CMU200 操作培训

第一章 CMU200 简述

一 CMU200 应用及其基本功能

CMU200 在测试中模拟基站,通过U_m接口,对无线终端产品的性能指标进行测试的综合测试仪。除此之外,CMU200 还能作为信号源以及频谱分析仪,跟其他仪表配合起来使用。 作为一台综合测试仪,它几乎支持所有的协议: MS Test GSM400、900、1800、1900,TDMA IS 136, AMPS, CDMA IS 95, WCDMA, CDMA2000, EDGE等等。当然不同协议的支持 需要我们加载不同版本的软件。因此,可以说CMU200 是完全面向未来的模块化设计。

由于 CMU200 的基本单元中包含了信号源/功率计,示波器和简单的频谱分析仪的功能,CMU200 广泛的应用于下列各个领域:

- RF 开发
- 模块设计
- 生产中的模块测试
- 生产中的最终测试
- 功能测试
- 特性测试
- 高级维修
- 质量检验
- 测试系统的基本仪表
- 基站模拟

二 CMU200 的主要优点

CMU200 的设计不仅满足现在的测试需求,而且为以后的升级提供了很多备用资源。 它的有点主要体现在以下几个方面:

- 多标准支持的测试平台
- 很快的测试速度
- 很高的测试精度
- 重量轻
- 耗电省
- 兼容性好

三 CMU200 的按键及接口

CMU200 的前面板主要是由 VGA 显示屏以及 VGA 两旁的软件以及下面的热键和右面 的各类硬按键(FUNCTION、SYSTEM、DATA、VARIATION、CONTROL)以及各类接口 组成。下图为 CMU200 的前视图。

9个软键,0	N/Standb	y,	VGA显示	示屏	9个软键,	Escape		按键和接 !		
	ROHDE	ASCHW	ARZ UNIVERSAL RADIO	COMMUNICATION TESTER	R - CMU 200					(1100.0008.02)
		Group Config.	RF Analyzer / Generato		Connect. Control		FUNCTION MENU BALLECT DATA CTRL	SYSTEM		
		Max Level Frequency	Auto	- 27.0 etim [free]	Generator			VARIATION	-99	DATA1
		Bandwidth	WDE 1	Off H	Modulation			\bigcirc		DATAZ
		Anslyzer Power	Power							ALK3
								ANY 2		Same
									0- 0	00+ 00+ 00+ 00+ 00T RF2 RF1
		Ana.FGen.	Power /1 Spectrum					Õ Õ.)(
)	8个	热键				1976		

图 2-1 CMU200 前视图

CMU200的后面板如下图所示,主要由信号、同步的输入输出口以及远程控制、外围设备的接口和电源及其开关组成。



图 2-2 CMU200 后视图 下面简单介绍一下各类按键以及接口。

FUNCTION

FUNCTION	预选择菜单: MENU SELECT	菜单选择
MENU	DATA	文件管理
SELECT DATA CTRL	CTRL	保留为以后扩展用

DATA 7 abc 4 5 abc 4 5 abc 5 abc 6 abc abc abc abc abc abc abc abc	数据输入: 09 *.E #_F G/n mV A M/u uV W B K/m dB uV C *1 dBm dB D ON/OFF EXP/COMP ENTER CONT/HALT UNIT	数字输入(编辑字符串用的字母) 特殊字符,小数点,十六进制"E" 特殊字符,负号,十六进制"F" 10 ⁹ /10 ⁻⁹ ,单位,十六进制"A" 10 ⁶ /10 ⁻⁶ ,单位,十六进制"B" 10 ³ /10 ⁻³ ,单位,十六进制"C" 10 ⁰ ,单位,十六进制"D" 编辑或者测试的打开/关闭 确认 进入/退出编辑,测试控制 保留为以后扩展用
SYSTEM		
SYSTEM HELP SETUP PRINT	系统控制: HELP SETUP PRINT	保留为以后扩展用 仪表设置 打印
VARIATION		
VARIATION	值可变按键和组选: 转动旋钮	择: 在输入域可变值,表中选择 参数以及下拉菜单的选择。 可用于扩大或压缩表,按下 表示对所选内容的确认。
	垂直几你健	在下边来早中远拜中几称 垂直移动
	水平光标键	在下拉菜单中选择中光标 水平移动
Further Keys		
ESCAPE	ESCAPE	退出下拉菜单,关闭编辑框, 取消确认。
	ON/STANDBY	测试模式跟待机模式的切换
CONTROL		

CONTROL CLR -	控制功能: CLR ← INS DEL VOL AUTO INFO RESET	清除编辑的字符串 从右向左依次清除字符 在编辑框中插入或者重写有关内容 依光标擦除字符 保留为以后扩展用 保留为以后扩展用 系统信息和硬件诊断 恢复出厂设置
DAIAI, DAIA2		
AUA3 AU SPEECH		
AUX 1 AUX 2 AF IN AF OUT	AUX1/2 AF IN/OUT	辅助音频信号输入输出口, 可能在远程控制中使用 音频信号的主输入输出端口
RF Connectors		
OG+ OG+ OG- OG- RF2 RF1	RF1 RF2	射频信号输入输出口 上面的指示灯表示射频信号相对与 CMU 是输入还是输出
RE4IN RE3OUT	RF3 OUT RF4 IN	射频信号输出口 射频信号输入口
Mains Switch		
	主电源开关 电源插头	

Interfaces



AUX, SERVICE, AUX4, extensions

四、软件升级和版本管理

利用软盘驱动或是用设备前部的 PCMCIA 接口来安装新的固件。在这样的情况下新安装的软件属性必须把一段键码输入到相应的软件属性菜单里面才能激活。通过 CMU 提供的版本管理器这样一个工具能是用户在同一设备里更方便的安装新的固件或者使用不同的应用和版本。

1 CMU 版本管理器

版本管理器是一个被设计成能以很方便的方式激活、删除、安装、结合以及列出不同 的软件版本。并且它提供了设备的硬件以及软件版本配置信息,并且能重新设置存储在随机 存储器上的启动配置。

如果 CMU 检测到软驱或 PCMCIA 插槽里的存储介质上有 CMU 固件的安装版本,那么 在启动的时候版本管理器会自动的打开。版本管理器的主界面如下图:

	VersionManager Ver 2.20	
	the active CMU hase software is the version	on: 2V20
‹ —	Activate other software	Write log files to disk \longrightarrow
<—	Delete software	Delete non volatile ran \longrightarrow
<—	Install software from PG-card slot Ø	Scan disk —>
‹ —	List software	List all versions to disk \longrightarrow
<—	Firmware update after board change	Copy non volatile ran to disk \longrightarrow
<—	Edit service tables	Defragment disk>
<—	Exit	Info \rightarrow

如果用户要用不同的功能可以使用相应的软键激活。但是需要注意,如果这台 CMU 上 只存在一个软件版本的配置,那么激活其它软件属性的功能就失效。

2 软件升级和版本管理

如果用户选择了"Activate other software"那么会出现如下界面:



例如,如果用户选中了"base 2X10.N03"那么这一项就会显示红色,如果用户点击"Activate" 相关的热键,那么 CMU 就会自动完成安装。

如果用户选择了"Delete Software"那么会出现如下界面:

		Uer	rsionManager Ver 2.20	
	the active	e CMU	base software is the version: 2020	
< —	Delete	base base base basc	2020 CSM MS 2020 (active) IS136, AMPS 2020 2X10.N03 1020 2011	
			+	
<—	Back to p	revio	us screen	Info>

如果用户点击了"Delete"的相关软键,那么当前的固件配置将会被删除,并且CMU 会要求用户激活余下的软件版本中的一个。如下图:

		VersionManager Ver 2.20		
	Which soft deleting t	ware version shall be the active ve the current version?	ersion after	
<	Activate	base 2810.N03		
		base 1V20		
		base 2011		
			Ļ	
<	Back to pr	vious screen		Info —>

如果用户点击了版本管理器里"Install software from PC—card slot 0"的相关软键,那么会出现如下界面:

		Version	Manager Ver 2	.20			
	Which ver:	sion shall	be install f	ron PC-card	slot 0 ?		
< —	Install	2X10.N03					
		2X10.N03	BASE				
		2X10.N03	GSM MS				
						↓	
<—	Back to p	revious sc:	reen				Info —

点击"Install",那么 CMU 会自动完成安装。但是如果要安装一个全新的固件的时候要么 对现有的版本进行升级要么创建一个新的,这时候会出现二选一的对话框,如下图:

	v	•	•
	VersionManager Ver 3.10		
	How do you want to handle this software?		
<—	Install as new base		
<	Upgrade existing version		
k —	Back to previous screen In	fo	>

但是需要注意的是如果用户安装的新的基本软件版本跟已经存在的软件版本不兼容的话,那 么这个对话框会被忽略,因为这时候必须进行全新的安装。如果升级存在的版本,用户可以 选择一个已经存在的配置然后代替基本的软件版本,这时候会出现如下的升级选择对话框:

VersionManager Ver 2.20	
Which version shall be upgraded with 2X10.N03 GSM MS ?	
— Upgrade base 2X10.N03	
- Pack to previous schoop	

但是如果在硬盘里面如果没有和用户选择相兼容的软件版本,那么会出现如下的出错提示框:

