

# **CERTIFICATION TEST REPORT**

**Report Number.**: 12775491-E1V2

**Applicant:** ANELTO INC.

6270 MORNINGSTAR DRIVE

SUITE 100

THE COLONY, TX 75056, U.S.A.

Model: ANH0319

FCC ID: 2AGPI-ANH0319

**IC**: 20951-ANH0319

**EUT Description**: CELLULAR PERSONAL EMERGENCY RESPONSE SYSTEM

Test Standard(s): FCC 47 CFR PART 15 SUBPART C

INDUSTRY CANADA RSS - 210 ISSUE 9 INDUSTRY CANADA RSS - GEN ISSUE 5

#### Date Of Issue:

August 13, 2019

# Prepared by:

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# **Revision History**

| Rev. | Issue<br>Date | Revisions                    | Revised By  |
|------|---------------|------------------------------|-------------|
| V1   | 7/2/2019      | Initial Issue                |             |
| V2   | 8/13/2019     | Updated Section 8.2 verbiage | Kenneth Mak |

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# 1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ANELTO INC.

6270 MORNINGSTAR DRIVE

SUITE 100

THE COLONY, TX 75056, U.S.A.

EUT DESCRIPTION: CELLULAR PERSONAL EMERGENCY RESPONSE SYSTEM

MODEL: ANH0319

**SERIAL NUMBER:** 190312, 190411, 190405

**DATE TESTED:** APRIL 12, 2019 to JUNE 07, 2019

#### **APPLICABLE STANDARDS**

STANDARD TEST RESULTS

CFR 47 Part 15 Subpart C

INDUSTRY CANADA RSS-210 Issue 9, Annex B.10 Complies

INDUSTRY CANADA 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

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CONSUMER TECHNOLOGY DIVISION

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UL Verification Services Inc.

Kenneth Mak

CONSUMER TECHNOLOGY DIVISION

Complies

Test Engineer

UL Verification Services Inc.

Cemet Mak

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# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 5, and RSS-210 Issue 9.

# 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 | 47266 Benicia Street | 47658 Kato Rd. |
|----------------------|----------------------|----------------|
| ☐ Chamber A          | ☐ Chamber D          |                |
| ☐ Chamber B          | ☐ Chamber E          |                |
| ☐ Chamber C          | ☐ Chamber F          |                |
|                      | ☐ Chamber G          | ☐ Chamber L    |
|                      | ☐ Chamber H          |                |

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. CALIBRATION AND UNCERTAINTY

# 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

# 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 EUT is a mobile personal emergency response system with WCDMA, LTE and 906 MHz single channel radio.

# 5.2. MAXIMUM FUNDAMENTAL FIELD STRENGTH

The transmitter has a maximum peak fundamental field strength as follows:

| Frequency Band (MHz) | Output PK E-field Strength (dBuV/m) |
|----------------------|-------------------------------------|
| 906                  | 71.52                               |

#### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

| Frequency Band | Antenna Peak Gair |  |
|----------------|-------------------|--|
| (MHz)          | (dBi)             |  |
| 906            | -2.0              |  |

#### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 5350CERT.

# 5.5. WORST-CASE CONFIGURATION AND MODE

All tests were performed with the EUT was set to transmit at the 906MHz frequency with highest output power as worst-case scenario.

The EUT is a mobile device. Therefore, all final radiated testing was performed with the EUT in the charging cradle orientation.

906 MHz and cellular do not transmit simultaneously.

# 5.6. DESCRIPTION OF TEST SETUP

# **SUPPORT EQUIPMENT & PERIPHERALS**

| SUPPORT EQUIPMENT & PERIPHERALS LIST                     |          |          |              |  |
|--|----------|----------|--------------|--|
| Description Manufacturer Model Serial Number/Part Number |          |          |              |  |
| AC/DC Adapter  | CUI Inc. | SWI5-5-N | SWI5-5-N-MUB |  |

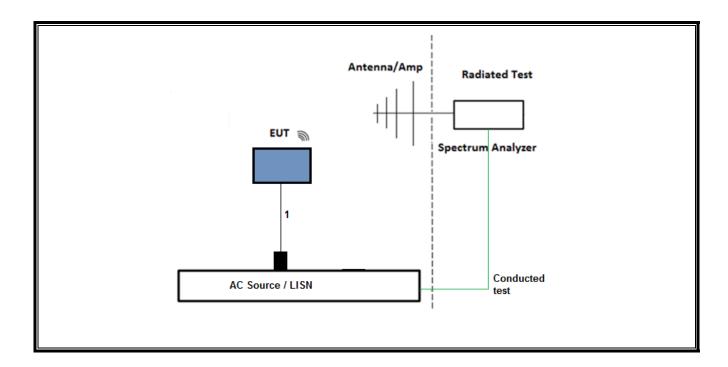
# I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

|              | I/O CABLE LIST |                |                   |               |              |         |
|--------------|----------------|----------------|-------------------|---------------|--------------|---------|
| Cable<br>No. | Port           | # of Identical | Connector<br>Type | Cable<br>Type | Cable Length | Remarks |
|              |                | Ports          |                   |               | m            |         |
| 1            | AC             | 1              | 2-prong           | Unshielded    | 1.2          | N/A     |

