

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

TEST REPORT

Navman B2-Series Bluetooth Hands Free Cradle

tested to the

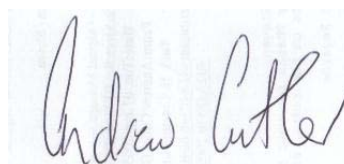
Code of Federal Regulations (CFR) 47

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

Section 15.247 – 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



EMC Technologies (NZ) Ltd

Test Report No **70306.4**

Report date: 23 March 2007

Table of Contents

1.	CLIENT INFORMATION	3
2.	DESCRIPTION OF TEST SAMPLE	3
3.	COMPLIANCE STATEMENT	4
4.	TEST SAMPLE DESCRIPTION	5
5.	ATTESTATION	6
6.	TRANSMITTER TEST RESULTS	7
7.	TEST EQUIPMENT USED	20
8.	ACCREDITATIONS	20
9.	PHOTOGRAPHS	21

EMC Technologies (NZ) Ltd

Test Report No **70306.4**
Report date: 23 March 2007

1. CLIENT INFORMATION

Company Name	Navman New Zealand
Address	Level 3, BNZ Building 129 Hereford Street
City	Christchurch 8000
Country	New Zealand
Contact	Roelf vanRooyen

2. DESCRIPTION OF TEST SAMPLE

Brand Name	Navman
Model Number	B2-Series
Product	Blue Tooth Hands Free Cradle
Manufacturer	Navman New Zealand
Country of Origin	Indonesia
Serial Number	0708ENDA00007 0708ENDA00017 0708ENDA00030
FCC ID	RAY ??
Ancillary Equipment	Navman N40i iCN. Sn# M6M7103447 Navman N60i iCN. Sn# YPM7105587 Navman F20 iCN. Sn# 0703E69001401

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

3. COMPLIANCE STATEMENT

The **Navman B2-Series Bluetooth Hands Free Cradle** complies with 47 CFR Part 15 and in particular Sections, 15.205, 15.207, 15.209 and 15.247 as detailed below.

<u>CLAUSE</u>	<u>TEST PERFORMED</u>	<u>RESULT</u>
15.203	Antenna requirement	Complies
15.205	Operation in restricted bands	Complies
15.207	Conducted emissions	Not applicable
15.209	Radiated emissions	Complies
15.247:		
(a)(1)	FHSS channel bandwidth	Complies
(a)(1)(iii)	FHSS channel occupancy	Complies
(a)(2)	Digital modulation bandwidth	Not applicable
(b)(1)	FHSS peak output power	Complies
(b)(3)	Digital peak output power	Not applicable
(c)	Antenna gains exceeding 6 dBi	Not applicable
(d)	Spurious emissions	Complies
(e)	Digital modulation power spectral density	Not applicable
(f)	Hybrid systems	Noted
(g)	Hopping systems	Noted
(h)	Hopping systems intelligence	Noted
(i)	Radio frequency hazard	Complies

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

4. TEST SAMPLE DESCRIPTION

The sample tested is a vehicle mounted device which allows the hands free use of an associated cell phone by using a Bluetooth connection.

The device also allows the attachment of an in car navigation device incorporating a GPS and RDS receiver.

Modulation system used

Frequency hopping spread spectrum (GFSK) at 1 Mbps

Rated Module Output Power

0 dBm (1 mW)

Antenna Type

PIFA circuit board antenna

Test frequencies

2402 MHz, 2440 MHz, 2480 MHz

Power Supply

The device is powered at 12 Vdc in a vehicle using an in car adaptor which supplies 3.6 Vdc to the device.

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

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.

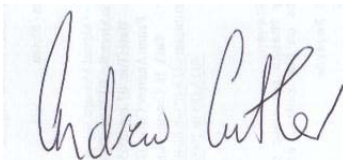
This report does not contain corrections or erasures.

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

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

6. TRANSMITTER TEST RESULTS

Section 15.203 – Antenna requirement

The device has an integral antenna that is attached permanently.

Section 15.205 – Restricted bands of operation

Refer to measurements made with reference to Section 15.247 (c).

Section 15.207 – Conducted emissions

Not applicable.

This device is intend for use in vehicles.

The device operates at 3.6 Vdc that is supplied using an in car adaptor that is inserted into the vehicles cigarette lighter socket.

It is therefore intended that this device operate from the vehicle power supply.

No provision has been made for the device to be powered from the AC mains either directly or in directly.

Section 15.209 – Radiated emissions

In accordance with section 15.247(c) attenuation below the general limits specified in Section 15.209(a) is not required except for those emissions that fall within the restricted bands defined in Section 15.205(a).

