

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 63	Channel 124
Target (dBm)	32.0	32.0	32.0
Tolerance \pm (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 \pm (dB)	1.0	1.0	1.0

GSM 900 GPRS (GMSK) (Burst Average Power)				
Channel		975	63	124
1 Txslot	Target (dBm)	29.5	29.5	29.5
	Tolerance \pm (dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	28.0	28.0	28.0
	Tolerance \pm (dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance \pm (dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	25.0	25.0	25.0
	Tolerance \pm (dB)	1.0	1.0	1.0
GSM 900 EGPRS (8PSK) (Burst Average Power)				
Channel		975	63	124
1 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance \pm (dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	25.0	25.0	25.0
	Tolerance \pm (dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	21.5	21.5	21.5

	Tolerance \pm (dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.0	20.0	20.0
	Tolerance \pm (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 \pm (dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance \pm (dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	23.0	23.0	23.0
	Tolerance \pm (dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.5	20.5	20.5
	Tolerance \pm (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 \pm (dB)	1.0	1.0	1.0
2 Txslot	Target (dBm)	23.0	23.0	23.0
	Tolerance \pm (dB)	1.0	1.0	1.0
3 Txslot	Target (dBm)	20.5	20.5	20.5
	Tolerance \pm (dB)	1.0	1.0	1.0
4 Txslot	Target (dBm)	20.0	20.0	20.0
	Tolerance \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (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 \pm (dB)	1.0	1.0	1.0

LTE Band 1

BW:5MHz [<RB=1>]			
Channel	Channel 18100	Channel 18300	Channel 18500
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:5MHz [<RB=8>, <RB=24>]			
Channel	Channel 18100	Channel 18300	Channel 18500
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:20MHz [<RB=1>]			
Channel	Channel 18100	Channel 18300	Channel 18500
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:20MHz [<RB=18>, <RB=99>]			
Channel	Channel 18100	Channel 18300	Channel 18500
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0

LTE Band 3

BW:1.4MHz [<RB=1>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:1.4MHz [<RB=5>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:5MHz [<RB=1>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:5MHz [<RB=8>, <RB=24>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:20MHz [<RB=1>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:20MHz [<RB=18>, <RB=99>]			
Channel	Channel 19300	Channel 19575	Channel 19850
	QPSK	QPSK	QPSK
Target (dBm)	23.5	23.5	23.5
Tolerance ±(dB)	1.0	1.0	1.0

LTE Band 7

BW:5MHz [<RB=1>]			
Channel	Channel 20850	Channel 21100	Channel 21350
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:5MHz [<RB=8>, <RB=24>]			
Channel	Channel 20850	Channel 21100	Channel 21350
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0

BW:20MHz [<RB=1>]			
Channel	Channel 20850	Channel 21100	Channel 21350
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:20MHz [<RB=18>, <RB=99>]			
Channel	Channel 20850	Channel 21100	Channel 21350
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0

LTE Band 8

BW:1.4MHz [<RB=1>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:1.4MHz [<RB=5>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:5MHz [<RB=1>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:5MHz [<RB=8>, <RB=24>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:10MHz [<RB=1>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0
BW:10MHz [<RB=12>, <RB=49>]			
Channel	Channel 21500	Channel 21625	Channel 21750
	QPSK	QPSK	QPSK
Target (dBm)	23.0	23.0	23.0
Tolerance ±(dB)	1.0	1.0	1.0

LTE Band 20

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

LTE Band 28

BW:3MHz [<RB=1>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:3MHz [<RB=4>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:5MHz [<RB=1>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0
BW:5MHz [<RB=4>, <RB=8>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance \pm (dB)	1.0	1.0	1.0



BW:20MHz [<RB=1>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance ±(dB)	1.0	1.0	1.0
BW:20MHz [<RB=18>, <RB=99>]			
Channel	Channel 37850	Channel 38000	Channel 38150
	QPSK	QPSK	QPSK
Target (dBm)	22.5	22.5	22.5
Tolerance ±(dB)	1.0	1.0	1.0

WiFi 2.4G

802.11b (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	13.0	14.0	13.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11g (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	13.5	13.0	13.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n HT20 (Average)			
Channel	Channel 1	Channel 7	Channel 13
Target (dBm)	12.0	12.0	12.5
Tolerance ±(dB)	1.0	1.0	1.0

WiFi 5.2G

802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	9.5	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)	9.5	9.5	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)	9.5	9.5	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 \pm (dB)	1.0	1.0
802.11ac(80MHz) (Average)		
Channel	Channel 42	
Target (dBm)	10.0	
Tolerance \pm (dB)	1.0	

WiFi 5.8G

802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	12.5	12.5	12.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(20MHz) (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	12.5	12.5	12.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11n(40MHz) (Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	12.5	12.5	
Tolerance ±(dB)	1.0	1.0	
802.11ac(20MHz) (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	12.5	12.5	12.5
Tolerance ±(dB)	1.0	1.0	1.0
802.11ac(40MHz) (Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	12.5	12.5	
Tolerance ±(dB)	1.0	1.0	
802.11ac(80MHz) (Average)			
Channel	Channel 155		
Target (dBm)	11.5		
Tolerance ±(dB)	1.0		

Bluetooth V5.0

BLE-GFSK (Average)1M			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	-1.0	-2.0	-1.0
Tolerance \pm (dB)	1.0	1.0	1.0
BLE-GFSK (Average)2M			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	-1.0	-2.0	-1.0
Tolerance \pm (dB)	1.0	1.0	1.0

GFSK (Average)		
Channel	Channel 0	Channel 78
Target (dBm)	5.0	5.0
Tolerance \pm (dB)	1.0	1.0
$\pi/4$ DQPSK (Average)		
Channel	Channel 0	Channel 78
Target (dBm)	3.5	3.5
Tolerance \pm (dB)	1.0	1.0
8DPSK (Average)		
Channel	Channel 0	Channel 78
Target (dBm)	3.5	3.5
Tolerance \pm (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

