

TEST REPORT

ACCORDING TO: FCC CFR 47 Part 15 subpart C, section 15.231;
RSS-210 issue 9 Annex A

FOR:

Paradox Security Systems Ltd.
Door Contact Wireless Detector
Model: DCTXP2
FCC ID: KDYDCTXP2
IC: 2438A-DCTXP2

This report is in conformity with ISO/ IEC 17025. The "A2LA Accredited" symbol endorsement applies only to the tests and calibrations that are listed in the scope of Hermon Laboratories accreditation. The test results relate only to the items tested.
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1 Applicant information

Client name: Paradox Security Systems LTD.
Address: 780 Industrial Boulevard St.Eustache, Quebec J7R 5V3 Canada
Telephone: 450-491-7444
Fax: 450-497-1095
E-mail: alexc@paradox.com
Contact name: Mr. Alex Chaplik

2 Equipment under test attributes

Product name: Door Contact Wireless Detector
Product type: Transmitter
Model: DCTXP2
Serial number: 163254+1
Hardware version: 312-7007-070
Software release: V4.00
Receipt date 14-Jun-18

3 Manufacturer information

Manufacturer name: Paradox Security Systems LTD.
Address: 780 Industrial Boulevard St.Eustache, Quebec J7R 5V3 Canada
Telephone: 450-491-7444
Fax: 450-497-1095
E-Mail: rhamitouche@paradox.com
Contact name: Mr. Rabah Hamitouche

4 Test details

Project ID: 31049
Location: Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel
Test started: 17-Jun-18
Test completed: 21-Jun-18
Test specifications: FCC 47CFR part 15, subpart C, §15.231;
RSS-210 issue 9 Annex A

5 Tests summary

Test	Status
Transmitter characteristics	
FCC Part 15, Section 231(a) / RSS-210, Section A1.1, Periodic operation requirements	Pass
FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions	Pass
FCC Part 15, Section 231(c) / RSS-210, Section A1.3, Occupied bandwidth	Pass
FCC Part 15, Section 207 / RSS-Gen, Section 8.8, Conducted emission	Not required
FCC Part 15, Section 203 / RSS-Gen, Section 6.8, Antenna requirements	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.

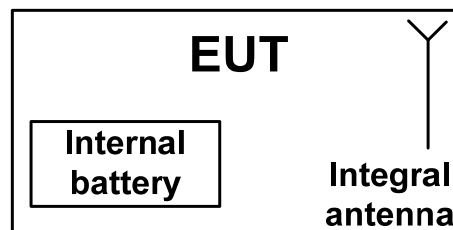
	Name and Title	Date	Signature
Tested by:	Mrs. E.Pitt, test engineer	June 21, 2018	
Reviewed by:	Mrs. Y. Rapin, technical writer	July 31, 2018	
Approved by:	Mr. K. Zushchuk, Projects & Customer Manager, EMC & Radio	August 18, 2018	

6 EUT description

6.1 General information

The EUT is a Wireless Long-Range Door Contact comprising RF transmitter module operating at 433.92 MHz. The EUT is equipped with an integral antenna and is powered by two 1.5V Alkaline batteries type AAA in series.

6.2 Test configuration



6.3 Changes made in EUT

No changes were implemented in the EUT during testing.



6.4 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 frequency		433.92 MHz				
Maximum rated output power		At transmitter 50 Ω RF output connector				
		Field strength at 3 m distance			74.67 dB(μ V/m) – peak 63.43 dB(μ V/m) -average	
Is transmitter output power variable?		X	No			
		Yes	continuous variable			
			stepped variable with stepsize			
			dB			
		minimum RF power				
		dBm				
		maximum RF power				
		dBm				
Antenna connection						
unique coupling		standard connector		X	integral	
				X	with temporary RF connector	
				X	without temporary RF connector	
Antenna/s technical characteristics						
Type		Manufacturer		Model number		
Integral		FORESIGHT ENT. Ltd.		312-4004-110T		
				Gain		
				0 dBi		
Transmitter aggregate data rate/s		1.67 kbps				
Type of modulation		OOK				
Modulating test signal (baseband)		ID code				
Transmitter power source						
X	Battery	Nominal rated voltage	2 x 1.5 VDC	Battery type	Alkaline type AA	
	DC	Nominal rated voltage	VDC			
	AC mains	Nominal rated voltage	VAC	Frequency		
Common power source for transmitter and receiver		X		yes	no	

Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1012 hPa	Power: 3 VDC
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C requirements

7.1 Periodic operation requirements

7.1.1 General

The EUT was verified for compliance with periodic operation requirements listed below:

- Continuous transmissions such as voice, video and the radio control of toys are not permitted;
- A manually operated transmitter shall employ switch that will automatically deactivate the transmitter within not more than 5 seconds of being released;
- A transmitter activated automatically shall cease transmission within 5 seconds after activation;
- Periodic transmissions, excluding polling or supervision transmissions, at regular predetermined intervals are not permitted;
- Total duration of polling or supervision transmissions, including data, to determine system integrity in security or safety applications shall not exceed 2 seconds per hour;
- Transmission of set-up information for security systems may exceed the transmission duration limits of 5 seconds, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

The rationale for compliance with the above requirements was either test results or supplier declaration. The summary of results is provided in Table 7.1.1.

7.1.2 Test procedure for transmitter shut down test

7.1.2.1 The EUT was set up as shown in Figure 7.1.1.

7.1.2.2 The spectrum analyzer center frequency was adjusted to the EUT carrier, span set to zero and video triggered for transmission.

7.1.2.3 The transmitter was activated either manually or automatically. Once manually operated transmitter was activated, the switch was immediately released.

The transmission time was captured and shown in Plot 7.1.1* Provided in Appendix G.

7.1.2.4 Plot 7.1.1.

7.1.3 Test procedure for measurements of polling / supervision transmission duration

7.1.3.1 The EUT was set up as shown in Figure 7.1.1.

7.1.3.2 The spectrum analyzer center frequency was adjusted to the EUT carrier, span set to zero and video triggered for transmission.

