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Report On

FCC Testing of the
RF Solutions Ltd
Hornet

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FCC ID: P90 HORNET

Document 75913457 Report 01 Issue 1

July 2011



Product Service

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RF Solutions Ltd
Hornet

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July 2011

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DATED

21 July 2011

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





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SECTION 1

REPORT SUMMARY

FCC Testing of the
RF Solutions Ltd
Hornet



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Solutions Ltd, Hornet 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	RF Solutions Ltd
Model Number(s)	Hornet TX
Serial Number(s)	Not Serialised (TSR_0006)
Software Version	FNC 125-1
Hardware Version	PCB 125-1
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15C: 2010
Incoming Release Date	Declaration of Build Status 01 April 2011
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	15613 01 April 2011
Start of Test	17 July 2011
Finish of Test	17 July 2011
Name of Engineer(s)	G Lawler



Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 15C is shown below.

Configuration 1 - Stand Alone						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.231(b)	Field Strength of Spurious Emissions	Transmit	0	Pass	
2.2	15.231(b)	Field Strength of Fundamental	Transmit	0	Pass	

1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Hornet TX Keyfob
MANUFACTURER	RF Solutions Ltd
TYPE/MODEL	Hornet TX
PART NUMBER	Hornet TX1, TX2 and TX3
SERIAL NUMBER	Not Applicable
HARDWARE VERSION	PCB 125-1
SOFTWARE VERSION	FNC 125-1
TRANSMITTER OPERATING RANGE	433.92 MHz
RECEIVER OPERATING RANGE	
INTERMEDIATE FREQUENCIES	N/A
EMISSION DESIGNATOR(S): (i.e, GMSK, QPSK)	433MF2D
HIGHEST INTERNALLY GENERATED FREQUENCY IN RECEIVE IDLE MODE	
OUTPUT POWER (W or dBm)	0.1mW
FCC ID	P90 HORNET
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Remote Control Telemetry Keyfob Transmitter
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	CR2032 HP Lithium Cell
MANUFACTURER	
TYPE	Lithium
PART NUMBER	CR2032
VOLTAGE	3.2V
SERIAL NUMBER	

Signature	<u>Held on File</u>
Date	<u>01 April 2011</u>
D of B S Serial No	<u>75913457/01</u>

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 Ltd as to the accuracy of the information declared in this document by the manufacturer.

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a RF Solutions Ltd, Hornet. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration

Configuration 1: Stand Alone

The EUT was configured in accordance with FCC CFR 47 Part 15C.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 - Transmit

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, test laboratories or an open test area as appropriate.

The EUT was powered from an internal battery supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

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

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

SECTION 2

TEST DETAILS

FCC Testing of the
RF Solutions Ltd
Hornet

2.1 FIELD STRENGTH OF SPURIOUS EMISSIONS

2.1.1 Specification Reference

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

2.1.2 Equipment Under Test

Hornet, S/N: Not Serialised (TSR_0006)

2.1.3 Date of Test and Modification State

17 July 2011 - Modification State 0

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CRF 47 Part 15C.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions within the restricted bands defined in 15.205 were measured in accordance with 15.209. Emissions measured below 1GHz employed a quasi peak detector, in accordance with 15.35(a). Emissions measured above 1GHz employed an average detector as defined in 15.35(b). The peak level of the emission was also measured to ensure that a difference of 20dB from the average level was not exceeded, as defined in 15.35(b). Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector. Other emissions from 1GHz to 5GHz excluding the restricted bands were measured using a peak detector.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.1.6 Environmental Conditions

17 July 2011

Ambient Temperature 21°C

Relative Humidity 48%

Atmospheric Pressure 991mbar

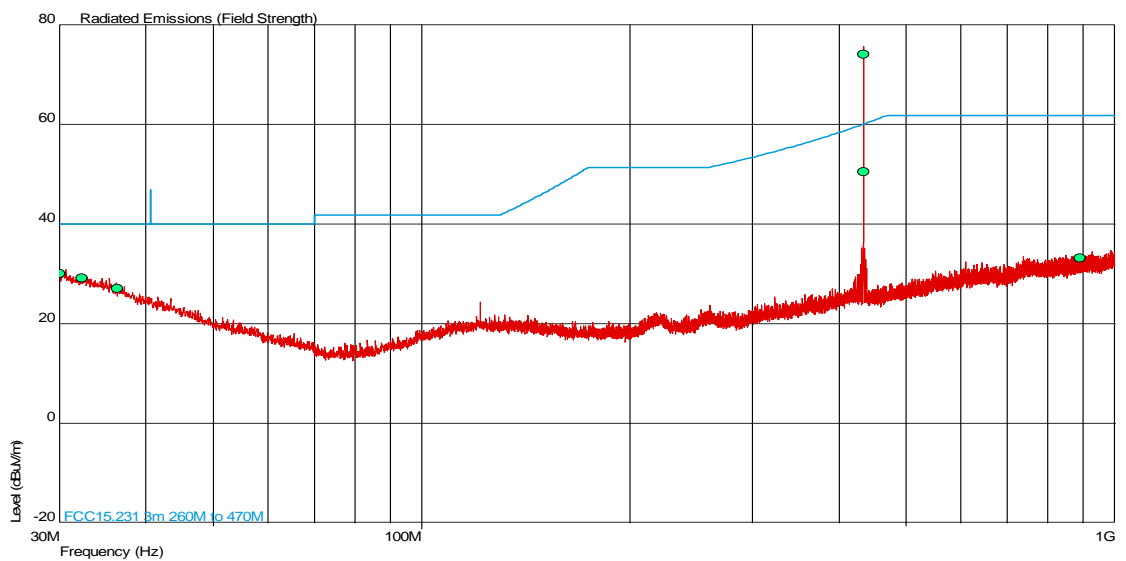
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C for Field Strength of Spurious Emissions.

