



**Title : Power Tune up procedure for TRIZIUM**

**VERIFICATION AND APPROVAL**

Function Responsible (F.Deperini) : \_\_\_\_\_

RSD

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## GSM 1900 RF power structure and function

### Final amplifier stage structure

The final amplifier stage consists of a power amplifier module and an integrated RF power circuit. This stage is providing the corresponding RF power levels at the antenna point.

The RF power amplifier module is supplied directly from the battery voltage input.

Typical operating voltage is 3.4 - 4.2 volts. Current consumption is directly related to the different power levels with an approximate maximum peak current consumption of 2 Amperes. The current consumption is related to the duty cycle of the transmitter (1/8) in class 8 GPRS or (2/8) in class 10 GPRS giving an average current consumption of 250 mA while operating in class 10.

The RF power control circuit sets the RF power amplifier module output by regulating the power amplifier gain in accordance to the values stored after the factory tune up procedure.

### Range of operating RF power levels

GSM 1900 supports 16 power levels as described in the GSM 1900 system specification. The nominal power levels and tolerances are indicated in the following table

Power control level	dBm	Transmitter output power		Tolerances
		Normal	Extreme	
0	30	+/-2,0 dB	+/-2,5 dB	
1	28	+/-3 dB	+/-4 dB	
2	26	+/-3 dB	+/-4 dB	
3	24	+/-3 dB	+/-4 dB	
4	22	+/-3 dB	+/-4 dB	
5	20	+/-3 dB	+/-4 dB	
6	18	+/-3 dB	+/-4 dB	
7	16	+/-3 dB	+/-4 dB	
8	14	+/-3 dB	+/-4 dB	
9	12	+/-4 dB	+/-5 dB	

<b>10</b>	<b>10</b>	<b>+/-4 dB</b>	<b>+/-5 dB</b>
<b>11</b>	<b>8</b>	<b>+/-4 dB</b>	<b>+/-5 dB</b>
<b>12</b>	<b>6</b>	<b>+/-4 dB</b>	<b>+/-5 dB</b>
<b>13</b>	<b>4</b>	<b>+/-4 dB</b>	<b>+/-5 dB</b>
<b>14</b>	<b>2</b>	<b>+/-5 dB</b>	<b>+/-6 dB</b>
<b>15</b>	<b>0</b>	<b>+/-5 dB</b>	<b>+/-6 dB</b>

Table 1: GSM 1900 transmitter output power according to 3GPP TS 51.010-1 (Power class 1)

Our cellular device is tuned to our internal power levels well inside the limits of the GSM 1900 system.

### Tune-up procedure

Our devices are tuned up in our production by the use of special software in our test equipment and in the cellular device itself. After tuning the actual RF power levels settings are stored in the internal memory and the cellular devices software is finalised by the final customer version.

There are no user tuneable parts in our cellular device.

Our cellular devices are normally tuned to the nominal RF power level as shown in the table above, except for power level 0 where we normally reduce the power level remaining inside the limits.

The reduction of power level is done in order to preserve battery lifetime and extend the talk time for our cellular devoces at maximum power levels.