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TEST REPORT

**Simoco SDB680 AC 01
VHF Base Station Transceiver
(136-174 MHz)**

tested to

47 Code of Federal Regulations

Part 15 - Radio Frequency Devices

Subpart A + B

for

Simoco Australasia Pty Ltd

This Test Report is issued with the authority of:

A handwritten signature in black ink, appearing to read "Andrew Cutler".

Andrew Cutler- General Manager



All tests reported
herein have been
performed in accordance
with the laboratory's
scope of accreditation

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1. STATEMENT OF COMPLIANCE

The **Simoco SDB680 AC 01 (136-174 MHz) VHF Base Station Transceiver** complies with the Class B limits contained within FCC Part 15 Subpart A + B when the methods as described in ANSI C63.4 - 2003 are applied.

2. RESULTS SUMMARY

The results of testing, carried out between 14th January and 30th January 2015, are summarised below.

Clause	Parameter	Result
15.101	Equipment authorisation requirement.	The verification process has been applied to this device
15.103	Exempted devices.	Device is not exempt as it contains a receiver and a digital device.
15.107	Conducted Emissions 0.15 - 30 MHz	Complies.
15.109	Radiated Emissions 30 - 2500 MHz	Complies.
15.111	Antenna Terminal Disturbance 30 – 950 MHz	Complies.

3. INTRODUCTION

This report describes the tests and measurements performed for the purpose of determining compliance with the specification.

The client selected the test sample.

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 Simoco Australasia Pty Ltd

Address 1270 Ferntree Gully Road
Scoresby

State Victoria, 3179

Country Australia

Contact Mr Robert Stowell

5. TEST SAMPLE DESCRIPTION

Brand Name Simoco

Model Number SDB680 AC 01

Product VHF Base Station Transceiver (136-174 MHz)

Manufacturer Simoco

Manufactured in Taiwan

Designed in Australia

Serial Number 36BAC1450900Y

FCC ID U89SDB680AC01

FCC Frequency Bands

Part 90: 150- 174 MHz

Test frequencies

150.175 MHz, 162.175 MHz, 172.875 MHz

Power Supply

DC voltage supply typically 14.0 Vdc

6. RESULTS

Standard

The sample was tested in accordance with 47 CFR Part 15 Subpart A and B with the Class B limits being applied.

Methods and Procedures

The following measurement methods and procedures have been applied:

- ANSI C63.4 – 2003

Section 15.101: Equipment authorisation requirement

The device tested is a receiver contained within a transceiver that has an Ethernet Port.

The verification process has been applied to this device because:

- the receiver is contained within a transceiver
- the device has an Ethernet port that contains a digital device
- the device is marketed for use in a commercial, industrial or business environment and would therefore be classed a Class A digital device

Section 15.107: Conducted limits

Conducted Emissions testing was carried out over the frequency range of 150 kHz to 30 MHz which was carried out at the laboratory's MacKelvie Street premises in a 2.4 m x 2.4 m x 2.4 m screened room

Testing was carried out using a representative power supply that was powered at 120 Vac 60 Hz.

The device was placed on top of the emissions table, which is 1 m x 1.5 m, 80 cm above the screened room floor which acts as the horizontal ground plane.

In addition the device was positioned 40 cm away from the screened room wall which acts as the vertical ground plane.

The artificial mains network was bonded to the screened room floor.

At all times the device was kept more than 80 cm from the artificial mains network.

Result: Complies.

