Excellence in Compliance Testing

# Certification Exhibit

**FCC ID: S85-DAS900**
**IC: 10899A-DAS900**

**FCC Rule Part: 15.247**
**IC Radio Standards Specification: RSS-210**

**ACS Project Number: 12-0534**

Manufacturer: Channel D Solutions, Inc.
Model: DAS-900

# Manual


# DAS-900
# Antenna Distribution System

## Serial Number:

## User Manual

## Documentation and Reference Guide

CHANNEL D SOLUTIONS

**www.channelDsolutions.com**
**Sales - 615-323-2852** **Tech Support - 706-622-3589**

Customer:

Build Date:
Serial Number:

**AC Power fuse** – Type GMA 3A Fast Blow (Spare located in connector)
Location – Integrated in AC connector
AC input requirements: 85 – 250 VAC 50-60 Hz

**Operating Temperature Range –** From -40 to +50 degrees Centigrade.

**RF Input Connector:** RP-TNC Jack

**RF Output (To Antenna) Connector:** RP-N Jack

**Warranty** – One year parts and labor. Physical damage due to use/abuse is not covered under warranty. See Limited Warranty statement at the end of this manual. Customer pays shipping to Channel D Solutions.

**WARNING** – To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
Do not use this apparatus near water.
Do not expose the apparatus to dripping or splashing. Do not place objects filled with liquids, such as vases, on the apparatus.
The DAS-900 shall be connected to a main socket outlet having a protective grounding connection.
Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
Do not defeat the safety purpose of the polarizing or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point of exit on the DAS-900.
Only use attachments/accessories specified by the manufacturer.
Unplug this apparatus during lightning storms or when unused for long periods of time.

Refer all servicing to manufacturer. Servicing is required when the apparatus has been damaged in any way, for example if the power-supply cord has been damaged, liquid has been spilled or objects have fallen into the unit, or if it has been exposed to rain, moisture, does not operate normally, or has been dropped.

**A/C Power Warning**: Users should exercise extreme care when working with electricity. Additional care should be used when working with electricity outdoors in inclement weather. When working outdoors or near water, always connect the system into a ground-fault interrupting circuit. **There are no user-serviceable parts inside the DAS-900**. Opening the case may expose dangerous electrical components, and will void the warranty.

**Important FCC and Safety Information**

**I. Digital Device Statement**

A. The DAS-900 been tested and found to comply with the limits for Class B digital devices, pursuant to Part 15 of the Rules and Regulations of the U.S. Federal Communications Commission (the FCC) . This product is marketed as Class B digital device. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

B. This equipment generates, uses, and can radiate radio-frequency energy. If not installed and used in accordance with all instructions, it may cause harmful interference to radio communications.

C. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**II. Intentional Radiator Statement**

A. The DAS-900 is ONLY to be used with the modular, low-power radio transceiver module that operates pursuant to Part 15 of the FCC's Rules. The DAS-900 can only be operated AS A COMPLETE SYSTEM under FCCID S85-DAS900

B. Operation is subject to the following conditions:

1. The DAS-900 system may not cause harmful interference to other users of the radio spectrum.
2. Upon notification by a representative of the FCC that a DAS-900 system is causing harmful interference, use of the system must be suspended. Operation must not resume until the condition causing the harmful interference has been corrected.
3. The DAS-900 system must accept any interference received, including interference that may cause undesired operation.

C. The DAS-900 system must be used with only with the approved antennas listed below. Use of any non-approved antenna, or any modification to any part of the DAS-900 system violates the system's warranty, and also constitutes a violation of the FCC's Rules and Regulations and of § 302 of the Communications Act of 1934, as amended.
D. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that required for successful communication.
III. RF-Exposure Statement
A. The FCC has adopted limits on the exposure to radio-frequency energy from devices such as the DAS-900 system. The FCC adopted these limits by drawing upon the efforts of independent scientific organizations that have engaged in periodic evaluations of the scientific literature. The FCC's standards are intended to assure the safety of all persons, regardless of age or health.
B. The DAS-900 system has been designed and manufactured to comply with the FCC's exposure limits. When used with approved antennas, and when used in accordance with all instructions, the DAS-900 system complies with those exposure limits.
C. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body. This system must not be co-located or operating in conjunction with any other antenna or transmitter.

