

Televes®



Product Guide

Index

INTRODUCTION	3
THE RADIOELECTRIC SPECTRUM	4
PRODUCT	5
Filters	6
Plug-in and easy F format	6
Microcavities filter	7
Intelligent aerials	8
DAT HD BOSS 790	9
QBOSS	10
INNOVA BOSS	11
LTE Amplification	12
Nanokom masthead amplifiers	12
Setback amplifiers	13
Launch amplifiers	13
Programmable amplifier Avant3	14
Programmable amplifier Avant HD	15
Single channel amplifiers T12	16
Distribution	18
Certified coaxial cable	18
PRO easyF connectors	20
Cable leads	21
Outlet plates	22
Splitters and taps	22
RECEPTION AND ADAPTION DTT	23
ZAS HD adaptor	23
Transmodulation COFDM/COFDM regenerator	24
MEASUREMENT	25
H60 The perfect tool to analyze the new digital dividend	25

► Introduction

The path initiated with the deployment of DTT will take a step further with the development of the digital dividend a process which will establish the technical conditions for the allocation of the 800 MHz band (channels 61- 68) in the EU for the introduction of advanced mobile phone services and mobile Internet (Long Term Evolution - LTE).

The use of channels 61 to 68 for mobile services responds, on one hand, to an intent to harmonize the use of this band across Europe and, on the other, to reduce the cost of the network infrastructure (less cells required, better penetration and better coverage at these frequencies).

Mobile phone connections will represent 80% of the broadband connection in the year 2014. This spectrum must be harmonized in the 800 MHz band in order to develop the maximum potential of LTE technology and make it available to societies growing demand for services.

The release of the digital dividend must be completed in Europe before the 1st of January 2015. Some governments, like the UK, have already announced that these frequencies will be released during the first half of 2013.

In some countries, the release of the digital dividend could face an added complexity since DTT channels will need to be relocated to channels between 21 and 60. So during this transition retuning will be required by the end user and maybe adaption of the installation. The planification for the relocation of frequencies is normally regulated by a government agency and will be part of an on going plan; in the UK the regulator is OFCOM.

For the installers of domestic and commercial TV reception systems, the digital dividend is a challenge. As an industry leader, Televes has worked hard to give the professional installer all the support required, not only with products but also with technical support.



790-791	791-796	796-801	801-806	806-811	811-816	816-821	821-832	832-837	837-842	842-847	847-852	852-857	857-862
Guard band	Downlink						Duplex gap	Uplink					
1 MHz	30 MHz (6 blocks of 5 MHz)						11 MHz	30 MHz (6 blocks of 5 MHz)					

The deployment of LTE transmitters will, presumably, be done using the same locations as the current UMTS (3G) and/or GSM networks, so they will be in proximity with TV reception systems, most of these TV systems will have broadband amplification. In this scenario, the TV reception systems will simultaneously receive DTT and LTE transmissions. This will generate intermodulation signals to a greater or lesser extent depending on many different factors (level of the received signals, amplification, DTT channels received, etc.). The intermodulation interference will travel through all the distribution components until it reaches the set top box. In anticipation to LTE deployment, Televes has participated in trials and has done in depth analysis of the implications that this technology will have on the reception of broadcasted TV.



As the result of the work carried out by our R&D team a company leader in the industry, Televes has developed a **complete range of products specifically designed to minimize the potential of LTE interference** over DTT services. All these products will carry the **LTE Ready** stamp, registered by Televes.

RANGE OF PRODUCTS SPECIFICALLY DESIGNED FOR LTE

FILTERS

403101	LTE57 FILTER 11/10 "F" C21-57
403401	LTE60 FILTER 11/10 "F" 5-790 MHz
405101	LTE57 FILTER 11/10 "EasyF" C21-57 OUTDOORS
405401	LTE60 FILTER 11/10 "EasyF" 5-790 MHz OUTDOORS
403301	LTE60 FILTER 11/10 "F" 5-790 MHz MICROCAVITIES

ANTENNAS

149901	DAT HD BOSS 790 ANT.(Ch21-60) G32dB BOXED
130201	IINNOVA BOSS ANT. (Ch21-69 or Ch21-60) G27dB

QBOSS

561901	QBOSS 790 LTE60 "EasyF" Ch21-60 G15dB Vo102
562001	QBOSS 766 LTE57 "EasyF" Ch21-57 G12dB Vo100

MASTHEAD AMPLIFIERS

561501	MAST AMP.12..24V 3I/10 B3/U-FMmx-SATmx AUTO.ADJUST.
561601	MAST AMP. 12..24V 3I/10 U-Vmix-SATmix AUTO. ADJUST.
561701	MAST AMP.12..24V 3I/10 U-U-Vmix AUTO.ADJUST.
561801	MAST AMP. 12..24V 3I/10 BIII-U-FMmix AUTO.ADJUST.

SETBACK AMPLIFIERS

562701	DOM.AMP.10 VHF/UHF G13/24dB AUT.ADJ.+DC
562702	DOM.AMP.20 VHF/UHF G10/21dB AUT.ADJ. +DC
562703	DOM.AMP.20+TV VHF/UHF G9/20dB AUT.ADJ.+DC
562713	DOM.AMP.20+TV V/U G9/20dB AUT.+DC W/O PSU

LAUNCH AMPLIFIERS

562301	MINIKOM AMP5/1 "EasyF" FM-V-U-21..35-39..60/69F
562302	MINIKOM AMP5/1 "EasyF" FM-V-U-21..32-36..60/69
562401	MINIKOM AMP.MATV 4I/10 "EasyF" FM-V-U-U
562501	MINIKOM AMP.MATV 3I/10 "EasyF" FM-V-U
562601	MINIKOM AMP.SMATV 4I/10 "EasyF" FM-V-U-SAT

PROGRAMMABLE AMPLIFIERS

532740	AVANT3
532840	AVANT HD

SINGLE CHANNEL AMPLIFIERS

508012	IF BAND AMPLIFIER T12	SAT
508112	BI BAND AMPLIFIER T12	BI
508212	FM BAND AMPLIFIER T12	FM
509912	DAB BAND AMPLIFIER T12	DAB
508312	BIII BAND AMPLIFIER T12	BIII
508712	LOW S BAND AMPLIFIER T12	SB LOW
508812	HIGH S BAND AMPLIFIER T12	SB HIGH
508912	HYPERBAND AMPLIFIER T12	HYPERB.
509812	SELECTIVE SINGLE CHANNEL AMPLIFIER	UHF
508612	SINGLE CHANNEL AMPLIFIER	UHF
549812	SWITCHED PSU T12	
509512	SEL. SINGLE CHANNEL AMP WITH AGC T12	UHF
509712	SINGLE CHANNEL AMP. WITH AGC T12	UHF

OUTLET PLATES

522610	LTE OUTLET PLATE.47..2150MHz 1-1,5dB+DC
523110	THROUGH LTE OUTLET PLATE 5...790MHz TV-FM 11-29dB

SCREENED COAX LEADS

431001	LTE COAX LEAD "IEC" ELBOW.M-F WHITE 1,5M
431002	LTE COAX LEAD "IEC" ELBOW.M-F WHITE 2,5M

SPECTRUM ANALYZER

5960	H60 ADVANCE (FULL HD + CI+F.O.+EXTENDED SPECTRUM 5...3300 MHz)
596005	H60 ADVANCE (FULL HD + CI+EXTENDED SPECTRUM 5...3300 MHz+SELECTIVE F.O)

LTE FILTERS 57 and 60

Televes has designed two types of filters with different rejection and performance depending if there are TV services over channel 57 or not. Once decided the type of filter based on the location of the channels, we will need to choose the format.

