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User's Guide

Agilent 83220A/E DCS1800 Test Set



83220-90027

January 1998

Printed in: UK

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This product has been designed to meet the protection requirements of the European Communities Electromagnetic Compatibility (EMC) directives:

In order to preserve the EMC performance of the product, any cable which becomes worn or damaged, must be replaced with the same type and specification.

EN55011:1991 (Group 1, Class A)

EN50082-1:1992

- IEC 1000-4-2 (1995) ESD

- IEC 1000-4-3 (1995) Radiated Susceptibility

- IEC 1000-4-4 (1995) EFT

Safety Information

This product conforms to EN61010-1(1993) / IEC 1010-1(1990) +A1(1992) +A2(1994) /CSA C22.2 No. 1010.1(1993) Safety requirements for Electrical Equipment for Measurement, Control and Laboratory Use, and has been supplied in a safe condition. The instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

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Radio Frequency Interference Statement Deutsche Bundespost

(Federal Republic of Germany only)

Herstellerbescheinigung

Hiermit wird bescheinigt, daß dieses Gerät, System Agilent 83220A/E in Ûbereinstimmung mit den Bestimmungen von Postverfügung 526/527 funkentstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes/Systems angezeigt und die Berechtigung zur Ûberprüfungder Serie auf Einhaltung der Bestimmungen eingeräumt.

Zusatzinformation für Meß- und Testgeräte:

Werden Meß - und Testgeräte mit ungeschirmten Kabeln und/oder in offenen Meßaufbauten verwendet, so ist vom Betreiber sicherzustellen, daß die Funk-Entstörbestimmungen unter Betriebsbedingungen an seiner Grundstücksgrenze eingehalten werden.

Manufacturer's Declaration

This is to certify that the equipment Agilent 83220A/E meets the radio frequency interference requirements of Directive FTZ 526/527. The German Bundespost has been notified that this equipment was put into circulation and has been granted the right to check the product type for compliance with these requirements.

Additional Information for Test and Measurement Equipment:

If test and measurement equipment is operated with unscreened cables and/or used for measurements on open set-ups, the user has to assure that under operating conditions the Radio Interference Limits are still met at the border of the user's premises.

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Sound Emission

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB(A).

- Sound Pressure Lp < 70 dB(A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779:1991 DIN 45635 pt. 19 (Type Test).

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel Lp < 70 dB(A).
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779:1991 DIN 45635 pt. 19 (Typprüfung).

Responsibilities of the Customer

The customer shall provide;

1. Access to the products during the specified periods of coverage to perform maintenance.
2. Adequate working space around the products for servicing by Agilent Technologies personnel.
3. Access to and use of all information and facilities determined necessary by Agilent Technologies to service and/or maintain the products. (In so far as these items may contain proprietary or classified information, the customer shall assume full responsibility for safeguarding and protection from wrongful use.)
4. Routine operator maintenance and cleaning as specified in the Agilent Technologies Operating and Service Manuals.
5. Consumables such as paper, disks, magnetic tapes, ribbons, inks, pens, gases, solvents, lamps, filters, fuses, seals, etc.

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General Safety Considerations

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

WARNING **This is a Safety Class I instrument (provided with a protective earthing ground, incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the instrument is likely to make the instrument dangerous. Intentional interruption is prohibited.**

DO NOT operate the product in an explosive atmosphere or in the presence of flammable gasses or fumes.

DO NOT use repaired fuses or short-circuited fuseholders: For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type.

DO NOT perform procedures involving cover or shield removal unless you are qualified to do so: Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel only.

DO NOT service or adjust alone: Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, service personnel must not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to an Agilent Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

DO NOT substitute parts or modify equipment: Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to a Agilent Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

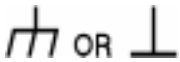
WARNING **There are many points in the instrument which can, if contacted, cause personal injury. Be extremely careful.**

Any adjustments or service procedures that require operation of the instrument with protective covers removed should be performed only by trained service personnel.

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Safety Symbols

The following symbols on the instrument and in the manual indicate precautions which must be taken to maintain safe operation of the instrument

Safety Symbols	
	The Instruction Documentation Symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the supplied documentation.
	Indicates the field wiring terminal that must be connected to earth ground before operating the equipment - protects against electrical shock in case of fault.
	Frame or chassis ground terminal - typically connects to the equipment's metal frame.
	Alternating current (AC)
	Direct current (DC)
	Warning,risk of electric shock.
WARNING	Warning denotes a hazard. It calls attention to a procedure, which if not correctly performed or adhered to could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
CAUTION	Caution denotes a hazard. It calls attention to a procedure, which if not correctly performed or adhered to could result in damage to or destruction of the instrument. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
	The CE mark shows that the product complies with all relevant European Legal Directives.
ISM 1-A	This is a symbol of an Industrial, Scientific, and Medical Group 1 Class A product.
	The CSA mark is a registered trademark of the Canadian Standards Association, and indicates compliance to the standards defined by them.
	Indicates that a laser is fitted. The user must refer to the manual for specific Warning or Caution information to avoid personal injury or damage to the product.

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Declaration Of Conformity

Declaration of Conformity

according to ISO/IEC Guide 22 and EN45014

Manufacturer's Name: **Agilent Technologies**

Manufacturer's Address:

South Queensferry
West Lothian, EH30 9TG
Scotland, United Kingdom

Declares that the product

Product Name: DCS1800 Test Set, DCS/PCS MS Test Set.

Model Numbers: **Agilent Technologies 83220A and 83220E**

Product Options: This declaration covers all options of the above products as detailed in TCF A-5951-9852-02

Conforms with the protection requirements of European Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic compatibility.

Against EMC test specifications EN 55011:1991 (Group 1, Class A) and EN 50082-1:1992

As Detailed in: Electromagnetic Compatibility (EMC)
Technical Construction File (TCF) No. A-5951-9852-02

Assessed by: Dti Appointed Competent Body
EMC Test Centre,
GEC-Marconi Avionics Ltd.,
Maxwell Building,
Donibristle Industrial Park,
KY11 5LB
Scotland, United Kingdom

Technical Report Number:6893/2200/CBR, dated 23 September 1997

Supplementary Information:

The product conforms to the following safety standards:

EN 61010-1(1993) / IEC 1010-1(1990) +A1(1992) +A2(1994)
CSA-C22.2 No. 1010.1-93

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC, and carries the CE-marking accordingly.

South Queensferry, Scotland	*17 November 1997*	R M Evans
Location	***Date***	***R.M. Evans / Quality Manager***

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Agilent 83220A/E Description

Agilent 83220A/E Capability

The Agilent 83220A/E expands the capabilities of the HP/Agilent 8922 GSM Test Set family to comprehensively test DCS1800 mobile radios across the band 1710 MHz to 1880 MHz; and PCS1900 mobile radios across the band 1850 MHz to 1990 MHz. All the features of the RF generator, RF analyzer and general instrumentation of the HP/Agilent 8922 series are retained.

DCS1800 Base Station

The Agilent 83220A/E, when configured with the HP/Agilent 8922, can now emulate a DCS1800/PCS1900 base station and establish and maintain a DCS1800/PCS1900 link. Once a link has been established, comprehensive tests can be sequenced across the full DCS1800/PCS1900 band without interrupting the link.

NOTE

PCS1900 is configured as a standard on all Agilent 83220Es with serial prefix 3524U00479 or greater. Prior to this serial break PCS1900 was available on the Agilent 83220E as options K19.

PCS1900 is configured as a standard on all Agilent 83220As with serial prefix 3524U00424 or greater. Prior to this serial break PCS1900 was available on the Agilent 83220A as options K19.

Your HP/Agilent 8922 must also be configured for PCS1900 operation:

HP/Agilent 8922A/B require firmware revision B.05.04 or greater.

HP/Agilent 8922E/G do not support PCS1900.

HP/Agilent 8922F require firmware revision B.05.02 or greater to support PCS1900.

HP/Agilent 8922H require firmware revision B.06.00 or greater to support PCS1900.

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How to Use This Manual

Where to Start

If you have just received the Agilent 83220A/E and want to get it ready to use for the first time:

Thoroughly read the “Installing Your Agilent 83220A/E” chapter in this manual and follow its instructions for:

- Unpacking the Test Set.
- Preparing it for use.
- Installation Overview.
- System Calibration.
- DCS1800/PCS1900 Configuration.

If you need to verify the unit is operating within its specifications, perform the confidence tests in the “Verifying Performance” chapter in this manual.

Making measurements in DCS1800/PCS1900 mode is identical to making measurements in GSM900 mode. Follow the instructions in the “Making Measurements” chapter in the appropriate *HP/Agilent 8922 Series User's Guide* to learn how to make measurements using the DCS1800 Test System.

To find more detailed information about the Test Set, its applications, and key descriptions, consult the “Screens”, “Connectors”, and “GPIB” chapters in this manual, and in the appropriate *HP/Agilent 8922 Series User's Guide*.

To learn how to program the Test Set, read the “GPIB” chapter in this manual, and the “GPIB”, “Programming Examples”, and “Programmer's Reference” chapters of the appropriate *Agilent 8922M/S Programming Reference Guide*

NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *HP/Agilent 8922 Multi-Band User's Guide* for more details on connection and operating differences.

WARNING **If this instrument is not used as specified, the protection provided by the equipment could be impaired. This instrument must only be used in a normal condition (in which all means of protection are intact).**

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1 Installing Your Agilent 83220A/E

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Introduction

This section provides installation instructions for the DCS1800 Test System (Agilent 83220A/E and Agilent/HP 8922).

The Agilent 83220A/E *User's Guide* covers the operation of the Agilent 83220A/E in conjunction with an appropriate HP/Agilent 8922 Series GSM Test Set, extending the capabilities of the HP/Agilent 8922 Series to cover the DCS1800/PCS1900 frequency bands. The Agilent 83220A/E and HP/Agilent 8922 together constitute a DCS1800/PCS1900 Test System.

Using this Chapter

Use the following procedure to power-up the Agilent 83220A/E, HP/Agilent 8922 DCS1800 Test System correctly. After completion of this procedure, refer to "Making Measurements" in the appropriate *HP/Agilent 8922 Series User's Manual* for an introduction to operating the appropriate HP/Agilent 8922. Select the test required, follow the instructions as in the appropriate HP/Agilent 8922 manual. Make the measurement.

The information contained in this guide includes:

- ❏ Accessories supplied.
- ❏ Initial inspection.
- ❏ Installation check list.
- ❏ Preparation for use.
- ❏ Fuses and power cords.
- ❏ Installation overview
- ❏ Running the System Calibration routine.
- ❏ DCS1800/PCS1900 configuration.
- ❏ General information.

The interface between the HP/Agilent 8922 and the Agilent 83220A/E is via a 15 way D-Type connector and five BNC coaxial connectors.

NOTE DCS1800 Test System setup is shown for the HP/Agilent 8922H. DCS1800 Test System setup using any of the other HP/Agilent 8922 Series will be similar. The HP/Agilent 8922 rear panel layout is slightly different for each model in the series.

NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *HP/Agilent 8922 Multi-Band User's Guide* for more details on connection and operating differences.

WARNING **If this instrument is not used as specified, the protection provided by the equipment could be impaired. This instrument must only be used in a normal condition (in which all means of protection are intact).**

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Accessories Supplied

Table 1-1 Accessories Supplied with the DCS1800 Test System

Description	Agilent Part Number	Comments
User's Guide	83220-90027	1 copy shipped with Agilent 83220A/E.
Interconnecting Cables	See Table 1-2	Shipped with DCS1800 Test System.
Power Cord	See Figure 1-2	Shipped with DCS1800 Test System.
Rackmount Flange Kit	5062-4071	Shipped with Option AX4
GSM/DCS1800 Mobile Station Test Software	83212D	Available separately

Table 1-2 Supplied Cables

Type	Part Number	Model Number	Agilent 83220A/E Port	HP/Agilent 8922 Port
BNC	8120-1838		CONNECT TO 8922 AUX RF OUT (Front panel)	AUX RF OUT (Front panel)
BNC	8120-1838		CONNECT TO 8922 AUX RF IN (Front panel)	AUX RF IN (Front panel)
BNC	83220-61025		10 MHz IN (Rear panel)	10 MHz OUT (Rear panel)
BNC	83220-61025		SCOPE (Rear panel)	SCOPE (Rear panel)
BNC	83220-61025		AM (Rear panel)	AM (Rear panel)
D-type	08922-61083		PCN INTERFACE (Rear panel)	PCN INTERFACE (Rear panel)

CAUTION It is advisable to connect all the cables as shown in the `Installation Overview` section **before** switching on the DCS1800 Test System.

Initial Inspection

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the Agilent 83220A/E has been checked mechanically and electrically. Procedures for checking the electrical performance of the DCS1800 Test System are given in the "Verifying Performance" chapter of this manual. Procedures for checking the electrical performance of the HP/Agilent 8922 are given in the "Verifying Performance" chapter of the appropriate *HP/Agilent 8922 Series User's Guide*. If the

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contents are incomplete, if there is mechanical damage or defect, or if the DCS1800 Test System does not pass the electrical performance tests, notify the nearest Agilent Technologies office.

If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Agilent Technologies office. Keep the shipping material for the carrier's inspection.

WARNING **To avoid hazardous electrical shock, do not apply power to the Agilent 83220A/E when there are any signs of shipping damage to any part of the Agilent 83220A/E.**

If the shipping materials are in good condition, retain them for possible future use. You may wish to ship the Agilent 83220A/E to another location or to return it to Agilent Technologies for service. See "How to Return Your Agilent 83220A/E for Servicing," in this chapter.

Installation Check List

Before connecting the Agilent 83220A/E or HP/Agilent 8922 to the line (mains) voltage, ensure the following steps are taken:

1. Read the warning in this chapter, see `Preparation for Use`.
2. Check that the line voltage setting on the rear panel power line modules are set to the correct voltage, see `Fuses and Power Cords`.
3. Ensure that the rating of the line (mains) fuse is appropriate for the line voltage being used, see Table 1-3 on page 6.
4. Ensure that the power cable is the correct type, see `Power Cords`.

Preparation for Use

WARNING **The Agilent 83220A/E and HP/Agilent 8922 Series are Safety Class 1 products (provided with a protective earth terminal). An uninterruptible safety earth ground must be provided from the mains power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the DCS1800 Test System must be made inoperative and be secured against any unintended operation.**

If the Agilent 83220A/E or HP/Agilent 8922 are to be energized via an external autotransformer for voltage reduction, make sure that the common terminal is connected to the neutral pole of the power source.

Before connecting the Agilent 83220A/E or HP/Agilent 8922, the protective earth terminal of the Agilent 83220A/E and HP/Agilent 8922 must be connected to the protective conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by the use of an extension cord (power cable) without a protective conductor (grounding). Grounding one conductor of a two-conductor outlet is not sufficient protection.

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Fuses and Power Cords

Line Voltage Selection and Fuse Selection

CAUTION Before connecting the DCS1800 Test System to the mains (line) voltage, ensure that the correct operating voltages and fuses have been selected for each instrument.