VersionManager Ver 2.20	
No installed version can be upgraded with 1V20 BLUETOOTH !	
Base version 2021 is needed?	
C— Back to previous screen	Info —>
最后当软件安装完成以后会出现如下的对话提示框:	
VersionManager Ver 2.20	
What do you want to do next with version 2020 ?	
< Install next software upgrade from PC-card slot 0	
< Install next software upgrade 2020 GSN MS from PC-card slot 1	
< Change disks	
< Finish installation	Info —>

点击"Finish installation"安装完成。

如果用户还要安装下个软件的时候,这时候 CMU 会自动检查是否有足够的硬盘空间,如果不够的话,会出现如下对话框:

VersionManager Ver 2.20	
Installing a new software version requires more diskspace. Which version shall be deleted?	
C Delete base 2020 GSM MS 2020 (active) IS136, AMPS 2020 base 2X10.N03 base 1020 base 2011	
< Back to previous screen In	fo —>

要求用户删除相应的软件版本,以腾出空间来安装新的软件。

版本管理器还有删除有效的随机存储器内容、扫描磁盘、列出磁盘上的所有软件版本、 拷贝有效的随机存储器内容到磁盘上、磁盘碎片整理等功能。

第二章 信令模式下移动台测试操作

一 CMU 的 5 钟信令状态

CMU200 信令模式下测试移动台,在进入测试之前,我们先了解以下 CMU200 的 5 钟 不同信令状态。在 CMU 信令模式下的测试,无论通话的建立、释放,以及无线移动网络的 控制,信号都可区分为以下 5 钟。

Signal OffCMU 不传输信号

Signal On CMU 输出 GSM 控制信道信号给移动台同步

Synchronized 与移动台取得同步且位置更新确认

Alerting 移动台被 CMU 呼叫/震铃

Call Established 移动台呼叫建立

根据不同的信令状态,会有5钟不同的Signalling菜单。当一种信令状态的信号到达时,相应的菜单会自动打开。

下面这张图表示5钟信令状态之间的相互转换。



图 2-1 CMU200 信令测试模式下的状态转换。

在图 2-2, 2-3, 2-4, 2-5, 2-6中, 我们可以很清楚的看到 CMU 各种信令状态之间的相互转化。

Ch. 1 Ch. 2 GSM90	900 Overview						Connect Control
😑 GSM 900 Conne	tio	n Control				Sig	gnal Off
				Q			
▶ Signalling States							
→MS Capabilities							Signal
MS Revision Level				Dree	e the Signal (In key	On
SBands/PowClass				FIC3	to smalle th		on
P-GSM		-			to enable th	e	
E-GSM				synchro	nization sign	al (BCCH).	
R-GSM		-					
GSM 1800		-					
➡Multislot Class							
Circuit Switched							
Packet Data							
↓ Signaling Info							
IMSI					Circuit Sw	uitched	Main
IMEI					Gircuit Of		Service
Dialled Number							
→MS Signal							Network
		_			GS	M only 🛃 🛛	Cummont
Timing Advance	0	Sym.					Support
		(D
PCL (MS)	10	(23.0 dBm)					Wideband
l imesiot	3				Deals		Power
- ▼BS Signal					меак		
Connection		MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

图 2-2 GSM900 Connection Control_Connection _Signal Off

在 Signal Off 状态下, CMU 跟移动台之间没有联系, CMU 在这种状态下, 只能切换到 Signal On, 通过按 Signal On 软键。

Ch. 1 Ch. 2 GSM90	00 Overview	Connect Control	
😑 GSM 900 Connec	ction Control 📓	Si Si	gnal On
		0	
► Signalling States			
➡MS Capabilities			Signal
MS Revision Level		Waiting for	Off
▼5.Barius/POWCiass		mobile synchronization	
E-GSM		or call from the mobile	Connect
R-GSM		or call if officient che mobile.	Mohilo
GSM 1800			mobile
➡Multislot Class			Cond
Circuit Switched		-1	Seria
Packet Data			SMS
➡Signaling Info			
IMSI		Circuit Switched	Main
		Gircuit Ownterlea	Service
Dialled Number			
witebool		COM and a	Network
Timing Advance	0.Svm	GSM ONLY 🔮	Support
-Single Slot	o oyni		
PCL (MS)	10 (23.0 dBm)		2 Iúlideband
Timeslot	3		Doutor
		Peak	POwer
Connection	MS Signal BS Signal	Network RF 🕀 Sync.	Conn. Cfg.

图 2-3 GSM900 Connection Control_Connection _Signal On

CMU 在 Signal On 状态可以通过 Signal Off 回到 SignalOff 状态,可以等待同步进入 Synchronized 状态,也可以通过拨打 MS 按 Connect Mobile 进入 Alerting 状态。在 Signal On 状态,CMU 可以给移动台发短信,Send SMS。

Ch.1 Ch.2 GSM90	00 Overvie	ew		Circuit Switched Single Slot	1	Connect Control
😑 GSM 900 Conne	ction Control				Syr	chronized
	-]	<mark>0</mark>			
► Signalling States						[
MS Revision Level	Phoce II					Signal
S Bands/PowClass	I Hase II		Make	a call from th	ie mobile	Off
P-GSM	supported	4 (max. 33 dBm)		or press the	•	
E-GSM	supported		Co	nnect Mobile	key.	Connect
R-GSM	not supported					Mobile
GSM 1800	supported	1 (max. 30 dBm)				
✓Multislot Class Circuit Curitshod						Send
Parket Data						SMS
✓ Signaling Info						
IMSI	001.01.012345678	39		Oin with On	de la sul d	Main
IMEI	446019.19.750759	3.00		Circuit Sw	litched	Service
Dialled Number	-					
✓MS Signal						Network
	0. Cum			GS	M only	Support
Single Slot	U Synn.					adabase
PCL (MS)	10 (23.0 dBm)					Ridlidehand
Timeslot	3					Douver
				Peak		
Connection	MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

图 2-4 GSM900 Connection Control_Connection _Synchronized

当 CMU 跟 MS 取得同步后, CMU 进入 Synchronized 状态, 在 Synchronized 状态下, CMU 有时会因为 MS 的某种原因(譬如 MS 功率降低)转换到 Signal On 状态; 在 Synchronized 状态下,可以通过 Singal Off 进入 Singal Off 状态; 在 Synchronized 状态下,可以通过 Connect Mobile 进入 Alerting 状态; 在 Synchronized 状态 CMU 可以给移动台发短信, Send SMS。

Ch. 1 Ch. 2	GSM900 Overview						Connect Control
😑 GSM 900 Con	nectio	on Control	- 9			A	lerting
Signalling States				0			Ē
✓MS Capabilities							Olawal .
MS Revision Leve	el Ph	ase II					Signal
- S.Bands/PowClas	ss						Off
P-GSM	su	pported 4	l (max. 33 dBm)	Call t	Call to mobile in progress.		
E-GSM	su	pported					Disconnect
R-GSM	no	t supported -					Mobile
GSM 1800	su	pported 1	l (max. 30 dBm)				
▼IMUITISIOT Class Circuit Switchod		_					
Parket Data	·	_					
IMSI	00	1.01.012345678	9		01 14 0		Main
IMEI	44	6019.19.750759.	.00		Circuit Sw	itched	Service
Dialled Number	-						0011100
►MS Signal							Nativiork
		_			GS	M only	Cunnart
Timing Advance	e 0	Sym.					Support
Single Slot PCL (MS)	10	(22.0 dBm)					R IAB Jak and
Timeslot	3	(23.0 ubiii)		2	l.6 dBm		VVIdeparid
-BS Signal					Peak		Power
Connection		MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

图 2-5 GSM900 Connection Control_Connection _Alerting

当CMU跟MS取得同步后,通过呼叫MS,CMU可以进入Alerting状态。在Alerting状态下, CMU可以通过Signal Off进入Signal Off状态;在Alerting状态下,CMU可以通过Disconnect Mobile进入Synchronized状态,当然也可能是MS的无应答,CMU返回Synchronized状态;在 Alerting状态下,如果MS作出相应,通话链路建立起来,则CMU进入Call Established 状态。

Ch. 1 Ch. 2	SM90	0 Power			Circuit Switched Single Slot		Connect Control
😑 GSM 900	Connec	tion Control	(19) []			Call	Established
				Q			
► Signalling St	tates						1
MS Revisio	ues In Level	Phase II					Signal
S.Bands/P	owClass	i nase i		Relea	ise the call fro	om the	Off
P-GSM		supported	4 (max. 33 dBm)	m	obile or press	the	
E-GSM		supported		Disco	onnect Mobile	key.	Disconnect
R-GSM		not supported					Mobile
GSM 180	0	supported	1 (max. 30 dBm)				
→Multislot C	lass vitobod						Send
Packet D	ata						SMS
- Signaling Inf	(0						
IMSI		001.01.01234567	789		Circuit Orvitals ad		
IMEI		446019.19.75075	9.00		Circuit Sw	tched	Service
Dialled Nur	mber	-					
→MS Signal	:4 - 11						Network
Timing A	dvance	0 Sym			GSI	n only	Support
-Single Sto	uvance nt	o ayını.					emphone
PCL (M	5)	10 (23.0 dBm)					Ridlideband
Timeslo	it	3		21	.5 dBm		Dower
					Peak		
Connection	Handove	r MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

