

# InterLab<sup>®</sup>

## RF Exposure

For

Vodafone MachineLink 4G,  
NetComm Wireless NWL-22-02

FCC ID XIA-NWL2202

**Assessment Reference:** MDE\_VODA\_1501\_MPEb

### **Test Laboratory:**

7layers GmbH  
Borsigstrasse 11  
40880 Ratingen  
Germany

#### **Note:**

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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## 0 Summary

### 0.1 Technical Report Summary

#### Type of Report

RF Exposure Assessment for a GSM/UMTS/LTE/WiFi Router.

#### Applicable FCC Rules

#### For RF Exposure:

OET Bulletin 65 Edition 97-01 August 1997

FCC 47 CFR §1.1307

FCC 47 CFR §1.1310

Report version control			
Version	Release date	Changes	Version validity
000	2016-08-10	Initial version	Valid

Responsible for  
Accreditation Scope:



Responsible  
for Report:



## 1 Administrative Data

### 1.1 Testing Laboratory

Company Name: 7layers GmbH

Address Borsigstr. 11  
40880 Ratingen  
Germany

This facility has been fully described in a report submitted to the FCC and accepted under the registration number 96716.

The test facility is also accredited by the following accreditation organisation:  
Laboratory accreditation no.: DAKKS D-PL-12140-01-01

Responsible for Accreditation Scope: Dipl.-Ing. Bernhard Retka  
Dipl.-Ing. Robert Machulec  
Dipl.-Ing. Andreas Petz  
Dipl.-Ing. Marco Kullik

Report Template Version: 2016-05-15

### 1.2 Project Data

Responsible for assessment and report: Mr. Andreas Tübel

Date of Report: 2016-08-10

### 1.3 Applicant Data

Company Name: NetComm Wireless

Address: Orion Road 18-20  
NSW 2066  
Australia

Contact Person: Mr. Talal Shamat

### 1.4 Manufacturer Data

Company Name: please see applicant data

Address:

Contact Person:

## 2 Test object Data

### 2.1 General EUT Description

<b>Equipment under Test:</b>	LTE WiFi Router
<b>Type Designation:</b>	Vodafone MachineLink 4G, NetComm Wireless NWL-22-02
<b>Kind of Device:</b> <b>(optional)</b>	
<b>Voltage Type:</b>	DC
<b>Voltage Level:</b>	DC 12.0 V
<b>Tested Modulation Type:</b>	OFDM:64-QAM

#### General product description:

The EUT is a GSM / UMTS / LTE / GPS / WiFi Router.

#### Specific product description for the EUT:

The EUT is a GSM / UMTS / LTE / GPS / WiFi Router. It supports WiFi 2.4GHz nmode, GPS and the relevant bands for European Approval GSM 900 and 1800, UMTS FDD I and VIII and E-UTRA eFDD 1, 3, 7, 8 and 20.

### 3 Evaluation Results

#### 3.1 RF Exposure Evaluation

Standards
OET Bulletin 65 Edition 97-01 August 1997
FCC 47 CFR §1.1307
FCC 47 CFR §1.1310

##### 3.1.1 Test limits

As specified in Table 1B of 47 CFR 1.1310 – Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure.

Frequency range (MHz)	Power density (mW/cm <sup>2</sup> )
300 – 1,500	f/1500
1,500 – 100,000	1.0

Equation OET bulletin 65, page 18, edition 97-01: 
$$S = \frac{PG}{4\pi R^2} = \frac{EIRP}{4\pi R^2}$$

Where:

S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna

### 3.1.2 Test Protocol

The below table is to determine the MPE values using the maximum gain values for this product.

Operational Bands	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain -numeric- (mW/cm <sup>2</sup> )	Output Power (dBm)	Duty Cycle correction factor	Max. mean output power (dBm)	Output Power (mW)	Output Power (EIRP) (mW)	FCC Limit (mW/cm <sup>2</sup> )	Power Density value (mW/cm <sup>2</sup> )
WLAN n-Mode 20 MHz	2412	2	1.5849	14.90	0	14.90	30.90	48.98	1.0000	<b>0.0097</b>
WLAN n-Mode 40 MHz	2422	2	1.5849	14.20	0	14.20	26.30	41.69	1.0000	<b>0.0083</b>
LTE FDD7	2500	3.44	2.2080	23.00	0.00	23.00	199.53	440.55	1.00	<b>0.0876</b>
UMTS FDD 2	1850	2.98	1.9861	24.00	0.00	24.00	251.19	498.88	1.00	<b>0.0992</b>
UMTS FDD 5	1930	2.98	1.9861	24.00	0.00	24.00	251.19	498.88	1.00	<b>0.0992</b>
GSM 850	824	1.26	1.3366	33.00	-9.03	23.97	249.46	2666.86	1.00	<b>0.0663</b>
GSM 1900	1850	2.98	1.9861	30.00	-9.03	20.97	125.03	1986.09	1.0000	<b>0.0494</b>
EDGE 850	850	1.26	1.3366	28.00	-3.01	24.99	315.50	843.33	1.0000	<b>0.0839</b>
EDGE 1900	1850	2.98	1.9861	29.00	-3.01	25.99	397.19	1577.61	2.0000	<b>0.1569</b>

Operational Bands	Margin to FCC Limit (mW/cm <sup>2</sup> )	FCC Minimum Distance to be ensured (cm)
WLAN n-Mode 20 MHz	<b>0.9903</b>	<b>1.9742</b>
WLAN n-Mode 40 MHz	<b>0.9917</b>	<b>1.8214</b>
LTE FDD7	<b>0.9124</b>	<b>5.9210</b>
UMTS FDD 2	<b>0.9008</b>	<b>6.3008</b>
UMTS FDD 5	<b>0.9008</b>	<b>6.3008</b>
GSM 850	<b>0.9337</b>	<b>5.1510</b>
GSM 1900	<b>0.9506</b>	<b>4.4452</b>
EDGE 850	<b>0.9161</b>	<b>5.7929</b>
EDGE 1900	<b>1.8431</b>	<b>5.6025</b>