FCC Testing of the
Crane Electronics Ltd
RF Transceiver, Model: RF Module (101 – 482)
Power Supply. Model: AEL15US05
In accordance with FCC 47 CFR Part 15B

Prepared for: Crane Electronics Ltd
Watling Drive
Sketchley Meadows
Hinckley
LE10 3EY
United Kingdom

FCC ID: TA6RFM01

Product Service

Choose certainty.
Add value.

COMMERCIAL-IN-CONFIDENCE

Date: November 2017
Document Number: 75938430-03 | Issue: 01

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Steven White	01 November 2017	
Authorised Signatory	Matthew Russell	01 November 2017	

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

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.

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Graeme Lawler	01 November 2017	

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

EXECUTIVE SUMMARY
A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15B: 2016 for the tests detailed in section 1.3

TÜV SÜD Product Service
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Product Service

Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	01 November 2017

Table 1

1.2 Introduction

Applicant	Crane Electronics Ltd
Manufacturer	Crane Electronics Ltd
Model Number(s)	RF Module (101 – 482)
Serial Number(s)	Not Serialised (75938430-TSR0001)
Hardware Version(s)	B
Software Version(s)	5.0
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B: 2016
Order Number Date	049562 17-March-2017
Date of Receipt of EUT	06-April-2017
Start of Test	24-September-2017
Finish of Test	25-September-2017
Name of Engineer(s)	Graeme Lawler
Related Document(s)	ANSI C63.4 (2014)

Product Service

1.3 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			
Configuration and Mode: 2.4 GHz SRD - Idle					
2.1	15.109	6.2	Radiated Emissions	Pass	ANSI C63.4 (2014)

Table 2

Product Service

1.4 Declaration of Build Status

Manufacturer	Crane Electronics Ltd
Country of origin	UK
UK Agent	-
Technical Description	RF Transceiver
Model No	RF Module
Part No	101 - 482
Serial No	n/a
Drawing Number	101 - 482
Build Status	B
Software Issue	5.0
Hardware Issue	B
Highest Internally Generated Frequency	16MHz
FCC ID	TA6RFM1
Industry Canada ID	n/a

Signature	Neil McDonald
Date	31/3/2017
D of B S Serial No	n/a

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.

Product Service

1.5 Product Information

1.5.1 Technical Description

RF Transceiver

1.6 Deviations from the Standard

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

1.7 EUT Modification Record

The table below details modifications made to the EUT during the test programme.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
Serial Number: Not Serialised (75938430-TSR0001)			
0	As supplied by the customer	Not Applicable	Not Applicable

Table 3

1.8 Test Location

TÜV SÜD Product Service conducted the following tests at our Fareham Test Laboratory.

Test Name	Name of Engineer(s)	Accreditation
Configuration and Mode: 2.4 GHz SRD - Idle		
Radiated Emissions	Graeme Lawler	UKAS

Table 4

Office Address:

Octagon House
Concorde Way
Segensworth North
Fareham
Hampshire
PO15 5RL
United Kingdom

2 Test Details

2.1 Radiated Emissions

2.1.1 Specification Reference

FCC 47 CFR Part 15B, Clause 15.109

2.1.2 Equipment Under Test and Modification State

RF Module (101 – 482), S/N: Not Serialised (75938430-TSR0001) - Modification State 0

2.1.3 Date of Test

24-September-2017 to 25-September-2017

2.1.4 Test Method

The test was performed in accordance with ANSI C63.4, clause 8.

2.1.5 Environmental Conditions

Ambient Temperature 18.6 °C
Relative Humidity 62.0 %

2.1.6 Test Results

2.4 GHz SRD - Idle

Highest frequency generated or used within the EUT: 2.48 GHz
Upper frequency test limit: 13 GHz

Frequency (MHz)	QP Level (dBuV/m)	QP Limit (dBuV/m)	QP Margin (dBuV/m)	Angle(Deg)	Height(m)	Polarity
30.090	30.5	40.0	-9.5	62	1.00	Vertical
32.001	29.7	40.0	-10.3	87	1.80	Vertical
192.008	30.9	43.5	-12.6	351	1.00	Vertical
600.027	38.4	46.0	-7.6	5	1.00	Horizontal
600.048	37.6	46.0	-8.4	13	1.28	Horizontal
600.049	38.8	46.0	-7.2	45	1.08	Vertical
700.056	36.6	46.0	-9.4	360	1.00	Vertical

