FCC ID _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	GSM1900
GSM	33±1dBm	29.5±1dBm
GPRS (1 Slot)	33±1dBm	29.5±1dBm
GPRS (2 Slot)	32±1dBm	28.5±1dBm
GPRS (3 Slot)	30±1dBm	27±1dBm
GPRS (4 Slot)	30±1dBm	25.5±1dBm
EDGE (1 Slot)	27.5±1dBm	26.5±1dBm
EDGE (2 Slot)	27±1dBm	25.5±1dBm
EDGE (3 Slot)	24.5±1dBm	23.5±1dBm
EDGE (4 Slot)	23.5±1dBm	22.5±1dBm

Mode	WCDMA Band II	WCDMA Band IV	WCDMA Band V
RMC	23±1dBm	22.5±1dBm	23±1dBm
HSDPA Subtest-1	22±1dBm	21.5±1dBm	22±1dBm
HSDPA Subtest-2	21.5±1dBm	21±1dBm	21.5±1dBm
HSDPA Subtest-3	20±1dBm	20±1dBm	20.5±1dBm
HSDPA Subtest-4	20.5±1dBm	20±1dBm	20±1dBm
HSUPA Subtest-1	21.5±1dBm	21±1dBm	22±1dBm
HSUPA Subtest-2	22±1dBm	21.5±1dBm	22±1dBm
HSUPA Subtest-3	20.5±1dBm	20±1dBm	21±1dBm
HSUPA Subtest-4	22±1dBm	21.5±1dBm	22±1dBm
HSUPA Subtest-5	21.5±1dBm	20.5±1dBm	21.5±1dBm

BW[MHz]	RB Size	Mode	Band 2	Band 4	Band 5	Band 7	Band 12
1.4	1	QPSK	21±1dBm	22±1dBm	24±1dBm	N/A	23.5±1dBm
1.4	3		21±1dBm	22±1dBm	23.5±1dBm	N/A	23.5±1dBm
1.4	6		20±1dBm	21±1dBm	22.5±1dBm	N/A	22.5±1dBm
1.4	1	16- QAM	20±1dBm	21.5±1dBm	23±1dBm	N/A	22.5±1dBm
1.4	3		20±1dBm	21.5±1dBm	23±1dBm	N/A	22.5±1dBm
1.4	6		19±1dBm	20±1dBm	22±1dBm	N/A	21.5±1dBm
3	1	QPSK	21±1dBm	22.5±1dBm	24±1dBm	N/A	23.5±1dBm
3	8		20±1dBm	21±1dBm	23±1dBm	N/A	22.5±1dBm
3	15		20±1dBm	21±1dBm	22.5±1dBm	N/A	22.5±1dBm
3	1	16- QAM	21±1dBm	22±1dBm	23±1dBm	N/A	23±1dBm
3	8		19±1dBm	20±1dBm	22±1dBm	N/A	21.5±1dBm
3	15		19±1dBm	20±1dBm	22±1dBm	N/A	21.5±1dBm
5	1	QPSK	21±1dBm	22±1dBm	24±1dBm	21.5±1dBm	23.5±1dBm
5	12		20±1dBm	21±1dBm	24±1dBm	20.5±1dBm	22.5±1dBm
5	25		20±1dBm	21±1dBm	22.5±1dBm	20.5±1dBm	22.5±1dBm
5	1	16- QAM	21±1dBm	21.5±1dBm	23.5±1dBm	21±1dBm	23±1dBm
5	12		19±1dBm	20±1dBm	22±1dBm	19.5±1dBm	21.5±1dBm
5	25		19±1dBm	20±1dBm	21.5±1dBm	19.5±1dBm	21.5±1dBm
10	1	QPSK	21±1dBm	22±1dBm	24.5±1dBm	21.5±1dBm	24±1dBm
10	25		20±1dBm	21±1dBm	23.5±1dBm	20.5±1dBm	23±1dBm
10	50		20±1dBm	21±1dBm	23±1dBm	20.5±1dBm	23±1dBm
10	1	16- QAM	20±1dBm	21±1dBm	24±1dBm	21±1dBm	23.5±1dBm
10	25		19±1dBm	20±1dBm	22.5±1dBm	19.5±1dBm	22±1dBm
10	50		19±1dBm	20±1dBm	22.5±1dBm	19.5±1dBm	22±1dBm
15	1	QPSK	21±1dBm	22±1dBm	N/A	21.5±1dBm	N/A
15	36		20±1dBm	21±1dBm	N/A	20.5±1dBm	N/A
15	75		20±1dBm	21±1dBm	N/A	20.5±1dBm	N/A
15	1	16- QAM	20.5±1dBm	21.5±1dBm	N/A	21±1dBm	N/A
15	36		19±1dBm	20±1dBm	N/A	19.5±1dBm	N/A
15	75		19±1dBm	20±1dBm	N/A	19.5±1dBm	N/A
20	1	QPSK	21.5±1dBm	22.5±1dBm	N/A	22±1dBm	N/A
20	50		20.5±1dBm	21±1dBm	N/A	21±1dBm	N/A
20	100		20.5±1dBm	21±1dBm	N/A	21±1dBm	N/A
20	1	16- QAM	21±1dBm	21.5±1dBm	N/A	21.5±1dBm	N/A
20	50		19.5±1dBm	20.5±1dBm	N/A	20±1dBm	N/A
20	100		19.5±1dBm	20±1dBm	N/A	20±1dBm	N/A