PLUG-IN INDOORS



403401

403101

REF	FILTERS	Pass band (MHz)	Rejected band (MHz)	Pass band attenuation (dB)	Rejected band attenuation (dB)
405101	LTE57 1I/1O EasyF C21-57	470 - 766	791 - 862	<3 (7@766MHz)	>25
403101	LTE57 1I/1O F C21-57				
405401	LTE60 1I/1O EasyF 5-790	5 - 790	793 - 821	<1 (5@790MHz)	>20
403401	LTE60 1I/1O F 5 - 790			<0,5 (2@790MHz)	
403301	CAVITIES 1I/1O F 5 - 790				

EASY F OUTDOORS

The most reliable and quick connection

Reduces the installation time by 50%

✓ **Built-in system**

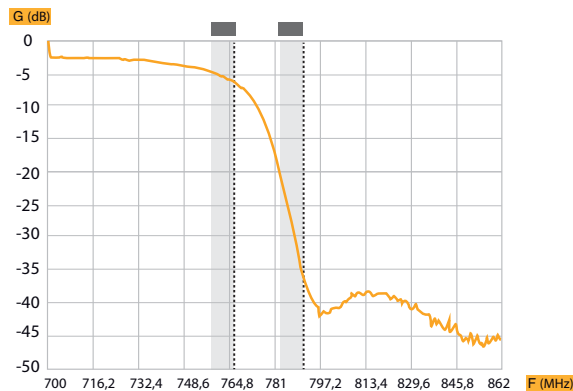
You will never require extra connectors



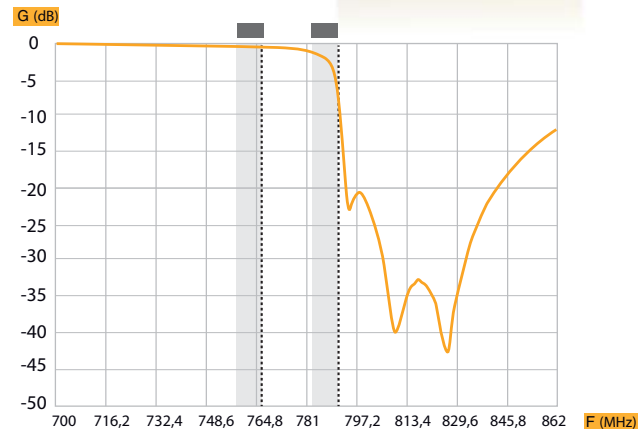
405101

405401

The quality in the filter's response can only be appreciated with graphs as the ones below, where the performance of the filter in the high UHF channels can be seen in detail.



C57 LTE filter rejects signals from 766MHz onwards. Specifically recommended for DTT installations with multiplex below channel 57.



C60 LTE filter rejects signals from 782MHz onwards. Specifically recommended for DTT installations with multiplex channels 58, 59 or 60.

The filters for LTE can be designed using different technologies:

■ **LC.** Using discrete components (L, C) important rejection to the interference band could be achieved but it will increase the insertion losses in the DTT band. Its use could lead to having to readjust the amplifiers in the system.

■ **Ceramic resonators.** The ceramic resonating filters resolve the problems with the insertion losses of the LC filters. If the resonators are not of high quality, variations in temperature will cause variations in the rejection and insertion losses in the DTT channels near LTE (channels 59 and 60).

■ **SAW Filters.** The surface wave filtering (SAW) achieves high rejection in small frequency intervals. It generates high insertion losses and why they need to be combined with an amplifier, which complicates its design and increases its cost.

■ **Cavity filters.** They are formed by three coupled transmission lines, which are located resonant metal cavities. They achieve optimum rejection characteristics (25-30 dB and even more), whilst maintaining minimum insertion losses (< 1 dB in the DTT band with 2 dB typical in the high UHF channels 59, 60).

PATENTED



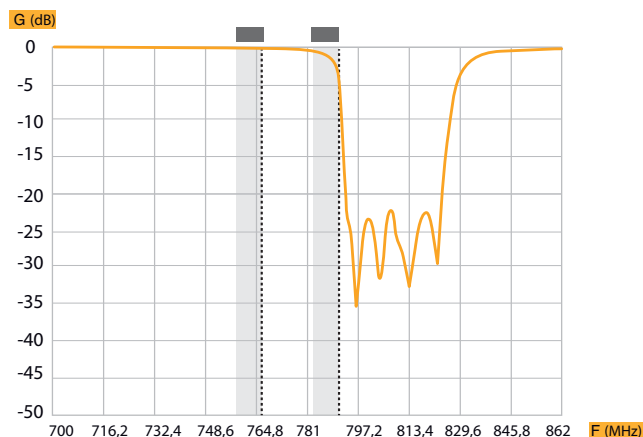
403301

MICROCAVITIES FILTER (F FORMAT)

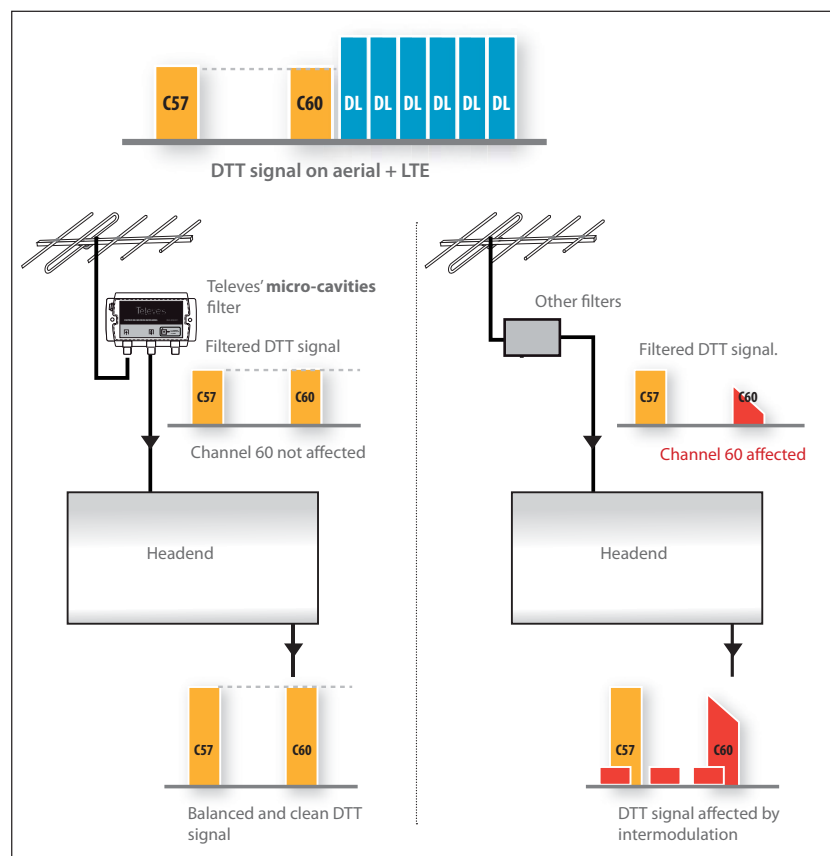
Normally these types of filters are bulky and heavy, hence the reason why they were never used in MATV solutions, restricting their use to broadcasting solutions or very high end MATV headends.

