



Product Service

**Choose certainty.
Add value.**

Report On

FCC Testing of the
Domo Ltd NETNode IP Mesh Radio (Robust)
In accordance with FCC Part 15B

COMMERCIAL-IN-CONFIDENCE

FCC ID: XRFNetnode

Document 75910529 Report 01 Issue 1

December 2010



Product Service

TÜV SÜD Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Domo Ltd NETNode IP Mesh Radio (Robust)
In accordance with FCC Part 15B

Document 75910529 Report 03 Issue 1

December 2010

PREPARED FOR

Cobham Surveillance
Domo Ltd
12 Manor Court
Barnes Wallis Road
Fareham
PO15 5TH

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

M J Hardy
Authorised Signatory

DATED

15 December 2010

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler





CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Declaration of Build Status 6
1.4	Product Information 7
1.5	Test Conditions 8
1.6	Deviations From the Standard 8
1.7	Modification Record 8
2	TEST DETAILS 9
2.1	Radiated Emissions (Enclosure Port) 10
3	TEST EQUIPMENT USED 14
3.1	Test Equipment Used 15
3.2	Measurement Uncertainty 16
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 17
4.1	Accreditation, Disclaimers and Copyright 18



SECTION 1

REPORT SUMMARY

FCC Testing of the
Domo Ltd NETNode IP Mesh Radio (Robust)
In accordance with FCC Part 15B



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Domo Ltd NETNode IP Mesh Radio (Robust) to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Domo Ltd
Model Number(s)	NETNode IP Mesh Radio (Robust)
Serial Number(s)	013149
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2009
Incoming Release Date	Declaration of Build Status 26 November 2010
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	6402 23 July 2010
Start of Test	02 November 2010
Finish of Test	02 November 2010
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4: 2003



Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15B is shown below.

Configuration 1						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.109	Radiated Emissions (Enclosure Port)	Receive Middle	0	Pass	ANSI C63.4



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Mesh Net Node (Rugged)-COFDM Robust IP Mesh Node (Phase2) 1W 2.17 to 2.50GHz (excluding ANTS)
MANUFACTURER	Cobham/Domo
TYPE	
PART NUMBER	NETNode-R-217250
SERIAL NUMBER	013149 Built 22/9/10
HARDWARE VERSION	1.5 (D832)
SOFTWARE VERSION	Mesh 1.4
TRANSMITTER OPERATING RANGE	2.17-2.5GHz
RECEIVER OPERATING RANGE	2.17-2.5GHz
COUNTRY OF ORIGIN	UK
INTERMEDIATE FREQUENCIES	2452.5, 2466.75 and 2481.0
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	2M5G2D
MODULATION TYPES: (i.e. GMSK, QPSK)	QPSK
HIGHEST INTERNALLY GENERATED FREQUENCY	N/A
OUTPUT POWER (W or dBm)	1W
FCC ID	XRFNetnode
INDUSTRY CANADA ID	8638A-Netnode
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Robust IP Mesh Radio system, used to pass IP packets of Video or Data/Audio.

Signature Held on File at TÜV SÜD Product Service

Date 26 November 2010

Declaration of Build Status Serial Number 75910529/01

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Domo Ltd NETNode IP Mesh Radio (Robust) with Bluetooth and GPS. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration

Configuration 1

The EUT was configured in accordance with FCC CFR 47 Part 15B.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 – Receive Middle



Product Service

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure or test laboratories as appropriate.

The EUT was powered from a 12V DC Power supply unit.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the Domo Ltd NETNode IP Mesh Radio (Robust)
Domo Ltd NETNode IP Mesh Radio (Robust)
In accordance with FCC Part 15B



Product Service

2.1 RADIATED EMISSIONS (ENCLOSURE PORT)**2.1.1 Specification Reference**

FCC CFR 47 Part 15B, Clause 15.109

2.1.2 Equipment Under Test

NETNode IP Mesh Radio (Robust), S/N: 013149

2.1.3 Date of Test and Modification State

02 November 2010 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI C63.4.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1

