

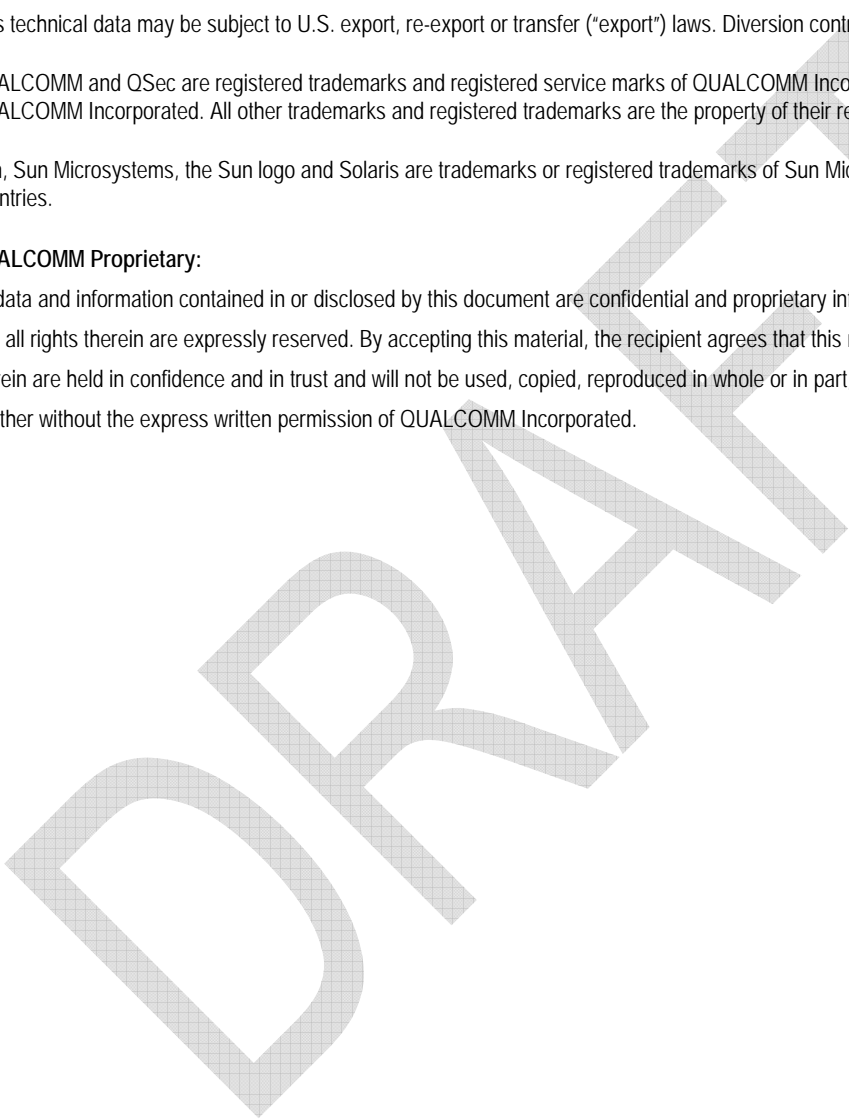


QUALCOMM Deployable Base Station-Broadband

Hardware Setup Guide

80-D9001-1 Rev. A

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5775 Morehouse Drive
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80-D9001-1 Rev. A

1 The products and equipment described in this document are manufactured under one or more of the following U.S. Patents:

