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TEST REPORT

**Salcom 12-86-0000 and 12-86-5000
Key Ring Paging Transmitters**

tested to the specification

EN 301 489-2 V2.1.0 (2017-03)

**Electro Magnetic Compatibility (EMC) standard
for radio equipment and services;
Part 2: Specific conditions for radio paging equipment;
Harmonised Standard covering the essential requirements
of article 3.1 (b) of Directive 2014/53/EU**

for

Sea Air and Land Communications (SALCOM) Ltd

A handwritten signature in black ink, appearing to read "Andrew Cutler", is written over a light blue rectangular background.

This Test Report is issued with the authority of:

Andrew Cutler - General Manager



Tests indicated as
not accredited are outside
the scope of the
laboratory's accreditation

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1. STATEMENT OF COMPLIANCE

The **Salcom 12-86-0000 and 12-86-5000 Key Ring Paging Transmitters** comply with EN 301 489-2 V2.1.0, 2017 (Draft) when tested in accordance with EN 301 489-1 V2.1.1, 2017 (Draft).

2. RESULTS SUMMARY

The results of testing, carried out in September 2017, are summarised below.

Clause	Phenomena	Application	Results.
8.2	Radiated emissions 30 – 6000 MHz	Enclosure.	Not applicable. Device is not a standalone ancillary. See EN 300 224 report
8.3	Conducted emissions.	DC power input/output port	Not applicable. Battery powered device.
8.4	Conducted emissions	AC input/output port	Not Applicable. Battery powered device.
8.5	Harmonic Emissions	AC mains port	Not Applicable. Battery powered device.
8.6	Voltage Fluctuations and Flicker	AC mains port	Not Applicable. Battery powered device.
8.7	Conducted emissions	Telecom port	Not applicable. No telecom port.

Immunity

Clause	Phenomena	Application	Results.
9.2	RF electromagnetic field 80 – 2700 MHz	Enclosure	Complies.
+9.2	RF electromagnetic field 2700 - 6000 MHz	Enclosure	Complies.
9.3	Electrostatic discharge	Enclosure	Complies
9.4	Fast transients, Common mode	Signal, telecom & control ports, DC & AC power input ports	Not applicable. Battery powered device.
9.5	RF common mode. 0.15 – 80MHz	Signal, telecom & control ports, DC & AC power ports	Not applicable. Battery powered device.
9.6	Transients and surges	DC power input ports	Not applicable – EUT is not for vehicular use.
9.7	Voltage dips and interruptions	AC mains power input ports	Not applicable – EUT is a Battery powered device.
9.8	Surges common and differential mode	Telecom port	Not applicable – EUT is Battery powered device only with no signal ports that connect to outdoor cables.

+ Test falls outside the scope of accreditation for this laboratory.

3. INTRODUCTION

This report describes the tests and measurements for the purpose of determining compliance with the specification under the following conditions:

The test sample was selected by the client.

This report relates only to the sample tested.

This report contains no corrections or erasures.

Measurement uncertainties with statistical confidence intervals of 95% are shown below test results. Both class A and Class B uncertainties have been accounted for, as well as influence uncertainties where appropriate.

All compliance statements have been made with respect of the specification limit with no reference to the measurement uncertainty.

4. CLIENT INFORMATION

Company Name Salcom Technologies Ltd

Address 10 Vanadium place
Addington
Christchurch 8024

Country New Zealand

Contact Mr John Croft

5. DESCRIPTION OF TEST SAMPLE

Brand Name Salcom

Model Numbers 12-86-000 and 12-86-5000

Product UHF (440-470MHz) Paging Transmitter

Manufacturer Sea Air Land Communications Ltd

Manufactured in New Zealand

Serial Numbers 12-86-0000: Not serialized
12-86-5000: 10643 16/1116

6. TEST RESULTS

EMC Immunity Performance Criteria

The device shall meet the following minimum performance criteria:

Performance criteria for Continuous phenomena applied to Transmitters (CT)

For pocket transmitters, a communication link shall be established before the test and during the test the modulation of the carrier of the EUT, caused by the modulation of the immunity test source, shall be less than 25% of the system peak modulation.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

Performance criteria for Transient phenomena applied to Transmitters (TT).

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

Performance criteria for Continuous phenomena applied to Receivers (CR)

For pocket paging receivers, during the test no false call shall occur.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Performance criteria for Transient phenomena applied to Receivers (TR).

At the conclusion of each exposure the EUT shall operate with no user noticeable loss of communication link.

At the conclusion of the total test comprising the series of individual exposures the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

Set-up

Each of the devices was powered from a 3 volt CR2032 button cell.

The 12-86-0000 and 12-86-5000 devices were programmed to output custom messages which were then decoded by a 12-90-0000 POCSAG paging transceiver.

During the test, the 12-86-0000 and 12-86-5000 devices were both tested independently with arrangements made for their continuous transmission.

The 12-90-0000 POCSAG paging transceiver was placed in the vicinity of the device under test inside the immunity room.

The custom text messages decoded by the transceiver were continuously logged and monitored using a terminal program that was supplied by the client, running on a laptop computer.

Radio Frequency Electromagnetic Field

Testing was carried out between 80 – 6000 MHz at 3 V/m in 1% steps in accordance with the requirements listed in EN 301 489-1 v2.1.1 2017-02 (Draft).

The RF signal was 80% AM modulated using a 1000 Hz tone.

The antenna was positioned 155 cm above the floor surface with the tip of the antenna being 1.5 meters from the device under test

Testing was carried out using both vertical and horizontal polarisations with a dwell time of 3 seconds.

