



# **CERTIFICATION TEST REPORT**

**Report Number. :** 13190901-E13V1

**Applicant :** APPLE, INC.  
1 APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**Model :** A2398

**FCC ID :** BCG-E3540A

**IC :** 579C-E3540A

**EUT Description :** SMARTPHONE

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
ISED RSS-216 ISSUE 2  
ISED RSS-GEN ISSUE 5

**Date Of Issue:**  
September 21, 2020

**Prepared by:**  
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## REPORT REVISION HISTORY

| Rev. | Issue<br>Date | Revisions     | Revised By |
|------|---------------|---------------|------------|
| V1   | 9/21/2020     | Initial Issue | Chin Pang  |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE, INC.  
ONE APPLE PARK WAY  
CUPERTINO, CA 95014,

**EUT DESCRIPTION** SMARTPHONE

**MODEL:** A2398

**SERIAL NUMBER:** Original: C7CD601F08HL  
Spot Check: C7CD601408GG

**DATE TESTED:** AUGUST 14, 2020 – SEPTEMBER 09, 2020

| APPLICABLE STANDARDS  |              |
|-----------------------|--------------|
| STANDARD              | TEST RESULTS |
| FCC PART 15 SUBPART C | Complies     |
| ISED RSS-216 Issue 2  | Complies     |
| ISED RSS-GEN Issue 5  | Complies     |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For  
UL Verification Services Inc. By:



Chin Pang  
Senior Engineer  
Consumer Technology Division  
UL Verification Services Inc.

Prepared By:



Joe Vang  
Test Engineer  
Consumer Technology Division  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, KDB 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, and FCC CFR 47 Part 15, RSS-GEN Issue 5 and RSS-216 Issue 2 January 2016.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street<br>ISED Site Code:         | 47266 Benicia Street<br>ISED Site Code:                    | 47658 Kato Rd<br>ISED Site Code:                 |
|---|--|--|
| <input type="checkbox"/> Chamber A (IC:2324B-1) | <input type="checkbox"/> Chamber D (IC:22541-1)            | <input type="checkbox"/> Chamber I (IC: 2324A-5) |
| <input type="checkbox"/> Chamber B (IC:2324B-2) | <input type="checkbox"/> Chamber E (IC:22541-2)            | <input type="checkbox"/> Chamber J (IC: 2324A-6) |
| <input type="checkbox"/> Chamber C (IC:2324B-3) | <input type="checkbox"/> Chamber F (IC:22541-3)            | <input type="checkbox"/> Chamber K (IC: 2324A-1) |
|   | <input checked="" type="checkbox"/> Chamber G (IC:22541-4) | <input type="checkbox"/> Chamber L (IC: 2324A-3) |
|   | <input type="checkbox"/> Chamber H (IC:22541-5)            |  |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER   | UNCERTAINTY |
|---|-------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.84 dB     |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.65 dB     |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 2.52 dB     |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 4.88 dB     |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.24 dB     |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB     |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB     |

Uncertainty figures are valid to a confidence level of 95%.

## 5. INTRODUCTION OF TEST DATA REUSE

### 5.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

### 5.2. INTRODUCTION

This application for certification is leveraging the data reuse procedures from KDB 484596 D01 based on reference FCC ID: BCG-E3539A, IC: 579C-E3539A to cover variant BCG-E3540A, 579C-E3540A. The major difference between the parent/reference model and the variant model is the depopulation in the variant model of the mmWave transmitter. All other circuitry and features are identical. The data reuse test plan was approved via manufacturer KDB inquiry.

### 5.3. SPOT CHECK VERIFICATION RESULTS SUMMARY

Spot check verification has been done on device model A2398, FCC ID: BCG-E3540A, IC: 579C-E3540A for radiated spurious and radiated band-edge in accordance with the Test Plan that was approved via KDB inquiry.

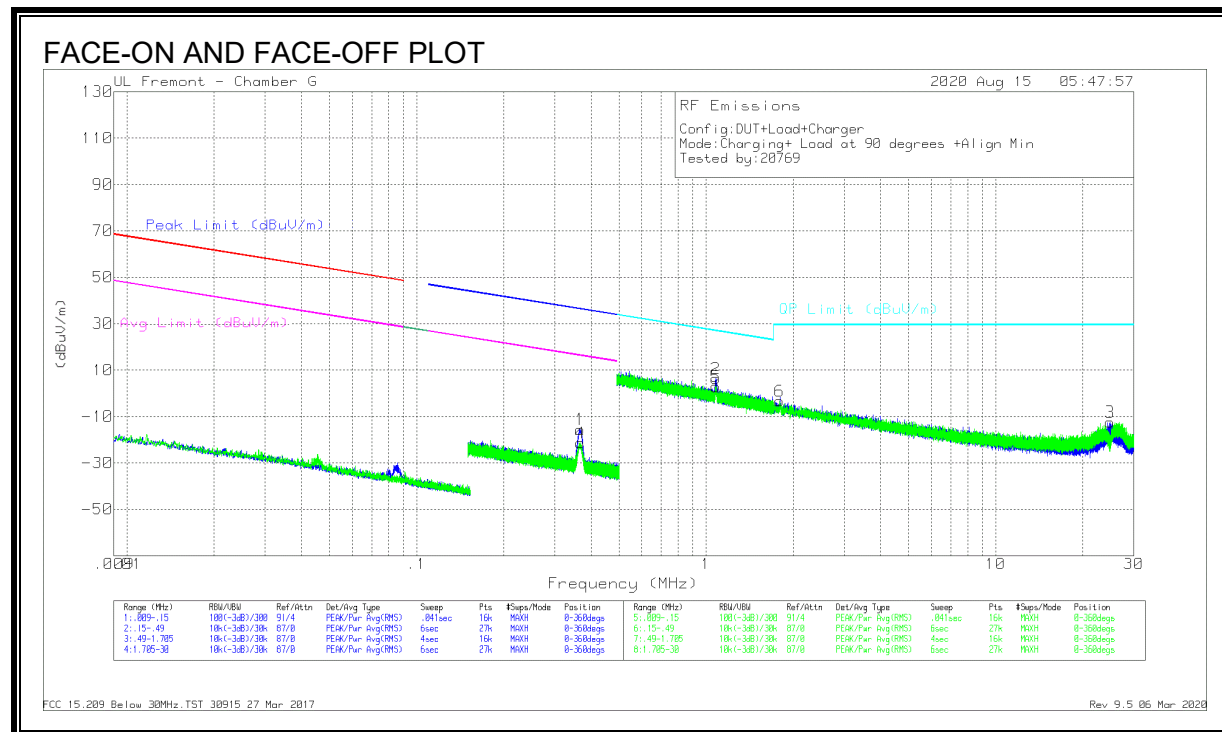
| Item | Frequency                         | Original model            |              | Spot check model          |              | Delta (dB) |      |
|------|-----------------------------------|---------------------------|--------------|---------------------------|--------------|------------|------|
|      |                                   | A2176                     |              | A2398                     |              |            |      |
|      |                                   | BCG-E3539A<br>579C-E3539A |              | BCG-E3540A<br>579C-E3540A |              |            |      |
|      |                                   | FCC                       | IC           | FCC                       | dBuA/m       |            |      |
| Fund | 360kHz                            | -12.95 dBuV/m             | 13.87 dBuA/m | -15.51 dBuV/m             | 11.10 dBuA/m | -2.56      | -2.7 |
| RSE  | 30.55 MHz (FCC)<br>58.14 MHz (IC) | 32.22dBuV/m               | 31.15dBuV/m  | 32.51 dBuV/m              | 31.47dBuV/m  | 0.29       | 0.32 |

Comparison of the models, upper deviation is within 3dB range and all tests are under FCC Technical Limits. The test report for FCC ID: BCG-E3539A, IC: 579C-E3539A is therefore being used to support the application for certification for FCC ID: BCG-E3540A, IC: 579C-E3540A.

# SPOT CHECK DATA

## 5.3.1. FCC TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

### OPERATING WITH LOAD



### DATA

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Dist Corr 300m | Corrected Reading (dBuV/m) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|----------------|----------------------------|---------------------|-------------|----------------|
| 1      | .3671           | 53.29                | Pk  | 11.1                | .1          | -80            | -15.51                     | 36.31               | -51.82      | 121            |
| 4      | .36783          | 47.41                | Pk  | 11.1                | .1          | -80            | -21.39                     | 36.3                | -57.69      | 186            |

Pk - Peak detector

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Dist Corr 30m | Corrected Reading (dBuV/m) | QP Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|---------------|----------------------------|-------------------|-------------|----------------|
| 5      | 1.08136         | 32.04                | Pk  | 10.8                | .1          | -40           | 2.94                       | 26.94             | -24         | 165            |
| 2      | 1.08158         | 35.49                | Pk  | 10.8                | .1          | -40           | 6.39                       | 26.94             | -20.55      | 123            |
| 6      | 1.79618         | 25.71                | Pk  | 10.8                | .2          | -40           | -3.29                      | 29.5              | -32.79      | 172            |
| 3      | 24.82283        | 17.99                | Pk  | 8.8                 | .8          | -40           | -12.41                     | 29.5              | -41.91      | 69             |

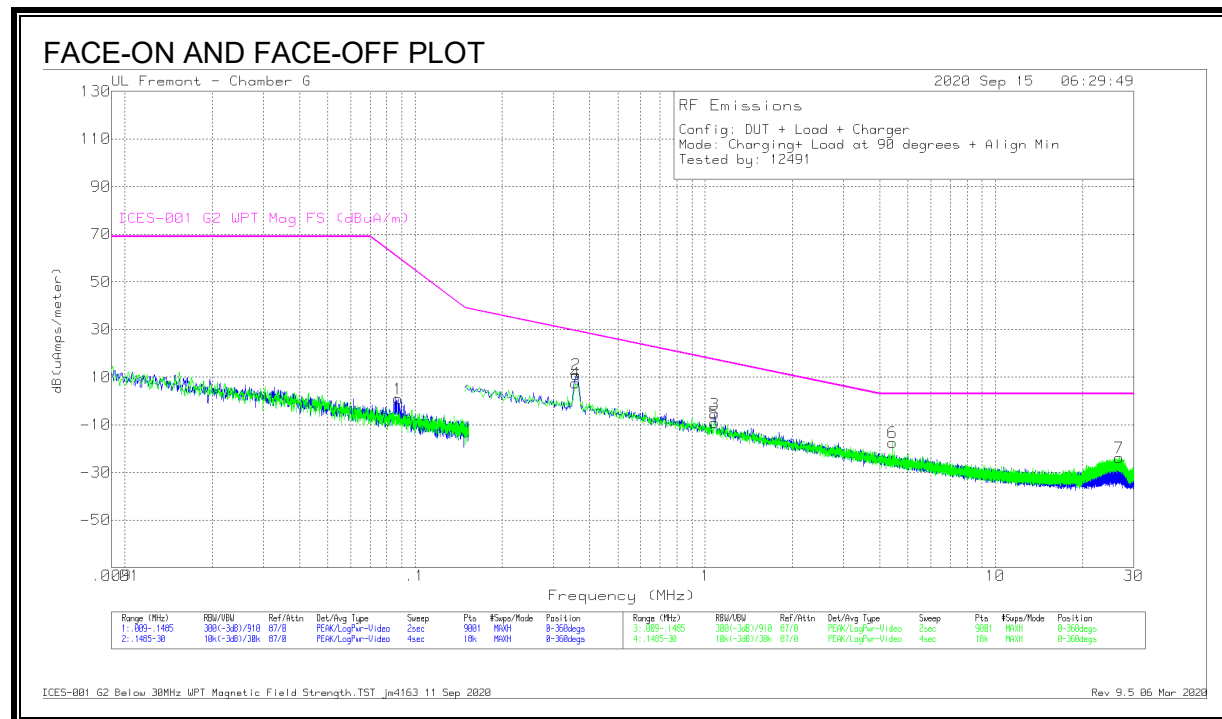
Pk - Peak detector

FCC 15.209 Below 30MHz.TST 30915 27 Mar 2017  
Rev 9.5 06 Mar 2020



## 5.3.2. IC / CISPR 11 TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

### OPERATING WITH LOAD



### DATA

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Corrected Reading dB(uAmps/meter) | ICES-001 G2 WPT Mag FS (dBuA/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|-----------------------------------|---------------------------------|-------------|----------------|
| 1      | .0875           | 40.34                | Pk  | -39.6               | .1          | .84                               | 60.1                            | -59.26      | 0-360          |
| 4      | .35741          | 48.08                | Pk  | -40.6               | .1          | 7.58                              | 29.4                            | -21.82      | 0-360          |
| 2      | .35907          | 51.6                 | Pk  | -40.6               | .1          | 11.1                              | 29.35                           | -18.25      | 0-360          |
| 3      | 1.07864         | 34.49                | Pk  | -40.2               | .1          | -5.61                             | 17.33                           | -22.94      | 0-360          |
| 5      | 1.0803          | 31.09                | Pk  | -40.2               | .1          | -9.01                             | 17.31                           | -26.32      | 0-360          |
| 6      | 4.43111         | 22.4                 | Pk  | -40.1               | .3          | -17.4                             | 3                               | -20.4       | 0-360          |
| 7      | 26.708          | 17.75                | Pk  | -42.5               | .8          | -23.95                            | 3                               | -26.95      | 0-360          |