D424,052	D361,065	D397,110	D413,117	D427,143	D386,186	D429,210	D429,212	D426,219	D422,262
412,483	D416,555	D356,560	D409,561	D424,573	D407,701	D375,740	D376,804	D411,823	D393,856
413,857	D413,860	D410,893	D375,937	D421,981	4,901,307	5,056,109	5,099,204	5,101,501	5,103,459
5,107,225	5,109,390	5,193,094	5,228,054	5,257,283	5,265,119	5,267,261	5,267,262	5,280,472	5,283,536
5,289,527	5,307,405	5,309,474	5,337,338	5,339,046	5,341,456	5,383,219	5,392,287	5,396,516	5,408,697
5,414,728	5,414,796	5,416,797	5,426,392	5,437,055	5,442,322	5,442,627	5,452,473	5,461,639	5,469,115
5,469,471	5,471,497	5,475,870	5,479,475	5,483,696	5,485,486	5,487,175	5,490,165	5,497,395	5,499,280
5,504,773	5,506,865	5,509,015	5,509,035	5,511,067	5,511,073	5,513,176	5,515,177	5,517,323	5,519,761
5,528,593	5,530,928	5,533,011	5,535,239	5,539,531	5,544,196	5,544,223	5,546,459	5,548,812	5,559,865
5,559,881	5,561,618	5,564,083	5,566,000	5,566,206	5,566,357	5,568,483	5,574,773	5,574,987	5,576,662
5,577,022	5,577,265	5,588,043	5,589,756	5,590,069	5,590,406	5,590,408	5,592,548	5,594,718	5,596,570
5,600,754	5,602,833	5,602,834	5,603,096	5,604,459	5,604,730	5,608,722	5,614,806	5,617,060	5,621,752
5,621,784	5,621,853	5,625,876	5,627,857	5,629,955	5,629,975	5,638,412	5,640,414	5,642,398	5,644,591
5,644,596	5,646,991	5,652,814	5,654,979	5,655,220	5,657,420	5,659,569	5,663,807	5,666,122	5,673,259
5,675,581	5,675,644	5,680,395	5,687,229	5,689,557	5,691,974	5,692,006	5,696,468	5,697,055	5,703,902
5,704,001	5,708,448	5,710,521	5,710,758	5,710,768	5,710,784	5,715,236	5,715,526	5,722,044	5,722,053
5,722,061	5,722,063	5,724,385	5,727,123	5,729,540	5,732,134	5,732,341	5,734,716	5,737,687	5,737,708
5,742,734	5,748,104	5,751,725	5,751,761	5,751,901	5,754,533	5,754,542	5,754,733	5,757,767	5,757,858
5,758,266	5,761,204	5,764,687	5,774,496	5,777,990	5,778,024	5,778,338	5,781,543	5,781,856	5,781,867
5,784,406	5,784,532	5,790,589	5,790,632	5,793,338	5,799,005	5,799,254	5,802,105	5,805,648	5,805,843
5,812,036	5,812,094	5,812,097	5,812,538	5,812,607	5,812,651	5,812,938	5,818,871	5,822,318	5,825,253
5,828,348	5,828,661	5,835,065	5,835,847	5,839,052	5,841,806	5,842,124	5,844,784	5,844,885	5,844,899
5,844,985	5,848,063	5,848,099	5,850,612	5,852,421	5,854,565	5,854,786	5,857,147	5,859,612	5,859,838
5,859,840	5,861,844	5,862,471	5,862,474	5,864,760	5,864,763	5,867,527	5,867,763	5,870,427	5,870,431
5,870,631	5,870,674	5,872,481	5,872,774	5,872,775	5,872,823	5,877,942	5,878,036	5,881,053	5,881,368
5,884,157	5,884,193	5,884,196	5,892,178	5,892,758	5,892,774	5,892,816	5,892,916	5,893,035	5,898,920
5,903,554	5,903,862	5,907,167	5,909,434	5,910,752	5,911,128	5,912,882	5,914,950	5,915,235	5,917,708
5,917,811	5,917,812	5,917,837	5,920,284	5,920,834	5,923,650	5,923,705	5,926,143	5,926,470	5,926,500
5,926,786	5,926,786	5,930,230	5,930,692	5,933,462	5,933,781	5,933,787	5,936,582	5,937,019	5,940,383
5,940,761	5,942,929	5,943,361	5,943,606	5,943,615	5,946,614	5,946,618	5,949,814	5,953,320	5,953,322
5,953,648	5,953,674	5,956,651	5,956,683	5,959,583	5,960,361	5,960,362	5,963,867	5,966,652	5,970,413
5,974,041	5,974,356	5,978,679	5,982,315	5,982,333	5,982,760	5,983,099	5,983,114	5,983,119	5,984,697
5,986,620	5,987,076	5,987,122	5,987,326	5,988,583	5,990,847	5,991,284	5,991,345	5,995,821	5,997,314
5,999,816	5,999,828	6,002,933	6,005,506	6,005,855	6,006,108	6,007,378	6,008,762	6,009,307	6,011,796
6,011,978	6,016,568	6,021,122	6,023,717	6,026,292	6,028,884	6,028,984	6,032,039	6,035,209	6,037,750
6,038,037	6,044,074	6,044,103	6,049,305	6,055,428	6,058,338	6,060,949	6,061,336	6,064,678	6,067,458
6,069,525	6,069,526	6,069,880	6,069,888	6,070,085	6,070,835	6,073,007	6,073,013	6,075,847	6,075,859
6,075,974	6,078,284	6,081,229	6,081,724	6,084,870	6,085,085	6,085,349	6,091,299	6,094,465	6,097,339
6,097,972	6,101,168	6,101,173	6,101,179	6,101,397	6,107,878	6,107,959	6,107,969	6,107,977	6,108,364
6,108,372	6,108,536	6,108,591	6,111,865	6,114,996	6,115,142	6,115,607	6,118,250	6,118,765	6,118,826
6,122,384	6,124,810	6,125,107	6,130,923	6,134,215	6,134,421	6,134,434	6,134,440	6,137,321	6,137,441
6,137,840	6,147,647	6,147,964	6,147,978	6,147,981	6,148,010	6,148,042	6,148,079	6,148,283	6,149,443
6,150,852	6,151,296	6,151,311	6,151,502	6,154,101	6,154,158	6,157,611	6,157,668	6,157,815	6,167,270
6,173,007	6,185,246	6,215,777	6,216,004	6,240,071	6,240,143	6,243,561	6,249,683	6,252,865	6,252,958
6,253,085	6,256,301	6,275,478	6,282,250	6,285,655	6,298,051	6,304,563	6,304,755	6,314,125	6,317,435
6,351,460	6,351,650	6,356,528	6,359,868	6,360,100	6,366,778	6,373,823	6,377,607	6,377,809	6,378,099
6,389,000	6,389,067	6,393,295	6,396,804	6,396,867	6,414,988	6,421,540	6,424,619	6,426,960	6,480,521
6,480,528	6,496,543	6,501,787	6,510,228	6,512,925	6,526,030	6,535,563	6,535,739	6,542,488	6,545,989
6,546,248	6,549,525	6,553,064	6,574,210	6,584,313	6,587,446	6,597,705	6,597,922	6,603,751	6,603,752
6,606,485	6,611,566								

