

## TEST REPORT

**ACCORDING TO:**

**FCC 47CFR part 15 subpart C § 15.209 and subpart B;  
RSS-210 issue 10 section 7.2, RSS-Gen issue 5, ICES-003 Issue 6:2019**

**FOR:**

**Afimilk Agricultural Cooperative Ltd.**

**AfiPass II Livestock Passive ID System consisting of:**

**Controller, model AfiPass II, part number 4095910**

**Passive Antenna, models**

**AfiPass II Stall external module 50, part number 4095912**

**AfiPass II Stall external module 40, part number 4095914**

**AfiPass II Rotary/Sort external module, part number 4095913**

**FCC ID: JER4095910**

**IC: 21531-5910**

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## 1 Applicant information

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**Contact name:** Mr. Eli Shimshon

## 2 Equipment under test attributes

**Product name:** AfiPass II Livestock Passive ID System consisting of:  
**Model:** Controller, model AfiPass II, part number: 4095910  
Passive Antenna, model AfiPass II Stall external module 50, part number 4095912 <sup>Note</sup>  
**Product type:** Transceiver  
**Hardware version:** 4095910 rev 00  
**Software release:** 0.3.3.2  
**Receipt date** 25-Dec-19

Note: According to manufacturer's declaration provided in Appendix G of the test report, models AfiPass II Stall external module 50, part number 4095912, AfiPass II Stall external module 40, part number 4095914, AfiPass II Rotary/Sort external module, part number 4095913 differ in size and electrical spec to optimally suit the purpose of each module in terms of ID range and peripheral area coverage. For more detailed description refer to this declaration. That's why only the model AfiPass II Stall external module 50, part number 4095912 was tested.

## 3 Manufacturer information

**Manufacturer name:** Afimilk Agricultural Cooperative Ltd  
**Address:** Kibbutz Afikim 1514800, Israel  
**Telephone:** +972 4675 4256  
**Fax:** +972 4675 1862  
**E-Mail:** [eli\\_s@afimilk.co.il](mailto:eli_s@afimilk.co.il)  
**Contact name:** Mr. Eli Shimshon

## 4 Test details




**Project ID:** 35230  
**Location:** Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel  
**Test started:** 04-Feb-20  
**Test completed:** 05-Feb-20  
**Test specification(s):** FCC 47CFR part 15 subpart C § 15.209 and subpart B;  
RSS-210 issue 10 section 7.2, RSS-Gen issue 5,  
ICES-003 Issue 6:2019

## 5 Tests summary

| Test   | Status |
|--|--------|
| <b>Transmitter characteristics</b>   |        |
| Section 15.209, / RSS-Gen, Section 6.5, 6.6<br>Field strength of emissions | Pass   |
| Section 15.215 / RSS-Gen, Section 6.7,<br>Occupied bandwidth               | Pass   |
| Section 15.207(a) / RSS-Gen, Section 7.2,<br>Conducted emission            | Pass   |
| Section 15.203 / RSS Gen Section 6.8,<br>Antenna requirements              | Pass   |
| <b>Unintentional emissions</b>   |        |
| Section 15.107, Conducted emission at AC<br>power port                     | Pass   |
| Section 15.109, / ICES-003 , section 6.2,<br>Radiated emission             | Pass   |

This test report supersedes the previously issued test report identified by Doc ID: AFIRAD\_FCC.35230\_Rev1

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.  
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

|                     | Name and Title  | Date                  | Signature   |
|---------------------|---|-----------------------|---|
| <b>Tested by:</b>   | Mr. A. Morozov, test engineer,<br>EMC & Radio           | 04-Feb-20 – 05-Feb-20 |  |
| <b>Reviewed by:</b> | Mrs. S. Peysahov Sheynin, test engineer,<br>EMC & Radio | 11-May-21             |  |
| <b>Approved by:</b> | Mr. S. Samokha, technical manager,<br>EMC & Radio       | 12-May-21             |  |

## 6 EUT description

Note: The following data in this clause is provided by the customer and represents his sole responsibility

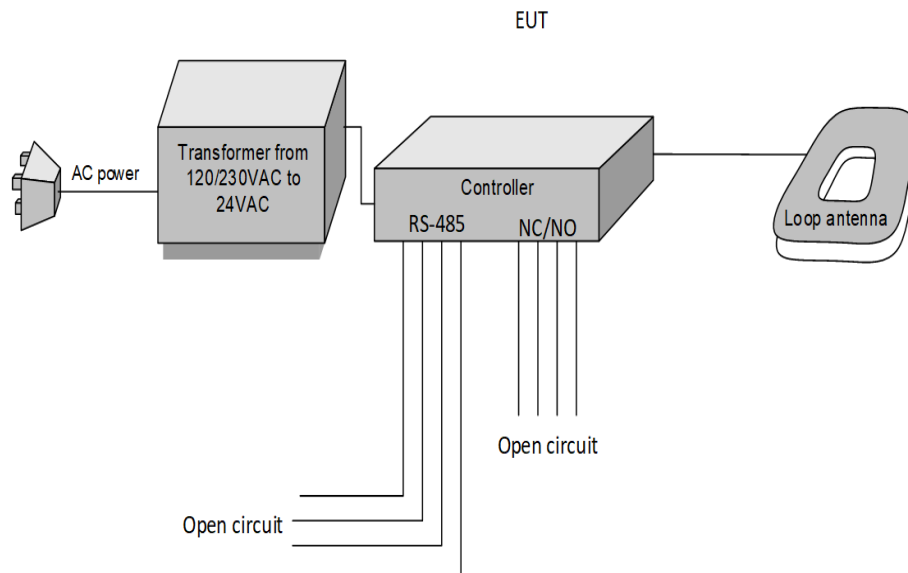
### 6.1 General information

The EUT is a Passive Identification System with operating frequency 134 kHz for Farm animals that includes Controller, Passive Antenna/s (i.e. external modules) designed to support various applications of livestock identification, 120 VAC / 24 VAC Transformer.

### 6.2 EUT system parts

| Description                            | Manufacturer  | Model or part number                                   | Serial number |
|--|---------------|--|---------------|
| Livestock Passive ID System Controller | Afimilk       | AfiPass II, Controller<br>PN: 4095910                  | 302000182     |
| Passive Antenna                        | Afimilk       | AfiPass II, External Module 50<br>PN: 4095912          | N/A           |
| Passive Antenna                        | Afimilk       | AfiPass II, External Module 40<br>PN: 4095914          | N/A           |
| Passive Antenna                        | Afimilk       | AfiPass II, Sort/Rotary External<br>Module PN: 4095913 | N/A           |
| Power Transformer                      | Gershon Klein | 5009401  | N/A           |

### 6.3 Test configuration



### 6.4 Changes made in EUT

No changes were implemented in the EUT during testing.

## 6.5 Transmitter characteristics

|   |  |  |                                |                             |                                |  |
|---|--|--|--------------------------------|-----------------------------|--------------------------------|--|
| <b>Type of equipment</b>                                |  |  |                                |                             |                                |  |
| X   | Stand-alone (Equipment with or without its own control provisions)                                       |  |                                |                             |                                |  |
|   | Combined equipment (Equipment where the radio part is fully integrated within another type of equipment) |  |                                |                             |                                |  |
|   | Plug-in card (Equipment intended for a variety of host systems)  |  |                                |                             |                                |  |
| <b>Operating frequencies</b>                            |  | 0.1338 MHz   |                                |                             |                                |  |
| <b>Maximum rated output power</b>                       |  | At transmitter 50 $\Omega$ RF output connector             |                                | dBm                         |                                |  |
|   |  | Field strength at 3 m distance                             |                                | 107.37 dB( $\mu$ V/m) -peak |                                |  |
| <b>Is transmitter output power variable?</b>            |  | X  | No                             |                             |                                |  |
|   |  | Yes  | continuous variable            |                             |                                |  |
|   |  |  | stepped variable with stepsize |                             |                                |  |
|   |  |  | dB                             |                             |                                |  |
|   |  |  | minimum RF power               |                             |                                |  |
| maximum RF power  |  |  |                                |                             |                                |  |
| dBm   |  |  |                                |                             |                                |  |
| <b>Antenna connection</b>                               |  |  |                                |                             |                                |  |
| unique coupling   | standard connector   | X  | integral                       | with temporary RF connector |                                |  |
|   |  |  |                                | X                           | without temporary RF connector |  |
| <b>Antenna/s technical characteristics</b>              |  |  |                                |                             |                                |  |
| Type  | Manufacturer   | Model number   |                                | Gain                        |                                |  |
| Loop (Integral)   | Afimilk  | AfiPass II, External Module 50<br>PN: 4095912*             |                                | NA                          |                                |  |
| Loop (Integral)   | Afimilk  | AfiPass II, External Module 40<br>PN: 4095914              |                                | NA                          |                                |  |
| Loop (Integral)   | Afimilk  | AfiPass II, Sort/Rotary External<br>Module PN: 4095913     |                                | NA                          |                                |  |
| <b>Type of modulation</b>                               |  | FSK  |                                |                             |                                |  |
| <b>Transmitter aggregate data rate/s</b>                |  | 7762,5 bit/s (Binary 1 bit)<br>8387,5 bit/s (Binary 0 bit) |                                |                             |                                |  |
| <b>Transmitter power source</b>                         |  |  |                                |                             |                                |  |
|   | Battery  | <b>Nominal rated voltage</b>                               |                                | Battery type                |                                |  |
|   | DC   | <b>Nominal rated voltage</b>                               | VDC                            |                             |                                |  |
| X   | AC mains   | <b>Nominal rated voltage</b>                               | 120 VAC                        | Frequency                   | 50 Hz                          |  |
| <b>Common power source for transmitter and receiver</b> |  |  |                                | X                           | yes                            |  |
|   |  |  |                                |                             | no                             |  |

\* - According to manufacturer's declaration provided in Appendix G the worst case of antenna configuration with the highest radiation area was tested.



|                     |                         |  |                       |
|---------------------|-------------------------|--|-----------------------|
| Test specification: |                         | Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                       |
| Test procedure:     |                         | ANSI C63.10, Section 6.4, 6.5                                      |                       |
| Test mode:          |                         | Verdict: PASS  |                       |
| Date(s):            |                         |  |                       |
| 04-Feb-20           |                         |  |                       |
| Temperature: 24 °C  | Relative Humidity: 44 % | Air Pressure: 1005 hPa   | Power: 120 VAC, 50 Hz |
| Remarks:            |                         |  |                       |

## 7 Transmitter tests according to 47CFR part 15 subpart C and RSS-210 requirements

### 7.1 Field strength of emissions

#### 7.1.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given Table 7.1.1 and Table 7.1.2.

Table 7.1.1 Radiated fundamental emission limits

| Fundamental frequency, kHz | Field strength at 3 m, dB(μV/m) |         |
|----------------------------|---------------------------------|---------|
|                            | Peak                            | Average |
| 133.8                      | 125.07                          | 105.07  |

Table 7.1.2 Radiated spurious emissions limits

| Frequency, MHz                   | Field strength at 3 m, dB(μV/m) |                 |                 |
|----------------------------------|---------------------------------|-----------------|-----------------|
|                                  | Within restricted bands         |                 |                 |
|                                  | Peak                            | Quasi Peak      | Average         |
| 0.009 – 0.090                    | 148.5 – 128.5                   | NA              | 128.5 – 108.5** |
| 0.090 – 0.110                    | NA                              | 108.5 – 106.8** | NA              |
| 0.110 – 0.490                    | 126.8 – 113.8                   | NA              | 106.8 – 93.8**  |
| 0.490 – 1.705                    | NA                              | 73.8 – 63.0**   | NA              |
| 1.705 – 30.0*                    |                                 | 69.5            |                 |
| 30 – 88                          |                                 | 40.0            |                 |
| 88 – 216                         |                                 | 43.5            |                 |
| 216 – 960                        |                                 | 46.0            |                 |
| 960 – 1000                       |                                 | 54.0            |                 |
| 1000 – 10 <sup>th</sup> harmonic | 74.0                            | NA              | 54.0            |

\*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:

$$\text{Lims}_2 = \text{Lims}_1 + 40 \log (S_1/S_2),$$

where  $S_1$  and  $S_2$  – standard defined and test distance respectively in meters.