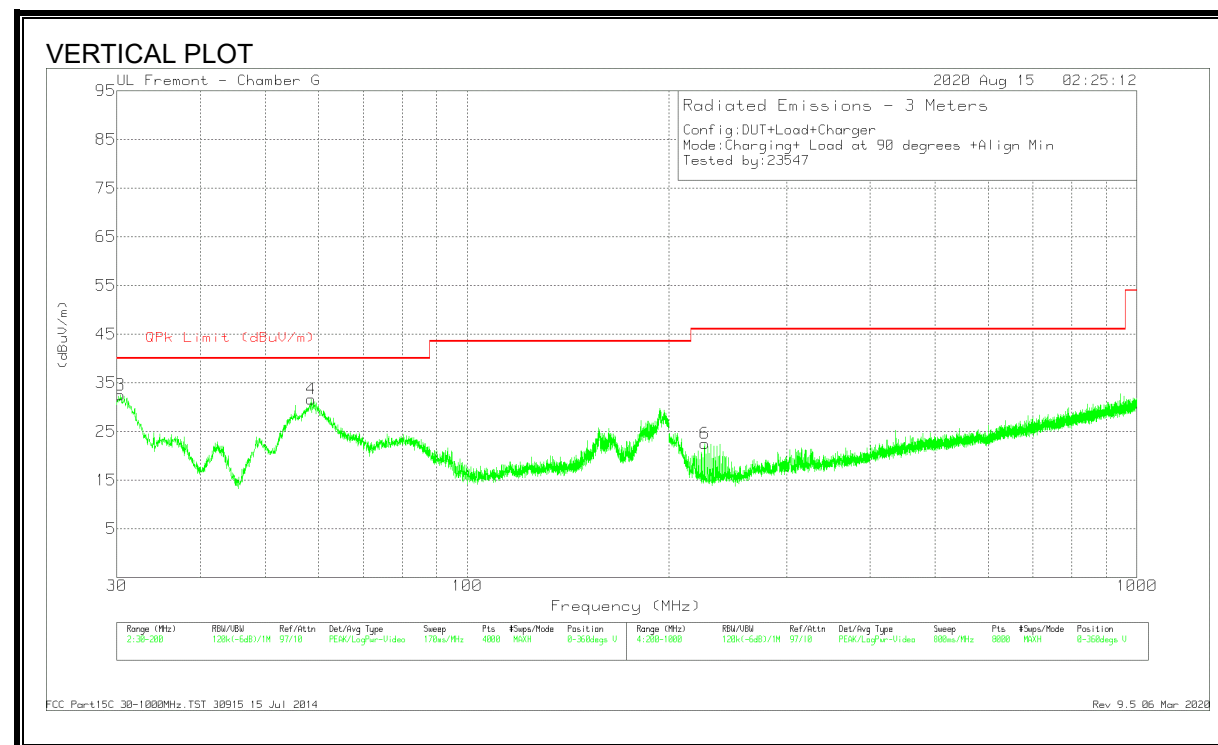
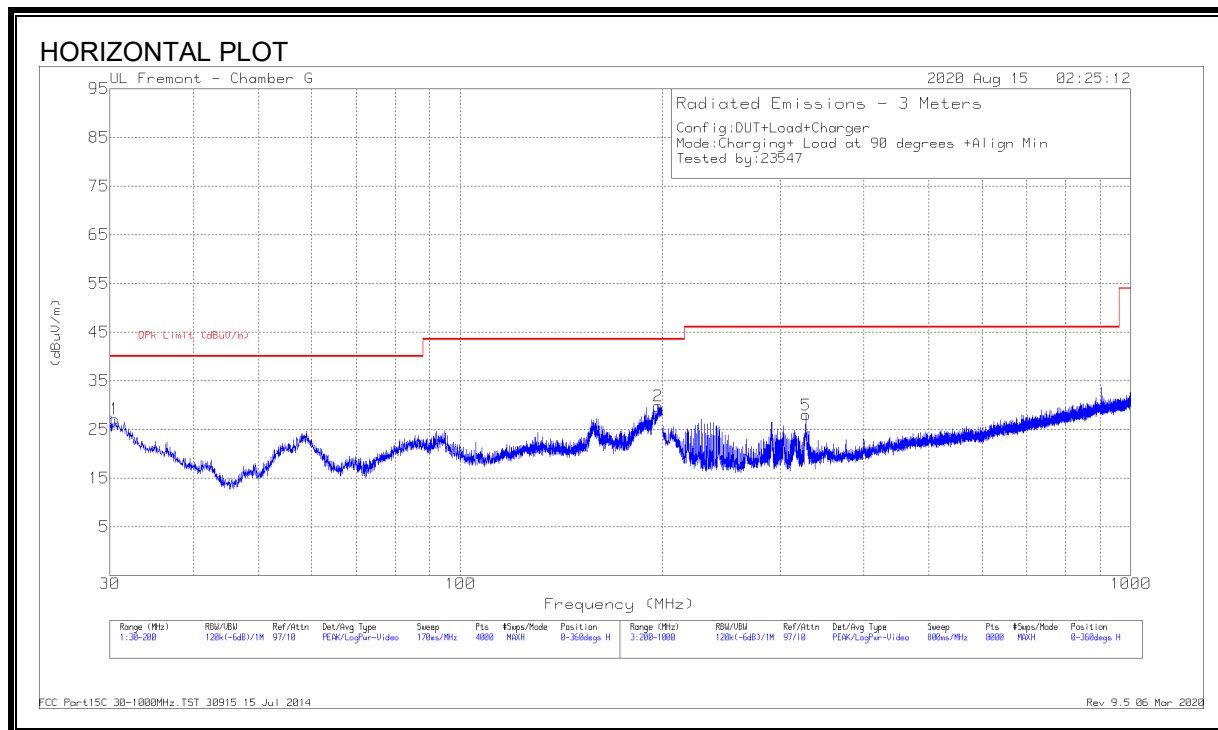
Pk - Peak detector

ICES-001 G2 Below 30MHz WPT Magnetic Field Strength.TST jm4163 11 Sep 2020

Rev 9.5 06 Mar 2020

### 5.3.3. FCC TX SPURIOUS EMISSION 30 TO 1000 MHz

#### OPERATING WITH LOAD



**DATA**

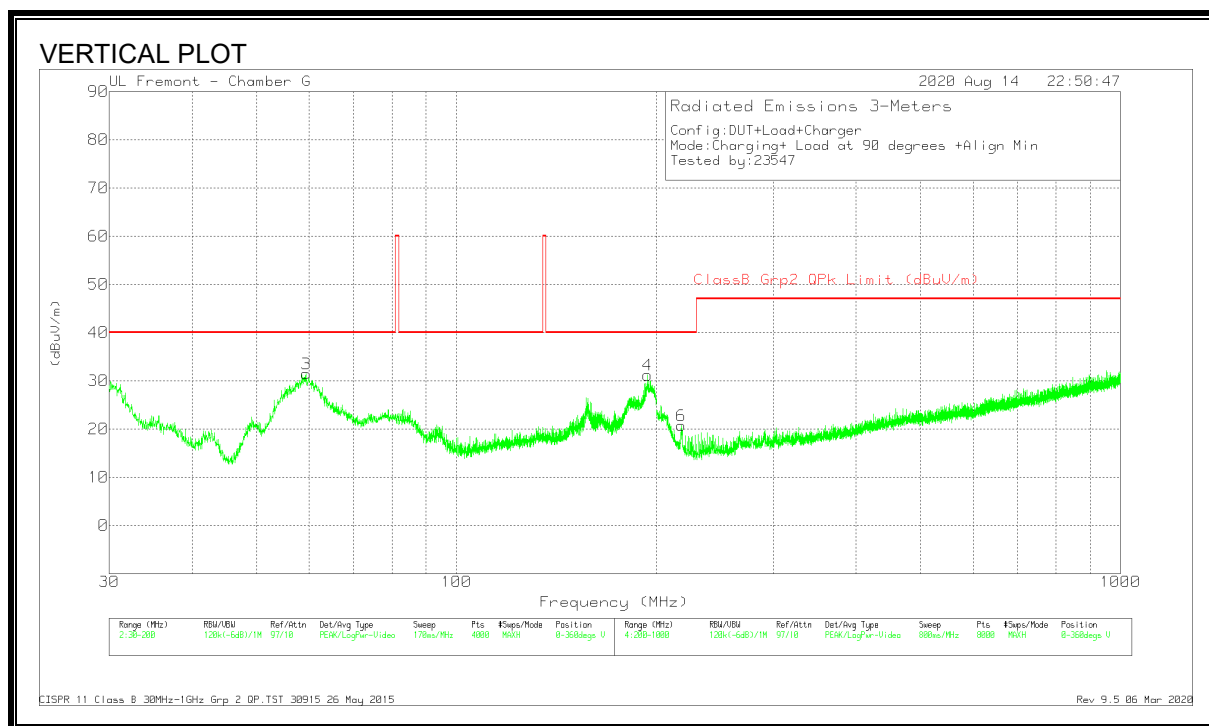
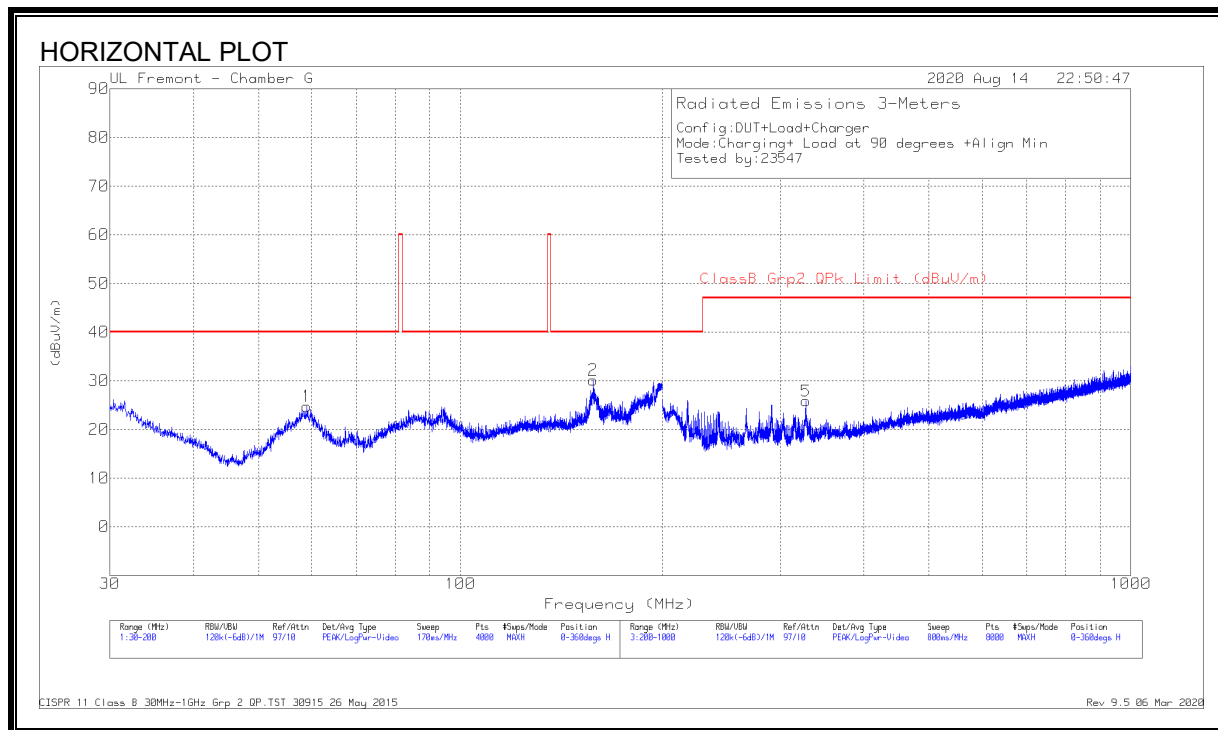
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T477 (dB/m) | Amp Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 5      | * 327.9166      | 36.56                | Pk  | 20             | -28.6        | 27.96                      | 46.02              | -18.06      | 193            | 99          | H        |
| 3      | 30.3401         | 36.41                | Pk  | 27.1           | -31          | 32.51                      | 40                 | -7.49       | 266            | 100         | V        |
| 1      | 30.5101         | 31.13                | Pk  | 27             | -31          | 27.13                      | 40                 | -12.87      | 69             | 99          | H        |
| 4      | 58.5249         | 48.96                | Pk  | 13.4           | -30.7        | 31.66                      | 40                 | -8.34       | 157            | 100         | V        |
| 2      | 197.4508        | 41.22                | Pk  | 18.1           | -29.5        | 29.82                      | 43.52              | -13.7       | 145            | 99          | H        |
| 6      | 226.3034        | 34.94                | Pk  | 16.9           | -29.3        | 22.54                      | 46.02              | -23.48      | 23             | 201         | V        |

