Tune-up procedure

Each device is individually calibrated during manufacturing. Measurement is performed in a full calibrated setup using Wideband Radio Communication Tester or spectrum analyzer and power meter.

Measurement procedure is outlined below:

1. Set the device to operational voltage and on a predefined band class and channel.
2. The maximum output power is measured when the power control bit is set as all UP bits. The WWAN RF output power will be adjusted equal or lower than tested power shown in the test report.
3. The WIFI specific RF characteristics were measured by spectrum analyzer and power meter.

The user has no possibility to change these settings.

Tune up procedure shall be over the power range or at specific operating power levels.

1. It must provide an operational voltage to turn on the device and on one certain channel in service mode by means of company proprietary software.
2. The Base station simulator measures the WWAN device specific RF characteristics.
3. The maximum gains of each individual device are adjusted until the target value met.

Conducted Power Table

GSM Band

Band	Mode	Target Power (dBm)	Tolerance (dB)
GSM 850	GSM (GMSK, 1Tx-slot)	32.50	(-1.5,+0.5)
	GPRS (GMSK, 1Tx-slot)	32.50	(-1.5,+0.5)
	GPRS (GMSK, 2Tx-slot)	32.00	(-1.5,+0.5)
	GPRS (GMSK, 3Tx-slot)	31.50	(-1.5,+0.5)
	GPRS (GMSK, 4Tx-slot)	31.00	(-1.5,+0.5)
	EDGE (8PSK, 1Tx-slot)	28.00	(-1.5,+0.5)
	EDGE (8PSK, 2Tx-slot)	27.50	(-1.5,+0.5)
	EDGE (8PSK, 3Tx-slot)	27.00	(-1.5,+0.5)
	EDGE (8PSK, 4Tx-slot)	26.50	(-1.5,+0.5)
GSM 1900	GSM (GMSK, 1Tx-slot)	30.00	(-1.5,+0.5)
	GPRS (GMSK, 1Tx-slot)	30.00	(-1.5,+0.5)
	GPRS (GMSK, 2Tx-slot)	29.60	(-1.5,+0.5)
	GPRS (GMSK, 3Tx-slot)	29.30	(-1.5,+0.5)
	GPRS (GMSK, 4Tx-slot)	29.00	(-1.5,+0.5)
	EDGE (8PSK, 1Tx-slot)	27.00	(-1.5,+0.5)
	EDGE (8PSK, 2Tx-slot)	26.50	(-1.5,+0.5)
	EDGE (8PSK, 3Tx-slot)	26.00	(-1.5,+0.5)
	EDGE (8PSK, 4Tx-slot)	25.50	(-1.5,+0.5)

WCDMA Band

Band	Mode	Target Power (dBm)	Tolerance (dB)
WCDMA II	RMC 12.2K	24.00	(-1.5,+0.5)
	HSDPA Subtest-1	24.00	(-1.5,+0.5)
	HSDPA Subtest-2	24.00	(-1.5,+0.5)
	HSDPA Subtest-3	24.00	(-1.5,+0.5)
	HSDPA Subtest-4	24.00	(-1.5,+0.5)
	HSUPA Subtest-1	24.00	(-1.5,+0.5)
	HSUPA Subtest-2	24.00	(-1.5,+0.5)
	HSUPA Subtest-3	24.00	(-1.5,+0.5)
	HSUPA Subtest-4	24.00	(-1.5,+0.5)
	HSUPA Subtest-5	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-1	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-2	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-3	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-4	24.00	(-1.5,+0.5)
	HSPA+	24.00	(-1.5,+0.5)
WCDMA IV	RMC 12.2K	23.50	(-1.5,+0.5)
	HSDPA Subtest-1	23.50	(-1.5,+0.5)
	HSDPA Subtest-2	23.50	(-1.5,+0.5)
	HSDPA Subtest-3	23.50	(-1.5,+0.5)
	HSDPA Subtest-4	23.50	(-1.5,+0.5)
	HSUPA Subtest-1	23.50	(-1.5,+0.5)
	HSUPA Subtest-2	23.50	(-1.5,+0.5)
	HSUPA Subtest-3	23.50	(-1.5,+0.5)
	HSUPA Subtest-4	23.50	(-1.5,+0.5)
	HSUPA Subtest-5	23.50	(-1.5,+0.5)
	DC- HSDPA Subtest-1	23.50	(-1.5,+0.5)
	DC- HSDPA Subtest-2	23.50	(-1.5,+0.5)
	DC- HSDPA Subtest-3	23.50	(-1.5,+0.5)
	DC- HSDPA Subtest-4	23.50	(-1.5,+0.5)
	HSPA+	23.50	(-1.5,+0.5)