2 Other patents pending.

3

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Section 1

Introduction

1 This document describes the procedures necessary to set up a pre-configured QUALCOMM
2 Deployable Base Station–Broadband (QDBS™–Broadband). Operation and configuration of the
3 QDBS–Broadband is described in the *QDBS Software User Guide*, 80-D8610, Rev. A. QDBS-
4 Broadband users must receive QUALCOMM training before they can operate a QDBS–Broadband.
5 The QDBS–Broadband transmits potentially harmful RF energy. All users shall familiarize
6 themselves with all warnings, cautions, and safety notices placarded on equipment before setting up
7 or operating a QDBS–Broadband.

8 1.1. Intended audience

9 This *Hardware Setup Guide* is intended for trained operators, technicians, engineers, and other
10 personnel responsible for performing QDBS–Broadband hardware setup and maintenance. Please
11 refer to the product Terms and Conditions for additional information regarding rights and
12 obligations when using the QDBS–Broadband.

13 1.2. In this document


14 The following table identifies and describes topics covered in this document.

Section	Description
1	Describes the document, its intended audience, purpose, and conventions, and provides definitions for related terminology and reference to documents for additional information.
2	Provides an overview of the QDBS–Broadband components.
3	Provides procedures and instructions for unpacking the QDBS–Broadband from shipping containers.
4	Provides a detailed description of each QDBS–Broadband component.
5	Provides procedures and instructions for setting up a QDBS–Broadband.
6	Provides procedures and instructions for setting up the QDBS–Broadband remote Radio.
7	Provides procedures and instructions setting up a QDBS–Cellular and QDBS–Broadband overlay.

1 1.3. Conventions

2 In regular text:

- 3 ▪ *Italic* text is used for variables in commands where real data must be substituted.
- 4 ▪ Courier text is used for names of software elements and code examples.
- 5 ▪ **Bold** text is used for buttons, and commands that must be input exactly as given.

