EMC Technologies (NZ) Ltd

Test Report No **60225.3**
Report date: 14th March 2006

TEST REPORT

Navman Remote Control Transceiver

tested to the

Code of Federal Regulations (CFR) 47

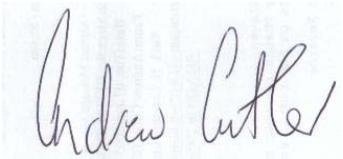
Part 15 – Radio Frequency Devices, Subpart C – Intentional Radiators

Section 15.249 – Operation in the band 2400 – 2483.5 MHz

for

Navman New Zealand

This Test Report is issued with the authority of:



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. CLIENT INFORMATION

Company Name Navman New Zealand

Address PO Box 68-155
Newton

City Auckland

Country New Zealand

Contact Mr Dominic Cranfield

2. DESCRIPTION OF TEST SAMPLE

Brand Name Navman

Model Number -

Product Remote Control Transceiver

Manufacturer Navman New Zealand

Country of Origin New Zealand

FCC ID RAY-ICNRMT

Sample Details

Serial No.	PCB	Description
BD03000037	30-BD00-075049 D2	Xmit every 180msec on 2.4149 GHz
BD03000054	30-BD00-075049 D2	Xmit every 180msec on 2.4489 GHz
BD03000065	30-BD00-075049 D2	Xmit every 180msec on 2.4709 GHz
BD03000011	30-BD00-075049 D2	Xmit every 180msec; 6 channels

3. COMPLIANCE STATEMENT

The **Navman Remote Control Transceiver** complies with 47 CFR Part 15 and in particular Sections, 15.205, 15.207, 15.209, 15.215 and 15.249 as detailed below.

CLAUSE	TEST PERFORMED	RESULT
15.109	Radiated emission limits	Complies
15.203	Antenna requirement	Complies
15.205	Operation in restricted bands	Complies
15.207	Conducted emissions	Not applicable
15.209	Radiated emissions	Complies
15.215	Additional provisions	Complies
15.249:		
(a)	Field strength of fundamental	Complies
(a)	Field strength of harmonics	Complies
(b)	Fixed, point to point operations	Not applicable
(c)	3 metre measurement distance	Noted
(d)	Spurious emission levels except harmonics	Complies
(e)	Detectors above 1000 MHz	Noted
(f)	Reference to section 15.37(d)	Noted

4. TEST SAMPLE DESCRIPTION

The Navman iCN720 / iCN750 in-car GPS navigation devices are sold with RF Remote Control transmitters.

These transmitters can be used to control various iCN720 / iCN750 device functions.

The remote control(s) have had their firmware modified so that they transmit continuously (every 180 msec) on a single channel.

Frequency Range:	2.4 GHz – 2.4835 GHz
Test Frequencies:	2414.9 MHz, 2448.9 MHz, 2470.9 MHz
Operating Frequencies:	2414.9 MHz, 2426.0 MHz, 2437.0 MHz, 2448.9 MHz, 2460.0 MHz, 2470.9 MHz.
Rated RF Power (max):	1 mW (0 dBm)
Modulation Type:	FSK
Antenna Type:	Integral
Power Supply:	Lithium battery
Nominal Voltage:	6 Vdc
Category:	Indoor use not below 0 degrees

5. ATTESTATION

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

The client selected the test sample.

The report relates only to the sample tested.

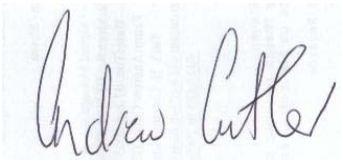
This report does not contain corrections or erasures.

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.

In addition this equipment has been tested in accordance with the requirements contained in the appropriate Commission regulations.

To the best of my knowledge, these tests were performed using measurement procedures that are consistent with industry or Commission standards and demonstrate that the equipment complies with the appropriate standards.

I further certify that the necessary measurements were made by EMC Technologies NZ Ltd, 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand.



Andrew Cutler
General Manager
EMC Technologies NZ Ltd

6. TRANSMITTER TEST RESULTS

Section 15.203 – Antenna requirement

The remote control devices contain a permanently attached whip antenna.

Section 15.205 – Restricted bands of operation

Refer to measurements made with reference to Section 15.249 (a).

Section 15.207 – Conducted emissions

The remote control devices are powered using internal dc batteries and no provision has been made in order that an external charger can be attached.

Section 15.209 – Radiated emissions

In accordance with section 15.249(d) the general emission limits specified in Section 15.209(a) have been applied to all emissions except the transmitter harmonics.

See Section 15.249(a) for further details.

Section 15.215 (c) – Additional provisions to the general radiated emission limitations

Spectrum mask measurements have been made at 2414.9 MHz and 2470.9 MHz to ensure that the 20 dB bandwidth of the emission is contained within the specified frequency band.