Measurement uncertainty: AC Mains port (0.15 - 30 MHz) $\pm$ 2.8 dB

Conducted Emissions – AC Input Power Port

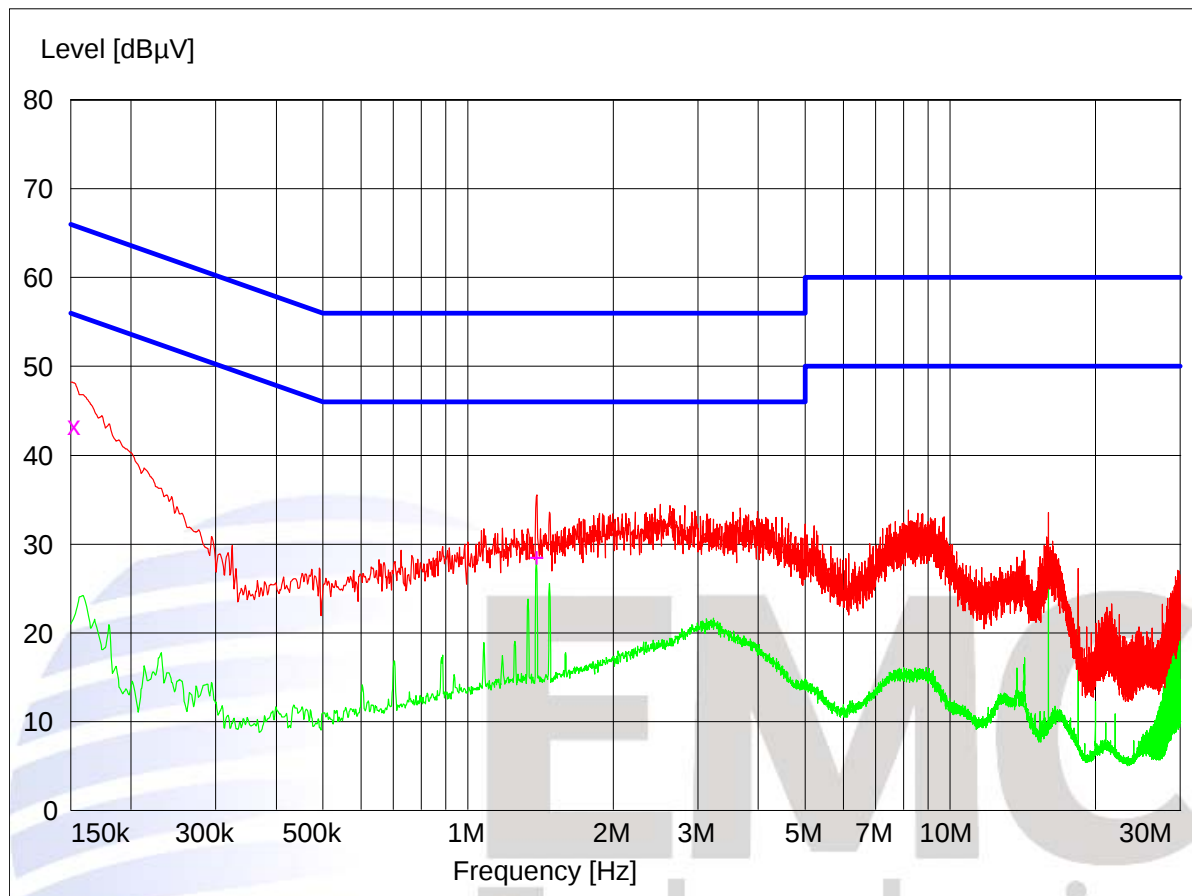
Setup: Device tested in receive / standby mode when powered at 120 Vac 60 Hz when using a representative AC power supply.

Peak ---

Average --

Quasi Peak X

Average +



Final Quasi-Peak Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
0.153000	43.40	65.8	22.4	N	

