

TEST REPORT

ACCORDING TO: FCC 47CFR part 15 subpart C §15.209
RSS-Gen issue 5

FOR:

**Afimilk Agricultural
Cooperative Ltd
Wireless Tag
Model: AfiCollar (8002022)
FCC ID: JER2022
IC: 21531-2022**

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1 Applicant information

Client name: Afimilk Agricultural Cooperative Ltd
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Telephone: +972 4675 4256
Fax: +972 4675 1862
E-mail: eli_s@afimilk.co.il
Contact name: Mr. Eli Shimshon

2 Equipment under test attributes

Product name: Wireless Tag
Product type: Transmitter
Model(s): AfiCollar (8002022)
Serial number: NA
Hardware version: 1
Software release: 010107
Receipt date 17-Jun-19

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
Contact name: Mr. Eli Shimshon




4 Test details

Project ID: 33571
Location: Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel
Test started: 14-Jul-19
Test completed: 07-Aug-19
Test specification(s): FCC 47CFR part 15 subpart C §15.209
RSS-Gen issue 5

5 Tests summary

Test	Status
Transmitter characteristics	
Section 15.209, / RSS-Gen, Section 6.5, 6.6 Field strength of emissions	Pass
Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth	Pass
Section 15.207(a), Conducted emission	Not required
Section 15.203 / RSS Gen Section 6.8, Antenna requirements	Pass
Unintentional emissions	
Section 15.109, / ICES-003 , section 6.2, Radiated emission	Pass

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
Tested by:	Mr. A Morozov test engineer EMC & Radio	14 July 19 – 07 Aug 19	
Reviewed by:	Mrs. S Peysahov Sheynin test engineer EMC & Radio	25 Sep 19 – 25 Oct 19	
Approved by:	Mr. S. Samokha, technical manager, EMC and Radio	29 Oct 19	

6 EUT description

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

6.1 General information

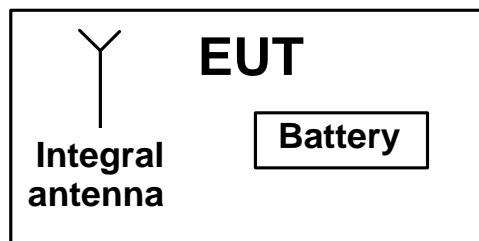
The EUT, Brand name AfiCollar, is a tag fed by internal battery. The EUT part number 8002022 is electrically, electronically and functionally fully identical to EUT part number 8002071 except for parameter setting for neighbor farm. That's why only 8002022 was tested.

According to manufacturer's declaration provided in Appendix G of the test report, EUT part number 8002022 and EUT part number 8002071 are electrically/electronically identical

6.2 EUT options/configurations

Number	Operating mode description	Configuration
1	Standby & Operating modes	Waiting for signal from control unit - answer back

6.3 Test configuration



6.4 Changes made in EUT

No changes were implemented in the EUT during testing.



6.5 Transmitter characteristics

Type of equipment						
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)					
Operating frequencies		200 KHz				
Maximum rated output power		At transmitter 50 Ω RF output connector		dBm		
		Field strength at 3 m distance		68.98 dB(μ V/m) -peak		
Is transmitter output power variable?		X	No			
		Yes		continuous variable		
				stepped variable with stepsize		
				minimum RF power		
				maximum RF power		
Antenna connection						
unique coupling	standard connector	X	integral	with temporary RF connector		
				X	without temporary RF connector	
Antenna/s technical characteristics						
Type	Manufacturer	Model number		Gain		
Integral	Afimilk	NA		Not defined		
Type of modulation		OOK				
Transmitter aggregate data rate/s		390 bps				
Transmitter power source						
X	Battery	Nominal rated voltage	3.6VDC	Battery type		
	DC	Nominal rated voltage	VDC			
	AC mains	Nominal rated voltage	VAC			
Common power source for transmitter and receiver			X	yes	no	



Test specification: Section 15.209 / RSS-Gen, Section 6.5, 6.6 Field strength of emissions			
Test procedure: ANSI C63.10, Section 6.4, 6.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C and RSS-Gen 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.

Table 7.1.1 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 th 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 7.1.2 and shown in the associated plots.

7.1.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.1.3.1 The EUT was set up as shown in Figure 7.1.2, energized and the performance check was conducted.

