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# Report On

FCC and Industry Canada Testing of the  
Schrader Electronics Ltd KAWASAKI 315 MHz  
In accordance with FCC CFR 47 Part 15C  
and Industry Canada RSS-210

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FCC ID: MRXKAW4  
IC ID: 2546A-KAW4

Document 75921309 Report 01 Issue 1

April 2013



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**APPROVED BY**

**Mark Jenkins**  
Authorised Signatory

**DATED**

16 April 2013

**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 and Industry Canada RSS-210. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

R Hampton

S Milliken



G Lawler



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## **SECTION 1**

### **REPORT SUMMARY**

FCC and Industry Canada Testing of the  
Schrader Electronics Ltd KAWASAKI 315 MHz  
In accordance with FCC CFR 47 Part 15C and Industry Canada RSS-210



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## 1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the Schrader Electronics Ltd KAWASAKI 315 MHz to the requirements of FCC CFR 47 Part 15C and Industry Canada RSS-210.

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	Schrader Electronics Ltd
Model Number(s)	Kawasaki 315 MHz
Serial Number(s)	51204431044645 51204431044555
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 15C (2012) Industry Canada RSS-210 (2010)
Incoming Release Date	Application Form 06 February 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	76131 14 January 2013
Start of Test	13 March 2013
Finish of Test	18 March 2013
Name of Engineer(s)	R Hampton S Milliken G Lawler
Related Document(s)	ANSI C63.10: 2009



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**1.2 BRIEF SUMMARY OF RESULTS**

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 15C, Industry Canada RSS-210 is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	FCC	IC			
Transmit					
2.1	15.231 (a)(1)	A1.1.1 (a)	Manually Operated Transmitter	Pass	
2.2	15.231 (b)	A1.1.2	Field Strength of Emissions	Pass	
2.3	15.231 (c)	A1.1.3	20dB Bandwidth	Pass	



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1.3 APPLICATION FORM

APPLICANT'S DETAILS	
COMPANY NAME :	SCHRADER ELECTONICS.....
ADDRESS :	.....UNIT 11 TECHNOLOGY PARK .....ANTRIM CO.ANTRIM...BT41 1QS.....
NAME FOR CONTACT PURPOSES :	.....JAMES KYLE.....
TELEPHONE NO: .....	028 9448 3067..... FAX NO: .....N/A.....
	E-MAIL: .....JAKYLE@SCHRADER.CO.UK.....

EQUIPMENT INFORMATION	
Model name/number	.....KAWASAKI 315 MHz.....Identification/Part number. 70103016.....
Hardware Version	.....Ver 1..... Software Version .....Ver 1.....
Manufacturer	...SCHRADER ELECTONICS..... Country of Origin .....UK.....
FCC ID	.....MRXKAW4..... Industry Canada ID .....IC:2546A-KAW4
Technical description (a brief description of the intended use and operation) .....TIRE PRESSURE AND TEMPERATURE MONITORING SYSTEM.....	
<u>Supply Voltage:</u>	
[ ]	AC mains State AC voltage ..... V and AC frequency ..... Hz
[ ]	DC (external) State DC voltage ..... V and DC current ..... A
[Yes ]	DC (internal) State DC voltage .....3... V and Battery type ...maxell 2050.....
<u>Frequency characteristics:</u>	
Transmitter Frequency range	.....314.9..... MHz to ...315.1..... 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: .....314.9... MHz Middle: .....315..... MHz Top: .....315.1..... MHz	
Intermediate Frequencies : ..... MHz	
Highest Internally Generated Frequency : .....315.1..... MHz	
<u>Power characteristics:</u>	
Maximum transmitter power	...0.01 mW Minimum transmitter power .....0.005 mW (if variable)
[ ]	Continuous transmission
[Y ]	Intermittent transmission State duty cycle .....<10%..... If intermittent, can transmitter be set to continuous transmit test mode? <u>Y</u> /N
<u>Antenna characteristics:</u>	
[ ]	Antenna connector State impedance ..... ohm
[ ]	Temporary antenna connector State impedance ..... ohm
[Y ]	Integral antenna Type ..... State gain ...-25..... dBi
[ ]	External Antenna Type ..... State gain ..... dBi
<u>Modulation characteristics:</u>	
[Y ]	Amplitude
[Y ]	Frequency
[ ]	Phase
[ ]	Other
Can the transmitter operate un-modulated? <u>Y</u> /N	
ITU Class of emission: .....K2D....	



