

Equipment List, Electrical

Applicable for C905

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1 General

This document describes the minimum required equipments for the Electrical Repair Process of the C905, C905a and C905c mobile phone.

Equipment listed without a part number is not orderable from Sony Ericsson and must be bought locally.

2 Column Definitions

The matrix in the end of the equipment tables describe where the actual equipment is needed (marked with an X) or may be needed/optional (marked with a Z).

Flash upgrade: Equipment for downloading software to the unit, both signalling and test-program.

Manual test: Equipment necessary to perform a manual test.

Repair: Equipment necessary for replacing components.

Go/No Go test: Equipment necessary for Go/No Go test.

Calibration with SERP: Equipment necessary to perform a calibration with SERP. **Calibration can only be done by authorized repair centers.**

The column that assist a specifying and/or clarifying the equipment needed are considered description type columns.



- Description The name of the equipment
- Part Number The Sony Ericsson part number to use when ordering from Sony Ericsson.
- Description Additional information that helps to specify the equipment.

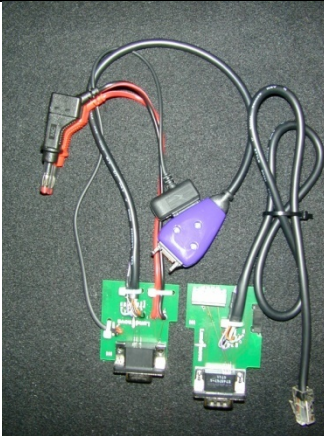


3 Repair Equipment

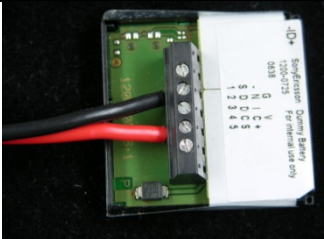

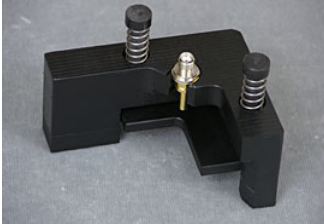
Some of the required equipment will be provided by Sony Ericsson and some equipment has to be sourced locally. This chapter will separate these equipments.




3.1 Sony Ericsson Provided Repair Equipment

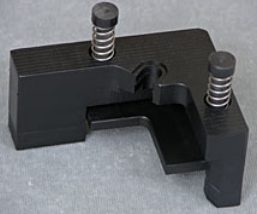


Pictures of tools that is orderable from Sony Ericsson.

				Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Part Number	Comments	Picture				
Sony Ericsson Programming Interface (SEPI)	LTN2141484	The Sony Ericsson Programming Interface (SEPI) is used in conjunction with the SEPI interface cable, the USB computer cable and battery charger to perform calibration on this product.				X	
Sony Ericsson Programming Interface (SEPI) cable	KRY1011119/1	A battery charger needs to be connected to this cable during calibration. (GSM Calibration only)				X	

				Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Part Number	Comments	Picture				
Cable Adapters for WCDMA calibration	1206-9888	Necessary for WCDMA Calibration. To be used with the 4921 Shield box Enclosure or any other Shield box that meets the minimum requirements stated in the Electrical Installation Instructions. The Service Tool Test Interface has two parts one for the inside and one for the outside of the Shield box.				X	
RF Test Cable Flexible IM	RPM119855				X	X	
RF Cable Short	RPM119891	The Short RF Cable is used to connect from the Shield box plate to the Phone.			Z	X	

				Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Part Number	Comments	Picture				
Battery Eliminator	1208-5627	If using the Battery Eliminator to power the handset during the GNG Test or Calibration routine, you must use a high quality DC source.		Z	Z	Z	
Rework Fixture for PCB	LTD260273	Used to hold the PCB during repair.					Z
RF Probe	SXA1097057	Used together with the RF Holder and RF Cable.			Z	X	

				Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Part Number	Comments	Picture				
USB Activation Dongle	NTZ1121071	Used for Activation in EMMA NOTE: cannot be ordered via the standard ordering process, To order contact your Regional Representative		X			
DCU-65/USB Cable	RPM13112	This cable is needed for loading ITP software and customization/activation.		X			
TV-Out Cable ITC-60	1201-8696	The TV-Out cable connects to the Fast port connector on the phone and to TV or home stereo via a RCA connector. PC TV card can be used too.					X

				Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Part Number	Comments	Picture				
RF Holder	1215-7612				X		
PCB Repair Fixture	1215-7617						X
Troubleshooting Fixture	1218-4986						X

3.2 Equipment Provided by Other Supplier

This is the list of equipments provided by other suppliers than Sony Ericsson

The matrix describes where the actual equipment is needed, marked with an X, or may be needed/option, marked with a Z.

