



Compliance Engineering Ireland Ltd

Clonross Lane, Derrockstown, Dunshaughlin, Co. Meath

Tel: +353 1 8256722 Fax: +353 1 8256733

Project Number: 14E4885-1f

Prepared for:

Control Electronic Measurement Systems Limited

By

Compliance Engineering Ireland Ltd

Clonross Lane

Derrockstown

Dunshaughlin

Co. Meath

FCC Site Registration: 92592

Industry Canada Assigned Site Code: 8517A-2

Date

14 June 2014

FCC EQUIPMENT AUTHORISATION

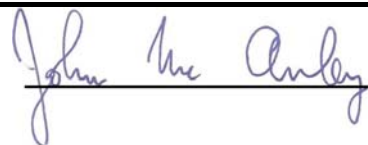
Test Report

EUT Description

RFID Reader module in 610f plastics

Authorised :

John McAuley

A handwritten signature in blue ink, reading 'John McAuley', written over a horizontal line.

TEST SUMMARY

Emissions were assessed to the following standards:

FCC CFR 47 Part 15

Federal Communications Commission: Part 15 Radio Frequency Devices

The equipment complies with the requirements according to the following standards.

FCC Part	TEST PARAMETERS	Test Result
15.209	RADIATED EMISSIONS	PASS

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF COMPLIANCE ENGINEERING IRELAND LTD

Exhibit A – Technical ReportTable of Contents

1.0	EUT DESCRIPTION	4
1.1	EUT OPERATION	5
1.2	MODIFICATIONS	5
1.3	DATE OF TEST	5
1.4	EMISSIONS TESTING	5
1.4.1	MEASUREMENT UNCERTAINTY	6
2.0	EMISSIONS MEASUREMENTS.....	7
2.1	CONDUCTED EMISSIONS MEASUREMENTS	7
2.2	RADIATED EMISSIONS MEASUREMENTS	7
3.0	RESULTS FOR CONDUCTED EMISSIONS	8
4.0	RESULTS FOR RADIATED EMISSIONS.....	9
	Appendix 1 List of Test Equipment	10
	Appendix 2 Test Configurations	11
	Appendix 3 Test plots	12

1.0 EUT Description

The EUT was a RFID reader unit which contained a transceiver module (as below) housed in plastic case. A finger print reader is also fitted on the EUT.

The module used a short range 13.56 MHz band transceiver for RFID.

RFID unit

Manufacturer:	Control Electronic Measurement Systems Limited
Make:	610f
Model:	610f

Module

Model:	S610MSCRM
Type:	13.56MHz Radio Transceiver for RFID
FCC ID:	QABS610MSCRM
IC ID:	12009A-S610MSCRM

1.1 EUT Operation

Operating Conditions during Test:

The equipment under test was operated during the measurement under the following conditions:

The EUT was powered from a 12v dc mains adapter.

The module was operated in normal modulated mode.

Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: +15 to +35 ° C

Humidity: 20-75 %

1.2 Modifications

No modifications were required in order to pass the test specifications.

1.3 Date of Test

The tests were carried out on one sample of the EUT on the 3rd March 2014.

1.4 Electromagnetic Emissions Testing

The guidelines of CISPR 16-4 were used for all uncertainty calculations, estimates and expressions thereof for EMC testing. A copy of Compliance Engineering Ireland Ltd.'s policy for EMC Measurement Uncertainty is available on request.

RF Requirements: Spurious emissions in accordance with FCC CFR 15.107, 15.109 and 15.209. Tests were carried out to the requirements of CISPR 16-4 and ANSI C63.4-2003.

1.4.1 Measurement Uncertainty

The measurement uncertainty (with a 95% confidence level) for the conducted emissions test was ± 3.5 dB.

The measurement uncertainty (with a 95% confidence level) for the radiated emissions test was ± 5.3 dB (from 30 to 100 MHz), ± 4.7 dB (from 100 to 300 MHz), ± 3.9 dB (from 300 to 1000 MHz) and ± 3.8 dB (from 1 GHz to 40 GHz).

2.0 Emissions Measurements

2.1 Conducted Emissions Measurements

The EUT was connected to the mains through a LISN and measurements were carried out using a Receiver over the frequency range 150KHz to 30MHz.

2.2 Radiated Emissions Measurements

Radiated Power measurements were made at the Compliance Engineering Ireland Ltd anechoic chamber located in Dunshaughlin, Co. Meath, Ireland to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

The EUT was connected to an AC2000 system comprising of a laptop running AC2000 firmware and a network switch / serial to Ethernet converter for communication to EUT. A Magnetic lock and Door simulator to mimic signals were also connected to the EUT to prove full functionality and simulate a complete system setup.

The EUT was centred on a motorized turntable, which allows 360 degree rotation. A measurement antenna was positioned at a distance of 3 metres as measured from the closest point of the EUT. The radiated emissions were maximised by configuring the EUT, by rotating the EUT, and by raising and lowering the antenna from 1 to 4 meters.

Emissions below 30MHz were measured using a loop antenna. In this case the resolution bandwidth was 200Hz for frequencies below 150KHz and RBW was 9KHz for frequencies above 150KHz.

