



# CLASS A+++ FLY LEADS

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Reduce EM interference within home installations (LTE/4G and beyond)



**technetix**

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## LTE/4G System interference over Cable TV channels

A network is made up of a number of different parts, each specifically designed to push through a clear signal to the end-user. If at any point there is a weak connection, the quality of the signal can be compromised. Due to the increased pressure of next generation devices such as LTE/4G which transmit at the same frequency spectrum as cable TV networks, there is an increased risk of interference within the home environment.

| E-UTRA       | Operating band (MHz) |               | Duplex mode | Channel               | Country/ Area |
|--------------|----------------------|---------------|-------------|-----------------------|---------------|
|              | Uplink (UL)          | Downlink (DL) |             | Bandwidths (MHz)      |               |
| Band I       | 1920 - 1980          | 2110 - 2170   | FDD         | 5, 10, 15, 20         | JP, KR, EU    |
| Band III     | 1710 - 1785          | 1805 - 1880   | FDD         | 1.4, 3, 5, 10, 15, 20 | US            |
| Band IV      | 1710 - 1755          | 2110 - 2155   | FDD         | 1.4, 3, 5, 10, 15, 20 | US            |
| Band VII     | 2500 - 2570          | 2620 - 2690   | FDD         | 5, 10, 15, 20         | EU            |
| Band VIII    | 880 - 915            | 925 - 960     | FDD         | 1.4, 3, 5, 10         | EU            |
| Band XIII    | 777 - 787            | 746 - 756     | FDD         | 1.4, 3, 5, 10         | US            |
| Band XIV     | 788 - 798            | 758 - 768     | FDD         | 1.4, 3, 5, 10         | US            |
| Band XVII    | 704 - 716            | 734 - 746     | FDD         | 1.4, 3, 5, 10         | US            |
| Band XX      | 832 - 862            | 791 - 821     | FDD         | 5, 10, 15             | EU            |
| Band XXXIII  | 1900 - 1920          |               | TDD         | 5, 10, 15, 20         | EU            |
| Band XXXIV   | 2010 - 2025          |               | TDD         | 5, 10, 15             | EU            |
| Band XXXVIII | 2570 - 2620          |               | TDD         | 5, 10                 | EU, CN        |
| Band XL      | 2300 - 2400          |               | TDD         | 10, 15, 20            | CN            |



LTE/4G (Long Term Evolution) is the latest in mobile phone technology and is the standard used throughout Europe and the US. LTE significantly improves the service that operators can provide to users, resulting in increased demands. To reduce attenuation of signal propagation, operators prefer to use a low LTE band with a frequency also used by cable networks. Operating on a starting frequency of 704MHz in the US and 791MHz in Europe means that any cable channels running at the same frequencies can be subject to interference.

LTE/4G 800 MHz coverage in Europe is presented on the map above.

Most European countries are already covered by LTE at 800 MHz, therefore the problem with interference to cable networks is a European wide one.

Besides LTE/4G there are many other external sources of electromagnetic radiation present in the in-home environment. These include short wave radio, mobile phones, DVB-Terrestrial and other services which can affect cable TV channels. Therefore, the screening effectiveness of a fly lead needs to mitigate the effects of both the egress and ingress of unwanted signals.

## How to address the interference problem?

To counteract interference from LTE/4G and other services, Technetix has carried out a series of tests and calculations. The outcome of these tests is to determine the level of screening effectiveness required on fly leads to provide protection within the home environment.

| Distance of cable equipment from LTE/4G device | Screening effectiveness for adequate protection | Minimum equivalent screening class |
|--|---|------------------------------------|
| 6 m  | 79 dB   | > Class B                          |
| 3 m  | 85 dB   | > Class A                          |
| 1 m  | 94 dB   | > Class A+                         |
| 0.5 m  | 100 dB  | > Class A ++                       |

Figure 1: Level of screening effectiveness required

According to EN 50117, the screening efficiency classes are defined as:

|           | Transfer impedance (mOhm/m) 5 - 30 MHz | Screening attenuation (dB) 30 - 1000 MHz | Screening attenuation (dB) 1000 - 2000 MHz | Screening attenuation (dB) 2000 - 3000 MHz |
|-----------|--|--|--|--|
| Class B   | <15                                    | >75                                      | >65  | >55  |
| Class A   | <5                                     | >85                                      | >75  | >65  |
| Class A+  | <2.5                                   | >95                                      | >85  | >75  |
| Class A++ | <0.9                                   | >105                                     | >95  | >85  |



## Technetix class A++ fly leads

In order to ensure adequate protection from LTE/4G devices within the home, Class A++ screening effectiveness is required. To meet this requirement, Technetix has developed a comprehensive range of Class A++ fly leads incorporating Technetix F-Safe and IEC Safe Class A++ connectors, both straight and right angled. The Technetix class A++ fly leads range has been designed to provide optimal performance in a home environment.

