Tune Up Procedure

Tune-up procedure

GSM/WCDMA/LTE TEST

Measurement Procedure:

GSMWCDMA/LTE

1.Connect EUT with CMU200(E5515C)/CMW500, through RF cable. Make a call from CMU200(E5515C)/CMW500;

2.Measure the Output Power Average value;

3.Remarks: All Output Power are tested in Average Value specification.

For WIFI/BT

1: Connect to Power meter (NRVD) through RF cable and let the EUT Continuously transmit

2: Measure the Output Power Average value

Manufacturing tolerance

GSM

GSM 900 (GMSK) (Burst Average Power)			
Channel	Channel 975	Channel 62	Channel 124
Target (dBm)	31.5	32.0	31.5
Tolerance ±(dB)	1.0	1.0	1.0
GSM 1800 (GMSK) (Burst Average Power)			
Channel	Channel 512	Channel 698	Channel 885
Target (dBm)	29.0	29.0	29.0
Tolerance ±(dB)	1.0	1.0	1.0

GSM 900 GPRS (GMSK) (Burst Average Power)				
Channel		975	62	124
1 Txslot	Target (dBm)	29.5	29.5	29.5
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	28.0	28.0	28.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	25.0	25.0	25.0
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 900 EGPRS (8PSK) (Burst Average Power)				
Channel		975	62	124
1 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	25.0	25.0	25.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	21.5	21.5	21.5

	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.0	20.0	20.0
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 1800 GPRS (GMSK) (Burst Average Power)				
Channel		512	698	885
1 Txslot	Target (dBm)	27.5	27.5	27.5
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	23.0	22.5	22.5
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.5	20.5	20.5
	Tolerance ±(dB)	1.0	1.0	1.0
GSM 1800 EDGE (8PSK) (Burst Average Power)				
Channel		512	698	885
1 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	23.0	23.0	23.0
	Tolerance ±(dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	20.5	20.5	20.5
	Tolerance ±(dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.0	20.0	20.0
	Tolerance ±(dB)	1.0	1.0	1.0

UMTS

UMTS Band VIII			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	22.5	22.5	22.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSDPA(sub-test 1)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSDPA(sub-test 2)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSDPA(sub-test 3)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSDPA(sub-test 4)			

Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSUPA(sub-test 1)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSUPA(sub-test 2)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSUPA(sub-test 3)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSUPA(sub-test 4)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band VIII HSUPA(sub-test 5)			
Channel	Channel 2712	Channel 2788	Channel 2863
Target (dBm)	21.5	21.5	21.5
Tolerance ±(dB)	1.0	1.0	1.0

UMTS Band I			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSDPA(sub-test 1)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSDPA(sub-test 2)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSDPA(sub-test 3)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSDPA(sub-test 4)			
Channel	Channel 9612	Channel 9750	Channel 9888

Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSUPA(sub-test 1)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSUPA(sub-test 2)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSUPA(sub-test 3)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSUPA(sub-test 4)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0
UMTS Band I HSUPA(sub-test 5)			
Channel	Channel 9612	Channel 9750	Channel 9888
Target (dBm)	22.0	22.0	22.0
Tolerance ±(dB)	1.0	1.0	1.0

LTE Band 1

BW:5MHz [<RB=1>]						
Channel	Channel 18100		Channel 18300		Channel 18500	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	23.0	22.5	23.0	22.5	23.0	22.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 18100		Channel 18300		Channel 18500	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	23.0	22.5	23.0	22.5	23.0	22.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 18100		Channel 18300		Channel 18500	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	23.0	22.5	23.0	22.5	23.0	22.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 18100		Channel 18300		Channel 18500	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	23.0	22.5	23.0	22.5	23.0	22.5

Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 3

BW:1.4MHz [<RB=1>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:1.4MHz [<RB=3>, <RB=6>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=1>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	22.5	22.0	22.5	22.0	22.5	22.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 7

BW:5MHz [<RB=1>]						
Channel	Channel 20850		Channel 21100		Channel 21350	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 20850		Channel 21100		Channel 21350	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM

Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 20850		Channel 21100		Channel 21350	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 20850		Channel 21100		Channel 21350	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 8

BW:1.4MHz [<RB=1>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:1.4MHz [<RB=3>, <RB=6>]						
Channel	Channel 19300		Channel 19575		Channel 19850	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=1>]						
Channel	Channel 21500		Channel 21625		Channel 21750	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 21500		Channel 21625		Channel 21750	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:10MHz [<RB=1>]						
Channel	Channel 21500		Channel 21625		Channel 21750	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:10MHz [<RB=50>, <RB=100>]						
Channel	Channel 21500		Channel 21625		Channel 21750	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0

Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 20

BW:5MHz [<RB=1>]						
Channel	Channel 24250		Channel 24300		Channel 24400	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 24250		Channel 24300		Channel 24400	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 24250		Channel 24300		Channel 24400	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 24250		Channel 24300		Channel 24400	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	24.0	23.0	24.0	23.0	24.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 38

BW:5MHz [<RB=1>]						
Channel	Channel 37850		Channel 38000		Channel 38150	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	20.5	20.0	20.5	20.0	20.5	20.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 37850		Channel 38000		Channel 38150	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	20.5	20.0	20.5	20.0	20.5	20.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 37850		Channel 38000		Channel 38150	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	20.5	20.0	20.5	20.0	20.5	20.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 37850		Channel 38000		Channel 38150	

	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	20.5	20.0	20.5	20.0	20.5	20.0
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

LTE Band 40

BW:5MHz [<RB=1>]						
Channel	Channel 38675		Channel 39150		Channel 39625	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:5MHz [<RB=12>, <RB=25>]						
Channel	Channel 38675		Channel 39150		Channel 39625	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=1>]						
Channel	Channel 38750		Channel 39150		Channel 39550	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0
BW:20MHz [<RB=50>, <RB=100>]						
Channel	Channel 38750		Channel 39150		Channel 39550	
	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Target (dBm)	21.0	20.5	21.0	20.5	21.0	20.5
Tolerance ±(dB)	1.0	1.0	1.0	1.0	1.0	1.0

WiFi 2.4G

802.11b (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	12.5	13.5	13.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11g (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	12.5	12.5	13.0
Tolerance ±(dB)	1.0	1.0	1.0
802.11n HT20 (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	11.0	11.0	11.5
Tolerance ±(dB)	1.0	1.0	1.0

WiFi 5.2G

802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	10.0	9.5	9.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(20MHz) (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	10.0	10.0	9.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(40MHz) (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	10.0	10.0	
Tolerance ±(dB)	1.0	1.0	
802.11ac(20MHz) (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	10.0	10.0	9.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11ac(40MHz) (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	10.0	10.0	
Tolerance ±(dB)	1.0	1.0	
802.11ac(80MHz) (Average)			
Channel	Channel 42		
Target (dBm)	10.0		
Tolerance ±(dB)	1.0		

WiFi 5.8G

802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	9.0	9.0	9.0
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(20MHz) (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.5	8.5	8.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(40MHz) (Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	9.0	9.0	
Tolerance ±(dB)	1.0	1.0	
802.11ac(20MHz) (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.5	8.5	8.5
Tolerance ±(dB)	1.0	1.0	1.0

802.11ac(40MHz) (Average)		
Channel	Channel 151	Channel 159
Target (dBm)	9.0	9.0
Tolerance ±(dB)	1.0	1.0
802.11ac(80MHz) (Average)		
Channel	Channel 155	
Target (dBm)	8.5	
Tolerance ±(dB)	1.0	

Bluetooth V5.0

BLE-GFSK (Average)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	0.5	-1.0	-1.0
Tolerance ±(dB)	1.0	1.0	1.0
GFSK (Average)			
Channel	Channel 0	Channel 78	
Target (dBm)	1.0	1.0	
Tolerance ±(dB)	1.0	1.0	
π/4DQPSK (Average)			
Channel	Channel 0	Channel 78	
Target (dBm)	0.5	0.5	
Tolerance ±(dB)	1.0	1.0	
8DPSK (Average)			
Channel	Channel 0	Channel 78	
Target (dBm)	1.0	1.5	
Tolerance ±(dB)	1.0	1.0	

Tune Up Procedure

1. RX Gain Calibration

a. Put DUT in test mode
b. Put DUT in BCH mode
c. Put DUT in selected channel band
d. Total gain chain calibration at center ARFCN
e. Frequency Ripple calibration
f. Complete RX_AGC Gain table

2. TX Power Calibration

a. Put DUT in test mode
b. Put DUT in BCH mode
c. Put DUT in selected channel band
d. Total gain chain calibration at center ARFCN
e .Frequency Ripple calibration
f .Complete TX_APC Gain table

3. AFC calibration

a. Put DUT in test mode
b. Put DUT in selected channel mode
c. Calibration AFC at center ARFCN
d. Complete AFC result table