Product Service

Choose certainty.
Add value.

Report On

FCC Testing of the
PFK Electronics SWDS Dealer Remote
In accordance with FCC CFR 47 Part 15C

COMMERCIAL-IN-CONFIDENCE

FCC ID: OXC844300

Document 75926294 Report 02 Issue 1 April 2014

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

REPORT ON

FCC Testing of the
PFK Electronics SWDS Dealer Remote
In accordance with FCC CFR 47 Part 15C

Document 75926294 Report 02 Issue 1

April 2014

PREPARED FOR

PFK Electronics
488 Umbilo Road
Durban
Kwazulu Natal
4001
South Africa

PREPARED BY

Natalie Bennett
Senior Administrator, Technical Solutions

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED 07 April 2014

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 CFR 47 Part 15C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler A Galpin

Product Service

CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
PFK Electronics SWDS Dealer Remote
In accordance with FCC CFR 47 Part 15C

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the PFK Electronics SWDS Dealer Remote to the requirements of FCC CFR 47 Part 15C.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	PFK Electronics
Model Number(s)	844300
Serial Number(s)	5 2 4
Number of Samples Tested	3
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2013)
Incoming Release Date	Application Form 27 March 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PE/144574_Rev0 26 March 2014
Start of Test	1 April 2014
Finish of Test	1 April 2014
Name of Engineer(s)	G Lawler A Galpin
Related Document(s)	ANSI C63.10: 2009

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C is shown below.

Section	Spec Clause	Test Description	Result	Comments/Base Standard
Transmit				
2.1	15.231 (a)(1)	Manually Operated Transmitter	Pass	ANSI C63.10: 2009
2.2	15.231 (b) and 15.205	Field Strength of Emissions	Pass	ANSI C63.10: 2009
2.3	15.231 (c)	20dB Bandwidth	Pass	ANSI C63.10: 2009

Product Service

1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	PFK Electronics……
ADDRESS :	488 Umbilo Road, Durban, Kwazulu Natal, 4001 South Africa……
NAME FOR CONTACT PURPOSES :	..Harvey Bowler
TELEPHONE NO:	…+27 31 2747200…… FAX NO: +27 312054324……
E-MAIL:	…Harveyb@pfk.co.za……

EQUIPMENT INFORMATION

Model name/number	SWDS Dealer Remote	Identification/Part number	…844 300…..……
Hardware Version	1	Software Version	4
Manufacturer	PFK Electronics PTY (Ltd.)	Country of Origin	South Africa
FCC ID	OXC844300	Industry Canada ID	……N/A……..……

Technical description (a brief description of the intended use and operation)

……Single Button Remote Transmitter……

Supply Voltage:

[ ]	AC mains	State AC voltage …… V	and AC frequency …… Hz
[ ]	DC (external)	State DC voltage …… V	and DC current …… A
[X]	DC (internal)	State DC voltage 3 V	and Battery type 2xCR1220

Frequency characteristics:

Transmitter Frequency range 433.6 MHz to 434.2 MHz — Channel spacing N/A (if channelized)

Receiver Frequency range (if different) N/A MHz to N/A MHz — Channel spacing N/A (if channelized)

Designated test frequencies:

Bottom: 433.6 MHz Middle: 433.9 MHz Top: 434.2 MHz

Intermediate Frequencies : …… MHz

Highest Internally Generated Frequency : 433.9 MHz

Power characteristics:

Maximum transmitter power 0.01 W — Minimum transmitter power …… W (if variable)

[ ] Continuous transmission

[X] Intermittent transmission — State duty cycle – average 50%

If intermittent, can transmitter be set to continuous transmit test mode? Yes

Antenna characteristics:

[ ]	Antenna connector	State impedance …… ohm
[ ]	Temporary antenna connector	State impedance …… ohm
[X]	Integral antenna State gain	-10 dBi

Modulation characteristics:

[X] Amplitude — [ ] Other

[ ] Frequency Details: OOK

[ ] Phase (GMSK, QSPK etc)

Can the transmitter operate un-modulated? No

ITU Class of emission: …….

Battery/Power Supply

Model name/number	CR1220	Identification/Part number	CR1220
Manufacturer	Standard	Country of Origin	N/A

Ancillaries (if applicable)

Model name/number	……..…….	Identification/Part number	……..…….
Manufacturer	……..…….	Country of Origin	……..…….

Extreme conditions:

Maximum temperature	60 ºC	Minimum temperature	0 ºC
Maximum supply voltage	6 V	Minimum supply voltage	4 V

Product Service

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature : Held on File at TUV SUD

Name : Harvey Bowler

Position held : Customer Technical Support Manager

Date : 27 March 2014

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a PFK Electronics SWDS Dealer Remote. 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 3 V Battery supply.