Televes has achieved with its **micro-cavities filter** (patented system) is implementing the technology in a small chassis (10 cm X 5 cm) and with a weight of less than 250 grams, which makes it suitable for internal or external use. In order to achieve this, Televes uses what is called micro-cavities, in which the resonant elements of high quality factor (Q) are allocated.

The **micro-cavities filter** achieves outstanding performance with temperature variation and its robust construction makes it very resistant to vibration, the ideal component for the rejection of the LTE interference, whilst preserving the reception of DTT. They could be used either as a preventive measure or a mitigation solution.



Micro-cavities LTE C60 filter it rejects signals above 782MHz with minimum insertion losses



In the presence of channel 60, depending on the chosen filter, it could be that the headend (amplifier) is unable to equalize the output level of all the available channels.

In the example figure we show channel 60 being received by the aerial and balanced with respect to the rest of the available channels. If the filter used is not a micro-cavities filter ref.403301, it is more likely that the headend will be unable to achieve the same output level for channel 60 as it does for the rest of the channels.

Both for broadband amplifiers or single channel amplifiers, the increase in gain in the amplifier to overcome the losses in the filter could result in the generation of intermodulation products.

▶ Intelligent antennas

Evolution of the species

Conventional electronic antennas are nothing more than basic ACTIVE AERIALS, this is an aerial with an amplifier which in many cases has an unacceptable noise figure.

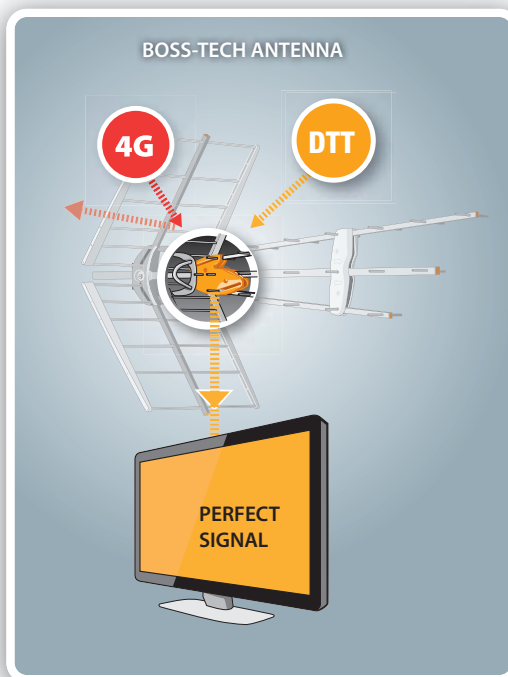
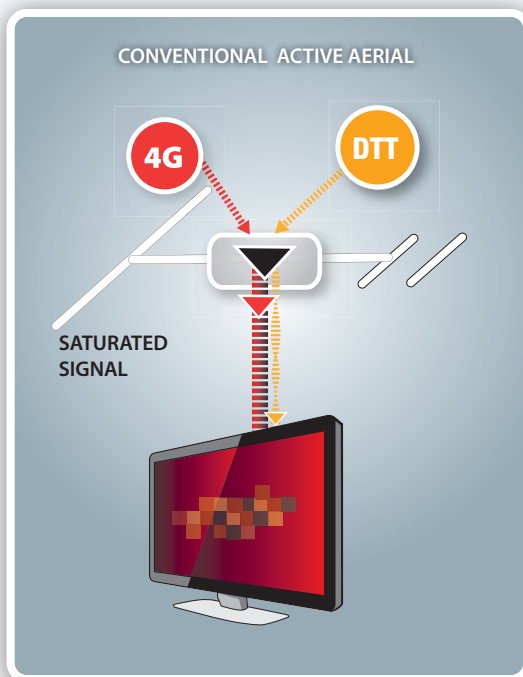
Televes' antennas with BOSS-TECH are not active aerials. The intelligent device built into the antenna which can be activated or not depending on the requirements of the installation, it automatically regulates the gain to provide the TV with the best signal quality.

ACTIVE aerials could cause problems that render them useless in the current scenario with DTT and in the future for co-existence of DTT with LTE/4G.

Whilst **an active aerial will saturate in the presence of a LTE/4G signal**, the BOSS-TECH will regulate its gain to avoid saturation, several radiated test where DTT and 4G coadjacent signals were received by a BossTech antenna. The option of blocking the power to the antenna can also be used in extreme cases.



The BOSS-TECH device allows the installer and the end user to **completely forget about the signal level in reception**, resolving those problems caused by level adjustment or the signal fluctuation that could occur during the life span of the installation.



Installing a Televes BOSS-TECH antenna assures the continuity in quality of service and the best possible performance of the system, even with LTE/4G.

INTELLIGENT ROOF TOP ANTENNA DAT HD BOSS 790



NEW
DAT HD BOSS
790

This antenna has been designed to optimize rejection to the LTE band whilst keeping the reception characteristics in the UHF TV band, it is an evolution of the DAT HD BOSS antenna with angular triple array patented by Televes.

The antenna incorporates the BOSS-Tech device, with improved electronic performance.

NEW ASSEMBLY SYSTEM

The new DAT incorporates a new **folding mechanism of the directors** and a **cam mechanism in the reflector**

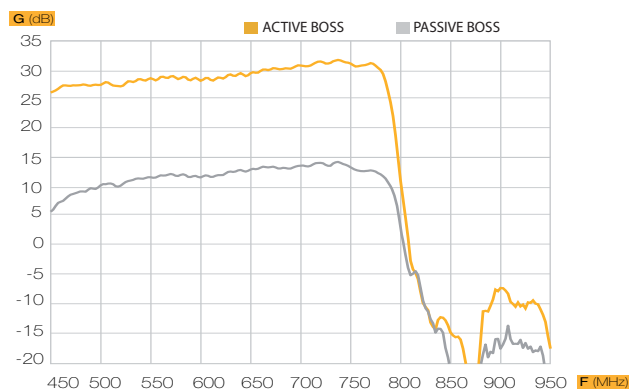


The new folding mechanism of the directors not only simplifies the assembly of the antenna but also optimizes its transport and storage.



