

## DBHB-20 Home Booster Series

### INSTALLATION AND OPERATION MANUAL



## DBHB-20

### Dual Band Home Booster

5920 0080 200

November 2007

#### Proprietary Information

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**1. Document History**

<b>Document Number</b>	<b>Document Name</b>	<b>Date</b>	<b>Compiled by</b>	<b>Approved by</b>	<b>Revision</b>
5920 0080 200	DBHB20 Home Booster	November 2007	Inderjit	D.S.Nagi	

**Revision****Revised Section****Date****Intentionally Left Blank**

## 2. Disclaimer

Every attempt has been made to make this material complete, accurate, and up-to-date. Users are cautioned, however, that **Shyam Telecom Limited** reserves the right to make changes without notice and shall not be responsible for any damages including consequential, caused by reliance of the contents presented, including, but not limited to, typographical, arithmetical, or listing errors.

Product name(s) referenced in this document may be trademarks or registered trademarks of their respective companies, and are hereby acknowledged.

In areas with unstable power grids (mains) all repeaters must be installed with a voltage regulator ensuring a constant voltage level at the repeater power input. A maximum voltage deviation should remain within the input range to the repeaters for warranty purposes.

All antennas must be installed with lightning protection. Damage to internal modules, as a result of lightning is not covered by the warranty.

***All specifications are subject to change without prior notice.***

## 3. Safety Instructions and Warnings

### 3.1. Personnel Safety

Before installing or replacing any equipment, the entire manual should be read and understood. The user needs to supply the appropriate AC power to the Repeater. Incorrect AC power settings can damage the repeater and may cause injury to the user.

Throughout this manual, there are "**Caution**" warnings, "**Caution**" calls attention to a procedure or practice, which, if ignored, may result in injury or damage to the system or system component or even the user. Do not perform any procedure preceded by a "Caution" until the described conditions are fully understood and met.

### 3.2. Equipment Safety

When installing, replacing or using this product, observe all safety precautions during handling and operation. Failure to comply with the following general safety precautions and with specific precautions described elsewhere in this manual violates the safety standards of the design, manufacture, and intended use of this product. **Shyam Telecom Limited** assumes no liability for the customer's failure to comply with these precautions. This entire manual should be read and understood before operating or maintaining the repeater system.

**CAUTION**

Calls attention to a procedure or practice which, if not followed, may result in personal injury, damage to the system or damage to individual components. Do not perform any procedure preceded by a **CAUTION** until described conditions are fully understood and met.

**3.3. Electrostatic Sensitivity****CAUTION****ESD = ELECTROSTATIC DISCHARGE SENSITIVE DEVICE**

Observe electrostatic precautionary procedures.

Semiconductor transmitters and receivers provide highly reliable performance when operated in conformity with the intentions of their design. However, a semiconductor may be damaged by an electrostatic charge inadvertently imposed by careless handling.

Static electricity can be conducted to the semiconductor chip from the centre pin of the RF input connector, and through the AC connector pins. When unpacking and otherwise handling the Repeater, follow **ESD** precautionary procedures including the use of grounded wrist straps, grounded workbench surfaces, and grounded floor mats.

## 4. Introduction

### 4.1. Purpose

The purpose of this document is to describe the electrical and mechanical specifications, operation and maintenance of the **DBHB20** Home Booster for indoor application.

### 4.2. Scope

This document is the product description of the Shyam **DBHB20** Home Booster.

### 4.3. Definitions

<b>AC</b>	Alternating Current
<b>ALC</b>	Automatic Level Control
<b>BTS</b>	Base Transceiver Station
<b>BSEL</b>	Band Selective
<b>CDMA</b>	Coded Division Multiple Access
<b>CSEL</b>	Channel Selective
<b>DCS</b>	Digital Communication System
<b>DL</b>	Downlink signal (from base station via repeater to mobile station)
<b>EGSM</b>	Extended Global System for Mobile Communication
<b>ETSI</b>	European Telecommunications Standard Institute
<b>GSM</b>	Global System for Mobile communication
<b>LED</b>	Light Emitting Diode
<b>LNA</b>	Low Noise Amplifier
<b>MS</b>	Mobile Station
<b>PA</b>	Power Amplifier
<b>PCN</b>	Personal Communication Network
<b>PCS</b>	Personal Communication System
<b>RF</b>	Radio Frequency
<b>RSSI</b>	Received Signal Strength Indication
<b>UL (Uplink)</b>	Uplink signal direction (from mobile station via repeater to base station)