7.1.3.3 The transmission time was captured and shown in Plot 7.1.2.

Figure 7.1.1 Setup for transmitter shut down test



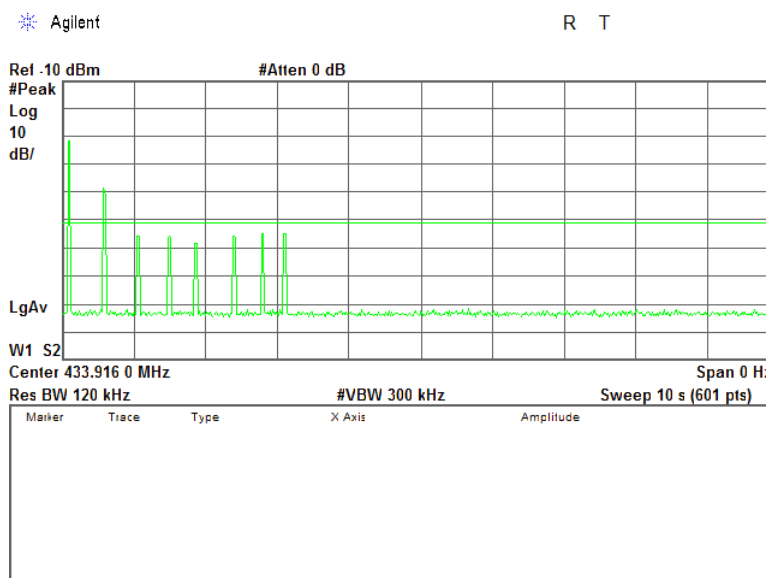
Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1012 hPa	Power: 3 VDC
Remarks:			

Table 7.1.1 Periodic operation requirements

Requirement	Rationale	Verdict
Continuous transmissions are not permitted	Supplier declaration*	Comply
A manually operated transmitter shall be deactivated within not more than 5 seconds of switch being released	NA	NA
Transmitter activated automatically shall cease transmission within 5 seconds	Plot 7.1.1	Comply
Periodic transmissions at regular predetermined intervals are not permitted	Supplier declaration	Comply
Total duration of polling or supervision transmissions shall not exceed 2 seconds per hour	Plot 7.1.2	Comply
Transmission of set-up information for security systems may exceed the transmission duration limits of 5 seconds, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.	NA	NA

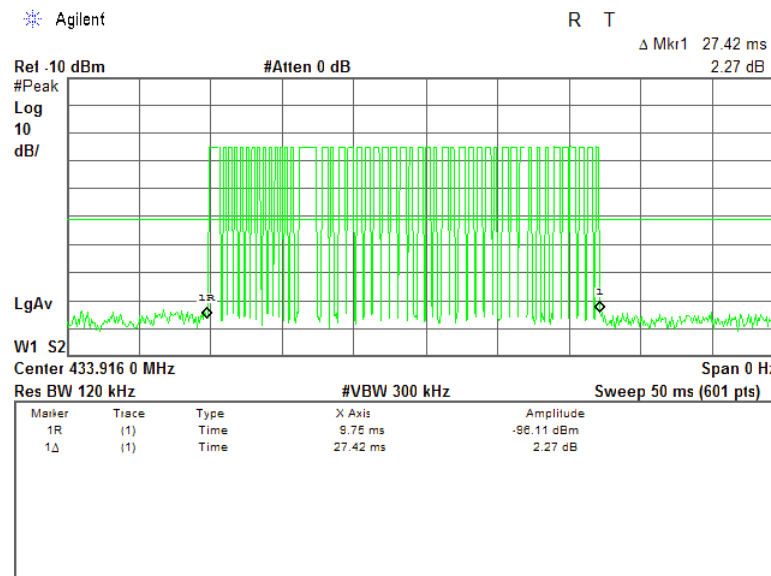
* Provided in Appendix G.

Plot 7.1.1 Transmitter shut down test result

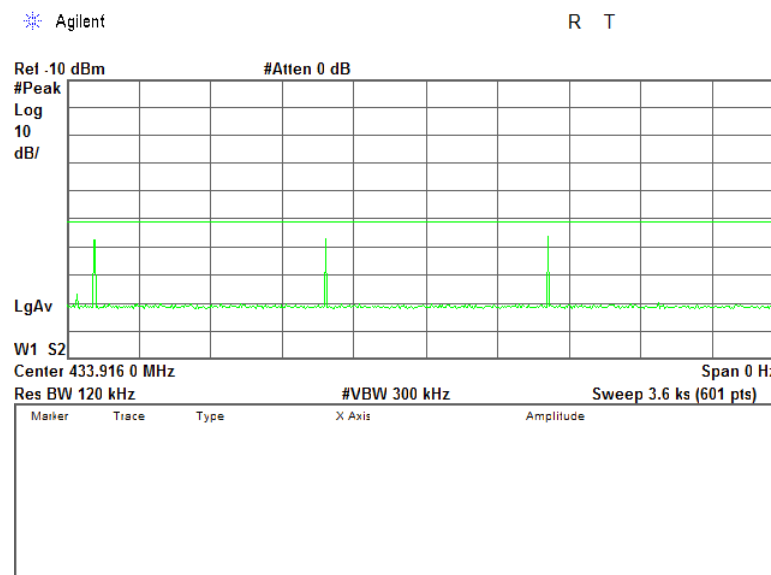


Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict: PASS	
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1012 hPa	Power: 3 VDC
Remarks:			

Plot 7.1.2 Polling / supervision transmission duration



Plot 7.1.3 Supervision transmission period



Test specification:	FCC Part 15, Section 231(a) / RSS-210, Section A1.1, Periodic operation requirements		
Test procedure:	Supplier declaration		
Test mode:	Compliance	Verdict:	PASS
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1012 hPa	Power: 3 VDC
Remarks:			

Table 7.1.2 Total duration of polling / supervision transmissions

Duration, ms	Repetition period, ms	Maximum number of transmissions within 1 hour	Total duration within 1 hour, ms
27.42	NA	16	432

Reference numbers of test equipment used

HL 3818							
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

7.2 Field strength of emissions

7.2.1 General

This test was performed to measure field strength of fundamental and spurious emissions from the EUT. Specification test limits are given in Table 7.2.1 and Table 7.2.2.

Table 7.2.1 Radiated fundamental emission limits

Fundamental frequency, MHz	Field strength at 3 m, dB(μV/m)	
	Peak	Average
433.92	100.8	80.8

Table 7.2.2 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m, dB(μV/m)				
	Within restricted bands			Outside restricted bands	
	Peak	Quasi Peak	Average	Peak	Average
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	80.8	60.8
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			
Above 1000	74.0	NA	54.0		

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

$$\text{Lim}_{S_2} = \text{Lim}_{S_1} + 40 \log (S_1/S_2),$$

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

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

Note 1: The fundamental emission limit in dB(μV/m) was calculated as follows:

$$\text{Lim}_{AVR} = 20 \times \log(56.81818 \times F - 6136.3636) \text{ - within } 130 - 174 \text{ MHz band;}$$

$$\text{Lim}_{AVR} = 20 \times \log(41.6667 \times F - 7083.3333) \text{ - within } 260 - 470 \text{ MHz band,}$$

where F is the carrier frequency in MHz.

The limit for spurious emissions was 20 dB lower than fundamental emission limit.

The above limits provided in terms of average values, peak limit was 20 dB above the average limit.

Note 2: The above field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

7.2.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.

7.2.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360° and the measuring antenna was rotated around its vertical axis.