Emissions between 30MHz and 1GHz were measured using a bi-log antenna. In this case the resolution bandwidth was 100KHz.

3.0 Results for Conducted emissions

Mains conducted Emissions results

Detector	Frequency MHz	Reading dBuV	Margin dB	Phase
Quasi-Peak	0.197	55.13	-9.52	Live
Average	0.197	40.06	-14.59	Live
Quasi-Peak	0.258	48.46	-14.45	Live
Quasi-Peak	0.463	43.24	-13.82	Live
Quasi-Peak	13.560	50.55	-9.45	Live
Average	17.124	38.20	-11.8	Live
Quasi-Peak	17.714	42.19	-17.81	Live
Average	17.714	37.42	-12.58	Live

Detector	Frequency MHz	Reading dBuV	Margin dB	Phase
Quasi-Peak	0.197	56.09	-8.56	Neutral
Average	0.197	41.00	-13.65	Neutral
Quasi-Peak	0.258	49.90	-13.01	Neutral
Quasi-Peak	0.443	43.36	-14.28	Neutral
Average	0.476	33.43	-13.25	Neutral
Quasi-Peak	13.560	50.56	-9.44	Neutral
Average	17.590	38.69	-11.31	Neutral
Average	17.727	38.26	-11.74	Neutral
Quasi-Peak	17.729	43.04	-16.96	Neutral

Ref Appendix 3 for scans

Result: Pass

4.0 Results for Radiated emissions

Appendix 3 shows the results of the scans in the anechoic chamber.

Frequency	Level	Antenna Factor	Cable Loss	Final Field Strength	Detector	Spurious Emission Limit	Margin	Pass / Fail
MHz	dBuV	dB	dB	dBuV/m		dBuV/m	dB	P/F
0.252	59.91	9.49	0.1	69.5	Average	99.58	30.08	Pass
15.283	20.65	8.35	0.1	29	Quasi Peak	69.54	40.54	Pass
18.47	6.15	8.35	0.1	14.5	Quasi Peak	69.54	55.04	Pass
27.12	14.4	6.32	0.1	14.4	Quasi Peak	69.54	55.14	Pass
*13.56	66.5	8.25	0.1	74.8	Quasi Peak	*124	*49.2	Pass

* Intentional radiator fundamental

4.1 Measurements with Bilog Antenna (30MHz to 1GHz)

Frequency MHz	Quasi Peak Level dBuV/m	Antenna Polarity	Antenna Factor dB	Cable loss dB	Final Field Strength Quasi Peak dBuV/m	Quasi Peak Limit dBuV/m	Margin dB
40.68	7.9	Vertical	14.2	0.2	22.3	40.0	17.7
54.24	16.6	Vertical	7.2	0.2	24	40.0	16.0
67.8	17.2	Vertical	6.1	0.2	23.5	40.0	16.5
125	16.3	Vertical	12.1	0.2	28.6	43.5	14.9
133.32	21.1	Vertical	12	0.2	33.3	43.5	10.2
250.02	13.8	Vertical	12.4	0.2	26.4	46.0	19.6
266.64	12.2	Vertical	13.7	0.2	26.1	46.0	19.9
375.047	18.2	Vertical	14.3	1.2	33.7	46.0	12.3
399.972	20.97	Vertical	15.6	1.2	37.77	46.0	8.3
500.063	26.8	Vertical	17.5	1.2	45.5	46.0	0.5
533.28	18.5	Vertical	17.9	1.2	37.6	46.0	8.4
800	13.01	Vertical	21.5	1.4	35.91	46.0	10.1
933.27	19.7	Vertical	23.3	1.4	44.4	46.0	1.6
40.68	13.6	Horizontal	14.2	0.2	28	40.0	12.0
54.24	2.6	Horizontal	7.2	0.2	10	40.0	30.0
67.8	1.7	Horizontal	6.1	0.2	8	40.0	32.0
250.02	16.3	Horizontal	12.4	0.2	28.9	46.0	17.1
350.044	8	Horizontal	14.2	1.2	23.4	46.0	22.6
375.06	19.2	Horizontal	14.3	1.2	34.7	46.0	11.3
399.972	23.2	Horizontal	15.6	1.2	40	46.0	6.0
500.07	22	Horizontal	17.5	1.2	40.7	46.0	5.3
933.27	17.75	Horizontal	23.3	1.4	42.45	46.0	3.6

Ref Appendix 3 for scans

Result: Pass

Appendix 1**List of Test Equipment**

Instrument	Mfr.	Model	CEI Ref No.	Cal Due Date
Bilog Antenna	Chase	CBL 6140	690	03/10/2015
Loop Antenna	EMCO	6502	821	27/08/2016
Spectrum Analyser/Receiver	Rohde & Schwarz	ESR	869	03/06/2015
LISN	Rohde & Schwarz	ESH3-Z5	604	14/12/2015

Appendix 2

Test Configurations



Fig 1 Radiated Emissions -



Fig 2 Radiated Emissions



Fig 3 Radiated Emissions -



Fig 4 Radiated Emissions



Fig 5 Conducted Emissions -

Appendix 3:

Test Results