Pk - Peak detector

FCC Part15C 30-1000MHz.TST 30915 15 Jul 2014  
Rev 9.5 06 Mar 2020

### 5.3.4. IC / CISPR 11 TX SPURIOUS EMISSION 30 TO 1000 MHz

#### OPERATING WITH LOAD



**DATA**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T477 (dB/m) | Amp Cbl (dB) | Corrected Reading (dBuV/m) | ClassB Grp2 QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------------------|-------------|----------------|-------------|----------|
| 1      | 58.9925         | 42.07                | Pk  | 13.4           | -30.7        | 24.77                      | 40                             | -15.23      | 178            | 201         | H        |
| 3      | 59.4176         | 48.77                | Pk  | 13.4           | -30.7        | 31.47                      | 40                             | -8.53       | 141            | 100         | V        |
| 2      | 157.703         | 41.64                | Pk  | 18.3           | -29.8        | 30.14                      | 40                             | -9.86       | 244            | 201         | H        |
| 4      | 194.135         | 43.08                | Pk  | 17.6           | -29.5        | 31.18                      | 40                             | -8.82       | 228            | 100         | V        |
| 6      | 218.2024        | 33.53                | Pk  | 16.6           | -29.4        | 20.73                      | 40                             | -19.27      | 202            | 99          | V        |
| 5      | 327.7166        | 34.44                | Pk  | 20             | -28.6        | 25.84                      | 47                             | -21.16      | 189            | 99          | H        |

Pk - Peak detector

CISPR 11 Class B 30MHz-1GHz Grp 2 QP.TST 30915 26 May 2015  
Rev 9.5 06 Mar 2020

#### 5.4. REFERENCE DETAIL

Reference application that contains the reused reference data which is attached to this report in Appendix A.

| Equipment Class | Reference FCC ID & IC     | Reference Report | Report Title/Section             |
|-----------------|---------------------------|------------------|----------------------------------|
| DCD             | BCG-E3539A<br>579C-E3539A | 13179110-E13     | FCC IC_WPTRReport / All sections |

#### 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT is a smartphone which connected to the AC/DC adapter via USB-C cable, and the inductive charging coil to charge WPT accessories. For the entire radiated emissions test, the EUT was performed based on the worst case on model A2176

| Configuration | Descriptions                          |
|---------------|---------------------------------------|
| Operating     | EUT and Load powered by AC/DC adapter |

For below 30MHz testing, investigation was done on three antenna orientations: RX antenna Face-on, Face-off and horizontal (parallel to ground). The worst-case configurations were determined on RX antenna Face-on and Face-off; therefore, all final tests were performed using these two orientations.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 300 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

## 5.6. DESCRIPTION OF TEST SETUP

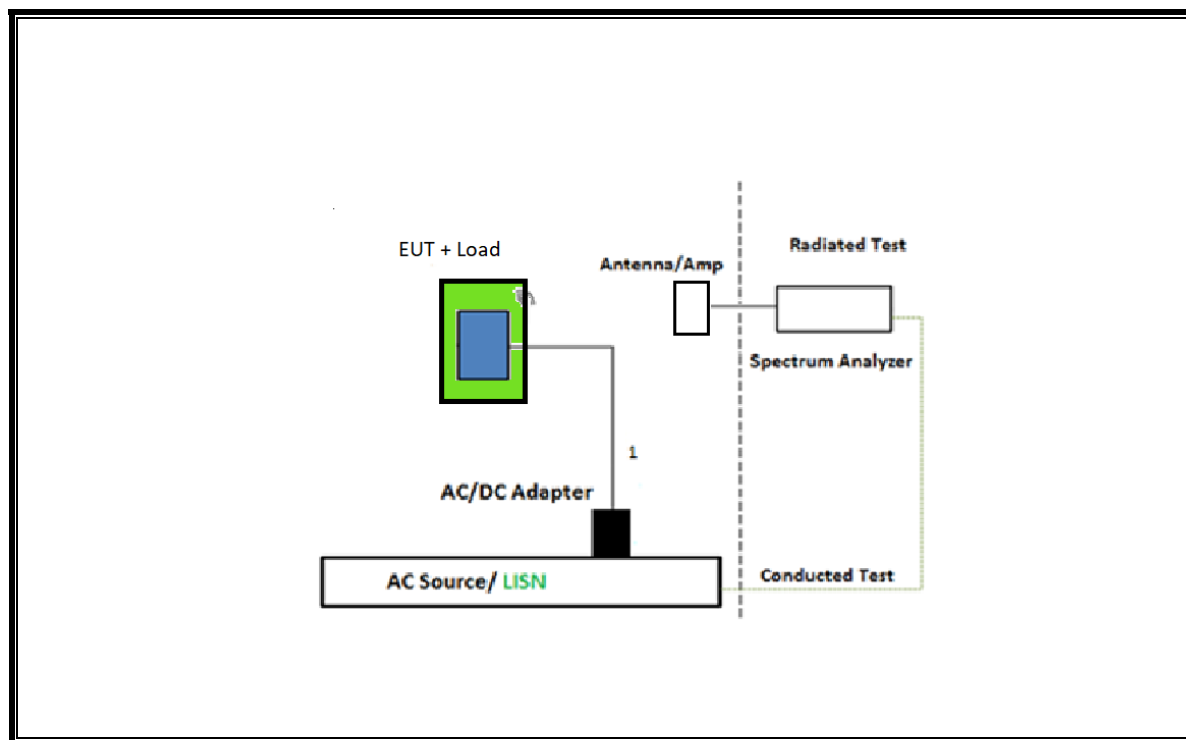
### SUPPORT EQUIPMENT & PERIPHERALS

| SUPPORT EQUIPMENT & PERIPHERALS LIST |              |       |               |        |
|--------------------------------------|--------------|-------|---------------|--------|
| Description                          | Manufacturer | Model | Serial Number | FCC ID |
| AC/DC adapter                        | Apple        | A2305 | N/A           | N/A    |
| WPT Accessory                        | Apple        | N/A   | N/A           | N/A    |

### I/O CABLES

| I/O CABLE LIST |      |                      |                |             |                  |                 |
|----------------|------|----------------------|----------------|-------------|------------------|-----------------|
| Cable No.      | Port | # of Identical Ports | Connector Type | Cable Type  | Cable Length (m) | Remarks         |
| 1              | DC   | 1                    | USBC           | Un-shielded | 2                | 5W Power Supply |

### CONFIGURATION 1: OPERATING MODE PHONE WITH LOAD



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST                                |                                 |            |        |            |            |  |
|--|---------------------------------|------------|--------|------------|------------|--|
| Description  | Manufacturer                    | Model      | ID Num | Cal Due    | Last Cal   |  |
| Antenna, Active Loop 9KHz to 30MHz                 | ETS-Lindgren                    | 6502       | T1616  | 10/28/2020 | 10/28/2019 |  |
| *Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB | Sunol Sciences Crop.            | JB3        | T477   | 09/04/2020 | 09/04/2019 |  |
| Amplifier, 10kHz to 1GHz, 32dB                     | Sonoma Instrument               | 310N       | T834   | 07/14/2021 | 07/14/2020 |  |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Agilent (Keysight) Technologies | N9030A-544 | T1113  | 03/02/2021 | 03/02/2020 |  |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Agilent (Keysight) Technologies | N9030A     | T342   | 01/23/2021 | 01/23/2020 |  |

| UL AUTOMATION SOFTWARE |    |        |                      |
|------------------------|----|--------|----------------------|
| Radiated Software      | UL | UL EMC | Ver 9.5, Mar 6, 2020 |

\*Testing is completed before equipment expiration date.

## 7. SETUP PHOTOS

Please refer to 13179110-EP1 for setup photos

## END OF TEST REPORT



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## Appendix A – Reference Test Report

Attached is the test report (13179110-E13) containing the reference data from the parent model as detailed in section 5.4.



# **CERTIFICATION TEST REPORT**

**Report Number. :** 13179110-E13V2

**Applicant :** APPLE, INC.  
ONE APPLE PARK WAY  
CUPERTINO, CA 95014, U.S.A.

**Model :** A2176

**FCC ID :** BCG-E3539A

**IC :** 579C-E3539A

**EUT Description :** Smartphone

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C  
ISED RSS-216 ISSUE 2

**Date Of Issue:**  
October 01, 2020

**Prepared by:**  
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NVLAP Lab code: 200065-0

Revision History

| Rev. | Issue Date | Revisions               | Revised By         |
|------|------------|-------------------------|--------------------|
| V1   | 9/21/2020  | Initial Issue           | Chin Pang          |
| V2   | 10/01/2020 | Addressed TCB Questions | Francisco Guarnero |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** APPLE, INC.  
ONE APPLE PARK WAY  
CUPERTINO, CA 95014,

**EUT DESCRIPTION:** Smartphone

**MODEL:** A2176

**SERIAL NUMBER:** C7CD601F08HL

**DATE TESTED:** AUGUST 13, 2020 – SEPTEMBER 10, 2020

| APPLICABLE STANDARDS  |              |
|-----------------------|--------------|
| STANDARD              | TEST RESULTS |
| FCC PART 15 SUBPART C | Complies     |
| ISED RSS-216 Issue 2  | Complies     |
| ISED RSS-GEN Issue 5  | Complies     |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For  
UL Verification Services Inc. By:



Chin Pang  
Senior Engineer  
Consumer Technology Division  
UL Verification Services Inc.