EMC Technologies (NZ) Ltd

Test Report No 70306.4

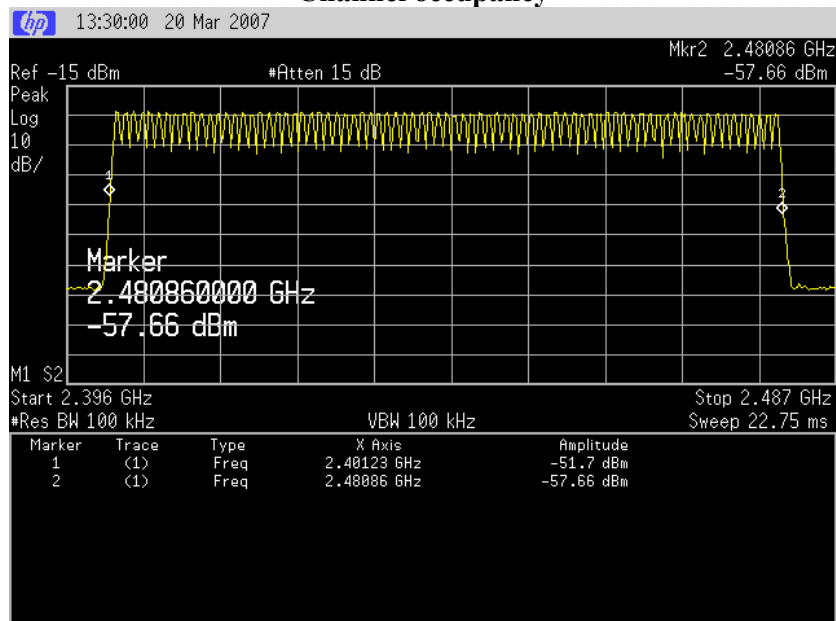
Report date: 23 March 2007

Section 15.247 (a) (1) – Frequency hopping systems channel bandwidth.

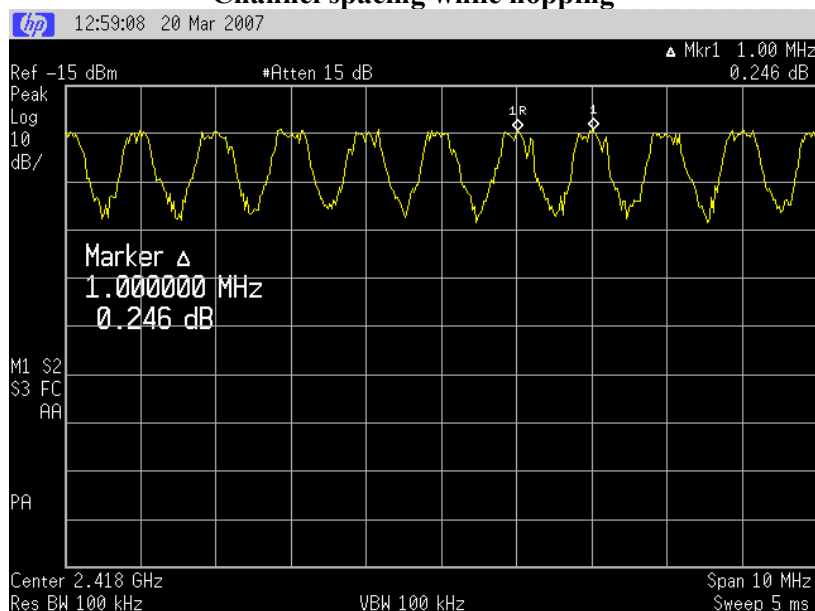
The frequency hopping system tested was a Bluetooth device.

79 channels were observed in operation between 2402 MHz and 2480 MHz which equates to a channel spacing of 1 MHz.

Channel occupancy



Channel spacing while hopping



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

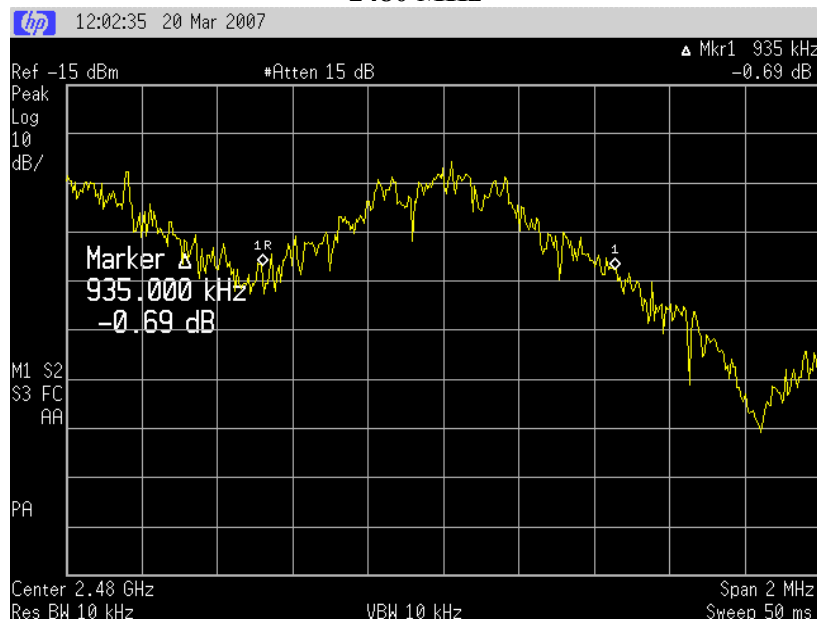
Test Report No 70306.4

Report date: 23 March 2007

The 20 dB bandwidth has been determined at 2402 MHz, 2440 MHz and 2480 MHz using a spectrum analyser with a resolution bandwidth of 10 kHz that gave a worst case bandwidth of 935 kHz.

Testing was carried out using with music being continuously streamed from a 2nd Bluetooth device (Cell phone).