2.1.6 Environmental Conditions

02 November 2010

Ambient Temperature 24.6°C

Relative Humidity 32%

Atmospheric Pressure 1008mbar



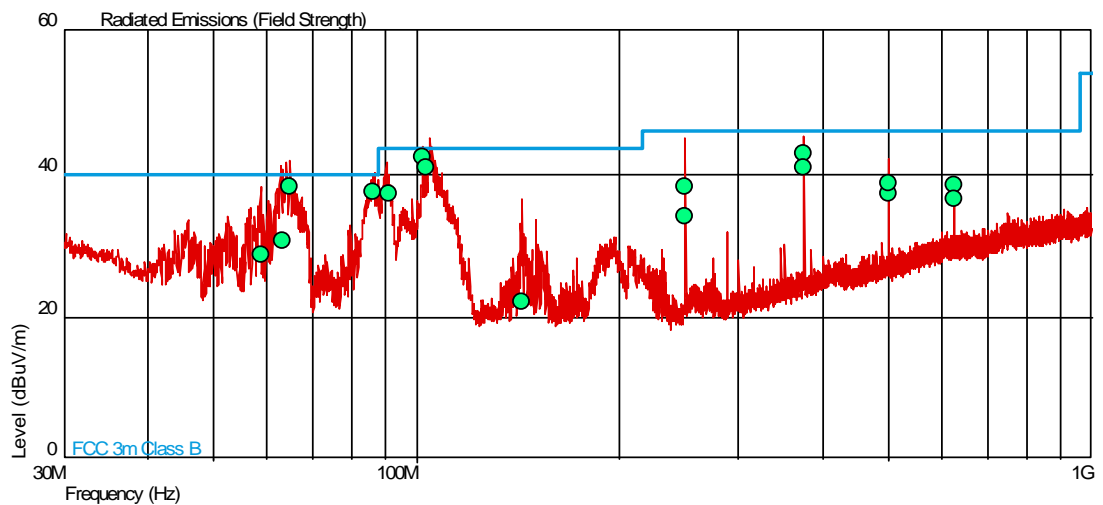
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1

30MHz to 1 GHz



Final Result

Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (deg)	Height (m)	Polarity
58.732	28.6	26.9	40.0	100	-11.4	73.1	4	1.00	Vertical
63.397	30.5	33.5	40.0	100	-9.5	66.5	236	1.00	Vertical
64.795	38.2	81.3	40.0	100	-1.8	18.7	231	1.23	Vertical
86.171	37.3	73.3	40.0	100	-2.7	26.7	30	1.44	Vertical
90.897	37.2	72.4	43.5	150	-6.3	77.6	252	1.13	Vertical
101.855	42.3	130.3	43.5	150	-1.2	19.7	0	1.00	Vertical
103.083	40.8	109.6	43.5	150	-2.7	40.4	180	1.00	Vertical
143.327	22.0	12.6	43.5	150	-21.5	137.4	346	1.00	Horizontal
249.999	38.1	80.4	46.0	200	-7.9	119.6	352	2.91	Vertical
250.011	34.1	50.7	46.0	200	-11.9	149.3	123	1.00	Horizontal
375.016	41.0	112.2	46.0	200	-5.0	87.8	129	1.02	Vertical
375.022	42.8	138.0	46.0	200	-3.2	62.0	138	1.00	Horizontal
500.006	37.2	72.4	46.0	200	-8.8	127.6	226	1.00	Horizontal
500.014	38.7	86.1	46.0	200	-7.3	113.9	338	1.37	Vertical
625.007	36.4	66.1	46.0	200	-9.6	133.9	339	1.00	Vertical
625.046	38.4	83.2	46.0	200	-7.6	116.8	242	1.66	Horizontal