7.1.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ 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.

7.1.3.3 The worst test results (the lowest margins) were recorded in Table 7.1.2 and shown in the associated plots.



Test specification: Section 15.209 / RSS-Gen, Section 6.5, 6.6 Field strength of emissions			
Test procedure: ANSI C63.10, Section 6.4, 6.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

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

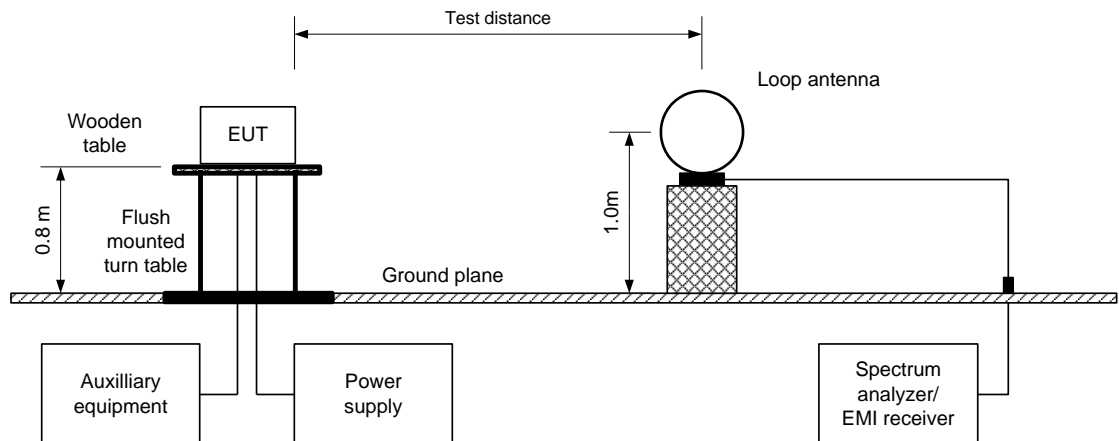
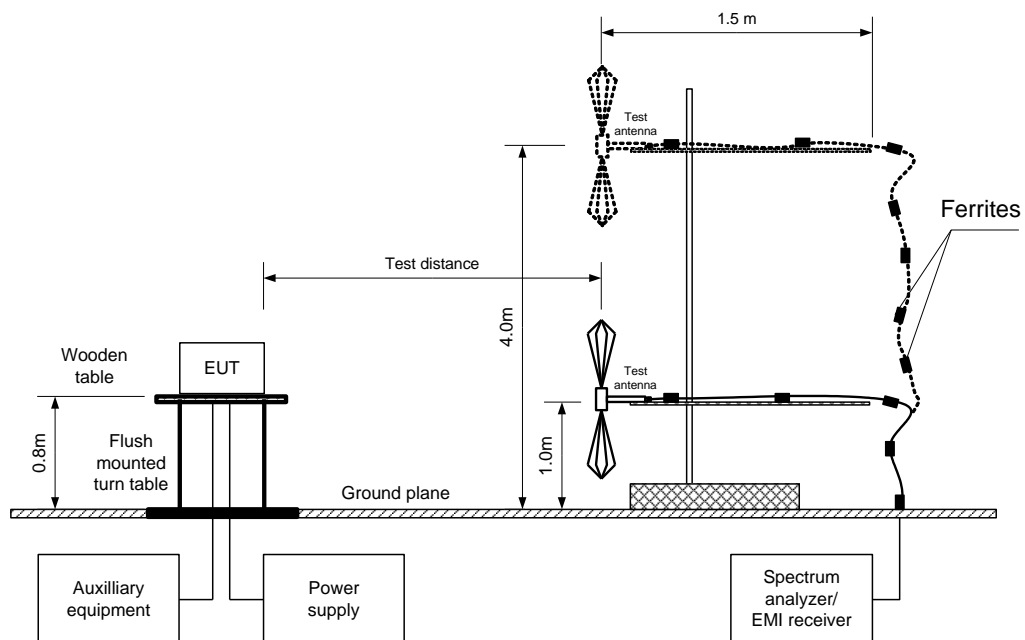


Figure 7.1.2 Setup for spurious emission field strength measurements above 30 MHz