2480 MHz



2440 MHz



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand
POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

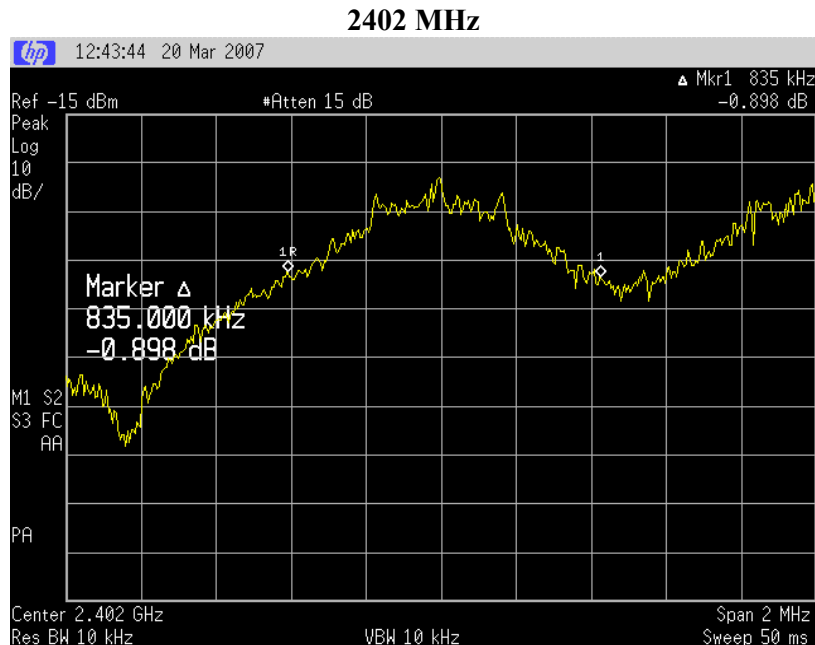
E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



Section 15.247 (a) (1) (iii) – Channel occupancy

As detailed previously 79 channels are used between 2402 – 2480 MHz.

The average time of occupancy on any channel shall not exceed 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels utilised.

$400 \text{ mS} \times 79 \text{ channels} = 31.5 \text{ seconds.}$

The Bluetooth specification states that each channel is occupied for 1.25 mS during which time any data is transmitted during the first 625 uS and data is received during the second 625 uS period.

Testing was carried out while music was being continuously streamed through the device from a 2nd Blue tooth device (Cell phone).

When tuned to 2402 MHz with a 0 Hz span the transmitter was observed to operate up to 28 times in 5 seconds.

Therefore in a 31.5 second period the transmitter could operate up to 177 times.

A test was carried out over a 31.6 second period however it was difficult to determine accurately the number of times that the transmitter was activated.

EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

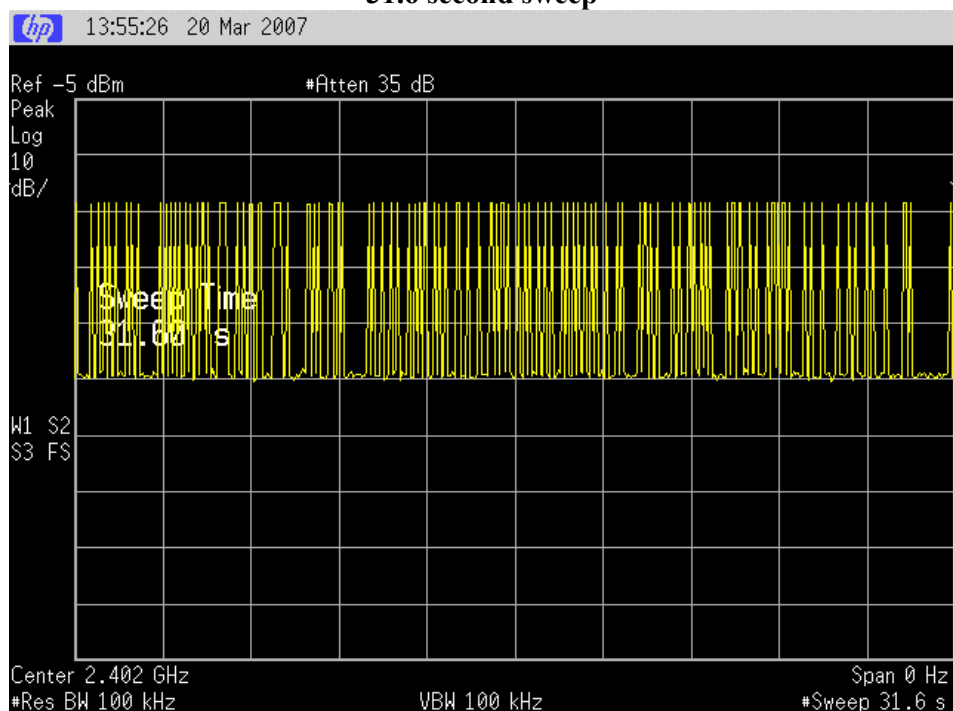
E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