图2-6 GSM900 Connection Control_Connection_Call Established

当通话建立后,CMU处于 Call Established状态,在这个状态下,CMU可以返回到除了Alerting 外的任何状态。当然在Call Established状态下,CMU可以通过Send SMS给MS发送短消息。

二 移动台测试前的准备

第一步:将CMU电源插上。



第二步:将已经插上 SIM 卡的移动台通过射频线连到 CMU200 的射频端口 RF2。



第三步:将 CMU ON/Stand 置为 ON。

Universal	Radio C	ommun	ication Te	ster CMU	
Process BaseDiscover OptionsBegin BaseDiscover OptionsEnd LoadFGroupDfisBegin		Info Model: CMU2 Senial #: 840 SW: V3.000	Info Model - CMU200 Serial #: 840675/018 SWLV3.00C 2001-01-29		
Options				ROUDEASCHWAR	
Hardware Option CMU-8711/812 CMU-821 CMU-821 CMU-852 CMU-853 CMU-851 CMU-851 CMU-881 CMU-883 CMU-861	8 OCXO Universal Signa Audo Measurer Speech Coclar Bluetooth prep Abis Interface COMA Signalin odma2000 Sign Roppy Disk. PomOA.	iling:Unit nentUnit for CMU-821 ar ation g Unit alling Unit ive	0100 not installed 0100 not installed 0100 not installed 0100 0100 not installed 0100 not installed		
CMU-U65	Measurement D	ISP f. WCDMA	not installed		
Load factor	y default setting	gs:			
Default Walt	vear ar our start	ф			

第四步:当 CMU 启动完全后,按 MENU SELECT。



第五步:选择 Menu Select 里选择测试对象以及测试模式。

Ch. 1 Ch. 2	GSM900	Spectrum			Circuit Switched Single Slot	•	τ.	Connect Control
😑 Men	u Select							
Se •G •	election G Basic Functions SSM Mobile Station GSM 900 GSM 1800	SM Mobile Station/	CSM 900/Signalling/S Non-Signalling Signalling Overview Power Modulation Spectrum Receiver Qua	pectrum/M → Analyzi → Spectru	odulation GMS er/Generator → → →	oress Enter	Hotkey GSM 90 Overvi GSM 90 Overvi	rs - Set 3 10 E ew 10 E ew
Menu Se	elect		Hotkey	ys H Set 1	otkeys Set 2	Hotk	eys Set 3	Hotkey Assign.



选择 GSM Mobile Station 下拉菜单下的 GSM900;Singalling;Overview、Power、Mudulation、Spectrum 或者 Receive Quality。按确认即可进入测试。

如果无法连接,可能是网络设置问题,可以按 Connect Control 进入 GSM900 Connection Control 界面更改 MS Singal、BS Signal 和 Network 的相关属性,当然也有可能是射频耦合 方面的原因。

Ch.1 Ch.2 GSM 900 Over	view		Circuit Switched Single Slot	"I" <mark>L</mark>	Connect Control
GSM 900 Connection Contr	ol 📲			Call E	stablished
Slot Mode	Single Slot	10	23.0 dBm]	PCL
		3			Timeslot
		0 9	Sym.		Timing Advance
			Normal		DAI
			-		
Connection Handover MS Sign	nal BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.
图 2-7 GSM900 Connetion Cor	ntrol_MS Signal				
	S A				
1L上的中世级 WIS Signal 进入	·图:	_	Circuit	((1.53)	Commond 1
Ch.1 Ch.2 GSM900 Over	view		Circuit Switched Single Slot		Connect Control
GSM900 Connection Contr	view ol ≝		Circuit Switched Single Slot	Call E	Connect Control
GSM900 Connection Contr Setup	view ol ≝	A	Circuit Switched Single Slot nalyzer Level	Call E	Connect Control stablished
GSM900 Connection Contr Setup Default All Settings	view ol ≌	A	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Connection Contr GSM900 Connection Contr Setup Default All Settings PMAX Circuit Switched	view ol ≌ 5 (33.0 dBm	A	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data	view ol ≝)	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level	view ol ≝ 5 (33.0 dBm)	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings	view view ○ ○ ○ ○ ○ ○ ○ ○ ○ ○)	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX Circuit Switched Packet Data Analyzer Level Default Settings RF Max, Level RE Mode	view ol ∰ 5 (33.0 dBm 30.0 dBm Auto	A	Circuit Switched Single Slot		Connect Control
GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings RF Max. Level RF Mode RF Attenuation	view ol 5 (33.0 dBm 30.0 dBm Auto Low Noise)) 9	Circuit Switched Single Slot	Call E	Connect Control
Ch.1 GSM900 Over GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings RF Max. Level RF Mode RF Attenuation • Trigger	view ol 5 (33.0 dBm 5 Jon dBm Auto Low Noise)) 9	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Connection Contr GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings RF Max Level RF Mode RF Attenuation • Trigger Source	view ol 5 (33.0 dBm 5 Jan 30.0 dBm Auto Low Noise Signalling))	Circuit Switched Single Slot	Call E	Connect Control
GSM900 Over GSM900 Connection Contr GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings RF Max Level RF Mode RF Attenuation • Trigger Source Level • Meas. Control	view ol ∰ 5 (33.0 dBm Auto Low Noiso Signalling Low)) Ə	Circuit Switched Single Slot		Connect Control
GSM900 Over GSM900 Connection Contr GSM900 Connection Contr Setup Default All Settings PMAX • Circuit Switched • Packet Data • Analyzer Level Default Settings RF Max Level RF Mode RF Attenuation • Trigger Source Level • Meas. Control	view ol ∰ 5 (33.0 dBm Auto Low Noise Signalling Low)) Ə	Circuit Switched Single Slot		Connect Control

图 2_8 GSM900 Connetion Control_MS Signal_Press Twice

在图 2_7,图 2_8 中,我们可以更改关于移动台侧的设置。

Ch. 1 Ch. 2	SM 900	Overvie	w		Circuit Switched Single Slot	"P" Ъ	Connect Control
😑 GSM 900	Connectio	n Control				Call E	stablished
Frequency Offset		+ 0 Hz	ТСН&ВССН	ТСН	Sing	e Slot	Slot Mode
Mode		BCCHa					
Level	- 85.0	0 dBm		- 60.0	dBm -	20.0 dB unused	TCH Level
RF Channel	32			62			RF Channel
				3			Timeslot
					Off 🛓		Hopping
Connection	Handover	MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.
図29 GS	M900 Conn	etion Contro	l BS Signal	· · · · · · · · · · · · · · · · · · ·	-	-	
在上图中再	按 BS Signa	1进入下图:	:				
Ch. 1 Ch. 2	SM900	Overvie			Circuit	(g)	Connect
			w		Single Slot		Control
GSM 900	Connectio	n Control	Ĩ		Single Slot	Call E	Control
GSM 900	Connectio	n Control		P	Single Slot acket Data/Traffi	Call E	Control
GSM 900 Setup Defa Frequ	Connectio	n Control	₩	P	Single Slot	Call E	Control Established
GSM900 Setup Defa Frequ ▼Contr	Connectio	n Control	+ 0 Hz	P	Single Slot	Call E	Control Established
GSM900 − Setup Defa Frequ ▼Contr Lev RF1	Connectio	n Control	₩ - 85.0 dВn 32	Р 1	Single Slot	Call E	Control Established
GSM900 Setup Defa Frequ ▼Contr Lev RF1 Moc	Connectio	n Control	₩ - 85.0 dBn 32 ВССН ап	P d TCH	Single Slot	Call E	Control Stablished
GSM900 Setup Defau Frequ ▼Contu Lev RF Moo ▼Circui ▶Tra	Connectio	n Control	₩ - 85.0 ави 32 ВССН ап	n d TCH	Single Slot	Call E	Control Established
GSM900 Setup Defai Frequ ▼Contri Lev RF Moc ▼Circui ▶Tra ▼Pack	Connectio	n Control	₩ + 0 нz - 85.0 ави 32 ВССН ап	n d TCH	Single Slot	Call E	Control
GSM900 Setup Frequ ▼Contr Lev RF Moc ▼Circui • Tra ▼Pack	Connectio	n Control	✓	n d TCH	Single Slot	Call E	Control
GSM900 Setup Frequ ▼Contr Lev RF1 Moc ▼Circui • Tra ▼Pack ▼Tra PC	Connectio	IS	✓ + 0 нz - 85.0 dBn 32 BCCH an Idle 4 dB 62	P d TCH	acket Data/Traffi	Call E	Control
GSM900 Setup Defau Frequ ▼Contu Lev RF Moc ▼Circui • Tra ▼Pack ▼Tra PC RF • Mu	Connectio	n Control	✓ ↓ 0 Hz − 85.0 dBm 32 BCCH an Idle 4 dB 62	n d TCH	acket Data/Traffi	Call E	Control
GSM900 Setup Defai Frequ • Contr Lev RF Moc • Circui • Tra • Pack • Tra PC RF • Mu	Connectio	n Control		d TCH	acket Data/Traffi	c Channel	Control