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Date of Issue: 29-Oct-19

Test specification: Section 15.209 / RSS-Gen, Section 6.5, 6.6 Field strength of emissions			
Test procedure: ANSI C63.10, Section 6.4, 6.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

Table 7.1.2 Field strength of spurious emissions

TEST DISTANCE: 3 m
 TEST SITE: Semi anechoic chamber
 EUT POSITION: Typical (Vertical)
 TRANSMITTER OUTPUT POWER SETTINGS: Maximum
 INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
 DETECTOR USED: Peak
 RESOLUTION BANDWIDTH: 1 kHz (9 kHz – 150 kHz)
 9.0 kHz (150 kHz – 30 MHz)
 120 kHz (30 MHz – 1000 MHz)
 VIDEO BANDWIDTH: ≥ Resolution bandwidth
 TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
 Biconilog (30 MHz – 1000 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*				
0.201	68.98	68.98	101.59	-32.61	Vertical	1.0	12	Pass

*- Margin = Measured emission - specification limit.

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

Reference numbers of test equipment used

HL 0446	HL 3903	HL 4360	HL 5288	HL 5405			
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Full description is given in Appendix A.



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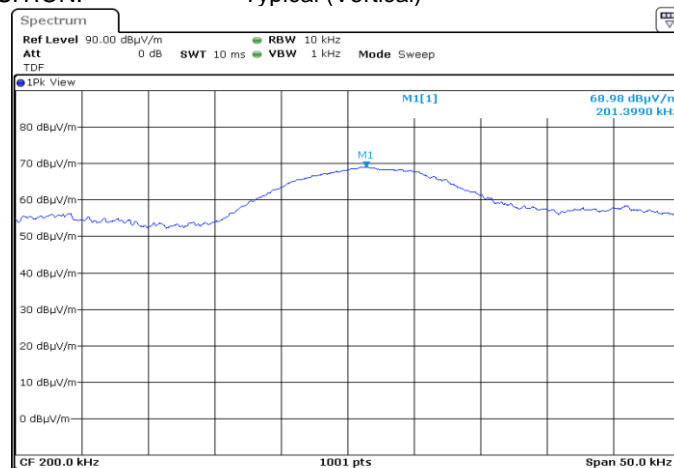
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Date of Issue: 29-Oct-19

Test specification: Section 15.209 / RSS-Gen, Section 6.5, 6.6 Field strength of emissions			
Test procedure: ANSI C63.10, Section 6.4, 6.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

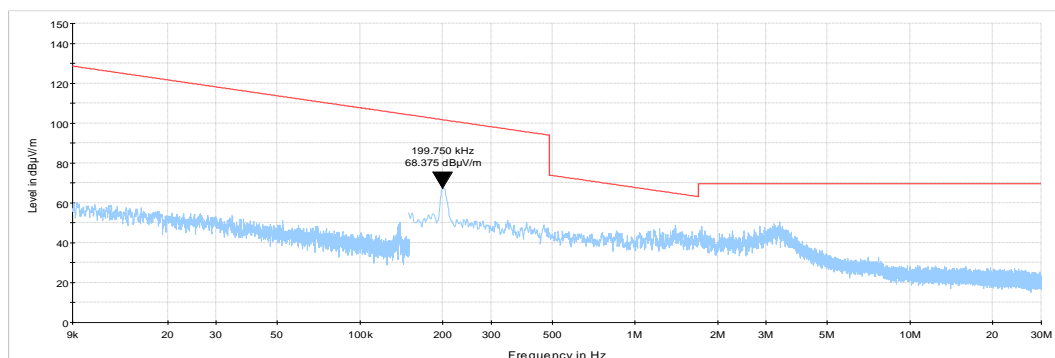
Plot 7.1.1 Radiated emission measurements at the fundamental frequency