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
RF Shield Package Rohde&Schwarz RF Shield Package <ul style="list-style-type: none"> CMU-Z10 – Antenna Coupler (Partnr: 1150.0801.10) CMU-Z11 – RF Shield Cover (Partnr. 1150.1008.02) 	Using an RF shield package is one of the options for testing the applicable product(s). Testing of the applicable product(s) can also be performed by using the combination of an RF Probe and an RF cable. <i>Spare parts for mobile phone fixation for R&S CMU-Z10 are available for purchase from Rohde&Schwarz:</i> <ul style="list-style-type: none"> Grid Positioning Plate – 1158.9789.00 L-shaped bracket – 1158.9808.00 Stabilizing pieces – 1158.9820.00 <p>NOTE: The Rohde & Schwarz package will require the use of a precision N-type male to SMA female RF adapter to mate with the SEMC RF cable.</p> <p>NOTE: If you are using a different RF Shield Package than Rohde & Schwartz, special attenuation factors for Go/No-Go test are required.</p>		Z	Z	

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
RF adapter for RF shield box <ul style="list-style-type: none"> The adapter for a Rohde & Schwarz Shield box must be a precision N-type male to SMA female adapter. 	This adapter is used to connect the RF shield box to the RF cable and is only required if a shield package is going to be used for testing. Recommended source: <ul style="list-style-type: none"> Pasternack Enterprises – (949) 261-1920 or www.pasternack.com Part number: PE9430		Z		
Willtek 4921 Shield Enclosure With modified rear panel and N terminator <ul style="list-style-type: none"> 248718 (Wiltek Part Number) 	Used for WCDMA or GSM Calibration. A Service Tool Test Interface (1206-9888) is also required.			X	
Modified rear panel and N terminator Willtek <ul style="list-style-type: none"> 300872 (Wiltek Part Number) 	Used with existing Willtek Shield boxes Replace rear panel with modified rear panel and place N terminator on RF connection. Remove RF coupler. A Service Test Tool Interface (1206-9888) is also required.			X	
Battery Charger (Standard SEMC charger applicable for C905)	The battery charger needs to be connected to the Sony Ericsson Programming Interface Cable during calibration. Also used for Charger Test.			X	

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
USB Computer Cable	<p>Type A to Type B USB cable.</p> <p>This is part of the hardware needed for performing calibration. This cable connects the computer to the SEPI.</p>			X	
<p>Agilent 8960</p> <p>Required Components:</p> <ul style="list-style-type: none"> E5515C (8960 Series 10 Mainframe) Option E5515C-002 (2nd RF source) Option E5515C-003 WCDMA HW Option <p>Required Software</p> <ul style="list-style-type: none"> E1985B or E1987A TA Fast Switching E1963A WCDMA Test Application E1968A-101 GSM Test Application E1968A-410 Application required for GSM Calibration 	<p><i>Note: It is strongly recommended that the instrument vendor be contacted before ordering this setup to ensure that the options stated are still valid or that no part numbers have changed.</i></p>		X	X	

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Rohde & Schwarz CMU200 Required Components <ul style="list-style-type: none"> • CMU200 mainframe (Base Unit) • Options CMU-B11, CMU-B21, CMU-B52, CMU-B54, CMU-B56, CMU-B68, CMU-B95 and CMU-U65 • Required SW package: CMU-PK100 	Note: It is strongly recommended that the instrument vendor be contacted before ordering this setup to ensure that the options stated are still valid or that no part numbers have changed.		X	X	
Power Supply (w/digital readout) NOTE! If using the Power Supply in conjunction with the Battery Eliminator (Dummy Battery) to power the phone during the GNG test or Calibration routine a high quality DC source that meets the following requirements <u>must</u> be used.	Device Requirements: <ul style="list-style-type: none"> • Output Voltage: 0-5 volt minimum. • Output Current: 0-2 amps minimum. • Transient response time: < 100 μs Some examples of Power Supplies that meet these requirements are as follows: <ul style="list-style-type: none"> • Agilent 66xx ser • Agilent 663x series 	Z	Z	Z	