The test results are shown below.

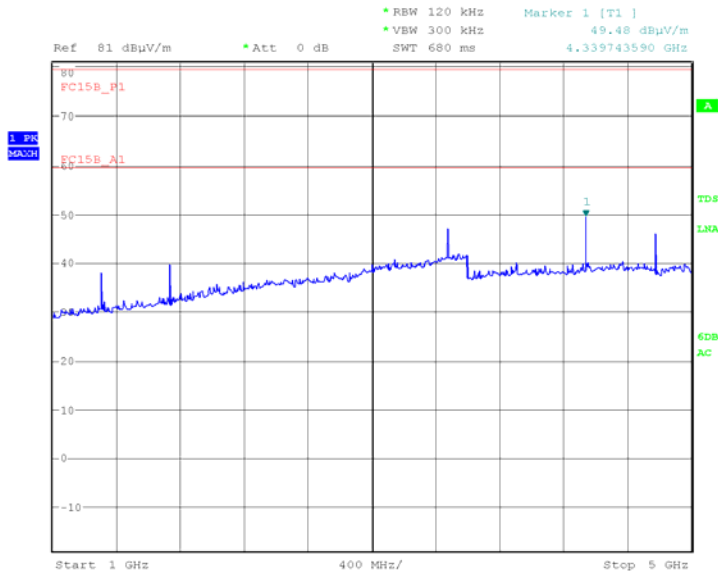
Configuration 1 - Mode 1

30MHz to 1GHz



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
30.034	30.0	31.6	40.0	100	-10.0	68.4	360	1.00	Horizontal
32.322	29.2	28.8	40.0	100	-10.8	71.2	180	1.52	Vertical
36.354	27.1	22.6	40.0	100	-12.9	77.4	175	1.00	Horizontal
889.138	33.1	45.2	61.9	1245	-28.8	1199.8	356	1.00	Horizontal

1GHz to 5GHz



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2.2 FIELD STRENGTH OF FUNDAMENTAL

2.2.1 Specification Reference

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

2.2.2 Equipment Under Test

Hornet, S/N: Not Serialised (TSR_0006)

2.2.3 Date of Test and Modification State

17 July 2011 - Modification State 9

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 Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15C.

The EUT was placed on a remotely controlled turntable within a semi-anechoic chamber. Measurements of the carrier frequency from the EUT were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The field strength measurement was performed with a CISPR Quasi - peak detector and the trace set to max hold using a Resolutionbandwidth of 120 kHz.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.2.6 Environmental Conditions

17 July 2011

Ambient Temperature 21°C

Relative Humidity 48%

Atmospheric Pressure 991mbar

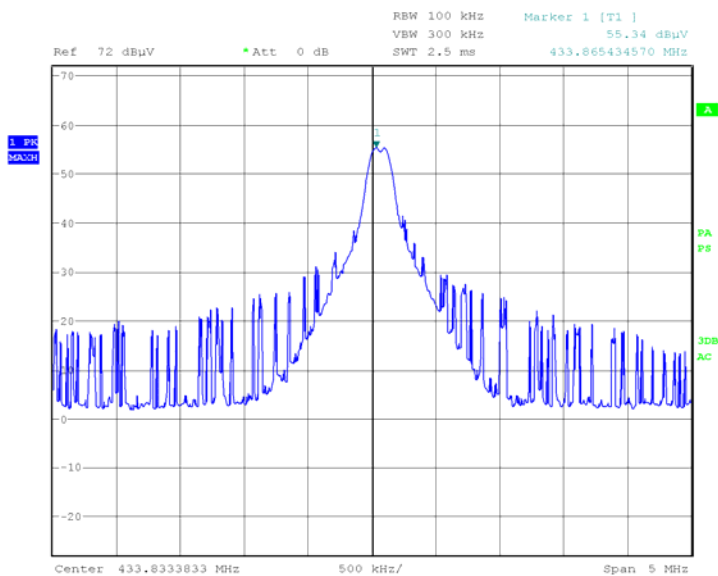
2.2.7 Test Results

For the period of test the EUT met to meet the requirements of FCC CFR 47 Part 15C for Field Strength of the Fundamental.

The test results are shown below.

Configuration 1 - Mode 1

Freq MHz	Result dB μ V/m	Limit dB μ V/m	Result μ V/m	Limit μ V/m
433.874	74.2	80.8	5128.6	10965



Date: 17.JUL.2011 12:19:59

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 and 2.2 - Field Strength of Spurious Emissions and Field Strength of Fundamental					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Nov-2011
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
Screened Room (5)	Rainford	Rainford	1545	24	3-Feb-2014
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
Comb Generator	Schaffner	RSG1000	3034	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU

TU – Traceability Unscheduled

3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.2dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	10MHz to 6GHz Test Amplitude	2.0dB†
Conducted Susceptibility RF	50kHz to 1000MHz Amplitude	3.1dB•
	EM Clamp Method of Test	1.2dB•
	CDN Method of Test	1.1dB•
	BCI Clamp Method of Test	1.2dB•
	Direct Injection Method of Test	1.2dB•
Conducted Susceptibility LF	DC to 150kHz	1.0%†
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10⁶.

* In accordance with CISPR 16-4-2

† In accordance with UKAS Lab 34

• In accordance with EN61000-4-6: 2009

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).

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