

TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: XT4 433 RC (part number 787453)

To: FCC Part 15.231: 2008

Test Report Serial No:
RFI/RPT3/RP74422JD01A

Supersedes Test Report Serial No:
RFI/RPT2/RP74422JD01A

This Test Report Is Issued Under The Authority
Of Brian Watson, Operations Director



| | |
|---|------------------------------|
| Checked By: Tony Henriques | Report Copy No: PDF01 |
|  | |
| Issue Date: 23 January 2009 | Test Dates: 18 December 2008 |

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1. Customer Information

| | |
|----------------------|---|
| Company Name: | FAAC Electronics Ltd |
| Address: | 4055 Kingswood Avenue Citywest Business Campus Dublin 24 Ireland |

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2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

| | |
|--------------|-----------------------|
| Description: | XT4 433 RC |
| Brand Name: | FAAC Electronics Ltd. |
| Part Number: | 787453 |

2.2. Description of EUT

The equipment under test was a keyfob transmitter that operates in the 433 MHz band.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to Testing

| Power Supply Requirement: | Internal Battery of 12 volts | | |
|---------------------------|------------------------------|----------------|-------------------------|
| Type of Unit: | Transmitter | | |
| Antenna Type: | Integral | | |
| Transmit Channels Tested: | Channel ID | Channel Number | Channel Frequency (MHz) |
| | Single Channel | - | 433.92 |

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3. Test Specification, Methods and Procedures

3.1. Test Specifications

| | |
|------------|--|
| Reference: | FCC Part 15.231: 2008 Subpart C |
| Title: | Code of Federal Regulations, (47CFR15) Radio Frequency Devices. |

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2001)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations from the Test Specification

There were no deviations from the test specification.

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5. Operation of the EUT During Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

- Transmit mode only

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- Standalone – The sample was fixed into transmit mode by keeping the button depressed. The unit had a cycle time of approximately 30 seconds where upon the button required resetting. The transmitter ceased transmission once the button was released.

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6. Summary of Test Results

| Range of Measurements | FCC Part 15 | Port Type | Result |
|---|--|-----------|----------|
| Transmitter Fundamental Fieldstrength | C.F.R. 47 FCC Part 15: Section 15.231(b) | Antenna | Complied |
| Transmitter 20 dB Bandwidth | C.F.R. 47 FCC Part 15: Section 15.231(c) | Antenna | Complied |
| Transmitter Timeout | C.F.R. 47 FCC Part 15: Section 15.231(a) | Antenna | Complied |
| Transmitter Radiated Spurious Emissions | C.F.R. 47 FCC Part 15: Sections 15.231(b) & 15.209 | Antenna | Complied |

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.

6.2. Site Registration Numbers

FCC: 209735

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7. Measurements, Examinations and Derived Results

7.1. General Comments

7.1.1. This section contains test results only.

7.1.2. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%.

Please refer to Section 8 for details of measurement uncertainties.

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7.2. Test Results

7.2.1. Transmitter Fundamental Fieldstrength: Section 15.231(b)

Ambient Temperature: 22°C Relative Humidity: 45%

| Channel | Field Strength (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Result |
|----------------|-------------------------|----------------|-------------|----------|
| Single Channel | 79.6 | 80.8 | 1.2 | Complied |

As the transmission was continuous i.e. not pulsed the provisions in 15.35 for average pulsed emissions were not applied.

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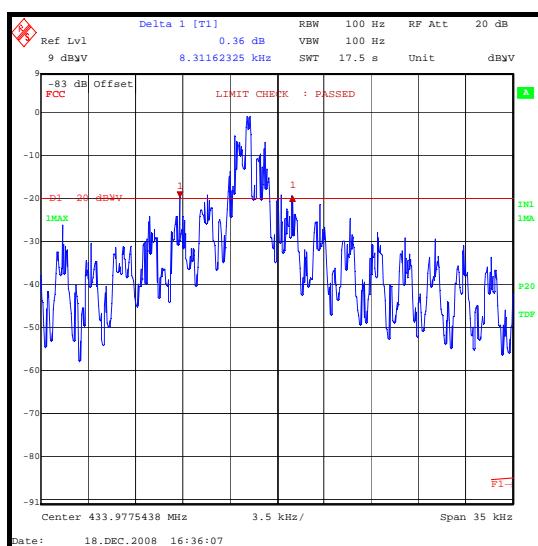
7.2.2. Transmitter 20 dB Bandwidth: Section 15.231(c)

Ambient Temperature: 22°C

Relative Humidity: 29%

| Transmitter 20 dB Bandwidth (kHz) | Limit (MHz) | Margin (MHz) | Result |
|-----------------------------------|-------------|--------------|----------|
| 8.311 | 1.0848* | 1.076 | Complied |