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



Plot 7.1.2 Radiated emission measurements from 9 kHz to 30 MHz

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





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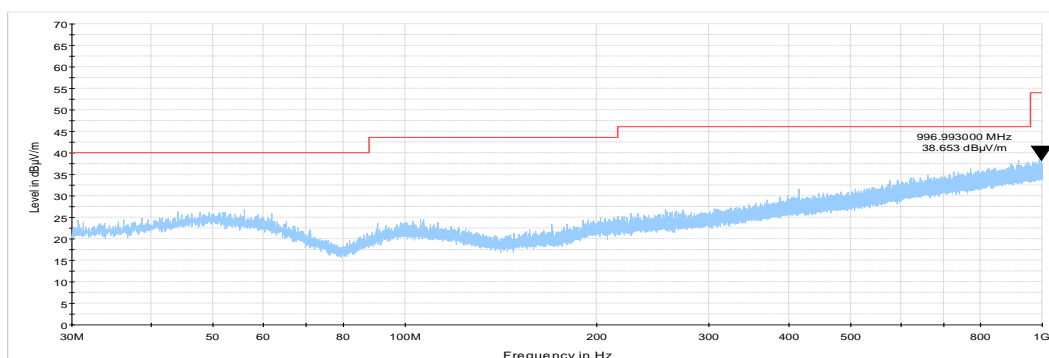
Report ID: AFIRAD_FCC.15.209.33571

Date of Issue: 29-Oct-19

Test specification: Section 15.209 / RSS-Gen, Section 6.5, 6.6 Field strength of emissions			
Test procedure: ANSI C63.10, Section 6.4, 6.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

Plot 7.1.3 Radiated emission measurements from 30 to 1000 MHz

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

**Table 7.1.3 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 7.1.4 Restricted bands according to RSS-Gen, Table 7

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



Test specification: Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth			
Test procedure: ANSI C63.10, Section 6.9.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Jul-19			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1005 hPa	Power: 3.6 VDC
Remarks: OBW			

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 7.2.3 and associated plots.

Table 7.2.1 Occupied bandwidth limits FCC 15.209

Assigned frequency, kHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, of the carrier frequency
200	20 dBc	NA

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

Table 7.2.2 Occupied bandwidth limits RSS-210

Assigned frequency, kHz	Modulation envelope reference points, %	Maximum allowed bandwidth, of the carrier frequency
200	99	NA

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 7.2.3 and associated plot.

Figure 7.2.1 Occupied bandwidth test setup





Test specification:		Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth	
Test procedure:		ANSI C63.10, Section 6.9.2	
Test mode:	Compliance	Verdict: PASS	
Date(s):	24-Jul-19		
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1005 hPa	Power: 3.6 VDC
Remarks: OBW			

Table 7.2.3 Occupied bandwidth 20 dBc test results

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 100 Hz
 VIDEO BANDWIDTH: 300 Hz
 MODULATION ENVELOPE REFERENCE POINTS: 20 dBc
 MODULATION: OOK
 BIT RATE: 390 bps

Carrier frequency, kHz	Left cross point frequency, kHz	Right cross point frequency, kHz	Occupied bandwidth, kHz*	Verdict
200.0	200.841	203.429	2.588	Pass

* - Occupied bandwidth = Right cross point frequency - Left cross point frequency

Table 7.2.4 Occupied bandwidth 99% test results

DETECTOR USED: Peak hold
 RESOLUTION BANDWIDTH: 200 Hz
 VIDEO BANDWIDTH: 500 Hz
 MODULATION ENVELOPE REFERENCE POINTS: 20 dBc
 MODULATION: OOK
 BIT RATE: 390 bps

Carrier frequency, kHz	Occupied bandwidth, kHz*	Verdict
200.0	7.113	Pass

* - Occupied bandwidth = Right cross point frequency - Left cross point frequency

Reference numbers of test equipment used

HL 4355								
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Full description is given in Appendix A.