Table 5 - 30 MHz to 1 GHz

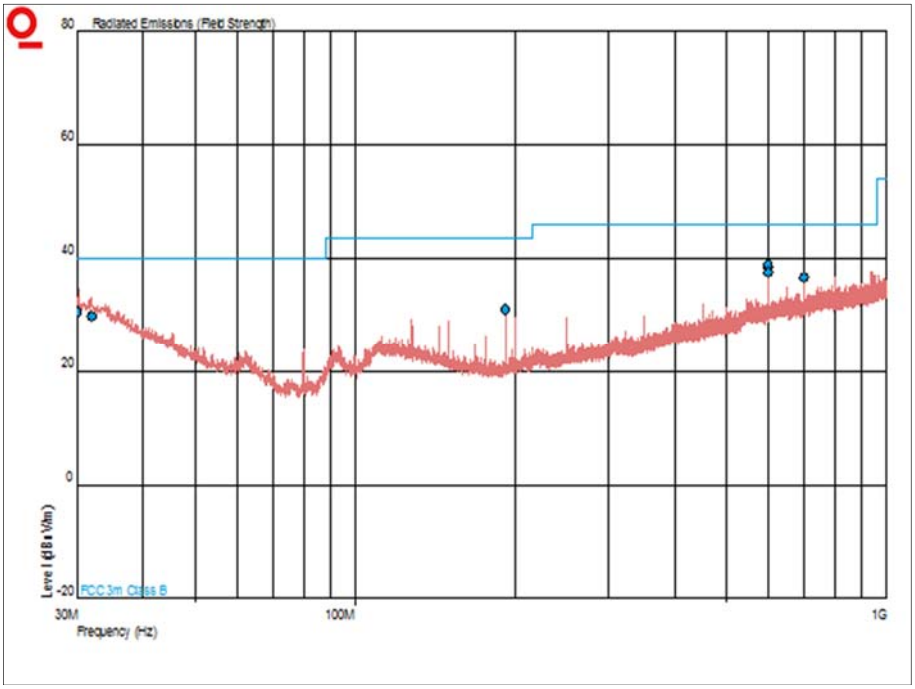

Figure 1 - 30 MHz to 1 GHz - Horizontal and Vertical

Frequency (GHz)	Result (µV/m)		Limit (µV/m)		Margin (µV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 6 - 1 GHz to 13 GHz

*No emissions were detected within 10 dB of the limit.

Frequency (GHz)	Result (dBµV/m)		Limit (dBµV/m)		Margin (dBµV/m)		Angle (°)	Height (m)	Polarisation
	Peak	Average	Peak	Average	Peak	Average			
*									

Table 7 - 1 GHz to 13 GHz

*No emissions were detected within 10 dB of the limit.