Prepared By:



Joe Vang  
Test Engineer  
Consumer Technology Division  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, 414788 D01 Radiated Test Site v01r01, FCC CFR 47 Part 2, and FCC CFR 47 Part 15, RSS-GEN Issue 5 and RSS-216 Issue 2 January 2016.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 47173 Benicia Street<br>ISED Site Code:         | 47266 Benicia Street<br>ISED Site Code:                    | 47658 Kato Rd<br>ISED Site Code:                 |
|---|--|--|
| <input type="checkbox"/> Chamber A (IC:2324B-1) | <input type="checkbox"/> Chamber D (IC:22541-1)            | <input type="checkbox"/> Chamber I (IC: 2324A-5) |
| <input type="checkbox"/> Chamber B (IC:2324B-2) | <input type="checkbox"/> Chamber E (IC:22541-2)            | <input type="checkbox"/> Chamber J (IC: 2324A-6) |
| <input type="checkbox"/> Chamber C (IC:2324B-3) | <input type="checkbox"/> Chamber F (IC:22541-3)            | <input type="checkbox"/> Chamber K (IC: 2324A-1) |
|   | <input checked="" type="checkbox"/> Chamber G (IC:22541-4) | <input type="checkbox"/> Chamber L (IC: 2324A-3) |
|   | <input type="checkbox"/> Chamber H (IC:22541-5)            |  |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER   | UNCERTAINTY |
|---|-------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.84 dB     |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.65 dB     |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 2.52 dB     |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 4.88 dB     |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.24 dB     |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB     |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB     |

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The Apple iPhone is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS, NFC and WPT. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

### 5.2. MAXIMUM E-FIELD and H-FIELD

The transmitter has maximum peak radiated electric and magnetic field strength as follows:

| Fundamental Frequency<br>(KHz) | Mode      | E field<br>(300m distance)<br>FCC (dBuV/m) | H field<br>(3m distance)<br>IC (dBuA/m) |
|--------------------------------|-----------|--|---|
| 360                            | Operating | -12.95                                     | 13.87                                   |

### 5.3. WORST-CASE CONFIGURATION AND MODE

The EUT is a smartphone which connected to the AC/DC adapter via USB-C cable, and the inductive charging coil to charge WPT accessories. For the entire radiated emissions test, the EUT was investigated on the following configuration during the test: 1. At its natural orientation with EUT set at center location, 2. EUT offset 2mm left and right, 3. EUT with 2mm spacer to find out the worst case location. And the worst case was at 2mm offset to the right and 3mm spacer.

| Mode      | Descriptions                          |
|-----------|---------------------------------------|
| Operating | EUT and Load powered by AC/DC adapter |

For below 30MHz & 1GHz tests EUT was connected to AC power adapter as the worst case, For AC line conducted emission, test was investigated with AC power adapter.

The EUT was tested as operation modes. During operational mode, EUT was tested with Phone and load.

For below 30MHz testing, investigation was done on three antenna orientations: RX antenna Face-on, Face-off and horizontal (parallel to ground). The worst-case configurations were determined on RX antenna Face-on and Face-off; therefore, all final tests were performed using these two orientations.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 300 m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.



## 5.4. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT & PERIPHERALS

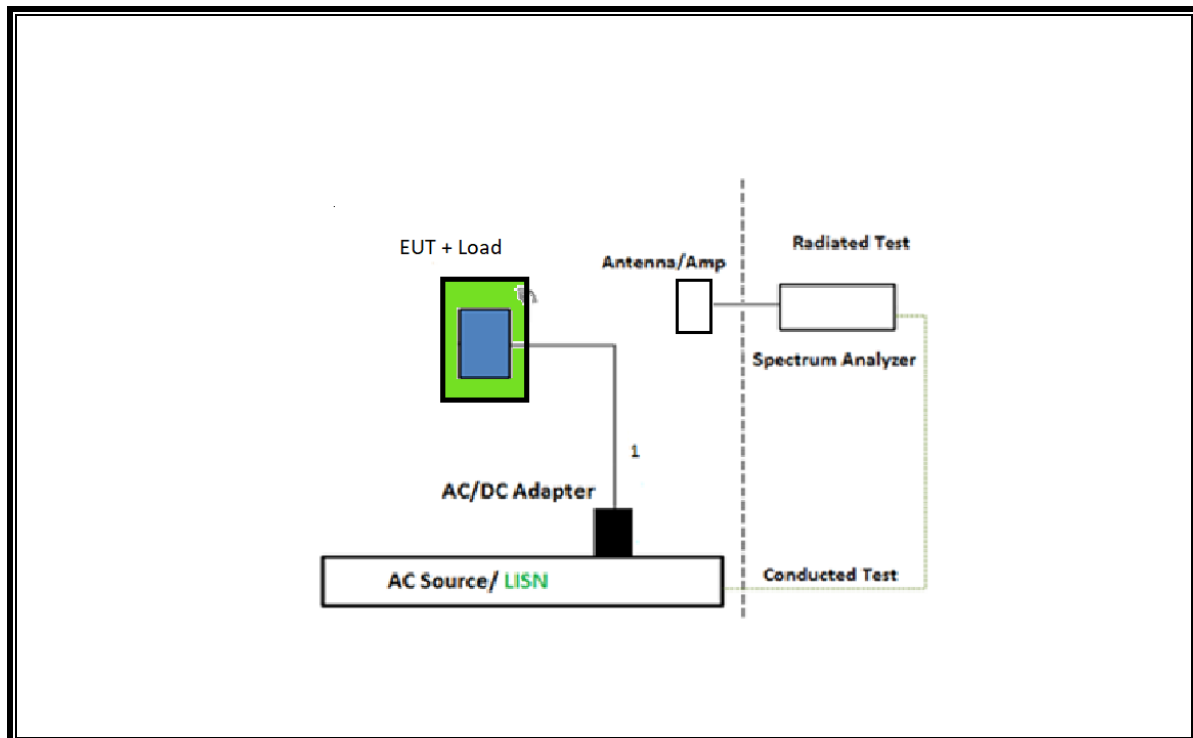
| SUPPORT EQUIPMENT & PERIPHERALS LIST |              |       |               |        |
|--------------------------------------|--------------|-------|---------------|--------|
| Description                          | Manufacturer | Model | Serial Number | FCC ID |
| AC/DC adapter                        | Apple        | A2305 | N/A           | N/A    |
| WPT Accessory                        | Apple        | N/A   | N/A           | N/A    |

### I/O CABLES

| I/O CABLE LIST |      |                      |                |             |                  |                 |
|----------------|------|----------------------|----------------|-------------|------------------|-----------------|
| Cable No.      | Port | # of Identical Ports | Connector Type | Cable Type  | Cable Length (m) | Remarks         |
| 1              | DC   | 1                    | USBC           | Un-shielded | 2                | 5W Power Supply |

### TEST SETUP

#### OPERATING MODE PHONE WITH LOAD



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST                                |                                 |            |        |            |            |
|--|---------------------------------|------------|--------|------------|------------|
| Description  | Manufacturer                    | Model      | ID Num | Cal Due    | Last Cal   |
| Antenna, Active Loop 9KHz to 30MHz                 | ETS-Lindgren                    | 6502       | T1616  | 10/28/2020 | 10/28/2019 |
| *Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB | Sunol Sciences Crop.            | JB3        | T477   | 09/04/2020 | 09/04/2019 |
| Amplifier, 10kHz to 1GHz, 32dB                     | Sonoma Instrument               | 310N       | T834   | 07/14/2021 | 07/14/2020 |
| Sniffer Probes                                     | Electro Metrics                 | EM-6992    | N/A    | NA         | NA         |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Agilent (Keysight) Technologies | N9030A-544 | T1113  | 03/02/2021 | 03/02/2020 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz               | Agilent (Keysight) Technologies | N9030A     | T342   | 01/23/2021 | 01/23/2020 |

| AC Line Conducted                     |                               |                         |                            |            |            |
|---------------------------------------|-------------------------------|-------------------------|----------------------------|------------|------------|
| Description                           | Manufacturer                  | Model                   | ID Num                     | Cal Due    | Last Cal   |
| EMI Test Receiver 9kHz-7GHz           | Rohde & Schwarz               | ESR                     | T1436                      | 02/20/2021 | 02/20/2020 |
| Power Cable, Line Conducted Emissions | UL                            | PR1                     | T861                       | 10/27/2020 | 10/27/2019 |
| LISN for Conducted Emissions CISPR-16 | FISCHER CUSTOM COMMUNICATIONS | FCC-LISN-50/250-25-2-01 | PRE0186446                 | 01/23/2021 | 01/23/2020 |
| UL AUTOMATION SOFTWARE                |                               |                         |                            |            |            |
| Radiated Software                     | UL                            | UL EMC                  | Ver 9.5, Mar 6, 2020       |            |            |
| Conducted Software                    | UL                            | UL EMC                  | 2020.2.26                  |            |            |
| AC Line Conducted Software            | UL                            | UL EMC                  | Ver 9.5, February 21, 2020 |            |            |

## 7. OCCUPIED BANDWIDTH

### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 300Hz. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

Note: Because the measured signal is CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

### RESULTS



## 8. RADIATED EMISSION TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.209 (a)

ICES-001 Section 3.3.4, IC RSS-216 6.2.2, and IC RSS-GEN Sections 8.9 and 8.10.

| Frequency (MHz)  | Field Strength (microvolts/meter) | Measurement Distance (m) |
|--|-----------------------------------|--------------------------|
| 0.009–0.490  | 2400/F(kHz)                       | 300                      |
| 0.490–1.705  | 24000/F(kHz)                      | 30                       |
| 1.705–30.0   | 30                                | 30                       |
| 30–88  | 100                               | 3                        |
| 88 to 216  | 150                               | 3                        |
| 216 to 960   | 200                               | 3                        |
| Above 960 MHz  | 500                               | 3                        |
| Note: The lower limit shall apply at the transition frequency. |                                   |                          |

ICES-001 Issue 5 Table 2 & Table 4:

**Table 2: Magnetic field strength radiated emission limits for induction cooking appliances**

| Frequency range (MHz)   | Quasi-peak, at 3 m distance (dBμA/m) |
|---|--------------------------------------|
| 0.009 – 0.07  | 69                                   |
| 0.07 – 0.15   | 69 to 39 *                           |
| 0.15 – 30   | 39 to 7 *                            |
| * The limit level in dBμA/m decreases linearly with the logarithm of frequency. |                                      |

