Real Freedom

Active UHF Splitter

Product Manual

Revision A

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Revision A

This manual contains important information regarding the installation and operation of the Real Freedom Active UHF Splitter. For safe and reliable operation, installers must ensure that they are familiar with, and fully understand, all instructions contained herein. Broadcast Sports International reserves the right to revise and improve its products as it sees fit. This publication describes the state of this product at the time of publication and may not always reflect the product in the future.

In this manual, the following symbols call your attention to important information:

⚠	**CAUTION** Indicates that care is required when proceeding to avoid damage to the system.
📝	**NOTE** Used to draw your attention to additional important information.
ⓘ	**TIP** Indicates information that may make procedures easier.
⚠	**WARNING** Indicates a potentially hazardous situation.

Warranty information

All products are warranted to be free from defects in materials or workmanship for a period of 24 months. If returned within the applicable warranty period, BSI will, at its sole discretion and at no cost to the customer, repair or replace the defective product with another unit of the same or equivalent model. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alterations or repairs.

Contact details and technical support

Real Freedom Team	For product information and help with missing or damaged items. Email: EngineeringDepartment@BSINTL.COM Tel: +1-410-564-2642
Telephone Support Line	Product technical support is provided via a telephone support line. Trained technicians are available to offer setup and configuration advice and to assist in troubleshooting technical issues. Tel: +1-410-564-2642
Return Merchandise Authorization (RMA) Procedure	Problems that cannot be resolved on the telephone may require the device to be returned to BSI for repair. In such cases, the telephone operator will assist the customer in obtaining an RMA. Please note that no returns can be accepted without a valid RMA.

About this manual

This manual contains safety information and information for installing, configuring, and operating a Real Freedom Active UHF Splitter.

It applies to the following products:

- ISP-3261: Real Freedom Active UHF Splitter

Contents

The Real Freedom Active UHF Splitter is an optional component to add additional functionality to the Real Freedom Fiber Antenna Extender system. The splitter provides multiple RF receiving paths allowing up to six Real Freedom Receivers to be simultaneously supported by a single Real Freedom Fiber Base unit.

> **NOTE:** An alternative option is to use a Real Freedom Fiber Base (Rack Mount), which combines the fiber base and active splitter in a single unit.

Configuration example

This example shows multiple RF cameras incorporating camera control deployed from a single remote site utilizing a single SMPTE hybrid fiber cable.

The Real Freedom Fiber Antenna Extender system consists of a Real Freedom Fiber Base unit (IFB-3211) which integrates with a Real Freedom Receiver for command and control along with a Real Freedom Fiber Remote unit (IFR-3211). Providing power to remote Real Freedom Downconverters and Data Transmitters over hybrid fiber cable, the system supports multiple RF cameras.
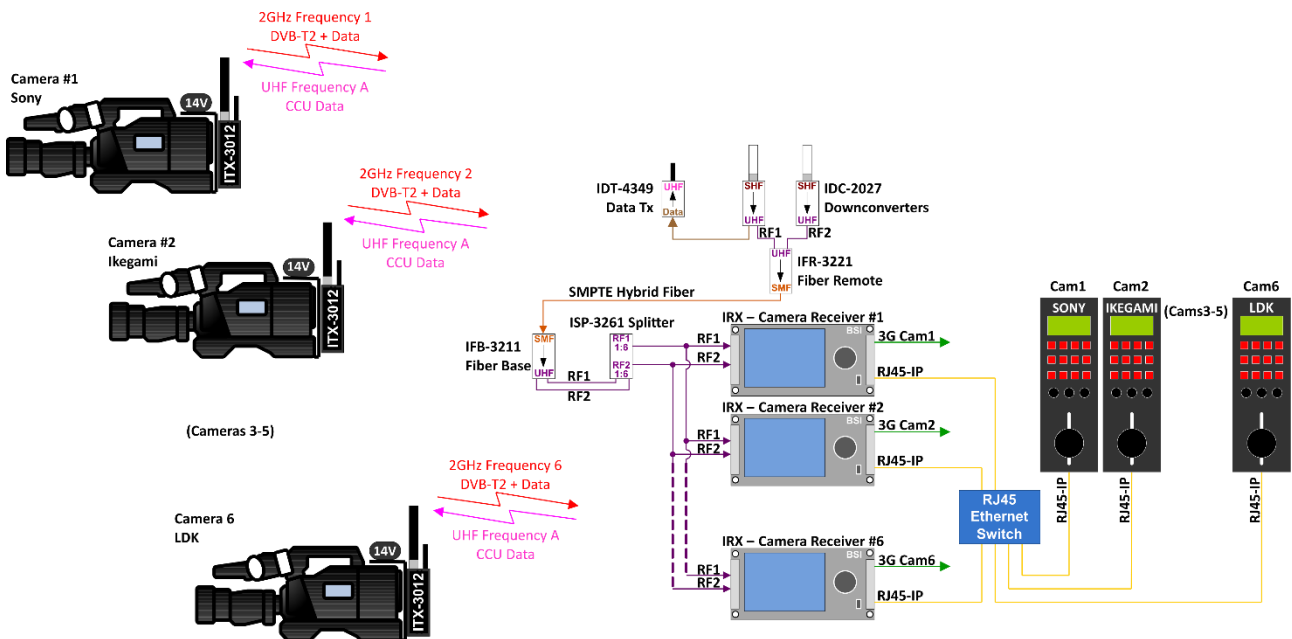

