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Report On

FCC and Industry Canada Testing of the
Ultra Electronics Ltd Helix
In accordance with FCC 47 CFR Part 15B and ICES-003

COMMERCIAL-IN-CONFIDENCE

FCC ID: XDW3663-0001
IC: Not Applicable

Document 75933746 Report 01 Issue 1

April 2016



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Ultra Electronics Ltd Helix
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Document 75933746 Report 02 Issue 1

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DATED

04 April 2016

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B and ICES-003. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler



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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Ultra Electronics Ltd Helix
In accordance with FCC 47 CFR Part 15B and ICES-003



1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC and Industry Canada Testing of the Ultra Electronics Ltd Helix to the requirements of FCC 47 CFR Part 15B and ICES-003.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Ultra Electronics Ltd
Model Number(s)	Helix
Serial Number(s)	Not Serialised (75933746-TSR0001)
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B (2015) ICES-003 (2016)
Incoming Release Date	Declaration of Build Status 23 February 2016
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	3791-00 17 February 2016
Start of Test	22 February 2016
Finish of Test	23 February 2016
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2014)



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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B and ICES-003 is shown below.

Section	Specification Clause		Test Description	Result	Comments/Base Standard
	Part 15B	ICES-003			
Printing cards					
2.1	15.107	6.1	AC Line Conducted Emissions	Pass	
2.2	15.109	6.2	Radiated Emissions	Pass	



1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Reverse-Transfer ID Card Printer		
MANUFACTURER	Ultra Electronics Card Systems		
MODEL NAME/NUMBER	Helix		
PART NUMBER	3663-xxxx-yy		
SERIAL NUMBER	61124501		
HARDWARE VERSION	1.0		
SOFTWARE VERSION	1.45		
TRANSMITTER FREQUENCY OPERATING RANGE (MHz)	13.553 – 13.567		
RECEIVER FREQUENCY OPERATING RANGE (MHz)	13.09625 – 14.02375		
COUNTRY OF ORIGIN	UK		
INTERMEDIATE FREQUENCIES			
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	A1D		
MODULATION TYPES: (i.e. GMSK, QPSK)	ASK		
HIGHEST INTERNALLY GENERATED FREQUENCY	200MHz		
OUTPUT POWER (W or dBm)	20dBm		
FCC ID	XDW3663-0001		
INDUSTRY CANADA ID	Not Applicable		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Printer for ID cards		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Indoor use AC Adapter		
MANUFACTURER	Powerpax		
TYPE	24VDC 160W output		
PART NUMBER	SW4379C-VI		
VOLTAGE	100 – 240VAC input		
COUNTRY OF ORIGIN	China		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
COUNTRY OF ORIGIN			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

I hereby declare that that the information supplied is correct and complete.

Name: Tim Last

Position held: Design Engineer

Date: 23/02/16



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Ultra Electronics Ltd Helix. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 110 V AC supply.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

Industry Canada Company Address Code
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



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SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Ultra Electronics Ltd Helix
In accordance with FCC 47 CFR Part 15B and ICES-003



Product Service

2.1 AC LINE CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.107
ICES-003, Clause 6.1

2.1.2 Equipment Under Test and Modification State

Helix S/N: Not Serialised (75933746-TSR0001)- Modification State 0

2.1.3 Date of Test

22 February 2016

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The test was performed in accordance with ANSI C63.4, Clause 7 and ICES-003, Clause 6.1.

Remarks

A mains supply cable of 1 m length was used to supply mains power to the EUT from the LISN.

All final measurements were assessed against the Class A emission limits in FCC 47 CFR Part 15, Clause 15.107 and ICES-003, Clause 6.1.

