



## Tune Up Procedure

### Tune-up procedure

#### 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

#### The conducted power measurement results for WCDMA

Item	band	FDD Band VIII result (dBm)			Tune up (dBm)	FDD Band I result (dBm)			Tune up (dBm)
		Test Channel				Test Channel			
	sub-test	2712	2788	2862		9612	9750	9888	
WCDMA	\	23.08	23.21	23.19	24.00	23.25	23.33	23.18	24.00
HSDPA	1	22.00	22.14	22.10	23.00	22.17	22.22	22.12	23.00
	2	21.91	21.98	21.89	22.00	21.86	21.92	22.08	22.50
	3	21.71	21.80	21.75	22.00	21.83	21.55	21.93	22.00
	4	21.46	21.80	21.44	22.00	21.59	21.20	21.59	22.00
HSUPA	1	22.07	22.24	22.23	23.00	22.28	22.34	22.24	23.00
	2	22.06	22.14	22.02	23.00	22.06	22.28	22.17	23.00
	3	22.13	22.00	21.74	23.00	22.00	22.16	22.26	23.00
	4	22.07	21.76	21.60	22.50	21.95	22.05	22.04	23.00
	5	21.92	21.70	21.51	22.00	21.89	21.80	21.80	22.00

#### The conducted power measurement results for WLAN

Mode	Channel	Frequency (MHz)	Conducted Output Power	Tune up (dBm)	Test Rate Data
			(dBm)		
802.11b	1	2412	15.32	16.00	1 Mbps
	7	2442	15.56	16.00	1 Mbps
	13	2472	15.21	16.00	1 Mbps
802.11g	1	2412	14.62	15.00	6 Mbps
	7	2442	14.66	15.00	6 Mbps
	13	2472	13.84	15.00	6 Mbps
802.11n(20MHz)	1	2412	13.93	14.00	6.5 Mbps
	7	2442	13.97	14.00	6.5 Mbps



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	13	2472	13.17	14.00	6.5 Mbps
802.11n(40MHz)	3	2422	12.41	12.50	13 Mbps
	7	2442	11.74	12.50	13 Mbps
	11	2462	11.92	12.50	13 Mbps

**The conducted power measurement results for Bluetooth**

Mode	Channel	Frequency (MHz)	Conducted Output Power	Tune up (dBm)
			(dBm)	
BLE	00	2402	0.49	1.00
	19	2440	0.46	1.00
	39	2480	-0.44	0.00
GFSK	00	2402	-0.60	0.00
	78	2480	-0.48	0.00
$\pi/4$ -DQPSK	00	2402	1.08	2.00
	78	2480	0.86	1.00
8DPSK	00	2402	1.68	2.00
	78	2480	2.16	3.00

**The conducted power measurement results for LTE**

**LTE-BAND1**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 1					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	22.35	23.00
			8RB#0	22.33	23.00
	Mid Range	1	1RB#0	22.46	23.00
			8RB#0	22.48	23.00
	High Range	1	1RB#24	22.49	23.00
			8RB#17	22.49	23.00
20MHz	Low Range	1	1RB#0	22.07	23.00
			18RB#0	22.03	23.00
	Mid Range	1	1RB#0	22.02	23.00
			18RB#0	22.24	23.00
	High Range	1	1RB#99	22.22	23.00
			18RB#82	22.29	23.00



**LTE-BAND3**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 3					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
1.4MHz	Low Range	1	1RB#0	22.58	23.00
	Mid Range	1	1RB#0	22.46	23.00
	High Range	1	1RB#0	22.31	23.00
			5RB#0	22.37	23.00
5MHz	Low Range	1	1RB#0	22.53	23.00
			1RB#24	22.45	23.00
	Mid Range	1	1RB#0	22.40	23.00
			1RB#24	22.40	23.00
	High Range	1	1RB#0	22.36	23.00
			1RB#24	22.27	23.00
8RB#0			22.35	23.00	
20MHz	Low Range	1	1RB#0	22.26	23.00
			1RB#99	22.12	23.00
	Mid Range	1	1RB#0	22.01	23.00
			1RB#99	22.29	23.00
	High Range	1	1RB#0	22.30	23.00
			1RB#99	21.94	23.00
18RB#0			22.33	23.00	