# **TEST SETUP**

The EUT was installed in a typical configuration. Refer to the following diagram.

# **TEST SETUP DIAGRAM**



# 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                       | Asset       | Cal Due     |
| Amplifier 1-8GHz 30dB gain                                  | L3 Narda                                 | AMF-4D-<br>01000800-30-29P  | 167494      | 8/1/2019    |
| EMI TEST RECEIVER   | Rohde & Schwarz                          | ESW44                       | PRE0179376  | 2/14/2020   |
| Amplifier, 9KHz to 1GHz, 32dB                               | SONOMA<br>INSTRUMENT                     | 310                         | PRE0180175  | 7/9/2019    |
| RF Amplifier, 1-18GHz                                       | MITEQ                                    | AFS42-00101800-<br>25-S-42  | 171460      | 8/1/2019    |
| Antenna,BroadBand Hybrid, 30MHz to 3GHz                     | SunAR rf motion                          | JB3                         | PRE0184971  | 11/13/2019  |
| Antenna, Double Ridge Guide Horn<br>Antenna 700MHz to 18GHz | A.H. SYSTEMS, INC.                       | SAS-571                     | PRE0190810  | 7/10/2019   |
| Amplifier, 1 to 18GHz, 35dB                                 | AMPLICAL                                 | AMP1G18-35                  | T1569       | 5/4/2020    |
| Amplifier, 1-7GHz, 24dB                                     | AMPLICAL                                 | AMP1G7-24-27                | T1609       | 5/4/2020    |
| Antenna,Broadband Hybrid, 30MHz to 3GHz                     | SunAR rf motion                          | JB3                         | PRE0184052  | 10/24/2019  |
| Amplifier, 9KHz to 1GHz, 32dB                               | SONOMA<br>INSTRUMENT                     | 310                         | 175953      | 12/13/2019  |
| Antenna, Double Ridge Guide Horn<br>Antenna 700MHz to 18GHz | A.H. SYSTEMS, INC.                       | SAS-571                     | PRE0190811  | 7/12/2019   |
| EMI TEST RECEIVER   | Rohde & Schwarz                          | ESW44                       | PRE0179367  | 5/16/2020   |
| Amplifier, 1 to 18GHz, 35dB                                 | AMPLICAL                                 | AMP1G18-35                  | T1571       | 5/28/2020   |
| Amplifier, 1-7GHz, 24dB                                     | AMPLICAL                                 | AMP1G7-24-27                | T1608       | 5/28/2020   |
| Amplifier, 9KHz to 1GHz, 32dB                               | SONOMA<br>INSTRUMENT                     | 310                         | PRE0180174  | 6/1/2020    |
| Antenna, Broadband Hybrid, 30MHz to 3GHz                    | SunAR rf motion                          | JB3                         | PRE0181575  | 8/1/2019    |
| Horn Antenna  | AR                                       | AMPL-ATH1G18                | PRE0189055  | 4/20/2020   |
| Spectrum Analyzer, PXA, 3Hz to 44GHz                        | Agilent (Keysight) Technologies          | N9030A                      | T907        | 1/23/2020   |
| Wideband Communication Test Set,<br>Call Box                | Rohde & Schwarz<br>(Koeln) GmbH & Co. KG | CMW500                      | T268        | 9/20/2019   |
|   | AC Line Conduct                          | ed                          |             |             |
| EMI Test Receiver   | Rohde & Schwarz                          | ESR                         | 1436        | 02/14/2020  |
| LISN  | Fischer Custom<br>Communications, Inc    | FCC-LISN-50/250-<br>25-2    | T24         | 01/24/2020  |
| LISN  | FISCHER CUSTOM COMMUNICATIONS            | FCC-LISN-50/250-<br>25-2-01 | T1310       | 01/24/2020  |
| AC Power Source   | Schaffner                                | NSG 1007                    | 134         | 01/23/2020  |
| Signal Conditioner  | Schaffner                                | CCN 1000-1                  | 133         | 01/23/2020  |
|   | <b>UL AUTOMATION SOF</b>                 | TWARE                       |             |             |
| Radiated Software   | UL                                       | UL EMC                      | Ver 9.5, De | ec 01, 2016 |
| AC Line Conducted Software UL UL EMC Ver 9.5                |  |                             | Ver 9.5, Ma | ay 26, 2015 |

# **NOTES:**

- Equipment listed above that calibrated during the testing period was set for test after the calibration.
- 2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

# 7. MEASUREMENT METHODS

Radiated emissions: ANSI C63.10-2013, Sections 6.5 and 6.6.