BW[MHz]	RB Size	Mode	Band 13	Band 17	Band 25	Band 26 (Part 22)	Band 26 (Part 90)	Band 66
1.4	1	QPSK	N/A	N/A	19±1dBm	24±1dBm	24±1dBm	20.5±1dBm
1.4	3		N/A	N/A	19±1dBm	24±1dBm	23.5±1dBm	20.5±1dBm
1.4	6		N/A	N/A	17.5±1dBm	23±1dBm	22.5±1dBm	19.5±1dBm
1.4	1	16- QAM	N/A	N/A	18±1dBm	23±1dBm	23±1dBm	19.5±1dBm
1.4	3		N/A	N/A	18±1dBm	23±1dBm	23±1dBm	20±1dBm
1.4	6		N/A	N/A	17±1dBm	22±1dBm	22±1dBm	9±1dBm
3	1	QPSK	N/A	N/A	19±1dBm	24±1dBm	24±1dBm	21±1dBm
3	8		N/A	N/A	18±1dBm	23±1dBm	23±1dBm	19.5±1dBm
3	15		N/A	N/A	18±1dBm	23±1dBm	22.5±1dBm	19.5±1dBm
3	1	16- QAM	N/A	N/A	18.5±1dBm	23.5±1dBm	23.5±1dBm	20.5±1dBm
3	8		N/A	N/A	17±1dBm	22±1dBm	22±1dBm	19±1dBm
3	15		N/A	N/A	17±1dBm	22±1dBm	22±1dBm	18.5±1dBm
5	1	QPSK	23.5±1dBm	24.5±1dBm	19±1dBm	24±1dBm	24±1dBm	20.5±1dBm
5	12		22±1dBm	23.5±1dBm	18±1dBm	23±1dBm	22.5±1dBm	19.5±1dBm
5	25		22±1dBm	23.5±1dBm	18±1dBm	23±1dBm	22.5±1dBm	19.5±1dBm
5	1	16- QAM	23±1dBm	24±1dBm	18.5±1dBm	23.5±1dBm	23±1dBm	20.5±1dBm
5	12		21±1dBm	22.5±1dBm	17±1dBm	22±1dBm	22±1dBm	18.5±1dBm
5	25		21±1dBm	22.5±1dBm	16.5±1dBm	22±1dBm	221.5±1dBm	18.5±1dBm
10	1	QPSK	23.5±1dBm	25±1dBm	19±1dBm	24.5±1dBm	23.5±1dBm	20.5±1dBm
10	25		22.5±1dBm	24±1dBm	18±1dBm	23±1dBm	22.5±1dBm	19.5±1dBm
10	50		22.5±1dBm	24±1dBm	18±1dBm	23±1dBm	22.5±1dBm	19±1dBm
10	1	16- QAM	23±1dBm	24.5±1dBm	18.5±1dBm	23±1dBm	23±1dBm	19.5±1dBm
10	25		22±1dBm	23±1dBm	17±1dBm	22±1dBm	22±1dBm	18.5±1dBm
10	50		22±1dBm	23±1dBm	17±1dBm	22±1dBm	21.5±1dBm	18±1dBm
15	1	QPSK	N/A	N/A	19±1dBm	N/A	24.5±1dBm	20.5±1dBm
15	36		N/A	N/A	18±1dBm	N/A	23±1dBm	19±1dBm
15	75		N/A	N/A	18±1dBm	N/A	23±1dBm	19±1dBm
15	1	16- QAM	N/A	N/A	18±1dBm	N/A	23.5±1dBm	19.5±1dBm
15	36		N/A	N/A	17±1dBm	N/A	22±1dBm	18±1dBm
15	75		N/A	N/A	16.5±1dBm	N/A	22±1dBm	18±1dBm
20	1	QPSK	N/A	N/A	19.5±1dBm	N/A	N/A	21±1dBm
20	50		N/A	N/A	18.5±1dBm	N/A	N/A	20±1dBm
20	100		N/A	N/A	18±1dBm	N/A	N/A	20±1dBm
20	1	16- QAM	N/A	N/A	18.5±1dBm	N/A	N/A	20.5±1dBm
20	50		N/A	N/A	17.5±1dBm	N/A	N/A	19±1dBm
20	100		N/A	N/A	17±1dBm	N/A	N/A	19±1dBm

Mode	BT
GFSK	7.5±1dBm
π/4-DQPSK	8±1dBm
8DPSK	8±1dBm

Mode	BLE
GFSK(1Mbps)	-4±1dBm
GFSK(2Mbps)	-4±1dBm

Mode	2.4G WLAN
802.11b	17±1dBm
802.11g	13.5±1dBm
802.11n(HT20)	11.5±1dBm
802.11n(HT40)	12±1dBm

Mode	5.2G WLAN
802.11a	-0.5±1dBm
802.11 n-HT20	-0.5±1dBm
802.11 n-HT40	-0.5±1dBm
802.11 ac-VHT20	-0.5±1dBm
802.11 ac-VHT40	-0.5±1dBm

Mode	5.8G WLAN
802.11a	-2±1dBm
802.11 n-HT20	-2±1dBm
802.11 n-HT40	-3±1dBm
802.11 ac-VHT20	-2±1dBm
802.11 ac-VHT40	-2.5±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).