#### 4.4. References

- [1] ETS 300 086.  
Radio Equipment and Systems Land mobile service Technical characteristics and test conditions for radio equipment with an internal or external RF connector intended primarily for analogue speech.
- [2] ETS 300 609-4.  
Digital cellular telecommunications system (phase 2): Base Station Systems (BSS) equipment specification: Part 4: Repeaters.
- [3] ETS 300 342-3  
Radio Equipment and Systems (RES); Electro-Magnetic Compatibility (EMC) for European Digital Cellular Telecommunications systems. Base Station Radio and ancillary equipment and Repeaters meeting phase 2 GSM requirements.

#### 4.5. General

A basic feature of a mobile communication system is to transmit RF signals between base stations and mobile radio equipment. If there is a blocking object such as a geographical structure or a building preventing the base station signal to reach the mobile equipment, a device responsible for boosting signal or to extend the base station's coverage area has to be inducted in the network for complete connectivity. Induction of Home Boosters in the network at appropriate spots/sites is a low cost solution to achieve the coverage in the targeted area.

The Home Boosters find applications in small offices, homes, basements & other small indoor locations.

The weak coverage problems at indoor locations can be overcome by installing the active booster system, designed for use in a multitude of installation configurations. Booster systems provide an effective solution by redirecting, filtering and amplifying the available signal at the donor antenna, into the weak coverage area, through a properly selected interior coverage antenna. The illumination of the weak coverage area allows the user's handset to operate as intended within the building or weak coverage area, while maintaining the user's call clarity.



**Figure 1: Indoor Coverage Application in Residence**

## 5. Functional Description of DBHB20 Home Booster

### 5.1. General Description

The **DBHB20 Home Booster** System is a dual band cost effective solution for providing coverage in homes, small offices and other small indoor locations. It is capable of handling signals in pre set dual band as per customer's requirement. The details of operating service frequency bands are given below:

S.NO.	Service Band	DL Frequency (MHz)	UL Frequency (MHz)
1.	<b>SMR 800</b>	851-866	806-821
2.	<b>Cellular</b>	869-894	824-849
3.	<b>SMR 900</b>	935-941	896-902
4.	<b>EGSM</b>	925-960	880-915
5.	<b>GSM 900</b>	935-960	890-915
6.	<b>DCS (60 MHz Bandwidth)</b>	1805-1880	1710-1785
7.	<b>PCS (45 MHz Bandwidth)</b>	1930-1990	1850-1910
8.	<b>UMTS</b>	2110-2170	1920-1980

**The Customer is advised to refer to the packing list giving the details of frequency band set & the bandwidth of the Home Booster.**

The system can be set in following combination/configuration to function in dual band:

- i) GSM 900+DCS 1800 (60 MHz)
- ii) GSM 900+UMTS
- iii) Cellular 850+PCS 1900 (45 MHz)
- iv) SMR 800+SMR 900