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

1.6 DEVIATIONS FROM THE STANDARD

No deviations were made to the test standard during testing.

1.7 MODIFICATION RECORD

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

Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
PFK Electronics SWDS Dealer Remote
In accordance with FCC CFR 47 Part 15C

2.1 MANUALLY OPERATED TRANSMITTER

2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.231 (a)(1)

2.1.2 Equipment Under Test and Modification State

844300 S/N: 2 - Modification State 0

2.1.3 Date of Test

1 April 2014

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 transmissions from the EUT were monitored using a spectrum analyser in time domain mode. The EUT was set to transmit using its manual operation switch, after approximately two seconds the switch was released and transmissions from the EUT were observed.

2.1.6 Environmental Conditions

Ambient Temperature	23.6°C
Relative Humidity	43.3%

2.1.7 Test Results

3 V Battery Supply

Does the switch automatically deactivate the transmitter in ≤ 5 seconds? Yes

Limit Clause

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Product Service

2.2 FIELD STRENGTH OF EMISSIONS

2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.231 (b) and 15.205

2.2.2 Equipment Under Test and Modification State

844300 S/N: 4 - Modification State 0

2.2.3 Date of Test

1 April 2014

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

A test environment and testing arrangement meeting the specification of ANSI C63.4 was used during all testing. The Equipment Under Test (EUT) was set upon a non-conducting platform at an elevation of 80 cm above a horizontal reference ground plane. The EUT was set upon a non-conducting platform during testing. When frequencies less than 18 GHz were measured; the EUT elevation was 80 cm above the horizontal reference ground plane.

The horizontal reference ground plane encompasses a turntable which is used to adjust the azimuth of the EUT. An antenna positioner is used to elevate the measuring antenna above the horizontal reference ground plane whereby the antenna elevation is adjustable between 1 m and 4 m.

Exploratory radiated emissions measurements were made by azimuth emissions searches over a range of 0° and 360°. These exploratory radiated emissions measurements were made using a peak detector over a frequency range of 30 MHz to 5 GHz, with the measuring antenna in both vertical and horizontal polarizations.

At least six of the greatest peak emissions, frequency positions were selected from the exploratory radiated emissions measurements for further evaluation as final measuring points.

To ascertain the azimuth and measuring antenna polarization that yields the highest peak emission level, each final measurement frequency was investigated by continuous azimuth emissions searching with the measuring antenna in both vertical and horizontal polarizations. For each final measurement frequency, the respective peak emission azimuth and measuring antenna polarization was used during a measuring antenna elevation search from 1 m to 4 m. Each final measurement frequency was then measured with the EUT azimuth, measuring antenna height and polarization that yielded the greatest peak emission level.

Product Service

Final measurement points over the frequency range of 30 MHz to 1 GHz were measured using a quasi-peak detector. Final measurement points over the frequency range of 1 GHz and 5 GHz were measured using peak and average methods. Peak measurements were made using a peak detector with 1 MHz resolution and video bandwidths. Average measurements were made using a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

All final measurements were assessed against the Class B emission limits in Clause 15.109 of FCC CFR 47 FCC Part 15.231.

