

User's handbook

Outdoor Multichannel Transmitter

A4D-ESxT/1

REGULATORY COMPLIANCE (USA)

This equipment requires licensing for operation under FCC Title 47 part 101

This equipment generates, uses and radiates electromagnetic fields that could cause interference to radio communications, is more important that it is installed and used in accordance with the instruction that are explained in this manual.

It is in conformity with the limits for a Class A computing device pursuant to Subpart B of Part 15 of the FCC Rules, that fixed and guarantee the reasonable protection against such interference when it is used in a commercial environment.

When this equipment is installed in a residential area it could cause interference, in which case the user must provide itself to avoid the interference.

The test results show compliance with the Class A limits for radiated emissions.

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is expressly forbidden by the law and can lead to serious civil and penal sanctions.



Warning!

The socket utilized for the unit supply must have the appropriate ground conductor.

The connection of the unit , to a socket without the ground conductor, will make the whole equipment dangerous for people safety.

About the repairing of the units please refer to specialized personnel only .

Inside the devices there are voltages which could be dangerous to people.
Before opening the cover switch off the unit, disconnect the connection and the supply cables.

In case of electrical shock please follow the instructions of first aid listed on page 4

Substitute the fuses interrupted with others of the same type and voltage.



The waste disposal of the devices must be executed in the respect of the enforced laws in the country uses.

Eurotek not assumed responsibility for waste disposal in contrast with enforced laws.

LIFE SUPPORT APPLICATIONS.

Eurotek's products are not designed for use as critical components in life support devices or system without the express written approval of the Eurotek S.r.l. As used herein.

- Life support devices or system are devices or system which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
- A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

The information given in this documentation could have variations without forewarning.

The firm Eurotek S.r.l. does not give any guaranty about this documentation.

The firm Eurotek S.r.l. does not consider itself responsible for possible mistakes which could be found in this documentation.

First aid: artificial breathing(mouth to mouth)

1	In case of electric shock you have to ensure the first aids to the patient, but to do this you have to consider two very important things: - interrupt immediately the electric circuit; - if the circuit has not been interrupted, do not touch the patient with bare hands; After doing this, without delay contact the nearest mobile unit of first aid and practice to the patient, in case of loss of consciousness, the breathing mouth to mouth as described below.	
2	Put the patient lying on his back with the arms parallel to the body, ensure that he does not have the breathing tracts obstructed (chewing-gum, dental prosthesis, etc.), otherwise set him free from foreign bodies. Kneel near the patient's head and putting a hand under his neck, incline as possible his/her head backwards.	
3	Going on with keeping the patient's head inclined with one hand, use the other one to occlude the nostrils, if you are going to practise the breathing through the oral cavity, or occlude the mouth if you want to do it through the nasal cavity. While doing this begin the auto-oxygenation, with deep breathing. Then practice the artificial breathing blowing in the chosen cavity beginning with ten expirations each minute to go on them with twelve and fifteen.	
4	During the breathing procedure you have to control that the patient's chest dilates, otherwise change cavity where to blow the air because the previous one could be obstructed.	
5	Do not ever stop the artificial breathing until the patient has recovered or the first aid unit has come.	

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1. Introduction

The A4D-ESxT/1 is a family of transmitter boards able to work from 5 GHz up to 15 GHz with excellent performances in terms of output power and spectral purity. The A4D-ESxT/1 boards have been designed in order to guarantee a reliable connection in a point to point radio link and they can operate in indoor environment.

The design has been carried out taking in consideration quality, cost and reliability by using first class solid state devices along with a careful choice of the design architecture.

The end user can easily access and monitor the boards through the EK-MFR/1 equipment.

All Eurotek products are designed according with the ETSI recommendations.