Occupied bandwidth (99% dB): ANSI C63.10-2013, Sections 6.9.3.

AC Power Line Conducted Emissions: ANSI C63.10-2013 Section 6.2.

# 8. TEST RESULTS

# 8.1. 20 dB AND 99% BANDWIDTH

# **LIMITS**

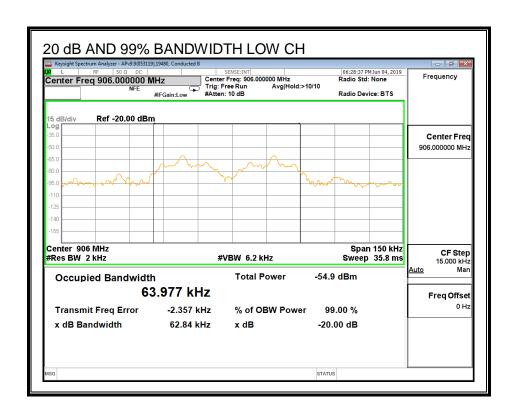
None; for reporting purposes only.

#### **TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The RBW is set to  $\geq$  1% of the 20 dB bandwidth. The VBW is set to  $\geq$  RBW. The sweep time is coupled.

# **RESULTS**

| Frequency<br>(MHz) | 20 dB<br>Bandwidth<br>(KHz) | 99%<br>Bandwidth<br>(KHz) |
|--------------------|-----------------------------|---------------------------|
| 906                | 62.84                       | 63.977                    |



REPORT NO: 12775491-E1V2 FCC ID: 2AGPI-ANH0319

# 8.2. RADIATED TEST RESULTS

#### **LIMITS**

FCC 15.249 (a)(d)(e) & 15.209 (a) IC RSS-210, B.10 IC RSS-GEN Clause 8.9 (Transmitter)

Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following @ 3 meter:

| Fundamental     | mental Field strength of fundamental at 3 m |        | Field strength of harmonics at 3 m |        |  |
|-----------------|---|--------|------------------------------------|--------|--|
| frequency       | mV/m  | dBuV/m | uV/m                               | dBuV/m |  |
| 902-928 MHz     | 50  | 94     | 500                                | 54     |  |
| 2400-2483.5 MHz | 50  | 94     | 500                                | 54     |  |
| 5725-5875 MHz   | 50  | 94     | 500                                | 54     |  |
| 24.0-24.25 GHz  | 250   | 107.95 | 2500                               | 67.95  |  |

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

| Frequency Range<br>(MHz) | Field Strength Limit<br>(uV/m) at 3 m | Field Strength Limit<br>(dBuV/m) at 3 m |
|--------------------------|---------------------------------------|---|
| 0.009-0.490              | 2400/F(kHz) @ 300m                    | -                                       |
| 0.490-1.705              | 24000/F(kHz) @ 30m                    | -                                       |
| 1.705-30.0               | 30 @ 30m                              | -                                       |
| 30 - 88                  | 100**                                 | 40**                                    |
| 88 - 216                 | 150**                                 | 43.5**                                  |
| 216 - 960                | 200**                                 | 46**                                    |
| Above 960                | 500**                                 | 54**                                    |

<sup>\*\*</sup>Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

**DATE: AUGUST 13, 2019** 

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#### **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

NOTE: According to ANSI C63.10 Section 6.6 NOTE 1— Where limits are specified by regulations for both average and peak detection, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

#### KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

#### RESULTS

**DATE: AUGUST 13, 2019** 

IC: 20951-ANH0319

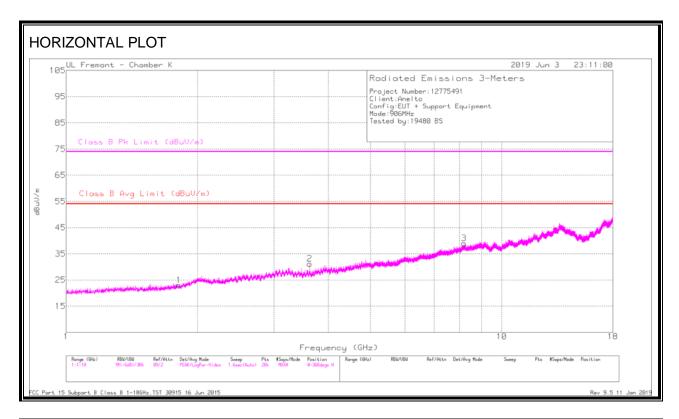
# 8.2.1. FUNDAMENTAL FREQUENCY RADIATED EMISSION

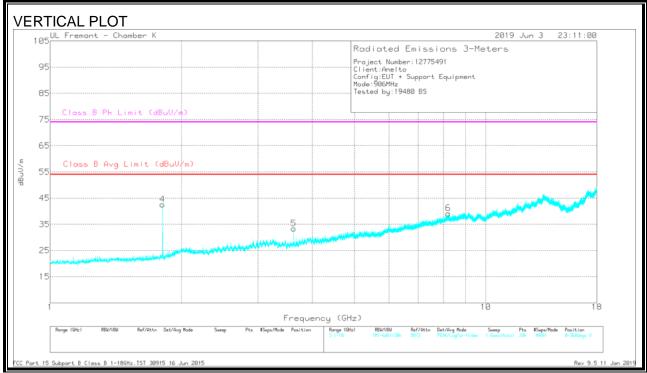
# **DATA**

| Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | AF<br>PRE0184052<br>(dB/m) | Amp/Cbl<br>(dB) | Corrected<br>Reading<br>(dBuV/m) | Avg. Limit<br>(dBuV/m) | Margin<br>(dB) | Peak Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarity |
|--------------------|----------------------------|-----|----------------------------|-----------------|----------------------------------|------------------------|----------------|------------------------|----------------|-------------------|----------------|----------|
| 905.9801           | 70.32                      | Pk  | 28.2                       | -27             | 71.52                            | -                      | -              | 114                    | -42.48         | 344               | 261            | Η        |
| 905.9801           | 54.85                      | Av  | 28.2                       | -27             | 56.05                            | 94                     | -37.95         | -                      | -              | 344               | 261            | Н        |
| 906.0201           | 61.43                      | Pk  | 28.2                       | -27             | 62.63                            | -                      | -              | 114                    | -51.37         | 145               | 177            | V        |
| 906.0201           | 12.57                      | Av  | 28.2                       | -27             | 13.77                            | 94                     | -80.23         | -                      | -              | 145               | 177            | V        |