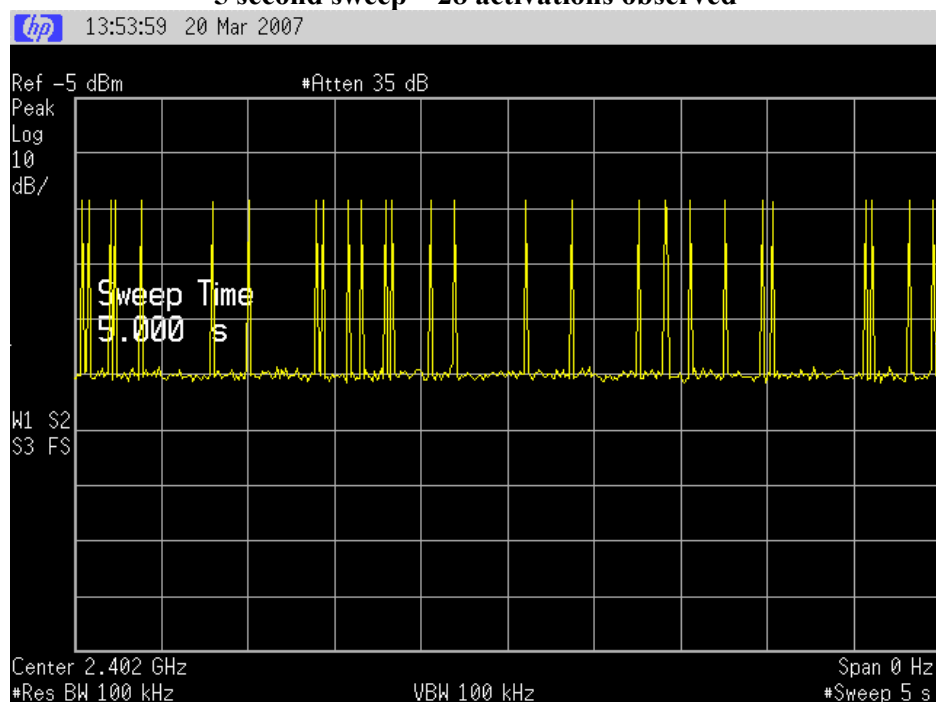
EMC Technologies (NZ) Ltd

Test Report No 70306.4
Report date: 23 March 2007

31.6 second sweep



5 second sweep – 28 activations observed



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand
POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

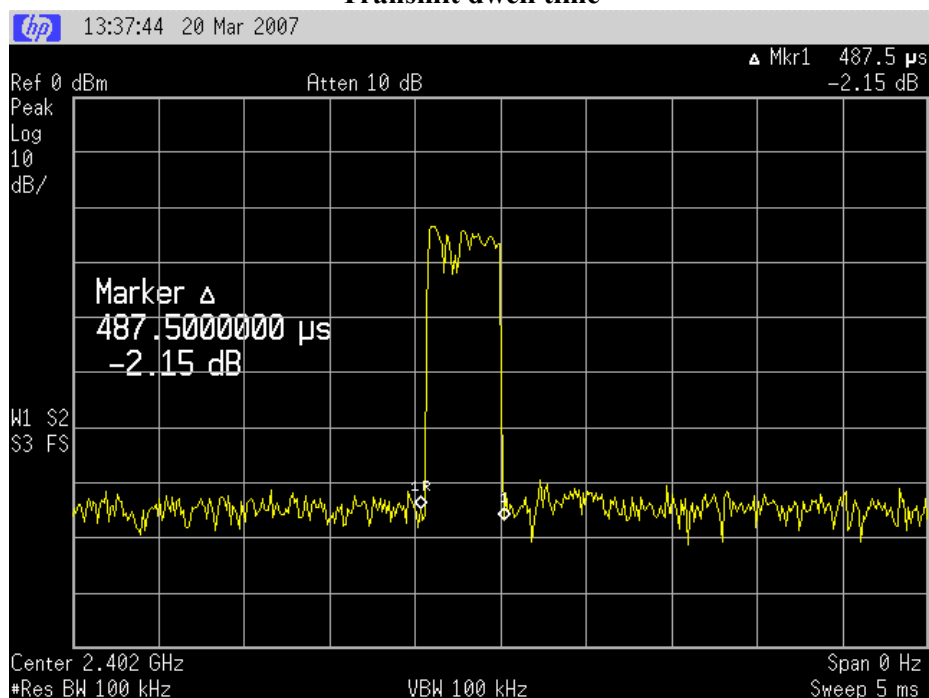
E-mail: aucklab@ihug.co.nz
Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Transmit dwell time



It can be seen that the transmitter operates for approximately 487.5 uS of the 625 uS transmit period.

It can be seen that in any 31.5 second period the transmitter will operate 177 times.

The Bluetooth specification for channel dwell time is 1.25 mS (2 x 625 uS).

Therefore each channel was occupied on average for a period of:

177 times x 1.25 mS = 0.22125 seconds or 221.25 mS.

The specification limit is 0.4 seconds or 400 mS in a 31.5 second observation period.

Result: Complies

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Section 15.247 (b) (1) & (3) – Peak output power

As this device has no external antenna port, with the antenna being located internally; radiated measurements were made to determine the peak output power.

The device was placed on the test table, being 80 cm above the ground plane, with the computer screen display facing the test antenna located 3 metres away.

The device was rotated in order to determine the highest power output indication.

Measurements were made with the spectrum analyser operating in peak hold mode with a resolution bandwidth of 1 MHz when transmitting continuously.

Measurements were made on a low, middle and high frequency channel on three samples with a different in car navigation unit attached.