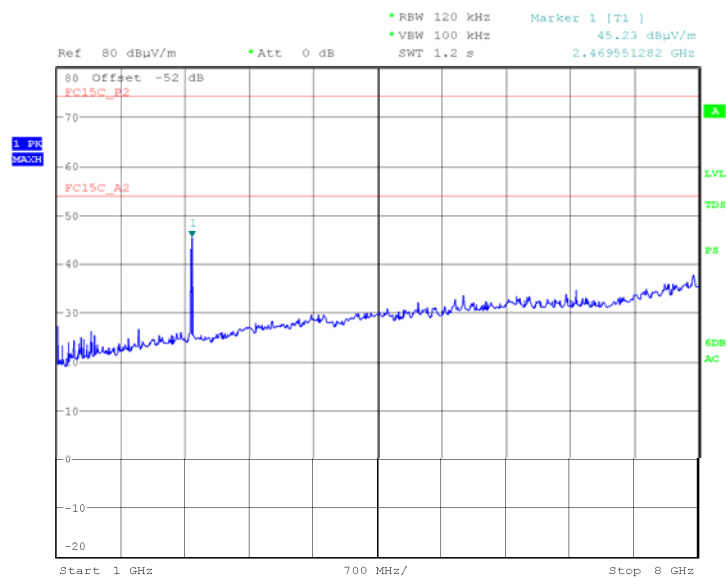


Product Service

1GHz to 13GHz

No emissions were detected in either polarity therefore receiver sensitivity values are presented in table and plot form.

Freq. GHz	Ant Pol V/H	Ant Hgt cm	EUT Arc Deg	Final Peak dBμV/m	Final Average dBμV/m	Peak Limit dBμV/m	Average Limit dBμV/m
2.46657	Horizontal	0	245	56.9	30.6	74.0	54.0

1GHz to 8GHzCombined Plot

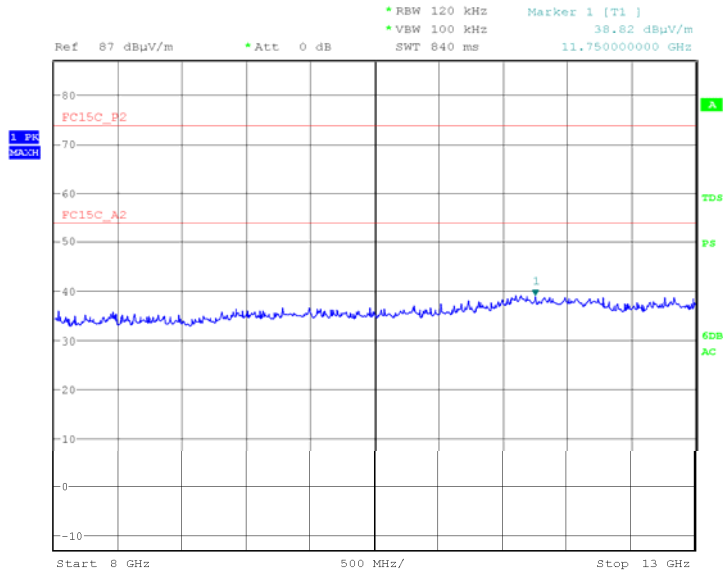
Date: 2.NOV.2010 20:03:09



Product Service

8GHz to 13 GHz

Combined Plot



Date: 2.NOV.2010 20:27:40



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – Radiated Emissions (Enclosure Port)					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	-	TU
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	11-Nov-2010
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	11-Nov-2010
Antenna (Bilog)	Schaffner	CBL6143	287	24	19-Jan-2012
Dual Power Supply Unit	Hewlett Packard	6253A	292	-	O/P Mon
Antenna (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	2-Aug-2012
Pre-Amplifier	Phase One	PS04-0086	1533	12	15-Sep-2011
Pre-Amplifier	Phase One	PSO4-0087	1534	12	22-Sep-2011
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Mast Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Turntable/Mast Controller	EMCO	2090	1607	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Comb Generator	Schaffner	RSG1000	3034	-	TU
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	12-Aug-2011
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	12	2-Jul-2011
Attenuator (30dB, 150W)	Narda	769-30	3369	12	24-May-2011
1m RF Cable sma(m)-sma(m)	Reynolds	262-0248-1000	3453	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
'3.5mm' - '3.5mm' RF Cable (2m)	Rhophase	3PS-1803-2000-3PS	3703	12	26-Jan-2011
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	12	10-Aug-2011

TU – Traceability Unscheduled

O/P Mon – Output monitored using calibrated equipment



Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB

* In accordance with CISPR 16-4-2



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
(Not UKAS Accredited).

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service Limited

© 2010 TÜV SÜD Product Service Limited