Pk - Peak detector Av - Average detection

#### 8.2.2. HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz





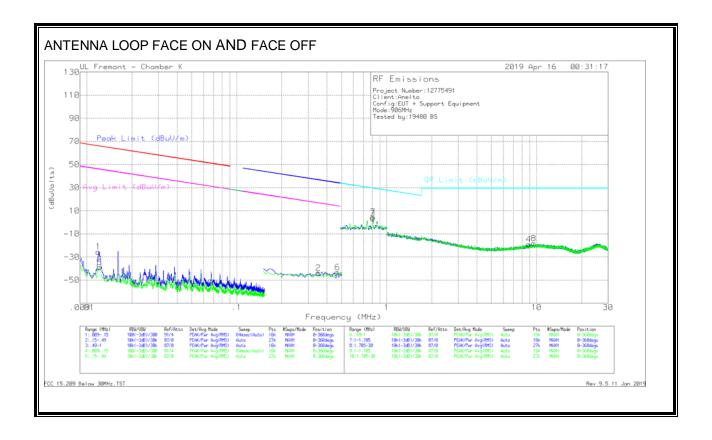
# **DATA**

| Frequency<br>(GHz) | Meter<br>Reading<br>(dBuV) | Det | AF<br>PRE0190811<br>(dB/m) | Amp/Cbl (dB) | Corrected<br>Reading<br>dBuV/m | Class B Avg<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Class B Pk<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarity |
|--------------------|----------------------------|-----|----------------------------|--------------|--------------------------------|----------------------------------|----------------|---------------------------------|----------------|-------------------|----------------|----------|
| 1.813              | 32.91                      | Pk  | 25.7                       | -35.4        | 23.21                          | -                                | -              | 74                              | -50.79         | 20                | 184            | Η        |
| 1.813              | 20.1                       | Av  | 25.7                       | -35.4        | 10.4                           | 54                               | -43.6          | -                               | -              | 20                | 184            | Н        |
| 3.624              | 32.95                      | Pk  | 29.9                       | -32.7        | 30.15                          | -                                | -              | 74                              | -43.85         | 340               | 110            | Н        |
| 3.624              | 20.24                      | Av  | 29.9                       | -32.7        | 17.44                          | 54                               | -36.56         | -                               | -              | 340               | 110            | Н        |
| 8.194              | 25.92                      | Pk  | 37.9                       | -25.6        | 38.22                          | -                                | -              | 74                              | -35.78         | 200               | 272            | Н        |
| 8.194              | 12.97                      | Av  | 37.9                       | -25.6        | 25.27                          | 54                               | -28.73         | -                               | -              | 200               | 272            | Н        |
| 1.812              | 52.47                      | Pk  | 25.7                       | -35.4        | 42.77                          | -                                | -              | 74                              | -31.23         | 108               | 240            | V        |
| 1.812              | 38.46                      | Av  | 25.7                       | -35.4        | 28.76                          | 54                               | -25.24         | -                               | -              | 108               | 240            | V        |
| 3.624              | 43.68                      | Pk  | 29.9                       | -32.7        | 40.88                          | -                                | -              | 74                              | -33.12         | 108               | 391            | V        |
| 3.624              | 30.91                      | Av  | 29.9                       | -32.7        | 28.11                          | 54                               | -25.89         | -                               | -              | 108               | 391            | V        |
| 8.208              | 35.54                      | Pk  | 38                         | -25.6        | 47.94                          | -                                | -              | 74                              | -26.06         | 127               | 155            | V        |
| 8.208              | 22.2                       | Αv  | 38                         | -25.6        | 34.6                           | 54                               | -19.4          | -                               | -              | 127               | 155            | V        |

Pk - Peak detector Av - Average detection

#### 8.2.3. WORST-CASE BELOW 30MHz

#### SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



# **DATA**

| Mark | er Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | Loop<br>Antenna<br>(ACF) | Cables w/<br>PRE0186650 | Dist<br>Corr<br>300m | Corrected<br>Reading<br>(dBuVolts) | Peak<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Avg Limit<br>(dBuV/m) | Margin<br>(dB) | Peak<br>Limit<br>(dBuV/m) | Margin<br>(dB) | Avg Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) |
|------|-----------------------|----------------------------|-----|--------------------------|-------------------------|----------------------|------------------------------------|---------------------------|----------------|-----------------------|----------------|---------------------------|----------------|-----------------------|----------------|-------------------|
| 1    | .01197                | 26.35                      | Pk  | 60                       | -31.8                   | -80                  | -25.45                             | 66.02                     | -91.47         | 46.02                 | -71.47         |                           |                |                       | -              | 0-360             |
| 2    | .35127                | 11.96                      | Pk  | 56.2                     | -32.1                   | -80                  | -43.94                             | -                         | -              | -                     | -              | 36.7                      | -80.64         | 16.7                  | -60.64         | 0-360             |
| 5    | .0122                 | 12.96                      | Pk  | 60                       | -31.8                   | -80                  | -38.84                             | 65.86                     | -104.7         | 45.86                 | -84.7          | -                         | -              | -                     | -              | 0-360             |
| 6    | .47094                | 12.61                      | Pk  | 56.2                     | -32.1                   | -80                  | -43.29                             |                           | -              | -                     | ,              | 34.15                     | -77.44         | 14.15                 | -57.44         | 0-360             |

