Cellular Engine TC35
The extra compact module for voice and data transmission

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General note

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Applications incorporating the described product must be designed to be in accordance with the technical specifications provided in these guidelines. Failure to comply with any of the required procedures can result in malfunctions or serious discrepancies in results.

Furthermore, all safety instructions regarding the use of mobile technical systems, including GSM products, which also apply to cellular phones must be followed.

Subject to change without notice at any time.
1 Introduction

Further to the TC35_HW_Interface_description this document provides additional instructions of how to improve the EMI/EMC performance of the TC35 GSM engine.

Specifications are subject to change without notice. This product is an original Siemens product protected by US, European and other patents.

1.1 References

TC35_HW_Interface_description (filename: TC35_HW_Interface_description.pdf)

1.2 Terms and Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>EMC</td>
<td>Electro Magnetic Compatibility</td>
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<tr>
<td>EMI</td>
<td>Electro Magnetic Interference</td>
</tr>
<tr>
<td>FFC</td>
<td>Flat Flexible Cable</td>
</tr>
<tr>
<td>PCB</td>
<td>Printed Circuit Board</td>
</tr>
<tr>
<td>ZIF</td>
<td>Zero Insertion Force</td>
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2 Recommendations for handling hum and noise in audio applications

2.1 Low resistance connection to ground

If you use an FFC cable to the max. length of 200 mm you may be required to follow additional precautions for preventing excessive supply voltage drop during GSM burst. This is necessary since undervoltage might cause the TC35 module to shut down. Use an additional cable fixed under the mounting hole of the TC35 and solder the other side to battery ground on your application platform.

Do not solder on the TC 35 cover!

* for low GND impedance connect TC35 GND to application ground battery

Figure 1: TC35 top view

2.2 ZIF-Connector and FFC

The FFC cable that links the TC35 module to your application platform should be as short as possible.
3 General

If your GSM application requires mounting the TC35 module inside a small and compact housing, be sure that its excellent audio characteristics are affected. Audio performance might be decreased by twisting or folding the FFC. Better quality of the audio channel, i.e. higher suppression of GSM noise, can be achieved by properly grounding the module.

3.1 Resistance of the power supply lines

The input terminal for the microphone signals of the TC35 is a balanced input. Best noise suppression is achieved when parasitic signals couple to both input lines with the same field strength. However, it goes without saying that best results can be obtained if no parasitic signal is present.

As shown in Figure 2 especially a long FFC can cause problems since it works as an antenna for EMI signals radiated by equipment close to the TC35. This effect occurs also when the FFC is folded and power lines lay over the microphone lines. To avoid this effect, the FFC should be as short as possible and must not be mounted in direct contact to any switching regulator of a power supply unit or close to any other digital blocks. The configuration described above requires a fully balanced electrical layout installed next to the microphone.

We suggest mounting the TC35 on top of a solid metal plate and inserting the FFC in between. Thus, the FFC is shielded by the metal plate and likewise, the PCB of the TC35 is in a "sandwich" structure. This requires appropriate electrical contacts between the ground pad of the TC35, the shielding plate and the ground pin of the battery. Even for short FCC cabling, it is strongly recommended you apply this shield design.

![Idealised diagram of the audio input terminal](image-url)
Figure 3: Mounting the TC35 on a metal plate

For more detailed information refer to Figure 1 that shows the location of the ground pad. This pad is usable for contacting with a spacer or screw.