

RF Exposure Calculation Report

For

NAR Compensor

FCC ID RK7MBC-NAR

IC: 4774A-MBCNAR

Report Reference: MDE_NOVER_1615_MPE_ICa

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 GSM/UMTS/LTE radio module.

Applicable FCC and IC Rules

For RF Exposure:

OET Bulletin 65 Edition 97-01 August 1997

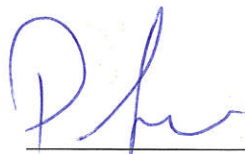
FCC 47 CFR §1.1307

FCC 47 CFR §1.1310

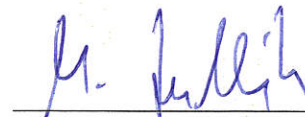
RSS-102 Issue 5 – March 2015

Report version control			
Version	Release date	Changes	Version validity
	2017-03-06	Initial version	

Reviewed by:
Patrick Lomax



Responsible
for Report:




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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 accredited under the test firm registration number 929146.

The corresponding FCC Designation Number is: DE001

This facility has been fully described in a report submitted to the IC and accepted under the registration number: Site# 3699A-1.

Report Template Version: 2016-08-02

1.2 Project Data

Responsible for assessment and report: Dipl.-Ing. Marco Kullik
Date of Report: 2017-03-06

1.3 Applicant Data

Company Name: Laird Dabendorf GmbH
Address: Märkische Str. 72
15806 Zossen
Germany
Contact Person: Mr. Raimo Jacobi

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	Consumer Signal Booster supporting bands 2 ,4, 5, 12, 13
Type Designation:	LTE-MBC-NAR
Kind of Device: GPRS/EDGE MSC	Mobile Wideband Consumer Signal Booster
GPRS Multi-slot class	-
FCC ID:	RK7MBC-NAR
IC Number:	4774A-MBCNAR

General product description:

The EUT is a wideband consumer booster used in road vehicle it support all cellular technologies GSM/UMTS/LTE/GPRS/EGPRS/HSDPA/HSUPA/CDMA2000/CDMA2000 1X-EVDO in the bands 850, 1900, 2, 4, 5, 12, 13.

3 Evaluation Results

3.1 RF Exposure Evaluation for Module

Standards
OET Bulletin 65 Edition 97-01 August 1997
FCC 47 CFR §1.1307
FCC 47 CFR §1.1310
RSS-102 Issue 5 – March 2015

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

Limits specified per RSS-102, Issue 5.

Frequency range (MHz)	Power density (W/m ²)	Power density (mW/cm ²)
300 – 6000	0.02619 f ^{0.6834}	mW/cm ² = W/m ² * 0.1

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

Antenna gain	Band	Mode	Duty Cycle	Frequency (MHZ)	Maximum Conducted output power (dBm)	Maximum Conducted output power (mW)	Equivalent conducted output power (mW)	IC MPE Limit (mW/cm ²)	FCC MPE Limit (mW/cm ²)	Separation distance (cm)	Power Density (mW/cm ²)
3.40	850	GSM	50%	848.8	28.4	691.83	345.94	0.26	0.5659	20	0.150567248
3.40	1900	GSM	50%	1909.8	28	630.96	315.50	0.46	1.0000	20	0.137318962
3.40	FDD 2	UMTS	100%	1907.6	28	630.96	630.96	0.46	1.0000	20	0.274618956
3.40	FDD 4	UMTS	100%	1740.0	28.4	691.83	691.83	0.43	1.0000	20	0.301113697
2.00	FDD 5	UMTS	100%	836.0	25	316.23	316.23	0.26	0.5573	20	0.099708116
3.40	eFDD 2	LTE	100%	1902.5	28	630.96	630.96	0.46	1.0000	20	0.274618956
3.40	eFDD 4	LTE	100%	1732.5	21.5	141.25	141.25	0.43	1.0000	20	0.061479526
2.00	eFDD 5	LTE	100%	825.5	28.4	691.83	691.83	0.26	0.5503	20	0.21813759
2.00	eFDD13	LTE	100%	784.5	22.2	165.96	165.96	0.25	0.5230	20	0.052327563
2.00	eFDD12	LTE	100%	711.0	22.7	186.21	186.21	0.23	0.4740	20	0.058712492

Antenna Gain values come from the document "Antenna Kitting for LTE/UMTS/GSM Compensator" provided by the customer.