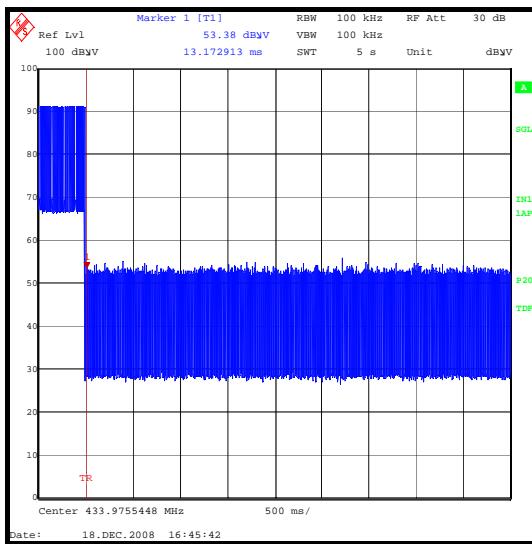
Note: * Calculated based on a fundamental frequency of 433.92 MHz



Test of: XT4 433 RC (part number 787453)
To: FCC Part 15.231: 2008**7.3.Transmitter Timeout: Section 15.231(a)**

Ambient Temperature: 22°C Relative Humidity: 29%

| Deactivation Time (seconds) | Limit (seconds) |
|--------------------------------|--------------------|
| 0.013 | 5 |



Test of: XT4 433 RC (part number 787453)
To: FCC Part 15.231: 2008**7.3.1. Transmitter Radiated Emissions: Section 15.231 (b)**

Ambient Temperature: 22°C Relative Humidity: 45%

**7.3.2. Electric Field Strength Measurements 30 MHz to 1 GHz
(emissions outside the restricted bands)**

| Frequency (MHz) | Antenna Polarity | Peak Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|---------------------------|----------------------|-------------|----------|
| 867.960 | Vertical | 54.7 | 60.8 | 6.1 | Complied |

The peak emission level was compared to the average limit stated in the table above and was compliant therefore average measurements were not performed as the peak emission is below the average limit. As the transmission was continuous i.e. not pulsed the provisions in 15.35 for average pulsed emissions were not applied.

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7.3.3. Transmitter Radiated Emissions: Section 15.231(b) (continued)

Ambient Temperature: 22°C Relative Humidity: 45%

7.3.3.1. Tests were performed in accordance with C63.4 Section 8 and relevant annexes.

7.3.4. Electric Field Strength Measurements 1 GHz to 4.4 GHz (emissions inside the restricted bands)

Highest Peak Level:

| Frequency (GHz) | Antenna Polarity | Detector Level (dB μ V) | Transducer Factor (dB) | Actual Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|-----------------------------|------------------------|-----------------------------|----------------------|-------------|----------|
| 1301.940 | Vertical | 64.7 | -10.8 | 53.9 | 74.0 | 20.1 | Complied |
| 3905.820 | Vertical | 53.6 | -1.5 | 52.1 | 74.0 | 21.9 | Complied |
| 4339.800 | Vertical | 65.8 | -12.3 | 53.5 | 74.0 | 21.3 | Complied |

Highest Average Level:

| Frequency (GHz) | Antenna Polarity | Detector Level (dB μ V) | Transducer Factor (dB) | Actual Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|-----------------------------|------------------------|-----------------------------|----------------------|-------------|----------|
| 1301.940 | Vertical | 64.7 | -10.8 | 53.9 | 54.0 | 0.1 | Complied |
| 3905.820 | Vertical | 53.6 | -1.5 | 52.1 | 54.0 | 1.9 | Complied |
| 4339.800 | Vertical | 65.8 | -12.3 | 53.5 | 54.0 | 1.3 | Complied |

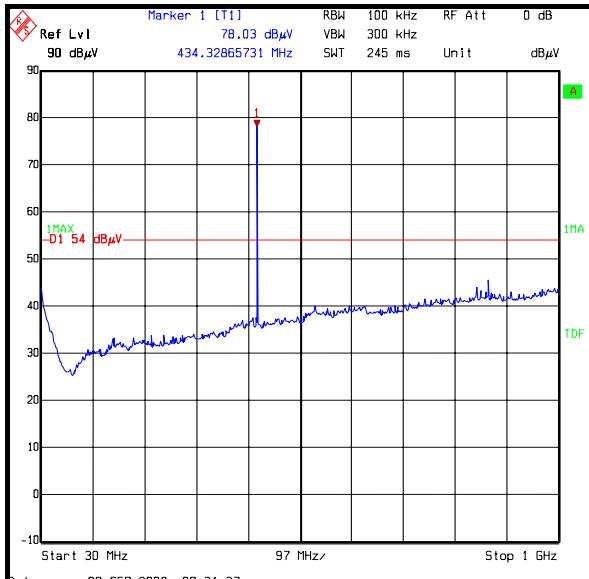
Test of: XT4 433 RC (part number 787453)
To: FCC Part 15.231: 2008**Transmitter Radiated Emissions: Section 15.231(b) (Continued)****Electric Field Strength Measurements 1 GHz to 4.4 GHz
(emissions outside the restricted bands)****Highest Peak Level:**

