



4\_SIEM\_0706\_UMTS

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***FCC ID QIPHMS1 – predictions for Maximum Permissible Exposure***

Dear Mr. Pfitzmann,

please find our Maximum Permissible Exposure calculations for the GSM module HMS1.

Best Regards

A handwritten signature in blue ink, appearing to read 'S. Längen', written over a large, light blue checkmark.

Sven Längen

registered in:

### **Maximum Permissible Exposure**

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

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

### **Calculations 850 MHz band**

Maximum peak output power at antenna input terminal: 31.5 dBm (1412,54 mW)  
(see 7 layers test results – FCC ID QIPHMS1)

Prediction distance **R**: 20 cm  
Prediction frequency: 836,4 MHz

MPE limit **S**: 0.5576 mW/cm<sup>2</sup>

Equation OET bulletin 65, page 18, edition 97-01:  $S = P \cdot G / (4\pi R^2)$

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

Maximum permissible antenna gain: **2,9759 dBi**

### **Prediction**

The maximum allowed MPE value of 0.5576 mW/cm<sup>2</sup> will be reached in a distance of 20 cm in case that an antenna with an antenna gain of 0,5576 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 2,9759 dBi.

### **Calculations 1900 MHz band**

Maximum peak output power at antenna input terminal: 28.6 dBm (724,44 mW)  
(see 7 layers test results – FCC ID QIPHMS1)

Prediction distance **R**: 20 cm  
Prediction frequency: 1880 MHz

MPE limit **S**: 1 mW/cm<sup>2</sup>

Equation OET bulletin 65, page 18, edition 97-01:  $S = P \cdot G / (4\pi R^2)$

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

Maximum permissible antenna gain: **8.413 dBi**

### **Prediction**

The maximum allowed MPE value of 1 mW/cm<sup>2</sup> will be reached in a distance of 20 cm in case that an antenna with an antenna gain of 8,413 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 8,413 dBi.