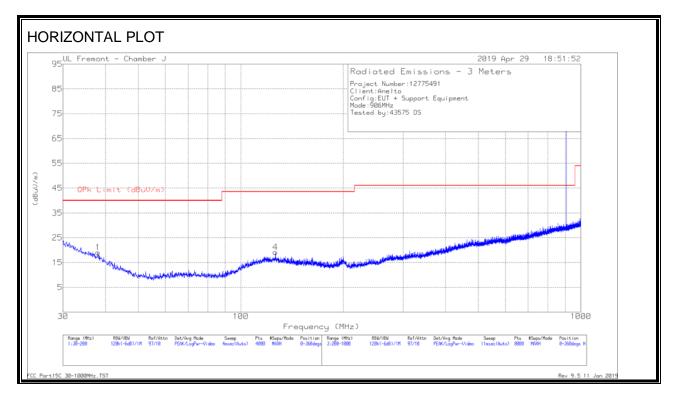
Pk - Peak detector

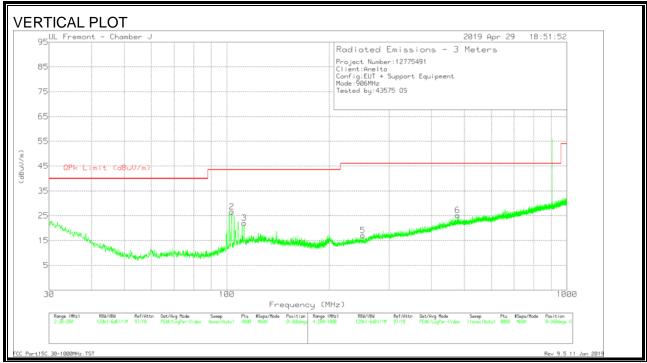
| Marker | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | Loop Antenna<br>(ACF) | Cables w/<br>PRE0186650 | Dist Corr 30m (dB)<br>40Log | Corrected<br>Reading<br>(dBuVolts) | QP Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) |
|--------|--------------------|----------------------------|-----|-----------------------|-------------------------|-----------------------------|------------------------------------|----------------------|----------------|-------------------|
| 3      | .80891             | 19.31                      | Pk  | 56.3                  | -32.1                   | -40                         | 3.51                               | 29.46                | -25.95         | 0-360             |
| 7      | .8125              | 20.41                      | Pk  | 56.3                  | -32.1                   | -40                         | 4.61                               | 29.42                | -24.81         | 0-360             |
| 4      | 8.86389            | 18.28                      | Pk  | 34.5                  | -31.8                   | -40                         | -19.02                             | 29.5                 | -48.52         | 0-360             |
| 8      | 9.54823            | 19.04                      | Pk  | 34.4                  | -31.8                   | -40                         | -18.36                             | 29.5                 | -47.86         | 0-360             |

Pk - Peak detector

#### 8.2.4. WORST-CASE 30MHz TO 1GHz

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)





# **DATA**

| Marker | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | AF<br>PRE0181575<br>(dB/m) | Amp Cbl (dB) | Corrected<br>Reading<br>(dBuV/m) | QPk Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarity |
|--------|--------------------|----------------------------|-----|----------------------------|--------------|----------------------------------|-----------------------|----------------|-------------------|----------------|----------|
| 1      | * 38.0346          | 29.68                      | Pk  | 20.9                       | -31.5        | 19.08                            | 40                    | -20.92         | 0-360             | 98             | Н        |
| 4      | * 126.5425         | 30.18                      | Pk  | 19.8                       | -30.8        | 19.18                            | 43.52                 | -24.34         | 0-360             | 398            | Н        |
| 2      | 103.4165           | 40.17                      | Pk  | 17.3                       | -30.9        | 26.57                            | 43.52                 | -16.95         | 0-360             | 101            | V        |
| 3      | * 112.4713         | 33.87                      | Pk  | 19                         | -30.8        | 22.07                            | 43.52                 | -21.45         | 0-360             | 101            | V        |
| 5      | * 251.2067         | 29.88                      | Pk  | 17.4                       | -30.2        | 17.08                            | 46.02                 | -28.94         | 0-360             | 299            | V        |
| 6      | 477.236            | 31.09                      | Pk  | 23.6                       | -29.5        | 25.19                            | 46.02                 | -20.83         | 0-360             | 101            | V        |

<sup>\* -</sup> indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

#### **Radiated Emissions**

| Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | AF<br>PRE0181575<br>(dB/m) | Amp Cbl<br>(dB) | Corrected<br>Reading<br>(dBuV/m) | QPk Limit<br>(dBuV/m) | Margin<br>(dB) | Azimuth<br>(Degs) | Height<br>(cm) | Polarity |
|--------------------|----------------------------|-----|----------------------------|-----------------|----------------------------------|-----------------------|----------------|-------------------|----------------|----------|
| * 38.2256          | 29.24                      | Pk  | 20.7                       | -31.5           | 18.44                            | 40                    | -21.56         | 114               | 277            | Н        |
| * 38.2256          | 22.51                      | Qp  | 20.7                       | -31.5           | 11.71                            | 40                    | -28.29         | 114               | 277            | Н        |
| * 126.5377         | 28.3                       | Pk  | 19.8                       | -30.8           | 17.3                             | 43.52                 | -26.22         | 350               | 311            | Н        |
| * 126.5377         | 22.07                      | Qp  | 19.8                       | -30.8           | 11.07                            | 43.52                 | -32.45         | 350               | 311            | Н        |
| 103.4592           | 28.98                      | Pk  | 17.3                       | -30.9           | 15.38                            | 43.52                 | -28.14         | 358               | 150            | V        |
| 103.4592           | 21.94                      | Qp  | 17.3                       | -30.9           | 8.34                             | 43.52                 | -35.18         | 358               | 150            | V        |
| * 112.2805         | 28.9                       | Pk  | 19                         | -30.8           | 17.1                             | 43.52                 | -26.42         | 122               | 384            | V        |
| * 112.2805         | 21.55                      | Qp  | 19                         | -30.8           | 9.75                             | 43.52                 | -33.77         | 122               | 384            | V        |
| * 251              | 29.08                      | Pk  | 17.4                       | -30.2           | 16.28                            | 46.02                 | -29.74         | 37                | 154            | V        |
| * 251              | 21.6                       | Qp  | 17.4                       | -30.2           | 8.8                              | 46.02                 | -37.22         | 37                | 154            | V        |
| 477.2307           | 29.26                      | Pk  | 23.6                       | -29.5           | 23.36                            | 46.02                 | -22.66         | 116               | 178            | V        |
| 477.2307           | 21.31                      | Qp  | 23.6                       | -29.5           | 15.41                            | 46.02                 | -30.61         | 116               | 178            | V        |