WCDMA V	RMC 12.2K	24.00	(-1.5,+0.5)
	HSDPA Subtest-1	24.00	(-1.5,+0.5)
	HSDPA Subtest-2	24.00	(-1.5,+0.5)
	HSDPA Subtest-3	24.00	(-1.5,+0.5)
	HSDPA Subtest-4	24.00	(-1.5,+0.5)
	HSUPA Subtest-1	24.00	(-1.5,+0.5)
	HSUPA Subtest-2	24.00	(-1.5,+0.5)
	HSUPA Subtest-3	24.00	(-1.5,+0.5)
	HSUPA Subtest-4	24.00	(-1.5,+0.5)
	HSUPA Subtest-5	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-1	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-2	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-3	24.00	(-1.5,+0.5)
	DC- HSDPA Subtest-4	24.00	(-1.5,+0.5)
	HSPA+	24.00	(-1.5,+0.5)

LTE Band

Band	Mode	Target Power (dBm)	Tolerance (dB)
LTE 2	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 4	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 5	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 7	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 12	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 13	QPSK/16QAM	22.50	(-1.5,+0.5)
LTE 25	QPSK/16QAM	23.00	(-1.5,+0.5)
LTE 26	QPSK/16QAM	23.00	(-1.5,+0.5)
LTE 41	QPSK/16QAM	24.00	(-1.5,+0.5)
LTE 66	QPSK/16QAM	23.00	(-1.5,+0.5)
LTE 71	QPSK/16QAM	23.00	(-1.5,+0.5)

2.4G WLAN

Band	Mode	Target Power (dBm)	Tolerance (dB)
2.4G WLAN	802.11b		(-2.0,+0.5)
	802.11g		(-1.5,+0.5)
	802.11n HT20		(-1.5,+0.5)

5G WLAN

Band		Mode	Target Power (dBm)	Tolerance (dB)
5G WLAN	U-NII-1	802.11a	14.50	(-2.0,+0.5)
		802.11n HT20	14.50	(-1.5,+0.5)
		802.11n HT40	15.00	(-1.5,+0.5)
	U-NII-2A	802.11a	14.00	(-2.0,+0.5)
		802.11n HT20	14.00	(-1.5,+0.5)
		802.11n HT40	14.50	(-1.5,+0.5)
	U-NII-2C	802.11a	13.50	(-2.0,+0.5)
		802.11n HT20	13.50	(-1.5,+0.5)
		802.11n HT40	14.00	(-1.5,+0.5)
	U-NII-3	802.11a	13.50	(-1.5,+0.5)
		802.11n HT20	13.50	(-1.5,+0.5)
		802.11n HT40	14.00	(-1.5,+0.5)

BT

Band	Mode	Target Power (dBm)	Tolerance (dB)
BT	GFSK	9.00	(-1.5,+0.5)
	π/4-DQPSK	7.00	(-1.5,+0.5)
	8-DPSK	7.00	(-1.5,+0.5)
	LE	-0.50	(-1.5,+0.5)

LTE

Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						3GPP 36.101 requirement MPR (dB)	MPR setting (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	2