Shanghai Sunmi Technology Co.,Ltd.

Power Tune up Procedure

During manufacturing each Terminal will be individually calibrated. The measurement is done in a fully calibrated setup, which is based on CMW500. Furthermore, the highest power level is verified afterwards in a call measurement on three channels (low, mid and high).

Procedure:

1. Set the module to operational voltage and on one certain channel in a special service mode by means of company proprietary software.
2. The actual power is measured at several power levels.
3. The gain factors of each individual Terminal are adjusted via the Board - test SW using automatic adjustment arithmetic until the target value is met.

The appropriate gain control settings are stored in RF table (a special section in Nor Flash marked with Read only and untouchable for end user) each Terminal individually (for each power level).
The user has no possibility to change these settings later on.

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Average Power (dBm)	Tune up
802.11b	1	2412	1	17.40	17.50
	6	2437		17.38	17.50
	11	2462		17.43	17.50
802.11g	1	2412	6	14.95	15.00
	6	2437		14.90	15.00
	11	2462		14.86	15.00
802.11n HT20 SISO	1	2412	MCS0	13.91	14.50
	6	2437		14.08	14.50
	11	2462		13.85	14.50
802.11n HT40 SISO	3	2422	MCS0	13.76	14.50
	6	2437		14.04	14.50
	9	2452		13.95	14.50

5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11a	U-NII-1	36	5180	6	14.94	15.50
		40	5200		14.76	15.50
		48	5240		15.20	15.50
	U-NII-2A	52	5260		14.94	15.50
		60	5300		14.84	15.50
		64	5320		15.27	15.50
	U-NII-2C	100	5500		15.27	15.50
		116	5580		14.63	15.50
		140	5700		15.14	15.50
	U-NII-3	149	5745		15.26	15.50
		157	5785		14.96	15.50
		165	5825		15.23	15.50
5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n HT20 SISO	U-NII-1	36	5180	MCS0	14.14	14.50
		40	5200		13.95	14.50
		48	5240		14.35	14.50
	U-NII-2A	52	5260		14.17	14.50
		60	5300		13.94	14.50

		64	5320		14.17	14.50
	U-NII-2C	100	5500		14.30	14.50
		116	5580		13.99	14.50
		140	5700		14.02	14.50
	U-NII-3	149	5745		14.20	14.50
		157	5785		13.93	14.50
		165	5825		14.16	14.50
5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11n HT40 SISO	U-NII-1	38	5190	MCS0	14.15	14.50
		46	5230		14.40	14.50
	U-NII-2A	54	5270		14.00	14.50
		62	5310		14.22	14.50
	U-NII-2C	102	5510		14.08	14.50
		110	5550		13.88	14.50
		134	5670		14.03	14.50
	U-NII-3	155	5755		14.00	14.50
		159	5795		14.21	14.50
5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT20 SISO	U-NII-1	36	5180	MCS0	12.82	13.50
		40	5200		12.93	13.50
		48	5240		13.28	13.50
	U-NII-2A	52	5260		13.04	13.50
		60	5300		12.82	13.50
		64	5320		13.19	13.50
	U-NII-2C	100	5500		13.02	13.50
		116	5580		12.83	13.50
		140	5700		13.13	13.50
	U-NII-3	149	5745		13.00	13.50
		157	5785		13.05	13.50
		165	5825		13.23	13.50
5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT40 SISO	U-NII-1	38	5190	MCS0	13.08	13.50
		46	5230		13.03	13.50
	U-NII-2A	54	5270		12.97	13.50
		62	5310		13.09	13.50
	U-NII-2C	102	5510		13.33	13.50
		110	5550		13.14	13.50
		134	5670		13.23	13.50
	U-NII-3	155	5755		13.02	13.50
5GHz	mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Average Power (dBm)	Tune up
802.11ac VHT80 SISO	U-NII-1	42	5210	MCS0	12.39	12.50
	U-NII-2A	58	5290		12.09	12.50
	U-NII-2C	106	5530		12.41	12.50
		122	5610		12.28	12.50
	U-NII-3	155	5775		12.26	12.50

BT			Average Conducted Power(dBm)	Tune up (dBm)
Modulation	Channel	Frequency (MHz)		
GFSK	0	2402	9.11	10.00
	39	2441	9.58	10.00
	78	2480	9.62	10.00
π/4DQPSK	0	2402	8.58	9.50
	39	2441	8.63	9.50
	78	2480	9.18	9.50
8DPSK	0	2402	8.59	9.50
	39	2441	9.11	9.50
	78	2480	9.41	9.50

BLE_1M			Average Conducted Power(dBm)	Tune up (dBm)
Modulation	Channel	Frequency (MHz)		
GFSK	0	2402	3.75	5.0
	19	2440	4.14	5.0
	39	2480	5.05	5.0

For FCC:

Mode/Band	Frequency		Tune up (dBm)
	TX(MHz)	RX(MHz)	
GSM 850	824-849	869-894	24.50
GSM1900	1850-1910	1930-1990	20.00
WCDMA Band II	1850-1910	1930-1990	25.00
WCDMA Band IV	1710-1755	2110-2155	25.00
WCDMA Band V	824-849	869-894	25.00
LTE Band 2	1850-1910	1930-1990	24.50
LTE Band 4	1710-1755	2110-2155	24.50
LTE Band 5	824-849	869-894	24.50
LTE Band 7	2500-2570	2620-2690	24.50
LTE Band 12	699-716	729-746	24.50
LTE Band 13	777-787	746-756	24.50
LTE Band 17	704-716	734-746	24.00
LTE Band 25	1850-1915	1930-1995	24.00
LTE Band 26	814-849	859-894	24.50
LTE Band 30	2305-2315	2350-2360	20.00
LTE Band 38	2570-2620	2570-2620	24.00
LTE Band 40	2305-2350 2345-2360	2305-2350 2345-2360	20.00
LTE Band 41	2496-2690	2496-2690	20.00
LTE Band 66	1710-1780	2110-2180	25.50
LTE Band 71	663-698	617-632	24.50

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For IC:

Mode/Band	Frequency		Tune up (dBm)
	TX(MHz)	RX(MHz)	
GSM 850	824-849	869-894	24.50
GSM1900	1850-1910	1930-1990	20.00
WCDMA Band II	1850-1910	1930-1990	25.00
WCDMA Band IV	1710-1755	2110-2155	25.00
WCDMA Band V	824-849	869-894	25.00
LTE Band 2	1850-1910	1930-1990	24.50
LTE Band 4	1710-1755	2110-2155	24.50
LTE Band 5	824-849	869-894	24.50
LTE Band 7	2500-2570	2620-2690	24.50
LTE Band 12	699-716	729-746	24.50
LTE Band 13	777-787	746-756	24.50
LTE Band 14	788-798	758-768	24.00
LTE Band 17	704-716	734-746	24.00
LTE Band 25	1850-1915	1930-1995	24.50
LTE Band 26	824-849	869-894	20.00
LTE Band 30	2305-2315	2350-2360	24.00
LTE Band 38	2570-2620	2570-2620	20.00
LTE Band 40	2305-2320 2345-2360	2305-2320 2345-2360	20.00
LTE Band 41	2500-2690	2500-2690	25.50
LTE Band 66	1710-1780	2110-2180	24.50
LTE Band 71	663-698	617-632	24.50