		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Small Convection (Hot Air) Device	Device Requirements: <ul style="list-style-type: none"> The device should allow variable adjustment over a temperature range. The device should be capable of reaching an upper temperature of 426.7°C (800°F) or more. The range of airflow the device is capable of generating should fall under 20 litre/minute.				X
Large Convection (Hot Air) Device	Use this device for large parts, shield cans, and BGA-type components. <ul style="list-style-type: none"> The device should allow variable temperature adjustment and be capable of reaching an upper temperature of 426.7°C (800°F) or more. The range of airflow the device is capable of generating should be above 20 litre/minute.				X
BGA Rework equipment					X
Nozzles for Large Convection (Hot Air) Device	NOTE: Only necessary if you have a large convection device.				X
Temperature Probes (Thermocouples)	Used to measure temperatures on the board when replacing parts with the Large Convection Device or creating temperature profiles.				X
Digital Multi-meter	Used for troubleshooting failures.				Z
Microscope	Minimum magnification required is 10x.				X

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
GPIB Card	National Instruments or Keithley NOTES: <ul style="list-style-type: none"> Drivers are required and should be supplied with a card. 		X	X	
GPIB Cable	This cable is only required if a GPIB card is used.		X	X	
Power cable – Red NOTE: Only necessary if using the Battery Eliminator (Dummy Battery).	Cable Requirements: <ul style="list-style-type: none"> Minimum cross sectional area of conductor = 1.2mm² Maximum length = 1.5 m One end of cable must have a male banana-type connector to be able to interface with the battery eliminator. The other end of the cable needs whatever connection is necessary to connect to the power supply that you have.	Z	Z	Z	

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Power cable – Black <i>NOTE: Only necessary if using the Battery Eliminator (Dummy Battery).</i>	Cable Requirements: <ul style="list-style-type: none"> • Minimum cross sectional area of conductor = 1.2mm² • Maximum length = 1.5 m • One end of cable must have a male banana-type connector to be able to interface with the battery eliminator. The other end of the cable needs whatever connection is necessary to connect to the power supply that you have.	Z	Z	Z	

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Component baking oven	<p>Temperature requirements: 125°C +5°C/-0°C Required for drying moisture sensitive components.</p> <p>Below are links to several companies that sell convection ovens.</p> <p>http://www.cascadetek.com/forcedlist.php</p> <p>http://www.wisoven.com/lab1.htm</p> <p>http://www.shellab.com/products.html</p> <p>http://www.terrauniversal.com/products/tempcontrol/ovens/imperiaivmechcon.php</p> <p>http://www.labsynergy.com/products_laboratoryovens.asp?keyword=*laboratoryovens</p>				X
FLUX	<p>Lead-free solder does not require a special flux. The "No Clean" flux used with leaded products is acceptable.</p> <p>Although some manufacturers are developing fluxes specially made for use with lead-free solder (higher evaporation temperatures, less smoke, etc.), these are not required.</p>				X
Low Static Heat Protection Tape	This tape is required to protect adjacent components from hot air.				X

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Computer	<p>One of the following operating systems must be used:</p> <ul style="list-style-type: none"> Windows 2000 with service pack 2 or higher Windows XP <p>Minimum Requirements:</p> <ul style="list-style-type: none"> One unused PCI slot for GPIB card 2 USB Ports <p>The processor and RAM of the computer should at least meet the the minimum requirements specified by the operating system's manufacturer.</p>	X	X	X	
Test USIM	According to your Instrument supplier	X	X		
Printer	Optional, but recommended		Z		
TV set	Any kind of TV set with Audio- Video RCA connectors. Needed for testing the TV-out function.				X

		Customization	Go/No Go Test	Calibration in SERP	Repair
Description	Comments				
Metal Cutters	<p>Use these to trim shield can fences when they obstruct access to parts.</p> <p>Cutters should be small enough to cut fences without damaging parts on the board.</p> <p>Cutters should be sharp enough to cut fences without twisting or pulling the fence.</p> <p>Recommended cutters available at www.MSCDirect.com:</p> <p>Knipex (left) - Mfr Part #: KN7803-5, MSC #: 32997462</p> <p>Xuron (right) - Mfr Part #: 2175AS, MSC #: 88356431</p> 				X

3.3 AGPS Test Equipment

The ability to test AGPS functionality on the product is required, but two options are available. Repair centres may select the option that best fits their spatial, financial, operational needs, etc. Once a repair centre selects an option, the centre must be able to perform that option reliably as determined by SEMC certification standards.

