TBS TRIUMPH FPV Antenna

Revision 2017-04-14

Compact and all-around capable 5.8GHz circular polarized antenna

The TBS TRIUMPH, a revolution in circular 5.8 GHz technology. Hand-tuned for ultimate noise and reflection rejection. True circularity and great range. Designed by none other than IBCrazy.

In our quest for the cleanest video signal and best range possible, we have ventured way beyond the traditional bent lobes of Cloverleaf designs and invested significant time and effort in finding the best antenna designs known to man, and modifying them specifically for FPV use.

After extensive design and testing, we focused on making sure the Triumph was durable enough to take even the toughest of abuse. After many test flights and extensive feedback from our pilots, we decided to use a double-jacket heavy duty Semi-Rigid cable and tin-plated connectors. For protection we created a special foam-filled and ultrasonic welded enclosure to secure the antenna from inbound trees, or other objects.

Key features

- Manufactured and tested to highest standards
- Best in class range and signal quality
- Extra compact and low weight
- Ultrasonic welded and foam infused cover for ultimate crash-protection
- Double-jacket semi-rigid cable for heavy impact resistance

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Specifications

Frequency range:	5500 to 6000 MHz - typ. 5.8GHz
Antenna gain:	1.26 dBiC
Axial ratio:	0.74
Polarization:	Both models available: - Right Hand Circular Polarized (RHCP) - black casing color - Left Hand Circular Polarized (LHCP) - orange casing color
Cable:	RG402 - Semi-rigid, heavy duty, double jacket (protective sleeves)
Connector:	Two models available: - SMA male connector - gold-plated - RP-SMA (reverse polarity) male connector - tin-plated
Weight:	Stub model: 8.5 to 9.7 grams Normal model: 11.5 grams
Height:	Stub model: 50 mm, 1.96 inch Normal model: 85 mm, 3.3 inch
Kit contents:	2x TBS TRIUMPH SMA/RP-SMA RHCP/LHCP antenna (for TX and RX)

Connector types

There are two kinds of SMA connectors, regular SMA and reversed-polarity SMA (RP-SMA). Depending on your VTX and VRX setup, you need to ensure that you pick the right one. Accidentally connecting a SMA connector to a RP-SMA socket will leave you with no direct center conductor, severely limiting the range - and leaving you pundering what's going on.

Compatibility with TBS equipment:

- **Both SMA and RP-SMA connector available:** TBS UNIFY PRO 5G8 V2, TBS UNIFY PRO 5G8 HV
- **Only SMA female connector:** TBS UNIFY PRO 5G8, TBS UNIFY PRO 5G8 HV Race, TBS UNIFY 2G4 500mW, TBS UNIFY 2G4 800mW, TBS GROUNDSTATION 2G4, TBS Lawmate 2.4GHz 500mW
- **Only RP-SMA female connector:** TBS GREENHORN, TBS DOMINATOR RX 5.8GHz

SMA - no center-pin (RHCP antenna)

RP-SMA - center-pin (LHCP antenna)

Signal polarization

This antenna is a circular-polarized (CP) antenna. That means that the radiated (and received) signal is propagated in a corkscrew form, as opposed to a fixed linear horizontal or vertical plane. This, essentially, gives you an overall better signal when the transmitting side changes orientation during the session.

Circular-polarized antennas can transmit (and resonate/receive) in one of two directions, either left-hand direction or right-hand direction. Both end devices, the transmitter and receiver, must use the same polarization direction otherwise there will be a phase mismatch and poor signal. That is why we colored the RHCP and LHCP differently.

- TBS TRIUMPH Right-Hand Circular-Polarized (RHCP) antenna is **black** - most commonly used
- TBS TRIUMPH Left-Hand Circular-Polarized (LHCP) antenna is **orange**

If there are a lot of transmitters around you using RHCP antennas, you will always get a better signal if you switch over to a LHCP antenna, as you can utilized the Triumph's excellent noise and reflection rejection properties.

Antenna length

The TBS TRIUMPH is available in two antenna lengths; a shorter stub at 50 mm / 1.97 inch for compact setups and a normal one at 85 mm / 3.3 inch that allows some bending.