Figure 1: Networked multi camera reception with remote fiber extender and active UHF splitter.

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2
Installation and configuration

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This chapter contains the installation instructions for the Real Freedom Active UHF Splitter.

Overview

The main installation and configuration steps for a Real Freedom Active UHF Splitter are as follows:

1. Optionally, rack mount the UHF splitter in a standard equipment rack.

   You can install two UHF spitters side by side in the rack.

2. Connect the RF outputs from a Real Freedom Fiber Base unit to the Real Freedom Active UHF Splitter.

3. Connect the RF outputs from the Real Freedom Active UHF Splitter to Real Freedom Receivers.

4. From the receiver, monitor fiber optic signal levels, voltages, and currents of connected equipment, which can help to alert you when RF performance is affected. If RF levels are low, use the receiver to introduces extra gain into the system.

Preparation

When planning the installation location for the UHF splitter, you should take note of the following points:

- In general, you should install UHF splitters in an area where they can be accessed easily by support technicians. This area should also be out of reach or inaccessible to anyone that does not need to gain access, such as fans at a sporting event or attendees at a conference.

- Install a UHF splitter close to the receivers, ideally in the same equipment rack, to minimize the loss of RF signal strength.

- Install a UHF splitter close to the Real Freedom Fiber Base unit to minimize RF cable lengths and the loss of RF signal strength.

   Alternatively, use a Real Freedom Fiber Base (Rack Mount), which is a combined fiber base unit and active UHF splitter.

Environmental requirements

The following table summarizes the environmental requirements for the operation and storage of a Real Freedom Active UHF Splitter.

Table 1: Environmental requirements

Specification	Details
Humidity	95% non-condensing
Operating and storage temperature	14° to 149°F / -10° to +65°C

Power requirements

The following table summarizes the power requirements for a Real Freedom Active UHF Splitter.

Table 2: Power requirements

Specification	Details
Power	9–36 V DC
Consumption	5 W

Unpack the active splitter

Unpack the Real Freedom Active UHF Splitter and refer to the packing list to ensure that all items are included. Report any missing items immediately to the Real Freedom Team.

Inspect the Real Freedom Active UHF Splitter for signs of damage. Report any damage to the Real Freedom Team.

Additional items required for installation

To install the Real Freedom Active UHF Splitter, you will require the following additional items:

- 9–36 V DC power supply with 4-pin LEMO connector.
- Standard 19-inch equipment rack with at least one Rack Unit (RU) of free space and a Real Freedom UHF Splitter Rack Mount Kit (20006-9-005) if you intend to rack mount the UHF splitter.
- The other components of your Real Freedom installation, which may include one or more receivers, downconverters, data transmitters, camera back transmitters and cameras, fiber base and remote units.

Cable requirements

To install the Real Freedom Active UHF Splitter, you will require the following cables:

- Coaxial cables with BNC connectors.

  It is recommended that you use good quality 75 Ohm cable.

Rack mount a UHF splitter

The Real Freedom Active UHF Splitter is designed to be mounted in a standard 19-inch (48.3 cm) equipment rack. The unit is 1RU high and half rack width. A rack mount kit (20006-9-005) allows you to mount two UHF splitters side by side.

> **NOTE:** You can also place a UHF splitter on a solid, stable surface.

Tools

To rack mount a Real Freedom Active UHF Splitter, you will require the following tools:

- #3 Phillips head screwdriver

Precautions

You should read these precautions before you install a Real Freedom Active UHF Splitter in an equipment rack.

