
35847.4	44.59	6.4	38.19	V
36918.0	46.17	8.4	37.77	V
38897.0	48.12	11.6	36.52	H

## 7. Test Equipment List

### 7.1. Radiated Emission Test System

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2021-05-10	1 year
2	EMI Test Receiver	ESU40	100307	R&S	2021-05-10	1 year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-51 5	Schwarzbeck	2020-02-28	2 years
4	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	2020-02-28	2 years
5	2-Line V-Network	ENV216	101380	R&S	2021-05-10	1 year
6	EMI Test Software	EMC32 V 9.15.00	N/A	R&S	N/A	N/A

Anechoic chamber

Fully anechoic chamber by ETS.

## Annex A: Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents .  
The detailed measurement uncertainty is defined in 3IN documents.

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Peak Output Power-Conducted	5100MHz-5875MHz	95%	1.024dB
Peak Power Spectral Density	5100MHz-5875MHz	95%	1.024dB/MHz
Conducted Emission	30MHz-2GHz	95%	0.90dB
Conducted Emission	2GHz-3.6GHz	95%	0.88dB
Conducted Emission	3.6GHz-8GHz	95%	0.96dB
Conducted Emission	8GHz-20GHz	95%	0.94dB
Conducted Emission	20GHz-22GHz	95%	0.88dB
Conducted Emission	22GHz-26GHz	95%	0.86dB
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	5.66dB
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	4.98dB
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	5.06dB
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	5.20dB

## Annex B: Accreditation Certificate



### Accredited Laboratory

A2LA has accredited

## INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

### Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 12<sup>th</sup> day of April 2021.

Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3682.01  
Valid to February 28, 2023

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*



\*\*\*\*\*END OF REPORT\*\*\*\*\*