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<u>Battery/Power Supply</u>			
Model name/number	.....CR2050.....	Identification/Part number	.....N/A.....
Manufacturer	.....MAXELL.....	Country of Origin	.....JAPAN.....
<u>Ancillaries (if applicable)</u>			
Model name/number	.....N/A.....	Identification/Part number	.....N/A.....
Manufacturer	.....N/A.....	Country of Origin	.....N/A.....
<u>Extreme conditions:</u>			
Maximum temperature	.....125... °C	Minimum temperature	-40..... °C
Maximum supply voltage	.....3... V	Minimum supply voltage	...3..... V

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

Signature :

Name :JAMES KYLE

Position held : RF COORDINATOR

Date :6.2.2013.

Company Officer: JAMES KYLE

Telephone Number: 028 9448 3067

Email: jakyle@schrader.co.uk





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## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was a Schrader Electronics Ltd KAWASAKI 315 MHz. 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 DC supply.

FCC Accreditation  
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation  
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  
Schrader Electronics Ltd KAWASAKI 315 MHz  
In accordance with FCC CFR 47 Part 15C and Industry Canada RSS-210



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## 2.1 MANUALLY OPERATED TRANSMITTER

### 2.1.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.231 (a)(1)  
Industry Canada RSS-210, Clause A1.1.1 (a)

### 2.1.2 Equipment Under Test and Modification State

Kawasaki 315 MHz S/N: 51204431044645 - Modification State 0

### 2.1.3 Date of Test

15 March 2013

### 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 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.

### 2.1.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	31.3%

### 2.1.7 Test Results

3 V DC Supply

Does the switch automatically deactivate the transmitter in  $\leq 5$  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.



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## 2.2 FIELD STRENGTH OF EMISSIONS

### 2.2.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.231 (b)  
Industry Canada RSS-210, Clause A1.1.2

### 2.2.2 Equipment Under Test and Modification State

Kawasaki 315 MHz S/N: 51204431044555 - Modification State 0

### 2.2.3 Date of Test

13 March 2013 & 18 March 2013

### 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

For conducted emissions, the EUT was set to operate at maximum power on the worst case data rate. The test was performed on the bottom, middle and top channels. The test was performed from 9 kHz to 25 GHz. Firstly, the power of each fundamental frequency was measured in 100 kHz bandwidth and this was used to show a -20 dBc limit line on the trace. The measurement path loss in each relevant frequency band was measured and entered as a reference level offset.

For radiated emissions, the test method described above was also used. However, the measurement was performed from 30 MHz to 25 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser.

The band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.3. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