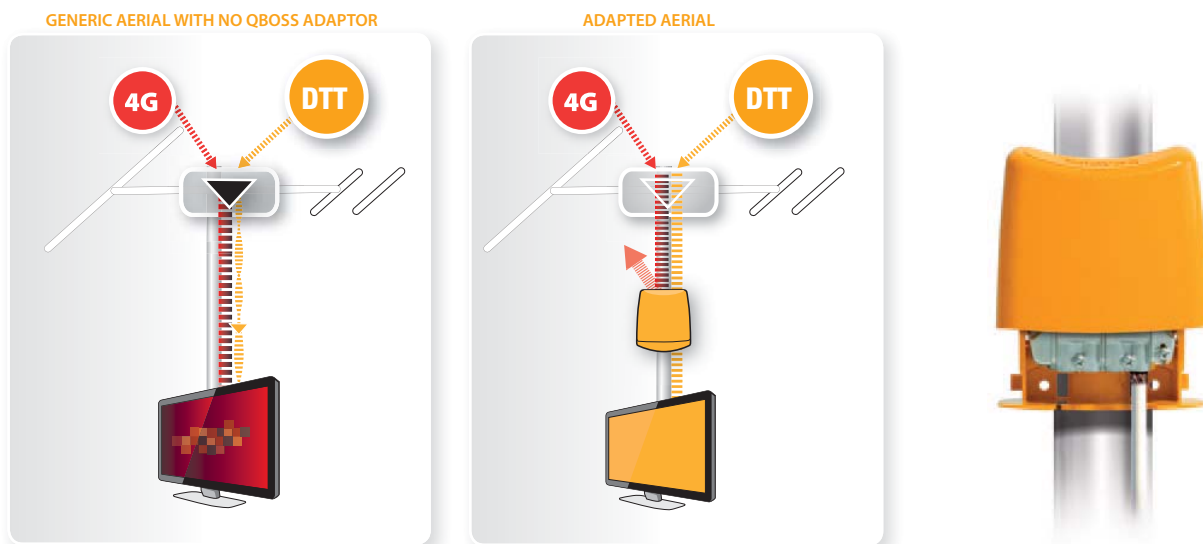
INTELLIGENT ROOF TOP ANTENNA DAT HD BOSS 790

REF.149901		SPECIFICATIONS	
Mode		Passive	Active
Bandwidth	MHz	470-790 (Ch 21-60)	
Maximum gain	dBi	15	32 max
Noise figure	dB	-	1.2 typ
Output level		-	Self adjustable
Recommended input level	dBμV	>75	<75
Powering	V	0	12-24
Maximum consumption	mA	0	45 (24V)/35(12V)
Lobe width	°	30	
Wind load	N	120 (130km/h)	165 (150 km/h)



QBOSS

The only device **capable of transforming any aerial into a BOSS-TECH antenna**, converting your active or passive aerial into an intelligent device.



QBOSS - EASY F	POWERING (V)	GAIN (dB)	OUTPUT LEVEL (dBuV) DIN45004B
		UHF	UHF
Ref.562001 QBOSS 766 C21-57	12...24V	12	100
Ref.561901 QBOSS 790 C21-60		15	102

INTELLIGENT SET TOP ANTENNA INNOVA BOSS

INNOVA^{BOSS}

SPECIFICALLY DESIGNED FOR THE RECEPTION OF DTT
INDOORS

The best possible DTT reception, HD services
and 3D TV indoors.

Incorporates the BOSS technology that **automatically regulates the output signal**, which ensures the optimum reception in areas with intermittent reception, whilst eliminating the interferences caused by people moving around the room in which its installed.

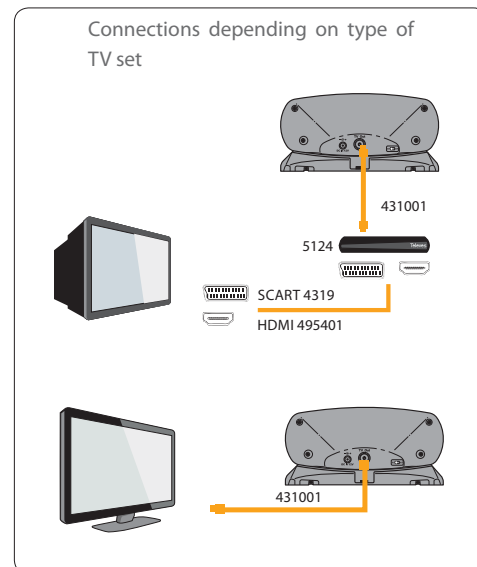
Its exceptional radiation lobe of 360° allows this set top antenna to be installed in any position with no worries about its orientation.

- ✓ **Plug&Play.**
- ✓ **No need to be orientated:**
- ✓ **LTE Ready.**

REF. 130201		SPECIFICATIONS
Bandwidth	MHz	Pos. 60: 470 - 790 Pos. 69: 470 - 862
Maximum gain	dB	25*
Noise figure (typ.)	dB	3
Maximum consumption (5 ... 12V)	mA	40
Protection index		IP 20
Dimensions	mm	215 x 102 x 105
Weight	gr	350

* Self regulated gain for high input levels.

The Innova Boss **incorporates a easy switch ON-OFF** that allows its user to turn ON or OFF the protection against LTE interference as necessary.



LTE amplification

MASTHEAD AMPLIFIERS

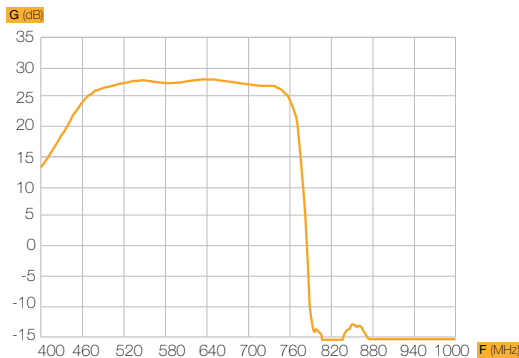
easyF

NanoKom

Series

- Optimized for the band between channels 21 and 60.
- Incorporates LTE Switch ON/OFF.
- Incorporates DC pass Switch (ON/OFF).
- Improved noise figure performance (NF).

Once the output level has been adjusted through a potentiometer located on the front, the amplifier will maintain this level by means of an automatic regulation system.



REF.	DESCRIPTION	NOISE FIGURE (dB)		GAIN (dB)		MAX. OUTPUT LEVEL (dBuV)		REMARKS
		UHF	VHF	UHF	VHF	UHF	VHF	
561501	(U+BIII)dc-(FM+BI) mix-Flmix	1.5	3.5	31	18	103	103	Auto. indep. Regulation U and BIII. Indep. Reg. Vout U and BIII DC (U+BIII) ON/OFF BIII:174-253 MHz LTE Filter ON/OFF
561601	UHF-VHFmix-Flmix	1	-	31	-1	103	-	Auto. Regulation UHF Vout regulation U VHF:47-253 LTE Filter ON/OFF
561701	U1dc-U2-VHFmix	6	-	27	-1	103	-	Indep. Atten. U1 and U2 DC U1 ON/OFF VHF:47-253 LTE Filter ON/OFF
561801	U-BIII-(FM+BI) mix	1	3	31	18	103	103	Auto. Indep. Regulation U and BIII Indep. Reg. Vout U and BIII BIII:174-253 MHz LTE Filter ON/OFF

SETBACK AMPLIFIERS

- Optimized for the band between channels 21 and 60.
- Remotely powered through any of its outputs.
- Detachable PSU, allowing flexibility in its location.