7.2.2.3 The worst test results (the lowest margins) were recorded in

7.2.2.4 Table 7.2.3, Table 7.2.5 and shown in the associated plots.

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

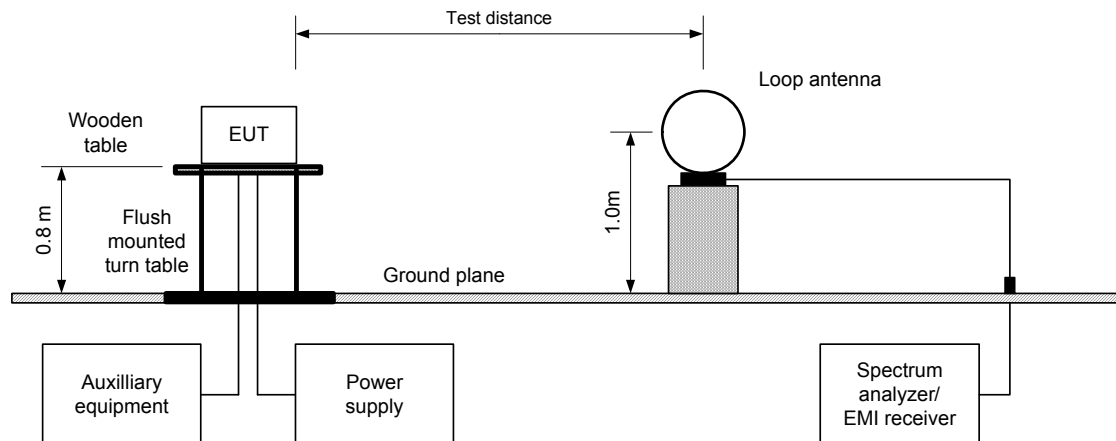
7.2.3.1 The EUT was set up as shown in Figure 7.2.2, Figure 7.2.3, energized and the performance check was conducted.

7.2.3.2 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.

7.2.3.3 The worst test results (the lowest margins) were recorded in

7.2.3.4 Table 7.2.3, Table 7.2.5 and shown in the associated plots.

Figure 7.2.1 Setup for spurious emission field strength measurements below 30 MHz



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict: PASS	
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Figure 7.2.2 Setup for spurious emission field strength measurements in 30 -1000 MHz

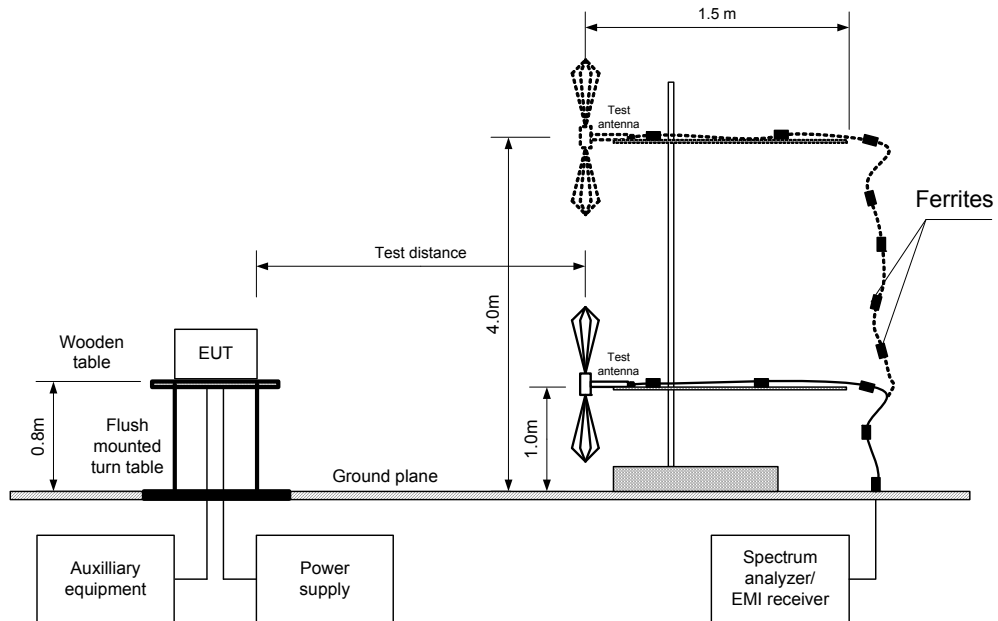
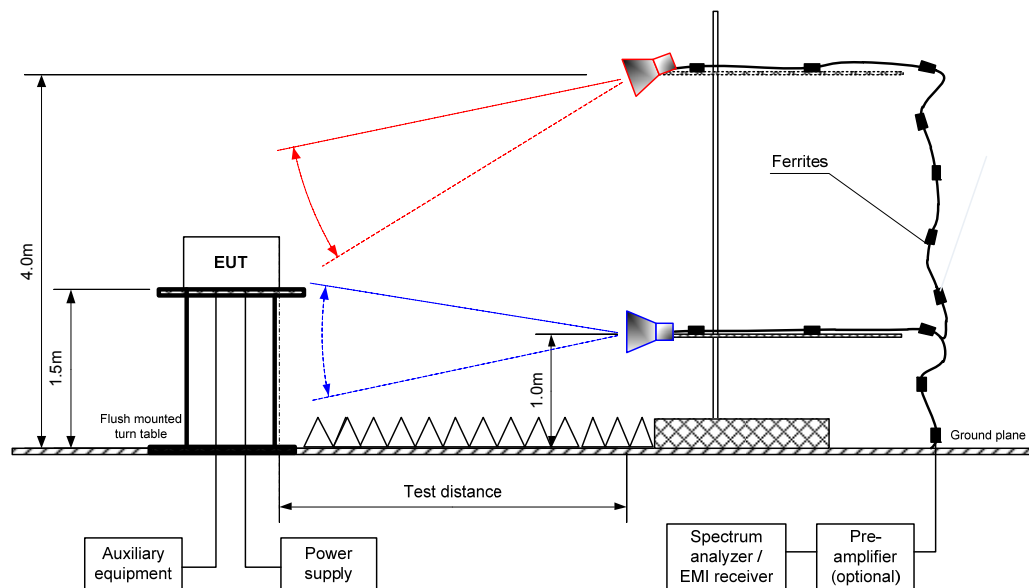


Figure 7.2.3 Setup for spurious emission field strength measurements above 1000 MHz



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict: PASS	
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Table 7.2.3 Field strength of fundamental emission, spurious emissions outside restricted bands and within restricted bands at frequencies above 1 GHz