Technetix pays close attention to detail in all aspects of the development, from specification of the materials, construction and performance characteristics. This close attention optimizes the end user experience, from installation to the long life expectancy of the product. Using precise dimensions with the outstanding resilience of the connectors and inner pins delivers a very reliable connection. The connectors are tightly secured and molded to the cables to ensure good pull and strain relief.

The cables' inner conductors are soldered to their inner pins to maintain excellent electrical and mechanical performance. Technetix fly leads exhibits low insertion loss, high return loss and exceeds Class A++ screening effectiveness over the whole frequency range, using quadruple shielding with a mix of braids and foils.



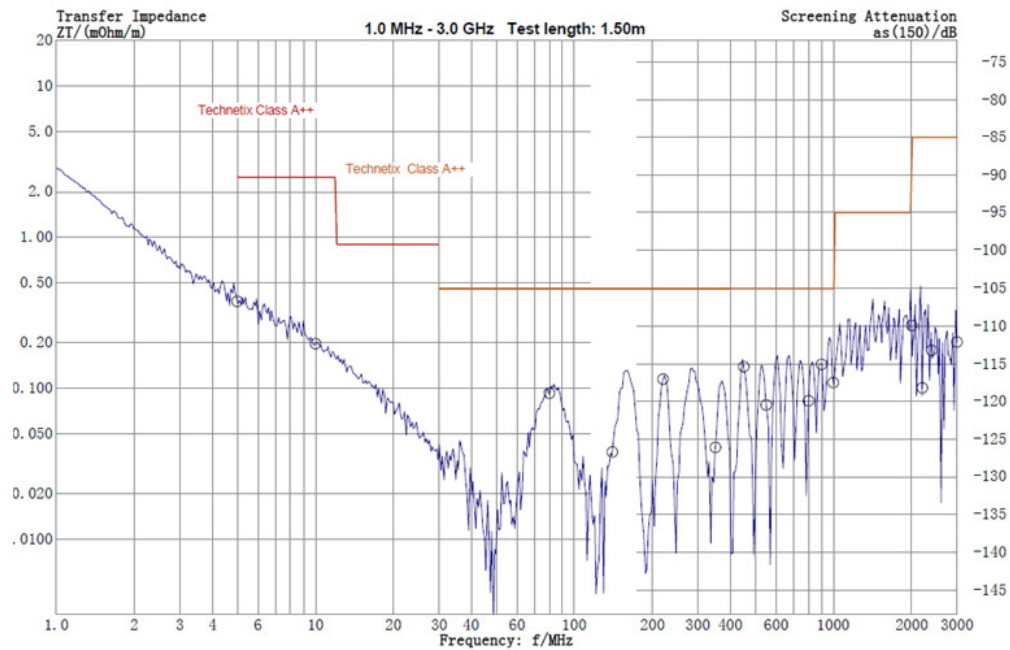


Figure 3: IEC Male - F Male push on fly lead screening performance

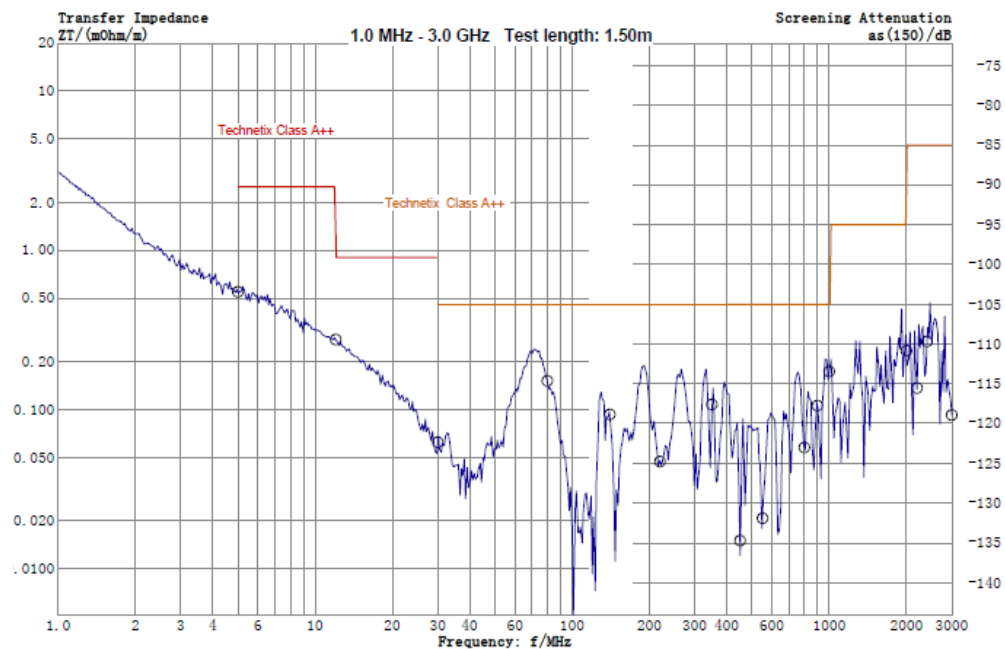


Figure 4: IEC Male to F Male right angled fly lead screening performance

Electrical performance information available on request.

## Technetix class A++ fly leads ordering information

### Straight combinations

| Article number | Item name    | Description                            |
|----------------|--------------|--|
| 19005202       | RLA++10-1.5B | RLA++ FLYLEAD IEC-M - IEC-F 1.5M BLACK |
| 19005203       | RLA++10-3B   | RLA++ FLYLEAD IEC-M - IEC-F 3M BLACK   |
| 19005204       | RLA++10-5B   | RLA++ FLYLEAD IEC-M - IEC-F 5M BLACK   |