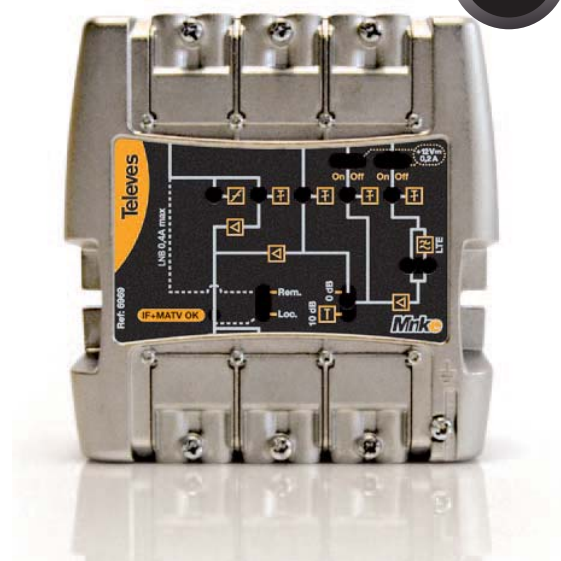
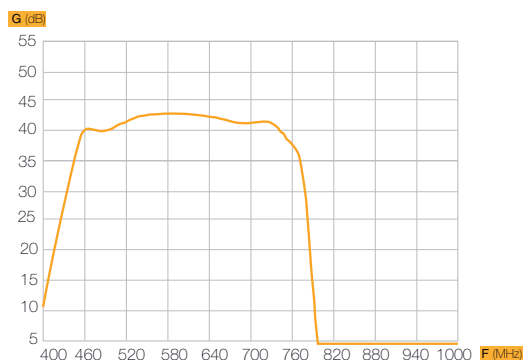
Once its output level has been set by means of a potentiometer located on the front, the amplifier will keep this level by means of an automatic gain regulation system..



REF.	DESCRIPTION	GAIN (dB)		MAX. OUTPUT LEVEL (dBuV) DIN45004B		NOTES
		UHF	VHF	UHF	VHF	
562701	AS VHF/UHF 1E/1S	24	13	106	98	Detachable PSU included Common auto. regulation VHF/UHF LTE Filter ON/OFF DC IN ON/OFF
562702	AS VHF/UHF 1E/2S	21	12	103	95	
562703	AS VHF/UHF 1E/2S+TV	20	9	102	94	
562713	AS VHF/UHF 1E/2S+TV	20	9	102	94	Detachable PSU not included Common auto regulation VHF/UHF LTE Filter ON/OFF DC IN ON/OFF

LAUNCH AMPLIFIERS

- Optimized for the band between channels 21 and 60.
- New compact design.
- Switch mode PSU, best guarantee of low consumption, and detachable.



REF.	DESCRIPTION	GAIN (dB)			MAX. OUTPUT LEVEL (dBuV)			NOTES
		UHF	VHF	FI	UHF	VHF	FI	
562301	AS FM-VHF-BIV(21-35)-BV(39-60)-UHF	37/27	30/20	-	117	113	-	BI is not amplified VHF: 174-400 MHz. Switchable LTE filter
562302	AS FM-VHF-BIV(21-32)-BV(36-60)-UHF	37/27	30/20	-	117	113	-	
562401	AS FM-VHF-UHF1-UHF2	37/27	30/20	-	117	113	-	
562501	AS FM-VHF-UHF	40/30	33/23	-	117	113	-	
562601	AS FM-VHF-UHF-FI	40/30	30/20	35-42	112	103	121	

LTE Amplification

PROGRAMMABLE AMPLIFIER AVANT 3

Programmable filtered launch amplifier for domestic or/ and communal systems. Incorporates 5 programmable filters with variable bandwidth, and can isolate the DTT signal from LTE interferences.

Main features

- Five or seven channels per filter.
- Self adjustable thanks to an AGC (Automatic Gain Control) in each filter, with an LED to indicate if we have enough input level in UHF.
- VHF input with expanded bandwidth, designed for the combination of services generated from signal processing headend.
- Expandable system; extra Avant3's can be linked.
- Ease of programming by means of handheld programmer and/or software.
- Switch mode PSU with low consumption and high efficiency.



▲ 532740

PARAMETERS		INPUTS					OUTPUT
		UHF1	UHF2	BI / FM	VHF	IN MIX	OUT
Bandwidth	MHz	470 - 790	470 - 790	47-68 / 87 - 108	111-406	47-406 / 470-790	470-790
Filters per input		5 - 0	2 - 3	-	-	-	-
Number of channels per filter		1-5 (21-30) / 1-7(31-69)		-	-	-	-
Gain	dB	48 ± 3		32 ± 2 / 15 ± 2	35 ± 2	3 ± 3 (INMIX-OUT)	2 ± 2 (UHF1, UHF2-UHF)
Gain regulation	dB	-		0 - 18	0 - 15	-	-
AGC's margin per filter	dB	0 - 20		-	-	-	-
Output level regulation	dB	15		-	-	-	-
Max. Input level	dBμV	95		-	-	-	-
Max. Output level 2 DTT Ch (typ.)	dBμV	113		111	111	111 / 113	-
Output level DIN 45004B (typ.)	dBμV	116		114	114	114 / 116	-
Output level IMD3 (2CH-60dB) (typ.)	dBμV	113		111	111	111 / 113	-
Rejection	dB	20 (± 16MHz)		20 (± 206MHz)	15 (± 40MHz)	-	-
Noise figure (typ.)	dB	7		7	7	-	-
Line power ⁽¹⁾ (12Vdc)	mA	50	50	-	-	-	-
Powering	V~	196 - 264					
Maximum current	mA	80					
Maximum power	W	9					
Protection Index		IP20					
Temperature range	°C	-5 a +45					

(1) Controlled by switch at the back.

PROGRAMMABLE AMPLIFIER AVANT HD

Programmable filtered launch amplifier for large domestic or communal systems, characterised for its selectivity and capacity to balance incoming signals.

Main features

- Easy to install and program.
- High output level and input dynamic margin.
- External programming.
- Very flexible configuration.
- Allows to clone configuration between devices.
- Access to configuration can be blocked via password.
- Low consumption.