<sup>\* -</sup> indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Pk - Peak detector

Qp - Quasi-Peak detector

# 8.3. AC POWER LINE CONDUCTED EMISSIONS

#### **LIMITS**

FCC §15.207 (a)

RSS-Gen 8.8

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

<sup>\*</sup>Decreases with the logarithm of the 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.

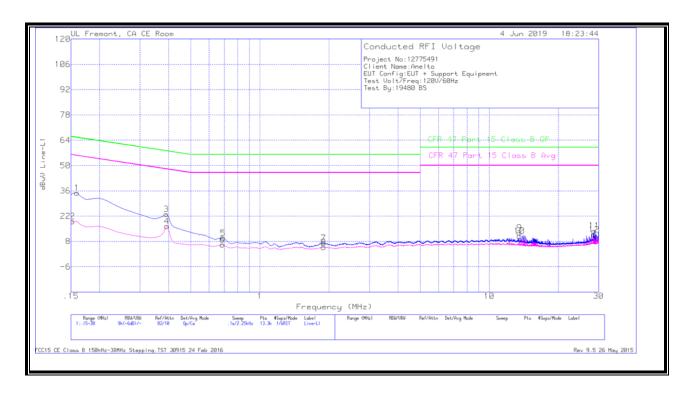
Line conducted data is recorded for both NEUTRAL and HOT lines.