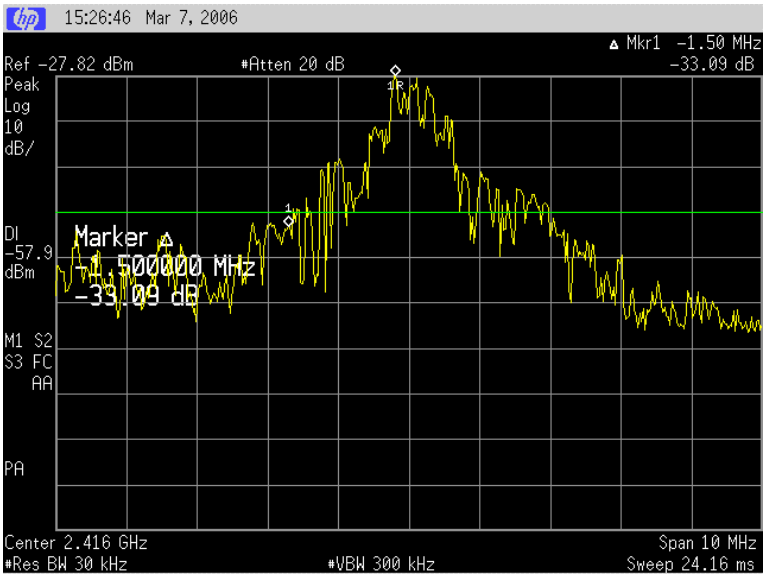
The remote control transmitters operate in the 2400 – 2483.5 MHz band.

Measurements were made at ambient temperature (20 degree centigrade) and this instance the 30 dB bandwidth was measured as an extreme case.

Temperature	F low	F high
+20.0	2412.6 MHz	2473.7 MHz

Result: Complies

2414.9 MHz lower band edge



2470.9 MHz upper band edge

Section 15.249 (a) – Field strength of the Fundamental and Harmonics

Standby mode

No emissions were detected from the remote control device when operating in standby.

Transmit mode

Transmit frequency (MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polarity
2414.900	88.0	94.0	6.0	Vertical
2414.900	80.0	94.0	14.0	Horizontal
2448.900	84.3	94.0	9.7	Vertical
2448.900	72.2	94.0	21.8	Horizontal
2470.900	89.5	94.0	4.5	Vertical
2470.900	71.7	94.0	22.3	Horizontal

No transmitter spurious emissions were detected up to 18 GHz when measurements were attempted using vertical and horizontal polarisations.

The device was placed on the test table, being 0.8 m above the ground plane, with the front display facing the test antenna.

All measurements were initially made over a distance of 3 metres. Further investigations were carried out at a distance of 1 metre however no emissions were detected.

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. The emission is measured in both vertical and horizontal antenna polarisations.

Below 1000 MHz a quasi peak detector was used with a bandwidth of 120 kHz.

Above 1000 MHz either an average or peak detector was used with a bandwidth of 1 MHz.

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

Level (dBμV/m) = Receiver Reading (dBμV) + Antenna Factor (dB) + Coax Loss (dB)

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (30 – 18,000 MHz) ± 4.1 dB

Result: Complies

7. TEST EQUIPMENT USED

Instrument	Manufacturer	Model	Serial No	Ref No
Aerial Controller	EMCO	1090	9112-1062	3710
Aerial Mast	EMCO	1070-1	9203-1661	3708
Turntable	EMCO	1080-1-2.1	9109-1578	3709
VHF Balun	Schwarzbeck	VHA 9103	-	3603
Biconical Antenna	Schwarzbeck	BBA 9106	-	3612
Log Periodic Antenna	Schwarzbeck	VUSLP 9111	9111-228	3785
Measurement Receiver	Rohde & Schwarz	ESCS 30	839873/1	E1595
Spectrum Analyser	Hewlett Packard	E7405A	US39150142	3776
Coax Cable	Sucoflex	104PA	2736/4PA	-
Horn Antenna	Electrometrics	RGA-60	6234	E1494

8. ACCREDITATIONS

Testing was carried out in accordance with EMC Technologies NZ Ltd registration with the Federal Communications Commission as a listed facility, Registration Number: 90838, which was updated on February 17th, 2004.