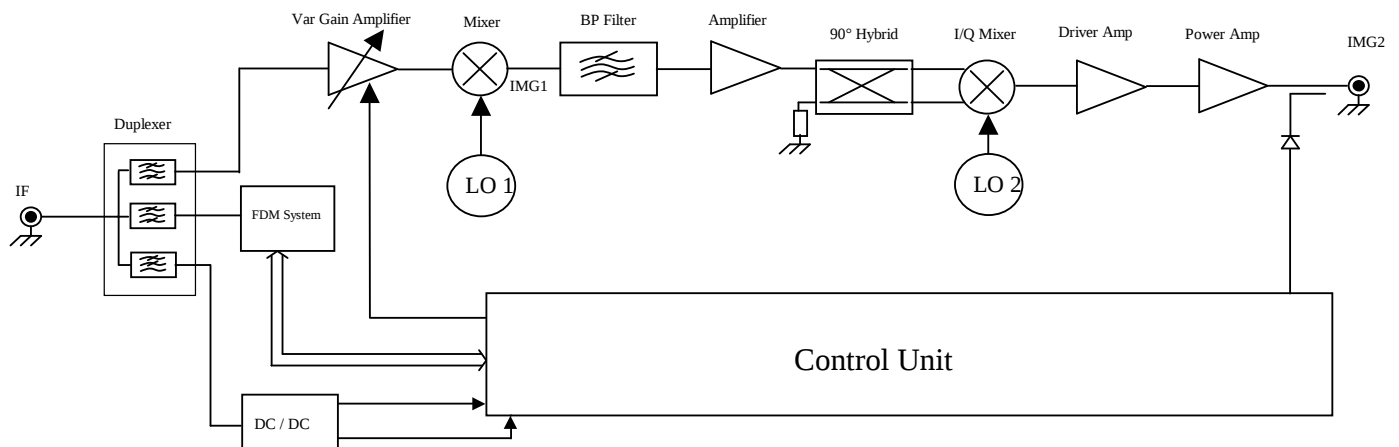
2. Theory of operation

The main task of the A4D-ESxT/1 board is to convert a 70 MHz IF signal up to 15 GHz, this is accomplished by using two up-conversion steps in order to keep as low as possible the spurious emission. A band pass filter is inserted after each up-converter and a number of solid state amplifiers keep the signal level controlled and stable in order to avoid unwanted distortions. One of the main issues concerning the up-conversion process is related to the local oscillator phase noise which must not exceed the maximum allowed by the whole system, the only way to keep the phase noise low enough to be compliant with the demodulator specs, is to implement for each VCO a phase locked loop able to stabilize the frequency and reduce the overall close-in phase noise.

3. A4D-ESxT/1 Block Diagram

The block diagram description is valid for the complete board family, only minor differences will be pointed out if essential to the reader understanding.

Each board has two main accesses, the first one is for the IF analog signal and the second one is a pure digital access devoted to board management.



3.1. Duplexer

The connection between the indoor unit EK-MFR/1 and the outdoor unit is made through a coaxial cable carrying the 70MHz IF signal, FDM control signals and the power supply. The modulated carrier is dropped by the duplexer and demodulated in order to establish the communication between indoor and outdoor units. The low pass filter inside the duplexer selects the bias voltage to be applied to the DC/DC converters .

3.2. IF analog signal path

The 70 MHz signal is amplified by the Variable gain amplifier.

The signal is then up-converted to the IMG1 IF using a fundamental mixer and filtered for the unwanted signals, the frequency range of the IMG1 signal is in the range of 1÷1.5 GHz.(see par. 3.4)

The second amplifier balances the first mixer loss and feeds the image rejection mixer which up converts the IMG1 to the final RF frequency (IMG2), the RF signal is then amplified by mean of a two stage amplifier in order to get the requested output power.

The two local oscillators (LO1 and LO2) are both part of a phase locked loop in order to guarantee both the long term frequency stability and the phase noise to be as low as possible. The first LO is a fixed frequency oscillator while the second one can be tuned in order to select the RF channel. (see par. 3.4).

3.3. Digital control

The unit is completely controlled, through the EK-CDP/1 board (see *EK-CDP/1 user 's manual*), by a microprocessor and the standard interface to the mainframe EK-MFR/1 allows an easy access to the board. The power control loop is fully controlled by the mainframe.

3.4. LO , IF and RF Frquency tables

ODU	IF	LO1	IMG1	LO2		IMG2	
A4D-ES5T/1	70	1610	1540	6740	6940	5200	5400
A4D-ES59T/1	70	1610	1540	7510	7940	5900	6400
A4D-ES6T/1	70	1610	1540	7940	8740	6400	7200
A4D-ES7T/1	70	1610	1540	8540	9540	7000	8000
A4D-ES8T/1	70	1610	1540	6460	6960	8000	8500
A4D-ES10T/1	70	1610	1540	11540	12240	10000	10700
A4D-ES11T/1	70	1610	1540	13240	13940	11700	12400
A4D-ES12T/1	70	1610	1540	13640	14040	12100	12500
A4D-ES13T/1	70	1610	1540	14240	14840	12700	13300
A4D-ES14T/1	70	1610	1540	12710	12960	14250	14500

Note : See Chapter 6 for Channel vs. Frequency tables

4. Main Features

4.1. Performances:

ODU	p1dB dBm	IP3 dBm	P diss. Watt	Input Connector	Output Connector
A4D-ES5T/1	29	37	< 22	N female	N female
A4D-ES59T/1	31	40	< 24	N female	N female
A4D-ES6T/1	31	40	< 25	N female	PDR70
A4D-ES7T/1	31	40	< 25	N female	PDR70
A4D-ES8T/1	31	40	< 25	N female	PDR84
A4D-ES10T/1	32	39	< 25	N female	UBR120
A4D-ES11T/1	32	39	< 25	N female	UBR120
A4D-ES12T/1	32	39	< 25	N female	UBR120
A4D-ES13T/1	32	39	< 25	N female	UBR120
A4D-ES14T/1	32	38	< 25	N female	UBR120