**Table 4: Electric field strength radiated emission limits for induction cooking appliances**

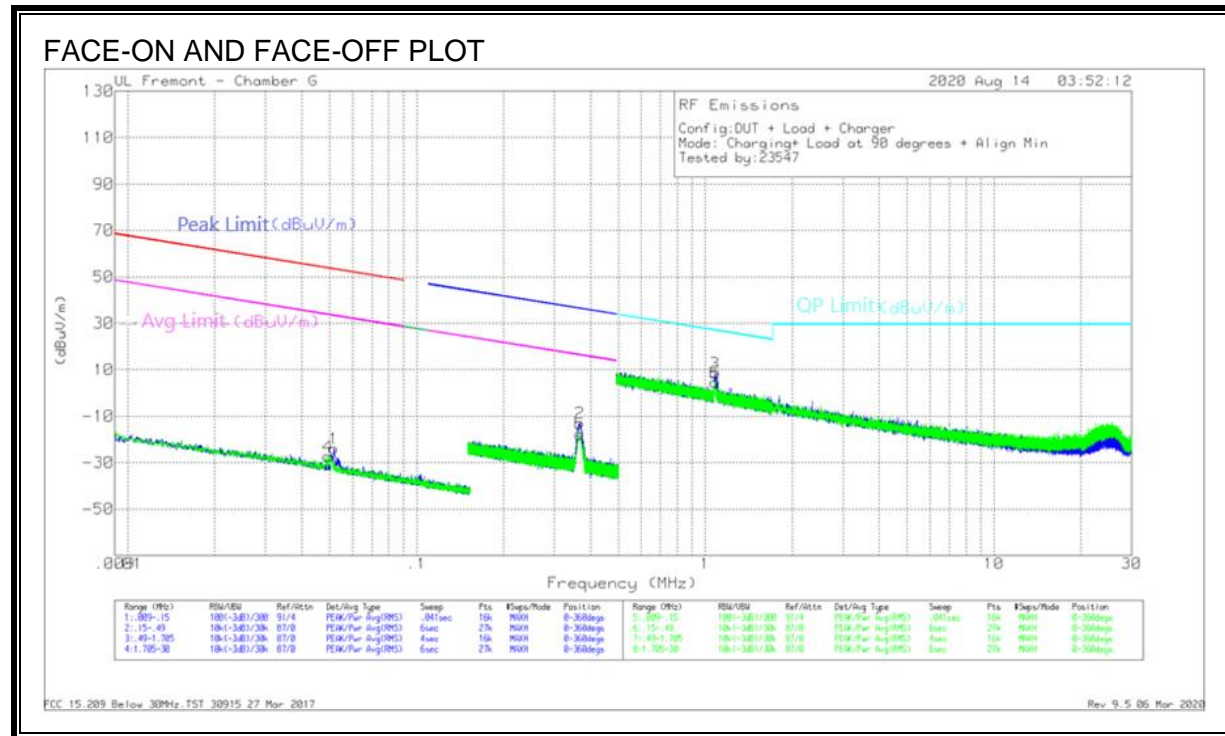
| Frequency range (MHz)   | OATS or SAC *<br>10 m measurement distance<br>Quasi-peak (dBμV/m) | OATS or SAC *<br>3 m measurement distance<br>Quasi-peak (dBμV/m) | FAR *<br>3 m measurement distance<br>Quasi-peak (dBμV/m) |
|---|---|--|--|
| 30 – 230  | 30  | 40   | 42 to 35**   |
| 230 – 1000  | 37  | 47   | 42   |
| <b>Note:</b> The more stringent limit applies at the transition frequency.<br>* OATS = open-area test site, SAC = semi-anechoic chamber, FAR = fully-anechoic room (see CSA CISPR 11:19).<br>** The limit level in dBμV/m decreases linearly with the logarithm of frequency. |   |  |  |

#### RESULTS

## 8.2. EUT With Load

### 8.2.1. FCC TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

#### OPERATING WITH LOAD



#### DATA

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Dist Corr 300m | Corrected Reading (dBuV/m) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|----------------|----------------------------|---------------------|-------------|--------------------|-------------|----------------|
| 4      | .04939          | 39.85                | Pk  | 12.7                | .1          | -80            | -27.35                     | 53.71               | -81.06      | 33.71              | -61.06      | 100            |
| 1      | .05175          | 43.25                | Pk  | 12.7                | .1          | -80            | -23.95                     | 53.31               | -77.26      | 33.31              | -57.26      | 100            |
| 5      | .36765          | 51.04                | Pk  | 11.1                | .1          | -80            | -17.76                     | 36.3                | -54.06      | 16.3               | -34.06      | 124            |
| 2      | .36767          | 55.85                | Pk  | 11.1                | .1          | -80            | -12.95                     | 36.3                | -49.25      | 16.3               | -29.25      | 336            |

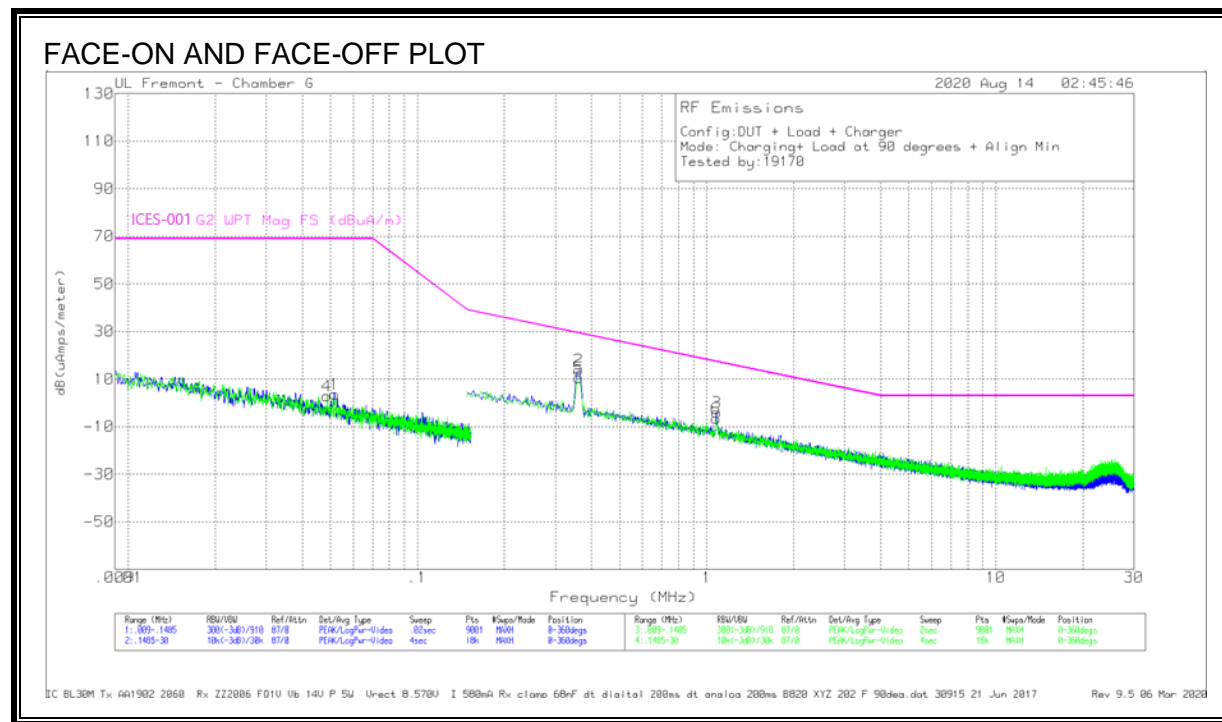
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Dist Corr 30m | Corrected Reading (dBuV/m) | QP Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|---------------|----------------------------|-------------------|-------------|----------------|
| 3      | 1.08029         | 37.58                | Pk  | 10.8                | .1          | -40           | 8.48                       | 26.95             | -18.47      | 174            |
| 6      | 1.08196         | 33.81                | Pk  | 10.8                | .1          | -40           | 4.71                       | 26.94             | -22.23      | 69             |

Pk - Peak detector

FCC 15.209 Below 30MHz.TST 30915 27 Mar 2017  
Rev 9.5 06 Mar 2020

## 8.2.2. IC / CISPR 11 TX FUNDAMENTAL AND SPURIOUS EMISSIONS FROM 9 kHz TO 30 MHz

### OPERATING WITH LOAD



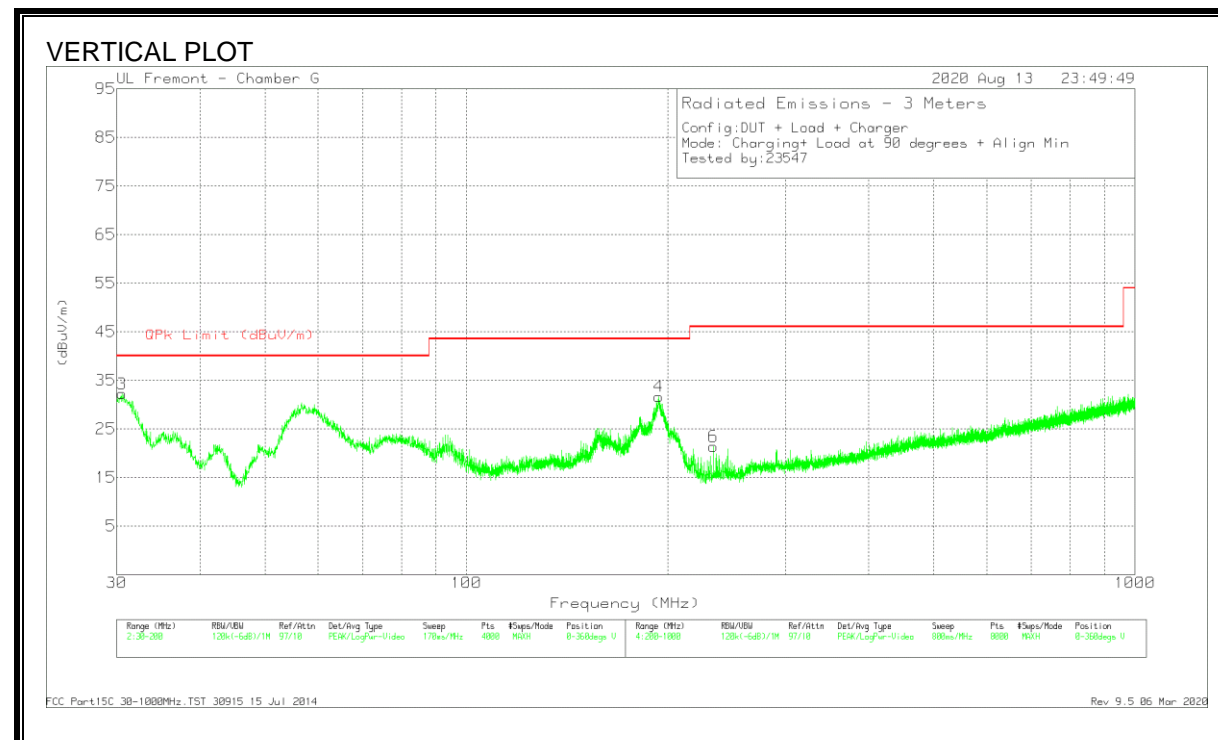
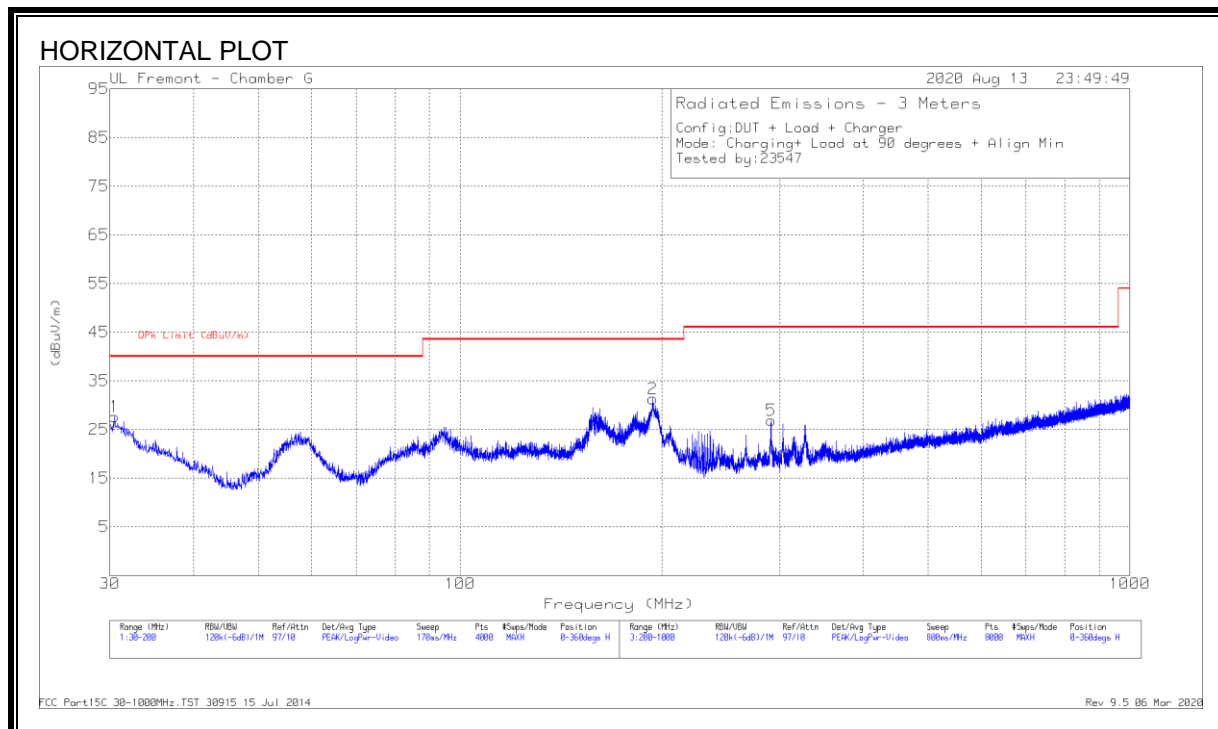
### DATA