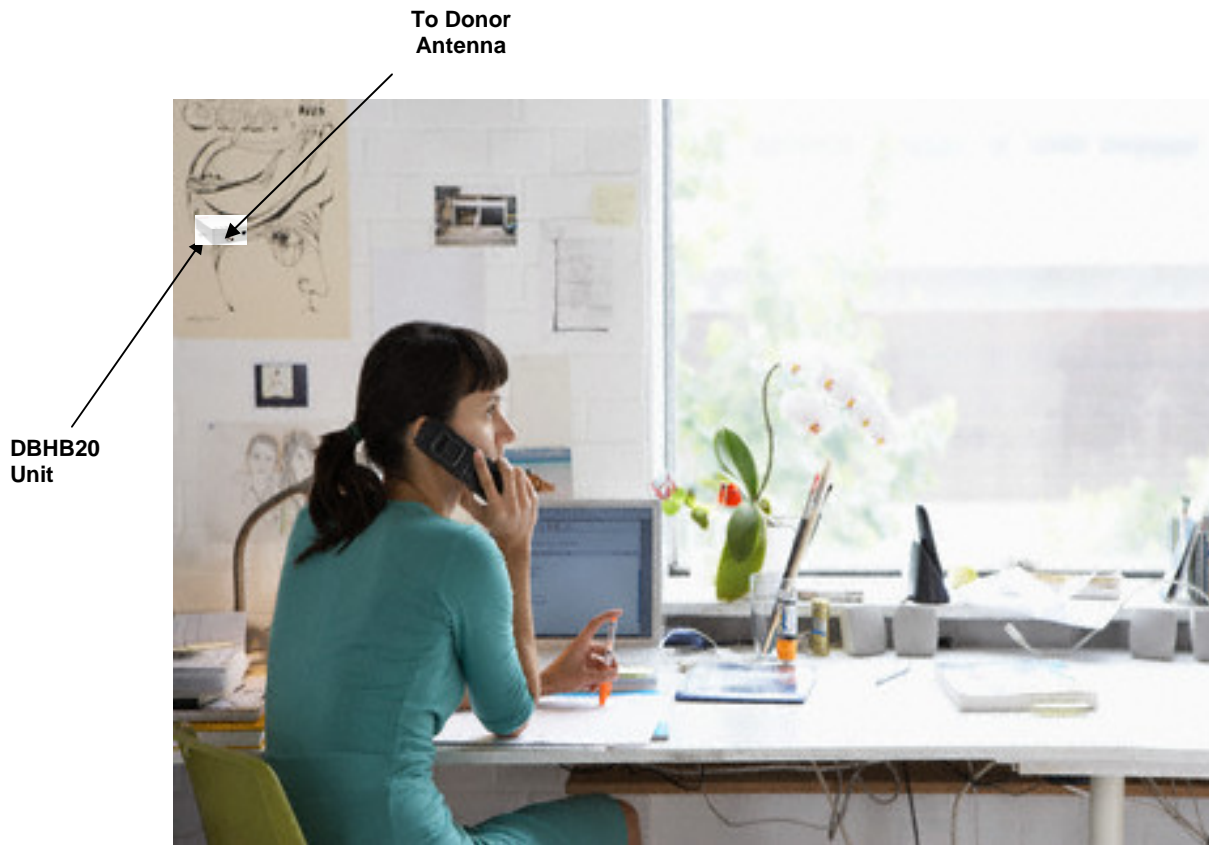
- The Home Booster is installed at a convenient indoor location where it is not exposed to direct Sunlight and excessive moisture.
- It receives signals through a donor antenna installed on the roof of the building or at a height from where it is capable of having line of sight with the nearest BTS. The received signals are amplified to a predetermined level.
- The amplified signals are distributed through a server antenna, which is of whip type and fixed on the unit itself.
- Depending on the requirement of the customer, it is set for operation in the specific bands.

- It is a simple device, which is operated from AC mains through AC/DC adapter and is extremely easy to install. It provides coverage in areas up to 500 sq meters (5,000 sq ft.).

## 5.2. Typical In-Building Coverage

The **DBHB20** Booster is designed to provide optimal coverage over an area of approximately 500 sq. meters (5,000 Sq ft.). However, ultimate performance depends on the obstructions blocking/absorbing of the RF signals inside the building and the available forward signal level at the donor antenna. Typical coverage is usually planned for relatively small areas such as large conference rooms or several adjacent rooms in smaller office areas.

Coverage is primarily determined by the available forward signal level at the outdoor antenna input, loss due to the RF cable length, type of RF cable installed and achievable isolation for optimum performance. Indoor coverage varies greatly due to the nature of various building construction techniques and materials.