2.1.6 Environmental Conditions

Ambient Temperature	30.0°C
Relative Humidity	33.0%

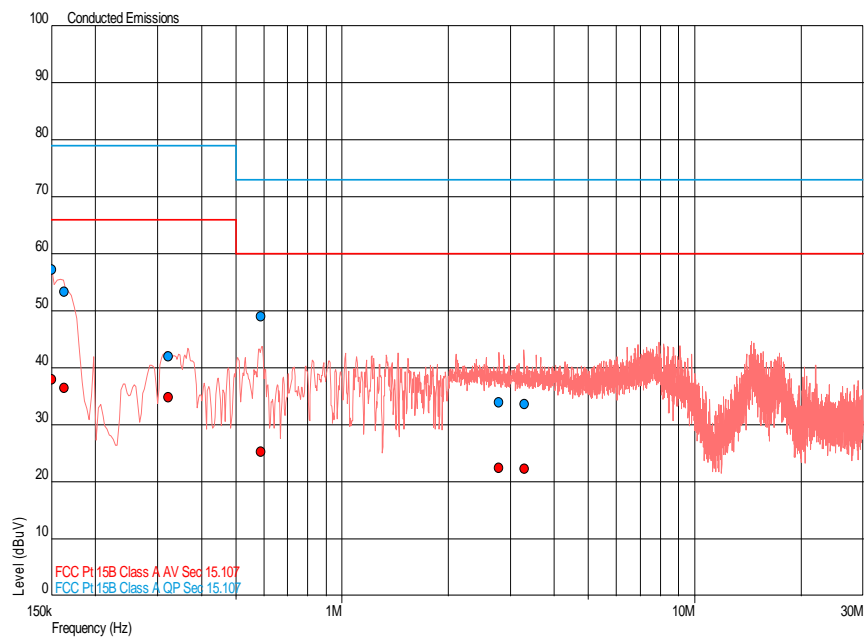


2.1.7 Test Results

Printing cards, Live Line Results

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (μV/m)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	57.2	79.0	-21.8	37.9	66.0	-28.1
0.163	53.3	79.0	-25.7	36.5	66.0	-29.5
0.322	42.0	79.0	-37.0	34.9	66.0	-31.1
0.590	49.0	73.0	-24.0	25.3	60.0	-34.7
2.783	33.9	73.0	-39.1	22.5	60.0	-37.5
3.284	33.6	73.0	-39.4	22.3	60.0	-37.7