**Approved antennas:**
Channel D Solutions part number 302244, 2 dBi omnidirectional antenna
Channel D Solutions part number 385564, 3 dBi omnidirectional antenna

**Important Industry Canada Statements**

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

This radio transmitter (10899A-DAS900) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (10899A-DAS900) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

**Approved antennas:**
Channel D Solutions part number 302244, 50 ohm impedance, 2 dBi omnidirectional antenna
Channel D Solutions part number 385564, 50 ohm impedance, 3 dBi omnidirectional antenna

**Antennes approuvées :**
Channel D Solutions pièce 385564, 50 ohms impédance, antenne omnidirectionnelle du dBi 2
Channel D Solutions pièce 385564, 50 ohms impédance, antenne omnidirectionnelle du dBi 3

# System Description and Design

The Channel D Solutions DAS-900 Antenna Distribution System is designed for use only with host equipment that contains FCCID: S85-DAS900 RF Module, and is sold ONLY as a complete system under FCCID: S85-DAS900

It is used to expand communications coverage into areas (hereafter referred to as “zones”) that cannot be covered by a single antenna, due to distance or RF-blocking obstructions and/or materials. The system is designed for and sold ONLY to commercial end-users, and is not available for sale/use to the general public.

Initial system layout is of the most critical importance. We strongly recommend that the end-user use only someone that is familiar with RF propagation, and is familiar with pertinent FCC and Industry Canada Rules and Regulations. Many customers may already have in-house personnel that meet this criteria, but if not, we urge the customer to consult with such a person for system layout and installation.

**IT IS IMPERATIVE THAT NO SINGLE ANTENNA’S COVERAGE OVERLAP ANY OTHER ANTENNA’S COVERAGE!**

The system provides wireless communications through the use of a Frequency-Hopping-Spread-Spectrum RF module, and transmits a DIGITALLY-encoded signal. If there is overlap between zones, packet degradation may occur resulting in unacceptable communications.

The first step is to define what areas are required for reliable communications. Once that has been determined, the system should be used in a portable configuration within each area of required coverage with only ONE antenna connected to the unit with NO LESS than 30 feet of LMR-200 coaxial cable (or the equivalent thereof) to determine the exact coverage area of that antenna. Please note that in this test all other output connections must be terminated into a proper 50 ohm impedance non-radiating termination. We suggest using a map or drawing of the area, and plotting the coverage pattern observed.

Next, move the system to each subsequent zone, and repeat the test. Once all zones have been mapped, choose a location that is equidistant from each antenna to the DAS-900. If that is not possible, a lower loss coaxial cable may be used for longer antenna runs PROVIDED that the loss is not less than the equivalent a 30 foot length of LMR-200 cable.

If you find that acceptable coverage is accomplished with fewer than 8 antennas, the unused output connections MUST be terminated into a proper 50 ohm impedance non-radiating termination.

Again, a suitable consulting firm can be retained to do these tests if you lack proper in-house personnel to do these tests. If Channel D Solutions is retained to do these tests, your system will come equipped with ONLY the proper number of antenna connections available on the exterior of the system, to prohibit unauthorized addition of antennas.

# Connecting Host Equipment Containing the S85-DAS900 RF Module to Channel D Solutions DAS-900 Antenna Distribution System

- Connect the supplied RP-TNC/RP-TNC coaxial cable to the host equipment RF connector, connect the other end to the RF input of the DAS-900 distribution portion.

***Always terminate <u>all</u> unused outputs into a proper 50Ω Ohm load***

- **Power up sequence**
  Channel D Solutions DAS-900 distribution portion must be powered on first. Wait for steady state LED status before proceeding. Power on the host equipment, wait for initialization to complete. After initialization is complete, wait for an additional 30 seconds for AGC stabilization . The system is now ready for use.