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cables (dB) | Corrected Reading dB(uAmps/meter) | CISPR11 G2 WPT Mag FS (dBuA/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|-------------|-----------------------------------|--------------------------------|-------------|----------------|
| 4      | .04871          | 41.73                | Pk  | -38.9               | .1          | 2.93                              | 69                             | -66.07      | 217            |
| 1      | .05169          | 42.52                | Pk  | -39                 | .1          | 3.62                              | 69                             | -65.38      | 342            |
| 2      | .36072          | 54.37                | Pk  | -40.6               | .1          | 13.87                             | 29.3                           | -15.43      | 35             |
| 5      | .36072          | 51.06                | Pk  | -40.6               | .1          | 10.56                             | 29.3                           | -18.74      | 306            |
| 6      | 1.07864         | 33.54                | Pk  | -40.2               | .1          | -6.56                             | 17.33                          | -23.89      | 298            |
| 3      | 1.08195         | 36.13                | Pk  | -40.2               | .1          | -3.97                             | 17.29                          | -21.26      | 37             |

Pk - Peak detector

## 8.2.3. FCC TX SPURIOUS EMISSION 30 TO 1000 MHz

### OPERATING WITH LOAD



## DATA

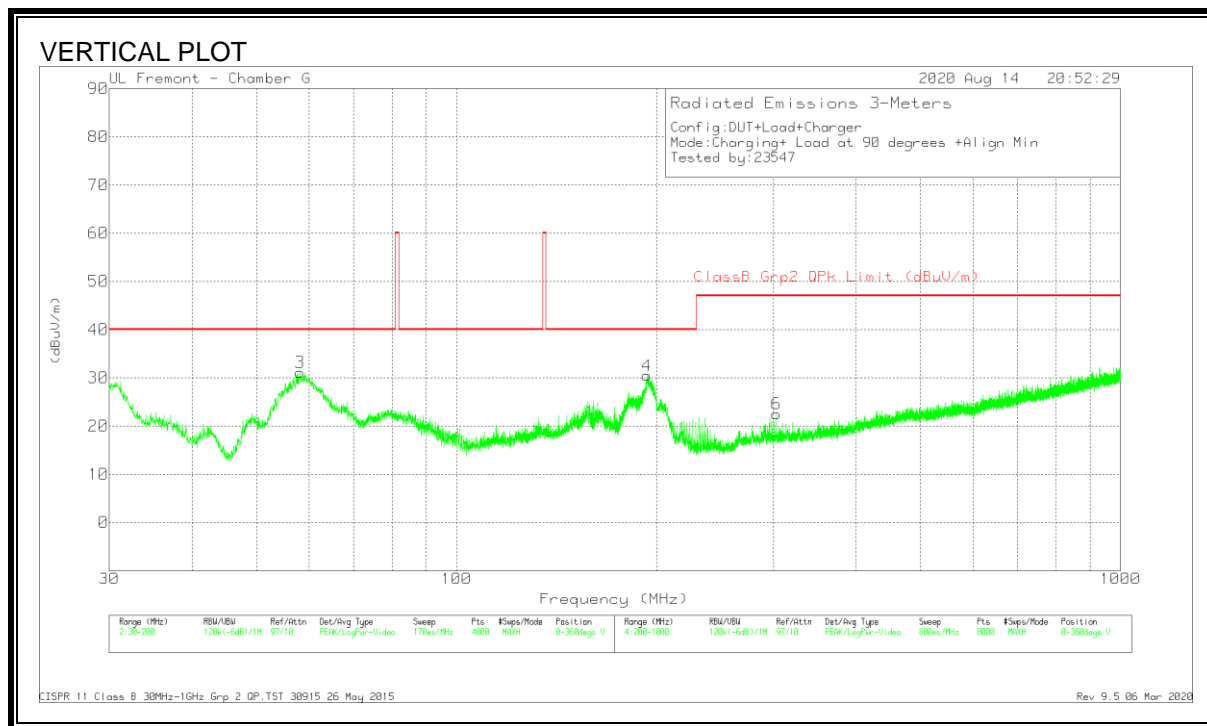
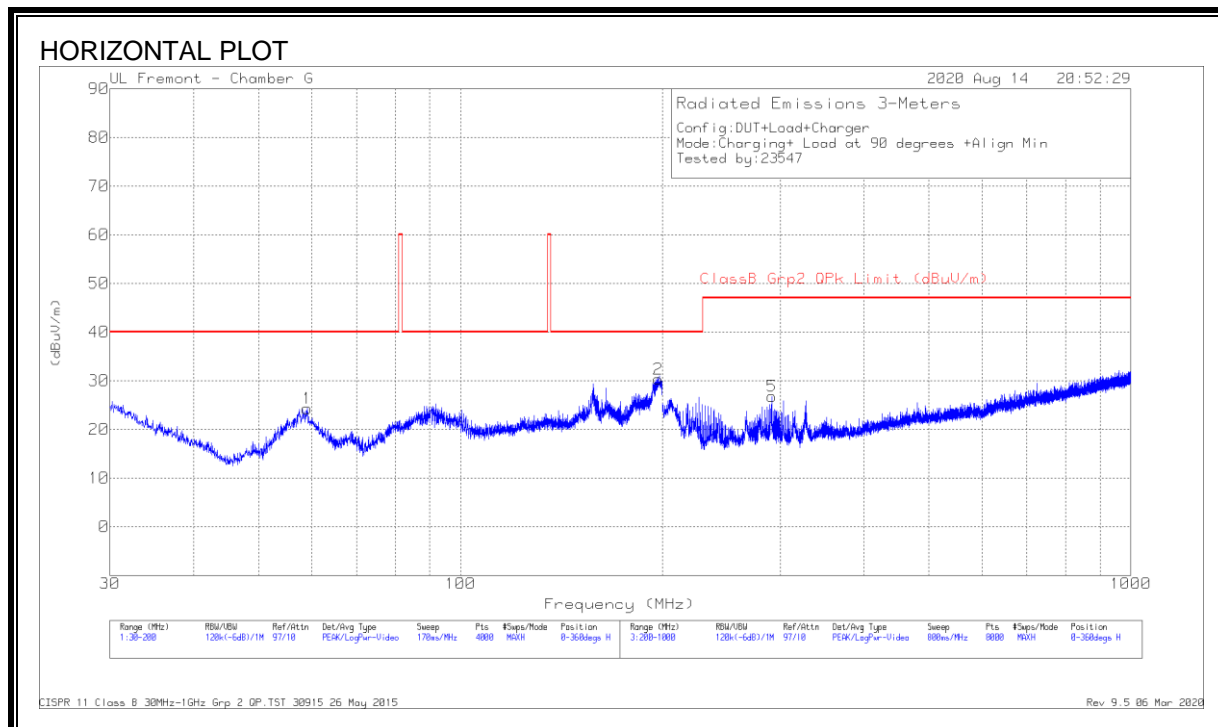
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T477 (dB/m) | Amp Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | 30.5101         | 31.64                | Pk  | 27             | -31          | 27.64                      | 40                 | -12.36      | 0-360          | 99          | H        |
| 3      | 30.5526         | 36.22                | Pk  | 27             | -31          | 32.22                      | 40                 | -7.78       | 0-360          | 100         | V        |
| 2      | 194.0074        | 43.21                | Pk  | 17.6           | -29.5        | 31.31                      | 43.52              | -12.21      | 0-360          | 99          | H        |
| 4      | 194.0074        | 43.57                | Pk  | 17.6           | -29.5        | 31.67                      | 43.52              | -11.85      | 0-360          | 100         | V        |
| 6      | 234.0044        | 33.3                 | Pk  | 17.4           | -29.3        | 21.4                       | 46.02              | -24.62      | 0-360          | 301         | V        |
| 5      | 291.4119        | 36.38                | Pk  | 19.4           | -28.9        | 26.88                      | 46.02              | -19.14      | 0-360          | 99          | H        |

Pk - Peak detector



## 8.2.4. IC / CISPR 11 TX SPURIOUS EMISSION 30 TO 1000 MHz

### OPERATING WITH LOAD



# **DATA**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T477 (dB/m) | Amp Cbl (dB) | Corrected Reading (dBuV/m) | ClassB Grp2 QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degr) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------------------|-------------|----------------|-------------|----------|
| 3      | 58.1423         | 48.45                | Pk  | 13.4           | -30.7        | 31.15                      | 40                             | -8.85       | 0-360          | 100         | V        |
| 1      | 59.0775         | 41.61                | Pk  | 13.4           | -30.7        | 24.31                      | 40                             | -15.69      | 0-360          | 201         | H        |
| 4      | 193.6248        | 42.37                | Pk  | 17.6           | -29.5        | 30.47                      | 40                             | -9.53       | 0-360          | 100         | V        |
| 2      | 197.4083        | 41.75                | Pk  | 18.1           | -29.5        | 30.35                      | 40                             | -9.65       | 0-360          | 99          | H        |
| 5      | 291.4119        | 36.3                 | Pk  | 19.4           | -28.9        | 26.8                       | 47                             | -20.2       | 0-360          | 100         | H        |
| 6      | 303.3134        | 31.84                | Pk  | 19.5           | -28.8        | 22.54                      | 47                             | -24.46      | 0-360          | 100         | V        |

Pk - Peak detector

## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

| Frequency of Emission (MHz) | Conducted Limit (dBµV) |            |
|-----------------------------|------------------------|------------|
|                             | Quasi-peak             | Average    |
| 0.15-0.5                    | 66 to 56 *             | 56 to 46 * |
| 0.5-5                       | 56                     | 46         |
| 5-30                        | 60                     | 50         |

\*Decreases with the logarithm of the frequency.