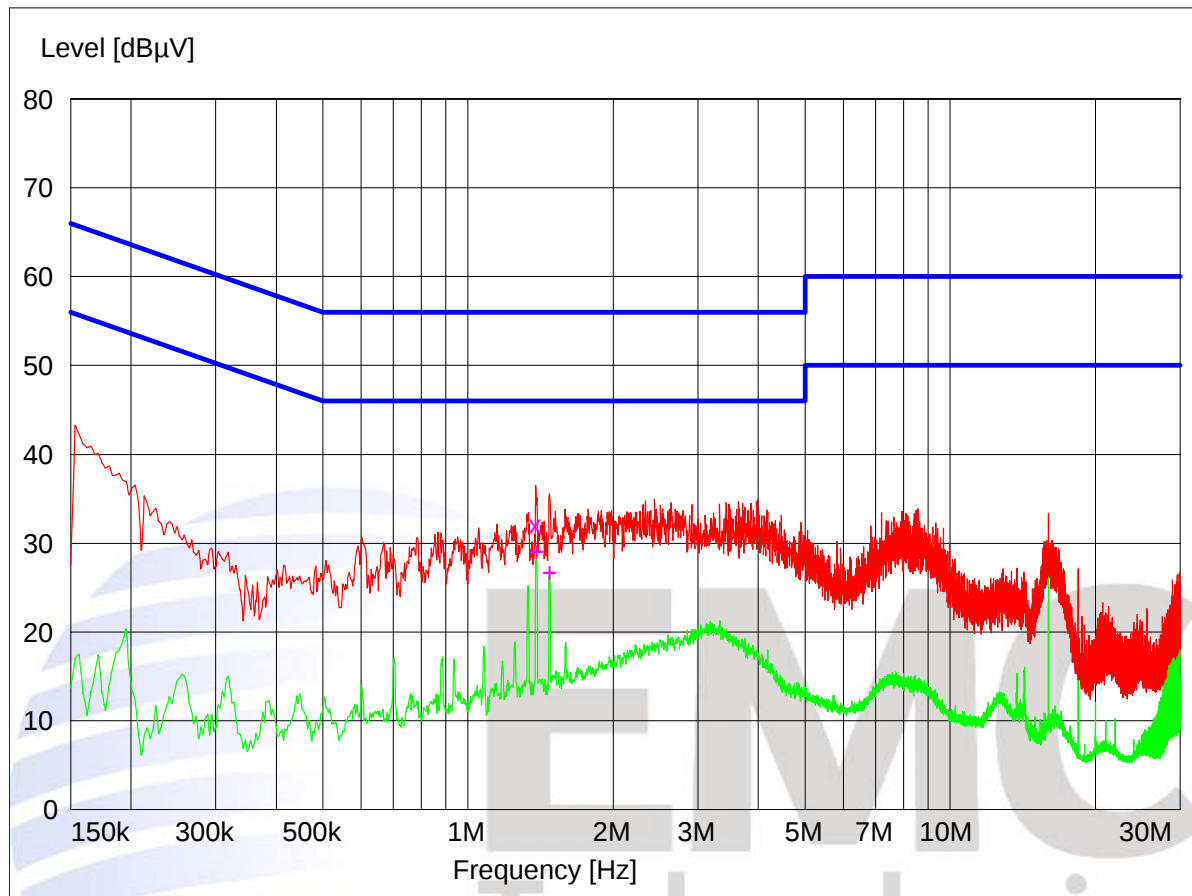
Final Average Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
1.386000	28.50	46.0	17.5	L1	

Conducted Emissions – AC Input Power Port

Setup:	Device tested in transmit mode when powered at 120 Vac 60 Hz when using a representative AC power supply.
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Peak ---
Average --
Quasi Peak X
Average +



Final Quasi-Peak Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
1.383000	32.10	56.0	23.9	N	

Final Average Measurements

Frequency MHz	Level dBμV	Limit dBμV	Margin dB	Phase	Rechecks dBμV
1.386000	29.10	46.0	17.0	N	
1.476000	26.70	46.0	19.3	N	

Section 15.109: Radiated spurious emissions

Radiated emission testing was carried out over the frequency range of 30 to 2500 MHz as the receiver operates between 150-174 MHz.

Testing was carried out at the laboratory's open area test site - located at 670 Kawakawa Orere Rd, RD3, Papakura, New Zealand.

Before testing was carried out, a receiver Self Test and Internal Calibration was undertaken along with a check of all connecting cables and programmed antenna factors.

The device was placed on the test tabletop, which was a total of 0.8 m above the test site ground plane.

Measurements were made at a distance of 3 metres.

Measurements below 1000 MHz were made using a Quasi Peak Detector with a bandwidth of 120 kHz.

Above 1000 MHz measurements were made using a Peak Detector and an Average Detector with a bandwidth of 1 MHz

When an emission is located, it is positively identified and its maximum level is found by rotating the automated turntable, and by varying the antenna height with an automated antenna tower.

All emissions were measured in both vertical and horizontal antenna polarisations.

The emission level is determined in field strength by taking the following into consideration:

Level (dB μ V/m) = Receiver Reading (dB μ V) + Antenna Factor (dB/m) + Coax Loss (dB) – Amplifier Gain (dB)

The Class B limits have been applied.