	N60i	F20	N40i		
Frequency	Level	Level	Level	Limit	Result
MHz	dBm	dBm	dBm	dBm	
2402.0	-7.1	-2.6	-5.3	30.0	Pass
2440.0	-4.9	-2.7	-	30.0	Pass
2480.0	-4.6	-4.7	-4.6	30.0	Pass

The specification limit is 30 dBm (1.0W) as more than 75 non overlapping channels have been used.

Variation by $\pm 10\%$ of the supply voltage to the in car adaptor did not vary the output power observed.

Result: Complies.

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Section 15.247 (i) – Radio Frequency Hazard Information

As per Section 1.1310 and Section 2.1091 certification of this transmitter is sought using the Uncontrolled / General Public Exposure limits as detailed in OST/OET Bulletin Number 65.

Minimum safe distances have been calculated below.

Power density, $W/m^2 = E^2/3770$

General Population / Uncontrolled exposure limit will be 1.0 mW/cm^2 as the device operates in the band 2400 – 2483.5 MHz.

The minimum distance from the antenna at which the MPE is met is calculated from the equation relating field strength in V/m, transmit power in watts, transmit antenna gain, transmitter duty cycle and separation distance in metres:

$$E, \text{ V/m} = (\sqrt{(30 * P * G)}) / d$$

$$E = 1.0 \text{ mW/cm}^2 = E^2/3770$$

$$E = \sqrt{1.0 * 3770}$$

$$E = 61.4 \text{ V/m}$$

The rated maximum transmitter power = 1 mW (0 dBm).

The antenna for this device is integral.

The safe distance has been calculated as follows.

$$d = \sqrt{(30 * P * G * DC)} / E$$

$$d = \sqrt{(30 * 0.001)} / 61.4$$

$$d = 0.0003 \text{ metres or } 0.3 \text{ cm}$$

Result: Complies. This device will comply with the 20 cm safe distance requirement.

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Section 15.247 (c) – Out of band emissions

As the transmitter does not have an external antenna port radiated measurements were made at the open area test site.

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

Measurements were made using a resolution bandwidth of 100 kHz where an emission fell outside of a restricted band.

When an emission fell within a restricted band, above 1 GHz, a peak detector and an average detector with a resolution bandwidth of 1 MHz were utilised in accordance with section 15.209.

Below 1 GHz a quasi peak detector with a resolution bandwidth of 120 kHz was utilised.

All measurements were initially made over a distance of 3 metres.

In the unrestricted bands measurements were made to determine if the field strength of the emissions observed were more than 20 dB down on the highest in band emission level.

Three samples with a different in car navigation unit attached.

Each sample was configured to transmit blue tooth continuously with each iCN device configured with the GPS activated and displaying positions and with the RDS system activated.

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.

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) – Amplifier Gain (dB)

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Transmitting on 2402 MHz (all 3 samples)

Frequency	Level	Limit	Antenna	Detector	Bandwidth	Result
MHz	dBuV/m	dBuV/m (dB)	Pol			
2402	94.8	-	Vert	peak	100 kHz	Pass
4804	-	54.0	Vert/Hort	average	1 MHz	Pass
7206	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
9608	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
12010	-	54.0	Vert/Hort	average	1 MHz	Pass
14412	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
16814	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass

Transmitting on 2440 MHz (F20 and N60i samples only)

Frequency	Level	Limit	Antenna	Detector	Bandwidth	Result
MHz	dBuV/m	dBuV/m (dB)	Pol			
2440	94.7	-	Vert	peak	100 kHz	Pass
4880	-	54.0	Vert/Hort	average	1 MHz	Pass
7320	-	54.0	Vert/Hort	average	1 MHz	Pass
9760	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
12200	-	54.0	Vert/Hort	average	1 MHz	Pass
14640	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
17080	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass

Transmitting on 2480 MHz (all 3 samples)

Frequency	Level	Limit	Antenna	Detector	Bandwidth	Result
MHz	dBuV/m	dBuV/m (dB)	Pol			
2480	92.8	-	Vert	peak	100 kHz	Pass
4960	-	54.0	Vert/Hort	average	1 MHz	Pass
7440	-	54.0	Vert/Hort	average	1 MHz	Pass
9920	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
12400	-	54.0	Vert/Hort	average	1 MHz	Pass
14880	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass
17360	-	(-20.0)	Vert/Hort	peak	100 kHz	Pass

No transmitter spurious emissions were detected from any of the 3 samples tested.

Where an average detector is listed in the above tables, measurements were also attempted using a peak detector where a limit of 74 dBuV/m was applied

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Where an emission level is indicated by a –, levels had a margin greater than 20 dB when compared to the limit.

Other emissions observed when the 3 samples were tested with different iCN devices attached are detailed below.

Each sample was tested when powered using an in car adaptor and a 12 Vdc battery.

Attached to the iCN devices was an external RDS receive antenna and an external microphone.

Each iCN was operated with the Blue tooth transmitter operating continuously along with the GPS receiver and RDS receiver activated.