- Active UHF splitters are fragile and vulnerable to damage. If you drop or damage the unit, it should be returned to BSI for inspection.
- Before you begin the installation, make sure that the splitter is disconnected from the power source.
- Close any open spaces in the rack with blank panels since open spaces will reduce cooling efficiency.

- To prevent the risk of overheating, use in a well-ventilated area.

- Since there is no power button (on/off switch) on the UHF splitter, ensure that you have access to the rear of the rack or leave a sufficient wire management loop to pull the unit out from the front of the rack.

Mounting procedure for a UHF splitter

To mount the UHF splitter, you will require 1RU (1 ¾ inches, 44.45 mm) of vertical rack space and a Real Freedom UHF Splitter Rack Mount Kit (20006-9-005).

1. Attach the *Rack Mount Plate* to each UHF splitter using four M3 x 8 screws.
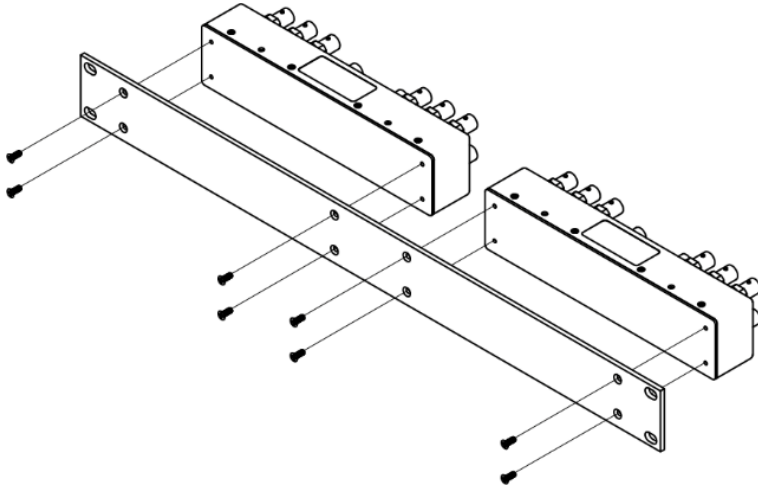
2. Install the UHF splitter at the desired location in the equipment rack and secure to the vertical uprights using four rack screws.

Connections

Refer to the following drawing which shows the locations of the connectors on the Real Freedom Active UHF Splitter.

> ⚠️ **CAUTION:** To prevent damage, it is recommended that you only use BSI supplied cables and accessories with this product.
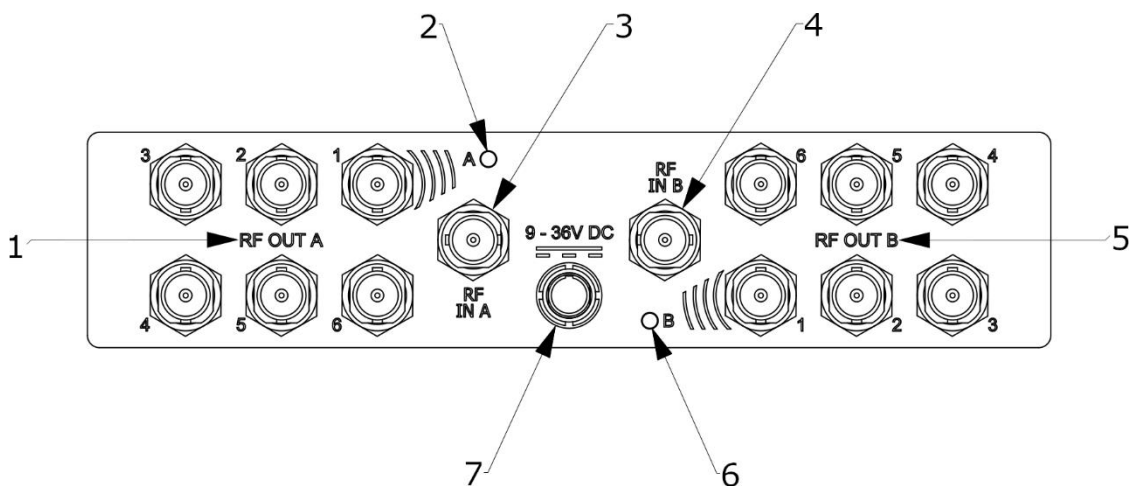