| 19005205       | RLA++12-1.5B | RLA++ FLYLEAD IEC-M - F-M 1.5M BLACK   |
| 19005206       | RLA++12-3B   | RLA++ FLYLEAD IEC-M - F-M 3M BLACK     |
| 19005207       | RLA++12-5B   | RLA++ FLYLEAD IEC-M - F-M 5M BLACK     |
| 19005208       | RLA++30-1.5B | RLA++ FLYLEAD F-M - F-M 1.5M BLACK     |
| 19005209       | RLA++30-3B   | RLA++ FLYLEAD F-M - F-M 3M BLACK       |
| 19005210       | RLA++30-5B   | RLA++ FLYLEAD F-M - F-M 5M BLACK       |
| 19005211       | RLA++40-1.5B | RLA++ FLYLEAD IEC-F - F-M 1.5M BLACK   |
| 19005212       | RLA++40-3B   | RLA++ FLYLEAD IEC-F - F-M 3M BLACK     |
| 19005213       | RLA++40-5B   | RLA++ FLYLEAD IEC-F - F-M 5M BLACK     |
| 19005928       | RLA++40-3W   | RLA++ FLYLEAD IEC-F - F-M 3M WHITE     |
| 19005929       | RLA++10-1.5W | RLA++ FLYLEAD IEC-M - IEC-F 1.5M WHITE |
| 19005930       | RLA++10-3W   | RLA++ FLYLEAD IEC-M - IEC-F 3M WHITE   |
| 19005931       | RLA++10-5W   | RLA++ FLYLEAD IEC-M - IEC-F 5M WHITE   |
| 19005932       | RLA++12-1.5W | RLA++ FLYLEAD IEC-M - F-M 1.5M WHITE   |
| 19005933       | RLA++12-3W   | RLA++ FLYLEAD IEC-M - F-M 3M WHITE     |
| 19005934       | RLA++12-5W   | RLA++ FLYLEAD IEC-M - F-M 5M WHITE     |
| 19005935       | RLA++30-1.5W | RLA++ FLYLEAD F-M - F-M 1.5M WHITE     |
| 19005936       | RLA++30-3W   | RLA++ FLYLEAD F-M - F-M 3M WHITE       |
| 19005937       | RLA++30-5W   | RLA++ FLYLEAD F-M - F-M 5M WHITE       |
| 19005938       | RLA++40-1.5W | RLA++ FLYLEAD IEC-F - F-M 1.5M WHITE   |
| 19005939       | RLA++40-5W   | RLA++ FLYLEAD IEC-F - F-M 5M WHITE     |