F20 with B2+ unit (Sn# 0708ENDA00030)

No emissions detected within 20 dB of the applicable limit when measurements were attempted between 30 – 2400 MHz at a distance of 3 metres when using either vertical or horizontal polarisations

N60i with B2+ unit (Sn# 0708ENDA00017)

Frequency MHz	Vertical dBuV/m	Horizontal dBuV/m	Limit dBuV/m	Margin dB	Result	Antenna Polarisation
58.285		12.3	40.0	27.7	Pass	Horizontal
70.780		13.4	40.0	26.6	Pass	Horizontal
77.998		13.8	40.0	26.2	Pass	Horizontal
79.180		12.5	40.0	27.5	Pass	Horizontal
137.440		27.8	43.5	15.7	Pass	Horizontal
320.560	28.1	32.2	46.0	13.8	Pass	Horizontal
312.230		31.0	46.0	15.0	Pass	Horizontal

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

N40i with B2+ unit (Sn# 0708ENDA00007)

Frequency MHz	Vertical dBuV/m	Horizontal dBuV/m	Limit dBuV/m	Margin dB	Result	Antenna Polarisation
77.998	13.3	13.8	40.0	26.2	Pass	Horizontal
124.000	21.5		43.5	22.0	Pass	Vertical
124.900	28.9	27.0	43.5	14.6	Pass	Vertical
137.440	18.2	27.8	43.5	15.7	Pass	Horizontal
224.800		33.4	46.0	12.6	Pass	Horizontal
230.500		33.8	46.0	12.2	Pass	Horizontal
236.000		31.4	46.0	14.6	Pass	Horizontal
241.500		33.1	46.0	12.9	Pass	Horizontal
247.000		31.0	46.0	15.0	Pass	Horizontal
252.800		29.0	46.0	17.0	Pass	Horizontal
258.300		31.7	46.0	14.3	Pass	Horizontal
263.800		30.9	46.0	15.1	Pass	Horizontal
274.800		32.1	46.0	13.9	Pass	Horizontal
280.500		33.6	46.0	12.4	Pass	Horizontal
297.000		34.9	46.0	11.1	Pass	Horizontal
302.545	33.0	40.8	46.0	5.2	Pass	Horizontal
308.080	34.5	42.1	46.0	3.9	Pass	Horizontal
313.643	34.1	41.6	46.0	4.4	Pass	Horizontal
319.185	33.9	41.4	46.0	4.6	Pass	Horizontal
324.713	32.7	36.1	46.0	9.9	Pass	Horizontal
330.270	34.1	38.3	46.0	7.7	Pass	Horizontal
335.832	34.6		46.0	11.4	Pass	Vertical
341.390	33.0	34.5	46.0	11.5	Pass	Horizontal
346.938	31.7	34.4	46.0	11.6	Pass	Horizontal
399.678	35.1	37.6	46.0	8.4	Pass	Horizontal

Result: Complies

Measurement uncertainty with a confidence interval of 95% is:

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

EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

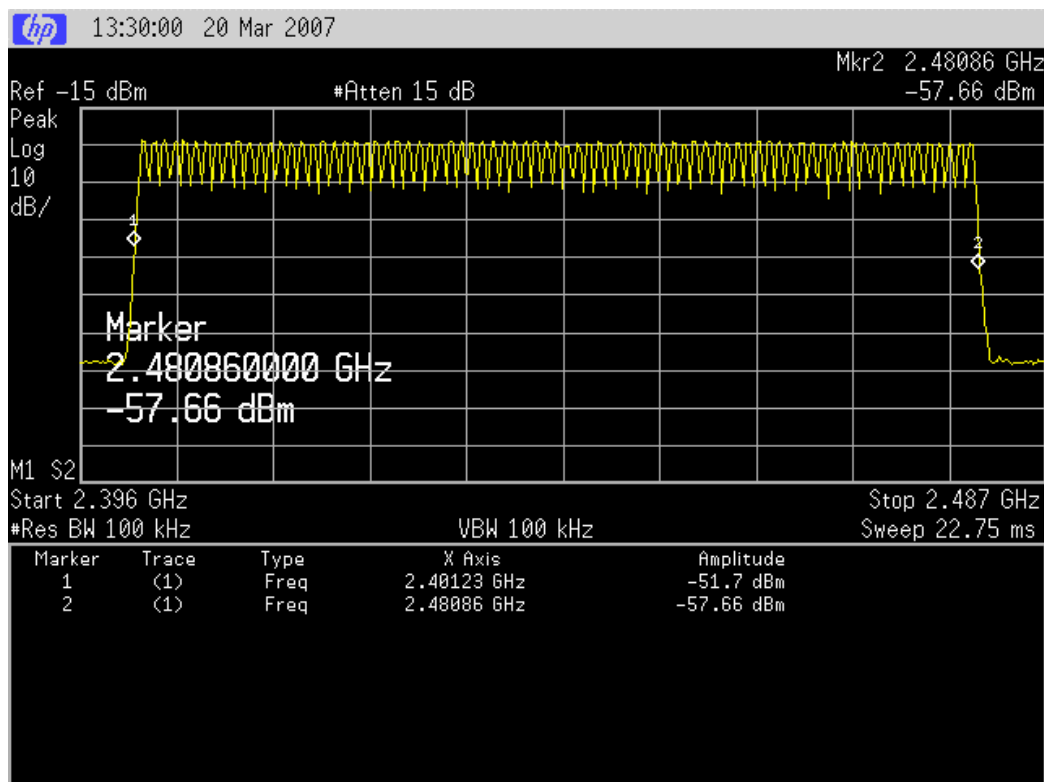
Test Report No 70306.4

Report date: 23 March 2007

Band edge measurements

The Bluetooth device is required to operate in the band 2400 MHz to 2483.5 MHz.

Initially relative measurements were made in the laboratory using a 100 kHz resolution bandwidth with the -20 dB limit being applied at both band edges.