6  **WARNING:** *Indicates a potentially hazardous situation, which if not avoided, may*
7 *result in personal injury or death. Read all warnings before performing a procedure.*

8  **CAUTION:** *Indicates a potential for a loss of data or damage to equipment.*

9  **NOTE:** *Alerts you to additional information about a procedure or other important*
10 *information.*

11 1.4. Revision history

12 The following revisions have been made to this document.

Revision	Date	Reason for change
A	August 2007	Initial release

1 1.5. Acronyms, abbreviations, and definitions

- 2 The following terms are used in this document. Some elements are identified by more than one
3 term.

Term	Definition
1PPS	1 Pulse per second
6U	6 Standard Rack Units. Each Rack Unit is 1.75 inches.
AC	Alternating Current
AT	Access Terminal
BNC	Bayonet Neill Concelman coaxial RF connector
BSC	Base Station Controller
BSS	Base Station System
BTS	Base Station Transceiver Subsystem
CAS	Channel Associated Signaling
CDMA	Code Division Multiple Access
CDR	Call Detail Record
CentOS	Community Enterprise Operating System
CIP	Customer Interface Packet
CLI	Command Line Interface
COTS	Commercial Off The Shelf
cPCI	Compact Peripheral Component Interconnect
DAT	Digital Audio Tape
DNS	Domain Name Server
DPLS	Deployable Position Location System
DSP	Digital Signal Processing
EIA	Electronic Industry Alliance
EMS	Element Management System
ESN	Electronic Serial Number
FNBDT	Future Narrowband Digital Terminal
FTP	File Transfer Protocol
GFI	Ground Fault Interruption
GMT	Greenwich Mean Time (the Zulu Time Zone)

Term	Definition
GPS	Global Positioning System
GRE	Generic Routing Encapsulation
HDLC	High Level Data Link Control
HLR	Home Location Register
ID	Identification
IOS	Interoperability Specification
IP	Internet Protocol
iPA	Synonymous with Power Amplifier
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IWF	Inter-working Function
LED	Light Emitting Diode
MAC	Media Access Control
MCN	Material Control Number
MGCP	Media Gateway Control Protocol
MGW	Media Gateway
MIB	Management Information Base
MIN	Mobile Identification Number
MS	Mobile Station
MSC	Mobile Switching Center
MRF	Media Resource Function
mW	milliWatts
N-Type	Type N connector is a threaded RF connector used to join coaxial cables
NID	Network Identification
NIPRNet	Non-secure Internet Protocol Router Network. NIPRNet is used to exchange unclassified but sensitive information between government users.
NMEA	National Marine Electronics Association
NTP	Network Timing Protocol
OA&M	Operations, Administration, and Maintenance
PA	Power Amplifier