A rear-panel, line power module permits operation from 100, 120, 220, or 240 Vac. The HP/Agilent 8922 power module is documented in the `Fuses and Power Cords` section of "Installing Your HP/Agilent 8922" in the appropriate *HP/Agilent 8922 Series User's guide*.

On the Agilent 83220A/E, the number visible in the window (located on the module) indicates the nominal line voltage to which the Agilent 83220A/E must be connected. Verify that the Line Voltage Selection Cam is matched to the power source (see Figure 1-1). Table 1-3 lists the ratings and the Agilent part numbers of the line fuses.

Internal Fuses

The fuses used within this instrument are listed below, and are non operator replaceable. These fuses are fast blow type (F).

Fuse	Current	Voltage	Type
F1	3.0A	250V	F
F2	6.0A	250V	F

NOTE The line voltage and line fuse ratings are selected at the factory according to the line voltage specified when the Agilent 83220A/E and HP/Agilent 8922 were ordered. If the voltage was not specified, the line voltage and line fuse rating are selected according to the country of destination.

Line Voltage Selection

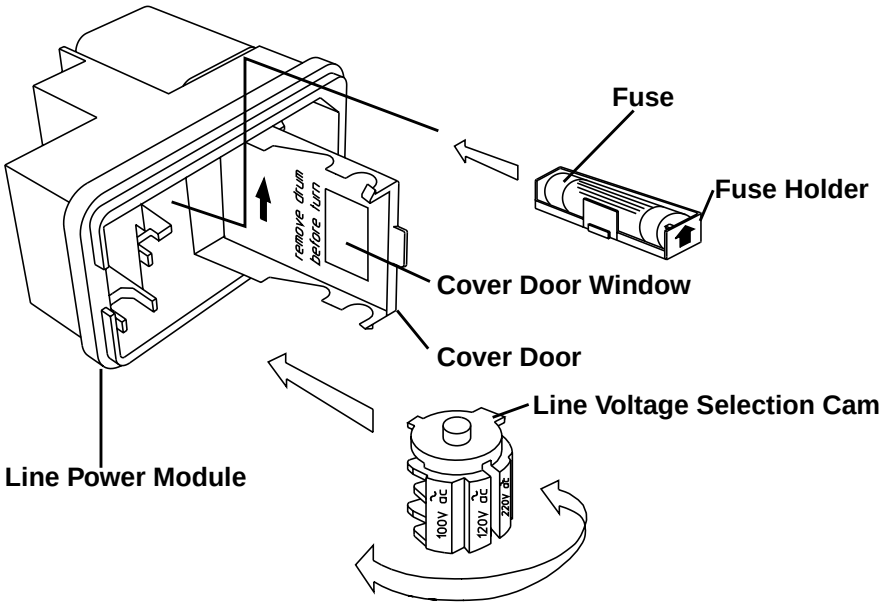
1. Open the Cover Door by placing a small standard screwdriver between the Cover Door and the Line Power Module, and pry open.
2. Remove the Line Voltage Selection Cam with fingers. Rotate cam so that the desired line voltage appears at the Cover Door Window when the cam is re-inserted.

Fuse Replacement

1. Remove Fuse Holder with fingers. Replace Fuse in Fuse Holder and re-insert into the Line Power Module.
2. Close the Cover Door by pressing it firmly.

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Figure 1-1 Fuse Replacement and Line Voltage Selection



WARNING **For protection against fire hazard, the line fuse should only be a 250V fuse with the correct current rating. (See Table 1-3).**

Table 1-3 Line Fuse Rating and HP Part Number

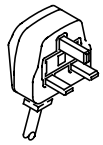
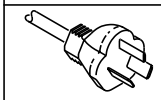
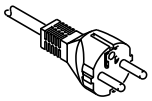
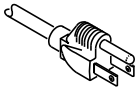
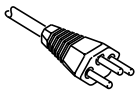
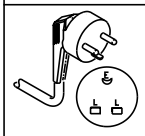
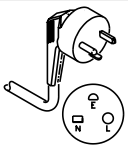
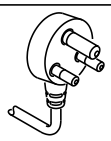
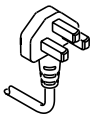
Model	Line Voltage	Rating	Type	Part Number
HP/Agilent 8922	100, 120 Vac 220, 240 Vac	5.0A, 250V 2.5A, 250V	Normal blow Normal blow	2110-0010 2110-0083
Agilent 83220A/E	100, 120 Vac 220, 240 Vac	2.0AT, 250V 1.5AT, 250V	Time delay Time delay	2110-0303 2110-0304

Power Cords

The Agilent 83220A/E and HP/Agilent 8922 are each supplied with a three-wire power cable. When connected to an appropriate ac power receptacle, these cables ground the DCS1800 Test System cabinets. The type of Mains plug shipped with each instrument depends on the country of destination. Refer to Table 1-4 on page 7 for the part numbers of the power cables and Mains plugs available.

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Table 1-4 Line Cords

PlugType	Cable Part Number	CD	Plug Description	Length, inches (mm)	Cable Color	For Use In Country
	8120-1351 8120-1703	0 4	90/Straight BS1363A[a] 90	90 (229) 90 (229)	Mint Gray Mint Gray	United Kingdom, Cyprus, Nigeria, Rhodesia, Singapore
	8120-1369 8120-0696	0 4	Straight NZSS198/ASC112 Straight/90[a]	79 (201) 87 (221)	Gray Gray	Australia, Argentina, New Zealand, Mainland China
	8120-1689 8120-1692	7 2	Straight 90	79 (201) 79 (201)	Mint Gray Mint Gray	East and West Europe, Central African Republic, Arabia, Egypt
	8120-1378 8120-4753 8120-1521 8120-4754	1 6 1	Straight NEMA5-15P[a] Straight 90 90	80 (203) 90 (230) 80 (203) 90 (230)	Jade Gray Jade Gray Jade Gray	United States, Canada, Mexico, Philippines, Taiwan, Japan
	8120-1348 8120-1538	2 3	Straight 90	80 (203) 80 (203)	Dark Gray Dark Gray	
	8120-2104 8120-2296 8120-3997	3 4 4	Straight SEV 1011 1959-24507, Type 12 Straight/90 Straight/90	79 (201) 79 (201) 177 (402)	Gray Gray Gray	Switzerland
	8120-0698	6	Straight/NEMA6-15P	90 (230)	Black	United States, Canada
	8120-2956 8120-2957 8120-3997	3 4 4	90/Straight 90/90 Straight/Straight	79 (201)	Gray Gray Gray	Denmark
	8120-4211 8120-4600	7 8	Straight IEC83-B1[a] Straight/90	79 (201) 79 (201)	Black Gray	South Africa, India
	8120-1860 8120-1575 8120-2191 8120-4379	6 0 8 8	Straight CEE22-V1 (Systems Cabinet Use) Straight/Straight Straight/90 90/90	59 (150) 31 (79) 59 (150) 80 (203)	Jade Gray Jade Gray Jade Gray Jade Gray	

a. Part number shown for plug is industry identifier for plug only. Number shown for cable is Agilent Part Number for complete cable including plug. E = Earth Ground; L = Line; N = Neutral.

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Operating Environment

Temperature: The Agilent 83220A/E may be operated in environments with temperatures from 0 to +55°C.

Humidity: The Agilent 83220A/E may be operated in environments with humidity from 0 to 95% (non-condensing). However, protect the Agilent 83220A/E from temperature extremes which can cause condensation within the Agilent 83220A/E.

Cooling: The Agilent 83220A/E obtains cooling airflow by forced ventilation from the fan on its rear panel.

CAUTION Ensure that all airflow passages at the rear and side of the Agilent 83220A/E are clear **before** installing the Agilent 83220A/E. This is especially important in a rack mount configuration.

Rack Mounting the Agilent 83220A/E

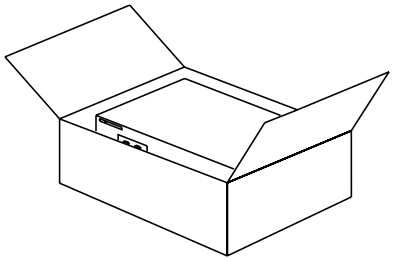
If the Agilent 83220A/E is to be rack mounted, ensure that all airflow passages at the rear and sides of the Agilent 83220A/E are not obstructed. Full instructions for rack mounting the Agilent 83220A/E are included with the rack mounting kit.

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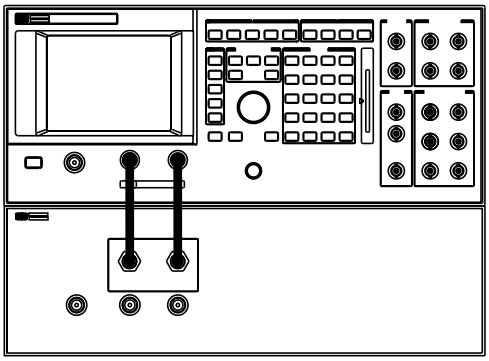
Installation Overview

NOTE DCS1800 Test System setup is shown for the HP/Agilent 8922H and Agilent 83220A. DCS1800 Test System setup using any of the other HP 8922 Series will be similar. The HP/Agilent 8922 rear panel layout is slightly different for each model in the series.

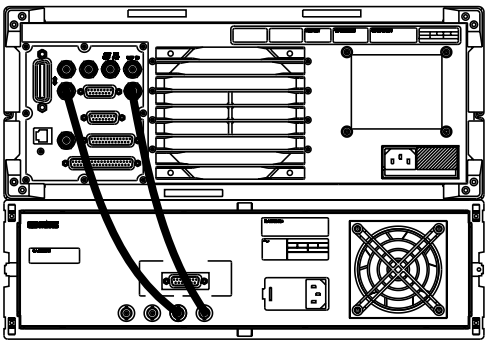
1. Unpack the Agilent 83220A/E.



2. On the front panel, connect the Agilent 83220A/E to the HP/Agilent 8922 as shown using the cables provided. (Part No. 8120-2682).

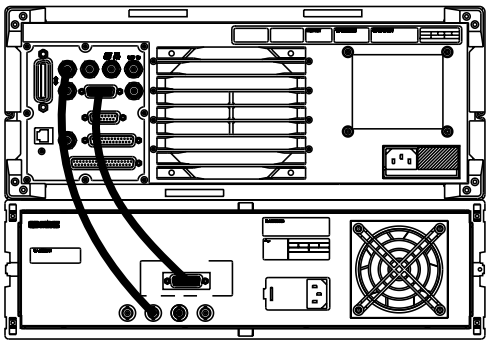


3. On the rear panel, connect AM to AM and SCOPE to SCOPE as shown using the cables provided. (Part No. 83220-61025).

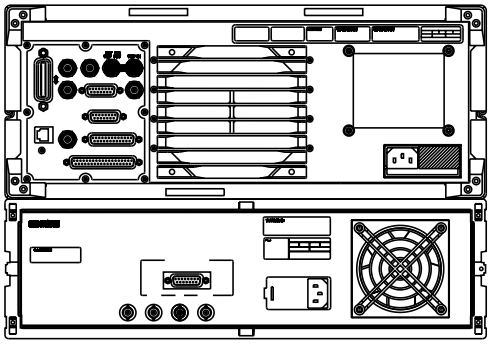


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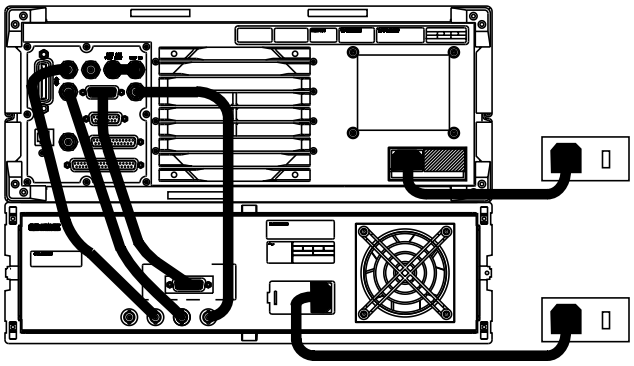
4. On the rear panel, connect Agilent 83220A/E 10 MHz IN to HP/Agilent 8922 10 MHz OUT and connect the PCN INTERFACE cable as shown using the cables provided. (Part No. 83220-61025 and 08922-61083).



5. Connect a 1, 2, 5, 10, or 13 MHz signal to HP/Agilent 8922 REF IN. If you have OPT 001, connect as shown using the cable provided. Refer to the `Installation Overview` section in the "Installing Your HP/Agilent 8922" chapter of the appropriate *HP/Agilent 8922 Series User's Guide* for information on configuring the reference.



6. Connect the supplied power cords to the Agilent 83220A/E and HP/Agilent 8922 and power up the instruments.



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Running the System Calibration Routine (Agilent 83220A only)

The System Calibration is a user-initiated calibration routine performed between the HP/Agilent 8922 and the Agilent 83220A.

NOTE The System Calibration routine should be run whenever an Agilent 83220A is first connected to an HP/Agilent 8922, or whenever a different Agilent 83220A is connected to an HP/Agilent 8922, and after a RAM Initialize from the SERVICE screen.

To perform a System Calibration:

1. Power down the DCS1800 Test System (Agilent 83220A and HP/Agilent 8922), achieved by powering down the HP/Agilent 8922.
2. On the Agilent 83220A, using a short cable (<30cm) (Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF OUT to the RF IN/OUT port.
3. On the HP/Agilent 8922, using a short cable (<30cm) (Part No. 10502A or similar), link the AUDIO OUT port to the TRIGGER IN port.
4. Power up the DCS1800 Test System.
5. From the HP/Agilent 8922 front panel, select the MESSAGE Screen. **SHIFT**, **MSSG**.
6. Look for any error message.
7. There should be no error messages before starting the System Calibration Procedure, if any errors occur, error messages are listed in the “Messages” chapter in this manual, and in the appropriate *HP/Agilent 8922 Series User's Guide*.
8. From the HP/Agilent 8922 front panel, select the TESTS Screen. **TESTS**
9. Using the knob, move the cursor to the Location field, and select ROM from the Choices field.
10. Move the cursor to the Procedure field and select SYS_CAL from the Choices field.
11. Using the knob, select Run Test.
12. Follow the instructions on the screen.
13. When the System Calibration Routine has finished, Cycle the DCS1800 Test System power.

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RAM Initialization (Agilent 83220E Only)

NOTE A RAM Initialize from the ``SERVICE'' screen should be run whenever an Agilent 83220E is first connected to an HP/Agilent 8922 or whenever a different Agilent 83220E is connected to an HP/Agilent 8922.