\*\* - The limit decreases linearly with the logarithm of frequency.

#### 7.1.2 Test procedure for fundamental and spurious emission field strength measurements in 9 kHz to 30 MHz

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and the performance check was conducted.

7.1.2.2 The specified frequency range was investigated with a loop antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna was rotated around its vertical axis. The measuring antenna polarization was switched from vertical to horizontal.

7.1.2.3 The worst test results (the lowest margins) were recorded in Table 7.1.3 and shown in the associated plots.



|                     |                         |  |                       |
|---------------------|-------------------------|--|-----------------------|
| Test specification: |                         | Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                       |
| Test procedure:     |                         | ANSI C63.10, Section 6.4, 6.5                                      |                       |
| Test mode:          |                         | Verdict: PASS  |                       |
| Date(s):            |                         |  |                       |
| 04-Feb-20           |                         |  |                       |
| Temperature: 24 °C  | Relative Humidity: 44 % | Air Pressure: 1005 hPa   | Power: 120 VAC, 50 Hz |
| Remarks:            |                         |  |                       |

Figure 7.1.1 Setup for spurious emission field strength measurements below 30 MHz

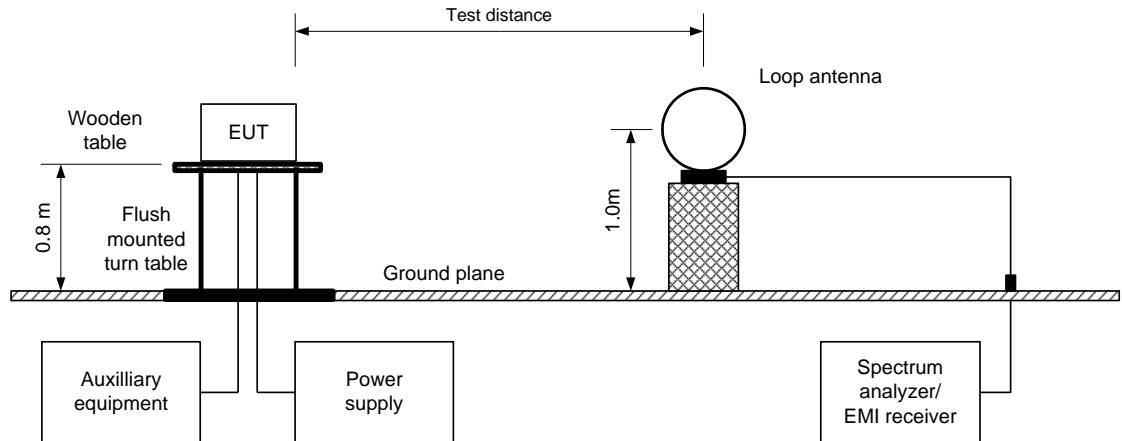
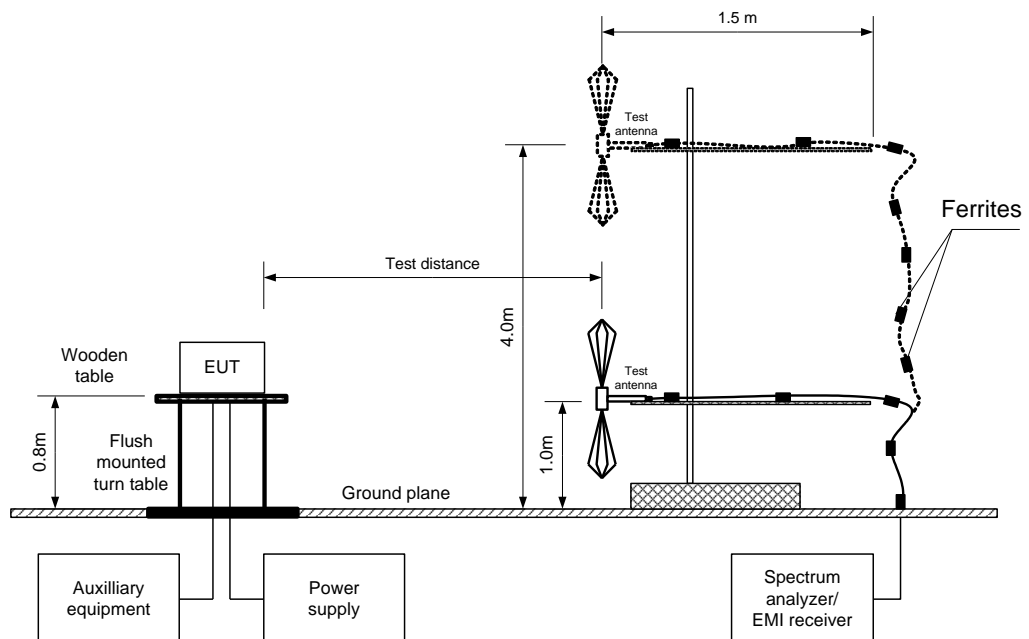


Figure 7.1.2 Setup for spurious emission field strength measurements above 30 MHz







|  |                         |                        |                       |
|--|-------------------------|------------------------|-----------------------|
| Test specification: Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                         |                        |                       |
| Test procedure: ANSI C63.10, Section 6.4, 6.5  |                         |                        |                       |
| Test mode: Compliance  |                         | Verdict: PASS          |                       |
| Date(s): 04-Feb-20   |                         |                        |                       |
| Temperature: 24 °C   | Relative Humidity: 44 % | Air Pressure: 1005 hPa | Power: 120 VAC, 50 Hz |
| Remarks:   |                         |                        |                       |

**Table 7.1.3 Field strength of fundamental emission**

TEST DISTANCE: 3 m  
 TEST SITE: Semi anechoic chamber  
 EUT POSITION: Typical (Vertical)  
 MODULATING SIGNAL: RFID  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 30 MHz  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)  
 9.0 kHz (150 kHz – 30 MHz)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)

| F, MHz | Antenna  |           | Azimuth, degrees* | Peak field strength |                 |              | Average field strength |                 |              | Verdict |
|--------|----------|-----------|-------------------|---------------------|-----------------|--------------|------------------------|-----------------|--------------|---------|
|        | Pol.     | Height, m |                   | Measured, dB(μV/m)  | Limit, dB(μV/m) | Margin, dB** | Measured, dB(μV/m)     | Limit, dB(μV/m) | Margin, dB** |         |
| 0.1338 | Vertical | 1.0       | 2.0               | 107.37              | 124.31          | -16.94       | 104.02                 | 114.31          | -10.29       | Pass    |

The fundamental emission results at U nom±15% are shown in Plots Plot 7.1.1.

\*- EUT front panel refers to 0 degrees position of turntable.

\*\* - Margin (dB) = measured result - specification limit.

**Reference numbers of test equipment used**

|         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|
| HL 4360 | HL 3903 | HL 4011 | HL 5309 | HL 5288 | HL 5085 | HL 5376 | HL 5379 |
| HL 0446 |         |         |         |         |         |         |         |

Full description is given in Appendix A.



|                     |                         |  |                       |
|---------------------|-------------------------|--|-----------------------|
| Test specification: |                         | Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                       |
| Test procedure:     |                         | ANSI C63.10, Section 6.4, 6.5                                      |                       |
| Test mode:          |                         | Verdict: PASS  |                       |
| Date(s):            |                         |  |                       |
| 04-Feb-20           |                         |  |                       |
| Temperature: 24 °C  | Relative Humidity: 44 % | Air Pressure: 1005 hPa   | Power: 120 VAC, 50 Hz |
| Remarks:            |                         |  |                       |

Table 7.1.4 Field strength of spurious emissions

TEST DISTANCE: 3 m  
 TEST SITE: Semi Anechoic chamber  
 EUT POSITION: Typical (Vertical)  
 MODULATION: RFID  
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum  
 INVESTIGATED FREQUENCY RANGE: 0.009 – 30 MHz  
 DETECTOR USED: Peak  
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)  
 VIDEO BANDWIDTH: 9.0 kHz (150 kHz – 30 MHz)  
 TEST ANTENNA TYPE: ≥ Resolution bandwidth  
 Active loop (9 kHz – 30 MHz)

| Frequency, MHz | Peak emission, dB(μV/m) | Quasi-peak                  |                 |             | Antenna polarization | Antenna height, m | Turn-table position**, degrees | Verdict |
|----------------|-------------------------|-----------------------------|-----------------|-------------|----------------------|-------------------|--------------------------------|---------|
|                |                         | Measured emission, dB(μV/m) | Limit, dB(μV/m) | Margin, dB* |                      |                   |                                |         |
| 0.667421       | 73.85                   | 72.82                       | 91.12           | -18.3       | V                    | 1.0               | -8.0                           | Pass    |
| 0.935193       | 69.76                   | 68.69                       | 88.20           | -19.51      | V                    | 1.0               | -8.0                           |         |
| 1.202965       | 65.59                   | 64.17                       | 86.02           | -21.85      | V                    | 1.0               | -8.0                           |         |
| 1.471683       | 56.98                   | 54.22                       | 84.28           | -30.06      | V                    | 1.0               | -8.0                           |         |
| Frequency, MHz | Peak emission, dB(μV/m) | Average                     |                 |             | Antenna polarization | Antenna height, m | Turn-table position**, degrees | Verdict |
|                |                         | Measured emission, dB(μV/m) | Limit, dB(μV/m) | Margin, dB* |                      |                   |                                |         |
| 0.399648       | 81.64                   | 80.74                       | 95.57           | 14.83       | V                    | 1.0               | -8.0                           | Pass    |

\*- Margin = Measured emission - specification limit.

\*\* - EUT front panel refer to 0 degrees position of turntable.

Reference numbers of test equipment used

|         |         |         |         |         |         |         |        |
|---------|---------|---------|---------|---------|---------|---------|--------|
| HL 4360 | HL 3903 | HL 4011 | HL 5309 | HL 5288 | HL 5085 | HL 5379 | HL 446 |
| HL 5376 |         |         |         |         |         |         |        |

Full description is given in Appendix A.