During the test the RF field was continuously monitored using an isotropic field probe which was placed close to the device under test.

The arrangement of the device under test is depicted in the photographs in this report.

The devices are required to meet criteria CT and TT.

The calibration uncertainties for Radiated Susceptibility to EN 61000-4-3 between 80 - 6000 MHz are +/- 1.1 V/m.

Observations

No effects or responses were observed during the tests.

Result: Complies.

The devices displayed immunity to Radiated RF Electromagnetic Fields throughout the test and continued to operate normally after the test.

Electrostatic Discharge

Device under test: 12-86-0000

Performance Criterion: Transient Phenomena

Electrostatic Discharge testing was required to be carried out at ± 4 kV for contact discharges and ± 8 kV for air discharges.

The calibration uncertainties for Electrostatic Discharge to EN 61000-4-2 are:

- DC Voltage	1%
- Peak Current	5%
- Rise Time	6%
- Curve decay points at 30 and 60 nS	5%

10 x ± 4 kV Contact discharges were applied at one second intervals as follows:

Point of Contact	Observation	Result
HCP	No effects observed	Pass
VCP (Front)	No effects observed	Pass
VCP (Rear)	No effects observed	Pass
VCP (Left hand side)	No effects observed	Pass
VCP (Right hand side)	No effects observed	Pass
Case (top) centre	Device is housed in a non-metallic plastic encasing. No ESD occurred.	Pass
Case (Right Side)		Pass
Case (Left Side)		Pass
Case (Rear Side)		Pass

10 x ± 8 kV Air discharges were applied at one second intervals as follows:

Point of Contact	Observation	Result
Case (top) centre	Device is housed in a non-metallic plastic encasing. No ESD occurred.	Pass
Case (Right Side)		Pass
Case (Left Side)		Pass
Case (Rear Side)		Pass

Result: Complies.

The device displayed immunity to Electrostatic Discharges during the test and continued to operate normally after the test.

Electrostatic Discharge

Device under test: 12-86-5000

Performance Criterion: Transient Phenomena

Electrostatic Discharge testing was required to be carried out at ± 4 kV for contact discharges and ± 8 kV for air discharges.

The calibration uncertainties for Electrostatic Discharge to EN 61000-4-2 are:

- DC Voltage 1%
- Peak Current 5%
- Rise Time 6%
- Curve decay points at 30 and 60 nS 5%

10 x ± 4 kV Contact discharges were applied at one second intervals as follows:

Point of Contact	Observation	Result
HCP	No effects observed	Pass
VCP (Front)	No effects observed	Pass
VCP (Rear)	No effects observed	Pass
VCP (Left hand side)	No effects observed	Pass
VCP (Right hand side)	No effects observed	Pass

10 x ± 8 kV Air discharges:

The device is a bare PCB card, submitted by the client for test purpose. In actual installation the power and output connections become the responsibility of the installer, with cautionary explanations of ESD-safe connections.

As a reason contact discharges and air discharges were not carried out at the point of contact with the device.

Result: Complies.

The device displayed immunity to Electrostatic Discharges during the test and continued to operate normally after the test.

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Asset Ref
Bilog Antenna	EMCO	3141	9707-1071	E1596
ESD Gun	Schaffner	NSG 435	1261	E1426
Horn Antenna	EMCO	3115	9511-4629	E1526
Measurement Receiver	Rohde & Schwarz	ESHS 10	838693/002	3800
Power Amplifier	Amplifier Research	30W1000B	-	EMC4022
Power Amplifier	Ophir	5263FE	1002	-
+ Power Amplifier	Exodus communications	AMP 2003	10002	E13942
Signal Generator	Rohde & Schwarz	SMP04	1035 5005.04	E1560

All test equipment was within calibration at the time of testing.

+ denotes equipment not calibrated.

8. ACCREDITATIONS

The tests were carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ ISO 17025.

All measurement equipment has been calibrated in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ ISO 17025.

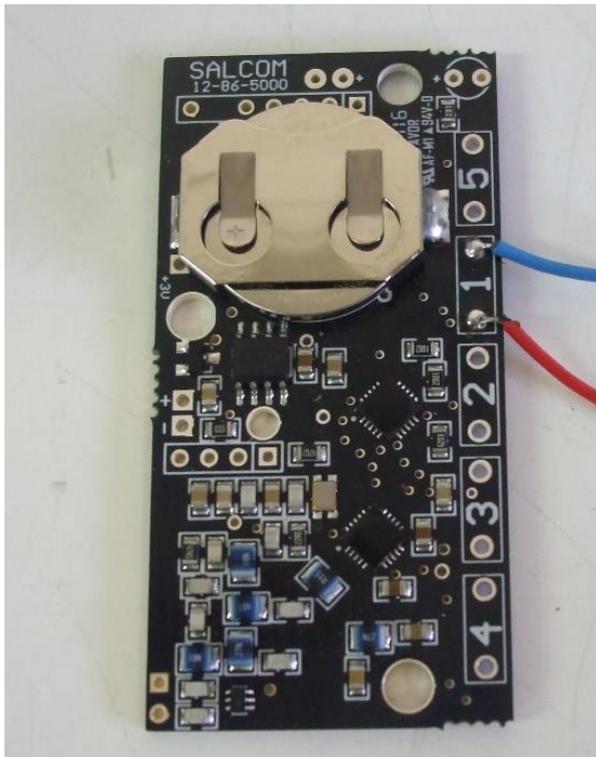
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with various accreditation bodies in a number of economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

9. PHOTOGRAPHS

SALCOM 12-86-0000



SALCOM 12-86-5000



Radiated Immunity test setup



ESD test setup