Printing cards, Live Line Plot

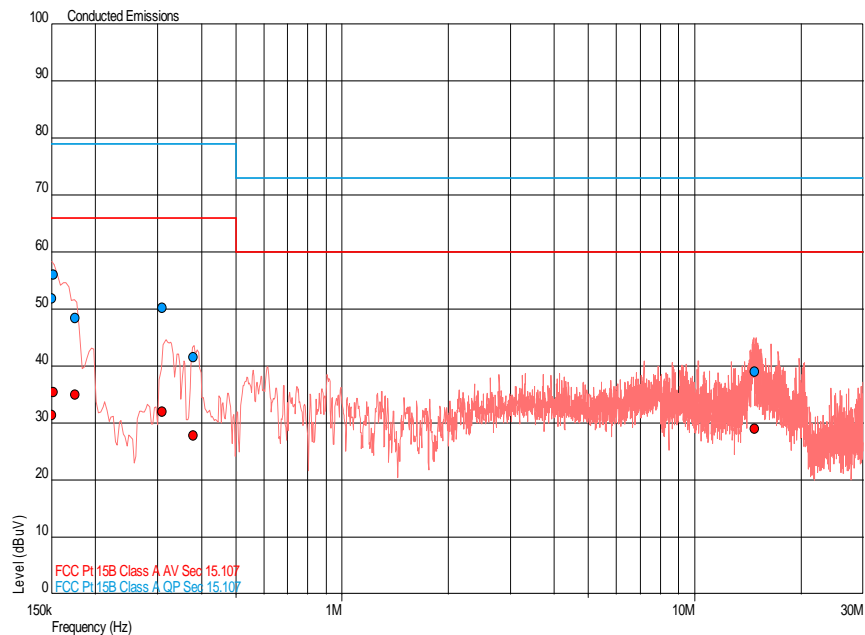




Printing cards, Neutral Line Results

Frequency (MHz)	QP Level (dBμV)	QP Limit (dBμV)	QP Margin (μV/m)	AV Level (dBμV)	AV Limit (dBμV)	AV Margin (dBμV)
0.150	51.9	79.0	-27.1	31.4	66.0	-34.6
0.152	56.0	79.0	-23.0	35.5	66.0	-30.5
0.175	48.4	79.0	-30.6	35.0	66.0	-31.0
0.309	50.3	79.0	-28.7	32.1	66.0	-33.9
0.380	41.5	79.0	-37.5	27.8	66.0	-38.2
14.803	39.0	73.0	-34.0	29.0	60.0	-31.0

Printing cards, Neutral Line Plot



FCC 47 CFR Part 15, Limit Clause 15.107 and ICES-003, Limit Clause 6.1

Class A

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	79	66
5 to 30	73	60



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2.2 RADIATED EMISSIONS

2.2.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109
ICES-003, Clause 6.2

2.2.2 Equipment Under Test and Modification State

Helix S/N: Not Serialised (75933746-TSR0001) - Modification State 0

2.2.3 Date of Test

23 February 2016

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Procedure

The test was performed in accordance with ANSI C63.4, Clause 8 and ICES-003, Clause 6.2.

Remarks

All final measurements were assessed against the Class A emission limits in FCC 47 CFR Part 15, Clause 15.109 and ICES-003, Clause 6.2.

