

2A9SN-A151_Tune Up Procedure

Measurement Procedure:

1. Set the device to operational voltage and on a predefined channel in a special test mode.
2. The actual output power is measured at several power levels.
3. The gain factors of each individual device are adjusted until the target value is met. The appropriate gain control settings for each output power level are stored in each device individually (for each power level). The user has no possibility to change these settings later on.
4. The maximum gains of each individual device are adjusted and measured until the target value is met. The production target power with tolerance compiles with the maximum power in test report.

Rated RF power output:

| Mode | GSM850(AVG) | GSM1900(AVG) |
|---------------|-------------|--------------|
| GSM | 33±1dBm | 30±1dBm |
| GPRS (1 Slot) | 33±1dBm | 30±1dBm |
| GPRS (2 Slot) | 30±1dBm | 26.5±1dBm |
| GPRS (3 Slot) | 28.5±1dBm | 24.5±1dBm |
| GPRS (4 Slot) | 26.5±1dBm | 22.5±1dBm |
| EDGE (1 Slot) | 25.5±1dBm | 26±1dBm |
| EDGE (2 Slot) | 24±1dBm | 24.5±1dBm |
| EDGE (3 Slot) | 21±1dBm | 22±1dBm |
| EDGE (4 Slot) | 19±1dBm | 20±1dBm |

| Mode | WCDMA Band II(AVG) | WCDMA Band V(AVG) | WCDMA Band IV(AVG) |
|-----------------|--------------------|-------------------|--------------------|
| RMC | 22±1dBm | 21.5±1dBm | 22±1dBm |
| HSDPA Subtest-1 | 21.5±1dBm | 21.3±1dBm | 21.5±1dBm |
| HSDPA Subtest-2 | 21±1dBm | 21±1dBm | 21.5±1dBm |
| HSDPA Subtest-3 | 21±1dBm | 21±1dBm | 21.5±1dBm |
| HSDPA Subtest-4 | 21±1dBm | 20.5±1dBm | 21±1dBm |
| HSUPA Subtest-1 | 21.5±1dBm | 21±1dBm | 21.5±1dBm |
| HSUPA Subtest-2 | 21.5±1dBm | 21.2±1dBm | 21.5±1dBm |
| HSUPA Subtest-3 | 21.5±1dBm | 21±1dBm | 21.5±1dBm |
| HSUPA Subtest-4 | 21.5±1dBm | 21.2±1dBm | 21.5±1dBm |
| HSUPA Subtest-5 | 21.5±1dBm | 21.2±1dBm | 21±1dBm |

| BW[MHz] | RB Size | Mode | Band 2 | Band 4 | Band 5 | Band 7 |
|---------|---------|---------|-----------|-----------|-----------|-----------|
| 1.4 | 1 | QPSK | 23±1dBm | 23±1dBm | 23±1dBm | N/A |
| 1.4 | 3 | | 23±1dBm | 22.5±1dBm | 23±1dBm | N/A |
| 1.4 | 6 | | 22±1dBm | 22±1dBm | 22±1dBm | N/A |
| 1.4 | 1 | 16- QAM | 22.5±1dBm | 21.5±1dBm | 23±1dBm | N/A |
| 1.4 | 3 | | 22±1dBm | 22±1dBm | 22.5±1dBm | N/A |
| 1.4 | 6 | | 21±1dBm | 21±1dBm | 21.5±1dBm | N/A |
| 3 | 1 | QPSK | 22.5±1dBm | 23±1dBm | 23±1dBm | N/A |
| 3 | 8 | | 22±1dBm | 22±1dBm | 22±1dBm | N/A |
| 3 | 15 | | 21.5±1dBm | 22±1dBm | 22±1dBm | N/A |
| 3 | 1 | 16- QAM | 22.5±1dBm | 22.5±1dBm | 23±1dBm | N/A |
| 3 | 8 | | 21±1dBm | 21±1dBm | 21.5±1dBm | N/A |
| 3 | 15 | | 21±1dBm | 21±1dBm | 21.5±1dBm | N/A |
| 5 | 1 | QPSK | 23±1dBm | 22.5±1dBm | 23±1dBm | 23±1dBm |
| 5 | 12 | | 22±1dBm | 22±1dBm | 21±1dBm | 22±1dBm |
| 5 | 25 | | 22±1dBm | 22±1dBm | 22±1dBm | 21.5±1dBm |
| 5 | 1 | 16- QAM | 22±1dBm | 22±1dBm | 22±1dBm | 22.5±1dBm |
| 5 | 12 | | 21±1dBm | 21±1dBm | 21.2±1dBm | 20±1dBm |
| 5 | 25 | | 21±1dBm | 21±1dBm | 21.5±1dBm | 21±1dBm |
| 10 | 1 | QPSK | 23±1dBm | 23±1dBm | 23.5±1dBm | 23±1dBm |
| 10 | 25 | | 22±1dBm | 22±1dBm | 22±1dBm | 22±1dBm |
| 10 | 50 | | 21.5±1dBm | 21.5±1dBm | 22±1dBm | 22±1dBm |
| 10 | 1 | 16- QAM | 23±1dBm | 22.5±1dBm | 23±1dBm | 23±1dBm |
| 10 | 25 | | 21±1dBm | 21±1dBm | 21.5±1dBm | 21±1dBm |
| 10 | 50 | | 21±1dBm | 21±1dBm | 21.5±1dBm | 21±1dBm |
| 15 | 1 | QPSK | 23±1dBm | 23±1dBm | N/A | 23±1dBm |
| 15 | 36 | | 22±1dBm | 22±1dBm | N/A | 22±1dBm |
| 15 | 75 | | 21.5±1dBm | 21.5±1dBm | N/A | 22±1dBm |
| 15 | 1 | 16- QAM | 23±1dBm | 23±1dBm | N/A | 23±1dBm |
| 15 | 36 | | 21.5±1dBm | 21±1dBm | N/A | 21±1dBm |
| 15 | 75 | | 21±1dBm | 21±1dBm | N/A | 21±1dBm |
| 20 | 1 | QPSK | 23±1dBm | 23±1dBm | N/A | 23±1dBm |
| 20 | 50 | | 22±1dBm | 22±1dBm | N/A | 22±1dBm |
| 20 | 100 | | 21.5±1dBm | 22±1dBm | N/A | 22±1dBm |
| 20 | 1 | 16- QAM | 22.5±1dBm | 22±1dBm | N/A | 22±1dBm |
| 20 | 50 | | 21±1dBm | 21±1dBm | N/A | 21±1dBm |
| 20 | 100 | | 21±1dBm | 21±1dBm | N/A | 21±1dBm |