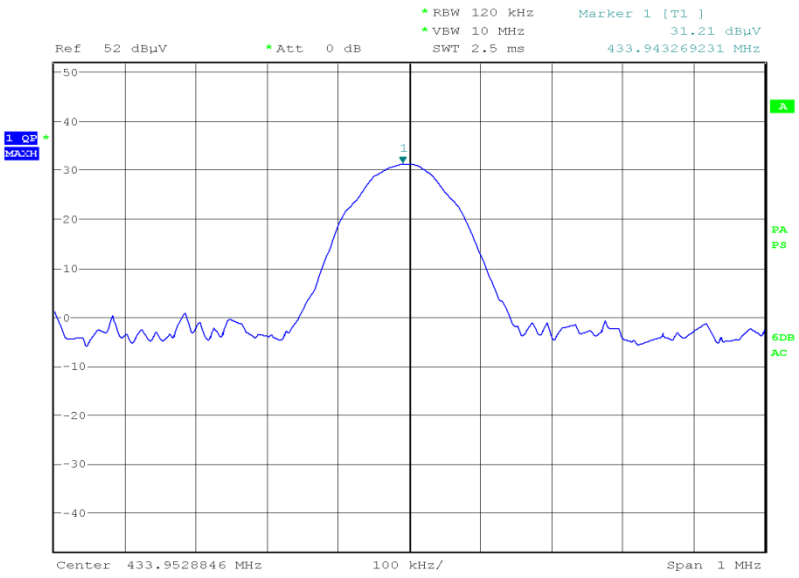
2.2.6 Environmental Conditions

Ambient Temperature	20.4°C
Relative Humidity	39.0%

2.2.7 Test Results

3 V Battery Supply

Carrier

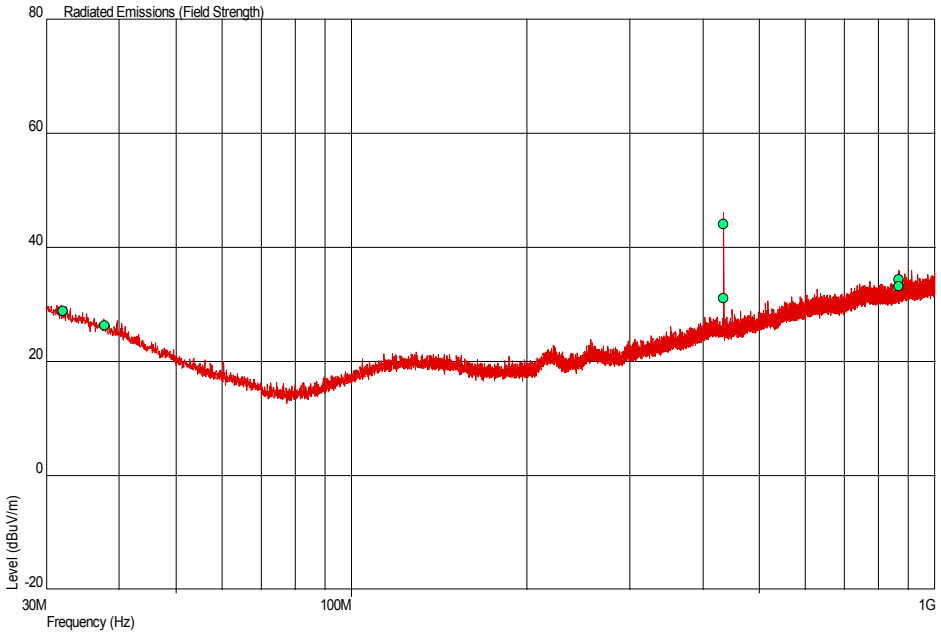


Date: 1.APR.2014 17:15:37

Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (degrees)	Height (m)	Polarity
433.900	50.35	329.23	80.826	10997.92	-30.48	-10668.29	304	1.00	Horizontal

Product Service

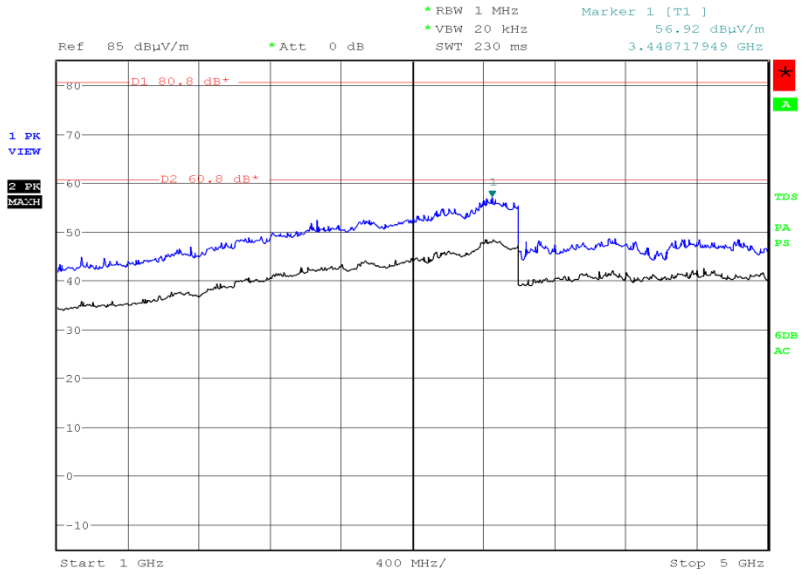
30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
32.065	28.9	27.9	60.8	1096	-31.9	1068.1	203	1.00	Horizontal
37.745	26.4	20.9	60.8	1096	-34.4	1075.1	312	1.00	Horizontal
433.943	31.1	35.9	80.8	10965	-49.7	10929.1	0	2.52	Vertical
433.957	44.1	160.3	80.8	10965	-36.7	10804.7	322	1.00	Horizontal
867.900	33.2	45.7	60.8	1096	-27.6	1050.3	61	2.09	Vertical
867.913	34.4	52.5	60.8	1096	-26.4	1043.5	59	1.00	Horizontal