**Limited Warranty**

This document details the Channel D Solutions Limited Warranty for all new products for sale within all regions with the exception of Military, Aerospace, and Government (MAG).
EXCEPT AS SET FORTH HEREIN ("LIMITED WARRANTY"), CHANNEL D SOLUTIONS MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, NONINFRINGEMENT OF THIRD PARTY RIGHTS, OR FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE EXPRESSLY DISCLAIMED.
I. Standard Limited Warranty. Channel D Solutions warrants its products, including supplied accessories, against defects in material or workmanship for the time periods as set forth below provided it was purchased from Channel D Solutions, or an authorized dealer or distributor.
a) Pursuant to this Limited Warranty, Channel D Solutions will, at its option:
i) repair the product using new or refurbished parts, or;
ii) replace the product with a new or refurbished product.
b) Remedies: In the event of a defect, the rights detailed in 1 (a) are your exclusive remedies. For purposes of this Limited Warranty, "refurbished" means a product or part that has been returned to its original specifications.
c) Standard Warranty Period:
i) All Channel D Solutions have a Limited Warranty of one year, with the exception of:
1) Cables, accessories, components & consumable items have a Limited Warranty of 90 days.
2) Any Channel D Solutions product that has been classified as obsolete at the time of sale has a Limited Warranty of 90 days from sales and will be replaced with the same product or a sales credit will be issued, at the sole discretion of Channel D Solutions.
3) Any Channel D Solutions product that is repaired or supplied as a replacement under the terms of this Limited Warranty shall inherit the remaining warranty period from the original product.

**Standard Warranty Period Start Date**

Warranty will commence from the Channel D Solutions invoice date. Any valid warranty claim within the Standard Warranty Period as determined by the Channel D Solutions invoice date will be covered without further supporting evidence. All warranty claims after this date must be supported by the Customer's proof of purchase that demonstrates the product is still within the Standard Warranty Period (as detailed in Section 1.c.i above) from their purchase date.

The Standard Warranty Period start date for contracts that include commissioning will be the date of the Site Acceptance Test (SAT) or one month from conclusion of the commissioning project, whichever is earlier.

**Invalidation of Warranty**

I) This Limited Warranty shall be invalidated if the product's outer case has been opened and internal modifications have been made or damage has occurred, or upon the occurrence of other damage or failure not attributable to normal wear and tear. Authorized modifications with Channel D Solutions' express written permission will not invalidate the warranty.
II. Exclusions. Services do not cover damage or failure caused by any occurrence beyond Channel D Solutions' reasonable control, including without limitation acts of God, fire, flooding, earthquake, lightning, failure of electric power or air conditioning, neglect, misuse, improper operation, war, government regulations, supply shortages, riots, sabotage, terrorism, unauthorized modifications or repair, strikes, labor disputes or any product failure that Channel D Solutions determines is not a result of failure in the Services provided by Channel D Solutions. Further Services excluded from this Agreement include: services required due to errors or omissions in Customer purchase orders; installation or maintenance of wiring, circuits, electrical conduits or devices external
(continued next page)

to the products; replacement or reconditioning of products which, in Channel D Solutions' opinion cannot be reliably maintained or properly serviced due to excessive wear or deterioration; Customer's failure to maintain the installation site in accordance with the environmental specifications of the products; or service on products removed from the location originally specified by Customer and/or reinstalled without the prior written approval of Channel D Solutions. Customer will pay Channel D Solutions' then current published charges to restore such Covered Products to a condition eligible for further service under this Agreement. Channel D Solutions shall be excused from and shall not be liable for any failure or delay in performance under this Agreement due to the foregoing or any causes beyond its reasonable control.

III. Limitation of Liability. IN NO EVENT WILL CHANNEL D SOLUTIONS BE LIABLE UNDER THIS AGREEMENT FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), REGARDLESS OF THE FORM OF ACTION, EVEN IF ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES.

IV. Assignment. Neither party may assign this Agreement or any portion thereof without the prior written consent of the other, except in the event of a merger, sale of all or substantially all of the assets or other corporate reorganization.

V. Ownership of replaced parts or product. All replaced parts or products become the property of Channel D Solutions.

VI. Entire Agreement. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof, and supersedes all prior or contemporaneous proposals, oral or written, and all other communications between them relating to the subject matter of this Agreement.