ICES-001 Issue 5 Table 1:

**Table 1: Conducted emission limits for induction cooking appliances (AC mains terminals)**

| Frequency range (MHz)   | Appliances rated 100 V, without an earth connection<br>Quasi-peak (dBµV) | Appliances rated 100 V, without an earth connection<br>Average (dBµV) | All other appliances<br>Quasi-peak (dBµV) | All other appliances<br>Average (dBµV) |
|---|--|---|---|--|
| 0.009 – 0.05  | 122  | —   | 110                                       | —                                      |
| 0.05 – 0.15   | 102 to 92 *  | —   | 90 to 80 *                                | —                                      |
| 0.15 – 0.5  | 72 to 62 *   | 62 to 52 *  | 66 to 56 *                                | 56 to 46 *                             |
| 0.5 – 5   | 56   | 46  | 56  | 46                                     |
| 5 – 30  | 60   | 50  | 60  | 50                                     |
| <b>Note:</b> The more stringent limit applies at transition frequencies.<br>* The limit level in dBµV decreases linearly with the logarithm of frequency. |  |   |   |  |

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

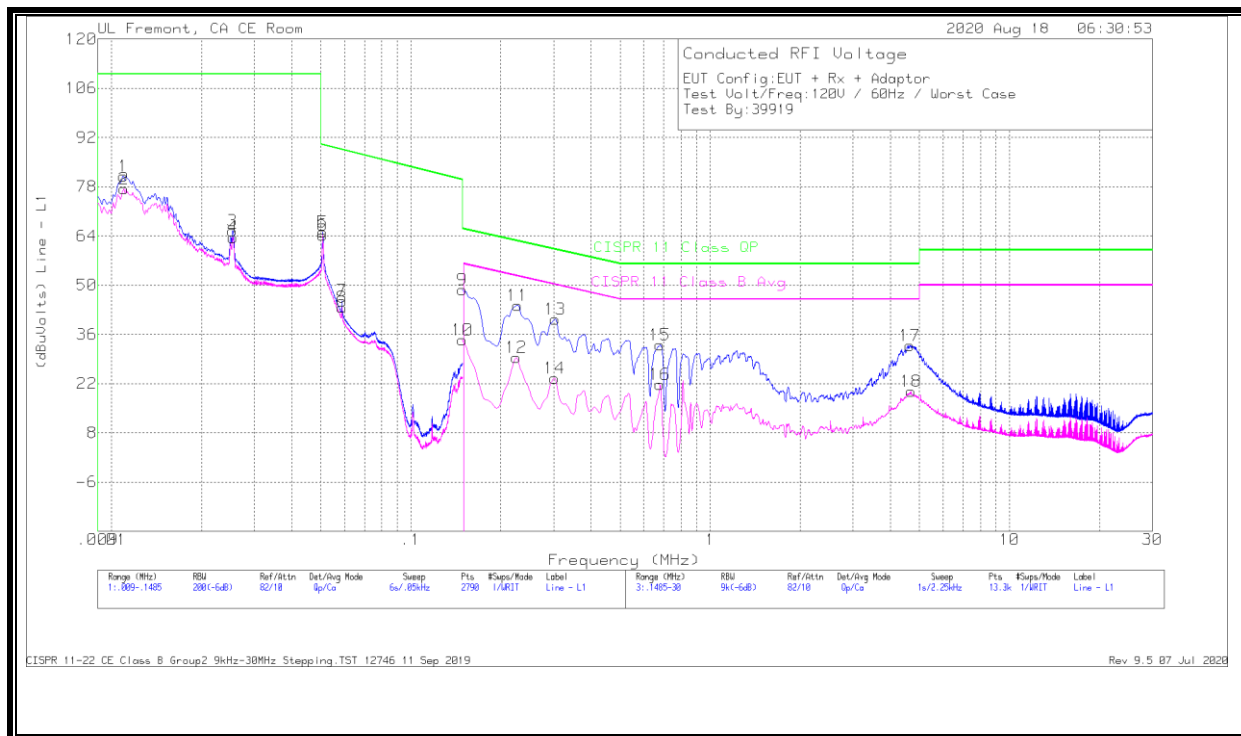
### RESULTS

Note: The limits on the plots from 150kHz – 30MHz cover both ICES-001 and FCC Part 15.207.

## 9.1. EUT With Load

### 9.1.1. OPERATING MODE WITH LOAD POWERED BY AC/DC ADAPTER

#### LINE 1 RESULTS



#### WORST EMISSIONS

##### Range 1: Line - L1 .009 - .1485MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L1 | LC Cables C1&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 1      | .01095          | 70.43                | Qp  | .1                 | 0               | 10.5         | 81.03                        | 110               | -28.97      | -                    | -           |
| 2      | .011            | 66.73                | Ca  | .1                 | 0               | 10.5         | 77.33                        | -                 | -           | -                    | -           |
| 3      | .0254           | 55.32                | Qp  | .1                 | 0               | 10.1         | 65.52                        | 110               | -44.48      | -                    | -           |
| 4      | .02545          | 53.39                | Ca  | .1                 | 0               | 10.1         | 63.59                        | -                 | -           | -                    | -           |
| 5      | .0508           | 55.05                | Qp  | .1                 | 0               | 10           | 65.15                        | 89.85             | -24.7       | -                    | -           |
| 6      | .05075          | 54.14                | Ca  | .1                 | 0               | 10           | 64.24                        | -                 | -           | -                    | -           |
| 7      | .0589           | 35.46                | Qp  | .1                 | 0               | 10           | 45.56                        | 88.5              | -42.94      | -                    | -           |
| 8      | .0589           | 33.61                | Ca  | .1                 | 0               | 10           | 43.71                        | -                 | -           | -                    | -           |

##### Range 3: Line - L1 .1485 - 30MHz

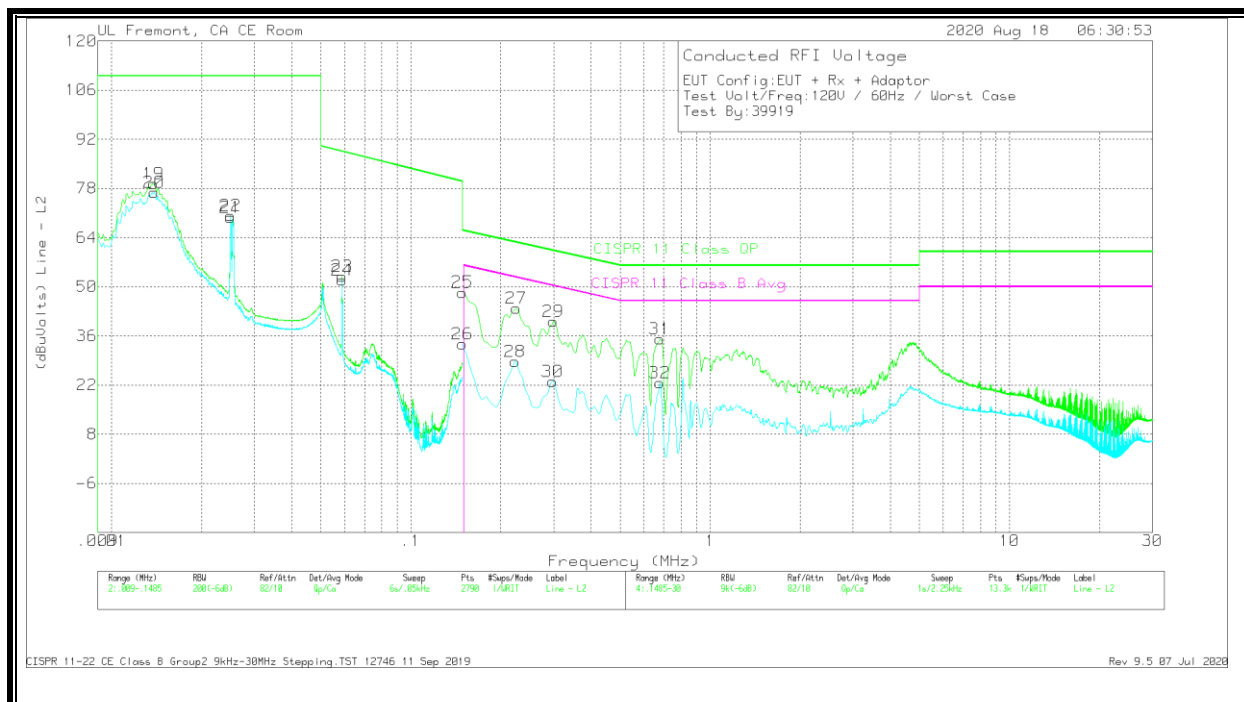
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L1 | LC Cables C1&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 9      | .1485           | 38.59                | Qp  | .1                 | 0               | 10           | 48.69                        | 66                | -17.31      | -                    | -           |
| 10     | .1485           | 24.28                | Ca  | .1                 | 0               | 10           | 34.38                        | -                 | -           | -                    | -           |
| 11     | .22725          | 34.23                | Qp  | 0                  | 0               | 10           | 44.23                        | 62.5              | -18.27      | -                    | -           |
| 12     | .225            | 19.35                | Ca  | 0                  | 0               | 10           | 29.35                        | -                 | -           | 52.63                | -23.28      |
| 13     | .30375          | 30.25                | Qp  | 0                  | 0               | 10           | 40.25                        | 60.11             | -19.86      | -                    | -           |
| 14     | .3015           | 13.61                | Ca  | 0                  | 0               | 10           | 23.61                        | -                 | -           | 50.2                 | -26.59      |
| 15     | .6795           | 22.94                | Qp  | 0                  | 0               | 10           | 32.94                        | 56                | -23.06      | -                    | -           |
| 16     | .6795           | 11.78                | Ca  | 0                  | 0               | 10           | 21.78                        | -                 | -           | 46                   | -24.22      |
| 17     | 4.65075         | 22.64                | Qp  | 0                  | .1              | 10.1         | 32.84                        | 56                | -23.16      | -                    | -           |
| 18     | 4.68            | 9.59                 | Ca  | 0                  | .1              | 10.1         | 19.79                        | -                 | -           | 46                   | -26.21      |

Qp - Quasi-Peak detector

Ca - CISPR average detection

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## LINE 2 RESULTS



## WORST EMISSIONS

### Range 2: Line - L2 .009 - .1485MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L2 | LC Cables C2&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 19     | .0138           | 68.9                 | Qp  | .1                 | 0               | 10.4         | 79.4                         | 110               | -30.6       | -                    | -           |
| 20     | .0139           | 66.32                | Ca  | .1                 | 0               | 10.4         | 76.82                        | -                 | -           | -                    | -           |
| 21     | .025            | 59.6                 | Qp  | .1                 | 0               | 10.1         | 69.8                         | 110               | -40.2       | -                    | -           |
| 22     | .025            | 60.07                | Ca  | .1                 | 0               | 10.1         | 70.27                        | -                 | -           | -                    | -           |
| 23     | .05895          | 42.93                | Qp  | .1                 | 0               | 10           | 53.03                        | 88.49             | -35.46      | -                    | -           |
| 24     | .05895          | 41.73                | Ca  | .1                 | 0               | 10           | 51.83                        | -                 | -           | -                    | -           |

### Range 4: Line - L2 .1485 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L2 | LC Cables C2&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 25     | .1485           | 38.32                | Qp  | .1                 | 0               | 10           | 48.42                        | 66                | -17.58      | -                    | -           |
| 26     | .1485           | 23.68                | Ca  | .1                 | 0               | 10           | 33.78                        | -                 | -           | -                    | -           |
| 27     | .225            | 33.84                | Qp  | 0                  | 0               | 10           | 43.84                        | 62.58             | -18.74      | -                    | -           |
| 28     | .22275          | 18.66                | Ca  | 0                  | 0               | 10           | 28.66                        | -                 | -           | 52.72                | -24.06      |
| 29     | .29925          | 30.12                | Qp  | 0                  | 0               | 10           | 40.12                        | 60.23             | -20.11      | -                    | -           |
| 30     | .297            | 13.07                | Ca  | 0                  | 0               | 10           | 23.07                        | -                 | -           | 50.33                | -27.26      |
| 31     | .6795           | 25.1                 | Qp  | 0                  | 0               | 10           | 35.1                         | 56                | -20.9       | -                    | -           |
| 32     | .6795           | 12.58                | Ca  | 0                  | 0               | 10           | 22.58                        | -                 | -           | 46                   | -23.42      |