HERMON LABORATORIES

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Date of Issue: 12-May-21

|  |                         |                        |                       |
|--|-------------------------|------------------------|-----------------------|
| Test specification: Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                         |                        |                       |
| Test procedure: ANSI C63.10, Section 6.4, 6.5  |                         |                        |                       |
| Test mode: Compliance  |                         | Verdict: PASS          |                       |
| Date(s): 04-Feb-20   |                         |                        |                       |
| Temperature: 24 °C   | Relative Humidity: 44 % | Air Pressure: 1005 hPa | Power: 120 VAC, 50 Hz |
| Remarks:   |                         |                        |                       |

Table 7.1.5 Restricted bands according to FCC 15, Section 205

| MHz               | MHz                 | MHz                   | MHz             | MHz           | GHz           |
|-------------------|---------------------|-----------------------|-----------------|---------------|---------------|
| 0.09 - 0.11       | 8.37625 - 8.38675   | 73 - 74.6             | 399.9 - 410     | 2690 - 2900   | 10.6 - 12.7   |
| 0.495 - 0.505     | 8.41425 - 8.41475   | 74.8 - 75.2           | 608 - 614       | 3260 - 3267   | 13.25 - 13.4  |
| 2.1735 - 2.1905   | 12.290 - 12.293     | 108 - 121.94          | 960 - 1240      | 3332 - 3339   | 14.47 - 14.5  |
| 4.125 - 4.128     | 12.51975 - 12.52025 | 123 - 138             | 1300 - 1427     | 3345.8 - 3358 | 15.35 - 16.2  |
| 4.17725 - 4.17775 | 12.57675 - 12.57725 | 149.9 - 150.05        | 1435 - 1626.5   | 3600 - 4400   | 17.7 - 21.4   |
| 4.20725 - 4.20775 | 13.36 - 13.41       | 156.52475 - 156.52525 | 1645.5 - 1646.5 | 4500 - 5150   | 22.01 - 23.12 |
| 6.215 - 6.218     | 16.420 - 16.423     | 156.7 - 156.9         | 1660 - 1710     | 5350 - 5460   | 23.6 - 24     |
| 6.26775 - 6.26825 | 16.69475 - 16.69525 | 162.0125 - 167.17     | 1718.8 - 1722.2 | 7250 - 7750   | 31.2 - 31.8   |
| 6.31175 - 6.31225 | 16.80425 - 16.80475 | 167.72 - 173.2        | 2200 - 2300     | 8025 - 8500   | 36.43 - 36.5  |
| 8.291 - 8.294     | 25.5 - 25.67        | 240 - 285             | 2310 - 2390     | 9000 - 9200   | Above 38.6    |
| 8.362 - 8.366     | 37.5 - 38.25        | 322 - 335.4           | 2483.5 - 2500   | 9300 - 9500   |               |

Table 7.1.6 Restricted bands according to RSS-Gen, Table 3

| MHz               | MHz                 | MHz                   | MHz             | MHz           | GHz           |
|-------------------|---------------------|-----------------------|-----------------|---------------|---------------|
| 0.09 - 0.11       | 8.291 - 8.294       | 16.80425 - 16.80475   | 399.9 - 410     | 3260 - 3267   | 10.6 - 12.7   |
| 2.1735 - 2.190    | 8.362 - 8.366       | 25.5 - 25.67          | 608 - 614       | 3332 - 3339   | 13.25 - 13.4  |
| 3.020 - 3.026     | 8.37625 - 8.38675   | 37.5 - 38.25          | 960 - 1427      | 3345.8 - 3358 | 14.47 - 14.5  |
| 4.125 - 4.128     | 8.41425 - 8.41475   | 73 - 74.6             | 1435 - 1626.5   | 3500 - 4400   | 15.35 - 16.2  |
| 4.17725 - 4.17775 | 12.290 - 12.293     | 74.8 - 75.2           | 1645.5 - 1646.5 | 4500 - 5150   | 17.7 - 21.4   |
| 4.20725 - 4.20775 | 12.51975 - 12.52025 | 108 - 138             | 1660 - 1710     | 5350 - 5460   | 22.01 - 23.12 |
| 5.677 - 5.683     | 12.57675 - 12.57725 | 156.52475 - 156.52525 | 1718.8 - 1722.2 | 7250 - 7750   | 23.6 - 24.0   |
| 6.215 - 6.218     | 13.36 - 13.41       | 156.7 - 156.9         | 2200 - 2300     | 8025 - 8500   | 31.2 - 31.8   |
| 6.26775 - 6.26825 | 16.42 - 16.423      | 240 - 285             | 2310 - 2390     | 9000 - 9200   | 36.43 - 36.5  |
| 6.31175 - 6.31225 | 16.69475 - 16.69525 | 322 - 335.4           | 2655 - 2900     | 9300 - 9500   | Above 38.6    |



HERMON LABORATORIES

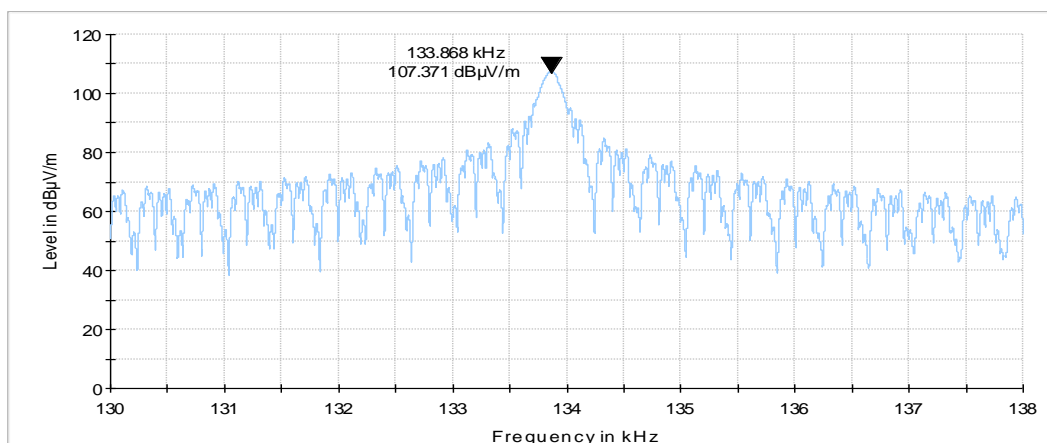
Report ID: AFIRAD\_FCC.35230\_Rev2

Date of Issue: 12-May-21

|   |                                |                               |                              |
|---|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.10, Section 6.4, 6.5  |                                |                               |                              |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 04-Feb-20   |                                |                               |                              |
| <b>Temperature:</b> 24 °C   | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>   |                                |                               |                              |

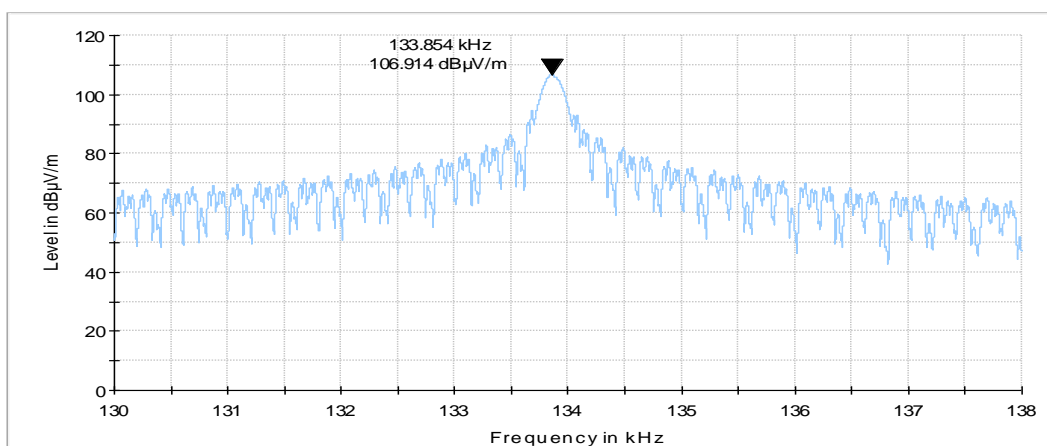
**Plot 7.1.1 Radiated emission measurements at the fundamental frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical  
EUT POSITION: Typical (Vertical)



**Plot 7.1.2 Radiated emission measurements at the fundamental frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical  
EUT POSITION: Typical (Vertical)  
VOLTAGE: 115%Unom

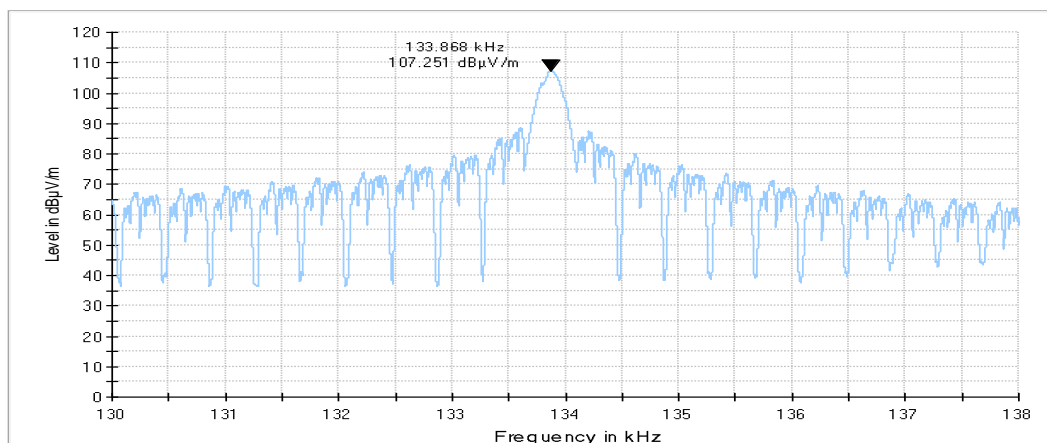




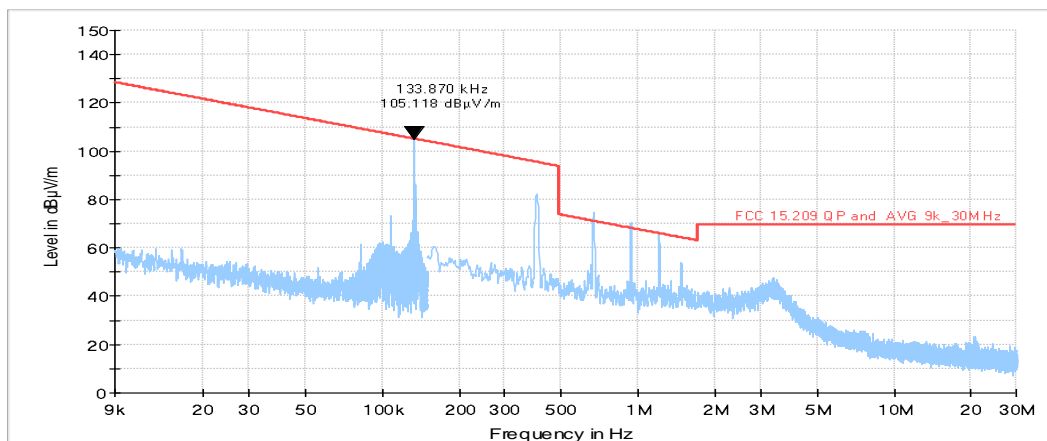
|                            |                                |   |                              |
|----------------------------|--------------------------------|---|------------------------------|
| <b>Test specification:</b> |                                | <b>Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions</b> |                              |
| <b>Test procedure:</b>     |                                | ANSI C63.10, Section 6.4, 6.5   |                              |
| <b>Test mode:</b>          |                                | <b>Verdict:</b> PASS  |                              |
| <b>Date(s):</b>            |                                |   |                              |
| 04-Feb-20                  |                                |   |                              |
| <b>Temperature:</b> 24 °C  | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa   | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>            |                                |   |                              |

**Plot 7.1.3 Radiated emission measurements at the fundamental frequency**

TEST SITE: Semi anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical  
EUT POSITION: Typical (Vertical)  
VOLTAGE: 85%Unom

**Plot 7.1.4 Radiated emission measurements from 9 to 150 kHz**

TEST SITE: Anechoic chamber  
TEST DISTANCE: 3 m  
ANTENNA POLARIZATION: Vertical  
EUT POSITION: Typical (Vertical)