▲ 532840

Inputs		UHF1	UHF2	UHF3	FM	BI	47-790 MHz		IF SAT
Band	MHz	470 - 790			87 - 108	174 - 260	47 - 370	370 - 790	950 - 2150
Gain	dB	Auto (máx. 51 ± 3)			Auto (máx. 41 ± 3)	Auto (máx. 44 ± 3)	Auto (máx. 36 ± 2)	Auto (máx. 39 ± 2)	42 ± 2 - 45 ± 2
Filter configuration	Nº	10	0	0	-	-	-	-	-
		9	0	1	-	-	-	-	-
		7	2	1	-	-	-	-	-
		6	3	1	-	-	-	-	-
		5	3	2	-	-	-	-	-
Number of channels per filter	Nº	0 - 5 **			-	-	-	-	-
Slope control	dB	0 - 9 **			-	-	-	-	0 - 12
Optimum input margin	dBµV	60 - 105			60 - 85	62 - 87	69 - 73	70 - 74	-
Gain regulation	dB	0 - 20 *			0 - 25 - OFF*	0 - 25 - OFF*	-	-	0 - 24 - OFF*
Manual gain regulation	dB	± 9 (per filter)			± 9	± 9	-	-	-
Output level ***	dBµV	121			115	115	115	121	125
Output level regulation	dBµV	100 - 115			90 - 105	95 - 110	95 - 110	100 - 115	-
Noise figure	dB	9 typ.			10	10	-	-	9
Rejection	dB	20 (±16 MHz)			20 (±16 MHz)	20 (±16 MHz)	-	-	40 (a 862MHz)
Line power (automatic) I. max.	V=mA	24			-	24	-	-	13/17 (22KHz)
		60			-	60	-	-	300
Mains voltage/frequency	V~/Hz	196 - 264 / 50-60							
Max. current	mA	255							
Max. power consumption	W	26							
Max. working temperature	°C	45							
Protection index		IP 20							

* Automatic adjustment (Depending on the wished level of exit and the signal of entrance).

** Programmable adjustment.

*** The output level depends on the nº of channels.

► LTE Amplification

T.12 SINGLE CHANNEL AMPLIFIERS

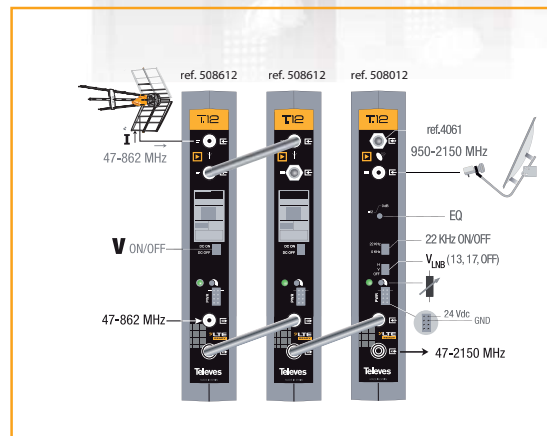
Televes launches the new T.12 single channel amplifiers, an advanced evolution of a product range, the result of Televes' broad experience accumulated since 1981 when this technology was first introduced.

Main features

- Completely compatible with the previous model (T03) and its PSU.
- Great reliability, thanks to its robotised manufacturing process.
- Improved screening.
- Modular and expandable system.
- Powering of up to 24 modules, from a PSU.
- Line powering of mastheads.



REF.	DESCRIPTION	
508012	IF BAND AMPLIFIER T12	IF
508112	BI BAND AMPLIFIER T12	BI
508212	FM BAND AMPLIFIER T12	FM
509912	DAB BAND AMPLIFIER T12	DAB
508312	BIII BAND AMPLIFIER T12	BIII
508712	LOW S BAND AMPLIFIER T12	LOW SB
508812	HIGH S BAND AMPLIFIER T12	HIGH SB
508912	HYPERBAND AMPLIFIER T12	HYPERB.
509812	SELECTIVE SINGLE CHANNEL AMPLIFIER	UHF
508612	SINGLE CHANNEL/MULTICHANNEL AMP.	UHF
549812	SWITCHED PSU T12	
509512	SELECTIVE SINGLE CH. AMP. W/ AGC T12	UHF
509712	SINGLE CHANNEL AMP. W/ AGC T12	UHF



With the T.12 single channel amplifiers Televes has produced a product that achieves an outstanding performance in the treatment of the signal, with precise and simple frequency adjustments.

The T.12 modules are manufactured in latest generation robotised lines and are subject to the strictest quality control, a guarantee of reliability and stability with no precedents in this industry.

Ready for the upcoming introduction of LTE services, this product carries Televes' LTE Ready stamp.

Televes has put a lot of trust in the T.12 modules, the new reference on single channel amplifiers in the market.



REFERENCES			508112	508212	508312	508712	509912	508812	508912	508612	509812	508012	509712	509512	
	f_w	MHz	47 - 88	87.5 - 108	174 - 230	104 - 174	195 - 232	230 - 300	302 - 470	470 - 865		950 - 2150	470-862	470-862	
	BW	MHz	7	-	7	7	37	7	8	8*56	8	950 - 2150	8	8	
	G		50	35	45	58	45	58	58	50	55	35*50	57	57	
		dB	35	35	35	35	35	35	35	30	30	20	30	30	
	EQ		-	-	-	-	-	-	-	-	-	0*12	-	-	
	V_{out}	A	123*	114*	123*	125*	-	124*	125*	125* 111*	121*	124**	125	121	
	I_c (24Vdc)	D	-	-	-	-	114***	-	-	118* 102*	115*		118	114	
	I	mA	100									400	100	100	
	V	Vdc	24									13/17	24	24	
		KHz	-									0/22	-	-	
I_c	mA	70									95	133	90	90	
	P	dB	≤ 1	< 3	< 3	< 1	< 3	< 1	< 1	< 3	< 2	-	< 1	< 2	
	R_{n+1}	dB	-	-	-	-	-	-	-	> 3	> 18	-	> 3	> 18	
	R_{n+2}		> 40	-	> 30	> 30	> 20	> 25	> 30	> 15	> 50	-	> 25	> 50	
	R_{n+3}		-	-	-	-	-	-	-	> 45	-	-	> 50	-	
Noise figure	NF	dB	< 9									< 11	< 12.5	< 9	< 11
AGC	AGC	dB	-									30			

* EN 50083-5

** DIN VDE0855/12

*** di = 50dB (2ch, 4MHz)

Distribution

Once 4G services are deployed, there is the possibility that signals will be transmitted from the mobile handset, the so called uplink, these could filter into the coax distribution network.

The passive distribution equipment should be selected with due care and should be correctly screened to avoid the ingress of signals that could interfere with the TV signals. In this scenario the attenuation might not be the most important parameter.

Televes recommends the use of the EASY-F connection system for installations perfectly prepared for the deployment of LTE/4G.

CERTIFIED COAXIAL CABLE

Coaxial cable 100% copper, high screening and low losses.

Screening efficiency in excess of 85dB in the TV band makes it specially useful against the potential risk of LTE/4G interference.

Replacement of the indoor cable in some households could be the solution to interference problems caused by mobile signals.