### 2.2.6 Environmental Conditions

Ambient Temperature	19.2 - 24.2°C
Relative Humidity	24.0 - 26.5%

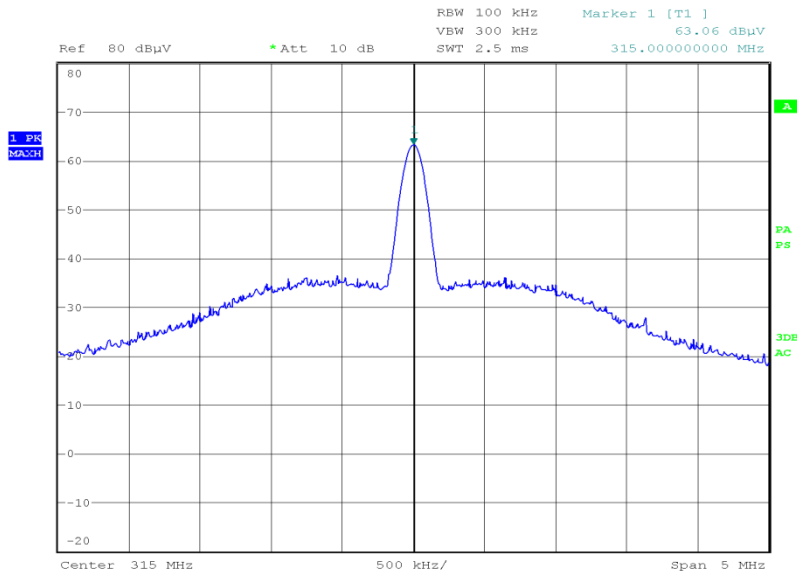


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### 2.2.7 Test Results

3 V DC Supply

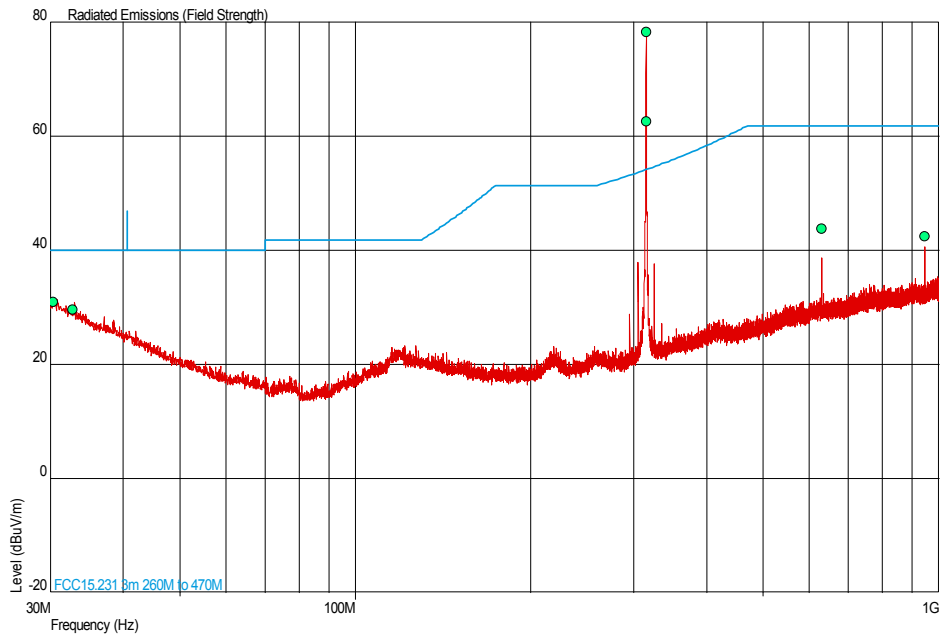
Carrier



Date: 13.MAR.2013 18:53:38



30 MHz to 1 GHz



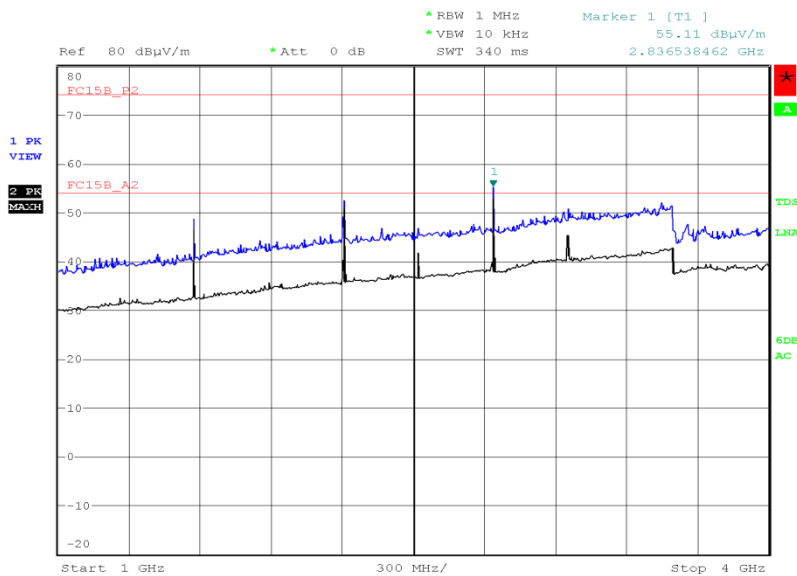
Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
30.405	30.9	35.1	40.0	100	-9.1	64.9	186	1.37	Horizontal
32.841	29.6	30.2	40.0	100	-10.4	69.8	27	1.00	Vertical
630.017	43.8	154.9	61.9	1245	-18.1	1090.1	303	1.55	Horizontal
944.994	42.5	133.4	61.9	1245	-19.5	1111.6	124	1.00	Horizontal