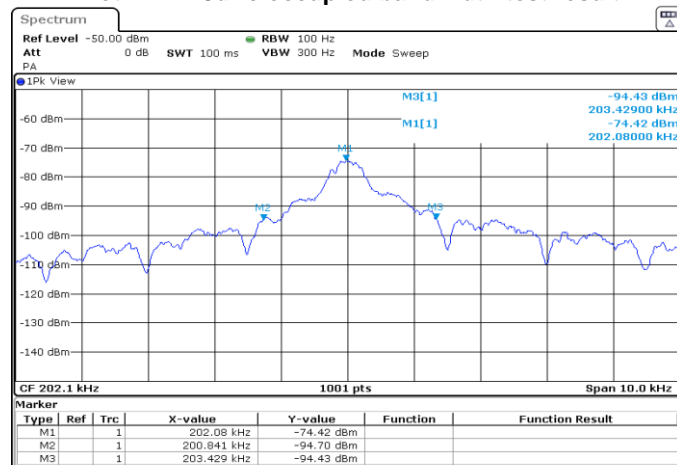
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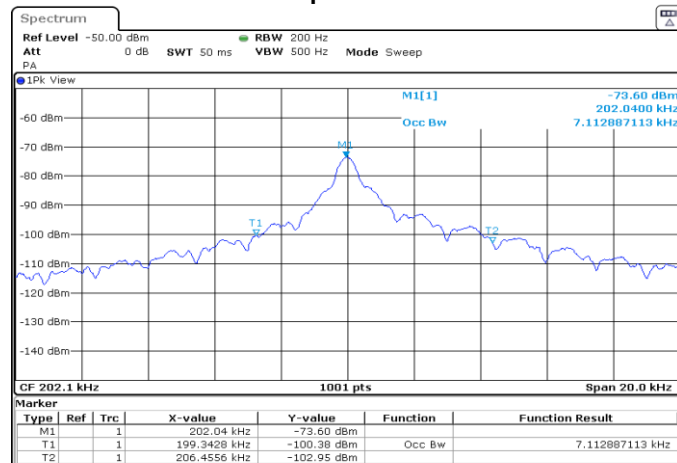
Date of Issue: 29-Oct-19

Test specification: Section 15.215 / RSS-Gen, Section 6.7, Occupied bandwidth			
Test procedure: ANSI C63.10, Section 6.9.2			
Test mode: Compliance		Verdict: PASS	
Date(s): 24-Jul-19			
Temperature: 24 °C	Relative Humidity: 45 %	Air Pressure: 1005 hPa	Power: 3.6 VDC
Remarks: OBW			

Plot 7.2.1 20dBc occupied bandwidth test result



Plot 7.2.2 99% occupied bandwidth test result



Test specification: Section 15.203 / RSS Gen Section 6.8, Antenna requirements			
Test procedure: Visual inspection			
Test mode: Compliance	Verdict: PASS		
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

7.3 Antenna requirements

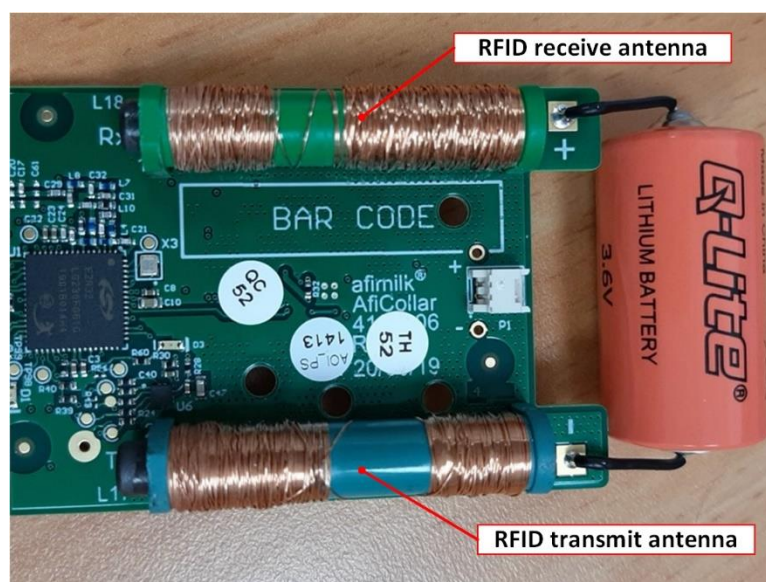
The EUT was verified for compliance with antenna requirements. A transmitter shall be designed to ensure that no antenna other than that furnished by the responsible party will be used with the device. It may be either permanently attached or employs a unique antenna connector for every antenna proposed 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 7.3.1

Table 7.3.1 Antenna requirements

Requirement	Rationale	Verdict
The transmitter antenna is permanently attached	Visual inspection	Comply
The transmitter employs a unique antenna connector	NA	
The transmitter requires professional installation	NA	

Photograph 7.3.1 Antenna assembly





Test specification: Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission			
Test procedure: ANSI C63.4, Sections 8.3 and 12.2.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

8 Unintentional emissions according to 47CFR part 15 subpart B

8.1 Radiated emission measurements

8.1.1 General

This test was performed to measure radiated emissions from the EUT enclosure. Specification test limits are given in Table 8.1.1, in * - The limit for test distance other than specified was calculated using the inverse linear distance extrapolation factor as follows: $\text{Lim}_{S2} = \text{Lim}_{S1} + 20 \log (S_1/S_2)$, where S_1 and S_2 – standard defined and test distance respectively in meters.