图 2—10 GSM900 Connetion Control_BS Signal_Press Twice

在图 2-9,图 2-10中,我们可以更改测试中基站侧的相关设置。

Ch. 1 Ch. 2	SM900	Overvie	w		Circuit Switched Single Slot	"I" I	Connect Control
- GSM 900	Connectio	n Control	an) =			Call E	stablished
				F Echo Handset I Codec Ca Encoder C	ull Rate Ver ∟ow I Cal	sion 1	Traffic Mode Bit Stream
Connection	Handover	MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.
图 2-11 GS 在上图中再打 Ch. 1 Ch. 2	M900 Conn 咹 Network SM900	etion Contro 进入下图: Overvie	ol_Network		Circuit Switched Single Slot	""" L	Connect Control
- GSM 900	Connectio	n Control	의원 클			Call E	stablished
Setup				C	ircuit Switched/S	ignalling Modes	
Defau Netwi Main S ► Netwi Circui ► Sign ► Req	It All Setting ork Support Service ork Identity t Switched alling Modes uested Mobil	s e Data	☑ GSM only Circuit St	witched			Expand
Adv Slot Packe Syste BA Lis	ice of Charge Offset et Data em Paramete st	ers	0			0	

图 2—12 GSM900 Connetion Control_Network_Press Twice

在图 2-11,图 2-12 中我们可以更改网络测的测试参数设置。

Ch. 1 Ch. 2	SM900	Overvie	w		Circuit Switched Single Slo	t E	Connect Control
😑 GSM 900	Connectio	n Control				Ca	ll Established
				RF	Connector Se	tup	
				RF 3 OUT	RF 2	RF 1	RF Output
				+ 0.0 dB	() +0.0 dB	+ 0.0 dB	Ext. Att. Output
				RF 4 IN	RF 2	RF 1	RF Input
				+ 0.0 dB	+ 0.0 dB	+0.0 dB	Ext. Att. Input
				- 0.3	dBm Peak		R <mark>U</mark> Wideband NPower
Connection	Handover	MS Signal	BS Signal	Network	RF G	→ Sync.	Conn. Cfg.

图 2-13 GSM900 Connetion Control_RF

RF Output 和 RF Input 向我们只是测试所使用的输出以及输入射频端口;而 Ext.Att Output 和 Ext.Att Input 表示输入信道和输出信道的射频补偿。

\equiv GSM900 Overview

Menu Select,选择 GSM Mobile Station 下拉菜单下的 GSM900;选择信令模式 Singalling;Overview,即可进入GSM900 Overview。

Ch. 1 Ch. 2 GSM900 Overview		Circuit Switched Single Slot	Connect Control
RUN P/t Norm. GMSK 10(23.0 dBm) Reported Power	Setup		P/t Norm. GMSK
21.5 dBm Avg. Burst Power (Current) 21.6 dBm Peak Burst Power	► MS Capabilities Signaling Info IMSI IMEI	001.01.0123456789 446019.19.750759.0	Appli- cation
- 0.25 sym. Timing Advance Error	Dialled Number Traffic Mode ←Meas. Control Repetition	- Full Rate Version 1 Continuous	Analyzer Level
RUN Ext. Phase Error GMSK 2 Hz Frequency Error - 5 9 * Peak - Phase Error (Current)	Stop Condition Display Mode Statistic Count	None Current 100 Bursts	MS Signal
2.3 • RMS	RF Attenuation Trigger Source	Auto Low Noise Signalling	BS Signal
MS Receiver Reports 48 (- 63 to -62 dBm) 0 (0.0 to 0.2 %) RX Quality Off Discontinuous Transmission (DTX)	✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot PCL (MS) Timeslot	0 Sym. 10 (23.0 dBm) 3	
Overview Power Modulation Spectrum	m	eceiver Quality	Menus

图 2-14 GSM900 Overview

GSM900 Overview 是对移动台综合性能的一个评述,它包括了移动台作为发射机以及接收 机时的主要性能指标,让我们对移动台的性能有了一个基本了解。

如上图所示,GSM Overview 里主要包含以下一个方面的内容。

RUN P/t Norm. GMSK

10(23.0 dBm)	Reported Power	P/t Norm.GMSK	
21.5 dBm	Avg. Burst Power (Current)	Reported Power	期望功率
21.6 dBm	Peak Burst Power	Avg Burst Power(Current)	平均突发功率
Ok	Power Ramp	Peak Burst Power	峰值突发功率
- 0.25 Sym	, Timing Advance Error	PowerRamp	功率斜坡
	-	Timing Advanced Error	时间提前量误差

RL	N Ext. Phase Ei	ror GMSK		
Г	2 нл	, Frequency Error	Ext.PhaseError GMSK	
E	_60 +	Pools — Phoon Error (Current)	Frequency Error	频率误差
H	-0.3	Peak T Phase Error (Current)	Peak Phase Error	相位峰值误差
2.3 *		RMS -	RMS Phase Error	相位均方根误差

MS Receiver Reports	MS Receive Reports
48 (-63 to -62 dBm) RX Level	RX Level
0 (0.0 to 0.2 %) RX Quality	RxQuality
Off Discontinuous Transmission (DTX)	

在右边的 Setup 窗口,我们可以看到很多设置的信息: Signalling States、MS Capability、 Signalling Info, Meas. Control, Analyzer Level, MS Signal, BS Singal, Network 和 AF/RF。 这里的很多项目是跟上图中的 Softkey 以及它所对应的热键是一致的。

接收等级 接收质量

在 Overview 的屏幕下端, 我们可以看到 Power、Modulation、Spectrum 以及 Receiver Quality, 按其所对应的热键,就可分别进入功率、调制、频谱这3个发射机指标以及接收质量这个接 收机指标的测试。这里我们先不作介绍,在后面将依次介绍。

在 Overview 的屏幕右端,我们可以看到 P/t Norm. GMSK、 Application、Analyzer Level、 MS Signal、BS Signal、Network 以及 Menu, 按其所对应的 Softkey, 可以分别进入功率 VS 时间在 GSMK 下的设置、使用不同调制方式下应用、分析仪设置、移动台信号设置、基站 信号设置以及网络设置,其中 Menu 可以帮助我们返回主菜单。下面我们对图 Overview 中 所示的 Softkey 做详细的介绍。



图 2-15 GSM 900 Overview P/t Norm.GMSK

Application

Application 主要对应下面 3 个热键。在这里他提供给我们移动台不同调制 方式的支持,我们的移动台一般只适用 GMSK。

Ch. 1 Ch. 2 Ch. 2 GSM900 Overview		Circuit (%1) Switched Single Slot	Connect Control
RUN P/t Norm. GMSK 10(23.0 dBm) Reported Power	Setup		P/t Norm. GMSK
21.4 dBm Avg. Burst Power (Current) 21.5 dBm Peak Burst Power	►MS Capabilities	446019.19.750759.0	Appli- cation
0.00 Sym. Timing Advance Error	Dialled Number Traffic Mode →Meas. Control Repetition	Emergency call Full Rate Version 1	Analyzer Level
RUN Ext. Phase Error GMSK -2 Hz Frequency Error 70 hz During Ethem Error	Stop Condition Display Mode Statistic Count	None Current 100 Bursts	MS Signal
2.5 • RMS	✓Analyzer Level RF Mode RF Attenuation Trigger Source	Auto Low Noise Signalling	BS Signal
MS Receiver Reports 48 (- 63 to -62 dBm) RX Level 0 (0.0 to 0.2 %) RX Quality Off Discontinuous Transmission (DTX)	✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot PCL (MS) Timeslot	0 Sym. 10 (23.0 dBm) 3	
P/t Norm. GMSK Error GMSK Overview 8PSK			Menus

图 2-16 GSM 900 Overview_Application

Analyzer Level

Analyzer Level 控制进入 RF 信令信道的信号的状态以及测试的触发设置。

Ch. 1 Ch. 2 GSM900 Overview		Circuit Switched Single Slot	Connect Control
RUN P/t Norm. GMSK	Setup		P/t Norm.
10(23.0 dBm) Reported Power	► Signalling States ► MS Canabilities		N GMSK
21.4 dBm Avg. Burst Power (Current)	Signaling Info		Appli_
21.5 dBm Peak Burst Power	IMSI		cation
Ok Power Ramp	Dialled Number	Emergency call	
0.00 Sym. Timing Advance Error	Traffic Mode	Full Rate Version 1	Analyzer
	Repetition	Continuous	Level
RUN Ext. Phase Error GMSK	Stop Condition	None	MC Circul
3 Hz Frequency Error	Statistic Count	100 Bursts	mə signai
6.4 • Peak T Phase Error (Current)		0.4-	
2.3 ° RMS -	RF Mode RF Attenuation	Low Noise	BS Signal
MC Pacaivar Paparte	Trigger Source	Signalling	
48(-63to -62 dBm) RX Level			
0 (00 to 02 with) RX Quality	Timing Advance	0 Sym.	
	PCL (MS)	10 (23.0 dBm)	
	Timeslot	3	
RF Max. Level Mode Attenuation	Trigger Tr Source	igger Level	Menus
图 2-17 GSM900 Overview_Analyzer Le	vel		
RF Max. 信号的最大值,单位 dBm Level			
RF 选择输入信号是手动还是	自动模式。		
手动 Manual 根	据 RF Max.Level 手运	边输入。	
自动 Auto 根	据所用的信号的平均	P突发功率自动设置。	5
RF选择 RF 信号的衰弱方式。			
正常 Normal	输入信号不衰弱		
低噪音 Low Noise 力	曾强信号。这种设置	可以保证CMU的动法	态范围,在
F	Power跟Specturn测记	式中推荐使用这个。	
高保真 Low 调	, 成弱信号。这种设置词	可以保证很告的传输	保真,在
Ν	/lodulation测试中推着	荐使用。	
Trigger Trigger Sourse 决定触发条	件。		
Free Run TI	MA时分触发。		
RF Power 突行	发的上升沿触发。		
IF Power 宠	带触发。		
Fxtern 外	部种发。		
Trigger 触发信号的强度。只适)	用于触发源是 RF Pov	wer 跟 IF Power 的情	