Also available in other colors, connector combinations and lengths

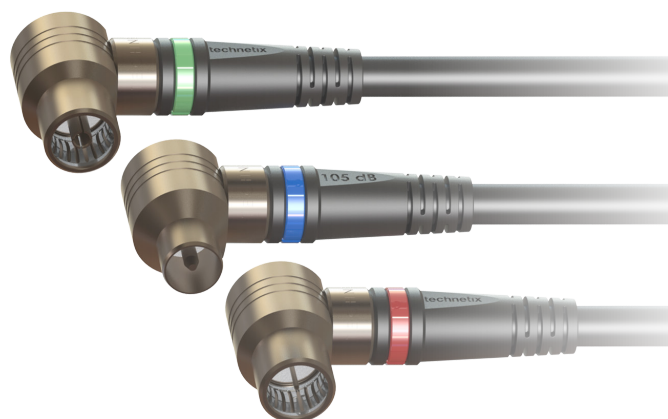


## Technetix class A++ fly leads ordering information

### Right angled combinations

| Article number | Item name     | Description                                 |
|----------------|---------------|---|
| 19008548       | RLA++-11-1.5B | RLA++FLYLEAD IEC-M - IEC-F RA 1.5M BLACK    |
| 19008549       | RLA++-11-3B   | RLA++FLYLEAD IEC-M - IEC-F RA 3M BLACK      |
| 19008550       | RLA++-11.5B   | RLA++FLYLEASD IEC-M - IEC-F RA 5M BLACK     |
| 19008551       | RLA++-20-1.5B | RLA++FLYLEAD IEC-M RA - IEC-F 1.5M BLACK    |
| 19008552       | RLA++-20-3B   | RLA++FLYLEAD IEC-M RA - IEC-F 3M BLACK      |
| 19008553       | RLA++-20-5B   | RLA++FLYLEAD IEC-M RA - IEC-F 5M BLACK      |
| 19008554       | RLA++-21-1.5B | RLA++FLYLEAD IEC-M RA - IEC-F RA 1.5M BLACK |
| 19008555       | RLA++-21-3B   | RLA++FLYLEAD IEC-M RA - IEC-F RA 3M BLACK   |
| 19008556       | RLA++-21-5B   | RLA++FLYLEAD IEC-M RA - IEC-F RA 5M BLACK   |
| 19008557       | RLA++-22-1.5B | RLA++FLYLEAD IEC-M RA - F-M 1.5M BLACK      |
| 19008558       | RLA++-22-3B   | RLA++FLYLEAD IEC-M RA - F-M 3M BLACK        |
| 19008559       | RLA++-22-5B   | RLA++FLYLEAD IEC-M RA - F-M 5M BLACK        |
| 19008560       | RLA++-31-1.5B | RLA++FLYLEAD IEC-F RA - F-M 1.5M BLACK      |
| 19008561       | RLA++-31-3B   | RLA++FLYLEAD IEC-F RA - F-M 3M BLACK        |
| 19008562       | RLA++-31-5B   | RLA++FLYLEAD IEC-F RA - F-M 5M BLACK        |
| 19008563       | RLA++-50-1.5B | RLA++FLYLEAD F-M RA - F-M 1.5M BLACK        |
| 19008564       | RLA++-50-3B   | RLA++FLYLEAD F-M RA - F-M 3M BLACK          |
| 19008565       | RLA++-50-5B   | RLA++FLYLEAD F-M RA - F-M 5M BLACK          |
| 19008566       | RLA++-55-1.5B | RLA++FLYLEAD F-M RA - F-M RA 1.5M BLACK     |
| 19008567       | RLA++-55-3B   | RLA++FLYLEAD F-M RA - F-M RA 3M BLACK       |
| 19008568       | RLA++-55-5B   | RLA++FLYLEAD F-M RA - F-M RA 5M BLACK       |
| 19008726       | RLA++-57-1.5B | RLA++FLYLEAD IEC-M - F-M RA 1.5M BLACK      |
| 19008727       | RLA++-57-3B   | RLA++FLYLEAD IEC-M - F-M RA 3M BLACK        |
| 19008728       | RLA++-57.5B   | RLA++FLYLEAD IEC-M - F-M RA 5M BLACK        |

Also available in other colors, connector combinations and lengths



## Contact information

To find out more visit [technetix.com](http://technetix.com), email [sales@technetix.com](mailto:sales@technetix.com)

## Technetix: a trusted partner

Technetix works in partnership with broadband cable network operators to truly understand their needs and to provide intelligent, customized solutions that help them deliver reliable, innovative services to their customers.

Our Headend solutions are designed for density and modularity, giving maximum flexibility, freeing up critical headend space and making future upgrades simple and cost effective. Our Access Network solutions enhance signal quality: reducing operator callouts and minimizing maintenance costs. Our Connected Home solutions enable high quality signals to be received at multiple points within a home: reducing or eliminating operator installation and maintenance costs.

An industry leader since 1990, Technetix is the tried, tested and trusted supplier to over 1,800 customers, operating out of 20 countries and selling into 75.

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