CERTIFIED

MODEL - REFERENCE			T200 - 213001	SK2000plus - 4138
Inner conductor - braid composition			COPPER	COPPER
Inner conductor	Ø	mm	1.2 ± 0.02	1.02 ± 0.016
Dielectric PE.	Ø	mm	5 ± 0.1	4.60 ± 0.05
Foil			Copper + Polyester	Aluminium + Polyester
Braid	dimensions	GxHxØ*	16 x 8 x 0.11	24 x 7 x 0.10
	coverage	%	73	82
Outer sheath	Ø	mm	6.9 ± 0.1	6.7 ± 0.1
Minimum bending radius			34.5	33.5
Screening			>75	>95
Attenuation Frequency (MHz)	5	dB/100m	1.10	4.8
	470		11.33	14.0
	862		15.61	18.7
	950		16.50	20.5
	2150		25.66	31.2
	3000		30.70	35.5

(*) GxHxØ: strand groups x number of strands x strand's diameter.

Televes' coaxial cable is subject to strict quality controls.

A requirement to give the installer the satisfaction and peace of mind to guard against LTE/4G signals, has made **Televes certify all the coaxial cable that we supply.**

This is why, **a coaxial cable with the Televes' brand is a certified cable**, an LTE READY cable.

	T100	T200	SK2000plus
PVC	2141	—	4138
PE	2155	—	-
LSFH	215101	213001	-



ONLY A CERTIFIED CABLE GUARANTEES THE QUALITY OF THE INSTALLATION

TELEVES' CABLE CERTIFICATION CENTER

At Televes we consider that the best way to guarantee the performance of a coaxial cable is through the quality control in all the manufacturing processes. In the LTE/4G scenario, only the certified cable will ensure the quality of the signal.

A cable with Televes on it, is a certified cable.

Hence why, Televes , in its cable certification center performs the following tests:

■ **Copper quality:** tests of DC performance at high and low frequencies generate parameters that help us evaluate the purity of the copper.

■ **Quality of the gas injection (foam):** through the test of dielectric rigidity we can detect alterations in the isolation between the inner conductor and the foil.

■ **Copper+Polyester foil:** the continuity tests highlight possible breaks in the foil that could deteriorate the conductivity to ground or the screening against interference.

■ **Braid interlacing:** the interlacing is one of the characteristics that can influence more the quality of the shielding. Its effectiveness can be measured by the screening attenuation (Fig.1).

■ **Quality of the outer sheath:** a complex tool detects variations in the walls of the outer sheath, which allows us to measure the homogeneity and symmetry of the outer sheath (fig.2)

■ **Attenuation and length:** the attenuation tests measure the uniformity of the impedance, preserving the quality of the signals travelling in the coaxial cable.

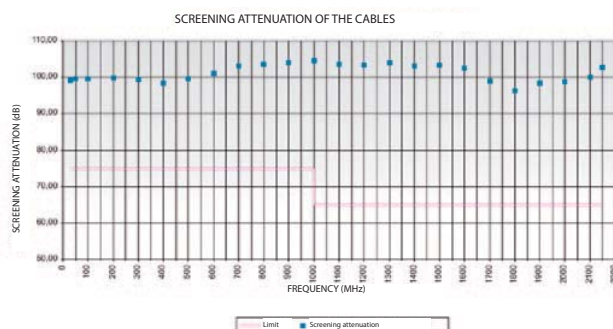


Fig.1 Graph of screening attenuation



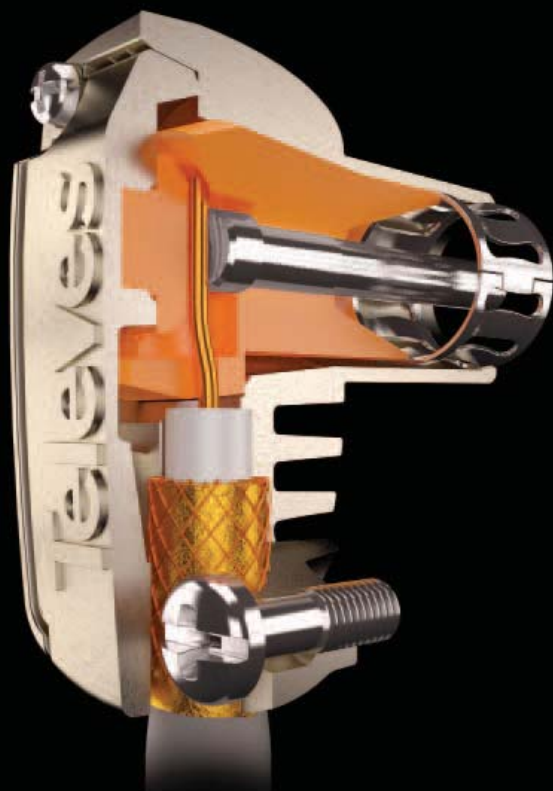
Fig.2 Detail of asymmetry of the coverage detected during the tests in the center

In addition to the tests of intrinsic quality, in the coaxial cable certification center we guarantee the length of the cable supplied and the serigraphy and packaging.

All the information generated during the certification processes, will be stored through a traceability system that allows us to find out all the data of each and every drum produced.

SAFE AND SHIELDED CONNECTION

PRO EASY F CONNECTORS



Safe connection

- ✓ Save time and cost in the installation.
- ✓ Ensure the reliability of the connection and avoid the need for future call backs.
- ✓ The peace of mind of a job well done.

Easy and quick to fit:

- ✓ One screw.
- ✓ Connection always visible.
- ✓ No push on pieces.
- ✓ No detachable pieces.

Electrically perfect:

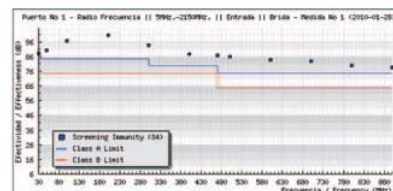
- ✓ 100% robotised manufacturing is a reassurance of its quality.
- ✓ Completely screened to avoid LTE/4G effects

easyF

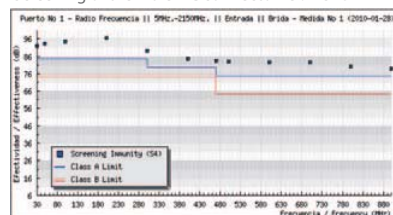
The Pro Easy F connectors ensure the maximum quality in the connection, giving exceptional screening to the TV signals in the installation as its screening efficiency exceeds the requirements of CLASS A.

No push on or detachable components, which simplifies its fitting, eases and assures its connection.

Screening of the male IEC connector ref.413201



Screening of the male IEC connector ref.413201



REF. DESCRIPTION

413201	"PRO EasyF" Connector "IEC" Ø 9,5mm Male elbow screened
413301	"PRO EasyF" Connector "IEC" Ø 9,5mm Female elbow screened
413401	"PRO EasyF" Connector "Quick F" Elbow screened



FLY LEADS



431001

431002

Despite having had the installation adapted to avoid the influence of LTE/4G, **the weakest point will be the leads connecting the outlet plate with the TV.**

The "LTE ready" leads are made with T200 Class A coaxial cable and screened Pro Easy-F connectors.

Both components guarantee the best screening possible.

The quality of these components is now key and would be a mistake to use leads of doubtful quality, many of these don't have screening or foil.