Table 8.1.1 Radiated emission limits according to FCC Part 15, Section 109 and ICES-003, Section 6.2

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 th 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: $\text{Lim}_{S2} = \text{Lim}_{S1} + 20 \log (S_1/S_2)$, where S_1 and S_2 – standard defined and test distance respectively in meters.

Table 8.1.2 Radiated emission limits according to RSS-Gen, Section 7.1.2

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 rd harmonic**	54.0

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

8.1.2 Test procedure for measurements in semi-anechoic chamber

8.1.2.1 The EUT was set up as shown in Figure 8.1.1 and associated photograph/s, energized and the performance check was conducted.

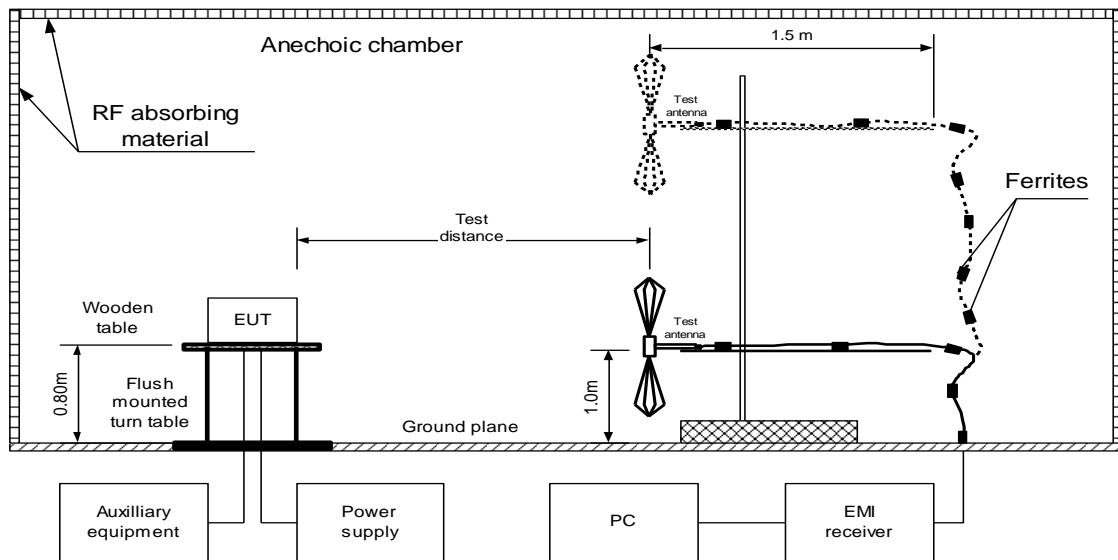
8.1.2.2 The specified frequency range was investigated with biconilog antenna connected to EMI receiver. To find maximum radiation the turntable was rotated 360°, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal and the EUT cables position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

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



Test specification: Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission			
Test procedure: ANSI C63.4, Sections 8.3 and 12.2.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

Figure 8.1.1 Setup for radiated emission measurements, table-top equipment





Test specification: Section 15.109, ICES-003 , section 6.2 , Class B Radiated emission			
Test procedure: ANSI C63.4, Sections 8.3 and 12.2.5			
Test mode: Compliance		Verdict: PASS	
Date(s): 14-Jul-19			
Temperature: 24 °C	Relative Humidity: 43 %	Air Pressure: 1008 hPa	Power: 3.6 VDC
Remarks:			

Table 8.1.3 Radiated emission test results

EUT SET UP: TABLE-TOP
LIMIT: Class B
EUT OPERATING MODE: Stand-by and Receive
TEST SITE: SEMI ANECHOIC CHAMBER
TEST DISTANCE: 3 m
FREQUENCY RANGE: 30 MHz – 1000 MHz
RESOLUTION BANDWIDTH: 120 kHz

RESOLUTION BANDWIDTH: 120 KHz					Antenna polarization	Antenna height, m	Turn-table position**, degrees	Verdict
Frequency, MHz	Peak emission, dB(μV/m)	Quasi-peak						
		Measured emission, dB(μV/m)	Limit, dB(μV/m)	Margin, dB*				
No emissions were found								Pass

*- Margin = Measured emission - specification limit.