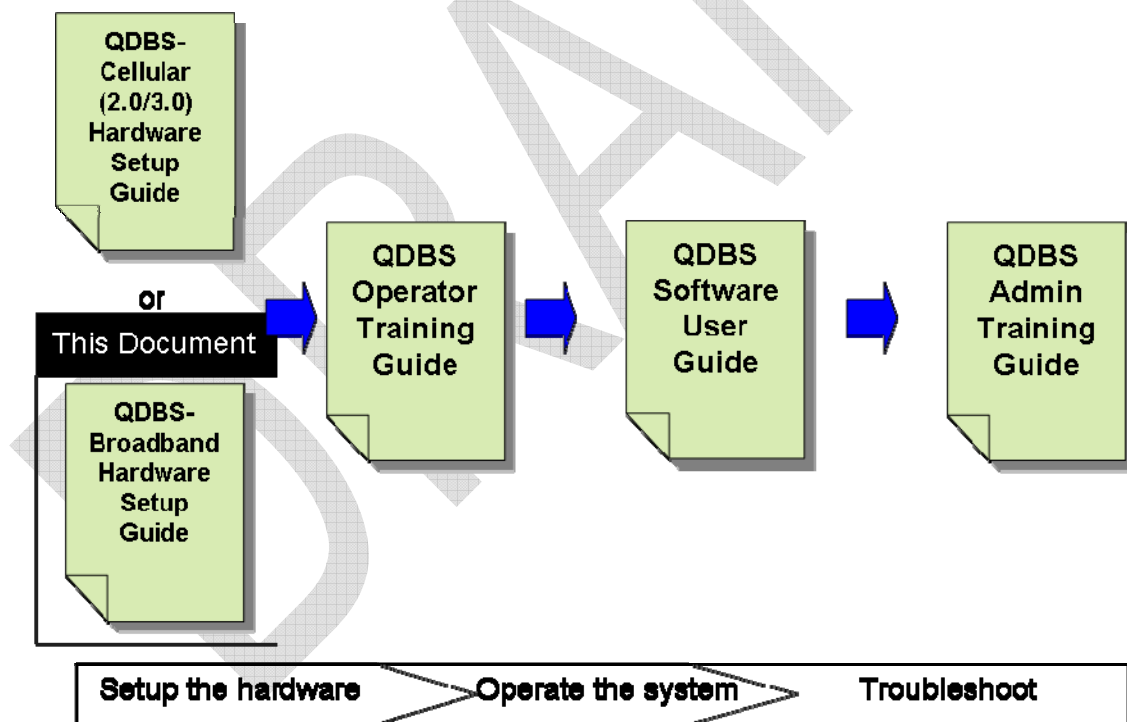
Term	Definition
PBX	Private Branch Exchange
PCM	Pulse Code Modulation
PDM	Position Determination Module
PDSN	Packet Data Service Node
PDU	Power Distribution Unit
PPP	Point-to-Point Protocol
PRI	Primary Rate Interface
PRL	Preferred Roaming List
PSTN	Public Switched Telephone Network
Pulizzi	A Power Distribution Unit (PDU)
QDBS	QUALCOMM Deployable Base Station
RADIUS	Remote Access Dial-in User Service
RAN	Radio Access Node
RJ-45	Registered Jack-45. An 8 pin , 8 conductor jack used for Ethernet connectivity
RLP	Radio Link Protocol
RMA	Return Material Authorization
RTP	Real-Time Transfer Protocol
SCCP	Signaling Connection Control Part
SCTP	Simple Control Transmission Protocol
SEC	Soft Exchange Controller
SGW	Signaling Gateway
SID	System Identification
SIP	Session Initiation Protocol
SMA	Sub-Miniature version A connectors are coaxial RF connectors
SMC	Short Message Composer
SMPP	Short Message Peer-to-Peer Protocol
SMSC	Short Message Services Center
SNMP	Simple Network Management Protocol
SSH	Secure Shell
SS7	Signaling System 7

Term	Definition
T1	A digital transmission line with a capacity of 1.544 Mbps
TIA	Telecommunications Industry Association
UI	User Interface
VLR	Visitor Location Register
W	Watts
WAN	Wide Area Network

1 1.6. Related QUALCOMM documentation

2 Figure 1 describes the series of documents that provide complete guidance for operating the
3 QDBS–Broadband. The documents listed below provide additional information about topics
4 described in this document.

5



6

7

Figure 1: The QDBS document series

8

[1] QDBS–Broadband Hardware Setup Guide (Release 3.0), 80-D8611-2, (this document).

9

10

[2] QDBS–Broadband User Guide (Release 3.0), 80-D8610-1.

11

- [3] QDBS–Cellular Hardware Setup Guide (Release 2.0), 80-D8611-1.
- [4] QUALCOMM Deployable Base Station Three Sector Expansion Kit User Guide, 80-D8478-1.
- [5] QDBS–Broadband Operator Training (Release 3.0), 80-D8311-2.
- [6] QUALCOMM Deployable Base Station Administrator Training (Release 3.0) 80-D8244-2.
- [7] QUALCOMM Deployable Base Station Test Procedures (Release 3.0), 80-D8410-2.
- [8] QUALCOMM Deployable Base Station Link Characteristics, 80-D8438-1.
- [9] QDBS–Broadband Red Book, TL80-D8409-1.
- [10] QDBS–Cellular Antenna Selection and Installation Guidelines, 80-D8673-1.
- [11] QDBS–Broadband Short Message Composer User Guide, 80-8689-1.

1.7. Human Exposure to Radio Frequency (RF) Electromagnetic Fields



When in operation, the QDBS–Broadband transmits non-ionizing RF electromagnetic energy that can be harmful to humans. In the Code of Federal Regulations (CFR) 47 Part 11310, the FCC has established limits for Maximum Permissible Exposure (MPE) of RF energy for the general population/uncontrolled exposure operational situations. When the QDBS–Broadband is operational, all personnel must maintain a separation distance of at least 1.6 meters from the transmitting antennas.