Figure 2: UHF splitter connections and LEDs on the rear panel

Key	Component	Description
1	RF OUT A	Use the RF connectors to split the RF output from RF input A. Each output forms a single RF input to a Real Freedom Receiver allowing you to connect up to six Real Freedom Receivers.
		You should connect BNC 1 to the Master Real Freedom Receiver that hosts the Connection Map. You can power the splitter on BNC 1 from the Real Freedom Receiver.
		Connector: BNC (F)
2	A	Indicates whether the Real Freedom Active UHF Splitter is powered and in active or passive mode.
		• FLASHING GREEN: Powered and in active mode (additional gain added for splitter loss).
		• FLASHING RED: Powered and in passive mode (no additional gain added for splitter loss).
		Add a gain boost when RF levels are too low from the receiver's **Fiber & Splitter** menu.
3	RF IN A	Use to connect the Real Freedom Active UHF Splitter to a Real Freedom Fiber Base Unit (RF1) or to a Real Freedom Downconverter.
		Connector: BNC (F)
4	RF IN B	Use to connect the Real Freedom Active UHF Splitter to a Real Freedom Fiber Base Unit (RF2) or to a Real Freedom Downconverter.
		Connector: BNC (F)
5	RF OUT B	Use the RF connectors to split the RF output from RF input B. Each output forms a single RF input to a Real Freedom Receiver allowing you to connect up to six Real Freedom Receivers.
		You should connect BNC 1 to the Master Real Freedom Receiver that hosts the Connection Map. You can power the splitter on BNC 1 from the Real Freedom Receiver.
		Connector: BNC (F)
6	B	Indicates whether the Real Freedom Active UHF Splitter is powered and in active or passive mode.
		• FLASHING GREEN: Powered and in active mode (additional gain added for splitter loss).
		• FLASHING RED: Powered and in passive mode (no additional gain added for splitter loss).
		Add a gain boost when RF levels are too low from the receiver's **Fiber & Splitter** menu.
7	9–36 V DC	Use to power the Real Freedom Active UHF Splitter.
		DC power is required if you do not want to use the receiver's phantom power or when using the splitter with third-party equipment. Note that the splitter has a fail-safe passive mode of operation when no power is available, or power is lost.
		Connector: 4-pin LEMO

Connect a fiber base unit to a UHF splitter (RF outputs)

Use coaxial cables to connect the outputs from a Real Freedom Fiber Base Unit (RF1 and RF2) to the RF IN A and RF IN B connectors on a Real Freedom Active UHF Splitter.

It is recommended that you use good quality 75 Ohm cable for connections.

Connect a UHF splitter to a receiver

Use coaxial cables to connect the outputs (RF OUT A and RF OUT B) on the Real Freedom Active UHF Splitter to the BNC connectors on the back of Real Freedom Receivers (RF1 and RF2).

You can connect the RF outputs to up to six receivers. It is recommended that you use good quality 75 Ohm cable for connections.

NOTE: You should connect BNC 1 to the Master Real Freedom Receiver that hosts the Connection Map.

Configure a UHF splitter

Once the power is supplied, the Real Freedom Receiver automatically detects the Real Freedom Active UHF Splitter and Real Freedom Antenna Extender (remote and base units) and configures itself appropriately.

NOTE: Refer to the *Real Freedom Receiver Product Manual* for more information on the fiber configuration options and how to enable Active Mode (Gain Boost) when RF levels are low.

3
Operation

Once connected to the system and configured, no further changes are required to the Real Freedom Active UHF Splitter during the routine operation of the system.

> ℹ **TIP:** Use the receiver's **Fiber Status** page to view fiber optic signal levels, voltages and currents of connected equipment, and real-time health check information, which can help to alert you when RF performance is affected. If the fiber levels are low or extremely low, you will see amber and red signal indicators. This usually indicates that you need to clean the fibers.

UHF splitter status LEDs

Use the LED indicators (A and B) on the Real Freedom Active UHF Splitter to help you to determine whether the splitter is in active or passive split mode.

Table 3: Active splitter LED indications

Condition	Description
RED (SLOW FLASH)	PASSIVE SPLIT MODE The splitter unit is powered from the Real Freedom Receiver and is in the passive split state. This is the normal mode of operation which can be controlled from the Real Freedom Receiver.
GREEN (SLOW FLASH)	ACTIVE SPLIT MODE The splitter unit is powered from the Real Freedom Receiver and is in the active split state. The active state introduces extra gain into the system which can be controlled from the Real Freedom Receiver.
OFF	UN-POWERED MODE The splitter unit is not powered from the Real Freedom Receiver on BNC 1. The splitter will still operate in a passive mode but will not appear on the receiver's Connection Map.