To perform a RAM Initialize:

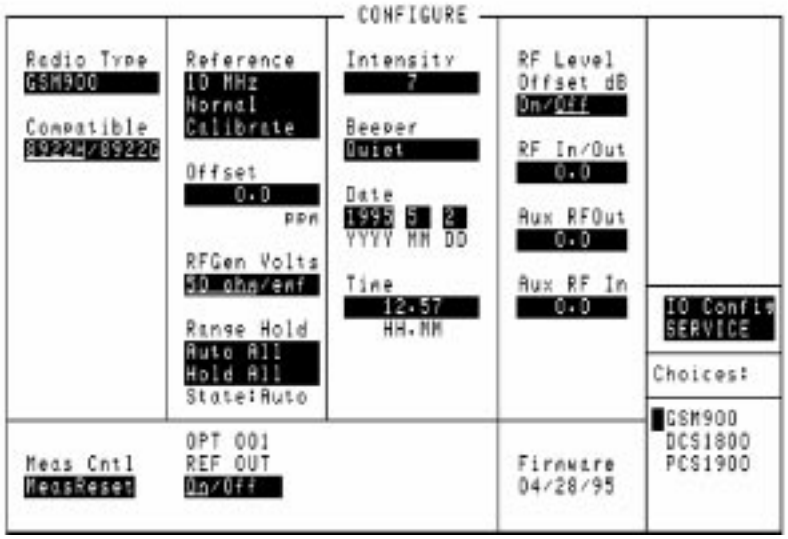
1. From the home screen, select the ``CONFIG'' Screen.
2. From the ``CONFIG'' Screen, select the ``SERVICE'' Screen.
3. Move the cursor next to the RAM Initialize field.
4. Select YES.
5. The instruments will then follow a restart cycle, after which, calibration information will be down loaded, and the instruments will be ready to use.

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DCS1800/PCS1900 Configuration

1. Access, then set up the CONFIGURE Screen with the cursor. Refer to the “Screens” chapter in this manual and in the appropriate *HP/Agilent 8922 Series User’s Guide.*

2. Select the Radio Type field. From the list of choices, select either DCS1800 or PCS1900 depending on the radio type you are testing.



NOTE When making DCS1800/PCS1900 measurements, use the RF IN/OUT port, AUX RF OUT port or AUX RF IN port on the Agilent 83220A/E. Making measurements in DCS1800 mode is identical to making measurements in GSM900 mode. Follow the instructions in the “Making Measurements” chapter in the appropriate *HP/Agilent 8922 Series User’s Guide.*

CAUTION When making GSM900 measurements, disconnect the connections to the Agilent 83220A/E and use the RF IN/OUT port, AUX RF OUT port or AUX RF IN port on the HP/Agilent 8922. The maximum Agilent 83220A/E RF IN/OUT port input power is 2W. **Never** connect a GSM900 radio to the Agilent 83220A/E or irreparable damage may occur.

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How to Return Your Agilent 83220A/E for Service

If you need to return your Agilent 83220A/E to Hewlett-Packard, first obtain the correct Service Center shipping address from your local sales office and carry out the following procedure.

CAUTION Instrument damage can result from using packaging materials other than the original shipping materials or equivalent. Never use styrene pellets as packaging materials. They do not adequately cushion the instrument, do not prevent it from shifting in the carton, and can cause instrument damage due to ESD.

1. Please send the following information with the returned instrument:
   a. Type of service required.
   b. Description of the problem and whether it is constant or intermittent.
   c. Name and phone number of technical contact person.
   d. Return address.
   e. Model number of returned instrument.
   f. Full serial number of returned instrument.
   g. List of any accessories returned with instrument
2. Send copies of any performance data recorded for the instrument.
3. Pack the instrument in the original shipping materials or the equivalent.
4. If the original shipping materials are not available, follow these steps to repackage the instrument for shipment:
   a. Wrap the instrument in antistatic plastic to reduce the possibility of ESD-caused damage.
   b. Obtain a double-walled, corrugated cardboard carton of 159 kg (350 lb) test strength. The carton must be large enough and strong enough to accommodate the instrument. Allow at least 7 to 10 cms on all sides of the instrument for packing material.
   c. Surround the instrument with 7 to 10 cms of packing material to protect it and prevent it from moving in the carton.
5. Seal the carton with strong nylon adhesive tape.
6. Mark the carton "FRAGILE, HANDLE WITH CARE."
7. Retain copies of all shipping papers.

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General Information

Operation and Storage Environment

This instrument is designed for Indoor use only.

The instrument may be operated at temperatures from 0°C to +55°C at altitudes up to 4600m (15,000 ft.). The instrument may be operated in environments up to 95% relative humidity to 40°C, but it should be protected from temperature extremes which may cause condensation.

CAUTION This instrument is designed for use in Installation Category II and Pollution Degree 2 per IEC1010 and 644 respectively.

To clean the instrument

Use a soft, clean damp cloth to clean the front-panel and side covers.

Refer to `System Specifications` in the "Verifying Performance" chapter in this manual for information about the operation or storage environment.

Instrument Options

Refer to `System Specifications` in the "Verifying Performance" chapter in this manual for information about instrument options.

Specifications

Refer to the "Verifying Performance" chapter in this manual for system specifications.

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Lifting/Carrying the Agilent 83220A/E and HP/Agilent 8922

To avoid potential injuries, ensure that two people are employed in lifting the HP/Agilent 8922x from it's packaging and at all other times. Before attempting to lift or carry the combined instruments consider the following basic lifting techniques (employing two people) to help avoid personal injury.

Using both arms to lift instruments.

- Reach for the instruments - bend your knees and waist, and keep your back straight.
- GRASP the lowermost instrument firmly.
- LIFT with your legs.
- KEEP your shoulders level.

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2 Verifying Performance

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Introduction

The tests in this chapter verify the electrical performance of the DCS1800 Test System. The basic functionality of the Agilent 83220A/E DCS1800 Test Set is checked using the internal capabilities of the host HP/Agilent 8922. The User Confidence Test will only be valid if the host HP/Agilent 8922 is functioning within its specification.

If any of the Confidence Tests fail verify the performance of the host HP/Agilent 8922, refer to the Appropriate *HP/Agilent 8922 Series User's Guide* and *HP/Agilent 8922 Series Assembly Level Repair* manuals.

Because of the specialized nature of the DCS1800 Test System and the equipment required to support it, it is recommended that calibration and repair be performed only by specially equiped Agilent Technologies service centers.

A list of system specifications is found at the end of this chapter.

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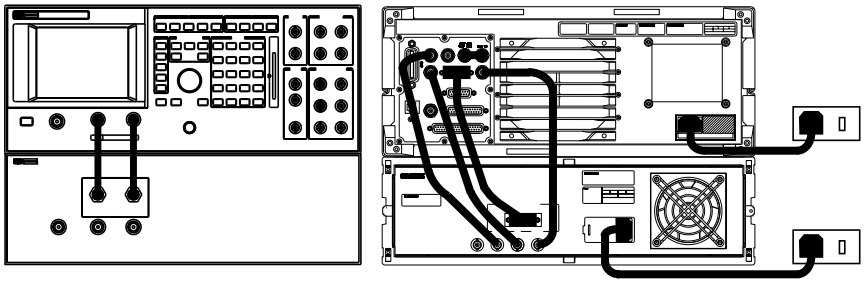
Setting up the Tests

This chapter contains the following information:

- ❏ System Connection
- ❏ Confidence Tests
  - RF Output Verification (Agilent 83220E only)
  - RF Port Selection Verification (Agilent 83220A only)
  - DC AM Verification (HP/Agilent 8922A/B/G/H/M only)
  - Phase Error and Peak Transmitter Carrier Power Verification
  - Pulse Modulation Verification (HP/Agilent 8922A/B only) (Agilent 83220A only)
  - Phase Error, Pulse Modulation, and Peak Transmitter Carrier Power Verification (HP/Agilent 8922E/F/G/H/M/S only) (Agilent 83220A only)
- ❏ System Specifications

System Connection

Connect the Agilent 83220A/E and HP/Agilent 8922 together as shown in the `Installation Overview` section of the “Installing Your Agilent 83220A/E” chapter in this manual.



Cycle the DCS1800 Test System power.

If the message "`DCS1800 Test Set has changed. Rereading cal data`" is displayed, then perform the System Calibration routine. Instructions for performing the System Calibration routine are described in the `Running the System Calibration Routine` section of the “Installing Your Agilent 83220A/E” chapter in this manual.

DCS1800 Configuration

Configure the HP/Agilent 8922 for DCS1800 operation. Refer to the `DCS1800 Configuration` section of the “Installing Your Agilent 83220A/E” chapter in this manual.

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Preset Conditions

The confidence tests can be run in any order, but are shown in the preferred order of test. Before running the confidence tests in the preferred order, it is important to cycle the DCS1800 Test System power and then configure the HP/Agilent 8922 for DCS1800 operation.

If you wish to run the confidence tests in a different sequence, or if you wish to run one or more of the confidence tests in isolation, it is important to start each confidence test from a known start position each time. To achieve this, press **PRESET**, and then configure the HP/Agilent 8922 for DCS1800 operation.

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RF OUTPUT Verfication (Agilent 83220E only)

This test checks transmission of RF signals from the Agilent 83220E CW Power at the Agilent 83220E RF OUT is checked using the HP/Agilent 437B power meter and HP/Agilent 8482A power sensor or appropriate alternatives. Signals are checked in the frequency range 1805 MHz to 1885 MHz in 10 MHz steps.

1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**).
2. Set the "OPERATING MODE" field to "DCS1800" and "CW Generator".
3. In the "CONTROL" section of the "CELL STATUS" screen set "Amplitude" to -20 dBm and "Frequency" to 1805 MHz.
4. With the cursor still at the "Frequency" field, press the HP/Agilent 8922 **INCR SET** key and enter 10 MHz.
5. Zero and calibrate the power meter. Connect the power sensor to the Agilent 83220E RF IN/OUT port.
6. Verify that the power meter displays -20 dBm (±1.5 dB).
7. In the HP/Agilent 8922 DATA FUNCTIONS keyboard section press the up arrow key to increment frequency in 10 MHz steps from 1805 MHz to 1885 MHz.
8. At each step verify that power meter reading is -20 dBm (±1.5 dB).

NOTE **PCS1900**

The RF Output verification test should also be carried out on Agilent 83220Es which support PCS1900. The test for PCS1900 is carried out using the same method as for DCS1800 but with the HP/Agilent 8922 configured for PCS1900 operation and at one frequency of 1975 MHz.

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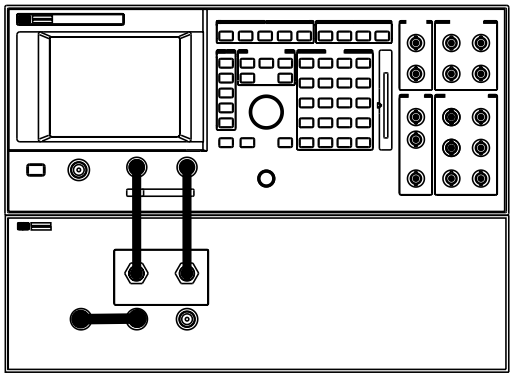
RF Port Selection Verification (Agilent 83220A only)

This test checks the transmission/reception of RF signals to and from the Agilent 83220A. CW frequency and power are checked using the HP/Agilent 8922 spectrum analyzer (On an HP/Agilent 8922E/F/H, the spectrum analyzer is only available with Option 006 fitted) and CW/AF analyzer (Power measurements are not available from the AUX RF IN port. On the CW MEAS/AF ANALYZER screen, CW power will read "----").

1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**), then configure the HP/Agilent 8922 for DCS1800 operation.
2. Select the RF GENERATOR / RF ANALYZER screen (press **SHIFT** [1] **RFG/RFA**), and alter the settings as follows:

Heading	Field	Setting
RF Gen	RF Output Amplitude	AUX RFOUT - 5.0 dBm
Mod Source	GMSK	Off
RF Analyzer	Frequency Amplitude	1806 MHz - 5.0 dBm

3. Remove any connections to the Agilent 83220A RF IN/OUT port.
4. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).
5. Zero the power meter by selecting ZeroPower from the **Meas Cntrl** field.
6. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF OUT to the RF IN/OUT port.



7. From the To Screen field, select the SPECTRUM ANALYZER screen (select More then SPEC ANL).

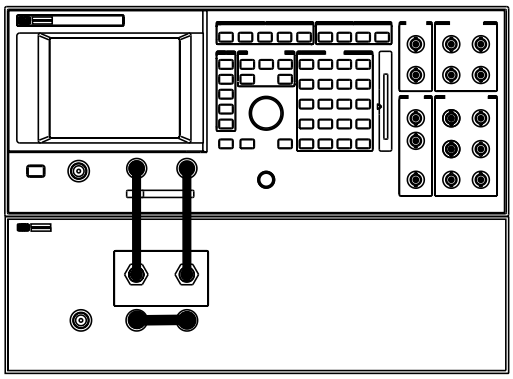
1. To select the RF GENERATOR/RF ANALYZER screen on an HP/Agilent 8922A/B, simply press **RFG/RFA**.

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8. Verify the presence of an 1806 MHz signal, at a level of 5 dBm (+3 dB, –4 dB). Differences from the expected value includes a loss of 0.5 dB (typically) for the external 10502A RF cable.
9. From the `To Screen` field, select the `CW MEAS/AF ANALYZER` screen (select `More` then `CW AF ANL`).
10. Verify that the signal frequency is 1806 MHz ±32 Hz, and that the signal level is 5 dBm (+1 dB, –2 dB). Differences from the expected value includes a loss of 0.5 dB (typically) for the external 10502A RF cable.
11. Select the `RF GENERATOR / RF ANALYZER` screen (press **SHIFT RFG/RFA**), and alter the settings as follows:

Heading	Field	Setting
`RF Analyzer`	RF Input Amplitude	AUX RF IN 5.0 dBm

12. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF IN to the AUX RF OUT port.

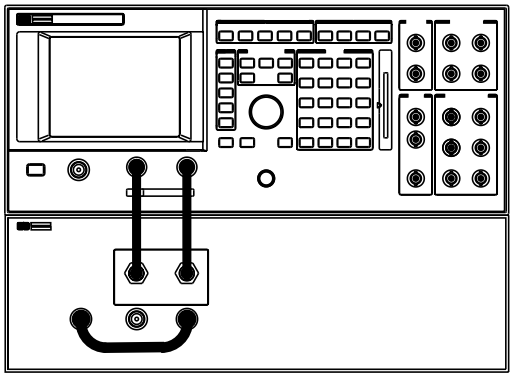


13. From the `To Screen` field, select the `SPECTRUM ANALYZER` screen (select `More` then `SPEC ANL`).
14. Verify the presence of an 1806 MHz signal, at a level of 5 dBm (+3 dB, –4 dB).
15. From the `To Screen` field, select the `CW MEAS/AF ANALYZER` screen (select `More` then `CW AF ANL`).
16. Verify that the CW frequency is 1806 MHz ±32 Hz.
17. Select the `RF GENERATOR / RF ANALYZER` screen (press **SHIFT RFG/RFA**), and alter the settings as follows:

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Heading	Field	Setting
RF Gen	RF Output Amplitude	RF IN/OUT –20.0 dBm
RF Analyzer	Amplitude	–20.0 dBm

18. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF IN to the RF IN/OUT port.



19. From the To Screen field, select the SPECTRUM ANALYZER screen (select More then SPEC ANL).

20. Verify the presence of an 1806 MHz signal, at a level of –20 dBm (+3 dB, –4 dB).

21. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).