Stub model

Normal length

Mounting antenna

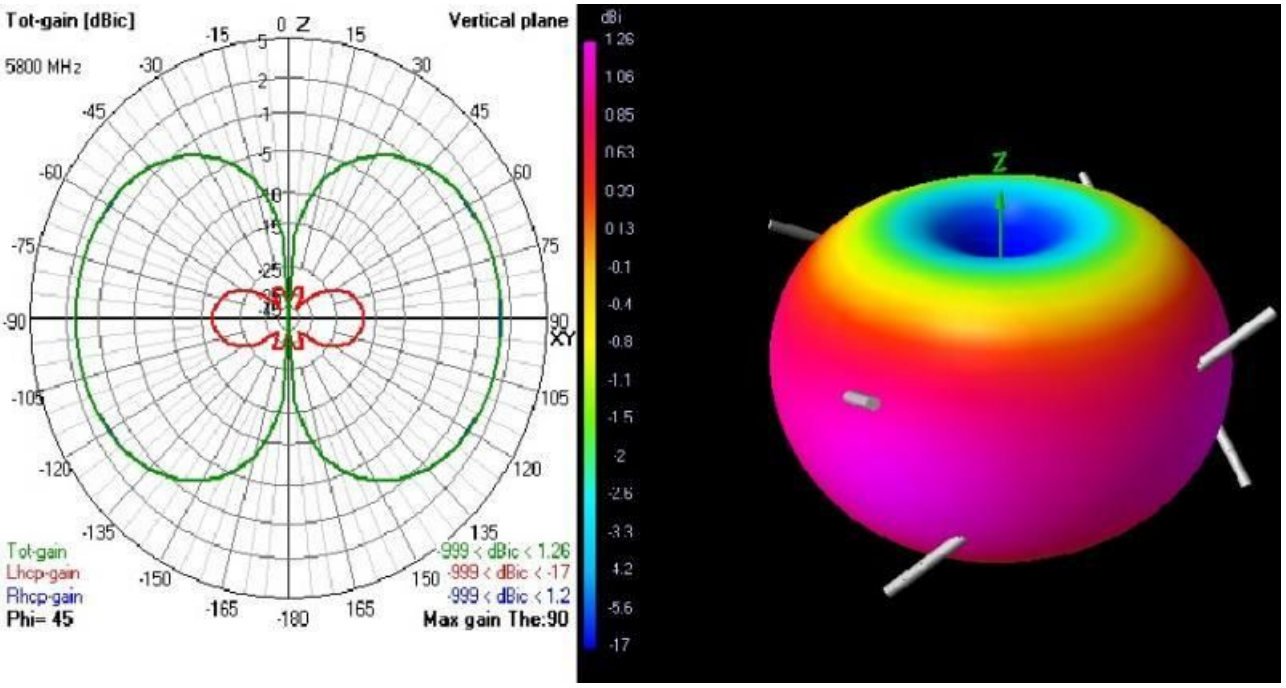
Attaching the antenna to your transmitter or receiver is easy, just screw it on. But it is important that you tighten it by holding the end of the connector (not the antenna or cable itself) to keep it in good condition. Tighten it just enough, do not use excessive force.

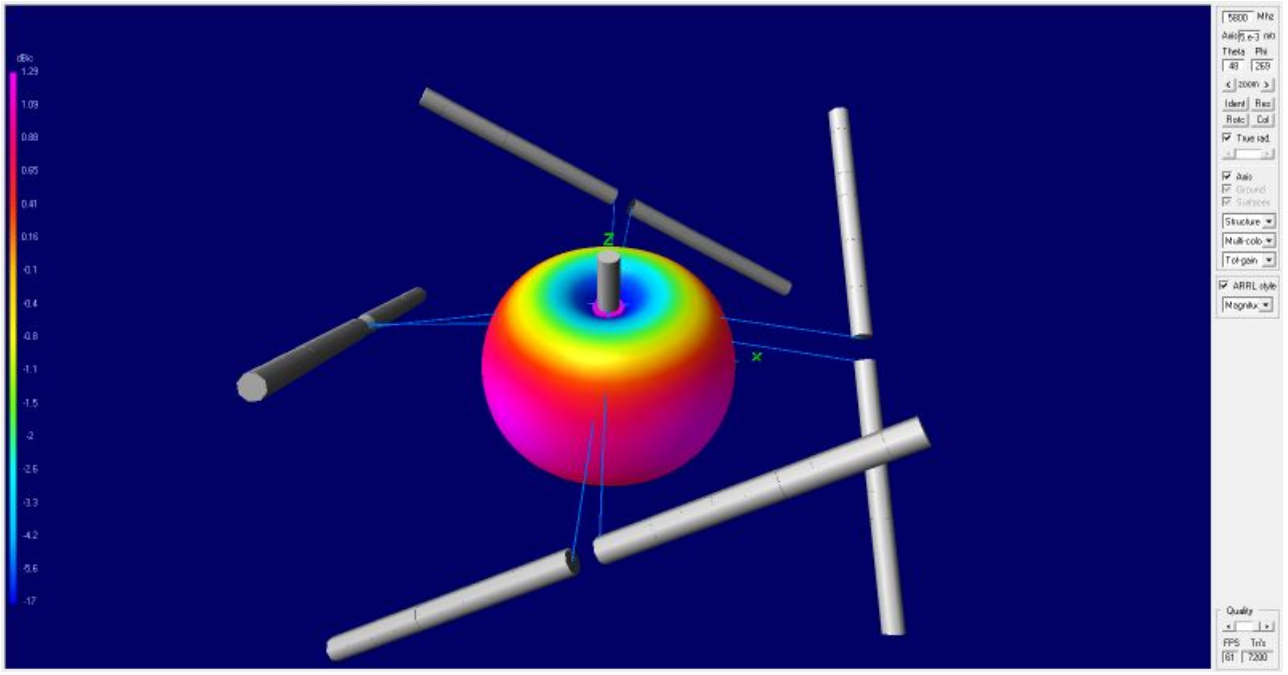
You can bend the normal model slightly, up to 45 degrees, if you need to adjust it for clearance or proper fit. The cable will keep its shape after you have made the bend. Avoid bending the cable unnecessary as it can have a detrimental effect on the cable's RF characteristics and attenuate the signal.