Test site measurements were then made in the 2310 – 2390 MHz and 2483.5 – 2500 MHz restricted bands using a peak detector and an average detector with a 1 MHz bandwidth while the Bluetooth device was transmitting continuously

Restricted band 2310 – 2390 MHz: No emissions detected

Restricted band 2483.5 – 2500.0 MHz: No emissions detected

Result: Complies

EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 19 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

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	EMCO	3115	9511-4629	E1526
Horn Antenna	Electrometrics	RGA-60	6234	E1494
Microwave Amplifier	Hewlett Packard	8349B	2644A01659	-

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 January 18th, 2007.

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.

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 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.

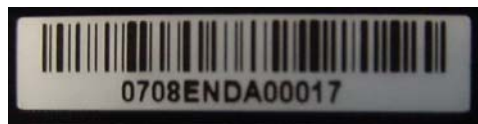
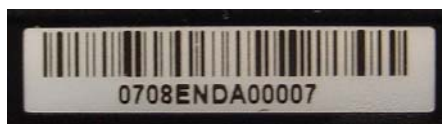
EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

9. PHOTOGRAPHS

External views



EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 22 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Ancillary items – iCN devices and attachments



In car adaptor



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 23 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

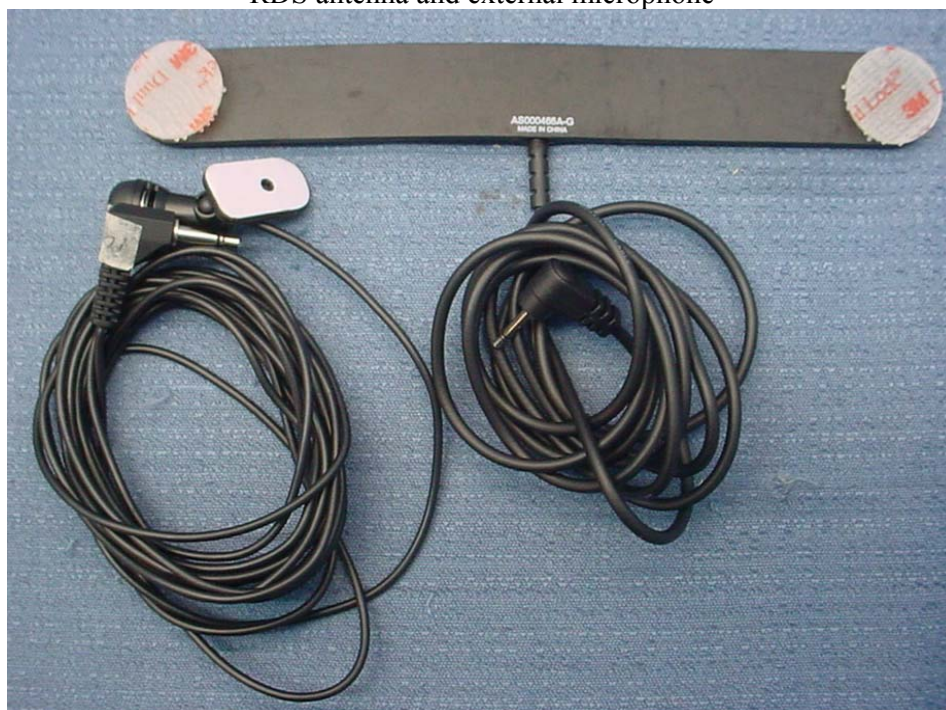
EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



RDS antenna and external microphone



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 24 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 25 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 26 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

