

Tune-up procedures of HUAWEI Sophia-L10

1.1 Test Equipment List

- GSM tester: CMU200
- WCDMA tester: CMU200
- LTE tester CMW500
- Dummy battery or Power Supply: Agilent 66319D
- PC with serial port
- GPIB card

1.2 The G850/PCS1900 power adjust procedure

Function:

After the GSM850/PCS1900 transmit POWER calibration the HUAWEI SOPHIA-L10 can find the relationship between the TX-AGC and output power. So it can transmit the specific power according to the 3GPP2 protocol.

Procedure:

Step1: The computer sets HUAWEI SOPHIA-L10 to the Factory test mode and works at GSM850/PCS1900 mode, sets the CMU200 to GSM850/PCS1900 analyzer mode.

Step2: Tuning the TX-AGC of HUAWEI SOPHIA-L10 from 50 to 600 and measure the output power of the HUAWEI SOPHIA-L10 via CMU200, so we can find the relationship between the TX-AGC and output power.

Output power of range:

GSM/GPRS850 (GMSK) :

1TXslot: 32.5 dBm [-1dB~~+1dB]

2TXslot: 30.5 dBm [-2.0dB~~+1.0dB]

3TXslot: 28.5 dBm [-2.0dB~~+1.0dB]

4TXslot: 26.5 dBm [-2.0dB~~+1.0dB]

EDGE850 (8PSK) :

1TXslot: 26.5 dBm [-2dB~~+1.0dB]

2TXslot: 24.5 dBm [-2.0dB~~+1dB]

3TXslot: 22.5 dBm [-2.5dB~~+1.0dB]

4TXslot: 20.5 dBm [-2.5dB~~+1dB]

EDGE850 (GMSK) :

1TXslot:32.5 dBm [-1dB~~+1dB]

2TXslot:30.5 dBm [-2dB~~+1dB]

3TXslot:28.5 dBm [-2dB~~+1dB]

4TXslot:26.5 dBm [-2dB~~+1dB]

Output power of reductions:

GPRS (GMSK) :

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

PCS/GPRS1900 (GMSK) :

1TXslot:29.5 dBm [-1dB~~+1dB]

2TXslot:27.5 dBm [-2dB~~+1.0dB]

3TXslot:25.5 dBm [-2dB~~+1dB]

4TXslot:23.5 dBm [-2dB~~+1.0dB]

EDGE1900 (8PSK) :

1TXslot: 26 dBm [-2.0dB~~+1dB]

2TXslot: 24 dBm [-2.0dB~~+1dB]

3TXslot: 22 dBm [-2.5dB~~+1dB]

4TXslot: 20 dBm [-2.5dB~~+1dB]

EDGE1900 (GMSK) :

1TXslot:29.5 dBm [-1dB~~+1dB]

2TXslot:27.5 dBm [-2dB~~+1.0dB]

3TXslot:25.5 dBm [-2dB~~+1dB]

4TXslot:23.5 dBm [-2dB~~+1.0dB]

Output power of reductions:

GPRS (GMSK) :

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4
4	6

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
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1	0
2	2
3	4
4	6

After hotspot function work:

PCS (GMSK) :

1TXslot:26.5 dBm [-1dB~~+1dB]

2TXslot:24.5 dBm [-2dB~~+1dB]

3TXslot:22.5 dBm [-2dB~~+1dB]

4TXslot:20.5 dBm [-2dB~~+1dB]

EDGE1900 (8PSK) :

1TXslot: 23 dBm [-2dB~~+1dB]

2TXslot: 21 dBm [-2.0dB~~+1dB]

3TXslot: 19 dBm [-2.5dB~~+1dB]

4TXslot: 17 dBm [-2.5dB~~+1dB]

EDGE1900 (GMSK) :

1TXslot:26.5 dBm [-1dB~~+1dB]

2TXslot:24.5 dBm [-2dB~~+1dB]

3TXslot:22.5 dBm [-2dB~~+1dB]

4TXslot:20.5 dBm [-2dB~~+1dB]

1.3 The WCDMA Band II power adjust procedure

Function:

After the WCDMA band II transmit POWER calibration the UE can find the relationship between the TX-PDM value and output power and can control the maximum conduct power through HDET value. So it can transmit the specific power according to the 3GPP protocol.

Procedure:

Step1: The computer sets UE to the Factory test mode and works at WCDMA band II, sets the CMU200 to WCDMA band II Analyzer mode.

Step2: Tuning the TX-PDM of UE from 0 to 123 and measure the output power of the UE via CMU200, at the same time measure the HDET value ,so we can find the relationship between the TX-PDM、 the HDET value and output power.

Output power of range:

WCDMA: 22.5 dBm [-1dB~~+1dB]

HSDPA: 22.5 dBm [-3dB~~+1dB]

HSUPA: 22.5 dBm [-3dB~~+1dB]

HSDPA:

Reduction of maximum output power, (dB)			
Sub—test 1	Sub—test 2	Sub—test 3	Sub—test 4
0.5	0.5	1.5	1.5

HSUPA:

Reduction of maximum output power, (dB)				
Sub—test 1	Sub—test 2	Sub—test 3	Sub—test 4	Sub—test 5
1.5	2.0	1.5	1.5	0.5

After hotspot function work:

WCDMA:18.5 dBm [-1dB~~+1dB]

HSDPA: 18.5dBm [-3dB~~+1dB]

HSUPA: 18.5 dBm [-3dB~~+1dB]

1.4 The WCDMA Band V power adjust procedure

Function:

After the WCDMA Band V transmit POWER calibration the UE can find the relationship between the

TX-PDM value and output power and can control the maximum conduct power through HDET value.

So it can transmit the specific power according to the 3GPP protocol.