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

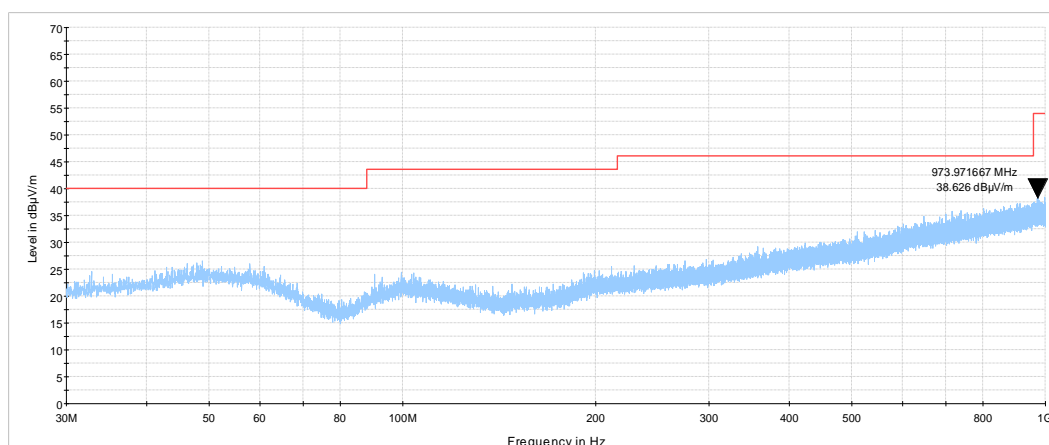
Reference numbers of test equipment used

HL 3903	HL 4360	HL 4933	HL 5288	HL 5405			
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Full description is given in Appendix A.

Plot 8.1.1 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: Receive / Stand-by



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-19	24-Feb-20
3903	Microwave Cable Assembly, 40.0 GHz, 1.5 m, SMA/SMA	Huber-Suhner	SUCOFL EX 102A	1226/2A	07-Apr-19	07-Apr-20
4355	Signal and Spectrum Analyzer, 9 kHz to 7 GHz	Rohde & Schwarz	FSV 7	101630	04-Aug-19	04-Aug-20
4360	EMI Test Receiver, 20 Hz to 40 GHz.	Rohde & Schwarz	ESU40	100322	31-Dec-18	31-Dec-19
4933	Active Horn Antenna, 1 GHz to 18 GHz	COM-POWER CORPORATION	AHA-118	701046	06-Jan-19	06-Jan-20
5288	Trilog Antenna, 25 MHz - 8 GHz, 100W	Frankonia	ALX-8000E	00809	08-Feb-19	08-Feb-22
5405	RF cable, 18 GHz, N-N, 6 m	Huber-Suhner	SF118/11 N(x2)	500023/118	11-Aug-19	11-Aug-20

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 μ V to obtain field strength in dB μ A/m.

HL 4933: Active Horn Antenna
COM-POWER CORPORATION, model: AHA-118, s/n 701046

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
1000	-16.1
1500	-15.1
2000	-10.9
2500	-11.9
3000	-11.1
3500	-10.6
4000	-8.6
4500	-8.3
5000	-5.9
5500	-5.7
6000	-3.3
6500	-4.0
7000	-2.2
7500	-1.7
8000	1.1
8500	-0.8
9000	-1.5
9500	-0.2

Frequency, MHz	Measured antenna factor (with preamplifier), dB/m
10000	1.8
10500	1.0
11000	0.3
11500	-0.5
12000	3.1
12500	1.4
13000	-0.3
13500	-0.4
14000	2.5
14500	2.2
15000	1.9
15500	0.5
16000	2.1
16500	1.2
17000	0.6
17500	3.1
18000	4.2

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

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 μ V to obtain field strength in dB μ 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 μ V to obtain field strength in dB μ V/m.