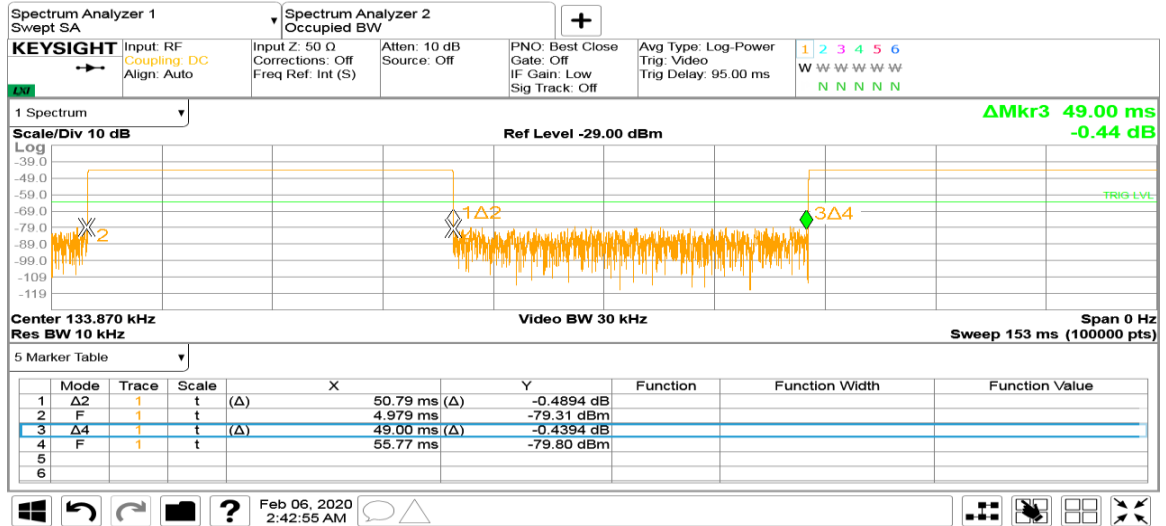
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|                     |                         |  |                       |
|---------------------|-------------------------|--|-----------------------|
| Test specification: |                         | Section 15.209 / RSS-210, Tables 2, 3, Field strength of emissions |                       |
| Test procedure:     |                         | ANSI C63.10, Section 6.4, 6.5                                      |                       |
| Test mode:          |                         | Verdict: PASS  |                       |
| Date(s):            |                         |  |                       |
| 04-Feb-20           |                         |  |                       |
| Temperature: 24 °C  | Relative Humidity: 44 % | Air Pressure: 1005 hPa   | Power: 120 VAC, 50 Hz |
| Remarks:            |                         |  |                       |

Plot 7.1.5 Transmission pulse duration





|                            |                                |  |                              |
|----------------------------|--------------------------------|--|------------------------------|
| <b>Test specification:</b> |                                | <b>Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth</b> |                              |
| <b>Test procedure:</b>     |                                | ANSI C63.10, Section 6.9.2                                       |                              |
| <b>Test mode:</b>          |                                | <b>Verdict:</b> PASS   |                              |
| <b>Date(s):</b>            |                                |  |                              |
| 04-Feb-20                  |                                |  |                              |
| <b>Temperature:</b> 24 °C  | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa                                    | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>            |                                |  |                              |

## 7.2 Occupied bandwidth test

### 7.2.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.2.1. The test results are provided in Table 7.2.2 and associated plots.

**Table 7.2.1 Occupied bandwidth limits**

| Assigned frequency, kHz | Modulation envelope reference points*, % | Maximum allowed bandwidth, % of the carrier frequency |
|-------------------------|--|---|
| 9 - 150                 | 99%                                      | NA  |

\*- Modulation envelope reference points provided in terms of attenuation below modulated carrier.

### 7.2.2 Test procedure

**7.2.2.1** The EUT was set up as shown in Figure 7.2.1, energized and its proper operation was checked.

**7.2.2.2** The EUT was set to transmit modulated carrier.

**7.2.2.3** The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.2.2 and associated plot.

**Figure 7.2.1 Occupied bandwidth test setup**





|                            |                                |  |                              |
|----------------------------|--------------------------------|--|------------------------------|
| <b>Test specification:</b> |                                | <b>Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth</b> |                              |
| <b>Test procedure:</b>     |                                | ANSI C63.10, Section 6.9.2                                       |                              |
| <b>Test mode:</b>          | Compliance                     | <b>Verdict:</b> PASS   |                              |
| <b>Date(s):</b>            | 04-Feb-20                      |  |                              |
| <b>Temperature:</b> 24 °C  | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa                                    | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>            |                                |  |                              |

Table 7.2.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 100Hz  
 VIDEO BANDWIDTH: 1kHz  
 MODULATION ENVELOPE REFERENCE POINTS: 99 %  
 MODULATION: Unmodulated

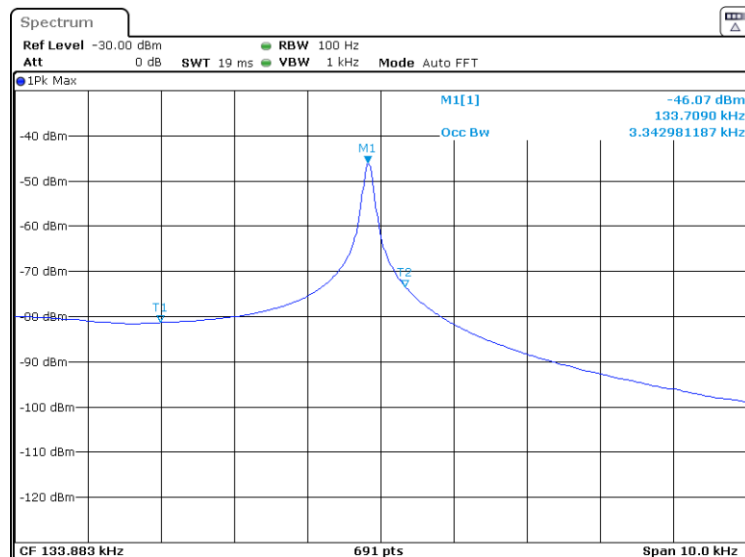
| Carrier frequency,<br>MHz | Occupied bandwidth,<br>kHz | Limit                      |     | Margin,<br>kHz | Verdict |
|---------------------------|----------------------------|----------------------------|-----|----------------|---------|
|                           |                            | % of the carrier frequency | kHz |                |         |
| 0.1338                    | 3.3429                     | NA                         | NA  | NA             | Pass    |

## Reference numbers of test equipment used

|         |    |    |  |  |  |  |  |  |
|---------|----|----|--|--|--|--|--|--|
| HL 4355 | HL | HL |  |  |  |  |  |  |
|---------|----|----|--|--|--|--|--|--|

Full description is given in Appendix A.

Plot 7.2.1 Occupied bandwidth test result







|   |                                |                               |                              |
|---|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.207(a) / RSS-Gen, Section 7.2, Conducted emission |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.10, Section 6.2   |                                |                               |                              |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 04-Feb-20   |                                |                               |                              |
| <b>Temperature:</b> 24 °C   | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>   |                                |                               |                              |

## 7.3 Conducted emissions

### 7.3.1 General

This test was performed to measure common mode conducted emissions at the power port. Specification test limits are given in Table 7.3.1

**Table 7.3.1 Limits for conducted emissions**

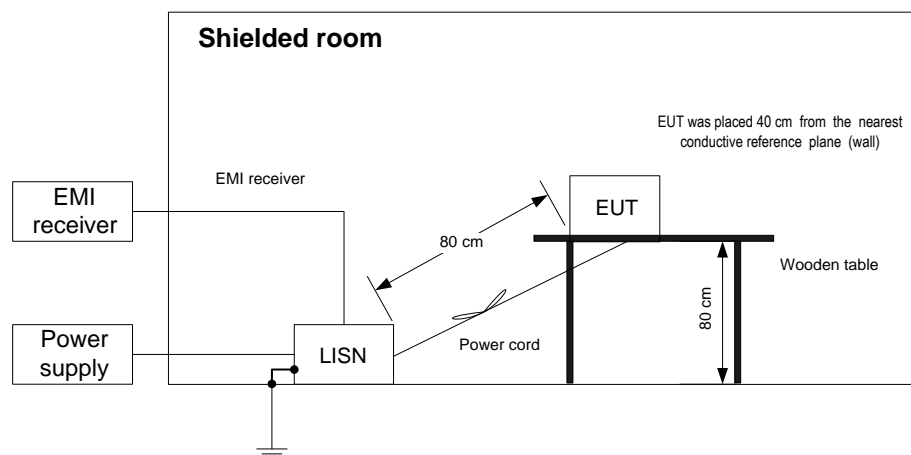
| Frequency,<br>MHz | Class B limit, dB(μV) |          |
|-------------------|-----------------------|----------|
|                   | QP                    | AVRG     |
| 0.15 - 0.5        | 66 - 56*              | 56 - 46* |
| 0.5 - 5.0         | 56                    | 46       |
| 5.0 - 30          | 60                    | 50       |

\* - The limit decreases linearly with the logarithm of frequency.

### 7.3.2 Test procedure

- 7.3.2.1** The EUT was set up as shown in Figure 7.3.1 and associated photographs, energized and the performance check was conducted.
- 7.3.2.2** The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer while unused coaxial connector of the LISN was terminated with 50 Ohm.
- 7.3.2.3** The position of the device cables was varied to determine maximum emission level.
- 7.3.2.4** The worst test results (the lowest margins) were recorded in Table 7.3.2 and shown in the associated plots.

**Figure 7.3.1 Setup for conducted emission measurements, table-top equipment**





|  |                         |                        |                       |
|--|-------------------------|------------------------|-----------------------|
| Test specification: Section 15.207(a) / RSS-Gen, Section 7.2, Conducted emission |                         |                        |                       |
| Test procedure: ANSI C63.10, Section 6.2   |                         |                        |                       |
| Test mode: Compliance  |                         | Verdict: PASS          |                       |
| Date(s): 04-Feb-20   |                         |                        |                       |
| Temperature: 24 °C   | Relative Humidity: 44 % | Air Pressure: 1005 hPa | Power: 120 VAC, 50 Hz |
| Remarks:   |                         |                        |                       |

Table 7.3.2 Conducted emission test results

LINE: AC mains  
 EUT OPERATING MODE: Transmit  
 EUT SET UP: TABLE-TOP  
 TEST SITE: SHIELDED ROOM  
 FREQUENCY RANGE: 150 kHz - 30 MHz  
 RESOLUTION BANDWIDTH: 9 kHz

| Frequency, MHz | Peak emission, dB(μV) | Quasi-peak                |               |             | Average                   |               |             | Line ID | Verdict |
|----------------|-----------------------|---------------------------|---------------|-------------|---------------------------|---------------|-------------|---------|---------|
|                |                       | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* |         |         |
|                |                       |                           |               |             |                           |               |             | L1      | Pass    |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             | L2      | Pass    |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |

\*- Margin = Measured emission - specification limit.

