

Inter**Lab**[®]

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

Equipment under Test:	LTE WiFi Router
Type Designation:	Vodafone MachineLink 4G, NetComm Wireless NWL-22-02
Kind of Device: (optional)	
Voltage Type:	DC
Voltage Level:	DC 12.0 V
Tested Modulation Type:	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 ²)
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 ²)	Output Power (dBm)	Duty Cycle correction factor	Max. mean output power (dBm)	Output Power (mW)	Output Power (EIRP) (mW)	FCC Limit (mW/cm ²)	Power Density value (mW/cm ²)
WLAN n-Mode 20 MHz	2412	2	1.5849	14.90	0	14.90	30.90	48.98	1.0000	0.0097
WLAN n-Mode 40 MHz	2422	2	1.5849	14.20	0	14.20	26.30	41.69	1.0000	0.0083
LTE FDD7	2500	3.44	2.2080	23.00	0.00	23.00	199.53	440.55	1.00	0.0876
UMTS FDD 2	1850	2.98	1.9861	24.00	0.00	24.00	251.19	498.88	1.00	0.0992
UMTS FDD 5	1930	2.98	1.9861	24.00	0.00	24.00	251.19	498.88	1.00	0.0992
GSM 850	824	1.26	1.3366	33.00	-9.03	23.97	249.46	2666.86	1.00	0.0663
GSM 1900	1850	2.98	1.9861	30.00	-9.03	20.97	125.03	1986.09	1.0000	0.0494
EDGE 850	850	1.26	1.3366	28.00	-3.01	24.99	315.50	843.33	1.0000	0.0839
EDGE 1900	1850	2.98	1.9861	29.00	-3.01	25.99	397.19	1577.61	2.0000	0.1569

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