4
Troubleshooting

This chapter provides troubleshooting information for the Real Freedom Active UHF Splitter.

Use this information to help you to solve some of the typical problems that you may encounter when using a Real Freedom Active UHF Splitter in a Real Freedom Fiber system.

Table 4: UHF splitter troubleshooting

Symptom	Possible cause	Actions
Poor RF signal.	Cable runs too long.	• Ensure that you minimize the required cable lengths and RF signal loss by installing the UHF splitter close to the receivers and fiber base unit.
	RF levels too low.	• Use the receiver's **Fiber & Splitter** menu to add a gain boost into the splitter system. Note that if you add a boost when RF levels are not too low, you can overload/saturate the system.
	Issues with the downconverters connected to the fiber remote unit.	• Check the placement of downconverters attached to the fiber remote unit. • Verify there is no mismatch of antennas. All downconverter and transmitter antennas should match your band of operations. • Check downconverters are powered.
	Poor or no fiber signal from the remote unit to the base unit.	• Check that all fiber connectors are securely fastened. • Remove the fiber connections and clean the glass tip. Reconnect and verify the signal. • Check that fiber is connected to the correct ports on both the fiber remote and fiber base units (S to S and D to D). • Turn off power to the receiver's RF ports carrying fiber. • Change the fiber cable.

This chapter describes the maintenance, cleaning, and storage procedures for the Real Freedom Active UHF Splitter.

Routine maintenance procedures

You should perform the following maintenance procedures on a regular basis.

> ⚠️ **WARNING:** The Real Freedom Active UHF Splitter does not contain user serviceable parts. Warranty is void if the device is opened. Refer servicing to qualified BSI personnel only.

Performance monitoring

It is recommended that you periodically monitor the overall performance of the fiber system. If you experience failure or deterioration in the performance of the system, check cables and adapters, input, and output connectors for damage.

Visual inspection

Depending on operating environments and use, periodically inspect the fiber antenna extender components and UHF splitter for signs of damage, dirt, or corrosion. Check that all markings and warning labels are in good condition.

Cleaning

If necessary, use low-pressure compressed air cleaning to remove small particles and debris from the surface of the UHF splitter.

Clean connector surfaces with a cotton swab moistened with a small quantity of alcohol. Use a lint-free cloth to wipe connector surfaces after cleaning.

> ⚠️ **CAUTION:** Do not use abrasive cleaners.

Storage

Store UHF splitters in the rack at operating temperature.

For long term storage:

1. Disconnect all cables from the Real Freedom Active UHF Splitter and remove from the rack if rack mounted.

2. Cover the connectors with suitable dust covers.

3. Place the Real Freedom Active UHF Splitter in protective packaging and store in a cool, dry environment.

Technical drawings and connector pinouts for the Real Freedom Active UHF Splitter.

Dimensions

The following drawings show the dimensions of the Real Freedom Active UHF Splitter and the positions of the holes used to mount the unit.
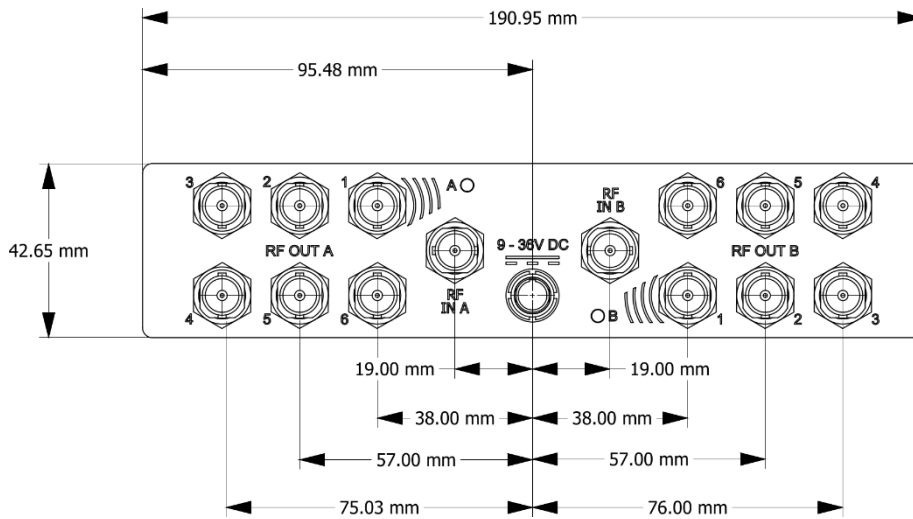