## L1

|   | Frequency [MHz] | QPeak [dBμV] | Limit 55022bqp [dBμV] | Delta [dB] | Avg [dBμV] | Limit 55022bav [dBμV] | Delta [dB] | Factor DC Limite.. [dB] | Factor LISN HL 2.. [dB] | Factor Cable HL .. [dB] |
|---|-----------------|--------------|-----------------------|------------|------------|-----------------------|------------|-------------------------|-------------------------|-------------------------|
| 1 | 5.35657         | 37.33        | 60.00                 | ---        | 32.58      | 50.00                 | -17.42     | 10.00                   | 0.25                    | 0.41                    |
| 2 | 16.896505       | 47.69        | 60.00                 | -12.31     | 42.74      | 50.00                 | -7.26      | 10.00                   | 0.80                    | 0.70                    |
| 3 | 19.841305       | 47.08        | 60.00                 | -12.92     | 42.25      | 50.00                 | -7.75      | 10.00                   | 0.93                    | 0.76                    |
| 4 | 20.1092         | 47.09        | 60.00                 | -12.91     | 42.26      | 50.00                 | -7.74      | 10.00                   | 0.95                    | 0.77                    |

## L2

|   | Frequency [MHz] | QPeak [dBμV] | Limit 55022bqp [dBμV] | Delta [dB] | Avg [dBμV] | Limit 55022bav [dBμV] | Delta [dB] | Factor DC Limite.. [dB] | Factor LISN HL 2.. [dB] | Factor Cable HL .. [dB] |
|---|-----------------|--------------|-----------------------|------------|------------|-----------------------|------------|-------------------------|-------------------------|-------------------------|
| 1 | 5.08663         | 37.57        | 60.00                 | ---        | 32.43      | 50.00                 | -17.57     | 10.00                   | 0.24                    | 0.40                    |
| 2 | 5.35657         | 42.51        | 60.00                 | -17.49     | 37.39      | 50.00                 | -12.61     | 10.00                   | 0.25                    | 0.41                    |
| 3 | 5.62242         | 38.25        | 60.00                 | ---        | 33.08      | 50.00                 | -16.92     | 10.00                   | 0.26                    | 0.42                    |
| 4 | 14.62042        | 34.78        | 60.00                 | ---        | 30.12      | 50.00                 | -19.88     | 10.00                   | 0.69                    | 0.65                    |
| 5 | 14.888315       | 35.30        | 60.00                 | ---        | 30.38      | 50.00                 | -19.62     | 10.00                   | 0.70                    | 0.66                    |
| 6 | 16.896505       | 49.08        | 60.00                 | -10.92     | 43.86      | 50.00                 | -6.14      | 10.00                   | 0.80                    | 0.70                    |
| 7 | 19.841305       | 48.94        | 60.00                 | -11.06     | 43.50      | 50.00                 | -6.50      | 10.00                   | 0.93                    | 0.76                    |
| 8 | 20.1092         | 49.39        | 60.00                 | -10.61     | 43.87      | 50.00                 | -6.13      | 10.00                   | 0.95                    | 0.77                    |

## Reference numbers of test equipment used

|         |         |         |         |         |  |  |  |
|---------|---------|---------|---------|---------|--|--|--|
| HL 5700 | HL 2888 | HL 2874 | HL 1205 | HL 5707 |  |  |  |
|---------|---------|---------|---------|---------|--|--|--|

Full description is given in Appendix A.



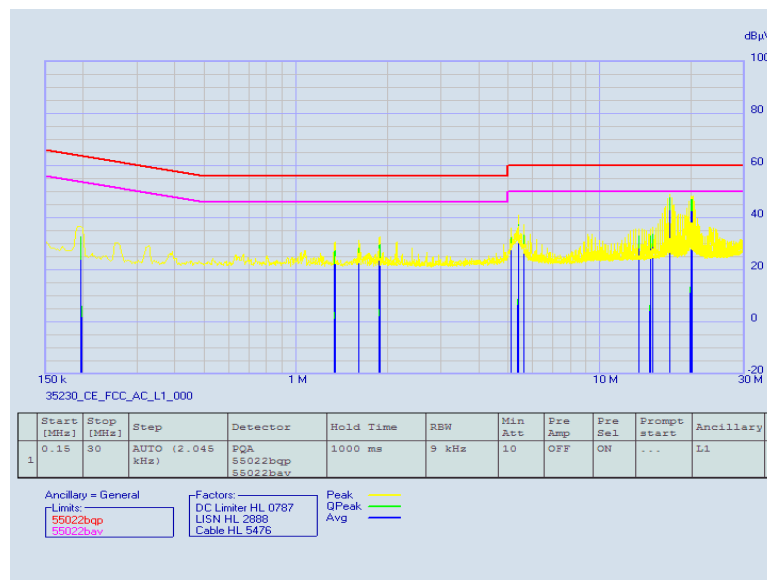
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|                     |                         |  |                       |
|---------------------|-------------------------|--|-----------------------|
| Test specification: |                         | Section 15.207(a) / RSS-Gen, Section 7.2, Conducted emission |                       |
| Test procedure:     |                         | ANSI C63.10, Section 6.2                                     |                       |
| Test mode:          |                         | Verdict: PASS  |                       |
| Date(s):            |                         |  |                       |
| 04-Feb-20           |                         |  |                       |
| Temperature: 24 °C  | Relative Humidity: 44 % | Air Pressure: 1005 hPa                                       | Power: 120 VAC, 50 Hz |
| Remarks:            |                         |  |                       |

Plot 7.3.1 Conducted emission measurements

LINE: L1  
EUT OPERATING MODE: Transmit  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK





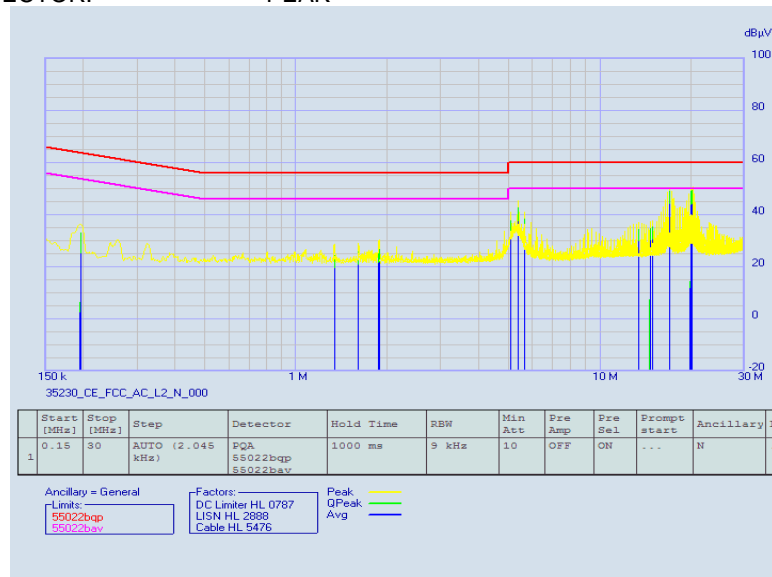
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Report ID: AFIRAD\_FCC.35230\_Rev2  
Date of Issue: 12-May-21

|  |                         |                        |                       |
|--|-------------------------|------------------------|-----------------------|
| Test specification: Section 15.207(a) / RSS-Gen, Section 7.2, Conducted emission |                         |                        |                       |
| Test procedure: ANSI C63.10, Section 6.2   |                         |                        |                       |
| Test mode: Compliance  |                         | Verdict: PASS          |                       |
| Date(s): 04-Feb-20   |                         |                        |                       |
| Temperature: 24 °C   | Relative Humidity: 44 % | Air Pressure: 1005 hPa | Power: 120 VAC, 50 Hz |
| Remarks:   |                         |                        |                       |

Plot 7.3.2 Conducted emission measurements

LINE: L2  
EUT OPERATING MODE: Transmit  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK





|   |                                |                               |                              |
|---|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.203 / RSS Gen Section 6.8, Antenna requirements |                                |                               |                              |
| <b>Test procedure:</b> Visual inspection  |                                |                               |                              |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 04-Feb-20   |                                |                               |                              |
| <b>Temperature:</b> 24 °C   | <b>Relative Humidity:</b> 44 % | <b>Air Pressure:</b> 1005 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>   |                                |                               |                              |

## 7.4 Antenna requirements

The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed for use with the EUT. This requirement does not apply to professionally installed transmitters.

The rationale for compliance with the above requirements was either visual inspection results or supplier declaration. The summary of results is provided in Table 7.4.1.

**Table 7.4.1 Antenna requirements**

| Requirement  | Rationale            | Verdict |
|--|----------------------|---------|
| The transmitter antenna is permanently attached    | NA                   | Comply  |
| The transmitter employs a unique antenna connector | NA                   |         |
| The transmitter requires professional installation | Supplier declaration |         |

**Photograph 7.4.1 Antenna assembly**





|  |                                |                               |                              |
|--|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.107, Conducted emission at AC power port |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.4, Sections 11.5 and 12.1.3                    |                                |                               |                              |
| <b>Test mode:</b> Compliance   |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 05-Feb-20  |                                |                               |                              |
| <b>Temperature:</b> 21.2 °C  | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1017 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>  |                                |                               |                              |

## 8 Unintentional emissions according to 47CFR part 15 subpart B

### 8.1 Conducted emissions

#### 8.1.1 General

This test was performed to measure common mode conducted emissions at the mains power port. Specification test limits according to FCC Part 15, Section 107 and RSS-Gen, Section 7.1.6 / ICES-003 are given in Table 8.1.1.

**Table 8.1.1 Limits for conducted emissions**

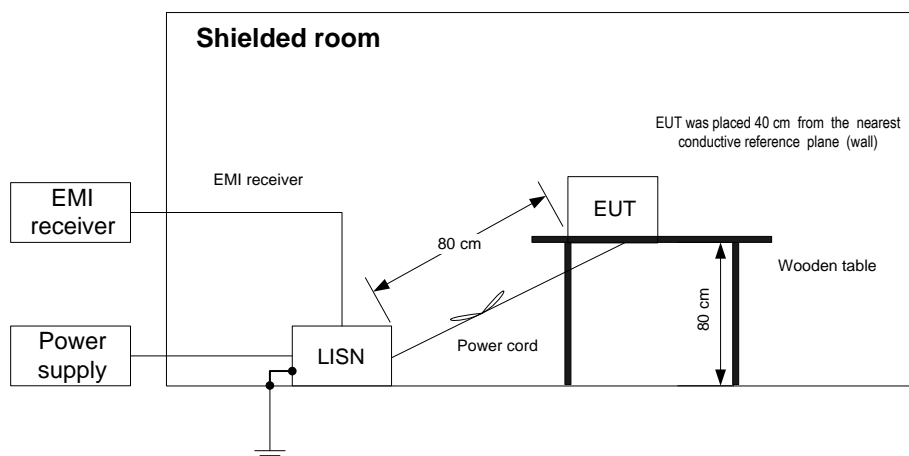
| Frequency, MHz | Class B limit, dB(μV) |          |
|----------------|-----------------------|----------|
|                | QP                    | AVRG     |
| 0.15 - 0.5     | 66 - 56*              | 56 - 46* |
| 0.5 - 5.0      | 56                    | 46       |
| 5.0 - 30       | 60                    | 50       |

\* - The limit decreases linearly with the logarithm of frequency.

#### 8.1.2 Test procedure

- 8.1.2.1 The EUT was set up as shown in Figure 8.1.1 and associated photographs, energized and the performance check was conducted.
- 8.1.2.2 The measurements were performed at power terminals with the LISN, connected to a spectrum analyzer while unused coaxial connector of the LISN was terminated with 50 Ohm.
- 8.1.2.3 The position of the device cables was varied to determine maximum emission level.
- 8.1.2.4 The worst test results (the lowest margins) were recorded in Table 8.1.2 and shown in the associated plots.