MS Signal

MS Signal 用来进行移动台测试。

mail GSM900 Overview		Circuit Switched Single Slot	Connect Control
RUN P/t Norm. GMSK 10(23.0 dBm) Reported Power	Setup ▶ Signalling States	Q	P/t Norm. GMSK
21.4 dBm Avg. Burst Power (Current) 21.6 dBm Peak Burst Power	►MS Capabilities Signaling Info IMSI IMEI	446019.19.750759.0	Appli- cation
0.00 Sym. Timing Advance Error	Dialled Number Traffic Mode ←Meas. Control Repetition	Emergency call Full Rate Version 1 Continuous	Analyzer Level
RUN Ext. Phase Error GMSK 9 Hz Frequency Error - 6.5 * Peak - Phase Error (Current)	Stop Condition Display Mode Statistic Count	None Current 100 Bursts	MS Signal
2.1 • RMS	RF Mode RF Attenuation Trigger Source	Auto Low Noise Signalling	BS Signal
48 (- 63 to -62 dBm) RX Level 0 (0.0 to 0.2 %) RX Quality	✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot	0 Sym.	
Off Discontinuous Transmission (DTX)	PCL (MS) Timeslot	10 (23.0 dBm) 3	
PCL Channel Timeslot Timing	ince	affic Bit Mode Stream	n Menus

图 2-18 GSM900 Overview_MS Signal



BS Signal

BS Signal 用来设置基站信息。





TCH Level

定义 CMU 传输信道在所使用的时隙的功率。

Hopping

四 GSM900 Power 测试

Menu Select,选择 GSM Mobile Station 下拉菜单下的 GSM900;选择信令模式 Singalling;Power,即可进入GSM900 Power。



图 2-20 GSM900 Power

在 GSM900 Power 的屏幕右端,我们可以看到 P/t Norm. GMSK、 Applic.1、Analyzer Level、MS Signal、BS Signal、Network、Market 以及 Menu,按其所对应的 Softkey,可以 分别进入功率 VS 时间在 GSMK 下的设置、功率测试的不同应用、分析仪设置、移动台信 号设置、基站信号设置、功率 VS 时间图分析设置以及网络设置,其中 Menu 可以帮助我们 返回主菜单。

R P/t Norm. GMSK P/t Norm. GMSK 按一下通过以下热键可以设置信号的重复方式、停止条件、现实模式以及测试所需要的突发数。



图 2-21 GSM900 Power_P/t Norm. GMSK



在这个图中,我们可以知道平均突发功率、时间提前量误差、训 练序列的类型、统计周期以及公差等5个方面的指标是否符合。



重复方式有连续(Continuous)跟非连续(Single Shot)两种

Stop Condition

Stop Condition 决定测试的结束条件。

None 不管测试结果,继续测试。 On Limit Failure 当测试结果超出范围时停止。

Display Mode

测试结果的显示方式。

Current显示当前值Maximum显示最大值Minimum显示最小值Average显示平均值



测试所统计的突发数量。



图 2-22 GSM900 Power_Applic.1

从图中我们可以看到功率测试的不同用运。主要有: P/t Normal SMSK, P/t Normal 8PSK、 P/t Multislot、P/Frame、P/Slot Graph、P/Slot Table、P/PCL 和 P/t Access Burst。 P/t Normal GMSK

测试一个 Normal Burst 中功率跟时间的对应关系。



图 2-23 GSM900 Power_Applic.1_ P/t Norm. GMSK



图 2-24 GSM900 Power_Applic.1_ P/t Multislot

P/t

11 12	SM	900 P	ower				Circuit Switched Single Sl	d (***) ot	τ.	Connect Control
Max. Le Frame	evel: Auto	0	Low Noise	PCL:		Chan. /	Meas Slot:	62 /	3	P/Frame
0 7	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2		
8 15	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2		Applic, 1
16 23	21.2					21.2	21.2	21.2		Applic.
24 31	21.2	21.2	21.2	21.1	21.1	21.2	- 54.9	21.1		ånalv 74
32 39	21.2	21.2	21.1	21.2	21.1	21.1	21.1	21.2		l evel
40 47	21.1	21.2	21.1	21.1	21.2	21.1	21.1	21.1		LUTU
48 55	21.1	21.2	21.1	21.2	21.1	21.1	21.1	21.1		NO 0:
56 63 ·	- 55.6	21.1	21.1	21.1	21.1	21.1	21.1	21.1		MS SIGN
64 71	21.1	21.1	21.1	21.2	21.2	21.1	21.1	21.1		
72 79	21.1	21.1	21.2	21.1	21.1	21.2	21.1	21.1		BS Sian
80 87	21.1	21.1	- 55.5	21.2	21.2	21.1	21.1	21.2		
88 95	21.2	21.2	21.1	21.2	21.2	21.2	21.2	21.1		
96 103	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2		
104 111	21.1	21.2	21.1	21.1	- 55.1	21.2	21.2	21.2		
112 119	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2		
120 127	21.2	21.2	21.2	21.2	21.2	21.2	21.2	21.2		
							all resu	Its in dBm		

图 2—15 GSM900 Power_Applic.1_ P/Frame

- --

P/Slot Graph

帧里各个时隙所对应的功率柱状图。



图 2-26 GSM900 Power_Applic.1_ P/Slot Graph

Tal	ble D SM	、表格的 900 F	形式表示 Power	〒128 个	连续时	<u> </u> 第的平均	J功率。 Circuit Switche Single S	ed 📑	τ.	Connect
Max. L Slot	.evel: Aut	to	Low Noise	PCL:		Chan. /	/ Main Slot:	62 /	3	P/Slot V Table
0 7	- 55.5	- 55.3	- 55.2	21.2	- 55.4	- 55.3	- 55.6	- 55.9		
8 15	- 55.2	- 55.2	- 54.8	21.2	- 55.6	- 55.2	- 55.5	- 55.0		Applic 1
16 23	- 55.6	- 55.5	- 55.0	21.2	- 55.2	- 55.4	- 55.6	- 54.7		Applic. 2
24 31	- 55.0	- 54.7	- 54.6	21.2	- 55.8	- 55.1	- 55.5	- 54.8		Analyza
32 39	- 55.7	- 55.2	- 54.5	21.2	- 55.3	- 55.4	- 55.1	- 55.0		Ariary zer
40 47	- 55.4	- 55.6	- 54.7	21.2	- 55.4	- 55.9	- 55.7	- 55.1		Levei
48 55	- 55.4	- 55.3	- 54.9	21.2	- 55.8	- 55.1	- 55.6	- 55.0		
56 63	- 55.5	- 55.2	- 54.9	21.2	- 55.4	- 54.9	- 55.2	- 55.2		MS Signa
64 71	- 55.1	- 55.0	- 55.2	21.2	- 55.4	- 55.3	- 55.7	- 55.3		
72 79	- 55.7	- 55.6	- 54.6	21.2	- 55.3	- 55.3	- 55.6	- 55.1		RS Signa
80 87	- 55.0	- 55.6	- 54.8	21.2	- 55.1	- 55.2	- 55.7	- 55.4		Do olgria
88 95	- 55.6	- 55.1	- 54.8	21.2	- 55.5	- 55.0	- 55.3	- 55.2		
96 103	- 55.2	- 55.5	- 54.8	21.2	- 55.5	- 54.8	- 55.3	- 55.4		
104 111	- 55.0	- 55.5	- 55.0	21.2	- 55.5	- 55.1	- 55.4	- 55.1		
112 119	- 55.3	- 55.6	- 55.4	- 55.1	- 55.4	- 55.2	- 55.4	- 55.0		
120 127	- 55.7	- 55.4					- 55.4	- 55.7		
						•	all res	ults in dBm		
t Normal	P/t Nor	mal P/	t Multiclet	P/Frai	ne P/S	ilot	P/Slot	Pi	PCL	Menus