Result: Complies.

Measurement Uncertainty: ± 4.1 dB

Results:

Testing has been carried out when the device was receiving on 162.175 MHz.

The receiver has an intermediate frequency of 45 MHz.

The receiver was tested when a dummy load was attached to the antenna port and an Ethernet cable was attached to the Ethernet port.

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Polarity	Margin (dB)	Result
141.200	22.8	43.5	Vertical	20.7	Pass
141.200	17.6	43.5	Horizontal	25.9	Pass
197.000	17.4	43.5	Vertical	26.1	Pass
197.000	17.4	43.5	Horizontal	26.1	Pass
238.400	20.6	46.0	Vertical	25.4	Pass
238.400	18.3	46.0	Horizontal	27.7	Pass
238.600	21.5	46.0	Vertical	24.5	Pass
238.600	23.7	46.0	Horizontal	22.3	Pass
238.800	24.3	46.0	Vertical	21.7	Pass
238.800	21.0	46.0	Horizontal	25.0	Pass
239.000	23.3	46.0	Vertical	22.7	Pass
239.000	19.2	46.0	Horizontal	26.8	Pass
239.200	24.6	46.0	Vertical	21.4	Pass
239.200	21.5	46.0	Horizontal	24.5	Pass
239.600	25.2	46.0	Vertical	20.8	Pass
239.600	25.0	46.0	Horizontal	21.0	Pass
239.800	26.8	46.0	Vertical	19.2	Pass
239.800	23.0	46.0	Horizontal	23.0	Pass
240.000	19.0	46.0	Vertical	27.0	Pass
240.000	19.1	46.0	Horizontal	26.9	Pass
300.000	13.7	46.0	Horizontal	32.3	Pass
300.000	14.0	46.0	Vertical	32.0	Pass
399.997	22.0	46.0	Vertical	24.0	Pass
399.997	24.5	46.0	Horizontal	21.5	Pass

All other emissions observed had a margin to the limit that exceeded 20 dB.

Section 15.111: Receiver spurious emissions at antenna terminals

Testing was carried out at the antenna port.

Frequency: 150.175 MHz

Frequency (MHz)	Level (dBm)	Limit (dBm)
195.175	<-90.0	-57.0

Frequency: 162.175 MHz

Frequency (MHz)	Level (dBm)	Limit (dBm)
207.175	<-90.0	-57.0

Frequency: 173.875 MHz

Frequency (MHz)	Level (dBm)	Limit (dBm)
218.875	<-90.0	-57.0

No emissions observed.

Limit:

In accordance with CFR 47 Part 15, section 15.111 the power of any emission at the antenna terminal should not exceed 2 nW (-57.0 dBm).

Result: Complies.

Measurement Uncertainty: ± 3.3 dB

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial #	Asset	Cal Due	Interval
Receiver	R & S	ESHS 10	828404/005	3728	27/06/15	2 year
Mains Network	R & S	ESH2-Z5	881362/032	3628	23/10/16	2 year
Aerial Controller	EMCO	1090	9112-1062	3710	N/a	N/a
Aerial Mast	EMCO	1070-1	9203-1661	3708	N/a	N/a
Biconical Antenna	Schwarzbeck	BBA 9106	-	3789	05/02/2017	3 years
Horn Antenna	EMCO	3115	9511-4629	E1526	04/06/2017	3 years
Log Periodic Antenna	Schwarzbeck	VUSLP 91111	9111-228	3785	01/12/2017	3 years
Receiver	Rohde & Schwarz	ESIB-40	100171	4003	29/04/2015	1 year
Turntable	EMCO	1080-1-2.1	9109-1578	3709	N/a	N/a
VHF Balun	Schwarzbeck	VHA9103	-	3789	05/02/2017	3 years

At the time of testing all test equipment was within calibration.

8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies Ltd registration with the Federal Communications Commission as a listed facility, registration number: 90838, which was updated in June 2014.

All testing was carried out in accordance with the terms of EMC Technologies (NZ) Ltd International Accreditation New Zealand (IANZ) Accreditation to NZS/ISO/IEC 17025.

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

External Photos



Label Details



Conducted emissions test set up photos



Radiated emission test set up photos