TEST DISTANCE:	3 m
EUT POSITION:	Typical (Vertical)
MODULATION:	OOK
MODULATING SIGNAL:	NA
BIT RATE:	1.67 kbps
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
INVESTIGATED FREQUENCY RANGE:	0.009 – 4500 MHz
DETECTOR USED:	Peak
RESOLUTION BANDWIDTH:	0.2 kHz (9 kHz – 150 kHz) 9.0 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1000 MHz) 1.0 MHz (above 1000 MHz)
VIDEO BANDWIDTH:	≥ Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz) Double ridged guide (above 1000 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)	Calculated, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	
Fundamental emission											
433.920	V	1.24	-51.0	74.67	100.80	-26.13	74.67	63.43	80.80	-17.37	Pass
Spurious emissions											
1301.6898	V	1.28	-166.0	41.34	74.00	41.34	41.34	30.10	54.00	-23.90	Pass
1735.7100	V	1.00	-166.0	37.76	74.00	37.76	37.76	26.52	60.80	-34.28	
2169.4898	V	2.10	71.0	37.28	74.00	37.28	37.28	26.04	60.80	-34.76	
2643.6001	H	2.65	132.0	37.72	74.00	37.72	37.72	26.48	60.80	-34.32	
3151.9800	H	1.91	136.0	38.92	74.00	38.92	38.92	27.68	60.80	-33.12	
3471.4200	V	1.83	131.0	43.32	74.00	43.32	43.32	32.08	60.80	-28.72	
3905.0700	H	2.38	-4.0	45.05	74.00	45.05	45.05	33.81	54.00	-20.19	
4400.1100	V	1.01	12.0	41.89	74.00	41.89	41.89	30.65	60.80	-30.15	

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

**- Margin, dB = Measured (calculated) value, dB(μV/m) - Limit, dB(μV/m)

Table 7.2.4 Average factor calculation

Transmission pulse		Transmission burst		Transmission train duration, ms	Average factor, dB
TxON Duration, ms	During 100 ms	Duration, ms	Period, ms		
27.42	1	N/A	N/A	NA	-11.24

*- Average factor was calculated as follows

for pulse train shorter than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{\text{Train duration}} \times \text{Number of bursts within pulse train} \right)$$

for pulse train longer than 100 ms:

$$\text{Average factor} = 20 \times \log_{10} \left(\frac{\text{Pulse duration}}{\text{Pulse period}} \times \frac{\text{Burst duration}}{100 \text{ ms}} \times \text{Number of bursts within 100 ms} \right)$$

Reference numbers of test equipment used

HL 0446	HL 3352	HL 4277	HL 4339	HL 4360	HL 4933	HL 5111	HL 5288
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Table 7.2.5 Field strength of emissions below 1 GHz within restricted bands

TEST DISTANCE: 3 m
EUT POSITION: Typical (Vertica)
MODULATION: OOK
BIT RATE: 1.67 kbps
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
INVESTIGATED FREQUENCY RANGE: 0.009 – 1000 MHz
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 0.2 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*				
No peak 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 0446	HL 3352	HL 4277	HL 4339	HL 4360	HL 5111	HL 5288	
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Table 7.2.6 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	

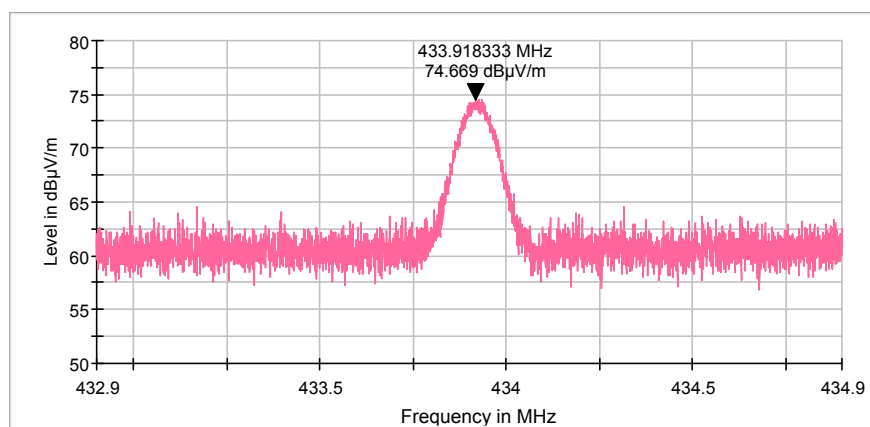
Table 7.2.7 Restricted bands according to RSS-Gen, Table 3

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

Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Plot 7.2.1 Radiated emission measurements at the fundamental frequency

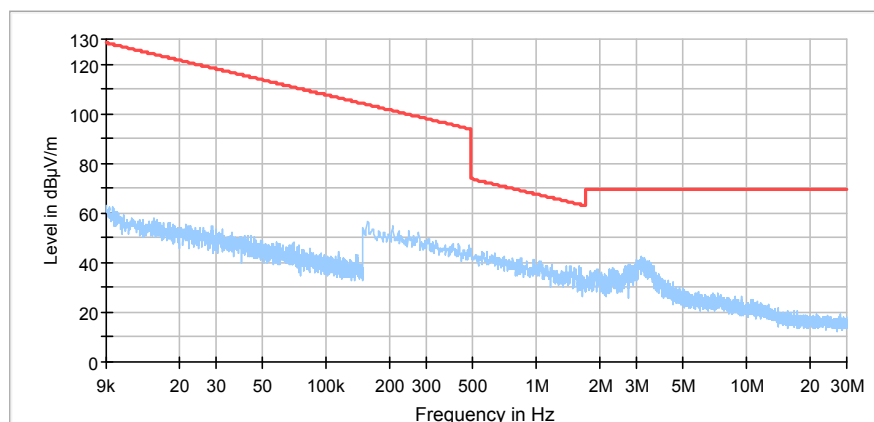
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical & Horizontal
EUT POSITION: Typical (Vertical)



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

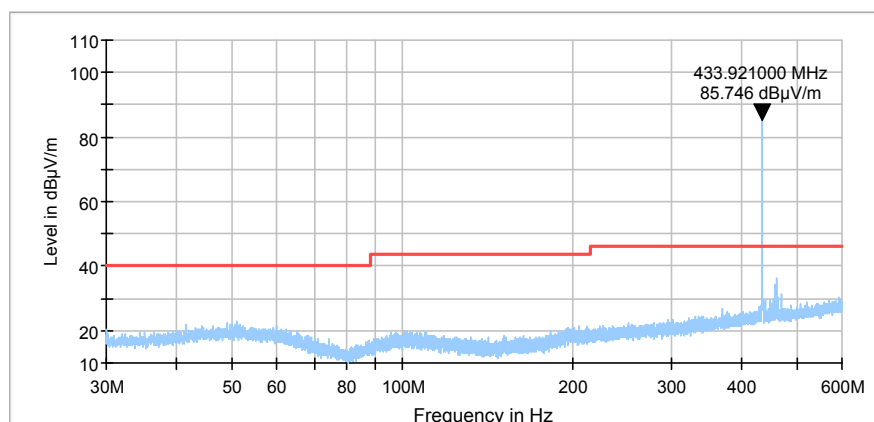
Plot 7.2.2 Radiated emission measurements from 9 kHz to 30 MHz