Product Service

1 GHz to 5 GHz



Date: 1.APR.2014 18:53:34

Limit Clause

Fundamental Frequency (MHz)	Field Strength of Fundamental (Microvolts/meter)	Field Strength of Spurious Emissions (Microvolts/meter)
40.66 to 40.70	2250	225
70.00 to 130.00	1250	125
130.00 to 174.00	[1] 1250 to 3750	[1] 125 to 375
174.00 to 260.00	3750	375
260.00 to 470.00	[1] 3750 to 12500	[1] 375 to 1250
Above 470.00	12500	1250

NOTE: [1] Linear interpolations

2.3 20dB BANDWIDTH

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.231 (c)

2.3.2 Equipment Under Test and Modification State

844300 S/N: 4 - Modification State 0

2.3.3 Date of Test

1 April 2014

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

The EUT was connected to a Spectrum Analyser via a test jig and cable. The EUT was set to transmit at maximum power with modulation. The resolution and video bandwidths were set appropriately to perform an accurate measurement. The trace was set to Max Hold and the peak was recorded. The markers were then set to -20 dBc and the 20 dB bandwidth result was recorded.

2.3.6 Environmental Conditions

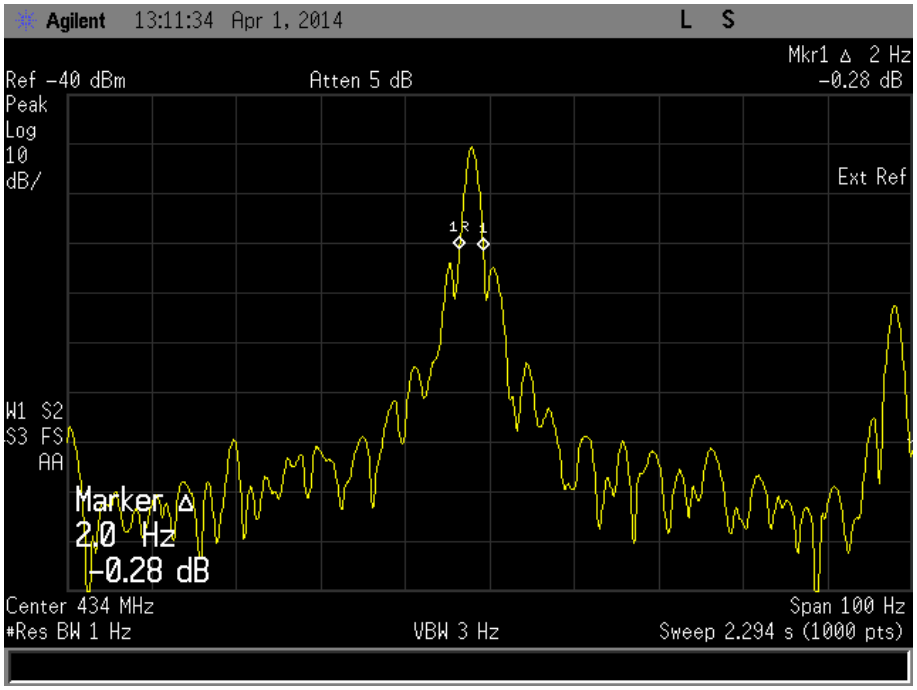
Ambient Temperature	23.6°C
Relative Humidity	43.3%

Product Service

2.3.7 Test Results

3 V Battery Supply

Frequency (MHz)	Modulation	20 dB Bandwidth
433.900	AM	2 Hz



Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

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 - Manually Operated Transmitter					
RF Coupler	TUV SUD Product Service	TÜV	415	-	TU
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014
Section 2.2 - Field Strength of Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Screened Room (5)	Rainford	Rainford	1545	24	10-Jan-2015
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	22-Oct-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
LISN, 5µH +10µF	ACME LISN Foundry	Def Stan 59-41/411	3904	12	21-Jun-2014
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Section 2.3- 20dB Bandwidth					
RF Coupler	TUV SUD Product Service	TÜV	415	-	TU
Spectrum Analyser	Agilent Technologies	E4407B	1154	12	13-Aug-2014
Rubidium Standard	Rohde & Schwarz	XSRM	1316	6	22-Jul-2014
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	22-Jul-2014

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Manually Operated Transmitter	-
20dB Bandwidth	± 16.74 kHz
Field Strength of Emissions	30MHz to 1GHz: ± 5.1 dB 1GHz to 40GHz: ± 6.3 dB

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

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 (Not UKAS Accredited).