图 2—27 GSM900 Power_Applic.1_ P/Slot Table

1 9 (0.0 00m)		0.1			
19 (5.0 dBm)	6.7	6.7	6.7		
18 (7.0 dBm)	7.8	7.7	7.7		
17 (9.0 dBm)	8.8	8.8	8.8		
16 (11.0 dBn	J 10.0	98	99		,
15 (13.0 dBm	a) 11.5	11.5	11.6		BS Sign
	136	13.6	13.6		
12 (19.0 dBm	ນ 157	15.6	15.6		
1 (21.0 dBn 12 (40.0 dBn	J 17.4	17.3	17.4		MS Sig
10 (23.0 dBh 11 (24 o vic	10 2 1.J	2 1.J 10 1	19.2		
9 (25.0 dBn	23.3	∠3.3 21.3	23.3		Level
8 (27.0 dBn	1) 25.3	25.3	25.4		Analyz
7 (29.0 dBm	a) 27.3	27.3	27.4		Applic
6 (31.0 dBn	n) 28.7	28.7	28.7		Applic
5 (33.0 dBn	n) 🖵 30.3	30.4	30.4		
PCL/Chann	el 1st 1	2nd 62	3rd 124		P/PCL
	SIVI900	Powe	r	Switched Single Slot	Contro

图 2-28 GSM900 Power_Applic.1_ P/PCL

I

P/t Access Burst

接入突发的功率 VS 时间曲线。



图 2-29 GSM900 Power_Applic.2_ P/t Access Burst

P/t Access Burst 测试的时候一定要注意,它不是什么时候都能捕捉到的。Access Burst 是接入突发,只在移动台向 CMU 要求接入的那一刻存在。



Analyer Level、MS Signal、BS Signal 设置具体跟 OverView 里完全相同可以参考 Overview 部分中关于这 3 个的介绍。



Marker、Display 用来帮助我们分析信号。其中通过按此键,可以在 Marker 跟 Display 之间自由切换。





图 2-30 GSM900 Power_Display

Display Area

选择屏幕的显示区域。

Timing Offset

设置时间的比特偏移量。

P/t Norm. ■GMSK

连续 2 次按 P/t Norm GMSK 软键,进入 Power Configuration。



图 2-31 GSM 900 Power Configuration_Control

Power Configuration 主要由 3 个部分构成: Control、Limit Lines 和 Limits。

Control

在 Control 下拉菜单中,又包含 P/t 8PSK.Multislot、P/t Norm.GSMK、P/t Norm.8PSK、P/t Multislot、P/Frame、P/Slot Graph、P/Slot Table、P/PCL 以及 P/t Access Burst 等 8 个功率测 试相关内容的设置,以上 8 个配置项目又有各自的菜单。

Limit Lines



图 2-32 GSM 900 Power Configuration_Limit Lines

Limit Lines 主要跟功率 VS 时间模板有关, P/t Norm.GSMK、P/t Norm.8PSK 和 P/t Multislot, 在这个配置项里面,对功率 VS 时间模板有严格的定义。

Ch. 1 Ch. 2	SM900 Power				Circuit Switched Single Slot		-	Connect Control
dB Max. L	Power Configuration Control Limit Lines	; l	_imits			GSM90	0	P/t Norm. GMSK
+0 R=000	Setup		Avg. Burs	st Power/Rang	je] <mark>0</mark> [Applic. 1
-10	▼Avg. Burst Power Default Settings							Applic. 2
-24	▼Range	PCL	fromto	Lower	Upper	Enable		Level
-30	1	MAX	MAX	-2.0 dB	+2.0 dB		ress	
	2	0	2	-2.0 dB	+ 2.0 dB	$\mathbf{\nabla}$		MS Signal
-40	3	3	15	-3.0 dB	+ 3.0 dB	$\mathbf{\Lambda}$		
-\$0	4	16	31	-5.U dB	+ 5.U dB			BS Signal
	C C		Off	Off	Off			
-60	7		Off	Off	Off			
	8		Off	Off	Off			
+70	9		Off	Off	Off			
-60	10	Off	Off	Off	Off			Marker
								Display
	Control Limit Lines	Limits					_	Menus

图 2-33 GSM 900 Power Configuration_Limits

在 Limits 里面,对移动台的各级功率的范围有严格说明,CMU 通过这里的设置来确认被测的移动台功率指标是否符合要求。

五 GSM900 Modulation 测试

Menu Select,选择 GSM Mobile Station 下拉菜单下的 GSM900;选择信令模式 Singalling;Modulation,即可进入 GSM900 Modulation。



图 2-34 GSM900 Modulation

在 Modulation 里面,主要测试移动台发射信号时的调制质量,主要通过峰值相位误差、均 方根相位误差、频率误差等参数体现出来。

Origin Offset 和 I/Q Imbalance 参数反应 I/Q 调制的精度。

在 GSM900 Modulation 中,各种参数的设置基本上相同,就 Analyzer Level、MS Signal、BS Signal 以及 Marker 等等的设置,参考 Power 测试部分就可以了。而在 GSM900 Modulation 的 Application 中,我们只关心 Ext.Phase Err.GMSK。

在 Modulation 测试中, softkey 跟 hotkey 的组合使用跟 Power 测试中基本一样,这里就不在 详细介绍,参考 Power 部分的介绍。大家自己看一下下面的图片。



图 2-35 GSM900 Modulation_Ext.Phase Err.GSMK



图 2-36 GSM900 Modulation_Application



图 2-37 GSM900 Modulation_Analyzer Level



图 2-38 GSM900 Modulation_MS Signal







图 2-40 GSM900 Modulation_Marker

Ch. 1 Ch. 2	SM900 Modulation	Circuit Switched Single Slot	^{((q)} ^(m)	Connect Control
● Max.L +20	Modulation Configuration Control	Limits	GSM900	Ext.Phase Err.GMSK
+10 +5		Ovw,EVM,ME,PE 8PSK	<mark>0</mark>	Appli- cation
+0 -9 -10	 Overview 8PSK EVM 8PSK 		Expand	Analyzer Level
-15 -20 0	Magnitude Error 8PSK Ext. Phase Error GMSK Phase Error 8PSK			MS Signal
G				BS Signal
Phase Error - Origin Offset				
I/Q Imbalance Frequency Er				Marker
	Control	s		Menus

图 2-41 GSM900 Modulation Configuration_Control



图 2-42 GSM900 Modulation Configuration_Limits

六 GSM900 Spectrum 测试

Menu Select,选择 GSM Mobile Station 下拉菜单下的 GSM900;选择信令模式
Singalling;Spectrum,即可进入 GSM900 Spectrum。
关于移动台的 Spectrum,主要包括 2 个方面,调制谱和开关谱。

1 Modulation GMSK 调制谱



图 2-43 GSM900 Spectrum



图 2-44 GSM900 Spectrum_Application_ Modulation GSMK



图 2-45 GSM900 Spectrum_Analyzer Level_ Modulation GSMK



图 2-46 GSM900 Spectrum_MS Signal_ Modulation GSMK



图 2-47 GSM900 Spectrum_BS Signal_ Modulation GSMK



图 2-48 GSM900 Spectrum_Marker_ Modulation GSMK

2 Switching GMSK



图 2-49 GSM900 Spectrum_Application_ Switching GSMK





图 2-49 GSM900 Spectrum_Analyzer_ Switching GSMK



图 2-51 GSM900 Spectrum_BS Signal_Switching GSMK



图 2-52 GSM900 Spectrum_Marker_ Switching GSMK

七 GSM900 Receive Quality 测试

Menu Select,选择 GSM Mobile Station 下拉菜单下的 GSM900;选择信令模式 Singalling; Receive Quality,即可进入 GSM900 Receive Quality。

在接受质量的具体应用中,我们主要以下3钟:BER、Average BER 和 Neighbor Cells。

Ch. 1 Ch. 2 GSM900 Receiver Quality									
0.057 % Class II 0.000 % Class Ib	Setup ▶ Signalling States ▶ MS Capabilities → Signaling Info	Q	R BER N Average						
0 CRC Err.	IMSI IMEI Dialled Number Traffic Mode	 446019.19.750759.0 Emergency call Full Rate Version 1	Appli- cation Analyzer						
100 Speech Fram <mark>es</mark>	✓Meas. Control Stop Condition Average Meas. Mode	None 100 Frames BER	Level MS Signal						
Meas. Mode BER Traffic Full Rate Version 1 Bit Stream PRBS 2E9-1		30.00 dBm Auto Low Noise Signalling	BS Signal						
Main Slot RX Level 3 6 (-105 to -104 dBm) 0 (0.0 to 0.2 %) RX Quality	Frigger Level ►MS Signal ►BS Signal ►BER Limit Config	Low							
Overview Power Modulation Spectr	um R	eceiver Quality	Menus						

图 2-53 GSM 900 Receive Quality



图 2-54 GSM 900 Receive Quality_Application BER Average



图 2-55 GSM 900 Receive Quality_BER

Ch. 1 Ch. 2 GSM900 Receiver Quality	Connect Control
Channel RX Level	Neighb. Cells
	Appli- cation
	Analyzer Level
	MS Signal
	BS Signal
BER BER Cells	Menus