Radiation pattern

The following graphical representation displays the radiation properties of the RHCP antenna (exactly the same for LHCP, just in the other direction).

The large spherical lobes shows why this makes a perfect FPV antenna; wide coverage, even antenna gain and excellent reflection rejection properties.





Counterfeits

With the success of the TBS Triumph antenna line, cloning and counterfeiting was inevitable. The clones are not made in the same factory, or using the same components as the original. It goes without saying that the clones are by far inferior quality as they lack the controlled and automated manufacturing, and often times only $1 or $2 cheaper than the originals.

TBS guarantees consistency and provides warranty, so buying genuine is a no-brainer. However, there may be occasions where counterfeits are hard to distinguish from originals. Therefore, we provide the following criteria to help you avoid clones:

- Websites such as Alibaba, Aliexpress, Taobao, 1688.com only carry counterfeits
- There is no legitimate stock in China, so if your parcel originates from there, they are counterfeit
- As of January 2017, all TBS antennas have the words “TBS” and the TBS logo etched into the SMA connector

If you suspect you have purchased a counterfeit antenna, please keep your proof of purchase and contact the vendor immediately to get a refund. You can also contact the TBS Customer Support for further information:

http://team-blacksheep.freshdesk.com

Good practices

We have compiled a list of all of practices which have been tried and tested in countless environments and situations by the TBS crew and other experienced FPV pilots.

Follow these simple rules, even if rumors on the internet suggest otherwise, and you will have success in FPV.

- Start with the bare essentials and add equipment one step at a time, after each new equipment was added to proper range- and stress tests.
- Do not fly with a video system that is capable of outperforming your R/C system in terms of range.
- Do not fly with a R/C frequency higher than the video frequency (e.g. 2.4GHz R/C, 900MHz video).
- Monitor the vitals of your plane (R/C link and battery). Flying with a digital R/C link without RSSI is dangerous.
- Do not use 2.4GHz R/C unless you fly well within its range limits, in noise-free environments and always within LOS. Since this is most likely never the case, it is recommended to not use 2.4GHz R/C systems for longer range FPV.
- Do not fly at the limits of video, if you see noise in your picture, turn around and buy a higher-gain receiver antenna before going out further.
- Shielded wires or twisted cables only, anything else picks up RF noise and can cause problems.
- When using powerful R/C transmitters, make sure your groundstation equipment is properly shielded.
- Adding Return-To-Home (RTH) to an unreliable system does not increase the chances of getting your plane back. Work on making your system reliable without RTH first, then add RTH as an additional safety measure if you must.
- Avoid powering the VTx directly from battery, step-up or step-down the voltage and provide a constant level of power to your VTx. Make sure your VTx runs until your battery dies.
- Do not power your camera directly unless it works along the complete voltage range of your battery. Step-up or step-down the voltage and provide a constant level of power to your camera. Make sure your camera runs until your battery dies.
- A single battery system is safer than using two dedicated batteries for R/C and FPV. Two batteries in parallel even further mitigate sources of failure.
- For maximum video range and “law compatibility”, use 2.4GHz video with high-gain antennas.
- When flying with R/C buddies that fly on 2.4GHz, or when flying in cities, it is perfectly possible to use 2.4GHz video provided you stick to the channels that do not lie in their band (CH5 to CH8 for Lawmate systems, available from TBS).
- Do not use diversity video receivers as a replacement for pointing your antennas, diversity should be used to mitigate polarization issues.

- Improving the antenna gain on the receiver end is better than increasing the output power (except in RF-noisy areas). More tx power causes more issues with RF on your plane. 500mW is plenty of power!
- Try to achieve as much separation of the VTx and R/C receiver as possible to lower the RF noise floor and EMI interference.
- Do not buy the cheapest equipment unless it is proven to work reliably (e.g. parts falling off, multitudes of bug fix firmware updates, community hacks and mods are a good indicator of poor quality and something you do NOT want to buy for a safe system). Do due diligence and some research before sending your aircraft skyward.

Manual written and designed by ivc.no in cooperation with TBS.