2.2.6 Environmental Conditions

Ambient Temperature	18.4°C
Relative Humidity	30.0%

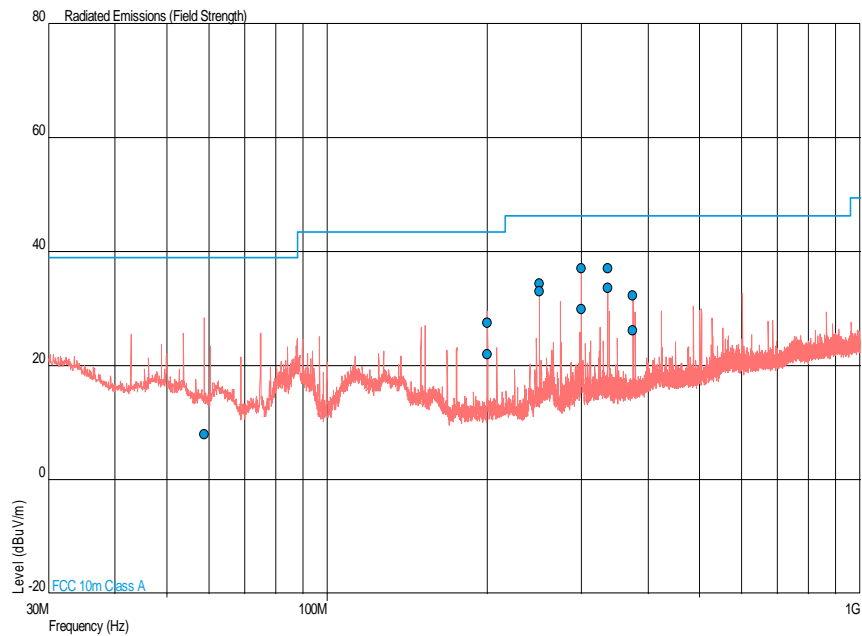


2.2.7 Test Results

Printing cards, 30 MHz to 1 GHz Results

Frequency (MHz)	Quasi-Peak Level (dB μ V/m)	Quasi-Peak Level (μ V/m)	Quasi-Peak Margin (d μ V/m)	Quasi-Peak Margin (μ V/m)	Angle (°)	Height (m)	Polarisation
58.806	8.0	2.5	-31.1	-87.5	360	2.29	Vertical
200.001	22.0	12.6	-21.5	-137.4	241	2.28	Vertical
200.007	27.6	24.0	-15.9	-126.0	293	1.27	Horizontal
249.996	33.0	44.7	-13.4	-164.3	322	1.00	Vertical
250.000	34.4	52.5	-12.0	-156.5	291	1.90	Horizontal
299.999	29.9	31.3	-16.5	-177.7	358	1.66	Vertical
300.008	37.1	71.6	-9.3	-137.4	0	1.00	Horizontal
335.981	33.7	48.4	-12.7	-160.6	329	1.00	Horizontal
336.003	37.1	71.6	-9.3	-137.4	0	1.39	Vertical
374.998	32.4	41.7	-14.0	-167.3	201	1.25	Horizontal
375.000	26.2	20.4	-20.2	-188.6	179	1.26	Vertical

Printing cards, 30 MHz to 1 GHz Plot



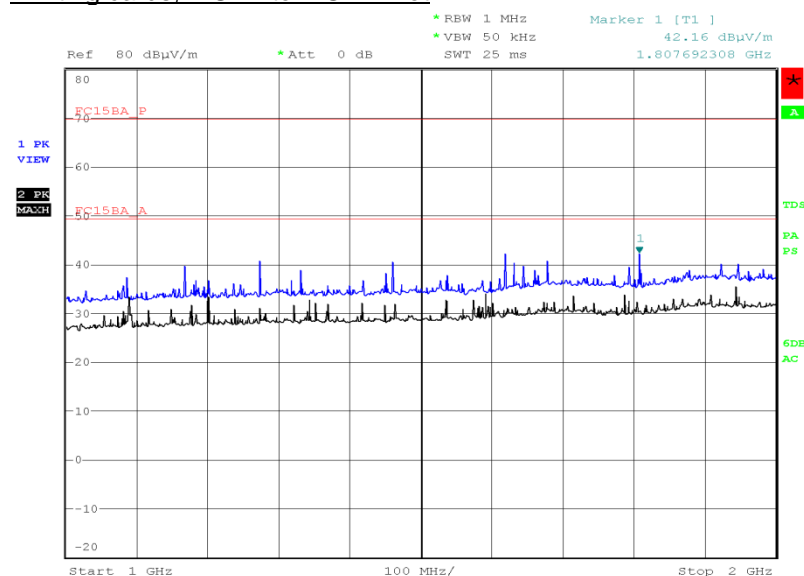


Printing cards, 1 GHz to 2 GHz Results

Frequency (MHz)	Average Level (dBμV/m)	Peak Level (dBμV/m)	Average Level (μV/m)	Peak Level (μV/m)	Angle (deg)	Height (m)	Polarisation
*							

No emissions were detected within 10 dB of the limit.

Printing cards, 1 GHz to 2 GHz Plot



Date: 23.FEB.2016 18:07:39

FCC 47 CFR Part 15, Limit Clause 15.109

Class A

Frequency of Emission (MHz)	Field Strength (μV/m)
30 to 88	90.0
88 to 216	150.0
216 to 960	210.0
Above 960	300.0



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ICES-003, Limit Clause 6.2Class A

Frequency of Emission (MHz)	Quasi-Peak (dB μ V/m)
30 to 88	39.0
88 to 216	43.5
216 to 960	46.4
960 to 1000	49.5

Frequency of Emission (MHz)	Field Strength (dB μ V/m)	
	Linear Average Detector	Peak Detector
Above 1000	49.5	69.5



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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – AC Line Conducted Emissions					
LISN (1 Phase)	Chase	MN 2050	336	12	1-Apr-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Transient Limiter	Hewlett Packard	11947A	2378	12	1-Jul-2016
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	27-Nov-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
9m RF Cable (N Type)	Rhophase	NPS-2303-9000- NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

TU – Traceability Unscheduled



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3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
AC Line Conducted Emissions	± 3.2 dB
Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
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