图 2-56 GSM 900 Receive Quality_Neighbor Cells

Ch. 1	lity	Circuit ((198)	Connect
Ch. 2 GSM900 Receiver Qua		Switched Single Slot	Control
0.026 % Class II 0.000 % Class Ib 0 CRC Err. 100 Speech Frames Meas. Mode BER Traffic Full Rate Version 1 Btt Stream PRBS 2E9-1 Main Slot 3 6 (-105 to -104 dBm) RX Level 0 (0.0 to 0.2 %) RX Quality	Setup Signalling States MS Capabilities Signaling Info IMSI IMEI Dialled Number Traffic Mode Meas. Control Stop Condition Average Meas. Mode Analyzer Level RF Max Level RF Mode RF Attenuation Trigger Source Trigger Level MS Signal BS Signal BER Limit Config	446019.19.750759.00 Emergency call Full Rate Version 1 None 100 Frames BER 30.00 dBm Auto Low Noise Signalling Low	BER Average Appli- cation Analyzer Level MS Signal BS Signal
RF Max.	Trigger	rigger	Menus
Level RF Mode RF Attenuation	Source	Level	

图 2—57 GSM 900 Receive Quality_Analyzer Level



图 2-58 GSM 900 Receive Quality_MS Signal



图 2-59 GSM 900 Receive Quality_BS Signal

第三章 整机以及天线耦合测试的手动实现

一、整机测试

1、 整机测试项简介

测试项	描述
PeakPower	峰值功率
BurstMatch	突发匹配
TimeAdvance	时间提前量
PosFlatness	正平坦度
NegFlatness	负平坦度
RMSPhase	相位均方误差
Frequency	频率
Sensitivity	灵敏度
RxLevel	接收电平
RxQuality	接受质量

2、 测试过程简介

以 EG730+为例,测试 GSM900 的 5、10、15 功率等级的 1、62、124 信道以 及 GSM1800 的 0、5、10 功率等级的 512、698、885 信道

第一步、确保手机与 CMU 之间射频正确连接

第二步、合理设置 CMU 在 900 以及 1800 频率的射频补偿如下图:

GSM900RF Overview

Ch. 1 Ch. 2	SM900	Overvie	w		Circuit Switched Single Slot		Connect Control
😑 GSM 900	Connectio	n Control				Call	Established
				RF	Connector Setu	p	
				RF 3 OUT	RF 2	RF 1	RF Output
				+ 0.0 dB	+ 0.0 dB	+0.0 dB	Ext. Att. Output
				RF 4 IN	RF 2	RF 1	RF Input
				+ 0.0 dB	+ 0.0 dB	+0.0 dB	Ext. Att. Input
				- 0.3	dBm Peak		R U NPower
Connection	Handover	MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

Ch. 1 Ch. 2	900	Overvie	w		Circuit Switched Single Slot		Connect Control
GSM 900 Con	nectio	n Control	4			Si	anal Off
				Q			gnaron
▶ Signalling States				Ť			
✓MS Capabilities							Signal
MS Revision Leve	el			Dree	the Signal O	In Itory	Signal
- S.Bands/PowClas	ss			Pres	s the <u>signal</u> o	nkey	On
P-GSM		-			to enable the	e	
E-GSM				synchro	onization signa	al (BCCH).	
R-GSM		-					
GSM 1800		-					
✓Multislot Class							
Circuit Switched	k						
Packet Data							
Signaling Info INCL							h dan ing
					Circuit Sw	itched	Main
IMEI Dielled Number							Service
Dialied Number							
▼INS Signal Circuit Switchod					00	t d a set a l III	Network
		Primo			63	M only 🚊	Support
Firning Auvance Single Slot	8 0 8	Syrri.					
Following Policy (MS)	10	(22.0 dBm)					Ridlidahand
Timeslot	3	(23.0 ubm)					
	3				Peak		N Power
▼ 00 oignar					1 Cont		
Connection		MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.
						······································	
第四步、手机	几开机り	以后,按下	"Signal On	"以后等得	戶手机与 CM	[U 同步如⁻	下图:
			Signal Of				
	_				Circuit		
	lann	Overvie			Circuit Switched	- T .	Connect
Ch. 1 Ch. 2	900	Overvie	W		Circuit Switched Single Slot	i L	Connect Control
Ch. 1 Ch. 2 GSN		Overvie n Control	W		Circuit Switched Single Slot		Connect Control
Ch. 1 Ch. 2 GSN	1900 Inectio	Overvie <mark>n Control</mark>	ew		Circuit Switched Single Slot	Syn	Connect Control
Ch. 1 Ch. 2 GSM900 Con	1900 Inectio	Overvie <mark>n Control</mark>	ew E	<u>e</u>	Circuit Switched Single Slot	Syn	Connect Control
Ch. 1 Ch. 2 GSN GSM 900 Con	1900 Inectio	Overvie <mark>n Control</mark>	ew		Circuit Switched Single Slot	Syn	Connect Control
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities	1900 Inectio	Overvie <mark>n Control</mark>	ew		Circuit Switched Single Slot	Syn	Connect Control Ichronized
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Level	1900 mectio	Overvie n Control	ew	Make	Circuit Switched Single Slot	e mobile	Connect Control Ichronized Signal Off
Ch. 1 Ch. 2 GSM900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas	1900 mectio	Overvie n Control		Make	Circuit Switched Single Slot	e mobile	Connect Control Ichronized Signal Off
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM	1900 nnectio	Overvie n Control ase II	9 w (max. 33 dBm)	Make	Circuit Switched Single Slot	e mobile	Connect Control Inchronized Signal Off
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM B-GSM	1900 nnectio el Pha ss sup	Overvie n Control ase II ported gumented	4 (max. 33 dBm)	Make	a call from the or press the princet Mobile	e mobile key.	Connect Control Signal Off Connect
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1900	1900 nnectio el Pha ss sup sup not	Overvie n Control ase II ported supported supported	4 (max. 33 dBm)	Make	a call from the or press the princet Mobile	e mobile key.	Connect Control Signal Off Connect Mobile
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 - Mittiglot Class	1900 nnectio el Pha ss sup sup not sup	Overvie n Control ase II ported supported supported ported	4 (max. 33 dBm)	Make	a call from the or press the princet Mobile	e mobile key.	Connect Control Signal Off Connect Mobile
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 - Multislot Class Circuit Switched	1900 nnectio el Pha ss sup not sup	Overvie n Control ase II ported supported supported ported	4 (max. 33 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 -Multislot Class Circuit Switched Packet Data	1900 nnectio el Pha ss sup sup not sup	Overvie n Control ase II ported supported ported supported	4 (max. 33 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS
Ch. 1 Ch. 2 GSM 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 -Multislot Class Circuit Switched Packet Data -Signalling Info	1900 Innectio el Pha ss sup not sup a	Overvie n Control ase II ported supported ported - ported -	4 (max. 33 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS
Ch. 1 Ch. 2 GSN 900 Con Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI	1900 Innectio el Pha ss sup not sup not sup	Overvie n Control ase II ported supported - ported - ported -	4 (max. 33 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main
Ch. 1 Ch. 2 GSN 900 Corr Signalling States MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI IMEI	1900 Innectio el Pha ss sup not sup not sup not sup not sup	Overvie n Control ase II ported supported - ported - ported - ported -	4 (max. 33 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Connige
Ch. 1 Ch. 2 GSN 900 Corr Signalling States MS Capabilities MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI IMEI Dialled Number	1900 Innectio el Pha ss sup not sup not sup 1 001 446	Overvie n Control ase II ported supported - ported - ported - supported - ported - supported - ported - supported - ported - port	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Service
Ch. 1 Ch. 2 GSN 900 Corr Signalling States ✓MS Capabilities MS Revision Leve ✓S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 ✓Multislot Class Circuit Switched Packet Data ✓Signalig Info IMSI IMEI Dialled Number ✓MS Signal	1900 Innectio el Pha ss sup not sup not sup not sup not sup not sup not sup	Overvie n Control ase II ported supported - ported - ported - supported - ported - supported - ported - supported - ported - port	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Service
Ch. 1 Ch. 2 GSN 900 Con Signalling States MS Capabilities MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI IMEI Dialled Number MS Signal Circuit Switched	1900 Innectio el Pha ss sup not sup not sup not sup not sup not sup	Overvie n Control ase II ported 4 supported - ported 5 upported 6 .01.012345678 019.19.750759	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Service Network
Ch. 1 Ch. 2 GSN 900 Corr Signalling States ✓MS Capabilities MS Revision Leve ✓S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 ✓Multislot Class Circuit Switched Packet Data ✓Signaling Info IMSI IMEI Dialled Number ✓MS Signal ✓Circuit Switched Timing Advance	1900 Innectio el Pha ss sup not sup sup not sup not sup not sup not sup not sup not sup not sup not sup not sup sup not sup sup not sup sup not sup sup not sup sup not sup sup sup sup sup sup sup sup sup sup	Overvie n Control ase II ported 4 supported - ported 5 upported 6 .01.012345678 019.19.750759	9 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States ✓MS Capabilities MS Revision Leve ✓S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 ✓Multislot Class Circuit Switched Packet Data ✓Signaling Info IMSI IMEI Dialled Number ✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot	1900 Innectio el Pha ss sup not sup sup not sup not sup not sup not sup not sup not sup not sup not sup not sup sup not sup sup not sup sup not sup sup not sup sup not sup sup sup sup sup sup sup sup sup sup	Overvie n Control ase II ported 4 supported 4 supported 4 supported 4 supported 4 supported 4 supported 5 .01.012345678 019.19.750759 Sym.	9 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile [key.	Connect Control Achronized Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States ✓MS Capabilities MS Revision Leve ✓S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 ✓Multislot Class Circuit Switched Packet Data ✓Signaling Info IMSI IMEI Dialled Number ✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot PCL (MS)	1900 nnectio el Pha sup not sup 1 001 446 - 0 \$ 10	Overvie n Control ase II ported 4 ported 5 supported 7 .01.012345678 019.19.750759 Sym. (23.0 dBm)	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Achronized Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States MS Capabilities MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI IMEI Dialled Number MS Signal Circuit Switched Timing Advance Single Slot PCL (MS) Timeslot	1900 nnectio el Pha sup not sup not sup not sup not sup not sup not sup not sup not sup not sup not 3 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Overvie n Control ase II ported 4 supported 4 supported 4 supported 4 supported 4 supported 5 .01.012345678 019.19.750759 Sym. (23.0 dBm)	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile [key.	Connect Control Achronized Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States ✓MS Capabilities MS Revision Leve ✓S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 ✓Multislot Class Circuit Switched Packet Data ✓Signaling Info IMSI IMEI Dialled Number ✓MS Signal ✓Circuit Switched Timing Advance ✓Single Slot PCL (MS) Timeslot ✓BS Signal	1900 nnectio el Pha sup not sup not sup not sup not sup not sup not sup not sup not sup not sup not 3 10 10 10 10 10 10 10 10 10 10	Overvie n Control ase II ported 4 supported 4 supporte	4 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile key.	Connect Control Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States →MS Capabilities MS Revision Leve →S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 →Multislot Class Circuit Switched Packet Data →Signaling Info IMSI IMEI Dialled Number →MS Signal →Circuit Switched Timing Advance →Single Slot PCL (MS) Timeslot →BS Signal	1900 nnectio el Pha sup not sup not sup not sup not sup not sup not sup not sup not sup not sup not sup not sup not 3 10 10 10 10 10 10 10 10 10 10	Overvie n Control ase II ported 4 supported 5 supported 6 .01.012345678 019.19.750759 Sym. (23.0 dBm)	9 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm)	Make	Circuit Switched Single Slot	e mobile [key.	Connect Control Achronized Signal Off Connect Mobile Send SMS Main Service Network Support
Ch. 1 Ch. 2 GSN 900 Corr Signalling States MS Capabilities MS Capabilities MS Revision Leve S.Bands/PowClas P-GSM E-GSM R-GSM GSM 1800 Multislot Class Circuit Switched Packet Data Signaling Info IMSI IMEI Dialled Number MS Signal Circuit Switched Timing Advance Single Slot PCL (MS) Timeslot BS Signal	1900 nnectio el Pha sup not sup 101 3	Overvie n Control ase II ported 4 supported - ported - ported - ported - ported - supported - ported -	9 (max. 33 dBm) (max. 30 dBm) (max. 30 dBm) 9 .00	Make	Circuit Switched Single Slot	e mobile [key.	Connect Control Signal Off Connect Mobile Send SMS Main Service Network Support