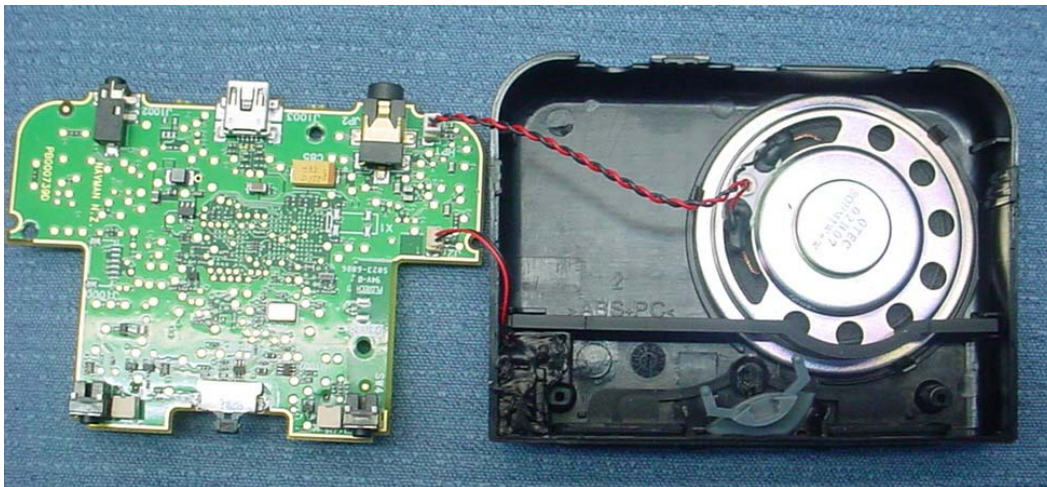
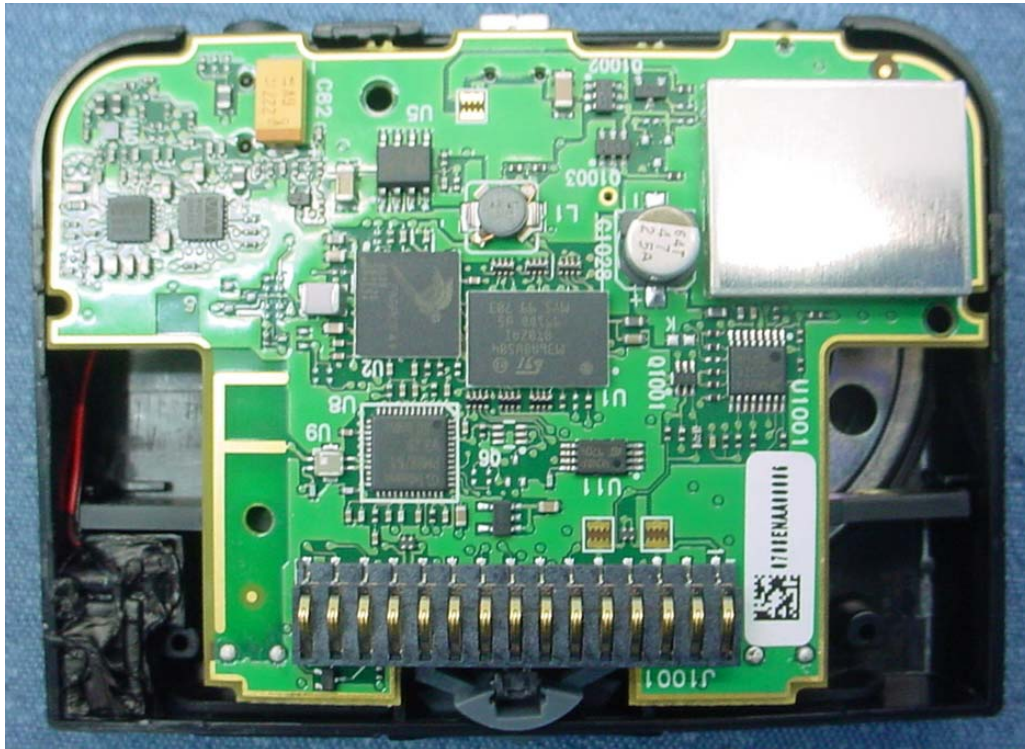
Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Internal Photos



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 27 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

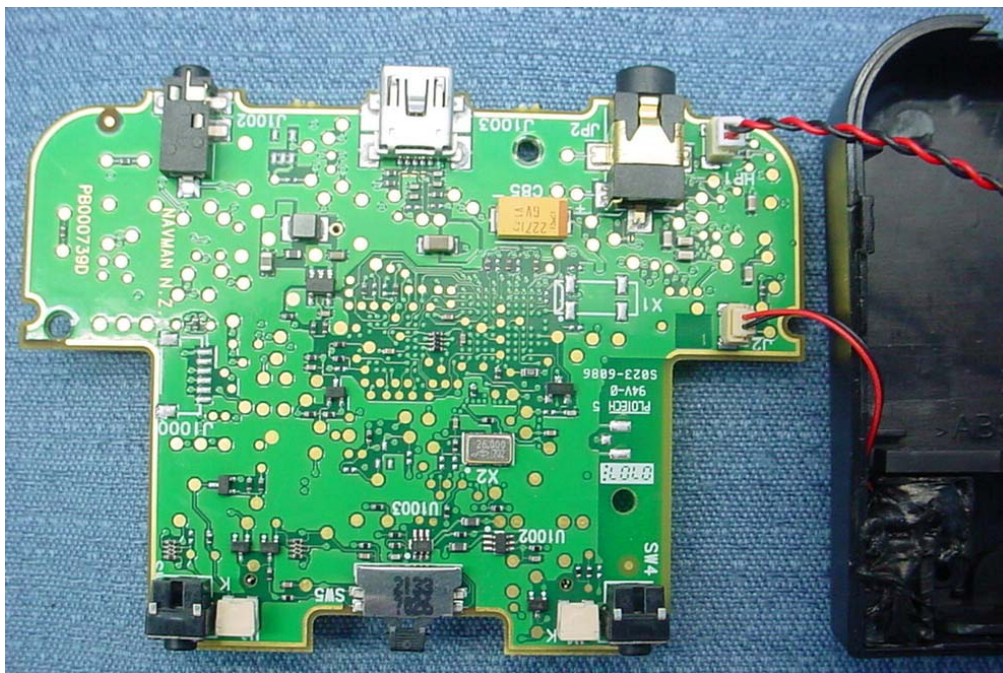
E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 28 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au

EMC Technologies (NZ) Ltd

Test Report No 70306.4

Report date: 23 March 2007

Radiated emissions test set up



EMC Technologies (NZ) Ltd

STREET ADDRESS - 47 MacKelvie Street, Grey Lynn, Auckland, New Zealand

POSTAL ADDRESS - PO Box 68 307, Newton, Auckland, New Zealand

Page 29 of 29

This report may not be reproduced except in full

Telephone: +64 9 360 0862 Fax: +64 9 360 0861

E-mail: aucklab@ihug.co.nz

Web Site: www.emctech.com.au