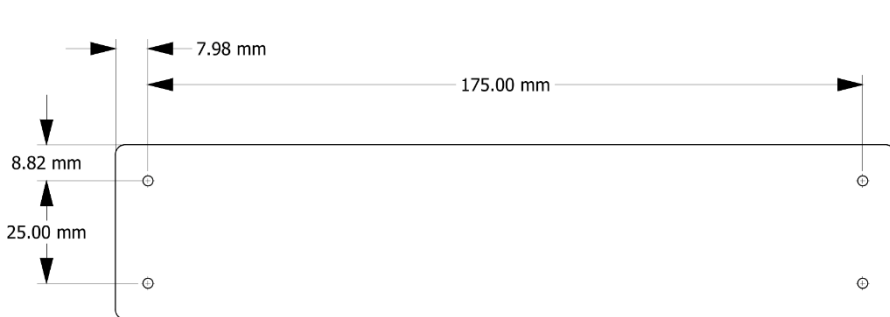*Figure 3: Active UHF splitter rear panel showing connectors*

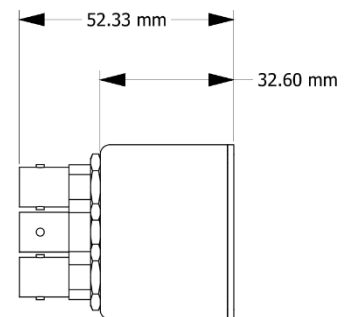*Figure 4:Active UHF splitter front panel showing mounting holes*   *Figure 5: Side view*

Connector pinout assignments

Pinouts for the connectors on the Real Freedom Active UHF Splitter.

DC power

Use to power the Real Freedom UHF Splitter.
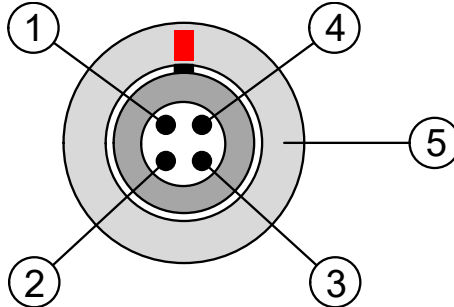
Connector: LEMO 0B 4-Pin (ECG.0B.304.CLN)

Figure 6: Front face of LEMO power connector

Pin	Purpose
1	Return
2	RS-232 RXD
3	RS-232 TXD
4	+9 to 36 V DC
5	Shield

RF input/output connectors

Use to connect the Real Freedom Active UHF Splitter to a Real Freedom Fiber Base Unit (input) or Real Freedom Downconverter (input) or to split the RF output and connect to Real Freedom Receivers.
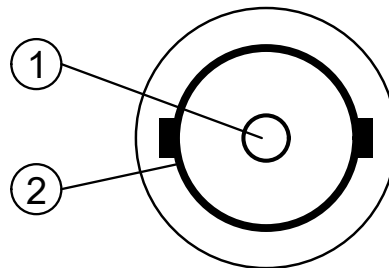
Connector: BNC female (75 Ohm)

Figure 7: Front face of BNC (F) connector

Pin	Purpose
1	RF input/output
2	Ground/Shield

Safety and regulatory compliance

Important safety and electromagnetic compatibility information.

Safety notice

It is extremely important to read and understand all safety information and instructions before using a Real Freedom Active UHF Splitter. Specific warnings and cautions are found throughout this product manual, and you should follow this guidance during the routine use of a Real Freedom Active UHF Splitter.

Electromagnetic compatibility – Class A

Information about the Real Freedom Active UHF Splitter's electromagnetic compatibility.

Compliance statement (United States)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions, however, set forth in Section 15.5 of the FCC Rules: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. 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.

Changes or modifications not expressly approved by Broadcast Sports International could void the user's authority to operate the equipment.

Disposal and recycling – European Union

This product is required to comply with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC and 2012/19/EU) and is marked with the following symbol:

This symbol indicates that this product is not to be disposed of with household waste, according to the WEEE Directive and your national law. This product should be handed over to a designated collection point or to an authorized collection site for recycling waste Electrical and Electronic Equipment (EEE).

Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substance that are generally associated with EEE and products of this type. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about recycling this product, please contact BSI.