For the measurement of the quality of screening of these leads with IEC connectors we use the following standards EN 60966-2-5 and N 60966-2-4.

The specifications are reproduced in the table attached. **These parameters are not achieved by any other leads currently available in the market.**

REF. DESCRIPTION

431001	LTE "IEC" coaxial lead Ø 9,5mm Screened elbow 1.5m (Blister G)	Male - Female
431002	LTE "IEC" coaxial lead Ø 9,5mm Screened elbow 2.5m (Blister G)	Male - Female

TYPE OF LEAD			IEC CONNECTOR
Class A lead	From 30 to 1000MHz	dB	> 85
	From 1 to 3GHz		> 65
Class B lead	From 30 to 1000MHz		>75
	From 1 to 3GHz		> 55

► Distribution

OUTLET PLATES

The special manufacturing process and design of our outlet plates guarantees the protection of the TV and satellite signal.

DON'T ALLOW THE DIGITAL QUALITY TO VANISH IN THE CONNECTIONS.

- ✓ Cable connection with easy F
- ✓ Automated production for highest reliability
- ✓ Lateral opening clamp for easy fitting

A manufacturer of outlet plates that offers solutions for every scenario



AUTOMATED MANUFACTURING PROCESS



PRODUCT	SPECIFICATIONS		
	Pass band (MHz)	Attenuation (dB)	
		TV/FM	IF SAT
Ref.522610 TV / SAT DC terminal outlet plate	47-790 950-2150	1/1	1,5
Ref.523110 TV - FM through outlet plate	47-790	11 (2 through) / 29 (2 through)	(2,5 through)

SPLITTERS AND TAPS

In the Easy F splitter and tap range special care has been taken in the screening of the circuit, also done with the connection system.

The zamak chassis allows perfect screening across the whole frequency range plus its connection by means of the Easy F system; simplifies the installation with no detriment to the screening efficiency..



► DTT Reception

Several studies and test have been carried out in Europe with regards to the influence of pulsed 4G signals over the performance of demodulators built into DTT receivers and adaptors.

These studies concluded that the performance of DTT receivers, TVs and adaptors are subject to interference from LTE/4G, even with optimum screening of the installation.

This is the reason why by design the characteristics of the LTE/4G signals must be taken into account in order to avoid signal break-up or pixelation.



ZAS HD RECEIVER

European manufacturing, with strict quality controls and state of the art electronic design make the zAs HD the ideal receiver to allow the viewing of TV despite changing broadcast scenarios like deployment of LTE/4G.



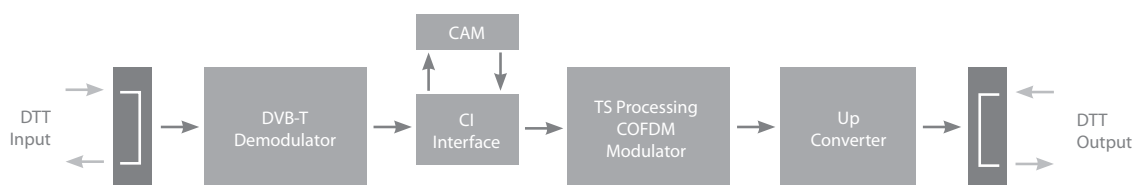
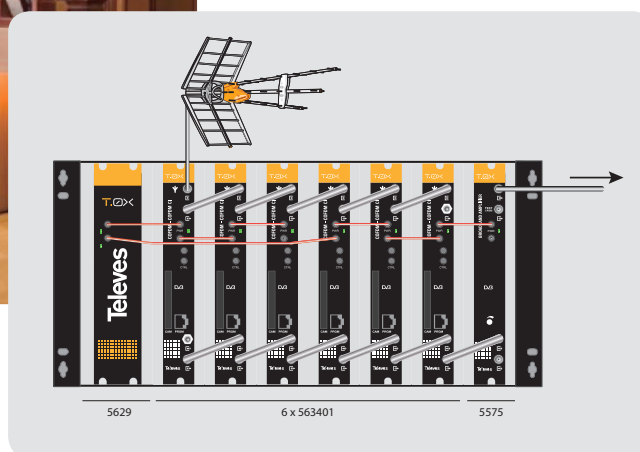
► DTT processing

The transmodulator/regenerator is an element that could be used in those instances where standard mitigation techniques (filtering) can't be used or don't achieve the desired results. This alternative allows the re-construction of the original signal, so that the original services are re-modulated at the headend. The regenerator even allows the installer to edit parameters of the multiplexed services. It is the ideal solution to re-establish the quality of the affected signal.

T.OX TRANSMODULATOR / REGENERATOR COFDM / COFDM

The transmodulator COFDM/COFDM CI (Ref.563401) adapts the transport stream to the requirements of the DVB-T transmission through the selective deletion of services from the received DTT MUX, to avoid the reception (and storage) by the DTT receivers and TVs.

By means of its CI interface and the CAM module, those encrypted DTT services could be decrypted and distributed as free to air.



Even more important with the deployment of the 4G telephony network and due to the pulsant nature of this interference signal only a spectrum analyzer capable of capturing up to 20MHz of bandwidth in less than 10 milliseconds will be able to detect it.

NEW SPECTRUM ANALYZER H60, WITH DIGITAL PROCESSING

Unprecedented speed and mathematical precision in all its measurements...



The spectrum analyzer recommend by Televés to analyze the TV signals in the communal system during 4G deployment.

The Digital Processing allows an uncomparable precision and speed in the analysis.

The choice is clear



Spectrum analyzer up to 3.3 GHz

- ✓ TILT function
- ✓ Network frequency attenuation.
- ✓ MPEG4 with common interface. HD video.
- ✓ HDMI output.
- ✓ Selective optical interface.
- ✓ DVB-T2 demodulation.
- ✓ 5.7" of high resolution.
- ✓ Digital processing.

Remote control of measurements via IP

Ideal for monitoring incoming signals and broad-band networks.

Leave your H60 connected to a system and control to it remotely.

Once the job is done, export your results to any PC/ laptop by means of the HSuite SW (included).



the 1990s, the number of people in the world who are under 15 years of age is expected to increase from 1.2 billion to 1.5 billion.

As the world's population grows, the demand for food and other resources will increase. This will put pressure on the environment and on the world's food supply.

One way to meet this demand is to increase the amount of food that is produced. This can be done by using more land for agriculture, by using more water, or by using more fertilizers.

Another way to meet this demand is to reduce the amount of food that is wasted. This can be done by improving food storage and distribution, or by changing eating habits.

There are many ways to meet the world's growing demand for food and other resources. It is up to us to decide which way is best.

One of the most important things we can do is to make sure that we are using resources wisely. This means using less water, less land, and less fertilizer.

Another important thing we can do is to make sure that we are not wasting food. This means eating what we buy, and not throwing away food that is still good to eat.

By doing these things, we can help to make sure that there is enough food and other resources for everyone in the world.

It is our responsibility to make sure that we are using resources wisely and that we are not wasting food. This is the only way to make sure that there is enough food and other resources for everyone in the world.

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Televes®



Product Guide

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