After installing the equipment per manufacturer's instructions, the repair centre will need to use a satellite signal meter to measure the signal strength being radiated from the antenna. The signal strength should be between -140dBm and -130dBm.

3.3.1 Option 1: Re-radiating GPS System

NOTE: Repair Centres located inside the USA must meet FCC regulatory standards for re-radiating satellite signals. Other regions may have similar regulations. Repair centres are responsible for knowing and following these regulations.

The FCC regulatory policy that is currently in effect in the U.S.A. allows GPS Re-Radiating Kits to be sold to the following:



- International Customers (outside the U.S.A.)
- Agencies of the US Federal Government
 - All Branches of the US Military or Parties Operating under the Direction of US Federal Government
- Parties that have received an STA or Experimental License under part 5 of the FCC rules
- Parties that will be operating GPS Re-Radiators in a shielded room or under an approved GPS Networking Re-Radiating Hood

Centres in the U.S.A. that do not think they are eligible under any of the above criteria should visit the FCC link below to ask for more information about how to file for an Experimental License under part 5 of the FCC rules or see the second link below to file an application.



http://wireless.fcc.gov/index.htm?job=rules_and_regulations

Option 1: Re-radiating GPS System Continued

Several manufacturers sell re-radiating kits. Below are links to some. Important considerations are environmental protection for the external antenna, signal radiating radius of the internal antenna, and length of the transmission cable. Excessive cable lengths will attenuate the signal too much.

			Test	Repair
Description	Comments	Picture		
Aucon AS-47 and 48	Wireless GPS ReRadiating-System / GPS-Repeater with up to 12 meters transmission distance or with up to 30 meters transmission distance with the AS-48! http://www.aucon.de/technical_data_sheet(70k)pattern(33k)demonstration_pics(300_kb)		X	
GPS Source GPSRKL1	The GPSRKL1 Repeater kit is a low power GPS frequency repeater for areas where the GPS signal is not present. www.gpssource.com		X	
Continued on next page				

Option 1: Re-radiating GPS System Continued

			Test	Repair
Description	Comments	Picture		
GPS Networking HNRRKIT	<p>The HNRRKIT is a complete re-radiating system to allow you to re-radiate the GPS L1 carrier signal indoors. The HNRRKIT consists of a Roof Antenna, a plug-in re-radiating amplifier & a re-radiating antenna.</p> <p>www.gpsnetworking.com</p>		X	
Mobile GPS Online RK-304	<p>GPS L1 Band GPS Reradiator Kits with reradiating range 30 meters</p> <p>http://mobilegpsonline.com/mgpsos/index.php?main_page=index&zenid=58babc16b365ad58702c1a87f7f37f90</p>		X	
GPS Receiving Device	<p>Optional equipment used to confirm if the test equipment is radiating appropriate signal strength. If test units continually fail to receive signal, then use a known-good GPS receiving device to ensure the equipment is setup correctly.</p> <p>GPS receiving devices include watches, navigators, etc.</p>		Z	

3.3.2 Option 2: Satellite Signal Simulator System

			Test	Repair
Description	Comments	Picture		
Spirent STR4500	12 Channel GPS Simulator with Simplex Software (scenario replay units) www.spirentcom.com http://www.spirentcom.com/documents/67.pdf?wt=2&az-c=dc		X	
Synergy Systems PN-05	Passive GPS antenna. Part number 10001703G Bare 15mm sq element, 15mm coax, ra SMA plug http://www.synergy-gps.com/component/option,com_frontpage/Itemid,1/		X	

			Test	Repair
Description	Comments	Picture		
GPS Receiving Device	<p>Optional equipment used to confirm if the test equipment is radiating appropriate signal strength. If test units continually fail to receive signal, then use a known-good GPS receiving device to ensure the equipment is setup correctly.</p> <p>GPS receiving devices include watches, navigators, etc.</p>		Z	

4 Revision History

Rev.	Date	Changes / Comments
1	2008-10-24	First release
2	2008-11-18	Change description for some tools
3	2008-12-17	Troubleshooting Fixture added
4	2009-05-27	Changed part-number for RF Probe