1 GHz to 4 GHz

Frequency (MHz)	QP Level (dBµV/m) at 3m	QP Level (µV/m) at 3m	QP Limit (dBµV/m) at 30m	QP Limit (µV/m) at 30m	Angle (deg)	Height (m)	Polarity
315.000	42.21	128.97	75.62	6041.67	186	100	Horizontal

1 GHz to 4 GHz



Date: 13.MAR.2013 19:12:28

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	<sup>1</sup> 1250 to 3750	<sup>1</sup> 125 to 375
174.00 to 260.00	3750	375
260.00 to 470.00	<sup>1</sup> 3750 to 12500	<sup>1</sup> 375 to 1250
Above 470.00	12500	1250

NOTE: <sup>1</sup> Linear interpolations

A duty cycle correction to the Fundamental Measurement The duty cycle is the ratio of the On Time to the On plus Off Time Duty (dB) = 20 Log(1/(30.315ms/1929.487ms)) = -36.06 dB



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## **2.3 20dB BANDWIDTH**

### **2.3.1 Specification Reference**

FCC CFR 47 Part 15C, Clause 15.231 (c)  
Industry Canada RSS-210, Clause A1.1.3

### **2.3.2 Equipment Under Test and Modification State**

Kawasaki 315 MHz S/N: 51204431044555 - Modification State 0

### **2.3.3 Date of Test**

14 March 2013

### **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 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.

### **2.3.6 Environmental Conditions**

Ambient Temperature	23.6°C
Relative Humidity	20.4%



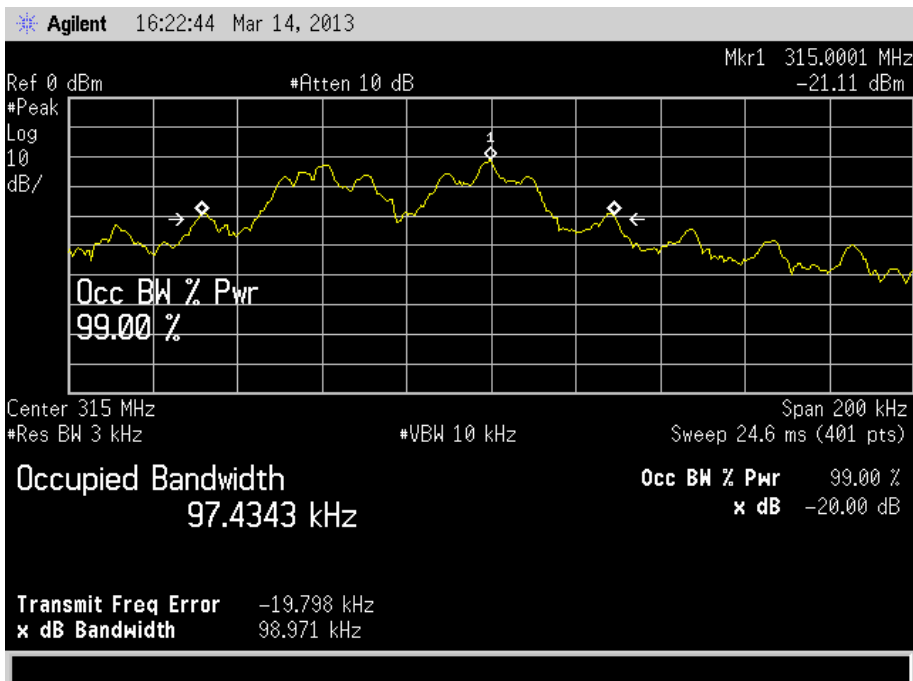


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**2.3.7 Test Results**

3 V DC Supply

Frequency (MHz)	20 dB Bandwidth
315	98.971 kHz





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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
<b>Section 2.1 - Manually Operated Transmitter</b>					
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013
<b>Section 2.2 - Field Strength of Emissions</b>					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	12-May-2013
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
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
<b>Section 2.3 - 20dB Bandwidth</b>					
RF Coupler	TUV SUD Product Service	RFC1	414	-	TU
Spectrum Analyser	Hewlett Packard	E4407B	1154	12	17-Jul-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	23-Jul-2013

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



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### 3.2 MEASUREMENT UNCERTAINTY

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

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



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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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