第三步、回到 GSM900 Overview 界面如下图:

第五步、接下去是用户可以拨"112"去连接基站,也可以按下"Connect Mobile" 呼叫移动台。如下图:

Ch. 1 Ch. 2	SM900) Overvi	ew			Circuit Switched Single Slot	«t» L	Connect Control
<mark>- GSM900</mark>	Connect	ion Control	မ <mark>ြ</mark> ား				ļ	Alerting
 ▶ Signalling S ▼MS Capabili MS Revisio ▼S.Bands/P P-GSM E-GSM R-GSM GSM 180 ▼Multislot C 	tates ties on Level F owClass s s n 0 s lass	hase II upported upported ot supported upported	4 (max. 33 dB 1 (max. 30 dB	m)	Call to m	nobile in pro	ogress.	Signal Off Disconnect Mobile
Circuit Sv Packet D →Signaling Int IMSI IMEI Dialled Nut →MS Signal →Circuit Sw Timing A →Single Sic PCL (M:	mitched - fo 0 4 mber - itched dvance (5) 1	 01.01.01234567 46019.19.75075 0 Sym. 0 Sym. 0 (23.0 dBm)	39 3.00		246	Circuit Sw GSI	itched	Main Service Network Support
Timeslo ⊸BS Signal	ot 3				21.6	dBm Peak		Power
Connection		MS Signal	BS Signa	I Netw	ork	RF ⊕+	Sync.	Conn. Cfg.
第六步:	用户按下	"Connect N	Iobile" 以	后,手材	l会产生)	震铃,用	户只要按 ⁻	下接听
线, 就能 Ch. 1 Ch. 2	与用户壁_ SM900	立通话。) Overvi	ew			Circuit Switched Single Slot	1	Connect Control
RUN P/t N 10(23.0	lorm. GMSK dBm) Repo	rted Power		Setup	States		<mark>0</mark>	P/t Norm. GMSK
21.5 21.6	dBm Avg. dBm Peak	Burst Power (C : Burst Power er Ramn	urrent)	► Signaling IMSI IMSI IMEI	Info	001.01.0123 446019.19.7	3456789 750759.01	Appli- cation
- 0.2	5 Sym. Timi	ng Advance Erro	r	Traffic I ▼Meas. Co Repetitio	Node Node ntrol Dn	- Full Rate Ve Continuous	rsion 1	Analyzer Level
- 5.	Phase Error Gf 2 Hz Freq 9 • Peak	MSK uency Error :	(Current)	Stop Co Display Statistic ↓Analyzer	ndition Mode Count Level	None Current 100 Bursts		MS Signal
MS Receiver	3 * RMS Reports	1		RF Mode RF Atter Trigger →MS Signa	e nuation Source I	Auto Low Noise Signalling		BS Signal
48(-63 0(00 Off Dis	to -62 dBm) to 0.2 %) continuous Tra	RX Level RX Quality	0	←Circuit S Timing ←Single : PCL (Time:	witched Advance Slot (MS) slot	0 Sym. 10 (23.0 dB 3	m)	
Overview	Power	Modulation	Spectrur	n	Re	ceiver Quality		Menus

第七步:GSM900 频段的测试,用户选择 5 功率等级 1 信道,按下"MS Signal"按钮,如下图:

Ch. 1 Ch. 2 GSM900 Overview		Circuit (***) Switched Single Slot	Connect Control
RUN P/t Norm. GMSK 10(23.0 dBm) Reported Power 21.4 dBm Avg. Burst Power (Current) 21.6 dBm Peak Burst Power 0k Power Ramp 0.00 Sym. Timing Advance Error RUN Ext. Phase Error GMSK 9 Hz Frequency Error -6.5 * Peak Phase Error (Current) 2.1 *	Setup Signalling States MS Capabilities Signaling Info IMSI IMEI Dialled Number Traffic Mode Meas. Control Repetition Stop Condition Display Mode Statistic Count Analyzer Level RF Mode RF Attenuation Trigger Source	Single Slot	Control P/t Norm. GMSK Appli- cation Analyzer Level MS Signal BS Signal
48 (-63 to -62 dBm) RX Level 0 (0.0 to 0.2 %) RX Quality Off Discontinuous Transmission (DTX) PCL Channel Timeslot Timing Adva	<pre>✓Wis Signal</pre>	0 Sym. 10 (23.0 dBm) 3 affic Bit Stream	m Menus

然后按下"PCL"按钮,会弹出 PCL 的对话框,用户输入"5"然后按下"ENTER" 键,接着按下"Channel"按钮,会弹出 Channel 对话框,用户输入"1"然后按下 "ENTER"键,这时如下图:

这时测量的就是 GM900 下的 5 功率等级 1 信道的相关值。重复以上的步骤用户可以测完 GSM900 的 5、10、15 功率等级的 1、62、124 信道的相关测试参数。 第八步: GSM1800 频段的测试,用户如果从 GSM900 频段的测试到 GSM1800 频段 的测试需要切换,首先用户按下"Conncet Control"切换如下图:

Ch. 1 Ch. 2	SM 900	Power			Circuit Switched Single Slot		Connect Control
🗕 GSM 900	Connectio	n Control	92) =			Call E	stablished
	Hand	Press th lover from	e Handove the Origin	er key to p to the Dest	perform a ination Ne	twork	Handover
					∋SM 1800 Du	alband 🕹	Destination Selection
Origin Parameter							Destination Parameter
							Destination Defaults
Connection	Handover	MS Signal	BS Signal	Network	RF ⊕+	Sync.	Conn. Cfg.

然后按下"Desstination Selection"按钮,选择"GSM 1800 Dualband",按下"Eenter" 以后,按下"Handover"按钮,CMU 会切换到"GSM1800 Overview"界面。接下去测 量 GSM1800 的 0、5、10 功率等级的 512、698、885 信道的步骤跟 GSM900 的一样,可 以参考关于 GSM900 测试的介绍。

二、天线耦合测试简介

天线耦合测试主要是为了检测手机天线的功能是否正常,程序测试跟整机测试没什 么差别,测试功率等级以及信道都比整机的要少,还有跟整机测试有点不同的是由 于跟 CMU 通话是通过天线来实现所以射频损耗比较大,这一点需要用户注意,其 它测试上跟整机测试没什么差别,可以参考整机测试。