#### **RESULTS**

**DATE: AUGUST 13, 2019** 

IC: 20951-ANH0319

#### **LINE 1 RESULTS**



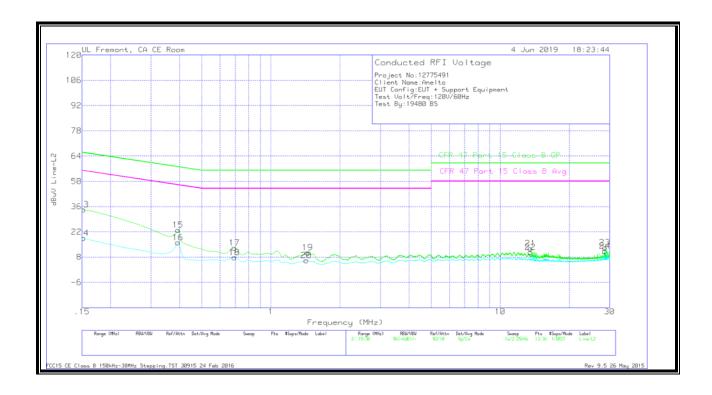
#### **WORST EMISSIONS**

| Rang   | e 1: Line-L1       | 1 .15 - 30                 | MHz |            |                       |                 |                              |                                    |                      |                                     |                             |
|--------|--------------------|----------------------------|-----|------------|-----------------------|-----------------|------------------------------|------------------------------------|----------------------|-------------------------------------|-----------------------------|
| Marker | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | LISN<br>L1 | LC<br>Cables<br>C1&C3 | Limiter<br>(dB) | Corrected<br>Reading<br>dBuV | CFR 47<br>Part 15<br>Class B<br>QP | QP<br>Margin<br>(dB) | CFR 47<br>Part 15<br>Class B<br>Avg | Av(CISPR)<br>Margin<br>(dB) |
| 1      | .159               | 24.68                      | Qp  | .1         | 0                     | 10.1            | 34.88                        | 65.52                              | -30.64               | -                                   | -                           |
| 2      | .15225             | 8.94                       | Ca  | .1         | 0                     | 10.1            | 19.14                        | -                                  | -                    | 55.88                               | -36.74                      |
| 3      | .39075             | 12.9                       | Qp  | 0          | 0                     | 10.1            | 23                           | 58.05                              | -35.05               | -                                   | -                           |
| 4      | .393               | 6.38                       | Ca  | 0          | 0                     | 10.1            | 16.48                        |                                    | -                    | 48                                  | -31.52                      |
| 5      | .69225             | 2                          | Qp  | 0          | 0                     | 10.1            | 9.9                          | 56                                 | -46.1                | -                                   | -                           |
| 6      | .68775             | -3.98                      | Ca  | 0          | 0                     | 10.1            | 6.12                         |                                    | -                    | 46                                  | -39.88                      |
| 7      | 1.89825            | -3.14                      | Qp  | 0          | .1                    | 10.1            | 7.06                         | 56                                 | -48.94               | -                                   | -                           |
| 8      | 1.89713            | -5.4                       | Ca  | 0          | .1                    | 10.1            | 4.8                          | -                                  | -                    | 46                                  | -41.2                       |
| 9      | 13.56              | 2.35                       | Qp  | .1         | .2                    | 10.2            | 12.85                        | 60                                 | -47.15               | -                                   | -                           |
| 10     | 13.56              | .51                        | Ca  | .1         | .2                    | 10.2            | 11.01                        | -                                  | -                    | 50                                  | -38.99                      |
| 11     | 28.689             | 2.93                       | Qp  | .1         | .4                    | 10.5            | 13.93                        | 60                                 | -46.07               | -                                   | -                           |
| 12     | 28.689             | .82                        | Ca  | .1         | .4                    | 10.5            | 11.82                        | -                                  | -                    | 50                                  | -38.18                      |

Qp - Quasi-Peak detector

Ca - CISPR average detection

#### **LINE 2 RESULTS**



# **WORST EMISSIONS**

| Rang   | e 2: Line-L2       | 2 .15 - 30                 | MHz |         |                       |                 |                              |                                    |                      |                                     |                             |
|--------|--------------------|----------------------------|-----|---------|-----------------------|-----------------|------------------------------|------------------------------------|----------------------|-------------------------------------|-----------------------------|
| Marker | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Det | LISN L2 | LC<br>Cables<br>C2&C3 | Limiter<br>(dB) | Corrected<br>Reading<br>dBuV | CFR 47<br>Part 15<br>Class B<br>QP | QP<br>Margin<br>(dB) | CFR 47<br>Part 15<br>Class B<br>Avg | Av(CISPR)<br>Margin<br>(dB) |
| 13     | .15225             | 24.23                      | Qp  | .1      | 0                     | 10.1            | 34.43                        | 65.88                              | -31.45               | -                                   | -                           |
| 14     | .15225             | 8.34                       | Ca  | .1      | 0                     | 10.1            | 18.54                        | -                                  | -                    | 55.88                               | -37.34                      |
| 15     | .393               | 12.91                      | Qp  | 0       | 0                     | 10.1            | 23.01                        | 58                                 | -34.99               | -                                   | -                           |
| 16     | .393               | 5.99                       | Ca  | 0       | 0                     | 10.1            | 16.09                        | -                                  |                      | 48                                  | -31.91                      |
| 17     | .6945              | 3.01                       | Qp  | 0       | 0                     | 10.1            | 13.11                        | 56                                 | -42.89               | -                                   | -                           |
| 18     | .6945              | -2.26                      | Ca  | 0       | 0                     | 10.1            | 7.84                         | -                                  | -                    | 46                                  | -38.16                      |
| 19     | 1.446              | .41                        | Qp  | 0       | .1                    | 10.1            | 10.61                        | 56                                 | -45.39               | -                                   | -                           |
| 20     | 1.428              | -4.06                      | Ca  | 0       | .1                    | 10.1            | 6.14                         | -                                  |                      | 46                                  | -39.86                      |
| 21     | 13.56              | 2.37                       | Qp  | .1      | .2                    | 10.2            | 12.87                        | 60                                 | -47.13               | -                                   | -                           |
| 22     | 13.56              | .2                         | Ca  | .1      | .2                    | 10.2            | 10.7                         | -                                  | -                    | 50                                  | -39.3                       |
| 23     | 28.5675            | 2.26                       | Qp  | .1      | .4                    | 10.5            | 13.26                        | 60                                 | -46.74               | -                                   | -                           |
| 24     | 28.5675            | .33                        | Ca  | .1      | .4                    | 10.5            | 11.33                        | -                                  | -                    | 50                                  | -38.67                      |

Qp - Quasi-Peak detector Ca - CISPR average detection