22. Verify that the CW frequency is 1806 MHz ±32 Hz.

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DC AM Verification for the Agilent 83220E

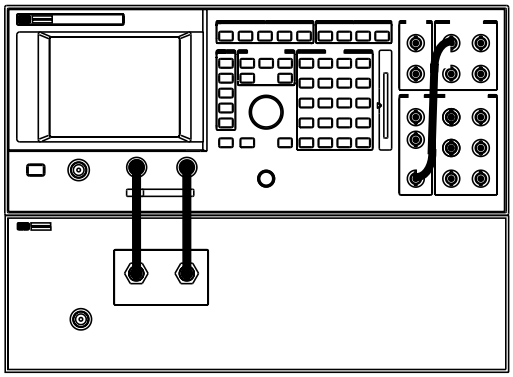
NOTE Applicaable to the HP/Agilent 8922A/B/G/H/M only. DC AM is not available on an HP/Agilent 8922E/F.

This test checks transmission of the DC AM control voltage from the HP/Agilent 8922 to the Agilent 83220E. The resulting change in CW Power is checked using the HP/Agilent 8922 CW/AF analyzer and spectrum analyzer.

1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**), then configure the HP/Agilent 8922 for DCS1800 operation.
2. Set the `OPERATING MODE` field to DCS1800 and CW Generator.
3. Zero the power meter (page 21 for power meter details)and connect the power meter sensor to the Agilent 83220E RF IN/OUT port.
4. In the CONTROL section of the `CELL STATUS` screen, set Amplitudes to -30 dBm and `Frequency` to 1805 MHz.
5. Verify the power meter displays -30 dBm (±1.5 dB).
6. In the measurements section, select AUDIO and set the fields as follows;

Field	Setting
Frequency	0 Hz
Amplitude	1 V
Coupling	DC

7. Select the RF GENERATOR / RF ANALYZER screen (press **SHIFT RFG/RFA**), and set the Mod Source DC AM field to Ext.
8. Connect a BNC cable from the HP/Agilent 8922 AUDIO OUT to AM/IN SPEECH:



9. Verify that the power meter reading has increased by 6 dB to -24 dBm (±1.5 dB).

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DC AM Verification for the Agilent 83220A

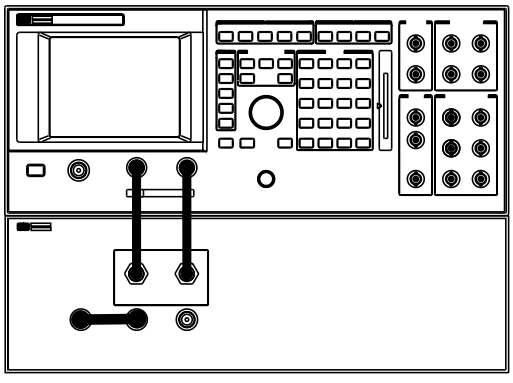
NOTE Applicaable to the HP/Agilent 8922A/B/G/H/M only. DC AM is not available on an HP/Agilent 8922E/F.

This test checks transmission of the DC AM control voltage from the HP/Agilent 8922 to the Agilent 83220A. The resulting change in CW Power is checked using the HP/Agilent 8922 CW/AF analyzer and spectrum analyzer.

1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**), then configure the HP/Agilent 8922 for DCS1800 operation.
2. Select the RF GENERATOR / RF ANALYZER screen (press **SHIFT RFG/RFA**), and set as follows:

Heading	Field	Setting
RF Gen	RF Output Amplitude	AUX RFOUT, 0.0 dBm
Mod Source	GMSK	Off
AF Gen	Frequency Amplitude Coupling	0.0 Hz, 1.0 V AC/DC
RF Analyzer	Frequency Amplitude	1806 MHz, 0.0 dBm

3. Remove any connections to the Agilent 83220A RF IN/OUT port.
4. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).
5. Zero the power meter by selecting ZeroPower from the **Meas Cntrl** field.
6. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF OUT to the RF IN/OUT port.



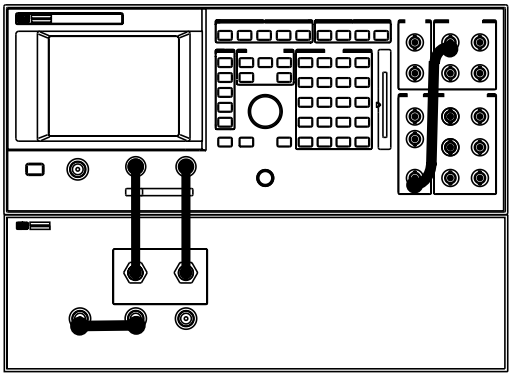
7. Verify that the CW power measures 0 dBm (+1 dB, –2 dB).

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8. Select the RF GENERATOR / RF ANALYZER screen (press **SHIFT RFG/RFA**), and alter the settings as follows:

Heading	Field	Setting
Mod Source	DC AM	Ext

9. On the HP/Agilent 8922, using a short cable (<30cm - Part No. 10502A or similar), link the AUDIO OUT port in the AUDIO section to the IN AM/SPEECH port in the MODULATION section.



10. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).
11. Verify that the CW power has increased by approximately 6 dB.
12. Select the RF GENERATOR / RF ANALYZER screen (press **SHIFT RFG/RFA**), and alter the settings as follows:

Heading	Field	Setting
AF Gen	Frequency Amplitude	0.1 Hz, 0.707 V

13. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).
14. Verify that the CW power varies between 6 dBm (+1 dB, –2 dB) and –25 dBm (or lower). Differences from the expected value includes a loss of 0.5 dB (typically) for the external 10502A RF cable.
15. From the To Screen field, select the SPECTRUM ANALYZER screen (select More then SPEC ANL).
16. Alter the SPECTRUM ANALYZER screen as follows:

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Field	Setting
Ref Level	7.0 dBm

17.Verify that the CW power varies between 6 dBm (+3 dB, –4 dB) and –60 dBm (or lower).

18.Remove the cable from the AUDIO OUT and IN AM/SPEECH ports.

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Phase Error & Peak Transmitter Carrier Power Verification (Agilent 83220A only)

This test checks the phase stability of the Agilent 83220A, and operation of the Agilent 83220A Peak TX Power Meter.

1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**), then configure the HP/Agilent 8922 for DCS1800 operation.
2. Select the RF GENERATOR / RF ANALYZER screen (press **RFG/RFA**), and set as follows:

Heading	Field	Setting
RF Gen	RF Output Amplitude Frequency	AUX RFOUT 5.0 dBm 1806 MHz
AF Gen	Frequency Amplitude Coupling	100 Hz 5.0 V AC/DC
RF Analyzer	RF Input Frequency Amplitude	RF IN/OUT 1806 MHz 5.0 dBm

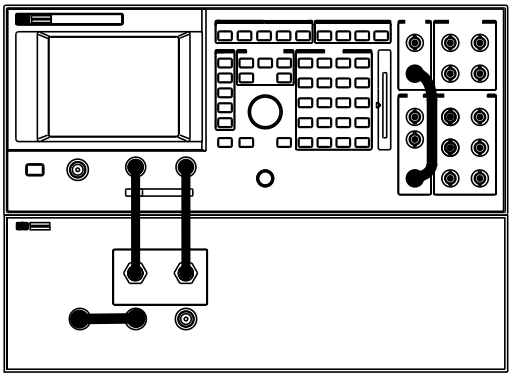
3. Select the MEASUREMENT SYNC screen (press **MEAS ARM**), and alter the settings as follows:

Heading	Field	Setting
Meas Trig	Trig Source	Ext Meas

4. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF OUT to the RF IN/OUT port.

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5. On the HP/Agilent 8922, using a short cable (<30cm - Part No. 10502A or similar), link the AUDIO OUT port in the AUDIO section to the TRIGGER IN port in the MEASURE section.



6. From the `To Screen` field, select the `DSP ANALYZER` screen, (`DSP ANL`), and alter the settings as follows:

Heading	Field	Setting
`DSP Analyzer`	View	PhaseMain

7. Press **MEAS ARM.**
8. Verify the following:

Measurement	Result
RMS Phase Error	< 1.00°
Peak Phase Error	< 4.00°
Frequency Error	< ±32 Hz

9. Alter the `DSP ANALYZER` screen as follows:

Heading	Field	Setting
`DSP Analyzer`	View	Ampl Main

10. Remove the connection to the Agilent 83220A RF IN/OUT port.
11. Zero the power meter by selecting `ZeroPower` from the `View` field.
12. Reconnect the connection to the Agilent 83220A RF IN/OUT port.

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13. Verify that the Peak Transmitter Power measures 5.0 dBm (+1 dB, –2 dB). Differences from expected values should be mainly due to losses in the external RF cables. Check that the reading is consistent with the cable being used. (10502A has approx 0.5 dB loss).

14. Remove the cable from the AUDIO OUT and TRIGGER IN ports.

NOTE **PCS1900**

The Phase Error and Peak Transmitter Carrier Power Verification test should also be carried out on Agilent 83220As which support PCS1900. The test for PCS1900 is carried out using the same method as for DCS1800 but with the HP/Agilent 8922 configured for PCS1900 operation and in step 2, an RF Generator and RF Analyzer frequency of 1975 MHz should be selected.

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Pulse Modulation Verification (Agilent 83220A only)

NOTE Applicable to the HP/Agilent 8922A/B only.

This test checks the operation of the Agilent 83220A pulse modulator using the HP/Agilent 8922A/B spectrum analyzer.

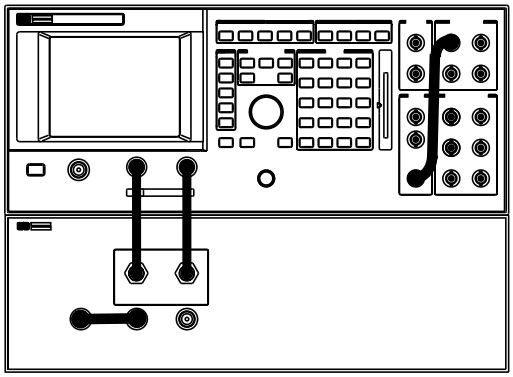
1. Preset the HP/Agilent 8922 to a known state, (press **PRESET**), then configure the HP/Agilent 8922 for DCS1800 operation.
2. Select the RF GENERATOR / RF ANALYZER screen (press **RFG/RFA**), and set as follows:

Heading	Field	Setting
RF Gen	RF Output Amplitude	AUX RFOUT 5.0 dBm
Mod Source	GMSK Pulse	Off Ext, Normal
AF Gen	Frequency Amplitude Coupling	0.5 Hz 5.0 V AC/DC
RF Analyzer	Frequency Amplitude	1806 MHz 5.0 dBm

3. Remove any connections to the Agilent 83220A RF IN/OUT port.
4. From the To Screen field, select the CW MEAS/AF ANALYZER screen (select More then CW AF ANL).
5. Zero the power meter by selecting ZeroPower from the **Meas Cntrl** field.
6. On the Agilent 83220A, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar), link the AUX RF OUT to the RF IN/OUT port.

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7. On the HP/Agilent 8922, using a short cable (<30cm - Part No. 10502A or similar), link the AUDIO OUT port in the AUDIO section to the PULSE port in the MODULATION section.



8. From the `To Screen` field, select the `SPECTRUM ANALYZER` screen (select `More` then `SPEC ANL`).
9. Verify the CW power alternates between 5 dBm (+3 dB, –4 dB) and –70 dBm (or lower). Differences from expected values should be mainly due to losses in the external RF cables. Check that the reading is consistent with the cable being used. (10502A has approx 0.5 dB loss)
10. Remove the cable from the AUDIO OUT and PULSE ports.

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Phase Error, Pulse Modulation & Peak Transmitter Carrier Power Verification (Agilent 83220A only)

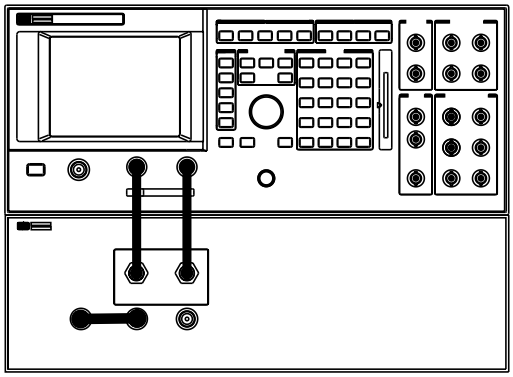
NOTE Applicable to the HP/Agilent 8922E/F/G/H/M/S only.

This test checks the phase stability of the Agilent 83220A, and operation of the Agilent 83220A pulse modulator and Peak Tx Power Meter.

1. Cycle the DCS1800 Test System power.
2. Select the TESTS screen (press **TESTS**).
3. Using the knob, move the cursor to the `Location` field, and select `ROM` from the `Choices` field.
4. If you are using an HP/Agilent 8922E, move the cursor to the `Procedure` field, and select `EDCSDIAG` from the `Choices` field.
5. If you are using an HP/Agilent 8922G, move the cursor to the `Procedure` field, and select `GDCSDIAG` from the `Choices` field.
6. Select `Run Test`, or press **L1**.
7. Follow the instruction given on the HP/Agilent 8922E/G screen. (Ignore all pass/fail results shown on the screen while the program is running.)
8. Once the program has finished, select the `RF GENERATOR / RF ANALYZER` screen (press **SHIFT RFG/RFA**), and set as follows:

Heading	Field	Setting
`RF GEN`	Amplitude	5.0 dBm
`RF Analyzer`	Amplitude	5.0 dBm

9. Ensure that the Agilent 83220A AUX RF OUT port is connected to the HP/Agilent 83220A RF IN/OUT port, using a short cable (<30cm - Part No. 10502A or similar) and 2 BNC to N-type adapters (Part No. 1250-0780 or similar).



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10. From the `To Screen` field, select the `DSP ANALYZER` screen, (`DSP ANL`), and alter the settings as follows:

Heading	Field	Setting
`DSP Analyzer`	View	PhaseMain

11. Press **MEAS ARM**.

12. Verify the following:

Measurement	Result
RMS Phase Error	< 1.00°
Peak Phase Error	< 4.00°
Frequency Error	< ±32 Hz

13. Remove the connection to the Agilent 83220A RF IN/OUT port.

14. Alter the `DSP ANALYZER` screen as follows:

Heading	Field	Setting
`DSP Analyzer`	View	Ampl Main

15. Zero the power meter by selecting `ZeroPower` from the `View` field.

16. Reconnect the connection to the Agilent 83220A RF IN/OUT port.

17. Alter the `DSP ANALYZER` screen as follows:

Heading	Field	Setting
`DSP Analyzer`	View	Ampl Rise

18. Verify that the Peak Transmitter Power measures 5.0 dBm (+1 dB, –2 dB). Differences from expected values should be mainly due to losses in the external RF cables. Check that the reading is consistent with the cable being used. (10502A has approx 0.5 dB loss).

19. Verify the presence of a rising pulse, within the limits of the amplitude mask, on the DSP Analyzer screen.

20. Alter the `DSP ANALYZER` screen as follows:

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Heading	Field	Setting
DSP Analyzer	View	Ampl Fall

21. Verify the presence of a falling pulse, within the limits of the amplitude mask, on the DSP Analyzer screen.

22. Cycle the DCS1800 Test System power.

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System Specifications

This section contains the system specifications and supplemental characteristics that apply to the Agilent 83220A/E DCS1800 Test Set when used in conjunction with any of the HP/Agilent 8922 Series.

