FCC RF Exposure Report
(MPE Calculation)

Test Report no.:	EMC_BO_001773	**Date of Report:**	12-Nov-2012
Number of pages:	6	**Project support engineer:**	Robert Müller

Customer:	novero GmbH, Meesmannstrasse 103, 44807 Bochum, Germany
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Manufacturer:	novero GmbH
EUT ident.:	Novero, HT-6c

FCC ID:	WJLHT-6C	**IC ID:**	7847A-HT6C

Referred documents:	FCC rules Part 1 and IC standards RSS-102; FCC Test Reports with FCC ID / IC ID mentioned above

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	FCC listing no.:	881111	IC recognition no.:	7847A-1
	Laboratory manager:	Jürgen Mitterer		

Test result	The EUT does comply with the requirements made in the referred test documents.

Signature:

12-Nov-2012, Jürgen Mitterer
Manager Validation Services
Approval

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1. Maximum Permissible Exposure

1.1. Calculation method and limit

1.1.1 §1.1310

Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure) are specified in Table 1B of 47 CFR 1.1310 and table chapter 4.2 of RSS-102 standard.

Frequency range [MHz]	Power Density[mW/cm²]
300 – 1500	f/1500
1500 – 100,000	1.0

Calculations can be made with the following equation according to OET bulletin 65:

S = power density

P = power input of 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

EIRP = equivalent (or effective) isotropic radiated power

1.1.2 §2.1091

Subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and their effective radiated power (ERP) is 1.5 watt or more, or if they operate at frequencies above 1.5 GHz and their ERP is 3 watts or more.

For 850 MHz Operations:
G = 10*log 1500mW [ERP] - Conducted Peak Power [dBm] + Duty Cycle [dB] + 2.15dB

For 1900 MHz Operations
(§ 24.232 to be considered for the maximum transmitter power limit of 2W EIRP):
G = 10*log 2000mW [EIRP] - Conducted Peak Power [dBm] + Duty Cycle [dB]

For 1700 MHz Operations
(§ 27.50 to be considered for the maximum transmitter power limit of 1W EIRP):
G = 10*log 1000mW [EIRP] - Conducted Peak Power [dBm]

1.2. Results

1.2.1 Results for 850 MHz Operations (Part 22)

§1.1310: Maximum Gain [dBi] = 10*log (S * 4πR²) – Conducted Peak Power [dBm] + Duty Cycle [dB]

§2.1091: Maximum Gain [dBi] = 10*log 1500mW [ERP] - Conducted Peak Power [dBm] + Duty Cycle [dB] + 2.15dB

Band	Channel	Frequency [MHz]	Conducted Peak Power [dBm]	Duty Cycle [dB]	Average Power [dBm]	MPE Limit [mW/cm²]	§ 1.1310 Max. Gain [dBi]	§ 2.1091 (c) Max. Gain [dBi]
GSM	128	824.2	32.28	-9.03	23.25	0.5495	11.16	10.66
	192	837.0	32.35	-9.03	23.32	0.5580	11.16	10.59
	251	848.8	32.29	-9.03	23.26	0.5659	11.28	10.65
GPRS	128	824.2	32.13	-3.01	29.12	0.5495	**5.29**	4.79
	192	837.0	32.15	-3.01	29.14	0.5580	5.34	**4.77**
	251	848.8	32.14	-3.01	29.13	0.5659	5.41	4.78
EGPRS	128	824.2	27.84	-3.01	24.83	0.5495	9.58	9.08
	192	837.0	27.90	-3.01	24.89	0.5580	9.59	9.02
	251	848.8	27.98	-3.01	24.97	0.5659	9.57	8.94
FDD V	4132	826.4	27.86	0.00	27.86	0.5509	6.56	6.05
	4175	835.0	28.01	0.00	28.01	0.5567	6.46	5.90
	4233	846.6	28.10	0.00	28.10	0.5644	6.43	5.81

For GPRS/EGPRS mode Multislot Class12 (maximal 4 Uplink time slots) is considered for duty cycle.