Procedure:

Step1: The computer sets UE to the Factory test mode and works at WCDMA band V, sets the CMU200 to WCDMA Band V Analyzer mode.

Step2: Tuning the TX-PDM of UE from 0 to 123 and measure the output power of the UE via CMU200, at the same time measure the HDET value ,so we can find the relationship between the TX-PDM、 the HDET value and output power.

Output power of range:

WCDMA: 23.5 dBm [-1dB~~+1dB]

HSDPA: 23.5 dBm [-3dB~~+1dB]

HSUPA: 23.5 dBm [-3dB~~+1dB]

HSDPA:

Reduction of maximum output power, (dB)			
Sub—test 1	Sub—test 2	Sub—test 3	Sub—test 4
0.5	0.5	1.5	1.5

HSUPA:

Reduction of maximum output power, (dB)				
Sub—test 1	Sub—test 2	Sub—test 3	Sub—test 4	Sub—test 5
1.5	2.0	1.5	1.5	0.5

1.5 The LTE Band VII power adjust procedure

Function:

After the LTE Band VII transmit POWER calibration the UE can find the relationship between the TX-PDM value and output power and can control the maximum conduct power through HDET value.

So it can transmit the specific power according to the 3GPP protocol.

Procedure:

Step1: The computer sets UE to the Factory test mode and works at LTE band IV, sets the CMW500 to LTE band VII Analyzer mode.

Step2: Tuning the TX-PDM of UE from 0 to 123 and measure the output power of the UE via CMW500, at the same time measure the HDET value ,so we can find the relationship between the TX-PDM、the HDET value and output power.

Output power of range:

LTE: 22.5dBm [-2dB~~+1.5dB]

LTE Band VII						
Frequency (MHz)	BW (MHz)	Modulation	RB Size	Target power	MPR Target	MPR Allowed by 3Gpp
Uplink:1710~1785 Downlink:1805~1880	1.4	QPSK	≤5	22.5	0	0
		16-QAM	≤5	21.5	1	0-1
		QPSK	>5	21.5	1	0-1
		16-QAM	>5	20.5	2	0-2
Uplink:1710~1785 Downlink:1805~1880	3	QPSK	≤4	22.5	0	0
		16-QAM	≤4	21.5	1	0-1
		QPSK	>4	21.5	1	0-1
		16-QAM	>4	20.5	2	0-2
Uplink:1710~1785 Downlink:1805~1880	5	QPSK	≤8	22.5	0	0
		16-QAM	≤8	21.5	1	0-1
		QPSK	>8	21.5	1	0-1
		16-QAM	>8	20.5	2	0-2
Uplink:1710~1785 Downlink:1805~1880	10	QPSK	≤12	22.5	0	0
		16-QAM	≤12	21.5	1	0-1
		QPSK	>12	21.5	1	0-1
		16-QAM	>12	20.5	2	0-2
Uplink:1710~1785 Downlink:1805~1880	15	QPSK	≤16	22.5	0	0
		16-QAM	≤16	21.5	1	0-1
		QPSK	>16	21.5	1	0-1
		16-QAM	>16	20.5	2	0-2
Uplink:1710~1785 Downlink:1805~1880	20	QPSK	≤18	22.5	0	0
		16-QAM	≤18	21.5	1	0-1
		QPSK	>18	21.5	1	0-1
		16-QAM	>18	20.5	2	0-2

After hotspot function work:

LTE: 19.5dBm [-2dB~~+1.5dB]

LTE Band VII						
Frequency (MHz)	BW (MHz)	Modulation	RB Size	Target power	MPR Target	MPR Allowed by 3Gpp
Uplink:1710~1785 Downlink:1805~1880	1.4	QPSK	≤5	19.5	0	0
		16-QAM	≤5	19.5	0	0-1
		QPSK	>5	18.5	1	0-1
		16-QAM	>5	18.5	1	0-2
Uplink:1710~1785 Downlink:1805~1880	3	QPSK	≤4	19.5	0	0
		16-QAM	≤4	19.5	0	0-1
		QPSK	>4	18.5	1	0-1
		16-QAM	>4	18.5	1	0-2
Uplink:1710~1785 Downlink:1805~1880	5	QPSK	≤8	19.5	0	0
		16-QAM	≤8	19.5	0	0-1
		QPSK	>8	18.5	1	0-1
		16-QAM	>8	18.5	1	0-2
Uplink:1710~1785 Downlink:1805~1880	10	QPSK	≤12	19.5	0	0
		16-QAM	≤12	19.5	0	0-1
		QPSK	>12	18.5	1	0-1
		16-QAM	>12	18.5	1	0-2
Uplink:1710~1785 Downlink:1805~1880	15	QPSK	≤16	19.5	0	0
		16-QAM	≤16	19.5	0	0-1
		QPSK	>16	18.5	1	0-1
		16-QAM	>16	18.5	1	0-2
Uplink:1710~1785 Downlink:1805~1880	20	QPSK	≤18	19.5	0	0
		16-QAM	≤18	19.5	0	0-1
		QPSK	>18	18.5	1	0-1
		16-QAM	>18	18.5	1	0-2

1.6 The Bluetooth RF test procedure

Step1: The computer sets UE to the Factory test mode and works at Bluetooth mode and sets the CMU200 to Bluetooth Analyzer mode.

Step2: The EUT's Bluetooth chip connects with CMU200 through SMA interface, then all the BT RF performances can be tested.

BT Average Power: $\leq 7\text{dBm}$ **BT Peak Power:** $\leq 10\text{dBm}$

1.7 The WiFi RF test procedure

WiFi station:

802.11b: 15dBm [-2dB~~+1dB]

802.11g: 14dBm [-2dB~~+1dB]

802.11n: 14dBm [-2dB~~+1dB]

Note: The user has no possibility to change these settings later on.