**Figure 2: Indoor Coverage in Office Premises**

## 6. DBHB20 Booster Specifications

### 6.1. Electrical Specifications-RF

S.NO.	Parameter	Specified Limits
1.	Frequency Band DL & UL	Customized as per requirement of the User.
2.	Frequency Band width	Full band as per requirement of customer (Refer table in clause 5.1).
3.	Operator, State Selective Version	Specific models for different operators Worldwide are made available.
4.	Nominal Gain	65 dB
5.	RF composite Power	+10dBm
6.	Automatic Power Control	10 dB
7.	Automatic gain Adjustment	31 dB in 1 dB step
8.	Spurious Emission	≤ 36dBm from 9 KHz to 1 GHz ≤ -30dBm from 1 GHz to 12.75 GHz
9.	Noise Figure	8 dB max.
10.	VSWR	1.5 Max.

### 6.2. Electrical Specification Power Requirement

Parameters	Specified/Limits
Input AC Voltage Range through Adapter	100-240 V, 47/63 Hz
Power Consumption	24 watts

### 6.3. External Electrical Interface

Parameters	Specification
RF port UL	N-type (F)
RF port DL	N-type (F)

### 6.4. Mechanical Specification

Dimensions (w x h x d)	135x216x58 mm (5.3x8.5x2.3 inches)
Weight	2.9 Kg.(6.4 lbs.) approx.
Housing	Indoor application
Housing Color	Off white
Cooling	Convection

## 6.5. Environmental Specification

Conditions	Specification
Operating Temperature	-5°C to +55 °C (+23°F to +131°F)
Storage Temperature	-30°C to +75°C (-22°F to +167°F)
Enclosure	In accordance with Indoor application requirement

## 6.6. Contents of Delivery

ITEMS	QUANTITY
Booster DBHB20	1
AC/DC Power Supply Adapter	1
RF cable with connectors (15 meters length)	1
Operation & Installation manual	1
Mounting Clamps with Nuts-bolts	1 set
Donor antenna (Directional Panel Dual band)	1
Whip antenna (Dual band)	1

## 6.7. Description DBHB20 Booster

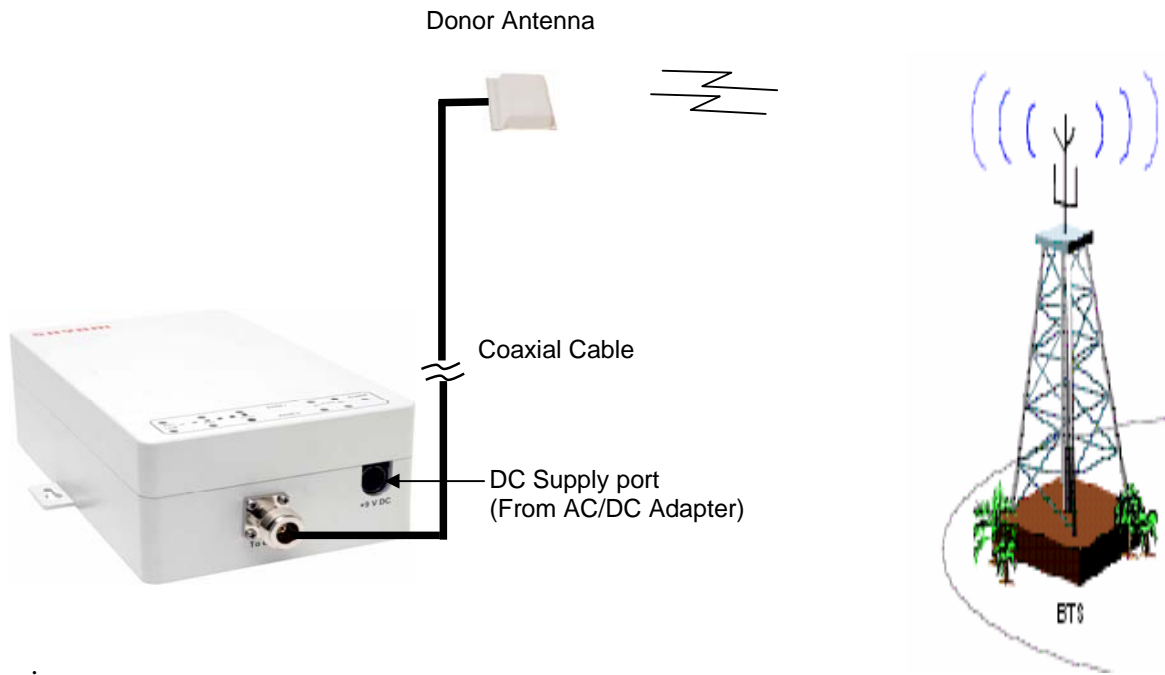
The **DBHB-20 booster** system contains an automatic power control, bi-directional amplifier (BDA) supplied along with a **donor antenna** (highly directive outdoor antenna) and **server antenna** (indoor dual band antenna of whip type), specifically designed for interior configurations.