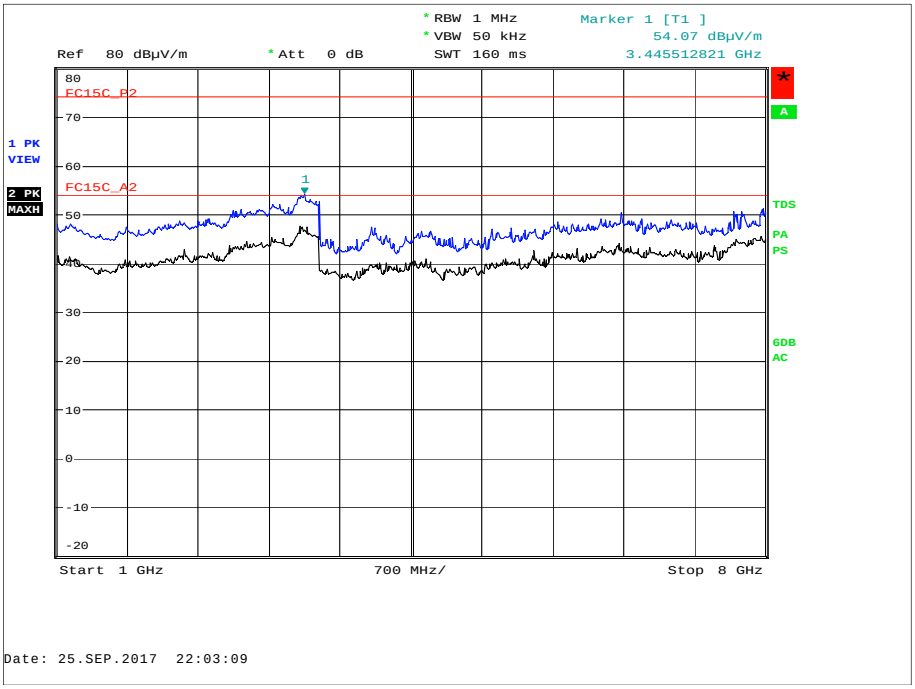

Figure 2 - 1 GHz to 8 GHz - Horizontal and Vertical

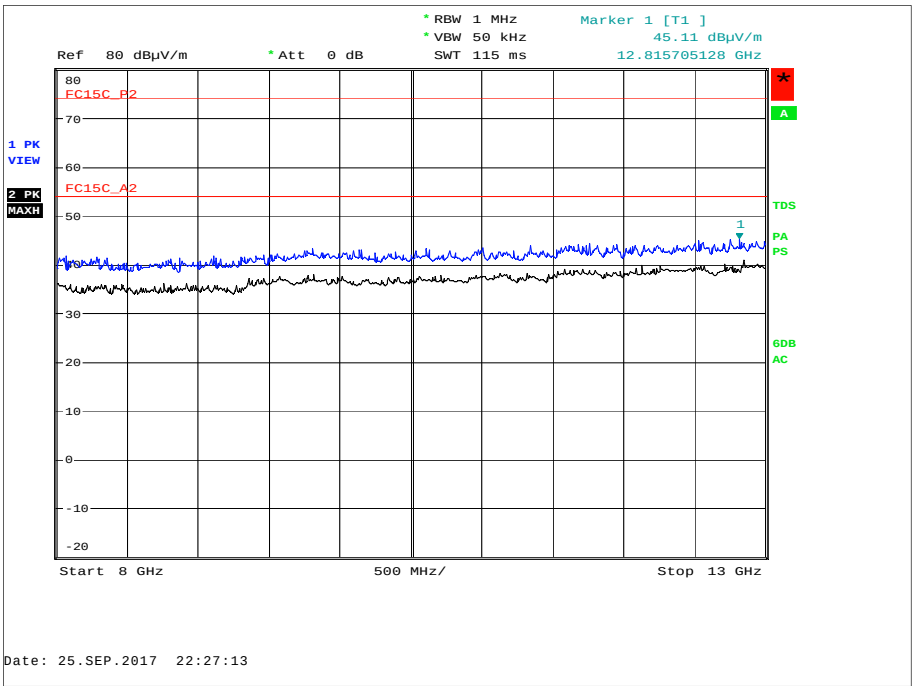

Figure 3 - 8 GHz to 13 GHz - Horizontal and Vertical

FCC 47 CFR Part 15, Limit Clause 15.109

Frequency of Emission (MHz)	Field Strength (µV/m)
30 to 88	100.0
88 to 216	150.0
216 to 960	200.0
Above 960	500.0

2.1.7 Test Location and Test Equipment Used

This test was carried out in EMC Chamber 5.

Instrument	Manufacturer	Type No	TE No	Calibration Period (months)	Calibration Due
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Apr-2018
Pre-Amplifier	Phase One	PS04-0086	1533	12	31-Jul-2018
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Multimeter	Iso-tech	IDM101	2417	12	30-Sep-2017
Comb Generator	Schaffner	RSG1000	3034	-	TU
Cable (N-N, 8m)	Rhophase	NPS-2302-8000-NPS	3248	12	02-May-2018
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	12-Nov-2017
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Digital thermo Hygrometer	Radio Spares	1260	4300	12	30-Aug-2018
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	6	04-Nov-2017
Cable (Rx, SMAm-SMAm 0.5m)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	O/P Mon
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	17-Feb-2018
Double Ridge Broadband Horn Antenna	Schwarzbeck	BBHA 9120 B	4848	12	17-Feb-2018

Table 8

TU - Traceability Unscheduled
O/P Mon – Output Monitored using calibrated equipment

3 Measurement Uncertainty

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

Test Name	Measurement Uncertainty
Radiated Emissions	30 MHz to 1 GHz: ±5.2 dB 1 GHz to 40 GHz: ±6.3 dB

Table 9