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



Plot 7.2.3 Radiated emission measurements from 30 to 600 MHz

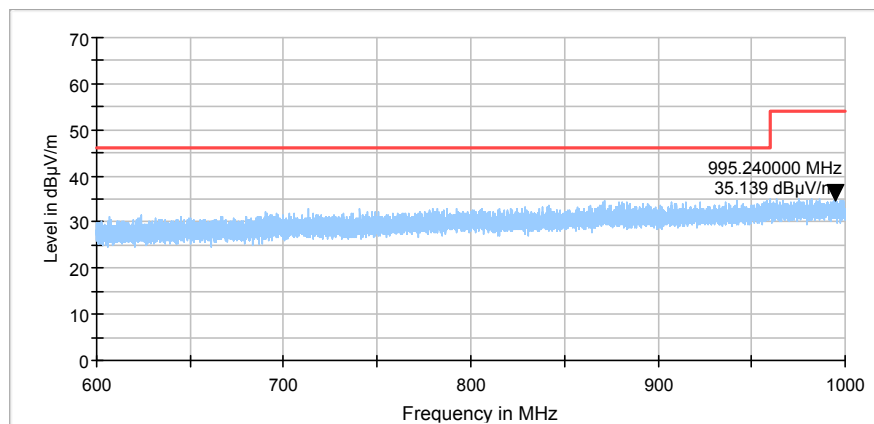
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal
EUT POSITION: Typical



Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

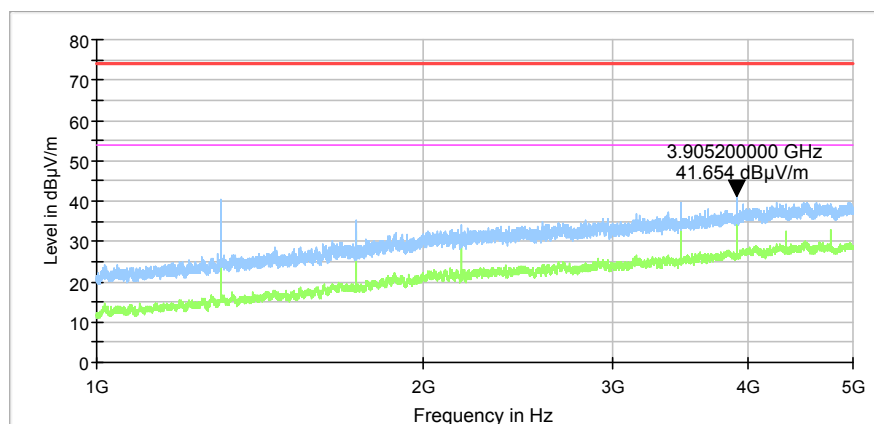
Plot 7.2.4 Radiated emission measurements from 600 to 1000 MHz

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



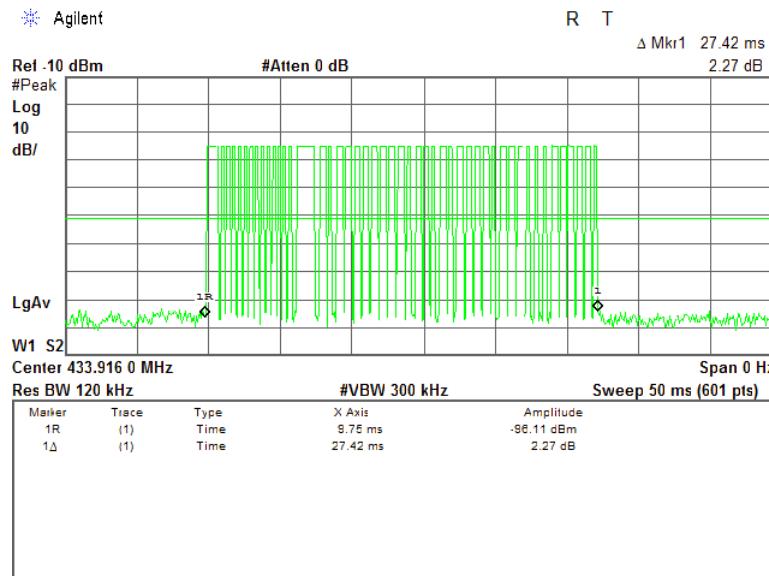
Plot 7.2.5 Radiated emission measurements from 1000 to 4500 MHz

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

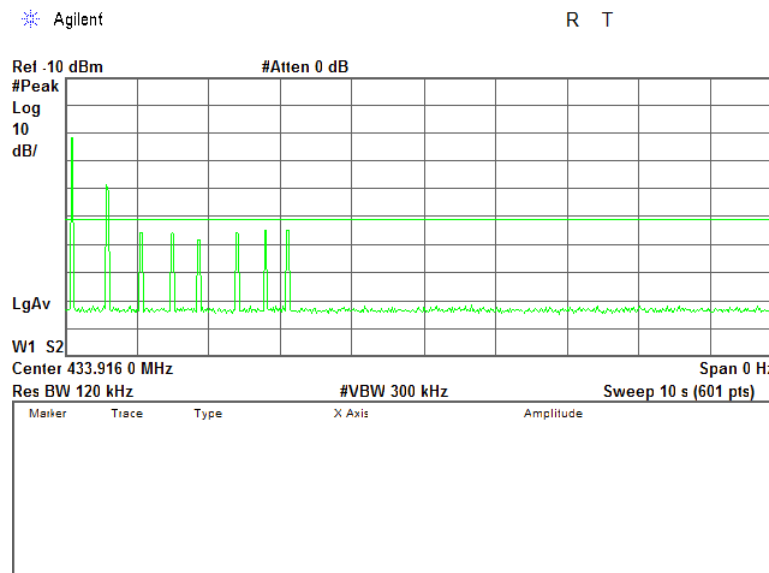


Test specification:	FCC Part 15, Section 231(b) / RSS-210, Section A1.2, Field strength of emissions		
Test procedure:	NSI C63.10 sections 6.5, 6.6		
Test mode:	Compliance	Verdict:	PASS
Date(s):	17-Jun-18 - 21-Jun-18		
Temperature: 25 °C	Relative Humidity: 49 %	Air Pressure: 1010 hPa	Power: 3 VDC
Remarks:			

Plot 7.2.6 Transmission pulse duration



Plot 7.2.7 Transmission pulse period



Test specification:	FCC Part 15, Section 231(c) / RSS-210, Section A1.3, Occupied bandwidth		
Test procedure:	ANSI C63.10 section 6.9.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 45 %	Air Pressure: hPa	Power: 3 VDC
Remarks:			

7.3 Occupied bandwidth test

7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1. The test results are provided in Table 7.3.2 and associated plots.

Table 7.3.1 Occupied bandwidth limits

Assigned frequency, MHz	Modulation envelope reference points*, dBc	Maximum allowed bandwidth, % of the carrier frequency
70 - 900	20.0	0.25
Above 900		0.50

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

7.3.2 Test procedure

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.