The donor antenna must point towards the base station from where the signals are to be picked up and is usually mounted on the exterior of the building so as to receive the maximum forward signal level from the base station.

The server antenna of DBHB-20 booster provides RF signal in the desired direction. AC/DC Power Supply Adapter is supplied with DBHB-20, powered by 100-240 VAC mains supply. A standard length of 15 m (45 ft.) RF cable with connectors is supplied to connect the donor antenna and DBHB-20 booster. Any other RF cable length is also available optionally, as per requirement

The booster is provided with LEDs on the cover to indicate the performance/Status. The LEDs indicate following conditions for each band:

- UL align
- DL align
- RSI low
- RSI high
- RSI mid
- Alarm



**Figure 3: DBHB Home Booster Set up**

## 7. Installation

### 7.1. Preparation Sheet-Pre Installation

#### 1. General

**Application: Indoor**  
**Service Band Particulars**

Frequency Band for Band 1 DL	
Frequency Band for Band 1 UL	
Frequency Band for Band 2 DL	
Frequency Band for Band 2 UL	

#### 2. Technical requirements

S.NO.	Requirement	Remarks
1.	Estimated RF Power available at site where donor antenna is to be installed	
2.	Estimated Cable loss from donor antenna to the Home Booster unit	
3.	Estimated DL RF power to the input to the Booster Unit.	
5.	Desired RF Power in DL	
6.	Estimated cable loss from repeater unit to server antenna port	
7.	ERP at server antenna	
8.	Desired RF Power in UL	
9.	Proposed gain settings in UL path	

3. Proposed site Address: -----

4. User's Address & other particulars: -----

Date:

Prepared by: -----

## 7.2. Engineering Consideration

### a. Pre-Installation Consideration

Before deciding to install the DBHB-20 in your home/office/premises, the availability of RF signals from the service provider outside the premises should be confirmed by making calls from the cell-phone and observing the signal bars on the phone. In case adequate signal strength is available outside the premises, it can be decided to install the system at the planned spot at indoor location.

### b. Location of Donor Antenna

It is responsible for interception of signals from the BTS and forwarding the same to the system, it is a dual band antenna which must be placed after due consideration as detailed below:

- Once the expected coverage area is determined, identify the location for installing the donor antenna from where it shall have direct line of sight with the base station of the Service Provider and also length of RF cable is minimum from antenna to the equipment to keep the losses minimum.
- Under normal circumstances, the donor antenna should be installed on the rooftop of the premises to have clear view of the BTS.
- The RF cable route from antenna to the equipment should be free from sharp bends and kinks to avoid damage to the RF cable.
- The antenna should technically conform to the frequency of operation.



**Figure 4: Donor Panel Antenna**

**Important:** There should not be any proximity with bare high voltage power lines to avoid the possibility of shock to the humans and damage to the equipment.

### **c. Location Of DBHB20 System**

Following points as indicated below need to be considered before installing DBHB20 unit:

- Accessibility to AC mains point for energizing the system.
- Flat, structural mounting surface for proper fixing.
- Accessibility to the system for day-to-day maintenance.
- A cool, dry location, away from other heat generating appliances or equipment should be ensured.