| BW[MHz] | RB Size | Mode | Band 40 (2305-2315) | Band 40 (2350-2360) | Band 41 |
|---------|---------|---------|------------------------|------------------------|-----------|
| 1.4 | 1 | QPSK | N/A | N/A | N/A |
| 1.4 | 3 | | N/A | N/A | N/A |
| 1.4 | 6 | | N/A | N/A | N/A |
| 1.4 | 1 | 16- QAM | N/A | N/A | N/A |
| 1.4 | 3 | | N/A | N/A | N/A |
| 1.4 | 6 | | N/A | N/A | N/A |
| 3 | 1 | QPSK | N/A | N/A | N/A |
| 3 | 8 | | N/A | N/A | N/A |
| 3 | 15 | | N/A | N/A | N/A |
| 3 | 1 | 16- QAM | N/A | N/A | N/A |
| 3 | 8 | | N/A | N/A | N/A |
| 3 | 15 | | N/A | N/A | N/A |
| 5 | 1 | QPSK | 9.5±1dBm | 9.5±1dBm | 23±1dBm |
| 5 | 12 | | 9±1dBm | 9.5±1dBm | 22±1dBm |
| 5 | 25 | | 9±1dBm | 9.5±1dBm | 22±1dBm |
| 5 | 1 | 16- QAM | 10±1dBm | 10±1dBm | 22.5±1dBm |
| 5 | 12 | | 9.5±1dBm | 9.5±1dBm | 21±1dBm |
| 5 | 25 | | 9±1dBm | 9.5±1dBm | 21.5±1dBm |
| 10 | 1 | QPSK | 9.5±1dBm | 9.5±1dBm | 23±1dBm |
| 10 | 25 | | 9.5±1dBm | 9.5±1dBm | 22±1dBm |
| 10 | 50 | | 8.5±1dBm | 9.5±1dBm | 22±1dBm |
| 10 | 1 | 16- QAM | 10±1dBm | 10±1dBm | 22.5±1dBm |
| 10 | 25 | | 9.5±1dBm | 9.5±1dBm | 21±1dBm |
| 10 | 50 | | 9±1dBm | 9.5±1dBm | 21±1dBm |
| 15 | 1 | QPSK | N/A | N/A | 23±1dBm |
| 15 | 36 | | N/A | N/A | 22±1dBm |
| 15 | 75 | | N/A | N/A | 22±1dBm |
| 15 | 1 | 16- QAM | N/A | N/A | 22.5±1dBm |
| 15 | 36 | | N/A | N/A | 21.5±1dBm |
| 15 | 75 | | N/A | N/A | 21.5±1dBm |
| 20 | 1 | QPSK | N/A | N/A | 23±1dBm |
| 20 | 50 | | N/A | N/A | 22±1dBm |
| 20 | 100 | | N/A | N/A | 22±1dBm |
| 20 | 1 | 16- QAM | N/A | N/A | 22±1dBm |
| 20 | 50 | | N/A | N/A | 21±1dBm |
| 20 | 100 | | N/A | N/A | 21±1dBm |

| Mode | 2.4G WLAN(AVG) |
|----------------|----------------|
| 802.11b | 13±1dBm |
| 802.11g | 17.5±1dBm |
| 802.11n(HT 20) | 17±1dBm |

| Mode | BT(AVG) |
|----------------|----------|
| GFSK | 6.5±1dBm |
| $\pi/4$ -DQPSK | 7±1dBm |
| 8DPSK | 8±1dBm |

| Mode | BLE(AVG) |
|-------------|----------|
| GFSK(1Mbps) | 3±1dBm |

Then these appropriate rated RF output power settings are stored in each device individually. The user has no possibility to change these settings later on, and during manufacturing each device will be individual calibrated. The measurement is done in fully calibrated setup, which is based on the base station simulator. Furthermore, the highest power level is verified afterwards in a call measurement on three channels (low, middle and high).