Specifications vs. Characteristics

Specifications

Specifications describe the instrument's warranted performance and apply after a 30 minute warm-up over the temperature range 0 to 55°C unless otherwise stated.

Supplemental Characteristics

(Shown in italics) are intended to provide additional information, useful in applying the instrument by giving typical (expected), but not warranted performance parameters. These characteristics are shown in italics or labeled as "typical", "usable to", or "nominal".

NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *HP/Agilent 8922 Multi-Band User's Guide* for more details on system specification differences.

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RF Generator Specifications

Frequency

Range:	1710 MHz to 1785 MHz, 1805 MHz to 1990 MHz.
Resolution:	1 Hz.
Accuracy:	Reference Accuracy ±0.5 Hz.
Stability:	Same as Reference.

Supplemental Charateristics

Frequency Underrange:	*Will underrange to 1700 MHz with uncalibrated output and modulation.*
Switching Speed:	*577 µs in hop mode (refer to 0.3 GMSK modulation specifications).*

RF In/Out Connector

Level Range:	–19 to –127 dBm. (*For >1880 MHz, -19 to -127 dBm.*)
Level Resolution:	0.1 dB.
Level Accuracy:[a]	±1.0 dB, levels ≥–127 dBm (*For >1880 MHz, ±1.0 dB, levels ≥–127 dBm.*) *±1.0 dB, typically for levels ≥–127 dBm while hopping.*[b]
Reverse Power:	2 watts continuous.
SWR:	<1.5:1. (*For >1880 MHz, <1.5:1.*)

a. *When using 30 dB pulse modulation, level accuracy is typically ±2 dB. Level accuracy is typically ±1.5 dB with the HP/Agilent 8922 series.*
b. Level accuracy degrades 0.2 dB when using the RF IN/OUT connector for both RF generator and RF analyzer.

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Aux RF Out Connector (Agilent 83220A only)

Level Range:	+7 to –127 dBm. (*For >1880 MHz, +7 dBm.*)
Level Resolution:	0.1 dB.
Level Accuracy[a]:	±1.0 dB, levels ≥–127 dBm.(*For >1880 MHz, ±1.0 dB, levels ≥–127 dBm.*) *±1.0 dB, typically for levels ≥–127 dBm while hopping.*
Reverse Power:	200 milliwatts.
SWR:	2.0:1, <–4 dBm. (*For >1880 MHz, 2.0:1, <–4 dBm.*)

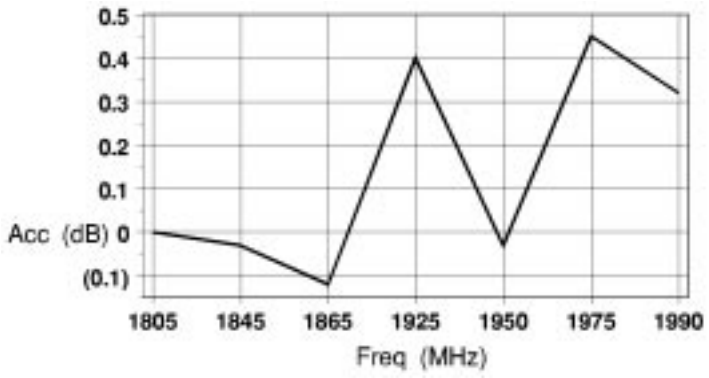
a. *When using 30 dB pulse modulation, level accuracy is typically ±2 dB. Level accuracy is typically ±1.5 dB with the HP/Agilent 8922 Series.*

Spectral Purity

Spurious Signals	(for ≤1 dBm output level at AUX RF OUT or ≤25 dBm output level at RF IN/OUT).
Harmonics:	<–25 dBc.
Non-Harmonic Spurious:	<–50 dBc, >5 kHz offset from carrier.

Level Accuracy Over Extended Frequency Range (Agilent 83220A only)

Measurements taken at –127 dBm.



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0.3 GMSK Modulation

After one timeslot, 577 µs, from an isolated RF generator hop trigger.

Phase Error:	≤1° rms.
Peak Phase Error:	≤4° peak.
Frequency Error:	±(0.01 ppm (22 Hz) + reference accuracy) for normal bursts.
	Typically ±(0.02 ppm (32 Hz) + reference accuracy), for RACHs.
Amplitude Flatness:	±0.25 dB peak.
Clock Input	
Frequency:	270.833 kHz ±2 Hz (relative to reference).
Level:	TTL.
Data Input[a]	
Format:	Non differentially encoded input.
Level:	TTL.

a. Not available with HP/Agilent 8922E.

Supplemental Characteristics

After three timeslots, 1.73 ms, from an isolated RF generator hop trigger.

Phase Error:	*≤0.5° rms.*
Peak Phase Error:	*≤2.0° peak.*
Frequency Error:	*±(0.005 ppm (9 Hz) + reference accuracy), for normal bursts.* *±(0.01 ppm (18 Hz) + reference accuracy), for RACH bursts.*

Pulse Modulation

Input Levels:	TTL.
Rise/Fall Time	
(10 - 90%):	≤5 µs.
Supplemental Characteristics	
On/Off Ratio:	*>80 dB.*

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30 dB Pulse Modulation [1]

Supplemental Characteristics

All timeslots 30 dB higher than desired/active timeslot to test adjacent timeslot rejection.

Input Levels:	TTL.
Rise/Fall Time (10 - 90%):	≤5 µs.

AM for Level Control[1]

For output levels ≤+1 dBm at AUX RF OUT (Agilent 83220A only) or ≤–25 dBm atRF IN/OUT.

Supplemental Characteristics

Input	
Range:	*–1.0 V to +0.6 V.*
Impedance:	*600 Ω nominal, DC coupled.*
Sensitivity:	*100% AM per volt, nominal.*
Calibration:	*0 VDC input produces calibrated output from the RF generator.*
Rise/Fall Time (10 - 90%):	*<20 µs.*

1. Not available with HP 8922E.

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RF Analyzer Specifications

Frequency

Range:	1710 MHz to 1900 MHz, 1910 MHz to 1990 MHz.
Resolution:	1 Hz.
Hop Mode -	
Resolution:	100 kHz.
Offset Frequency:	≤50 kHz.
Offset Resolution:	1 Hz for digital data recovery and modulation accuracy measurements.
RF In/Out SWR:	<1.5:1.

Supplemental Characteristics

Frequency Overrange:	*1700 MHz to 1710 MHz and 1900 MHz to 1910 MHz with unspecified performance.*
Offset Resolution:	*500 Hz for FM demodulation out.*

CW RF Frequency Measurement

Range:	1710 MHz to 1900 MHz, 1910 MHz to 1990 MHz.
Level Range	
RF In/Out:	–13 to +32 dBm.
Aux RF IN:	–23 to +20 dBm.
Input Frequency Setting Error[a]:	500 kHz.
Accuracy:	±(1 Hz + reference accuracy).

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within the limits shown the specified performance will result.

Supplemental Characteristics

Minimum Resolution:	*1 Hz.*
Frequency Overrange:	*1700 MHz to 1710 MHz and 1900 MHz to 1910 MHz with unspecified performance.*

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CW RF Power Measurement (RF In/Out only)

Range:	–5 to +32 dBm.
Input Frequency Setting Error:	±500 kHz.
Accuracy[a]:	±0.5 dB ± noise effects (0.015 mW),(over the range 1710 MHz to 1880 MHz and 0 dBm to +32 dBm). *(For >1880 MHz, ±0.5 dB ± noise effects (0.015 mW)).* *(For <0 dBm, ±0.5 dB ± noise effects (0.015 mW)).*

a. To calculate accuracy, add or subtract the 0.5 dB error (0.6 dB for Peak Transmitter Carrier Power) from the absolute power in dBm then convert to mW and add or subtract the 0.015 mW noise effect.

Supplemental Characteristics

Minimum Resolution:	*0.01 dB.*

Peak Transmitter Carrier Power Measurement (RF In/Out only)

After one timeslot 577 µs, from an isolated receiver hop trigger.

Range:	-5 to +32 dBm.
Input Frequency Setting Error[a]:	±10 kHz.
Input Level Setting Error[a]:	±3 dB.
Accuracy[b]:	±0.6 dB ± noise effects (0.015 mW), (over the range 1710 MHz to 1880 MHz and 0 dBm to +32 dBm). *(For >1880 MHz, ±0.6 dB ± noise effects (0.015 mW)).* *(For <0 dBm, ±0.6 dB ± noise effects (0.015 mW)).*

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within the limits shown the specified performance will result.
b. To calculate accuracy, add or subtract the 0.5 dB error (0.6 dB for Peak Transmitter Carrier Power) from the absolute power in dBm then convert to mW and add or subtract the 0.015 mW noise effect.

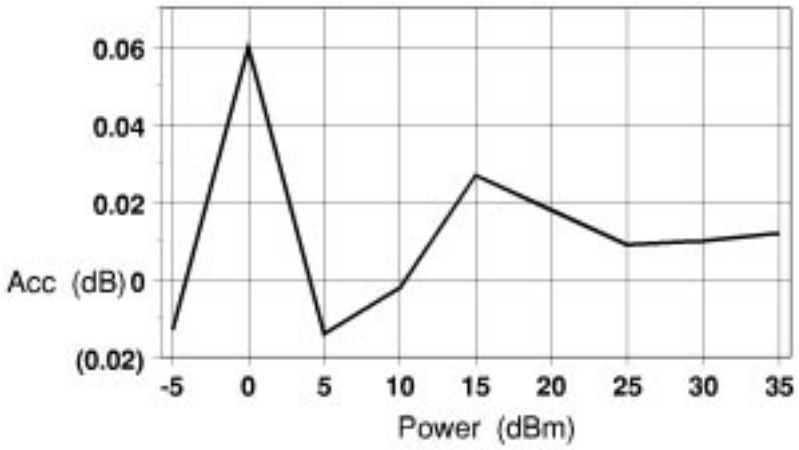
Supplemental Characteristics

Minimum Resolution:	*0.2 dB.*

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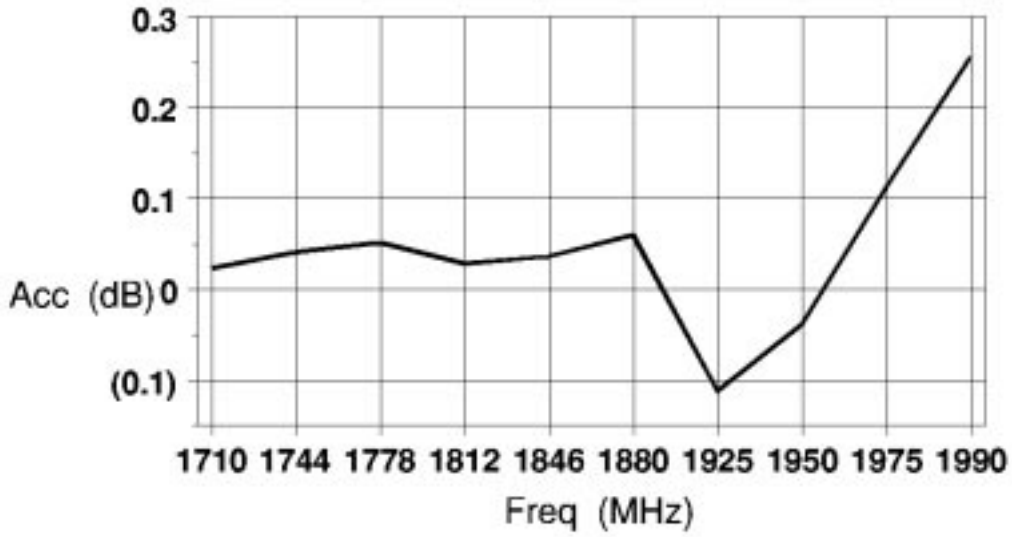
Power Measurement Accuracy Over Extended Power range (Agilent 83220A only)

Measurements taken at 1880 MHz.



Power Measurement Accuracy Over Extended Frequency Range (Agilent 83220A only)

Measurements taken at 0 dBm.



Pulse ON/OFF Ratio Measurement [1]

ON power is averaged over the useful part of the burst. OFF power is averagedover a 1 bit interval centered at a user specified time. Non-hopped mode only.

1. On an HP/Agilent 8922E/F/H, Pulse ON/OFF Ratio Measurement is only available withOption 006.

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Input Frequency Setting Error[a]:	±10 kHz.
Input Level Setting Error[a]:	±3 dB.
Timing Accuracy:	±1.7 µs *(±1.1 µs typical).*

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within thelimits shown the specified performance will result.

Accuracy (ON/OFF ≥40 dB, RF In/Out only)

OFF Power (dBm)	ON/OFF Ratio Accuracy	
–48 to –19	±2.4 dB	*±1.1 dB typically*
–55 to –48	±2.9 dB	*±1.3 dB typically*

Amplitude Envelope Measurement

After one timeslot, 577 µs, from an isolated receiver hop trigger.

Measurement Range	
RF In/Out:	–13 to +32 dBm.
Aux RF In:(Agilent 83220A only)	–23 to +20 dBm.
Input Frequency Setting Error:	±10 kHz.

Inaccuracy due to Noise:

Relative Level	Input Level Setting Error		
	±1 dB	**±3 dB**	**±3 dB w/5 averages**
0 dB	<±0.15 dB pk	<±0.2 dB pk	<±0.2 dB pk
–6 dB	<±0.2 dB pk	<±0.3 dB pk	<±0.3 dB pk
–30 dB	<+ 3.0 dB –3.8 dB	<+4.2 dB -7.5 dB	< +2.2 dB -2.6 dB

Phase and Frequency Measurement

(As described in GSM recommendation 11.10)

After one timeslot, 577 µs, from an isolated receiver hop trigger.

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Range	
RF In/Out:	–13 to +32 dBm.
Aux RF In:(Agilent 83220A only)	–23 to +20 dBm.
Input Frequency Setting Error:[a]	±10 kHz.
Input Level Setting Error:	±3 dB.
RMS Phase Error Accuracy:	≤1° rms.
Peak Phase Error Accuracy:	≤4° peak.
Frequency Error Accuracy:	±(0.01 ppm (22 Hz) + reference accuracy),for normal bursts.
	Typically, ±(0.02 ppm (32 Hz) + reference accuracy), for RACHs.

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within the limits shown the specified performance will result.

Supplemental Characteristics

After three timeslots, 1.73 ms, from an isolated receiver hop trigger.

RMS Phase Error Accuracy:	*≤0.5° rms.*
Peak Phase Error Accuracy:	*≤2° peak.*
Frequency Error Accuracy:	*±(0.005 ppm (9 Hz) + reference accuracy), for normal bursts.*
	±(0.01 ppm (18 Hz) + reference accuracy), for RACH bursts.

0.3 GMSK Data Recovery

After one timeslot, 577 µs, from an isolated receiver hop trigger.