### **d. Location of Server Antenna**

It is responsible for distribution of amplified signals received from Home Booster in the area where coverage is intended in DL path. It receives signals from mobile users in the UL path & transfers to the booster unit for amplification and transmission to BTS. The antenna used for this purpose is of whip type and fixed at the **MS port** in the unit.

### 7.3. Installation Tools

You will only need the following tools for carrying out the installation:

- Standard wrenches
- Hammer
- Screw drivers
- Pliers set

### 7.4. Installation Procedure

To install DBHB-20 booster, follow the sequence as mentioned below:

- After unpacking the system, please check for the contents.
- Identify the donor antenna and fix the same on a pole/pipe on the roof-top/spot from where the antenna can have clear line of sight with the BTS.
- Take the estimated length of RF cable and lay it to the spot where the installation of the system is proposed. Fix the clips on the cable route from antenna to the system, leaving no part of the cable loose.
- Provide firm connection of RF cable with the antenna through the connector fixed at the cable end.
- The other end of the RF cable should be connected to the **BTS** port of the DBHB20 system.
- The server antenna is of whip type which is fixed at the **MS** port in the unit itself for providing coverage.

Now the system is ready for Switching ON from the AC mains. Please ensure that the third pin at the power socket is provided with earth connection.

## 7.5. Commissioning

1. Plug in the AC/DC Power Adapter power cord to AC mains and other side DC plug shall be inserted in 9V DC socket in Home Booster.
2. When the booster is switched ON initially all the LED's will blink.
3. RSL low, mid and high corresponding to each band shall blink depending on the RF signals availability. It shall be ultimately stable at RSL mid, low or high depending on the strength of signals.
4. The system will automatically control the attenuation to keep both the Uplink and downlink output power at a constant level of +10dBm. The system will insert or release the attenuation by 1dB step.
5. Alarm indication LED (red) will glow, when the in put signals in DL exceed  $-15\text{dBm}$  and it shall go in to shut down mode. It shall check after 30 seconds and restart in case the input level strength is less than  $-15\text{dBm}$ .
6. Review the intended coverage area according to the site installation. In case the coverage is not satisfactory, rotate the donor antenna for further alignment with the signals from BTS.

For optimum performance and quality connectivity, there should be adequate separation between the Donor antenna & the server antenna to provide enough RF isolation. It shall avoid direct coupling between the two.

In technical terms RF Isolation is defined by the path loss or attenuation to RF signals between the donor and server antennas.

### **Guidelines for adequate isolation between the antennas:**

- The optimal location for the donor antenna should be high above the rooftop and exterior to the building so that the donor antenna has clear line of sight with BTS.
- Avoid installation of system near the window to avoid direct coupling between donor & server antenna.
- Mount the Donor antenna as high as physically possible to the exterior of the building for maximum vertical separation between antennas and pointing away from the building towards the base station site.
- Install the antenna taking advantage of any existing building structure such as brick walls, metal roofs or multiple wall structures for providing additional attenuation to the signals directly reaching from donor antenna to server antenna.

**7.6. Checklist-Post Installation****Service Band:**

- a) Frequency Band 1 & 2 (DL):
- b) Frequency Band 1 & 2 (UL):

**A. Repeater Installation**

<b>S.NO.</b>	<b>Point(s) To be Verified</b>	<b>Remarks</b>
1.	Ensure isolation between server and donor antennas, it has to be 15 dB + Gain set of the repeater.	
2.	Actual isolation measured	
3.	Cable from donor antenna connected to donor antenna port	
4.	Cable from server antenna connected to the relevant port in the unit	
5.	Mains cable connected to the unit through power supply adapter	
6.	Cable protection ensured and outdoor connections are waterproof	

**B. Repeater Set Up**

<b>S.NO.</b>	<b>Point(s) To be Verified</b>	<b>Remarks</b>
1.	Repeater switched ON	
2.	Any error (alarms) observed	
3.	Gain set	
4.	Power level in DL	
5.	Power level in UL	
6.	Observation - LEDs	
7.	Home Booster Secured	

Any Other Remark/Comment:

Date Of Installation: ----- Home Booster ID: -----

Site Address: -----

Name of the Installer: -----

### 7.7. Dos & Don't Dos

1. The site should be accessible for maintenance.
2. Arrangement is to be made to avoid unauthorized access to the repeater.
3. The housing should be kept away from direct exposure to the Sunlight & chemical fumes.
4. Stable power supply for repeater unit should be ensured.
5. The route of Cables to/from antennas should be short to limit the cable losses and should be free from sharp bends & kinks.
6. Local standard of cabling should be followed.
7. The donor antenna should have proper line of sight with the BTS from where the signals are to be intercepted for maximum signal strength and to reduce the effect of fading.
8. The spots for installation of antennas should be away from power lines to avoid damage to the system and people working on the system.
9. The selection of BTS should be made taking other BTSs in the same vicinity in to consideration to avoid interference.
10. Gain of the repeater should be set after taking antenna isolation in to consideration.
11. The estimation of coverage area should be confirmed.
12. The system should be made over for normal traffic after actual measurement of:
  - a) RF power in the DL
  - b) RF power in the UL
  - c) Antenna Isolation
  - d) Gain settings in DL & UL
13. Feedback regarding performance of the system must be obtained from the user.

## 8. System Maintenance

### 8.1. General

Under the normal circumstances, DBHB20 system does not need any specific maintenance provided AC input remains within the limits and de-orientation of donor antenna does not take place. Please refer to the LED display on the unit, as it shall guide you to reach the logical conclusion about the status of the system.

#### **Display Details of DBHB-20 [The LEDs are provided for each band]**

- UL ALIGN LED will glow after uplink alignment is completed.
- DL ALIGN LED will blink when the system is in the Downlink alignment mode. During alignment the system adjusts the gain depending on the received signal strength.

#### **Downlink RSSI is monitored continuously and status is displayed through 3 LED's.**

- When the RSSI is greater than  $-40\text{dB}$ , the RSL High LED shall glow.
- When the RSSI is between  $-60\text{dB}$  &  $-40\text{dB}$ , the RSL Mid LED shall glow.
- When the RSSI is less than  $-60\text{dB}$ , the RSL Low LED shall glow.

In the event of input signals going high and RF power detected to be  $>+12\text{dBm}$  in any of the bands, Alarm LED glows and the system goes to shut down mode. It restarts when the input signals are detected to be within limits.

The built in receive signal level indicator (RSSI) in DBHB-20 booster helps in aligning the donor antenna towards the selected base station and it always monitors the received signal level (DL signals) from the base station. DL signal strength may change if some high building, trees or any other obstruction comes in the way of line of sight (LOS) between the BTS and the Donor antenna. This may reduce the downlink received signal level and will result in poor connectivity.

## 9. Product Certification from International Agencies

TCB

GRANT OF EQUIPMENT  
AUTHORIZATION  
Certification  
Issued Under the Authority of the  
Federal Communications Commission  
By:

TCB

Compliance Certification Services  
581F Monterey Road  
Morgan Hill, CA 95037

Date of Grant: 08/28/2005  
Application Dated: 08/28/2005

Shyam Telecom Inc.  
18 Island Brook Drive  
North Brunswick, NJ 08902

Attention: S.A. Majumdar, Officer

**NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified herein for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: **S3CDBEB-20**

Name of Grantee: **Shyam Telecom Inc.**

Equipment Class: Amplifier

Notes: Dual Band Home Booster DB-HB-20

Grant Notes	FCC Rule Parts	Frequency Range (MHz)	Output Watts	Frequency Tolerance	Emission Designator
	22H	824.0 - 849.0	0.01	Amp	F3W
	22H	824.0 - 849.0	0.01	Amp	G3W
	22H	824.0 - 849.0	0.01	Amp	G7W
	22H	880.0 - 915.0	0.01	Amp	F3W
	22H	880.0 - 915.0	0.01	Amp	G3W
	22H	880.0 - 915.0	0.01	Amp	G7W
	24E	1920.0 - 1930.0	0.01	Amp	F3W
	24E	1920.0 - 1930.0	0.01	Amp	G3W
	24E	1920.0 - 1930.0	0.01	Amp	G7W
	24E	1930.0 - 1950.0	0.01	Amp	F3W
	24E	1930.0 - 1950.0	0.01	Amp	G3W
	24E	1930.0 - 1950.0	0.01	Amp	G7W