7.3.2.2 The EUT was set to transmit modulated carrier.

7.3.2.3 The transmitter occupied bandwidth was measured with spectrum analyzer as frequency delta between reference points on modulation envelope and provided in Table 7.3.2 and associated plot.

Figure 7.3.1 Occupied bandwidth test setup



Test specification:	FCC Part 15, Section 231(c) / RSS-210, Section A1.3, Occupied bandwidth		
Test procedure:	ANSI C63.10 section 6.9.2		
Test mode:	Compliance	Verdict: PASS	
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 45 %	Air Pressure: hPa	Power: 3 VDC
Remarks:			

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold
RESOLUTION BANDWIDTH: 3 kHz
VIDEO BANDWIDTH: 30 kHz
MODULATION: OOK
BIT RATE: 1.67 kbps

MODULATION ENVELOPE REFERENCE POINTS: 20 dBc

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit		Margin, kHz	Verdict
		% of the carrier frequency	kHz		
433.92	26.825	0.25	1085.80	-1058.975	Pass

MODULATION ENVELOPE REFERENCE POINTS: 99%

Carrier frequency, MHz	Occupied bandwidth, kHz	Limit		Margin, kHz	Verdict
		% of the carrier frequency	kHz		
433.92	162.17	0.25	1085.80	-923.63	Pass

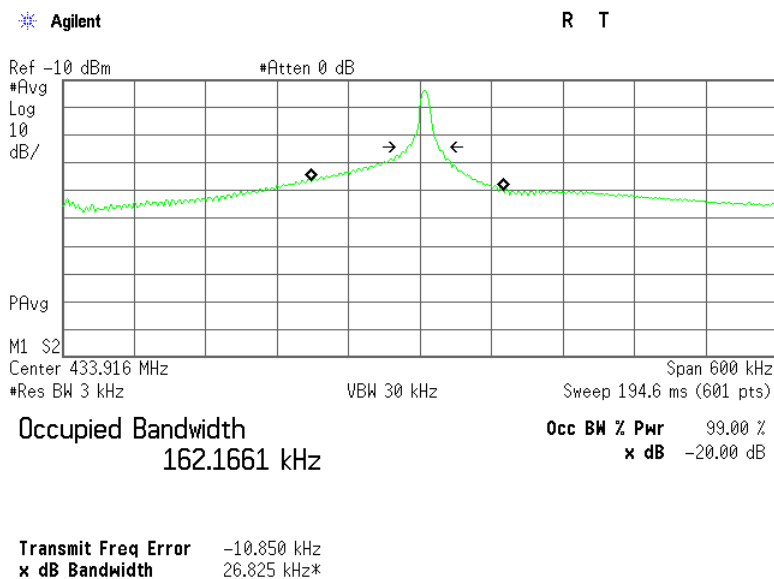
Reference numbers of test equipment used

HL 4136	HL 4354							
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Full description is given in Appendix A.

Test specification:	FCC Part 15, Section 231(c) / RSS-210, Section A1.3, Occupied bandwidth		
Test procedure:	ANSI C63.10 section 6.9.2		
Test mode:	Compliance	Verdict:	PASS
Date(s):	21-Jun-18		
Temperature: 25 °C	Relative Humidity: 45 %	Air Pressure: hPa	Power: 3 VDC
Remarks:			

Plot 7.3.1 Occupied bandwidth test result



Test specification:	FCC Part 15, Section 203 / RSS-Gen, Section 6.8, Antenna requirements		
Test procedure:	Visual inspection / supplier declaration		
Test mode:	Compliance	Verdict: PASS	
Date(s):	21-Jun-18		
Temperature: 24 °C	Relative Humidity: 49 %	Air Pressure: 1009 hPa	Power: 3 VDC
Remarks:			

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	Visual inspection	Comply
The transmitter employs a unique antenna connector	NA	
The transmitter requires professional installation	Supplier declaration	

Photograph 7.4.1 Antenna assembly



**8 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 kHz - 30 MHz	EMCO	6502	2857	11-Feb-18	11-Feb-19
3352	Low Pass Filter, 50 Ohm, DC to 580 MHz.	Mini-Circuits	3971	NA	01-Oct-17	01-Oct-19
3818	PSA Series Spectrum Analyzer, 3 Hz- 44 GHz	Agilent Technologies	E4446A	MY48250288	28-May-18	28-May-19
4136	Shield Box	TESCOM CO., LTD	TC-5916A	5916A000137	04-Apr-18	04-Apr-19
4277	Test Cable , DC-18 GHz, 3.05 m, N/M - N/M	Mini-Circuits	APC-10FT-NMNM+	0748A	10-Sep-17	10-Sep-18
4339	High pass Filter, 50 Ohm, 1000 to 18000 MHz, SMA-FM / SMA-M	Micro-Tronics	HPM50115-02	1	14-May-18	14-May-19
4354	Vector Signal Generator, 100 kHz to 6.0 GHz	Rohde & Schwarz	SMJ 100A	1403.4507 K02-101777-rc	01-May-18	01-May-19
4360	EMI Test Receiver, 20 Hz to 40 GHz.	Rohde & Schwarz	ESU40	100322	26-Dec-17	26-Dec-18
4933	Active Horn Antenna, 1 GHz to 18 GHz	COM-POWER CORPORATION	AHA-118	701046	04-Jan-18	04-Jan-19
5111	RF cable, 40 GHz, 5.5 m, K-type	Huber-Suhner	SF102EA/11SK/11SK/5500MM	502493/2EA	09-Apr-18	09-Apr-19
5288	Trilog Antenna, 25 MHz - 8 GHz, 100W	Frankonia	ALX-8000E	809	21-Jan-18	21-Jan-19

9 APPENDIX B Measurement uncertainties

Expanded uncertainty at 95% confidence in Hermon Labs EMC measurements

Test description	Expanded uncertainty
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.

10 APPENDIX C 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, 30 MHz - 1 GHz
Frankonia, model: ALX-8000E, s/n: 00809

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
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.