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HL 5405: RF Cable
Huber-Suhner, model: SF118/11N(x2), s/n: 500023/118
Calibration date: 01-Aug-2018

Set / Applied, MHz	Measured, dB	Uncertainty, dB
0.1	0.01	±0.07
50	0.23	±0.07
100	0.32	±0.07
200	0.45	±0.08
300	0.55	±0.08
400	0.64	±0.08
500	0.71	±0.08
600	0.78	±0.08
700	0.85	±0.08
800	0.91	±0.08
900	0.97	±0.08
1000	1.02	±0.08
1100	1.07	±0.08
1200	1.12	±0.08
1300	1.16	±0.08
1400	1.21	±0.08
1500	1.25	±0.08
1600	1.30	±0.08
1700	1.34	±0.08
1800	1.38	±0.08
1900	1.42	±0.08
2000	1.47	±0.08
2500	1.64	±0.10
3000	1.81	±0.10
3500	1.97	±0.10
4000	2.11	±0.10
4500	2.25	±0.10
5000	2.38	±0.10
5500	2.48	±0.10
6000	2.59	±0.10
6500	2.72	±0.10
7000	2.84	±0.13
7500	2.97	±0.13
8000	3.08	±0.13
8500	3.21	±0.13
9000	3.31	±0.13
9500	3.42	±0.13
10000	3.52	±0.13

11 APPENDIX C 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: ± 3.9 dB 150 kHz to 30 MHz: ± 3.8 dB
Radiated emissions at 10 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.0 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.1 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 5.5 dB Biconical antenna: ± 5.5 dB Log periodic antenna: ± 5.6 dB Double ridged horn antenna: ± 5.8 dB
Radiated emissions at 3 m measuring distance Horizontal polarization Vertical polarization	Biconilog antenna: ± 5.3 dB Biconical antenna: ± 5.0 dB Log periodic antenna: ± 5.3 dB Double ridged horn antenna: ± 5.3 dB Biconilog antenna: ± 6.0 dB Biconical antenna: ± 5.7 dB Log periodic antenna: ± 6.0 dB Double ridged horn antenna: ± 6.0 dB
Conducted emissions at RF antenna connector	9 kHz to 2.9 GHz: ± 2.6 dB 2.9 GHz to 6.46 GHz: ± 3.5 dB 6.46 GHz to 13.2 GHz: ± 4.3 dB 13.2 GHz to 22.0 GHz: ± 5.0 dB 22.0 GHz to 26.8 GHz: ± 5.5 dB 26.8 GHz to 40.0 GHz: ± 4.8 dB
Duty cycle, timing (Tx ON / OFF) and average factor measurements	± 1.0 %
Occupied bandwidth	± 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.

12 APPENDIX D Test facility 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 1, 2, 15, 18 parts of Code of Federal Regulations 47 (CFR 47), Test Firm Registration Number is 927748, Designation Number is IL1001; registered by Industry Canada for electromagnetic emissions, file number IC 2186A-1 for OATS, certified by VCCI, Japan (the registration numbers are R-808 for OATS, R-1082 for anechoic chamber, G-869 for RE measurements above 1 GHz, C-845 for conducted emissions site and T-1606 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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Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

Person for contact: Mr. Michael Nikishin, EMC and radio group manager

13 APPENDIX E

Specification references

47CFR part 15: 2019

ANSI C63.10: 2013

ANSI C63.4: 2014

RSS-Gen Issue 5,
April 2018

ICES-003 Issue 6: 2016

Radio Frequency 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(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
dB(μ 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
μ s	microsecond
NA	not applicable
NB	narrow band
OATS	open area test site
Ω	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



HERMON LABORATORIES

15 APPENDIX G Manufacturer's declaration



Declaration of Identity

We, the undersigned,

Company: Afimilk Ltd.
Address: Kibbutz Afikim, 1514800
Country: Israel
Telephone number: + 972 4 675 4811
Fax number: + 972 4 675 1862

Declare under our sole responsibility that the following equipment:

Brand/Item	Type/Model	Short Product description
AfiCollar	8002022	915MHz, 200KHz

is electronically/electrically/mechanically identical to the following equipment (including Software/Hardware version(s)):

Brand/Item	Type/Model	Short Product description
AfiCollar	8002071	915MHz, 200KHz

The reason for name change is: Parameter settings for neighbor farms.

afimilk
Agricultural Cooperative Ltd.

.....
(company stamp)

1/09/19
(date)

.....
(signature)

1514800
(printed name)

Prod. leader
(position)

END OF DOCUMENT