**Figure 8.1.1 Setup for conducted emission measurements, table-top equipment**





|                             |                                |  |                              |
|-----------------------------|--------------------------------|--|------------------------------|
| <b>Test specification:</b>  |                                | <b>Section 15.107, Conducted emission at AC power port</b> |                              |
| <b>Test procedure:</b>      |                                | ANSI C63.4, Sections 11.5 and 12.1.3                       |                              |
| <b>Test mode:</b>           |                                | <b>Verdict:</b> PASS                                       |                              |
| <b>Date(s):</b>             |                                |  |                              |
| 05-Feb-20                   |                                |  |                              |
| <b>Temperature:</b> 21.2 °C | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1017 hPa                              | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>             |                                |  |                              |

Table 8.1.2 Conducted emission test results

LINE: AC mains  
 EUT OPERATING MODE: Stand-by and receive  
 EUT SET UP: TABLE-TOP  
 TEST SITE: SHIELDED ROOM  
 FREQUENCY RANGE: 150 kHz - 30 MHz  
 RESOLUTION BANDWIDTH: 9 kHz

| Frequency, MHz | Peak emission, dB(μV) | Quasi-peak                |               |             | Average                   |               |             | Line ID | Verdict |
|----------------|-----------------------|---------------------------|---------------|-------------|---------------------------|---------------|-------------|---------|---------|
|                |                       | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* | Measured emission, dB(μV) | Limit, dB(μV) | Margin, dB* |         |         |
|                |                       |                           |               |             |                           |               |             | L1      | Pass    |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             | L2      | Pass    |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |
|                |                       |                           |               |             |                           |               |             |         |         |

\*- Margin = Measured emission - specification limit.

## L1

|   | Frequency [MHz] | QPeak [dBμV] | Limit 55022bqp [dBμV] | Delta [dB] | Avg [dBμV] | Limit 55022bav [dBμV] | Delta [dB] | Factor DC Limite.. [dB] | Factor LISN HL 2.. [dB] | Factor Cable HL .. [dB] |
|---|-----------------|--------------|-----------------------|------------|------------|-----------------------|------------|-------------------------|-------------------------|-------------------------|
| 1 | 5.35657         | 37.33        | 60.00                 | ---        | 32.58      | 50.00                 | -17.42     | 10.00                   | 0.25                    | 0.41                    |
| 2 | 16.896505       | 47.69        | 60.00                 | -12.31     | 42.74      | 50.00                 | -7.26      | 10.00                   | 0.80                    | 0.70                    |
| 3 | 19.841305       | 47.08        | 60.00                 | -12.92     | 42.25      | 50.00                 | -7.75      | 10.00                   | 0.93                    | 0.76                    |
| 4 | 20.1092         | 47.09        | 60.00                 | -12.91     | 42.26      | 50.00                 | -7.74      | 10.00                   | 0.95                    | 0.77                    |

## L2

|   | Frequency [MHz] | QPeak [dBμV] | Limit 55022bqp [dBμV] | Delta [dB] | Avg [dBμV] | Limit 55022bav [dBμV] | Delta [dB] | Factor DC Limite.. [dB] | Factor LISN HL 2.. [dB] | Factor Cable HL .. [dB] |
|---|-----------------|--------------|-----------------------|------------|------------|-----------------------|------------|-------------------------|-------------------------|-------------------------|
| 1 | 5.08663         | 37.57        | 60.00                 | ---        | 32.43      | 50.00                 | -17.57     | 10.00                   | 0.24                    | 0.40                    |
| 2 | 5.35657         | 42.51        | 60.00                 | -17.49     | 37.39      | 50.00                 | -12.61     | 10.00                   | 0.25                    | 0.41                    |
| 3 | 5.62242         | 38.25        | 60.00                 | ---        | 33.08      | 50.00                 | -16.92     | 10.00                   | 0.26                    | 0.42                    |
| 4 | 14.62042        | 34.78        | 60.00                 | ---        | 30.12      | 50.00                 | -19.88     | 10.00                   | 0.69                    | 0.65                    |
| 5 | 14.888315       | 35.30        | 60.00                 | ---        | 30.38      | 50.00                 | -19.62     | 10.00                   | 0.70                    | 0.66                    |
| 6 | 16.896505       | 49.08        | 60.00                 | -10.92     | 43.86      | 50.00                 | -6.14      | 10.00                   | 0.80                    | 0.70                    |
| 7 | 19.841305       | 48.94        | 60.00                 | -11.06     | 43.50      | 50.00                 | -6.50      | 10.00                   | 0.93                    | 0.76                    |
| 8 | 20.1092         | 49.39        | 60.00                 | -10.61     | 43.87      | 50.00                 | -6.13      | 10.00                   | 0.95                    | 0.77                    |

## Reference numbers of test equipment used

|         |         |         |         |         |  |  |  |
|---------|---------|---------|---------|---------|--|--|--|
| HL 5700 | HL 2888 | HL 2874 | HL 1205 | HL 5707 |  |  |  |
|---------|---------|---------|---------|---------|--|--|--|

Full description is given in Appendix A.



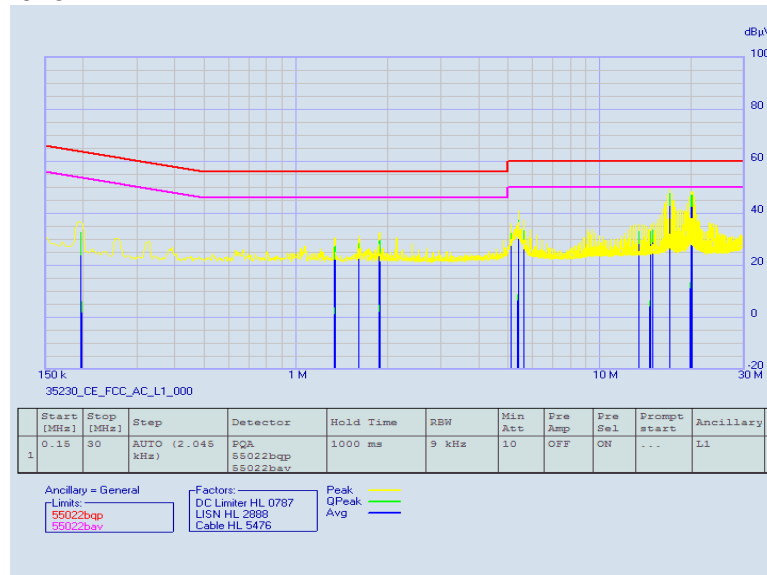
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Date of Issue: 12-May-21

|                      |                         |   |                       |
|----------------------|-------------------------|---|-----------------------|
| Test specification:  |                         | Section 15.107, Conducted emission at AC power port |                       |
| Test procedure:      |                         | ANSI C63.4, Sections 11.5 and 12.1.3                |                       |
| Test mode:           |                         | Verdict: PASS                                       |                       |
| Date(s):             |                         |   |                       |
| 05-Feb-20            |                         |   |                       |
| Temperature: 21.2 °C | Relative Humidity: 49 % | Air Pressure: 1017 hPa                              | Power: 120 VAC, 50 Hz |
| Remarks:             |                         |   |                       |

#### Plot 8.1.1 Conducted emission measurements

LINE: L1  
LIMIT: Class B  
EUT OPERATING MODE: Tx  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK







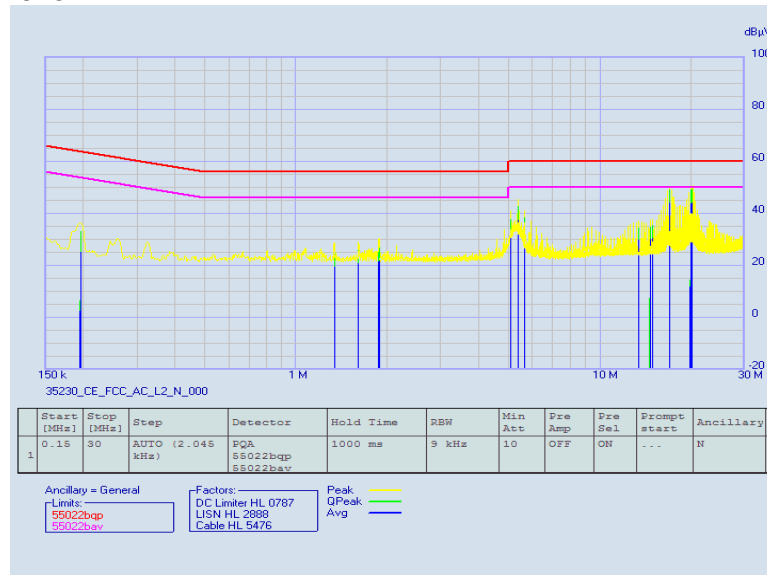
HERMON LABORATORIES

Report ID: AFIRAD\_FCC.35230\_Rev2  
Date of Issue: 12-May-21

|                      |                         |   |                       |
|----------------------|-------------------------|---|-----------------------|
| Test specification:  |                         | Section 15.107, Conducted emission at AC power port |                       |
| Test procedure:      |                         | ANSI C63.4, Sections 11.5 and 12.1.3                |                       |
| Test mode:           |                         | Verdict: PASS                                       |                       |
| Date(s):             |                         |   |                       |
| 05-Feb-20            |                         |   |                       |
| Temperature: 21.2 °C | Relative Humidity: 49 % | Air Pressure: 1017 hPa                              | Power: 120 VAC, 50 Hz |
| Remarks:             |                         |   |                       |

#### Plot 8.1.2 Conducted emission measurements

LINE: L2  
LIMIT: Class B  
EUT OPERATING MODE: Tx  
LIMIT: QUASI-PEAK, AVERAGE  
DETECTOR: PEAK





|   |                                |                               |                              |
|---|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.4, Sections 8.3 and 12.2.5                                    |                                |                               |                              |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 05-Feb-20   |                                |                               |                              |
| <b>Temperature:</b> 24 °C   | <b>Relative Humidity:</b> 40 % | <b>Air Pressure:</b> 1015 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>   |                                |                               |                              |

## 8.2 Radiated emission measurements

### 8.2.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.2.1.

**Table 8.2.1 Radiated emission limits**

| Frequency, MHz                   | Class B limit, dB(μV/m) |              | Class A limit, dB(μV/m) |              |
|----------------------------------|-------------------------|--------------|-------------------------|--------------|
|                                  | 10 m distance           | 3 m distance | 10 m distance           | 3 m distance |
| 30 - 88                          | 29.5*                   | 40.0         | 39.0                    | 49.5*        |
| 88 - 216                         | 33.0*                   | 43.5         | 43.5                    | 54.0*        |
| 216 - 960                        | 35.5*                   | 46.0         | 46.4                    | 56.9*        |
| 960 - 5 <sup>th</sup> harmonic** | 43.5*                   | 54.0         | 49.5                    | 60.0*        |

\* - The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows:  $\text{Lim}_{S2} = \text{Lim}_{S1} + 20 \log(S1/S2)$ , where  $S1$  and  $S2$  – standard defined and test distance respectively in meters.

**Table 8.2.2 Radiated emission limits**

| Frequency, MHz                   | Field strength limit at 3 m test distance, dB(μV/m) |
|----------------------------------|---|
| 30 - 88                          | 40.0  |
| 88 - 216                         | 43.5  |
| 216 - 960                        | 46.0  |
| 960 - 3 <sup>rd</sup> harmonic** | 54.0  |

\*\* - harmonic of the highest frequency the EUT generates, uses, operates or tunes to.

### 8.2.2 Test procedure for measurements in semi-anechoic chamber

**8.2.2.1** The EUT was set up as shown in Figure 8.2.1 and associated photograph/s, energized and the performance check was conducted.