Range	
RF In/Out:	–13 to +32 dBm.
Aux RF In:(Agilent 83220A only)	–23 to +20 dBm.
Input Frequency Setting Error:[a]	±100 Hz.
Required Phase Input Accuracy:	≤5˚ rms, ≤ 20˚ peak.
Demodulation Duty Cycle:	1 timeslot per frame.
Outputs:	Data, Clock and Data Valid
Data Output Clock:	Clocked at 1 MHz rate.
Delay, data:	≤1 frame (4.62 ms)
Output Level:	TTL.

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a. When setting up the RF analyzer for measurements, you enter the expectedfrequency and level for the incoming signal. If the frequency is within thelimits shown the specified performance will result.

FM Demodulation Output

Range	
RF IN/OUT:	–13 to +32 dBm.
AUX RF IN:(Agilent 83220A only)	–23 to +20 dBm.
Sensitivity:	20 µV/Hz ±5% (into an open circuit).
Input Frequency Setting Error:	±50 kHz, with ≤100 kHz pk deviation.
Input Level Setting Error:	±3 dB.

Supplemental Characteristics

3 dB Bandwidth:	*DC to 270 kHz.*
Ue	*600* Ω
DC Offset:	*≤5 mV.*

Pulse Demodulation Output

Range	
RF In/Out:	–13 to +32 dBm.
Aux RF In:(Agilent 83220A only)	–23 to +20 dBm.
Input Frequency Setting Error[a]:	±50 kHz.
Input Level Setting Error:	±3 dB.
Rise time (10 - 90%):	≤2.5 µs.
Fall time (90 - 10%):	≤2.5 µs.

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within the limits shown the specified performance will result.

Supplemental Characteristics

Output Impedance:	*600* Ω, *DC coupled.*
Output Level:	*2 Vpk into an open circuit.*

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Output RF Spectrum Measurement [1]

After one timeslot, 577 µs, from an isolated receiver hop trigger.

(When using "Output RF Spectrum due to Ramping" measurement, the dynamic range is decreased by 12 dB (due to Peak Hold)).

Range	
RF In/Out:	–13 to +32 dBm.
Aux RF IN:(Agilent 83220A only)	–23 to +20 dBm.
Input Levels for Optimum Dynamic Range	
RF In/Out:	–3, +2, +7, +12, +17, +22, +27, +32 dBm.
Aux RF IN:(Agilent 83220A only)	–13, –8, –3, +2, +7, +12, +17,+22 dBm.
Input Frequency Setting Error[a]:	±10 kHz.
Input Level Setting Error:	±3 dB.

a. When setting up the RF analyzer for measurements, you enter the expected frequency and level for the incoming signal. If the frequency is within the limits shown the specified performance will result.

Supplemental Characteristics

Log Linearity:	*±0.4 dB.*
Amplitude Flatness:	*±1.0 dB.*
Amplitude Resolution:	*0.4 dB.*
Dynamic Range (dB):	*This describes the spectrum analyzer resolution bandwidth filter used when measuring output RF spectrum. The dynamic range of the measurement will be a combination of this filter response and the modulation spectrum of the incoming signal.*

	Offset (kHz)					
	100	**200**	**300**	**400**	**600**	**800 to 1800**
Range (dB)	*29*	*45*	*51*	*63*	*73*	*75*

1. On an HP/Agilent 8922E/F/H, Output RF Spectrum Measurement is only available with Option 006.

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Spectrum Analyzer Specifications [1]

Frequency Range:	1710 MHz to 1900 MHz and 1910 MHz to 1990 MHz.
Frequency Span/Resolution Bandwidth (coupled)	

Span	Bandwidth
<50 kHz	300 Hz
<200 kHz	1 kHz
<1.5 MHz	3 kHz
≤4 MHz	30 kHz
≤10 MHz	[a] *30 kHz*

a. Supplemental Characteristic

Display:	Log, 10 dB/div.
Display Range:	80 dB.
Log Linearity:	±1.1 dB.
Reference Level Range	
RF In/Out:	+35 to –45 dBm.
Aux RF In:(Agilent 83220A only)	+23 to –55 dBm.
Non-harmonic Spurious	
Responses:	–50 dBc max, for inputs ≤–30 dBm.
Residual Response:	<–70 dBm (no input signal, 0 dB attenuation).
Image Rejection:	>50 dB.

Supplemental Characteristics

Level Accuracy:	*±2.5 dB.*
Frequency Overrange:	*±10 MHz with unspecified performance.*
Displayed Average Noise Level:	*<–116 dBm (Ref Level <–10 dBm [RF IN/OUT] or <–20 dBm [Aux RF IN], <50 kHz spans).*

1. On an HP/Agilent 8922E/F/H, the Spectrum Analyzer is only available with Option 006.

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Audio Source Specifications

Frequency

Range:	DC to 25 kHz.
Accuracy:	0.025% of setting.
Supplemental Characteristics	
Minimum Resolution:	*0.1 Hz.*

Output Level

Range :	0.1 mV to 4 V_{rms}.
Maximum Output Current:	20 mA peak.
Output Impedance:	<1 Ω
Accuracy:	±(2% of setting + resolution).
Residual Distortion (THD+noise, amplitude >200 mV_{rms}):	0.1%, 20 Hz to 25 kHz in 80 kHz BW.
Supplemental Characteristics	
Minimum Resolution	

Level	Minimum Resolution
≤0.01 V	*50 µV*
≤0.1 V	*0.5 mV*
≤1 V	*5 mV*
>1 V	*50 mV*

DC Coupled Offset:	*<50 mV.*

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Audio Analyzer Specifications

Frequency Measurement

Range:	20 Hz to 400 kHz.
Accuracy:	±(0.02% + 1 count + reference accuracy).
External Input:	20 mV_{rms} to 30 V_{rms}.
Supplemental Characteristics	
Minimum Resolution	

Frequency	Minimum Resolution
<10 kHz	*0.01 Hz*
<100kHz	*0.1Hz*
≥100 kHz	*1 Hz*

AC Voltage Measurement

Voltage Range:	0 to 30 V_{rms}.
Accuracy (20 Hz to 15 kHz, input >1 mV_{rms}):	±3% of reading.
Residual Noise + THD (15 kHz BW):	175 µV.
Supplemental Characteristics	
3 dB Bandwidth:	*2 Hz to 100 kHz.*
Input Impedance:	*1 MΩ 145 pF at AUDIO IN.*
Minimum Resolution:	*4 digits for inputs ≥100 mV.*
	3 digits for inputs <100 mV.

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DC Voltage Measurement

Voltage Range:	100 mV to 42 V.
Accuracy:	±(1.0% of reading + DC offset).
DC Offset:	±45 mV.
Supplemental Characteristics	
Minimum Resolution:	*1 mV.*

Distortion Measurement

Fundamental Frequency:	1 kHz ±5 Hz.
Input Level Range:	30 mV_{rms} to 30 V_{rms}.
Display Range:	0.1% to 100%.
Accuracy:	±1 dB (0.5 to 100% distortion).
Residual THD + Noise (15 kHz BW):	The greater of –60 dB or175 µV.
Supplemental Characteristics	
Minimum Resolution:	*0.01% Distortion.*

Audio Filters

LPF	HPF	Notch	Deemphasis
300 Hz	50 Hz	1 kHz	750 µs
3 kHz	300 Hz		
15 kHz			

Audio Detectors

RMS	Pk+	Pk–
Pk+hold	Pk–hold	Pk±/2
Pk±/2 hold	Pk±max	Pk±max hold

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Oscilloscope Specifications

Frequency Range (3 dB):	2 Hz to 50 kHz.
Scale/Division:	10 mV to 10 V in 1, 2, 5, 10 steps.
Amplitude Accuracy (20 Hz to 10 kHz):	±1.5% of reading ±0.1 division.
Time/Division:	10 µs to 100 ms in 1, 2, 5, 10 steps.
External Trigger Level:	TTL.

Supplemental Characteristics

3 dB Bandwidth:	*Typically >100 kHz.*
Internal DC Offset:	*≤0.1 division for ≥50 µV/div sensitivity.*

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Remote Programming

GPIB:	IEEE Standard 488.2.
Functions Implemented:	SH1, AH1, T6, L4, SR1, RL1, LE0, TE0, PP0, DC1,DT1, C4, C11 ,E2.
RS-232:	3-wire RJ-11 connector used for serial data in and out.
Baud Rates:	300, 1200, 2400, 4800, 9600, and 19200 selectable.

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General Specifications

Dimensions (height x width x length)	
Agilent 83220A/E:	133 mm x 426 mm x 574 mm. (5.25 x 16.75 x 23 in) nominal.
Agilent 83220A/E + HP/Agilent 8922:	310 mm x 426 mm x 574 mm.(12.25 x 16.75 x 23 in) nominal.
Weight	
Agilent 83220A/E:	16.3 kg, 36 lbs. (nominal)
Agilent 83220A/E + HP/Agilent 8922:	48.3 kg, 106 lbs. (nominal)
Operating Temperature	0° to +55°C.
Storage Temperature	–40° to +70°C.
Humidity	Up to 95% Relative Humidity to 40°C
Power	Operating Voltage Range: 100/120/220/240V Operating Frequency: 48-440 Hz 200 VA max (Agilent 83220A/E) 640 VA (Agilent 83220A/E + HP/Agilent 8922).



CAUTION Before switching on this instrument, make sure that the line voltage selector switch is set to the voltage of the power supply and the correct fuse is installed. Ensure the power supply voltage is in the specified range.

WARNING **Normal operating position must allow access to the appliance coupler (mains input via power cord), so that it may be used as a power disconnect.**

For continued protection against fire hazard, only replace the line fuse with the same type and line rating (F2.0A, 250V @ 100V and 120V, or F1.5A, 250V @ 220V and 240V). The use of other fuses or materials is prohibited

EMC	Meets CISPR11 Level A and EN50082-1
Safety	Meets IEC 1010-1(1990) +A1(1992) +A2(1994)
Acoustics	LpA <70 dB at 0.5m.
Cooling Requirements	To provide adequate cooling, an air gap of approximately 75mm should be maintained around the instrument.
Supplemental Characteristics	
Leakage:	*At RF generator output levels <–40 dBm, typical leakage is <1 µV induced in a resonant dipole antenna 1 inch away from any surface except the rear panel. Spurious leakage levels are typically <5 µV in a resonant dipole antenna 1 inch away from any surface except the rear panel.*

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Reference Specifications

(Testing DCS1800 radios require the HP/Agilent 8922 to be operated with the High Stability Reference (Opt. 001) or an external high stability reference.)

Accuracy (after warm up)	±[(Time since calibration × Agingrate) + Temperature effects + Accuracy of calibration].
External Reference Input	
Frequency:	13, 10, 5, 2, or 1 MHz, ±30 ppm.
Level:	0 to +10 dBm.
Nominal Impedance:	50 Ω
Supplemental Characteristics	
10 MHz OUT (rear panel BNC)	
Level:	*>+9.0 dBm nominal.*
Impedance:	*50 Ω nominal.*
13 MHz OUT (rear panel BNC)	
Level:	*>+9.0 dBm nominal.*
Impedance:	*50 Ω nominal.*

Fixed Reference Mode

Aging:	<2 ppm/year.
Temperature Stability:	±1 ppm (0° to +55°C).
Warm-up Time:	<30 seconds, ±2 ppm of final frequency.

Tunable Reference Mode[1]

Allows offsetting the internal reference by a selected amount relative to the high stability reference (Opt. 001 REF OUT) or an external reference.

Required External Reference	
Accuracy:	±0.5 ppm.
Tune Range:	±30 ppm.
Reference Accuracy (after calibration):	±1 ppm + accuracy ofexternal reference or high stability reference (Opt 001 REF OUT).
Temperature Stability (after calibration, 0° to 55°C):	≤4ppm, for selected offsets of up to ±30 ppm.

1. Not available with HP/Agilent 8922E.

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Transit Protection

Transit Cases

Part Number 9211-2661:	Transit case for Agilent 83220A/E.
Part Number 9211-1163:	Operating case for Agilent 83220A/E + HP/Agilent 8922 system.

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Agilent Technologies Systems Engineering Assistance

Extra assistance from Agilent Technologies in the form of system installation,productivity assistance, programmer or user training, or solution consultingare available on a consulting basis. Call Agilent Technologies for a quote.

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Ordering Information

Agilent 83220A/E DCS1800 Test Set

Option 0B1:	Provides a total of two sets of User's Guides (83220-90027).
Option AX4:	Rack Mount Flange Kit (5062-4071).
Option W30:	Extended repair service.
HP/Agilent 83212B or C:	GSM900/DCS1800 Mobile Station Test Software.

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3 Screens

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About This Chapter

This chapter describes the enhanced HP/Agilent 8922 Series user interface which allows operation with the Agilent 83220A/E.

The DCS1800 Test System (Agilent 83220A/E and HP/Agilent 8922) is designed to have the same appearance and feel as the HP/Agilent 8922 Series. Control of the system is carried out using the HP/Agilent 8922 keyboard and display. The HP/Agilent 8922 Series has been enhanced to allow operation with the Agilent 83220A/E to test DCS1800/PCS1900 equipment.

The HP/Agilent 8922 is controlled by using menu selections to move from one display screen to another. Within each screen, data can be entered by editing fields, using keys, or by adjusting the knob. The following chapter describes the enhancements to each screen, new fields, changed limits on existing fields and default settings for DCS1800 and PCS1900 operation. For each screen, changes are indicated with reference to the HP/Agilent 8922H. Enhancements to the other members of the HP/Agilent 8922 Series will be identical, where functions exist, in all products of the family.

Affected screens are:

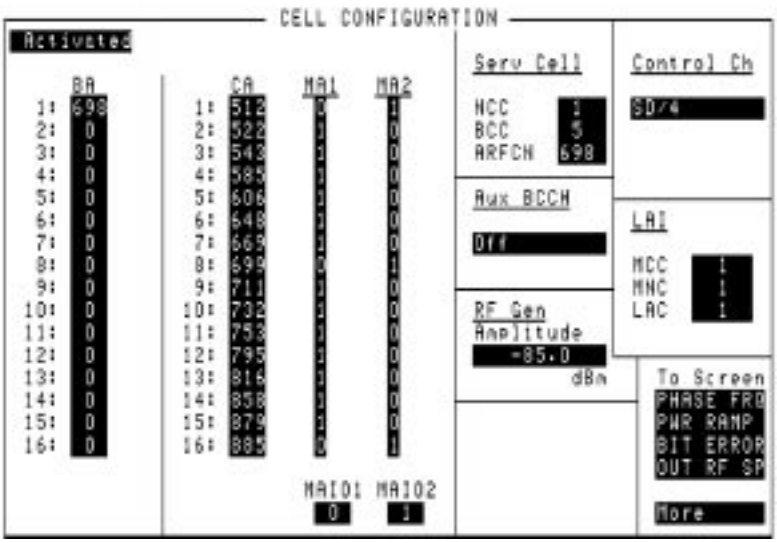
- CELL CONFIGURATION screen
- CELL CONTROL screen
- CONFIGURE screen
- SPECTRUM ANALYZER screen
- TESTS screen

NOTE On an HP/Agilent 8922E/F/H, the Spectrum Analyzer screens, Output RF Spectrum screens and Pulse ON/OFF Ratio screens are only available with Option 006.

NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *HP/Agilent 8922 Multi-Band User's Guide* for more details on screen differences.

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Cell Configuration



This screen has a different layout from the `GSM900 CELL CONFIGURATION` Screen.

While positioned differently on the screen, the following areas have the same function and method of operation in GSM900, DCS1800 and PCS1900 mode:

Serv Cell

Aux BCCH

RF Gen Amplitude

Control Ch

LAI

Settable/Activated

To Screen

With the exception of the ARFCN fields under “Serv Cell” and the “Control Ch” SD/8 mode, each field retains its value after a GSM900/DCS1800 mode change. The ARFCN fields are reset to the defaults for each mode when the mode changes.

The DCS1800 and PCS1900 mode CELL CONFIGURATION Screens “BA”, “CA”, “MA1”, “MA2”, “MAIO1” and “MAIO2” exist as separate fields from the GSM900 mode equivalents. In DCS1800 and PCS1900 mode these fields operate differently. Values entered during any one of the three modes (GSM, DCS1800 or PCS1900) will not affect the fields of the other two modes.

In DCS1800 and PCS1900 mode, the “BA<n>” and “CA<n>” tables are defined by a list of ARFCN in contiguous ascending order. The allocation must begin at BA1 and CA1 and continue through BA<m> and CA<m>. Normal ARFCN limits of 512 to 885 for DCS1800 and 512 to 810 for PCS1900 are allowed, zeros (0) are used to indicate no ARFCN set. Each

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entry in the “BA<n>” and “CA<n>” table behaves as a separate field. Values can be entered using the knob or data keys. “MA1” and “MA2” are each single boolean arrays. Values of 0 or 1 can be entered in each position of the array to point to CA table entries. “MA1” and “MA2” use the same data entry method in GSM900, DCS1800 and PCS1900 modes. “MAIO1” and “MAIO2” are independent fields for GSM900, DCS1800 and PCS1900 operation.

NOTE Where <n> = 1 to 16. Where <m> = the highest number allocated in the range 1 to 16.

On the HP/Agilent 8922E, the fields for “BA”, “CA”, “MA1”, “MA2”, “MAIO1”, “MAIO2” and Aux BCCH are not displayed and cannot be changed from their default settings.

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Cell Control

This screen appears unmodified from GSM900 to DCS1800 and PCS1900. However, the TX Level field has a different relationship to RF analyzer amplitude in DCS1800 and PCS1900 than for GSM900.

For DCS1800 Operation:

RF IN/OUT analyzer ampl = 30 – 2×(TX Level) dBm

that is:

TX Level = 0 analyzer ampl = 30 dBm
TX Level = 13 analyzer ampl = 4 dBm

For the HP/Agilent 8922H with firmware B.06.00 or greater the TX levels are extended for DCS1800. The additional levels are:

TX Level = 14 analyzer ampl = 2 dBm
TX Level = 15 analyzer ampl = 0 dBm

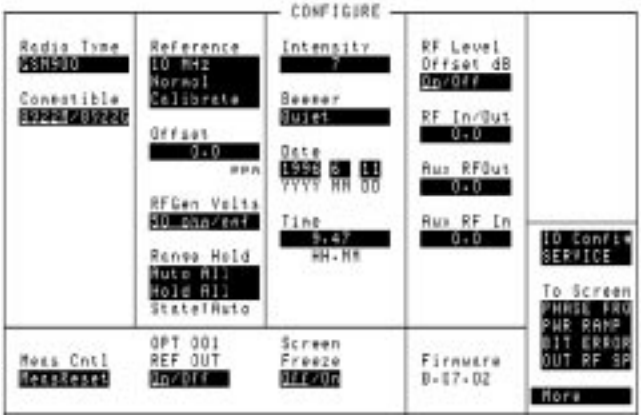
For the HP/Agilent 8922H with firmware B.06.00 or greater, TX levels are available for PCS1900.

TX Level = 30 analyzer ampl = 33 dBm
TX Level = 31 analyzer ampl = 32 dBm
TX Level = 0 analyzer ampl = 30 dBm
TX Level = 1 analyzer ampl = 28 dBm
TX Level = 2 analyzer ampl = 26 dBm
TX Level = 3 analyzer ampl = 24 dBm
TX Level = 4 analyzer ampl = 22 dBm
TX Level = 5 analyzer ampl = 20 dBm
TX Level = 6 analyzer ampl = 18 dBm
TX Level = 7 analyzer ampl = 16 dBm
TX Level = 8 analyzer ampl = 14 dBm
TX Level = 9 analyzer ampl = 12 dBm
TX Level = 10 analyzer ampl = 10 dBm
TX Level = 11 analyzer ampl = 8 dBm
TX Level = 12 analyzer ampl = 6 dBm
TX Level = 13 analyzer ampl = 4 dBm
TX Level = 14 analyzer ampl = 2 dBm
TX Level = 15 analyzer ampl = 0 dBm

The spectrum analyzer reference level will be set 3 dB above the analyzer amplitude setting, as with GSM900.

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Configure



A new field has been added:

Radio Type

Possible values are:

'GSM900' | 'DCS1800' | 'PCS1900'

Selecting DCS1800 or PCS1900 without an Agilent 83220A/E attached and powered on, results in an error message. This field will default to GSM900 after instrument preset or power cycle.

Selecting DCS1800 or PCS1900 causes all other screens and range limits to be modified as described in this chapter.

Selecting DCS1800, PCS1900 or GSM900 when in the active mode results in the following parameters being set:

MEAS ARM	**Disarmed**
CELL CONFIG State	**Activated**
BIT ERROR TEST Meas Cntl	**Stop**
DIGITAL DEMOD Arm State	**Arm**
RF GENERATOR Hop Trig	**Arm**
RF GENERATOR Hop Mode	**Hop**
RF ANALYZER Hop Trig	**Arm**
RF ANALYZER Hop Mode	**Hop**
HOP CONTROL Hop Freq Tables	**Cleared (HP 8922E/G only)**
CELL CONTROL RF Anl Ampl Cont	**MS TX Lev**
RF GENERATOR Output	**RF IN/OUT**
RF ANALYZER Input	**RF IN/OUT**
RF ANALYZER Control	**MS TX Lev**
RF GENERATOR Atten Hold	**OFF**
SPECTRUM ANALYZER Input Atten	**AUTO**
RF GENERATOR Freq	**Set to default**
RF ANALYZER Freq	**Set to default**
RF ANALYZER Hop Meas Freq	**Set to default**

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RF GENERATOR Amplitude	**Set to default**
RF ANALYZER Amplitude	**Set to default**
CELL CONFIG Serv Cell ARFCN	**Set to default**
CELL CONFIG Control Chan ARFCN	**Set to default**
CELL CONTROL TCH Params TCH1 ARFCN	**Set to default**
CELL CONTROL TCH Params TCH2 ARFCN	**Set to default**
CELL CONTROL TX Level	**Set to default**

NOTE Default parameters depend on the **Radio Type** set.

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Spectrum Analyzer

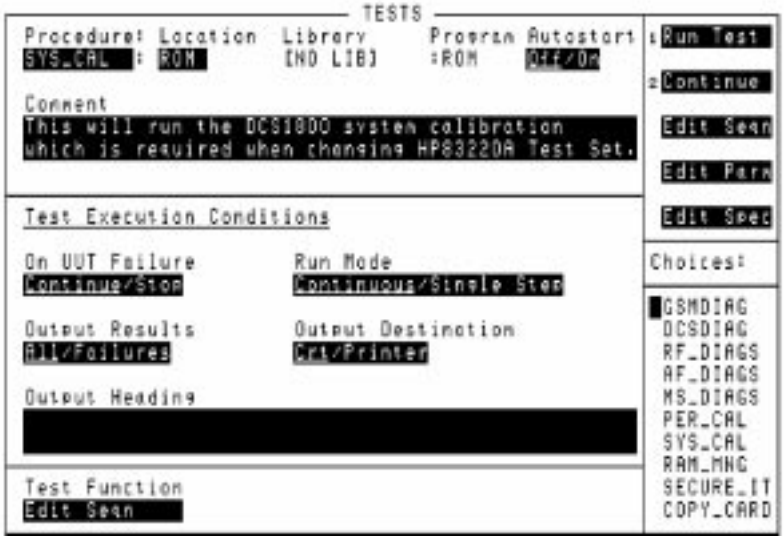
When the analyzer attenuator hold feature has been activated, using the **Auxiliary Input Atten** field, the possible attenuator selections are different in GSM900 than in DCS1800 and PCS1900 mode. In DCS1800 mode, the attenuator can be set in 5 dB steps. In GSM900 mode the attenuator is set in 10 dB steps.

Table 3-1 Auxiliary Input Atten Choices

DCS1800 PCS1900	GSM900
Auto	Auto
Hold	Hold
0 dB	0 dB
5 dB	10 dB
10 dB	20 dB
15 dB	30 dB
20 dB	40 dB
25 dB	
30 dB	
35 dB	

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Tests



There is an additional selection added to the **Procedure** field. The new entry is **SYS_CAL** and invokes a system calibration program.

SYS_CAL is a user-initiated calibration routine performed between the HP/Agilent 8922 and the Agilent 83220A. A system calibration should be initiated whenever a new combination of HP/Agilent 8922 and Agilent 83220A are connected together, (or whenever the HP/Agilent 8922 or Agilent 83220A are changed), or after a RAM Initialize from the **SERVICE** screen.

NOTE **SYS_CAL** can not be performed using the Agilent 83220E, due to the absence of AUX ports.

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Entry Limit Modifications

When **GSM900** is selected on the **CONFIGURE** screen, entry fields are identical to the HP/Agilent 8922 Series. When **DCS1800** or **PCS1900** is selected, the following modifications to entry limits apply:

CELL CONTROL MS Parms TX Level	0 to 15 for DCS1800 0 to 15, 30, 31 for PCS1900 [1]
RF ANALYZER Amplitude (RF IN/OUT)	−47 to +33 dBm [2]
SPECTRUM ANALYZER Ref Level (RF IN/OUT)	−44 to +36 dBm [3]
Auxiliary Input Attenuator	0 to 35 dB is steps of 5 dB
All ARFCN fields	512 to 885 for DCS1800 512 to 810 for PCS1900
RF GENERATOR Frequency	1700 to 1890 MHz for DCS1800 1700 to 1990 MHz for PCS1900
RF ANALYZER Frequency	1700 to 1890 MHz for DCS1800 1700 to 1990 MHz for PCS1900
CELL CONFIGURATION BA table entries	0 or 512 to 885 for DCS1800 0 or 512 to 810 for PCS1900
CELL CONFIGURATION CA table entries	0 or 512 to 885 for DCS1800 0 or 512 to 810 for PCS1900
CELL CONFIGURATION MAIO1 table entries	0 to 15
CELL CONFIGURATION MAIO2 table entries	0 to 15

[1]: This is the entry limit for an HP/Agilent 8922H with firmware revision greater than B.06.00. For earlier versions of HP/Agilent 8922H firmware or an HP/Agilent 8922A/B/E/G the entry limit is 0 to 13 for DCS1800 only.

[2]: This is the entry limit for an HP/Agilent 8922F/H. For an HP/Agilent 8922A/B/E/G the entry limit is −48 to +32 dBm.

[3]: This is the entry limit for an HP/Agilent 8922F/H. For an HP/Agilent 8922A/B/E/G the entry limit is −45 to +35 dBm.

All other limits are the same for GSM900, DCS1800 AND DCS1900 operation. In particular, the RF generator (RF IN/OUT or AUX RF OUT), RF analyzer Level (AUX RF IN) and spectrum analyzer reference level (AUX RF IN) share the same limits in both modes. The entry limits do not define the measurement or specified operation limits, these are listed in the **System Specifications** section of the “Verifying Performance” chapter in this manual.

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Default Settings

Most default settings are common for GSM900, DCS1800 AND PCS1900 operation. The following are new defaults for DCS1800 and PCS1900:

	DCS1800	PCS1900
RF GENERATOR Frequency	1806.0 MHz	1967.4 MHz
RF ANALYZER Frequency	1711.0 MHz	1850.2 MHz
RF ANALYZER HopMeasFreq	1711.0 MHz	1887.4 MHz
CELL CONFIGURATION Serv Cell ARFCN	698	698
CELL CONFIGURATION Cont Chan ARFCN	605	605
CELL CONTROL TCH Parms TCH1 ARFCN	512	512
CELL CONTROL TCH Parms TCH2 ARFCN	885	810
CELL CONTROL MS Parms TX Level	10	10
RF ANALYZER Amplitude (RF IN/OUT)	32 dBm	32 dBm
SPECTRUM ANALYZER Ref Level (RF IN/OUT)	35 dBm	35 dBm
CELL CONFIGURATION MAIO1	0	0
CELL CONFIGURATION MAIO2	1	1
CELL CONFIGURATION BA, CA, MA1, MA2	As Table below	As Table below

Table 3-2 Default Settings

	BA	CA DCS1800	CA PCS1900	MA1	MA2
1	698	512	512	0	1
2	0	522	520	1	0
3	0	543	537	1	0
4	0	585	570	1	0
5	0	606	587	1	0
6	0	648	620	1	0
7	0	669	637	1	0
8	0	699	661	0	1
9	0	711	671	1	0
10	0	732	688	1	0
11	0	753	705	1	0
12	0	795	738	1	0
13	0	816	755	1	0
14	0	858	788	1	0
15	0	879	805	1	0
16	0	885	810	0	1

When **PRESET** is selected, “Radio Type” will be set to **GSM900**.

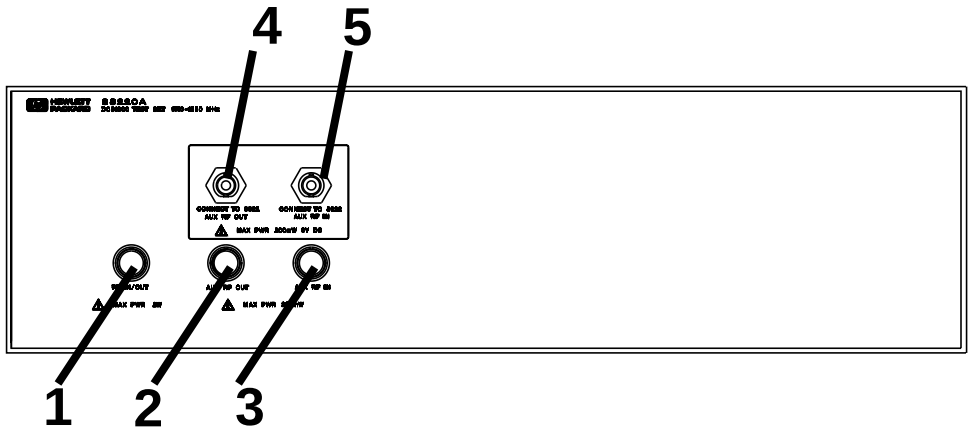
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4 Connectors

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Front-Panel Connectors



NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *HP/Agilent 8922 Multi-Band User's Guide* for more details on connection and operating differences.