**LTE-BAND7**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 7					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	22.22	24.00
			1RB#24	22.18	23.00
	Mid Range	1	1RB#0	23.41	24.00
			1RB#24	23.37	24.00
	High Range	1	1RB#0	22.20	24.00
			1RB#24	22.12	23.00
			8RB#0	22.18	23.00
20MHz	Low Range	1	1RB#0	22.07	23.00
			1RB#99	22.14	23.00
	Mid Range	1	1RB#0	22.60	23.00
			1RB#99	23.20	24.00
	High Range	1	1RB#0	22.05	23.00
			1RB#99	22.07	23.00
			18RB#0	22.18	23.00

**LTE-BAND8**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 8					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
1.4MHz	Low Range	1	1RB#0	24.20	25.00
	Mid Range	1	1RB#0	24.23	25.00
	High Range	1	1RB#0	24.39	25.00
			5RB#0	24.41	25.00
5MHz	Low Range	1	1RB#0	24.23	25.00
			1RB#24	24.29	25.00





	Mid Range	1	1RB#0	24.14	25.00
			1RB#24	24.15	25.00
	High Range	1	1RB#0	24.39	25.00
			1RB#24	24.29	25.00
			8RB#0	24.32	25.00
	10MHz	Low Range	1RB#0	24.28	25.00
			1RB#49	24.35	25.00
		Mid Range	1RB#0	24.35	25.00
			1RB#49	24.20	25.00
		High Range	1RB#0	24.42	25.00
			1RB#49	24.30	25.00
			12RB#0	24.41	25.00

**LTE-BAND20**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 20					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	24.92	25.00
			1RB#24	24.97	25.00
	Mid Range	1	1RB#0	24.80	25.00
			1RB#24	24.60	25.00
	High Range	1	1RB#0	24.92	25.00
			1RB#24	24.88	25.00
			8RB#0	24.97	25.00
20MHz	Low Range	1	1RB#0	24.66	25.00
			1RB#99	24.74	25.00
	Mid Range	1	1RB#0	24.68	25.00
			1RB#99	24.44	25.00
	High Range	1	1RB#0	24.58	25.00
			1RB#99	24.55	25.00
			18RB#0	24.73	25.00





## LTE-BAND28

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 28					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
3MHz	Low Range	1	1RB#0	24.84	25.00
			4RB#0	24.90	25.00
	Mid Range	1	1RB#0	24.74	25.00
			4RB#0	24.62	25.00
	High Range	1	1RB#14	24.77	25.00
			4RB#11	24.77	25.00
5MHz	Low Range	1	1RB#0	24.78	25.00
			8RB#0	24.71	25.00
	Mid Range	1	1RB#0	24.60	25.00
			8RB#0	24.61	25.00
	High Range	1	1RB#24	24.72	25.00
			8RB#17	24.76	25.00
20MHz	Low Range	1	1RB#0	24.50	25.00
			18RB#0	24.35	25.00
	Mid Range	1	1RB#0	24.37	25.00
			18RB#0	24.36	25.00
	High Range	1	1RB#99	24.49	25.00
			18RB#82	24.57	25.00





**LTE-BAND41**

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 41					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Tune up (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	22.70	23.00
			1RB#24	22.71	23.00
	Mid Range	1	1RB#0	22.09	23.00
			1RB#24	22.07	23.00
	High Range	1	1RB#0	23.04	23.50
			1RB#24	23.08	23.50
8RB#0			22.90	23.00	
20MHz	Low Range	1	1RB#0	22.52	23.00
			1RB#99	22.46	23.00
	Mid Range	1	1RB#0	21.99	22.00
			1RB#99	21.95	22.00
	High Range	1	1RB#0	22.80	23.00
			1RB#99	22.95	23.00
18RB#0			22.82	23.00	

**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



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- 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