**8.2.2.2** The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position was varied.

**8.2.2.3** The worst test results (the lowest margins) were provided in the associated tables and plots.



|   |                                |                               |                              |
|---|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.4, Sections 8.3 and 12.2.5                                    |                                |                               |                              |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                              |
| <b>Date(s):</b> 05-Feb-20   |                                |                               |                              |
| <b>Temperature:</b> 24 °C   | <b>Relative Humidity:</b> 40 % | <b>Air Pressure:</b> 1015 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>   |                                |                               |                              |

Figure 8.2.1 Setup for radiated emission measurements in semi anechoic chamber, table-top equipment

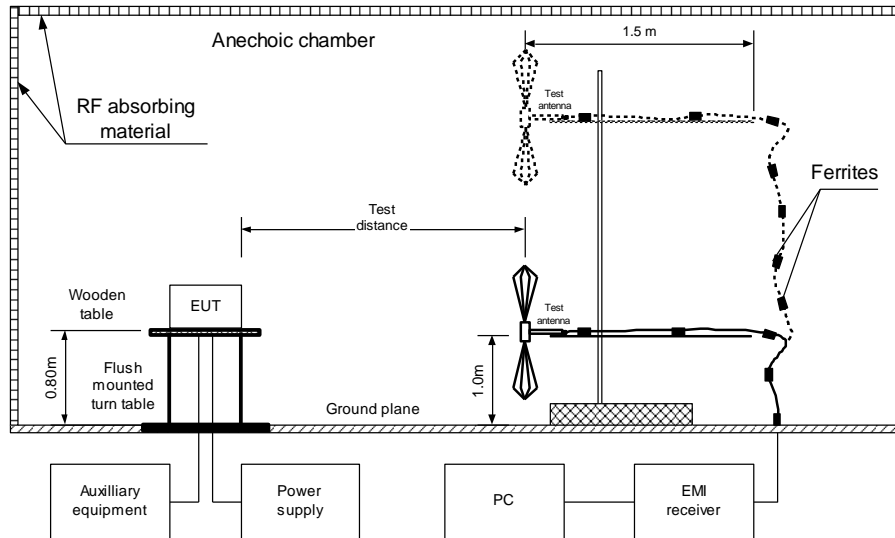


Table 8.2.3 Radiated emission test results

EUT SET UP:

LIMIT:

EUT OPERATING MODE:

TEST SITE:

TEST DISTANCE:

FREQUENCY RANGE:

RESOLUTION BANDWIDTH:

TABLE-TOP

Class B

Rx

SEMI ANECHOIC CHAMBER

3 m

30 MHz – 1000 MHz

120 kHz

| Frequency, MHz | Peak emission, dB(μV/m) | Quasi-peak                  |                 |             | Antenna polarization | Antenna height, m | Turn-table position**, degrees | Verdict |
|----------------|-------------------------|-----------------------------|-----------------|-------------|----------------------|-------------------|--------------------------------|---------|
|                |                         | Measured emission, dB(μV/m) | Limit, dB(μV/m) | Margin, dB* |                      |                   |                                |         |
| 36.376         | 41.30                   | 31.50                       | 40.0            | -8.50       | Vertical             | 1.02              | -53                            | Pass    |
| 108.817        | 48.00                   | 36.50                       | 43.5            | -7.00       | Horizontal           | 2.68              | -63                            |         |
| 110.009        | 47.76                   | 36.06                       | 43.5            | -7.44       | Vertical             | 1.35              | 13                             |         |
| 114.759        | 51.46                   | 37.21                       | 43.5            | -6.29       | Vertical             | 1.00              | -65                            |         |
| 125.625        | 49.63                   | 38.41                       | 43.5            | -5.09       | Vertical             | 1.32              | 180                            |         |
| 724.065        | 41.96                   | 39.01                       | 46.0            | -6.99       | Horizontal           | 1.02              | -86                            |         |

Reference numbers of test equipment used

|         |         |         |         |         |         |         |  |
|---------|---------|---------|---------|---------|---------|---------|--|
| HL 4360 | HL 3903 | HL 4011 | HL 5311 | HL 5309 | HL 5288 | HL 5085 |  |
|---------|---------|---------|---------|---------|---------|---------|--|

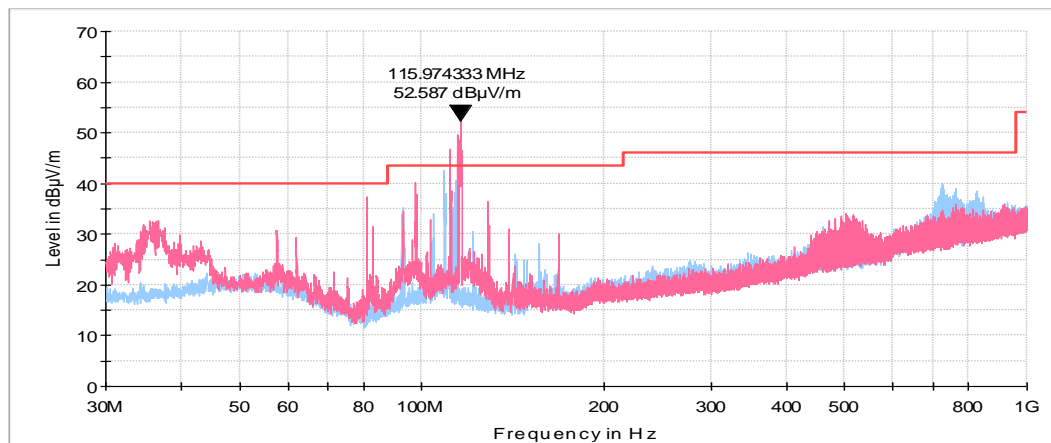
Full description is given in Appendix A.



|  |                                |                               |                              |
|--|--------------------------------|-------------------------------|------------------------------|
| <b>Test specification:</b> <b>Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission</b> |                                |                               |                              |
| <b>Test procedure:</b> ANSI C63.4, Sections 8.3 and 12.2.5   |                                |                               |                              |
| <b>Test mode:</b> Compliance   |                                | <b>Verdict:</b> <b>PASS</b>   |                              |
| <b>Date(s):</b> 05-Feb-20  |                                |                               |                              |
| <b>Temperature:</b> 24 °C  | <b>Relative Humidity:</b> 40 % | <b>Air Pressure:</b> 1015 hPa | <b>Power:</b> 120 VAC, 50 Hz |
| <b>Remarks:</b>  |                                |                               |                              |

**Plot 8.2.1 Radiated emission measurements in 30 - 1000 MHz range, vertical and horizontal antenna polarization**

TEST SITE: Semi anechoic chamber  
LIMIT: Class B  
TEST DISTANCE: 3 m  
EUT OPERATING MODE: Tx



## 9 APPENDIX A Test equipment and ancillaries used for tests

| HL No | Description   | Manufacturer          | Model          | Ser. No.        | Last Cal./ Check | Due Cal./ Check |
|-------|---|-----------------------|----------------|-----------------|------------------|-----------------|
| 0446  | Antenna, Loop, Active, 10 (9) kHz - 30 MHz                                    | EMCO                  | 6502           | 2857            | 24-Feb-20        | 24-Feb-21       |
| 1205  | One phase voltage regulator, 2kVA, 0-250V                                     | Hermon Laboratories   | TDGC-2         | 109             | 21-Apr-20        | 21-Apr-21       |
| 2874  | Life - Guard Extreme Isolation Transformer, 230/230, 50 Hz, 1Phase, 1.8 kVA   | Taiyo Yuden, Inc.     | LGY1.8k-21     | FI0412          | 05-Feb-20        | 05-Feb-21       |
| 2888  | LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A, MIL STD 461E, CISPR 16-1 | Rolf Heine            | NNB-2/16Z      | 02/10018        | 17-Mar-20        | 17-Mar-21       |
| 3903  | Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA                            | Huber-Suhner          | SUCOFL EX 102A | 1226/2A         | 06-Apr-20        | 06-Apr-21       |
| 4011  | Temp. & Humidity Meter, (-50 - +70) deg, (20 - 99 )% RH                       | Mad Electronics       | HTC-1          | NA              | 12-Aug-20        | 12-Aug-21       |
| 4360  | EMI Test Receiver, 20 Hz to 40 GHz.   | Rohde & Schwarz       | ESU40          | 100322          | 20-Jan-20        | 20-Jan-21       |
| 5085  | Attenuator, 4 dB, DC - 6 GHz, 1 W   | Mini-Circuits         | UNAT-4+        | NA              | 22-May-20        | 22-May-21       |
| 5288  | Trilog Antenna, 25 MHz - 8 GHz, 100W  | Frankonia             | ALX-8000E      | 00809           | 08-Feb-19        | 08-Feb-22       |
| 5309  | Antenna Mast, 1-4 meter, Pneumatic polarization                               | Frankonia             | FMB 1-4        | NA              | 23-Apr-20        | 23-Apr-21       |
| 5311  | Controller  | Dolev Ltd             | FC-06          | FC06.1-2016-024 | 23-Apr-20        | 23-Apr-21       |
| 5376  | EXA Signal Analyzer, 10 Hz - 32 GHz   | Keysight Technologies | N9010B         | MY57470404      | 18-Mar-20        | 18-Mar-21       |
| 5379  | 1/4" Free-field Microphone Preamplifier                                       | Bruel & Kjaer         | 2670           | 3166281         | 19-Aug-20        | 19-Aug-22       |
| 5700  | Temp. & Humidity Meter, (-10 - +50) deg, (10 - 99 )% RH                       | Mad Electronics       | HTC-1          | NA              | 02-Dec-19        | 02-Dec-20       |
| 5707  | EMI receiver  | PMM / Narda           | PMM 9010F      | 060WW91101      | 22-Nov-19        | 22-Nov-21       |

## 10 APPENDIX B Test equipment correction factors

HL 0446: Active Loop Antenna  
EMCO, model: 6502, s/n 2857

| Frequency, | Measured antenna factor, dBS/m | Measurement uncertainty, dB |
|------------|--------------------------------|-----------------------------|
| 10         | -33.4                          | ±1.0                        |
| 20         | -37.8                          | ±1.0                        |
| 50         | -40.5                          | ±1.0                        |
| 75         | -41.0                          | ±1.0                        |
| 100        | -41.2                          | ±1.0                        |
| 150        | -41.2                          | ±1.0                        |
| 250        | -41.1                          | ±1.0                        |
| 500        | -41.2                          | ±1.0                        |
| 750        | -41.3                          | ±1.0                        |
| 1000       | -41.3                          | ±1.0                        |

| Frequency, | Measured antenna factor, dBS/m | Measurement uncertainty, dB |
|------------|--------------------------------|-----------------------------|
| 2000       | -41.4                          | ±1.0                        |
| 3000       | -41.4                          | ±1.0                        |
| 4000       | -41.5                          | ±1.0                        |
| 5000       | -41.5                          | ±1.0                        |
| 10000      | -41.7                          | ±1.0                        |
| 15000      | -42.1                          | ±1.0                        |
| 20000      | -42.7                          | ±1.0                        |
| 25000      | -44.2                          | ±1.0                        |
| 30000      | -45.8                          | ±1.0                        |

The antenna factor shall be added to receiver reading in dB $\mu$ V to obtain field strength in dB $\mu$ A/m.