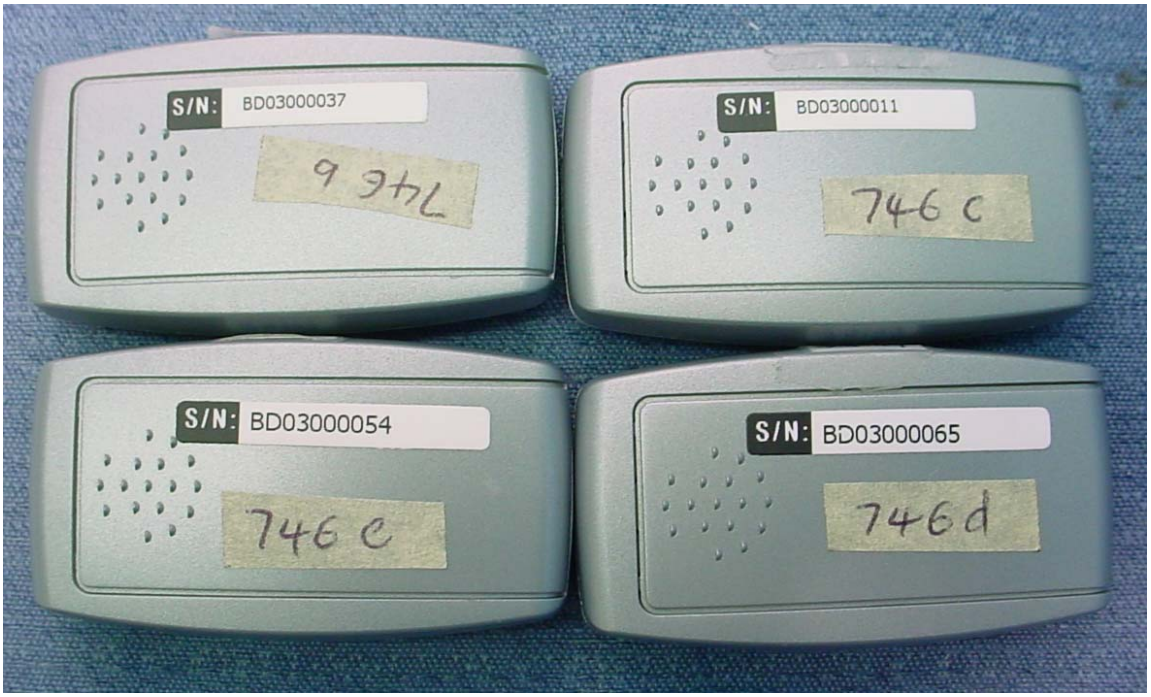
In addition testing was carried out in accordance with the terms of EMC Technologies (NZ) Ltd's International Accreditation New Zealand (IANZ) Accreditation to NZS/IEC/ISO 17025: 1999.

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: 1999.

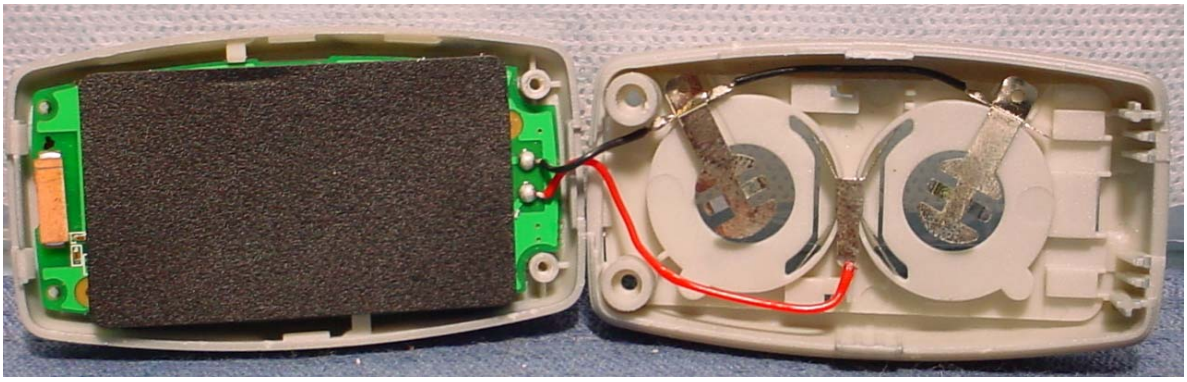
International Accreditation New Zealand has Mutual Recognition Arrangements for testing and calibration with 46 accreditation bodies in 34 economies. This includes NATA (Australia), UKAS (UK), SANAS (South Africa), NVLAP (USA), A2LA (USA), SWEDAC (Sweden). Further details can be supplied on request.

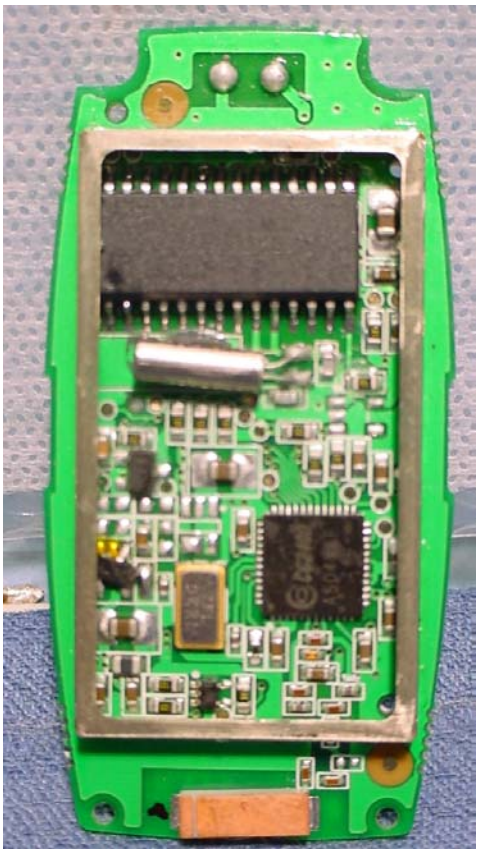
9. PHOTOGRAPHS

External views



Internal Views





Radiated emissions test set up