HL 4277: Test Cable
Mini-Circuits, model: APC-10FT-NMNM+, s/n 0748A

Insertion loss

Set / Applied, MHz	Measured, dB	Uncertainty, dB
0.1	0.26	+0.07 / -0.07 dB
50	0.27	+0.07 / -0.07 dB
100	0.38	+0.07 / -0.07 dB
200	0.55	+0.07 / -0.07 dB
300	0.69	+0.08 / -0.09 dB
400	0.80	+0.08 / -0.09 dB
500	0.91	+0.08 / -0.09 dB
600	1.00	+0.08 / -0.09 dB
700	1.08	+0.08 / -0.09 dB
800	1.17	+0.08 / -0.09 dB
900	1.24	+0.08 / -0.09 dB
1000	1.32	+0.08 / -0.09 dB
1100	1.39	+0.12 / -0.13 dB
1200	1.45	+0.12 / -0.13 dB
1300	1.52	+0.12 / -0.13 dB
1400	1.58	+0.12 / -0.13 dB
1500	1.65	+0.12 / -0.13 dB
1600	1.71	+0.12 / -0.13 dB
1700	1.77	+0.12 / -0.13 dB
1800	1.82	+0.12 / -0.13 dB
1900	1.88	+0.12 / -0.13 dB
2000	1.93	+0.12 / -0.13 dB
2100	1.99	+0.12 / -0.13 dB
2200	2.05	+0.12 / -0.13 dB
2300	2.10	+0.12 / -0.13 dB
2400	2.15	+0.12 / -0.13 dB
2500	2.20	+0.17 / -0.18 dB
2600	2.25	+0.17 / -0.18 dB
2700	2.30	+0.17 / -0.18 dB
2800	2.35	+0.17 / -0.18 dB
2900	2.40	+0.17 / -0.18 dB
3000	2.44	+0.17 / -0.18 dB
3100	2.49	+0.19 / -0.2 dB
3200	2.54	+0.19 / -0.2 dB
3300	2.58	+0.19 / -0.2 dB
3400	2.62	+0.19 / -0.2 dB
3500	2.66	+0.19 / -0.2 dB
3600	2.71	+0.19 / -0.2 dB
3700	2.75	+0.19 / -0.2 dB
3800	2.79	+0.19 / -0.2 dB
3900	2.84	+0.19 / -0.2 dB
4000	2.88	+0.19 / -0.2 dB

Set / Applied, MHz	Measured, dB	Uncertainty, dB
4100	2.84	+0.19 / -0.2 dB
4200	2.88	+0.19 / -0.2 dB
4300	2.92	+0.3 / -0.33 dB
4400	2.96	+0.3 / -0.33 dB
4500	3.01	+0.3 / -0.33 dB
4600	3.05	+0.3 / -0.33 dB
4700	3.09	+0.3 / -0.33 dB
4800	3.13	+0.3 / -0.33 dB
4900	3.18	+0.3 / -0.33 dB
5000	3.21	+0.3 / -0.33 dB
5100	3.25	+0.3 / -0.33 dB
5200	3.30	+0.3 / -0.33 dB
5300	3.34	+0.3 / -0.33 dB
5400	3.39	+0.3 / -0.33 dB
5500	3.44	+0.3 / -0.33 dB
5600	3.48	+0.3 / -0.33 dB
5700	3.53	+0.3 / -0.33 dB
5800	3.57	+0.3 / -0.33 dB
5900	3.60	+0.3 / -0.33 dB
6000	3.65	+0.3 / -0.33 dB
6100	3.68	+0.3 / -0.33 dB
6200	3.72	+0.3 / -0.33 dB
6300	3.77	+0.3 / -0.33 dB
6400	3.83	+0.3 / -0.33 dB
6500	3.86	+0.3 / -0.33 dB
6600	3.92	+0.3 / -0.33 dB
6700	3.96	+0.3 / -0.33 dB
6800	4.00	+0.3 / -0.33 dB
6900	4.04	+0.3 / -0.33 dB
7000	4.08	+0.3 / -0.33 dB
7100	4.11	+0.3 / -0.33 dB
7200	4.16	+0.3 / -0.33 dB
7300	4.20	+0.3 / -0.33 dB
7400	4.24	+0.3 / -0.33 dB
7500	4.29	+0.3 / -0.33 dB
7600	4.33	+0.3 / -0.33 dB
7700	4.38	+0.3 / -0.33 dB
7800	4.42	+0.3 / -0.33 dB
7900	4.51	+0.3 / -0.33 dB
8000	4.52	+0.3 / -0.33 dB
8100	4.55	+0.34 / -0.36 dB
8200	4.55	+0.34 / -0.36 dB



Insertion loss (continued)

Set / Applied, MHz	Measured, dB	Uncertainty, dB
8300	4.57	+0.34 / -0.36 dB
8400	4.60	+0.34 / -0.36 dB
8500	4.60	+0.34 / -0.36 dB
8600	4.63	+0.34 / -0.36 dB
8700	4.63	+0.34 / -0.36 dB
8800	4.64	+0.34 / -0.36 dB
8900	4.65	+0.34 / -0.36 dB
9000	4.67	+0.34 / -0.36 dB
9100	4.69	+0.34 / -0.36 dB
9200	4.71	+0.34 / -0.36 dB
9300	4.73	+0.34 / -0.36 dB
9400	4.76	+0.34 / -0.36 dB
9500	4.78	+0.34 / -0.36 dB
9600	4.81	+0.34 / -0.36 dB
9700	4.85	+0.34 / -0.36 dB
9800	4.87	+0.34 / -0.36 dB
9900	4.89	+0.34 / -0.36 dB
10000	4.93	+0.34 / -0.36 dB
10100	4.96	+0.4 / -0.44 dB
10200	4.99	+0.4 / -0.44 dB
10300	5.02	+0.4 / -0.44 dB
10400	5.05	+0.4 / -0.44 dB
10500	5.08	+0.4 / -0.44 dB
10600	5.11	+0.4 / -0.44 dB
10700	5.14	+0.4 / -0.44 dB
10800	5.17	+0.4 / -0.44 dB
10900	5.19	+0.4 / -0.44 dB
11000	5.22	+0.4 / -0.44 dB
11100	5.25	+0.4 / -0.44 dB
11200	5.28	+0.4 / -0.44 dB
11300	5.31	+0.4 / -0.44 dB
11400	5.34	+0.4 / -0.44 dB
11500	5.38	+0.4 / -0.44 dB
11600	5.41	+0.4 / -0.44 dB
11700	5.45	+0.4 / -0.44 dB
11800	5.49	+0.4 / -0.44 dB
11900	5.53	+0.4 / -0.44 dB
12000	5.56	+0.4 / -0.44 dB
12100	5.60	+0.4 / -0.44 dB
12200	5.63	+0.4 / -0.44 dB
12300	5.68	+0.4 / -0.44 dB
12400	5.72	+0.4 / -0.44 dB
12500	5.75	+0.47 / -0.52 dB
12600	5.80	+0.47 / -0.52 dB
12700	5.84	+0.47 / -0.52 dB
12800	5.93	+0.47 / -0.52 dB
12900	5.94	+0.47 / -0.52 dB
13000	5.98	+0.47 / -0.52 dB
13100	6.03	+0.47 / -0.52 dB