**HL 2888 LISN Two-line V-Network 50 Ohm / 50 uH + 5 Ohm, 16A**  
**Rolf Heine, model: NNB-2/16Z, s/n 02/10018, HL 2888**

Voltage division factor (insertion loss)

| Frequency, | L1, dB | L2, dB | Uncertainty, dB |
|------------|--------|--------|-----------------|
| 150        | 0.09   | 0.07   | ±0.09           |
| 170        | 0.08   | 0.07   | ±0.09           |
| 200        | 0.08   | 0.06   | ±0.09           |
| 250        | 0.09   | 0.06   | ±0.09           |
| 300        | 0.09   | 0.06   | ±0.09           |
| 350        | 0.09   | 0.07   | ±0.09           |
| 400        | 0.09   | 0.07   | ±0.09           |
| 500        | 0.09   | 0.07   | ±0.09           |
| 600        | 0.09   | 0.07   | ±0.09           |
| 700        | 0.10   | 0.08   | ±0.09           |
| 800        | 0.10   | 0.08   | ±0.09           |
| 900        | 0.11   | 0.08   | ±0.09           |
| 1000       | 0.11   | 0.08   | ±0.09           |
| 1200       | 0.11   | 0.09   | ±0.16           |
| 1500       | 0.12   | 0.10   | ±0.16           |
| 2000       | 0.14   | 0.12   | ±0.16           |
| 2500       | 0.15   | 0.12   | ±0.16           |
| 3000       | 0.16   | 0.14   | ±0.16           |
| 4000       | 0.19   | 0.16   | ±0.16           |
| 5000       | 0.23   | 0.19   | ±0.16           |
| 7000       | 0.30   | 0.25   | ±0.16           |
| 10000      | 0.46   | 0.40   | ±0.16           |
| 15000      | 0.71   | 0.62   | ±0.16           |
| 20000      | 0.94   | 0.85   | ±0.16           |
| 30000      | 1.41   | 1.33   | ±0.32           |

**HL 5288: Trilog Antenna**  
**Frankonia, model: ALX-8000E, s/n: 00809**  
**30-1000 MHz**

| Frequency, MHz | Antenna factor, dB/m |
|----------------|----------------------|
| 30             | 14.96                |
| 35             | 15.33                |
| 40             | 16.37                |
| 45             | 17.56                |
| 50             | 17.95                |
| 60             | 16.87                |
| 70             | 13.22                |
| 80             | 10.56                |
| 90             | 13.61                |
| 100            | 15.46                |
| 120            | 14.03                |
| 140            | 12.23                |

| Frequency, MHz | Antenna factor, dB/m |
|----------------|----------------------|
| 160            | 12.67                |
| 180            | 13.34                |
| 200            | 15.40                |
| 250            | 16.42                |
| 300            | 17.28                |
| 400            | 19.98                |
| 500            | 21.11                |
| 600            | 22.90                |
| 700            | 24.13                |
| 800            | 25.25                |
| 900            | 26.35                |
| 1000           | 27.18                |

The antenna factor shall be added to receiver reading in dB $\mu$ V to obtain field strength in dB $\mu$ V/m.  
**above 1000 MHz**

| Frequency, MHz | Antenna factor, dB/m |
|----------------|----------------------|
| 1000           | 26.9                 |
| 1100           | 28.1                 |
| 1200           | 28.4                 |
| 1300           | 29.6                 |
| 1400           | 29.1                 |
| 1500           | 30.4                 |
| 1600           | 30.7                 |
| 1700           | 31.5                 |
| 1800           | 32.3                 |
| 1900           | 32.6                 |
| 2000           | 32.5                 |
| 2100           | 32.9                 |
| 2200           | 33.5                 |
| 2300           | 33.2                 |
| 2400           | 33.7                 |
| 2500           | 34.6                 |
| 2600           | 34.7                 |
| 2700           | 34.6                 |
| 2800           | 35.0                 |
| 2900           | 35.5                 |
| 3000           | 36.2                 |
| 3100           | 36.8                 |
| 3200           | 36.8                 |
| 3300           | 37.0                 |
| 3400           | 37.5                 |
| 3500           | 38.2                 |

| Frequency, MHz | Antenna factor, dB/m |
|----------------|----------------------|
| 3600           | 38.9                 |
| 3700           | 39.4                 |
| 3800           | 39.4                 |
| 3900           | 39.6                 |
| 4000           | 39.7                 |
| 4100           | 39.8                 |
| 4200           | 40.5                 |
| 4300           | 40.9                 |
| 4400           | 41.1                 |
| 4500           | 41.4                 |
| 4600           | 41.3                 |
| 4700           | 41.6                 |
| 4800           | 41.9                 |
| 4900           | 42.3                 |
| 5000           | 42.7                 |
| 5100           | 43.0                 |
| 5200           | 42.9                 |
| 5300           | 43.5                 |
| 5400           | 43.6                 |
| 5500           | 44.3                 |
| 5600           | 44.7                 |
| 5700           | 45.0                 |
| 5800           | 45.0                 |
| 5900           | 45.3                 |
| 6000           | 45.9                 |

The antenna factor shall be added to receiver reading in dB $\mu$ V to obtain field strength in dB $\mu$ V/m.



## 11 APPENDIX C Test laboratory description

Tests were performed at Hermon Laboratories Ltd., which is a fully independent, private, EMC, Radio, Safety, Environmental and Telecommunication testing facility.

Hermon Laboratories is recognized and accredited by the Federal Communications Commission (USA) for relevant parts of Code of Federal Regulations 47 (CFR 47), Test Firm Registration Number is 927748, Designation Number is IL1001; Recognized by Innovation, Science and Economic Development Canada for wireless and terminal testing (ISED), ISED #2186A, CAB identifier is IL1001; Certified by VCCI, Japan (the registration numbers are R-10808 for OATS, R-1082 for anechoic chamber, G-10869 for RE measurements above 1 GHz, C-10845 for conducted emissions site and T-11606 for conducted emissions at telecommunication ports).

The laboratory is accredited by American Association for Laboratory Accreditation (USA) according to ISO/IEC 17025 for electromagnetic compatibility, product safety, telecommunications testing, environmental simulation and calibration (for exact scope please refer to Certificate No. 839.01, 839.03 and 839.04).

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Person for contact: Mr. Michael Nikishin, EMC&Radio group manager

## 12 APPENDIX D Measurement uncertainties

### Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

| Test description  | Expanded uncertainty   |
|---|--|
| Conducted emissions with LISN   | 9 kHz to 150 kHz: $\pm 3.9$ dB<br>150 kHz to 30 MHz: $\pm 3.8$ dB  |
| Radiated emissions at 10 m measuring distance<br>Horizontal polarization<br><br>Vertical polarization | Biconilog antenna: $\pm 5.0$ dB<br>Biconical antenna: $\pm 5.0$ dB<br>Log periodic antenna: $\pm 5.1$ dB<br>Double ridged horn antenna: $\pm 5.3$ dB<br>Biconilog antenna: $\pm 5.5$ dB<br>Biconical antenna: $\pm 5.5$ dB<br>Log periodic antenna: $\pm 5.6$ dB<br>Double ridged horn antenna: $\pm 5.8$ dB |
| Radiated emissions at 3 m measuring distance<br>Horizontal polarization<br><br>Vertical polarization  | Biconilog antenna: $\pm 5.3$ dB<br>Biconical antenna: $\pm 5.0$ dB<br>Log periodic antenna: $\pm 5.3$ dB<br>Double ridged horn antenna: $\pm 5.3$ dB<br>Biconilog antenna: $\pm 6.0$ dB<br>Biconical antenna: $\pm 5.7$ dB<br>Log periodic antenna: $\pm 6.0$ dB<br>Double ridged horn antenna: $\pm 6.0$ dB |
| Conducted emissions at RF antenna connector   | 9 kHz to 2.9 GHz: $\pm 2.6$ dB<br>2.9 GHz to 6.46 GHz: $\pm 3.5$ dB<br>6.46 GHz to 13.2 GHz: $\pm 4.3$ dB<br>13.2 GHz to 22.0 GHz: $\pm 5.0$ dB<br>22.0 GHz to 26.8 GHz: $\pm 5.5$ dB<br>26.8 GHz to 40.0 GHz: $\pm 4.8$ dB  |
| Duty cycle, timing (Tx ON / OFF) and average factor measurements                                      | $\pm 1.0$ %  |
| Occupied bandwidth  | $\pm 8.0$ %  |

Hermon Laboratories is accredited by A2LA for calibration according to present requirements of ISO/IEC 17025 and NCSL Z540-1. The accreditation is granted to perform calibration of parameters that are listed in the Scope of Hermon Laboratories Accreditation.

Hermon Laboratories calibrates its reference and transfer standards by calibration laboratories accredited to ISO/IEC 17025 by a mutually recognized Accreditation Body or by a recognized national metrology institute. All reference and transfer standards used in the calibration system are traceable to national or international standards.

In-house calibration of all test and measurement equipment is performed on a regular basis according to Hermon Laboratories calibration procedures, manufacturer calibration/verification procedures or procedures defined in the relevant standards. The Hermon Laboratories test and measurement equipment is calibrated within the tolerances specified by the manufacturers and/or by the relevant standards.

## 13 APPENDIX E

### Specification references

47CFR part 15: 2019

RSS-210 Issue 10: 2019

ANSI C63.10: 2013

ANSI C63.4: 2014

RSS-Gen Issue 5, April 2018

ICES-003 Issue 6: 2016

Radio Frequency Devices.

Low Power Licence- Exempt Radiocommunication Devices

American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

General Requirements for Compliance of Radio Apparatus

Information Technology Equipment (Including Digital Apparatus) – Limits and Methods of Measurement

## 14 APPENDIX F

## Abbreviations and acronyms

|                |   |
|----------------|---|
| A              | ampere                                      |
| AC             | alternating current                         |
| AM             | amplitude modulation                        |
| AVRG           | average (detector)                          |
| cm             | centimeter                                  |
| dB             | decibel                                     |
| dBm            | decibel referred to one milliwatt           |
| dB( $\mu$ V)   | decibel referred to one microvolt           |
| dB( $\mu$ V/m) | decibel referred to one microvolt per meter |
| dB( $\mu$ A)   | decibel referred to one microampere         |
| DC             | direct current                              |
| EIRP           | equivalent isotropically radiated power     |
| ERP            | effective radiated power                    |
| EUT            | equipment under test                        |
| F              | frequency                                   |
| GHz            | gigahertz                                   |
| GND            | ground                                      |
| H              | height                                      |
| HL             | Hermon laboratories                         |
| Hz             | hertz                                       |
| k              | kilo  |
| kHz            | kilohertz                                   |
| LO             | local oscillator                            |
| m              | meter                                       |
| MHz            | megahertz                                   |
| min            | minute                                      |
| mm             | millimeter                                  |
| ms             | millisecond                                 |
| $\mu$ s        | microsecond                                 |
| NA             | not applicable                              |
| NB             | narrow band                                 |
| OATS           | open area test site                         |
| $\Omega$       | Ohm   |
| PM             | pulse modulation                            |
| PS             | power supply                                |
| ppm            | part per million ( $10^{-6}$ )              |
| QP             | quasi-peak                                  |
| RE             | radiated emission                           |
| RF             | radio frequency                             |
| rms            | root mean square                            |
| Rx             | receive                                     |
| s              | second                                      |
| T              | temperature                                 |
| Tx             | transmit                                    |
| V              | volt  |
| WB             | wideband                                    |

## 15 APPENDIX G Manufacturer's declaration



### AfiPass II External Modules Specification

AfiPass II livestock Passive ID system comprise of a controller and antenna/s (i.e. external modules) designed to support various applications of livestock identification according to ISO standards 11784 and 11785.

The external modules differ in size and electrical spec to optimally suit the purpose of each module in terms of ID range and peripheral area coverage:

- **External Module 50 (Part Number: 4095912)**  
A 500mmX260mm air loop antenna pre-wired with a 15m RG58 coaxial cable. Suitable for most applications which require a long-distance ID range with medium-high peripheral area coverage (circular-elliptic). Enables the strongest transmission power for the system.
- **External Module 40 (Part Number: 4095914)**  
A 400mmX145mm air loop antenna pre-wired with a 15m RG58 coaxial cable. Suitable for specific applications which require short to medium distance ID range with small peripheral area coverage (elliptic).
- **Sort/Rotary External Module (Part Number: 4095913)**  
A 1235mmX285mm air loop antenna pre-wired with a 10m RG58 coaxial cable. Suitable for specific applications which require medium to long distance ID range with medium peripheral area coverage (squared-elliptic).

Afimilk rep: Barak Yosef  
Head of Hardware Development

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