1.8. Product support

1.8.1. Technical support hotline

For questions or problems about the QDBS–Broadband, contact the QUALCOMM Government Technologies Technical Support Hotline at:

1.800.777.9070 (U.S. only)
1.858.651-1016 (local and international)

Section 2

QDBS–Broadband Hardware Overview

1 This section provides a general description of the QDBS–Broadband hardware components.
2 The QDBS–Broadband is a compact, easy-to-deploy, easy-to-operate CDMA broadband base
3 station developed to address the communication needs of U.S. government agencies and armed
4 forces.

5 **2.1. Transit cases**

6 The QDBS–Broadband is comprised of two high-strength, lightweight MIL-SPEC (military
7 specification) aluminum transit cases, as shown in Figure 2 and Figure 3.

8 The Radio Case contains the radio components, while the Network Case contains the network
9 components. Each transit case provides six (6) standard rack units (6U) for hardware mounting.
10 Also included with the QDBS–Broadband are the radio frequency (RF) whip antennas, global
11 positioning system (GPS) antenna, and RF cables.



1
2

Figure 2: QDBS–Broadband Radio Case



3
4

Figure 3: QDBS–Broadband Network Case



1 ***NOTE: All photos in this document are for illustrative purposes only and may not***
2 ***depict your actual system configuration.***

3 2.2. System architecture

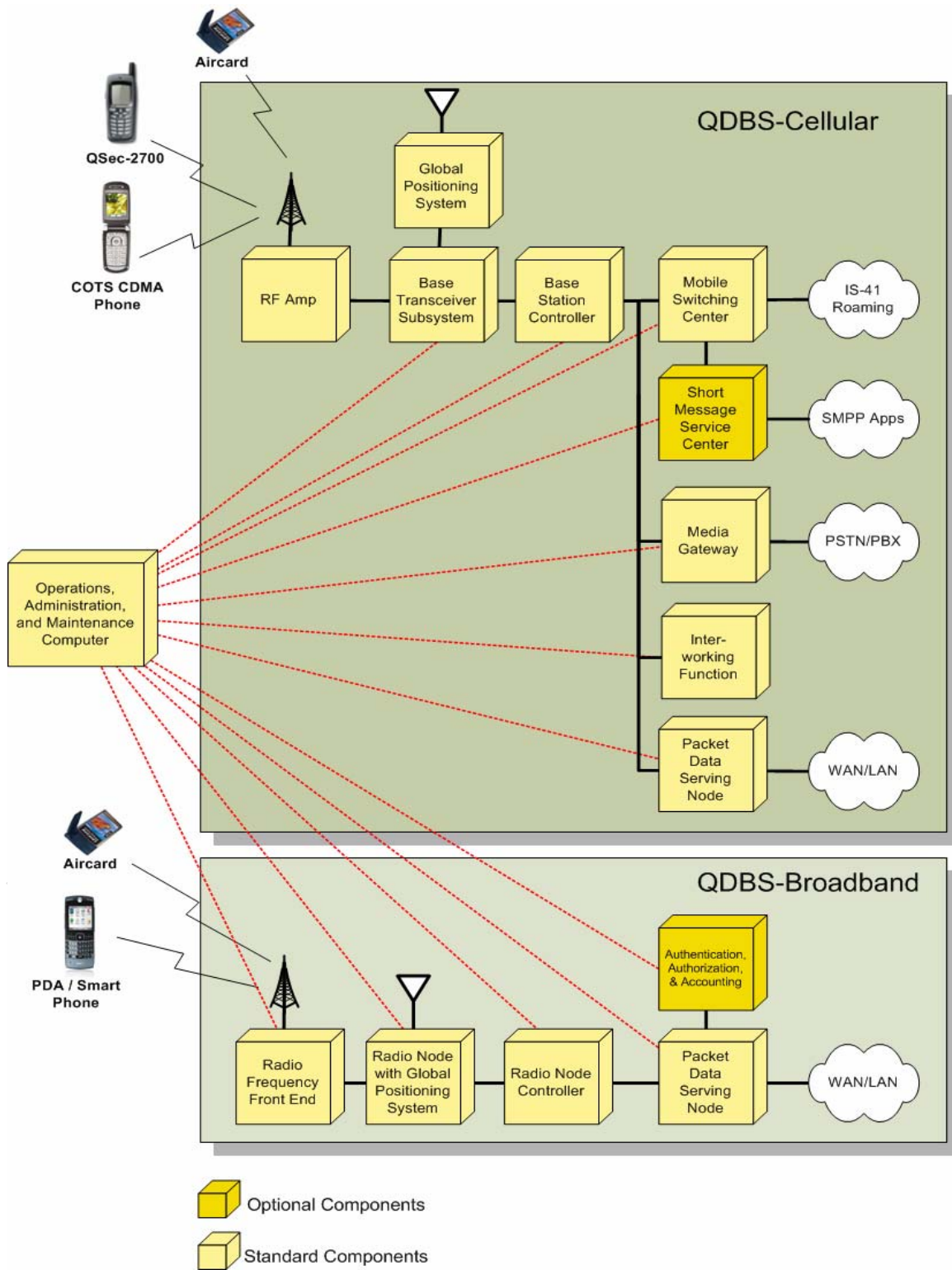
4 The QDBS–Broadband complies with the CDMA2000 1xEV-DO Rev. A (EV-DO) per TIA/EIA-
5 856-A air interface standard and operates over 1900 MHz (PCS band). The QDBS–Broadband
6 supports broadband packet data (with rates of up to 3.1 Mb/s in the forward link and 1.8 Mb/s in
7 the reverse). The QDBS–Broadband supports CDMA devices such as commercial-off-the-shelf
8 (COTS) cellular phones and data cards.