1. RF IN/OUT

Using an internal power combiner, the RF IN/OUT port connects directly to the DCS1800/PCS1900 GMSK signal generator, DSP and spectrum analyzers and RF peak and CW power meters. This port will often be the only connection needed to the device-under-test (DUT) to make a full range of transmitter and receiver measurements.

The RF IN/OUT port is designed to connect directly to the antenna connector of most DCS1800 and PCS1900 mobiles.

CAUTION The maximum Agilent 83220A/E RF IN/OUT port input power is 2W. **Never** connect a GSM900 radio to the Agilent 83220A/E or irreparable damage may occur.

See Also

Screens: RF Generator / RF Analyzer

2. AUX RF OUT (Agilent 83220A only)

The AUX RF OUT port provides a direct connection to the DCS1800/PCS1900 GMSK signal generator. Using the RF generator/RF analyzer screen, the signal generator can be routed to either the RF IN/OUT or AUX RF OUT ports.

CAUTION Maximum reverse power on AUX RF OUT port is 200 mW.

See Also

Screens: RF Generator / RF Analyzer, RF Gen

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3. AUX RF IN

The AUX RF IN port provides a direct connection to the DCS1800/PCS1900 DSP and spectrum analyzers. Using the RF generator/RF analyzer screen, the analyzer input can be connected to either the RF IN/OUT or AUX RF IN ports.

CAUTION Maximum AUX RF IN port input power is 200 mW.

See Also

Screens: RF Generator / RF Analyzer, `RF Analyzer`

4. CONNECT TO 8922 AUX RF OUT

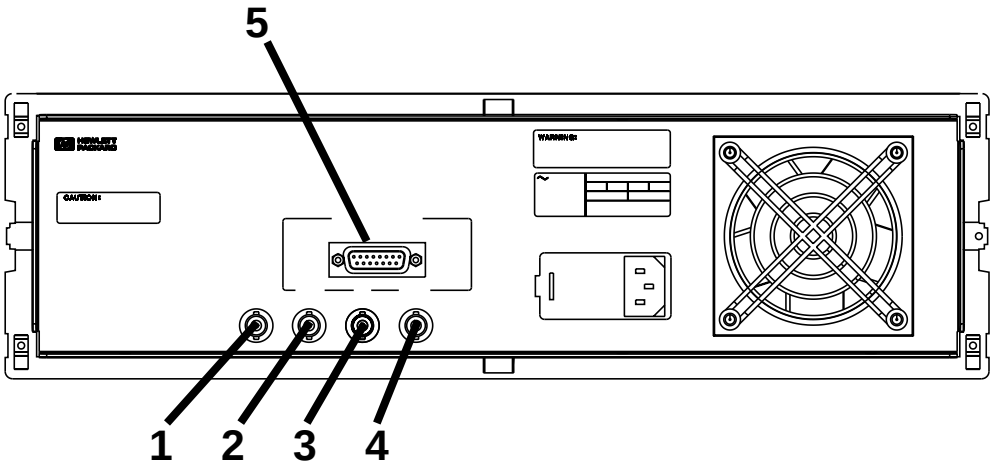
This port is always connected to the HP/Agilent 8922 AUX RF OUT port using the BNC cable provided (Model 10502A. Part No. 8120-2682).

5. CONNECT TO 8922 AUX RF IN

This port is always connected to the HP/Agilent 8922 AUX RF IN port using the BNC cable provided (Model 10502A. Part No. 8120-2682).

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Rear Panel Connectors



1. 10 MHz OUT

This port replaces the 10 MHz OUT port from the rear panel of the HP/Agilent 8922. The signal is a general purpose 10 MHz reference output (sine wave).

10 MHz OUT is always active.

See Also

Specifications, `Reference Specifications`

2. 10 MHz IN

This port is always connected to the HP/Agilent 8922 rear panel 10 MHz OUT port, and phase locks the down and up converter Local Oscillators in the Agilent 83220A/E to the 10 MHz reference from the HP/Agilent 8922. Connect together using the BNC cable provided (Part No. 83220-61025).

NOTE An independent 10 MHz reference should **not** be connected to the Agilent 83220A/E since the HP/Agilent 8922 can tune its 10 MHz reference for some applications. The HP/Agilent 8922 10 MHz OUT and the Agilent 83220A/E 10 MHz IN should always be linked together.

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3. AM

This port is always connected to the HP/Agilent 8922 rear panel AM port, it allows AM from the HP/Agilent 8922 front panel AM IN connector (or internally generated AM signals) to put AM onto the Agilent 83220A/E leveling loop to produce AM signals at DCS1800 and PCS1900 frequencies. Connect together using the BNC cable provided (Part No. 83220-61025).

See Also

Screens: RF Generator/RF Analyzer RF Gen

4. SCOPE

This port is always connected to the HP/Agilent 8922 rear panel SCOPE port, it carries the detected video signal from the Agilent 83220A/E peak detector to the HP/Agilent 8922 oscilloscope display. This is used during Peak TX power measurements. Connect together using the BNC cable provided (Part No. 83220-61025).

See Also

Screens: Oscilloscope

5. PCN INTERFACE

This multipin D-type connector is always connected to the HP/Agilent 8922 rear panel PCN INTERFACE connector. It carries various analog and digital signals to allow the HP/Agilent 8922 to control the internal settings of the Agilent 83220A/E. Connect together using the cable provided (Part No. 08922-61083).

CAUTION Before connecting this cable, it is advisable to **switch off** the DCS1800 Test System.

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5 GPIB

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Introduction

GPIB is available via the HP/Agilent 8922. No separate control of the Agilent 83220A/E is necessary. Most GPIB commands are unchanged for DCS1800 and PCS1900 operation. Refer to the "GPIB" chapter in the relevant *HP/Agilent 8922 Series User's Guide* or *HP/Agilent 8922 Programming Reference Guide* for programming format conventions.

NOTE If you have the Agilent 83220A/E Option 010 Multi-Band Test System, refer to the appropriate *Agilent 8922 Multi-Band User's Guide* for more details on GPIB programming differences.

New GPIB Commands

A small number of new commands have been added to the existing HP/Agilent 8922 set. Refer to the Relevant Subsystem description in the "GPIB" chapter of the relevant *HP/Agilent 8922M/S Programming Reference Guide* for a fuller explanation.

NOTE These are extended versions of existing commands to allow compatibility with the new DCS1800 and PCS1900 codes.

On the HP/Agilent 8922E/F/G/H, all spectrum analyzer, output RF spectrum, and pulse on/off ratio commands are only available with Option 006. In addition, most settings affecting cell configuration are not settable (cannot be changed) while Activated, subsequently, the commands for "BA", "CA", "MA1", "MA2", "MAIO1", "MAIO2" and Aux BCCH are not available on an HP 8922E.

The new commands are as follows:

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Cell Configuration Subsystem

```
CCONfigure

## Cell CONfiguration commands.

   :DCS1800
##  Controlling DCS1800 CELL CONFIGURATION.

      :BA<n>?
      :BA<n>                          0 | 512-885
##     Where <n> = 1 to 16
##      Sets/queries the Broadcast control channel Allocation.
##      Entries in BA table must be in contiguous ascending order.
##      The allocation must begin at BA1 and continue through BA<m>.
##      Zeros (0) are used to fill unallocated entries.
##      Where <m> = the highest number allocated in the range 1 to 16.

      :CA<n>?
      :CA<n>                          0 | 512-885
##     Where <n> = 1 to 16
##      Sets/queries the Cell Allocation.
##      Entries in CA table must be in contiguous ascending order.
##      The allocation must begin at CA1 and continue through CA<m>.
##      Zeros (0) are used to fill unallocated entries.
##      Where <m> = the highest number allocated in the range 1 to 16.


      :MA1?
      :MA1                            <quoted string>
##     Sets/queries the Mobile Allocation 1.
##      This is a binary string representing which CA ARFCNs will be in Mobile
##      Allocation number 1. This defines which of the first 16 entries in
##      the CA will be part of the sequential hop sequence for MA1.
##      NOTE: all 16 entries must be input.

         :IOFFset?
         :IOFFset                     <value> | [INUM]
##        Sets/queries the Mobile Allocation 1 Index OFFset.
##          This defines where the hop sequence starts for MA1.

      :MA2?
      :MA2                            <quoted string>
##     Sets/queries the Mobile Allocation 2.
##       This is a binary string representing which CA ARFCNs will be in Mobile
##       Allocation number 2. This defines which of the first 16 entries in
##       the CA will be part of the sequential hop sequence for MA2.
##       NOTE: all 16 entries must be input.

         :IOFFset?
         :IOFFset                     <value> | [INUM]
##        Sets/queries the Mobile Allocation 2 Index OFFset.
##          This defines where the hop sequence starts for MA2.

  [:GSM900]
##  Controlling GSM900 CELL CONFIGURATION.

      :BA?
      :BA                             <quoted string>
##     Sets/queries the Broadcast control channel Allocation.
##       This is a binary string representing which ARFCNs are in the
##       BCCH Allocation. A '1' in the first entry represents the
##       existence of ARFCN 1. NOTE: all 124 entries must be input.
```


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```
      :CA?
      :CA                              <quoted string>
##     Sets/queries the Cell Allocation.
##       This is a binary string representing which ARFCNs are in the Cell
##       Allocation. A '1' in the first entry represents the existence of
##       ARFCN 1. NOTE: all 124 entries must be input.

      :MA1?
      :MA1                             <quoted string>
##     Sets/queries the Mobile Allocation 1.
##       This is a binary string representing which CA ARFCNs will be in
##       Mobile Allocation number 1. This defines which of the first 64
##       entries of 1's in the CA will be part of the sequential hop
##       sequence for MA1. NOTE: all 64 entries must be input.

         :IOFFset?
         :IOFFset                      <value> | [INUM]
##        Sets/queries the Mobile Allocation 1 Index OFFset.
##          This defines where the hop sequence starts for MA1.

      :MA2?
      :MA2                             <quoted string>
##     Sets/queries the Mobile Allocation 2.
##       This is a binary string representing which CA ARFCNs will be in
##       Mobile Allocation number 2. This defines which of the first 64
##       entries of 1's in the CA will be part of the sequential hop
##       sequence for MA2. NOTE: all 64 entries must be input.

         :IOFFset?
         :IOFFset                      <value> | [INUM]
##        Sets/queries the Mobile Allocation 2 Index OFFset.
##          This defines where the hop sequence starts for MA2.

   :PCS1900
##  Controlling PCS1900 CELL CONFIGURATION.

      :BA<n>?
      :BA<n>                           0 | 512-810
##     Where <n> = 1 to 16
##      Sets/queries the Broadcast control channel Allocation.
##      Entries in BA table must be in contiguous ascending order.
##      The allocation must begin at BA1 and continue through BA<m>.
##      Zeros (0) are used to fill unallocated entries.
##      Where <m> = the highest number allocated in the range 1 to 16.

      :CA<n>?
      :CA<n>                           0 | 512-810
##     Where <n> = 1 to 16
##      Sets/queries the Cell Allocation.
##      Entries in CA table must be in contiguous ascending order.
##      The allocation must begin at CA1 and continue through CA<m>.
##      Zeros (0) are used to fill unallocated entries.
##      Where <m> = the highest number allocated in the range 1 to 16.


      :MA1?
      :MA1                             <quoted string>
##     Sets/queries the Mobile Allocation 1.
##      This is a binary string representing which CA ARFCNs will be in Mobile
##      Allocation number 1. This defines which of the first 16 entries in
##      the CA will be part of the sequential hop sequence for MA1.
##      NOTE: all 16 entries must be input.

        :IOFFset?
        :IOFFset                       <value> | [INUM]
##       Sets/queries the Mobile Allocation 1 Index OFFset.
```


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```
##           This defines where the hop sequence starts for MA1.

      :MA2?
      :MA2                              <quoted string>
##     Sets/queries the Mobile Allocation 2.
##       This is a binary string representing which CA ARFCNs will be in Mobile
##       Allocation number 2. This defines which of the first 16 entries in
##       the CA will be part of the sequential hop sequence for MA2.
##       NOTE: all 16 entries must be input.

         :IOFFset?
         :IOFFset                       <value> | [INUM]
##        Sets/queries the Mobile Allocation 2 Index OFFset.
##          This defines where the hop sequence starts for MA2.
```


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Configure Subsystem

```
CONFigure

## CONFigure subsystem setting commands.

   :RADio?
   :RADio                                ’GSM900’ | ’DCS1800’ | ’PCS1900’
##  Selecting the mode of operation (as in the CONFIGURE Screen).
```


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Spectrum Analyzer Subsystem

```
SANalyzer

## Spectrum ANalyzer functions

   :ATTenuator[1]?
   :ATTenuator[1]                          '0 dB' | '10 dB' | '20 dB' |
                                           '30 dB' | '40 dB'
   :ATTenuator2?
   :ATTenuator2                            '0 dB' | '5 dB' | '10 dB' |
                                           '15 dB' | '20 dB' | '25 dB' |
                                           '30 dB' | '35 dB'
##  Input ATTenuator[1]|2 selection. This is only valid when
##    ATT[1]:MODE 'HOLD' or ATT2:MODE 'HOLD' is selected, otherwise,
##    automatic attenuator selection is done.
##    ATTenuator[1] operates in 10 dB steps and is used in GSM900 mode.
##    ATTenuator2 operates in 5 dB steps and is used in DCS1800 and PCS1900
##    modes.

      :MODE?
      :MODE                                'AUTO' | 'HOLD'
##     ATTenuator MODE selection.
```


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6 Messages

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Introduction

This chapter covers any messages which are specific to the DCS1800 Test System.

Messages

```
DCS1800 Test Set has changed.  Rereading cal data
```

This message will be displayed whenever an HP/Agilent 8922 detects the presence of an Agilent 83220A/E which has a different serial number from the previous Agilent 83220A/E that was recognized. It will also be displayed the first time the Agilent 83220A/E is accessed after performing a RAM Initialization operation on the **SERVICE** screen. The Agilent 83220A/E is accessed at power-up if it is attached and also when DCS1800 or PCS1900 mode is selected.

```
DCS1800 Test Set is not connected, or not powered on
```

An attempt has been made to select DCS1800 or PCS1900 mode with the PCN Interface incorrectly attached, or the Agilent 83220A/E not powered up or non operational. This may also indicate a fault with the Agilent 83220A/E or HP/Agilent 8922.

```
Cal file checksum incorrect.  File reset to default values
```

This message will be displayed following a RAM Initialization from the **SERVICE** screen. It will also be displayed if there has been a problem reading the calibration data from the Agilent 83220A/E into the HP/Agilent 8922. This could be caused if the PCN Interface cable is not properly connected. If the problem persists, it may mean that the Agilent 83220A/E or HP/Agilent 8922 is faulty.

```
Facility is not available in Agilent 83220E Test Set
```

The Agilent 83220E cannot perform any operations associated with the AUX RF OUT or AUX RF IN connectors (they do not exist on the Agilent 83220E). This includes the System Calibration Routine as shown in the TESTS screen of the "Screens" chapter in this manual.

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