| Frequency (GHz) | Antenna Polarity | Detector Level (dB μ V) | Transducer Factor (dB) | Actual Level (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Result |
|-----------------|------------------|-----------------------------|------------------------|-----------------------------|----------------------|-------------|----------|
| 1735.920 | Vertical | 63.2 | -10.2 | 53.0 | 60.8 | 7.8 | Complied |
| 2169.900 | Vertical | 66.3 | -8.4 | 57.9 | 60.8 | 2.9 | Complied |
| 2603.880 | Horizontal | 53.9 | -6.9 | 47.0 | 60.8 | 13.8 | Complied |
| 3037.860 | Vertical | 59.6 | -5.9 | 53.7 | 60.8 | 7.1 | Complied |

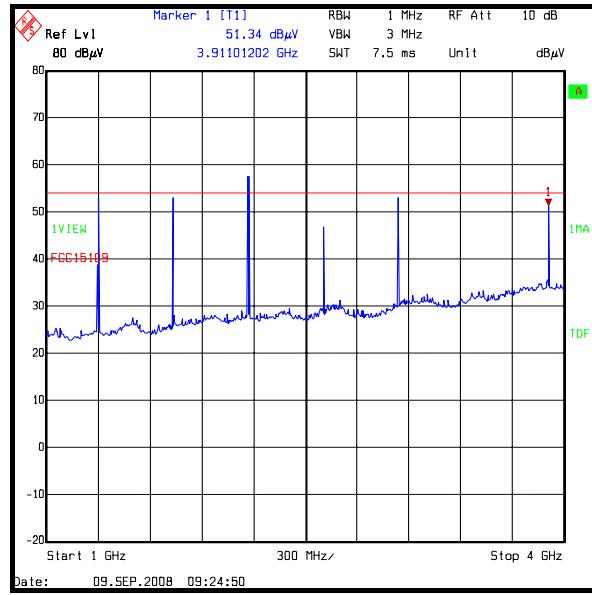
The peak emission level was compared to the average limit stated in the table above and was compliant therefore average measurements were not performed as the peak emission is below the average limit. As the transmission was continuous i.e. not pulsed the provisions in 15.35 for average pulsed emissions were not applied.

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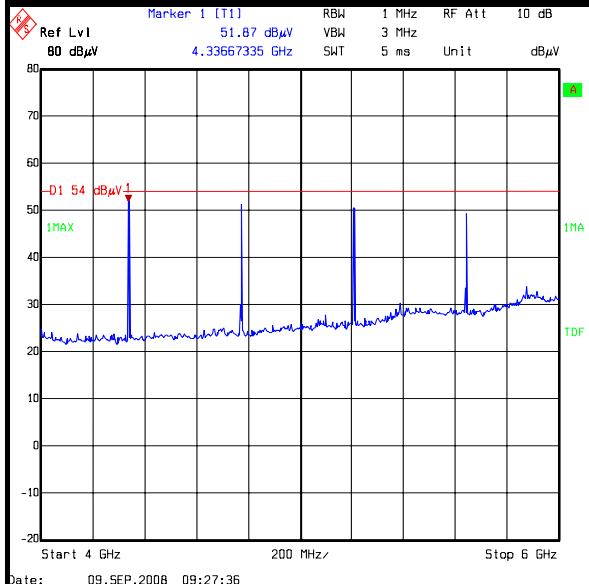
Transmitter Radiated Emissions: Section 15.231(b) - (Continued)



Date: 09.SEP.2008 09:31:37



Date: 09.SEP.2008 09:24:50



Date: 09.SEP.2008 09:27:36

Note: These plots are for pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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8. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

| Measurement Type | Range | Confidence Level (%) | Calculated Uncertainty |
|---------------------------------------|--------------------|----------------------|------------------------|
| Transmitter Fundamental Fieldstrength | N/A | 95% | ±2.94 dB |
| Transmitter 20dB Bandwidth | N/A | 95% | ±11.7ppm |
| Transmitter Timeout | N/A | 95% | ±3% |
| Radiated Spurious Emissions | 30 MHz to 5000 MHz | 95% | ±2.94 dB |

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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| RFI No. | Instrument | Manufacturer | Type No. | Serial No. | Date Last Calibrated | Cal. Interval (Months) |
|---------|-------------------|-----------------|----------|------------|----------------------|------------------------|
| A1299 | Antenna | Schaffner | CBL6143 | 5094 | 28 Jul 2008 | 12 |
| A1818 | Antenna | EMCO | 3115 | 00075692 | 25 Oct 2008 | 12 |
| K0002 | 3M RSE chamber | Rainford EMC | N/A | N/A | 26 Aug 2008 | 12 |
| M1124 | Spectrum Analyser | Rohde & Schwarz | ESIB26 | 100046K | 19 Feb 2008 | 12 |
| M166 | Thermometer | EuroCom | None | None | 18 Jun 2008 | 12 |

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.