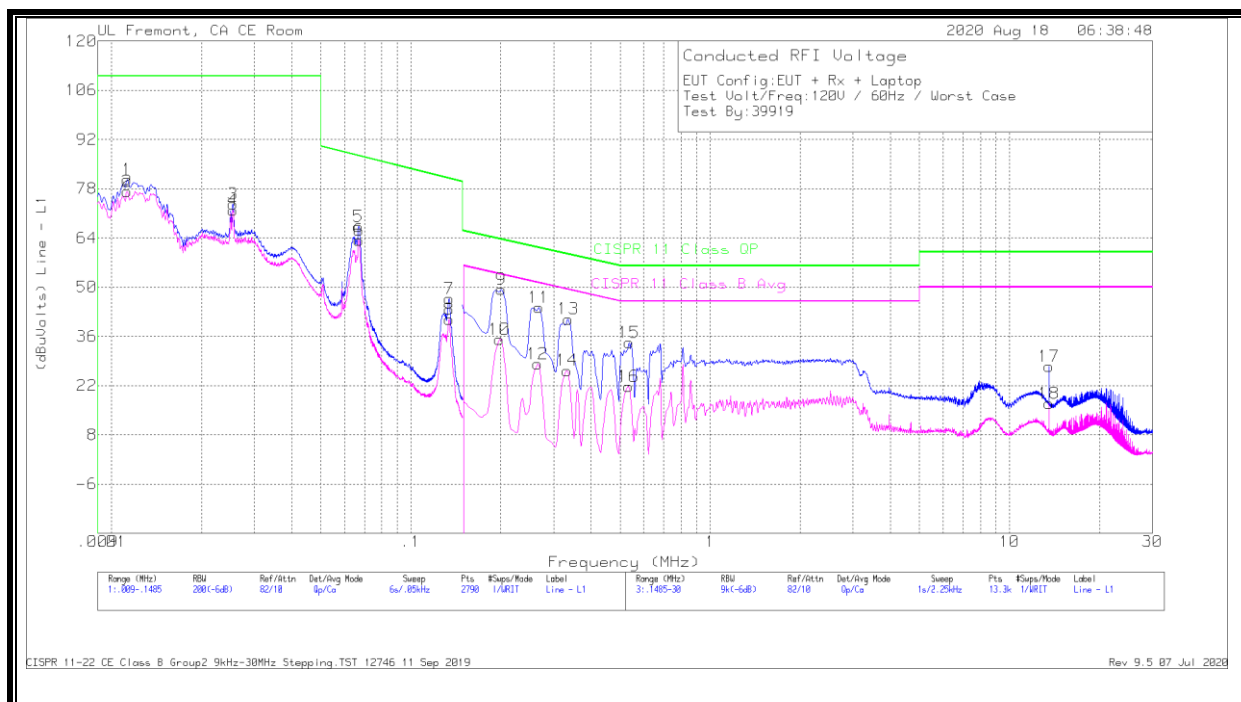
Qp - Quasi-Peak detector

Ca - CISPR average detection

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## 9.1.2. OPERATING MODE WITH LOAD POWERED BY HOST LAPTOP VIA USB CABLE

### LINE 1 RESULTS



### WORST EMISSIONS

#### Range 1: Line - L1 .009 - .1485MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L1 | LC Cables C1&C3 | Limiter (dB) | Corrected Reading (dBu(Volts)) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|--------------------------------|-------------------|-------------|----------------------|-------------|
| 1      | .0113           | 69.95                | Qp  | .1                 | 0               | 10.5         | 80.55                          | 110               | -29.45      | -                    | -           |
| 2      | .0113           | 66.61                | Ca  | .1                 | 0               | 10.5         | 77.21                          | -                 | -           | -                    | -           |
| 3      | .02545          | 63.39                | Qp  | .1                 | 0               | 10.1         | 73.59                          | 110               | -36.41      | -                    | -           |
| 4      | .02545          | 61.68                | Ca  | .1                 | 0               | 10.1         | 71.88                          | -                 | -           | -                    | -           |
| 5      | .06695          | 57.21                | Qp  | .1                 | 0               | 10           | 67.31                          | 87.32             | -20.01      | -                    | -           |
| 6      | .067            | 53.3                 | Ca  | .1                 | 0               | 10           | 63.4                           | -                 | -           | -                    | -           |
| 7      | .13425          | 36.58                | Qp  | .1                 | 0               | 10           | 46.68                          | 80.93             | -34.25      | -                    | -           |
| 8      | .1344           | 30.79                | Ca  | .1                 | 0               | 10           | 40.89                          | -                 | -           | -                    | -           |

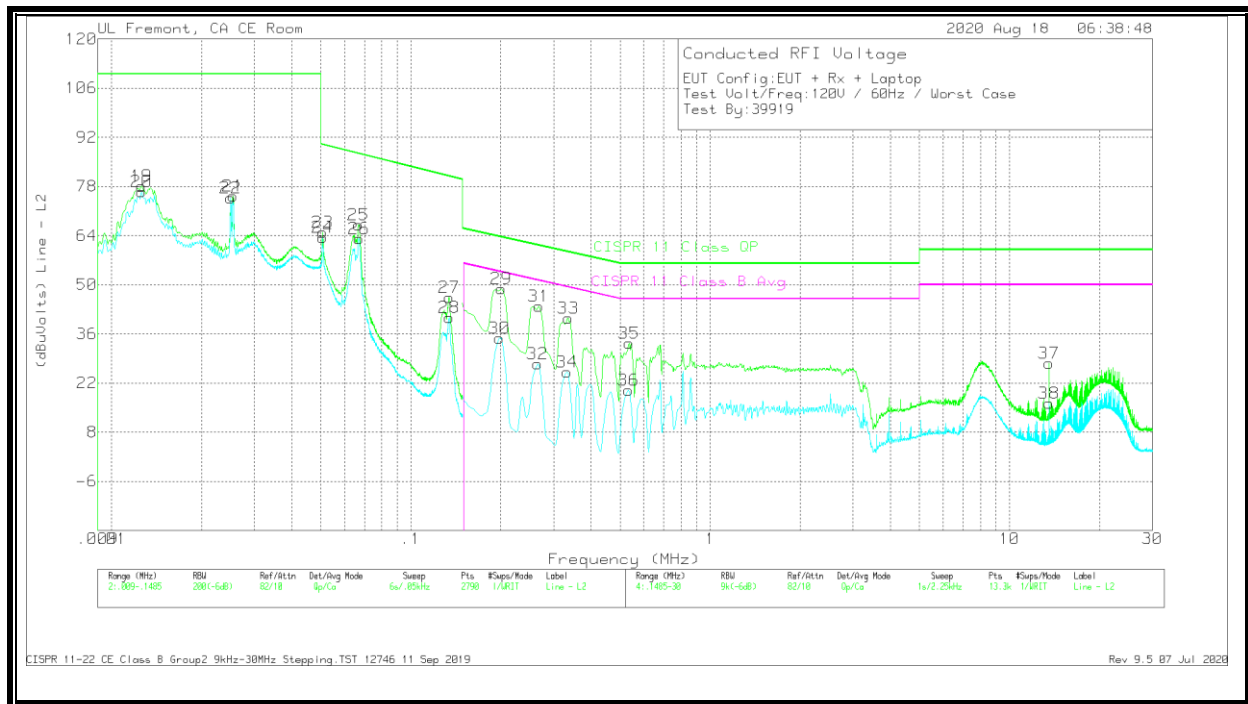
#### Range 3: Line - L1 .1485 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L1 | LC Cables C1&C3 | Limiter (dB) | Corrected Reading (dBu(Volts)) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|--------------------------------|-------------------|-------------|----------------------|-------------|
| 9      | .20025          | 39.34                | Qp  | 0                  | 0               | 10           | 49.34                          | 63.54             | -14.2       | -                    | -           |
| 10     | .198            | 25.13                | Ca  | 0                  | 0               | 10           | 35.13                          | -                 | -           | 53.69                | -18.56      |
| 11     | .26775          | 34.28                | Qp  | 0                  | 0               | 10           | 44.28                          | 61.14             | -16.86      | -                    | -           |
| 12     | .2655           | 18.1                 | Ca  | 0                  | 0               | 10           | 28.1                           | -                 | -           | 51.26                | -23.16      |
| 13     | .33525          | 30.93                | Qp  | 0                  | 0               | 10           | 40.93                          | 59.29             | -18.36      | -                    | -           |
| 14     | .333            | 16.3                 | Ca  | 0                  | 0               | 10           | 26.3                           | -                 | -           | 49.38                | -23.08      |
| 15     | .5355           | 24.23                | Qp  | 0                  | 0               | 10           | 34.23                          | 56                | -21.77      | -                    | -           |
| 16     | .53325          | 11.72                | Ca  | 0                  | 0               | 10           | 21.72                          | -                 | -           | 46                   | -24.28      |
| 17     | 13.56075        | 17.13                | Qp  | .1                 | .2              | 10.1         | 27.53                          | 60                | -32.47      | -                    | -           |
| 18     | 13.56075        | 6.6                  | Ca  | .1                 | .2              | 10.1         | 17                             | -                 | -           | 50                   | -33         |

Qp - Quasi-Peak detector  
Ca - CISPR average detection

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## LINE 2 RESULTS



## WORST EMISSIONS

### Range 2: Line - L2 .009 - .1485MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L2 | LC Cables C2&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 19     | .0126           | 67.44                | Qp  | .1                 | 0               | 10.5         | 78.04                        | 110               | -31.96      | -                    | -           |
| 20     | .0126           | 65.91                | Ca  | .1                 | 0               | 10.5         | 76.51                        | -                 | -           | -                    | -           |
| 21     | .02545          | 65.07                | Qp  | .1                 | 0               | 10.1         | 75.27                        | 110               | -34.73      | -                    | -           |
| 22     | .025            | 64.53                | Ca  | .1                 | 0               | 10.1         | 74.73                        | -                 | -           | -                    | -           |
| 23     | .05075          | 54.89                | Qp  | .1                 | 0               | 10           | 64.99                        | 89.86             | -24.87      | -                    | -           |
| 24     | .05075          | 53.35                | Ca  | .1                 | 0               | 10           | 63.45                        | -                 | -           | -                    | -           |
| 25     | .0669           | 56.97                | Qp  | .1                 | 0               | 10           | 67.07                        | 87.33             | -20.26      | -                    | -           |
| 26     | .067            | 53.02                | Ca  | .1                 | 0               | 10           | 63.12                        | -                 | -           | -                    | -           |
| 27     | .1342           | 36.35                | Qp  | .1                 | 0               | 10           | 46.45                        | 80.93             | -34.48      | -                    | -           |
| 28     | .13433          | 30.51                | Ca  | .1                 | 0               | 10           | 40.61                        | -                 | -           | -                    | -           |

### Range 4: Line - L2 .1485 - 30MHz

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | PRE0186446 LISN L2 | LC Cables C2&C3 | Limiter (dB) | Corrected Reading (dBuVolts) | CISPR 11 Class QP | Margin (dB) | CISPR 11 Class B Avg | Margin (dB) |
|--------|-----------------|----------------------|-----|--------------------|-----------------|--------------|------------------------------|-------------------|-------------|----------------------|-------------|
| 29     | .20025          | 38.94                | Qp  | 0                  | 0               | 10           | 48.94                        | 63.54             | -14.6       | -                    | -           |
| 30     | .198            | 24.82                | Ca  | 0                  | 0               | 10           | 34.82                        | -                 | -           | 53.69                | -18.87      |
| 31     | .26775          | 33.94                | Qp  | 0                  | 0               | 10           | 43.94                        | 61.14             | -17.2       | -                    | -           |
| 32     | .2655           | 17.39                | Ca  | 0                  | 0               | 10           | 27.39                        | -                 | -           | 51.26                | -23.87      |
| 33     | .33525          | 30.41                | Qp  | 0                  | 0               | 10           | 40.41                        | 59.29             | -18.88      | -                    | -           |
| 34     | .333            | 15.17                | Ca  | 0                  | 0               | 10           | 25.17                        | -                 | -           | 49.38                | -24.21      |
| 35     | .5355           | 23.3                 | Qp  | 0                  | 0               | 10           | 33.3                         | 56                | -22.7       | -                    | -           |
| 36     | .53325          | 10                   | Ca  | 0                  | 0               | 10           | 20                           | -                 | -           | 46                   | -26         |
| 37     | 13.56075        | 17.27                | Qp  | .1                 | .2              | 10.1         | 27.67                        | 60                | -32.33      | -                    | -           |
| 38     | 13.56075        | 5.84                 | Ca  | .1                 | .2              | 10.1         | 16.24                        | -                 | -           | 50                   | -33.76      |

Qp - Quasi-Peak detector  
Ca - CISPR average detection

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## 10. SETUP PHOTOS

Please refer to 13179110-EP1V1 for setup photos

**END OF TEST REPORT**