Set / Applied, MHz	Measured, dB	Uncertainty, dB
13200	6.09	+0.47 / -0.52 dB
13300	6.17	+0.47 / -0.52 dB
13400	6.27	+0.47 / -0.52 dB
13500	6.37	+0.47 / -0.52 dB
13600	6.49	+0.47 / -0.52 dB
13700	6.57	+0.47 / -0.52 dB
13800	6.60	+0.47 / -0.52 dB
13900	6.61	+0.47 / -0.52 dB
14000	6.59	+0.47 / -0.52 dB
14100	6.57	+0.47 / -0.52 dB
14200	6.54	+0.47 / -0.52 dB
14300	6.53	+0.47 / -0.52 dB
14400	6.49	+0.47 / -0.52 dB
14500	6.48	+0.47 / -0.52 dB
14600	6.46	+0.47 / -0.52 dB
14700	6.46	+0.47 / -0.52 dB
14800	6.49	+0.47 / -0.52 dB
14900	6.51	+0.47 / -0.52 dB
15000	6.54	+0.47 / -0.52 dB
15100	6.57	+0.47 / -0.52 dB
15200	6.62	+0.47 / -0.52 dB
15300	6.64	+0.47 / -0.52 dB
15400	6.68	+0.47 / -0.52 dB
15500	6.71	+0.47 / -0.52 dB
15600	6.78	+0.47 / -0.52 dB
15700	6.79	+0.47 / -0.52 dB
15800	6.82	+0.47 / -0.52 dB
15900	6.88	+0.47 / -0.52 dB
16000	6.89	+0.47 / -0.52 dB
16100	6.96	+0.47 / -0.52 dB
16200	6.97	+0.47 / -0.52 dB
16300	7.02	+0.47 / -0.52 dB
16400	7.07	+0.47 / -0.52 dB
16500	7.12	+0.47 / -0.52 dB
16600	7.17	+0.47 / -0.52 dB
16700	7.20	+0.47 / -0.52 dB
16800	7.22	+0.47 / -0.52 dB
16900	7.23	+0.47 / -0.52 dB
17000	7.24	+0.47 / -0.52 dB
17100	7.27	+0.47 / -0.52 dB
17200	7.28	+0.47 / -0.52 dB
17300	7.28	+0.47 / -0.52 dB
17400	7.30	+0.47 / -0.52 dB
17500	7.34	+0.47 / -0.52 dB
17600	7.35	+0.47 / -0.52 dB
17700	7.39	+0.47 / -0.52 dB
17800	7.41	+0.47 / -0.52 dB
17900	7.41	+0.47 / -0.52 dB
18000	7.44	+0.47 / -0.52 dB

HL 5111: RF cable
Huber-Suhner, SF102EA/11SK/11SK/5500MM, s/n 502493/2EA

Set / Applied, MHz	Measured, dB	Uncertainty, dB
100	0.70	±0.07
200	0.99	±0.08
300	1.21	±0.08
500	1.56	±0.08
1000	2.20	±0.08
1500	2.69	±0.08
2000	3.11	±0.08
2500	3.50	±0.10
3000	3.85	±0.10
3500	4.16	±0.10
4000	4.47	±0.10
4500	4.74	±0.10
5000	5.03	±0.10
5500	5.30	±0.10
6000	5.57	±0.10
6500	5.76	±0.10
7000	6.00	±0.10
7500	6.20	±0.10
8000	6.44	±0.10
8500	6.67	±0.10
9000	6.82	±0.10
9500	7.04	±0.10
10000	7.18	±0.10
10500	7.36	±0.10
11000	7.55	±0.10
11500	7.75	±0.10
12000	7.90	±0.10
12500	8.08	±0.13
13000	8.19	±0.13
13500	8.39	±0.13
14000	8.58	±0.13
14500	8.76	±0.18
15000	8.92	±0.18
15500	9.03	±0.18
16000	9.18	±0.18
16500	9.34	±0.18
17000	9.51	±0.18
17500	9.66	±0.18
18000	9.80	±0.18
18500	9.94	±0.23
19000	10.05	±0.23
19500	10.22	±0.23

Set / Applied, MHz	Measured, dB	Uncertainty, dB
20000	10.32	±0.23
20500	10.48	±0.23
21000	10.60	±0.23
21500	10.73	±0.23
22000	10.87	±0.23
22500	10.97	±0.29
23000	11.09	±0.29
23500	11.26	±0.29
24000	11.37	±0.29
24500	11.50	±0.29
25000	11.61	±0.23
25500	11.72	±0.23
26000	11.87	±0.23
26500	11.99	±0.23
27000	12.09	±0.33
27500	12.24	±0.33
28000	12.34	±0.40
28500	12.47	±0.40
29000	12.61	±0.40
29500	12.70	±0.40
30000	12.86	±0.40
30500	12.92	±0.33
31000	13.09	±0.33
31500	13.16	±0.33
32000	13.33	±0.33
32500	13.40	±0.33
33000	13.62	±0.33
33500	13.70	±0.33
34000	13.88	±0.33
34500	13.97	±0.40
35000	14.05	±0.40
35500	14.23	±0.40
36000	14.25	±0.40
36500	14.46	±0.40
37000	14.49	±0.33
37500	14.72	±0.33
38000	14.77	±0.33
38500	14.97	±0.33
39000	15.04	±0.33
39500	15.22	±0.33
40000	15.63	±0.47

11 APPENDIX D 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 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-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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Telephone: +972 4628 8001
Fax: +972 4628 8277
e-mail: mail@hermonlabs.com
website: www.hermonlabs.com

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

12 APPENDIX E Specification references

47CFR part 15: 2017	Radio Frequency Devices.
ANSI C63.10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.4: 2014	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.
RSS-210 Issue 9:2016	Licence- Exempt Radio Apparatus:Category I Equipment
RSS-Gen Issue 5: 2018	General Requirements for Compliance of Radio Apparatus
ICES-003 Issue 6: 2016	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement

13 APPENDIX F Abbreviations and acronyms

A	ampere
AC	alternating current
A/m	ampere per meter
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

END OF TEST REPORT

14 APPENDIX G Manufacturer's declaration about periodic operation



June 15th, 2018

To: Hermon Laboratories

Attention: Mr. Michael Nikishin and Ms. Ella Pitt

Manufacturer's Declaration

We, Paradox Security Systems Ltd. located in 780 Industrial Boulevard St.Eustache, Quebec J7R 5V3, Canada declare under our sole responsibility that the product Indoor Wireless Door Contact DCTXP2 is operate on 433.92 MHz and designed to comply and satisfy periodic operational requirements.

DCTXP2 does not allow continuous transmitting (such as voice, video and radio control).

The Wireless Door Contact DCTXP2 is not manually operated device.

The transmissions of DCTXP2 are not periodical and occur upon intrusion only.

DCTXP2 is an intrusion alarm system device and will send automatically its supervision status to control panel in a certain interval. This interval will be randomly selected between 17 minutes and 20 minutes.

Since, there is no periodical behavior except supervision transmissions, there are no predetermined intervals of any kind included in device's algorithm.

Alex Chaplik
Certification Manager

END OF DOCUMENT