Booster. Output power listed above is composite for multi-channel operation. Cellular band Uplink: 824-849 MHz; Cellular band Downlink: 859-884 MHz; PCS band Uplink: 1920-1930 MHz; PCS band Downlink: 1930-1950 MHz. Maximum rated single channel Uplink or Downlink power is 16 dBm. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. The server antenna (Max. 0 dBd) must be installed to provide minimum 20 cm separation distance between the server antenna and the body of user or nearby person. The donor antenna (Max. 7 dBd) used for this transmitter must be fixed-mounted on outdoor permanent structures with a separation distance of at least 30 cm from all persons during normal operation. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Ref: CE Application  
P-Code: 0048-070811-01

**CE**

### Verification of Compliance

IN COMPLIANCE WITH THE REQUIREMENTS OF THE

**EMC Directive of EU 89/338/EEC  
RTTE Directive 1999/5/EC**

**Shyam Telecom Inc.**  
18 Ireland Brook Drive  
North Brunswick, NJ 08902, USA

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**Dual Band Home Booster / DBHB20-900-1800**

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**Shyam Telecom Limited**

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**0048-070811-01**

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KEEPS ALL REQUIREMENTS ACCORDING FOLLOWING REGULATIONS:

**EN 301 488-7:2002**  
(EN 301488-1:2000; EN50351-1:1992; EN50052-1:1997; EN61000-3-2; EN61000-3-3:1995)

**EN 301 502:2001**  
(EN 300503-4 Sec. 5, Sec.6)


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**Power Supply: (AC 100-240V/47-63Hz,0.5A; DC 9V,3.33A)**


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**July 12th, 2007**

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Wei Li  
Lab Manager  
Advanced Compliance Laboratory, Inc.

**NVLAP** ALL test results are supported and covered by the NVLAP accreditation  
Lab Code: 200161-4



TCB

**GRANT OF EQUIPMENT  
AUTHORIZATION**  
Certification  
Issued Under the Authority of the  
Federal Communications Commission

TCB

Compliance Certification Services  
561F Monterey Road  
Morgan Hill, CA 95037

Date of Grant: 03/22/2006  
Application Dated: 03/22/2006

Shyam Telecom Inc.  
18 Ireland Brook Drive  
North Brunswick, NJ 08902

Attention: S.A. Majumdar, Officer

**NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: **S3CDBE8B-20-S8-S9**

Name of Grantee: **Shyam Telecom Inc.**

Equipment Class: Amplifier

Notes: Dual Band Home Repeater DBHB-20-S8-S9

Grant Notes	FCC Rule Parts	Frequency		Output Watts	Frequency Tolerance	Emission Designator
		Range (MHz)	Watts			
	90	805.0 - 824.0	0.025	Amp		G3W
	90	851.0 - 869.0	0.01	Amp		G3W
	90	895.0 - 901.0	0.025	Amp		G3W
	90	935.0 - 940.0	0.01	Amp		G3W
	90	905.0 - 924.0	0.025	Amp		FEW,F1D
	90	951.0 - 969.0	0.01	Amp		FEW,F1D
	90	995.0 - 1001.0	0.025	Amp		FEW,F1D
	90	1035.0 - 1040.0	0.01	Amp		FEW,F1D

Booster. Output power listed above is composite for multi-channel operation. SMR band Uplink: 805-824 MHz; SMR band Downlink: 851-869 MHz; DEN band Uplink: 895-901 MHz; DEN band Downlink: 935-940 MHz. Maximum composite power at each antenna port for Downlink is +7 dBm (0.005W) and Uplink is +7 dBm (0.005W). This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter. The lowest antenna (Max. 0 dBd) and donor antenna (Max. 7 dBd) used for this transmitter must be installed to provide a minimum 20 cm separation distance between the server antenna and the body of user or nearby person. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.



For Technical Support, please contact at any of the following addresses:

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