1.2.2 Results for 1900 MHz Operations (Part 24)

§1.1310: Maximum Gain [dBi] = 10*log (S * 4πR²) – Conducted Peak Power [dBm] + Duty Cycle [dB]

§2.1091: Maximum Gain [dBi] = 10*log 2000mW [EIRP] - Conducted Peak Power [dBm] + Duty Cycle [dB]

Band	Channel	Frequency [MHz]	Conducted Peak Power [dBm]	Duty Cycle [dB]	Average Power [dBm]	MPE Limit [mW/cm²]	§ 1.1310 Max. Gain [dBi]	§ 2.1091 (c) § 24.232 Max. Gain [dBi]
GSM	512	1850.2	29.19	-9.03	20.16	1.0	16,85	12,85
	661	1880.0	29.06	-9.03	20.03	1.0	16,98	12,98
	810	1908.8	29.21	-9.03	20.18	1.0	16,83	12,83
GPRS	512	1850.2	29.12	-3.01	26.11	1.0	10,90	6,90
	661	1880.0	28.94	-3.01	25.93	1.0	11,08	7,08
	810	1908.8	29.09	-3.01	26.08	1.0	10,93	6,93
EGPRS	512	1850.2	26.50	-3.01	23.49	1.0	13,52	9,52
	661	1880.0	25.02	-3.01	22.01	1.0	15,00	11,00

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	810	1908.8	26.31	-3.01	23.30	1.0	13,71	9,71
FDD II	4132	1852.4	27,34	0	27,34	1.0	9,67	**5,67**
	4175	1880.0	27,22	0	27,22	1.0	**9,79**	5,79
	4233	1907.6	27,32	0	27,32	1.0	9,69	5,69

For GPRS/EGPRS mode Multislot Class12 (maximal 4 Uplink time slots) is considered for duty cycle.

1.2.3   Results for 1700 MHz Operations (Part 27)

§1.1310: Maximum Gain [dBi] = 10*log (S * 4πR²) – Conducted Peak Power [dBm]
§2.1091: Maximum Gain [dBi] = 10*log 1000mW [EIRP] - Conducted Peak Power [dBm]

Band	Mode	Channel	Frequency [MHz]	Conducted Peak Power [dBm]	Average Power [dBm]	MPE Limit [mW/cm²]	§ 1.1310 Max. Gain [dBi]	§ 2.1091 (c) § 27.50 Max. Gain [dBi]
FDD IV	RMC	4132	1712.4	28.43	28.43	1.0	**8.58**	**4.58**
		4175	1732.4	27.80	27.80	1.0	9.21	5.21
		4233	1752.5	27.80	27.80	1.0	9.21	5.21

1.3.   Prediction

1.3.1   Prediction for 850 MHz band (Part 22)

The maximum allowed MPE value of 0.5495 mW/cm² will be reached in a distance of 20 cm in case that an antenna with an antenna gain of 5.29 dBi would be used. This means that the power density levels in a distance of 20 cm are in accordance with the FCC regulations as long as the used antenna has a gain below 5.29 dBi. Considering the max output power of 1.5 Watts ERP (FCC §2.1091) for mobile / portable stations the maximum antenna gain is **4.77 dBi,** which is below 5.29 dBi and in accordance to the FCC regulations.

This calculation has been made under the consideration of the duty cycle effect.

1.3.2   Prediction for 1900 MHz band (Part 24)

The maximum allowed MPE value of 1 mW/cm² will be reached in a distance of 20 cm in case that an antenna with an antenna gain of 9.79 dBi would be used. This means that the power density levels in a distance of 20 cm are in accordance with the FCC regulations as long as the used antenna has a gain below 9.79 dBi. Considering the max output power of 2 Watts EIRP (FCC §24.232) for mobile / portable stations the maximum antenna gain is **5.67 dBi**, which is below 9.79 dBi and in accordance to the FCC regulations.

This calculation has been made under the consideration of the duty cycle effect.

1.3.3 Prediction for 1700 MHz band (Part 27)

The maximum allowed MPE value of 1 mW/cm² will be reached in a distance of 20 cm in case that an antenna with an antenna gain of 8.58 dBi would be used. This means that the power density levels in a distance of 20 cm are in accordance with the FCC regulations as long as the used antenna has a gain below 5.58 dBi. Considering the max output power of 1 Watt EIRP (FCC §27.50) for mobile / portable stations the maximum antenna gain is **4.58 dBi,** which is below 8.58 dBi and in accordance to the FCC regulations.