9 The QDBS–Broadband leverages a packet-switched architecture that uses an Internet Protocol (IP)
10 suite for routing and transporting signaling and traffic packets among the subsystems. With this
11 architecture, the QDBS–Broadband can exploit the open interface and the ubiquitous availability of
12 IP connectivity, which results in faster application development and lower-cost system deployment.

13 The QDBS–Broadband can operate as a private, isolated network for packet data access. The
14 QDBS–Broadband is scalable to meet various capacity demands, from a single-sector network in
15 low capacity scenarios to a complex multiple-sector network in high-capacity scenarios.

16 Additional call capacity and area coverage is achieved by deploying a Three Sector Expansion Kit for
17 the Radio Case, or by adding Radio Cases. The use of additional Radio Cases is described in Section
18 5 of this document.

1 Figure 4 illustrates the major components of the QDBS (Cellular and Broadband) systems.



2

3

Figure 4: QDBS Functional Diagram

Section 3

Unpacking and Inspecting QDBS– Broadband Hardware

1 The QDBS–Broadband is shipped with all the electronic components fully assembled in the Radio
2 and Network Cases.

3 **3.1. Required tools**

4 **3.1.1. Pico-cell mode assembly**

5 The GPS antenna stand must be assembled; however, tools are not required to set up the QDBS–
6 Broadband in pico-cell mode (without an antenna mast or external antennas).

7 **3.1.2. Macro-cell mode assembly**

8 To operate the QDBS–Broadband in macro-cell mode (with external antennas), some standard tools
9 such as wrenches, screw drivers, and pliers, are required to set up the antennas. These standard tools
10 are not supplied with the QDBS–Broadband.

3.2. Unpacking the QDBS–Broadband

The QDBS–Broadband is shipped in two large cardboard boxes. The QDBS–Broadband and shipping materials weigh approximately 350 pounds and can be lifted using a pallet jack or fork lift.

To unpack the QDBS–Broadband:

1. Cut the shrink wrap from around the boxes on the pallet and discard.
2. Remove the tops of the telescoping cardboard boxes and store in a safe place.
3. Remove any packing material and corner pads from the top or sides of the transit cases.

Save all packing material in the event the equipment needs to be returned for servicing.

4. Remove each transit case from the lower portion of the cardboard box.


3.3. Inspecting equipment and cable connections

Before using the QDBS–Broadband, remove the transit case covers (see *Setting up the transit cases* on page 35 for more details), and perform a thorough inspection of the equipment to ensure there is no loose or damaged hardware. Verify that power and signal cables are not cut, chafed, or worn. Also verify that all AC power and signal cables are fully seated in their designated receptacles and ports. If there is any visual damage to the equipment, contact the QUALCOMM Sales Administration team toll free at 800.777.9070, or 858.651.1016.

3.3.1. Equipment list

The following is a list of the ancillary equipment that is included with the COTS QDBS–Broadband.

Table 1: Ancillary equipment

Equipment	Quantity	Description
GPS Antenna Kit	1	 <p>Optional if in overlay scenario.</p>