4.2. Bias Conditions

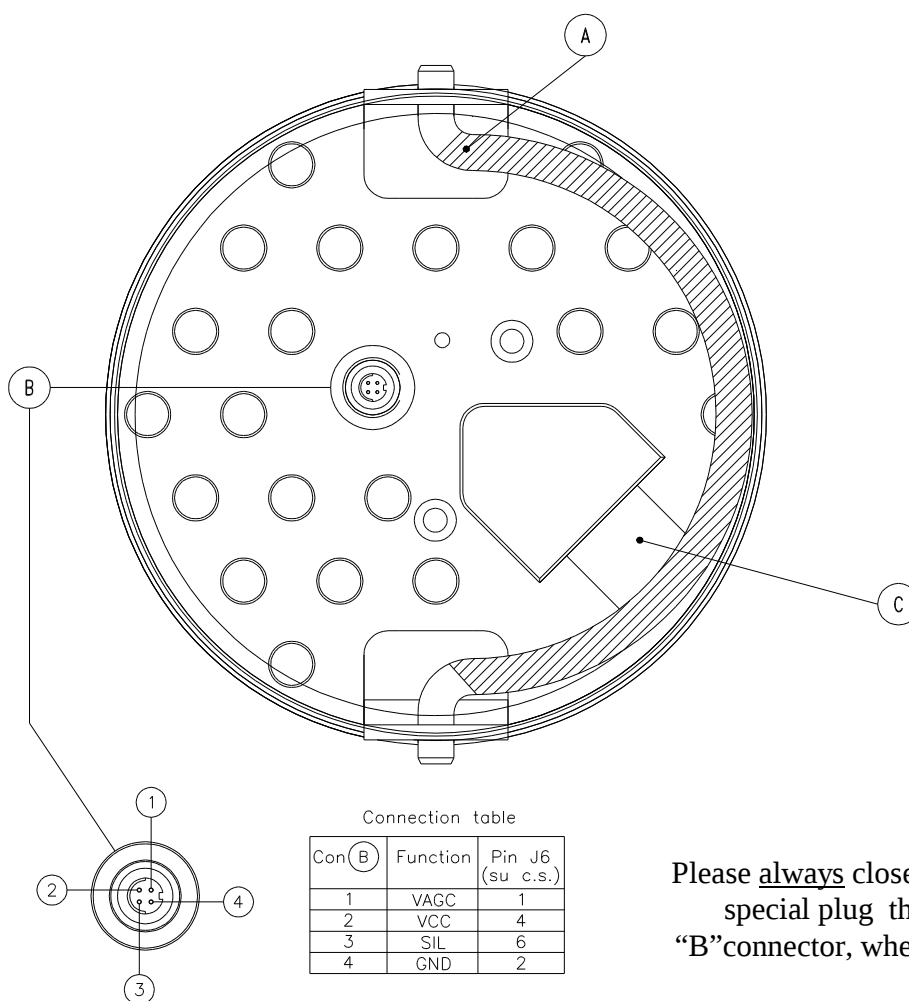
Voltage 16-36 Vcc negative to ground

4.3. Absolute Maximum Rating

Maximum Input Power 20 dBm
Storage temperature -40°C to 70°C
Operating temperature -30°C to 50 °C

5. Odu description

5.1. Rear description suitable for transmitting ODU:



Please always close with special plug the “B” connector, when not

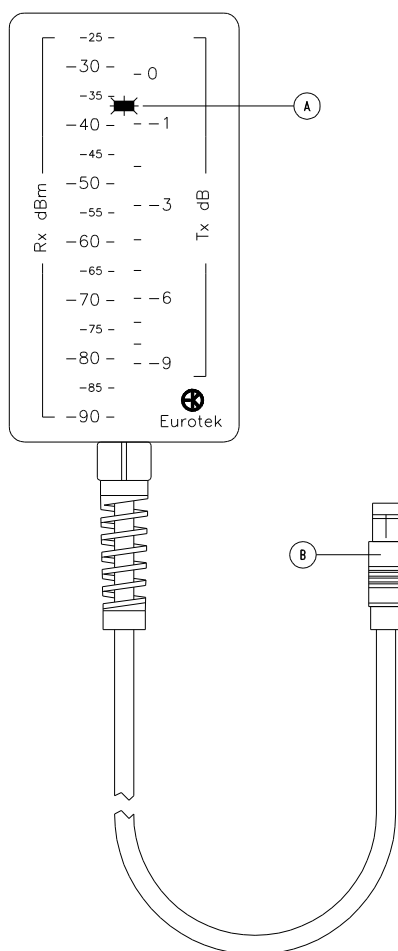
A) ODU¹ support handle

B) Link connector to EK-TMS/2 unit measurement

C) Link connector to IDU (receiver or transmitter)

1 – Waveguide orientation in output (when it is present), is parallel to the handle “A”; so pay attention, during the installation, that the handles of two ODU, either the receiving or the transmitting, are oriented in the same way. This in case that the Units are linked to antenna’s systems with direct connection to feed in round waveguide.

5.2. EK-TMS/2 unit measurement description:



A) The device indicates:

- in the receiving ODU, the received field intensity
- in the transmitting ODU, the transmitted power

Link connector to ODU (see letter B page 11)

6. Assembling instructions

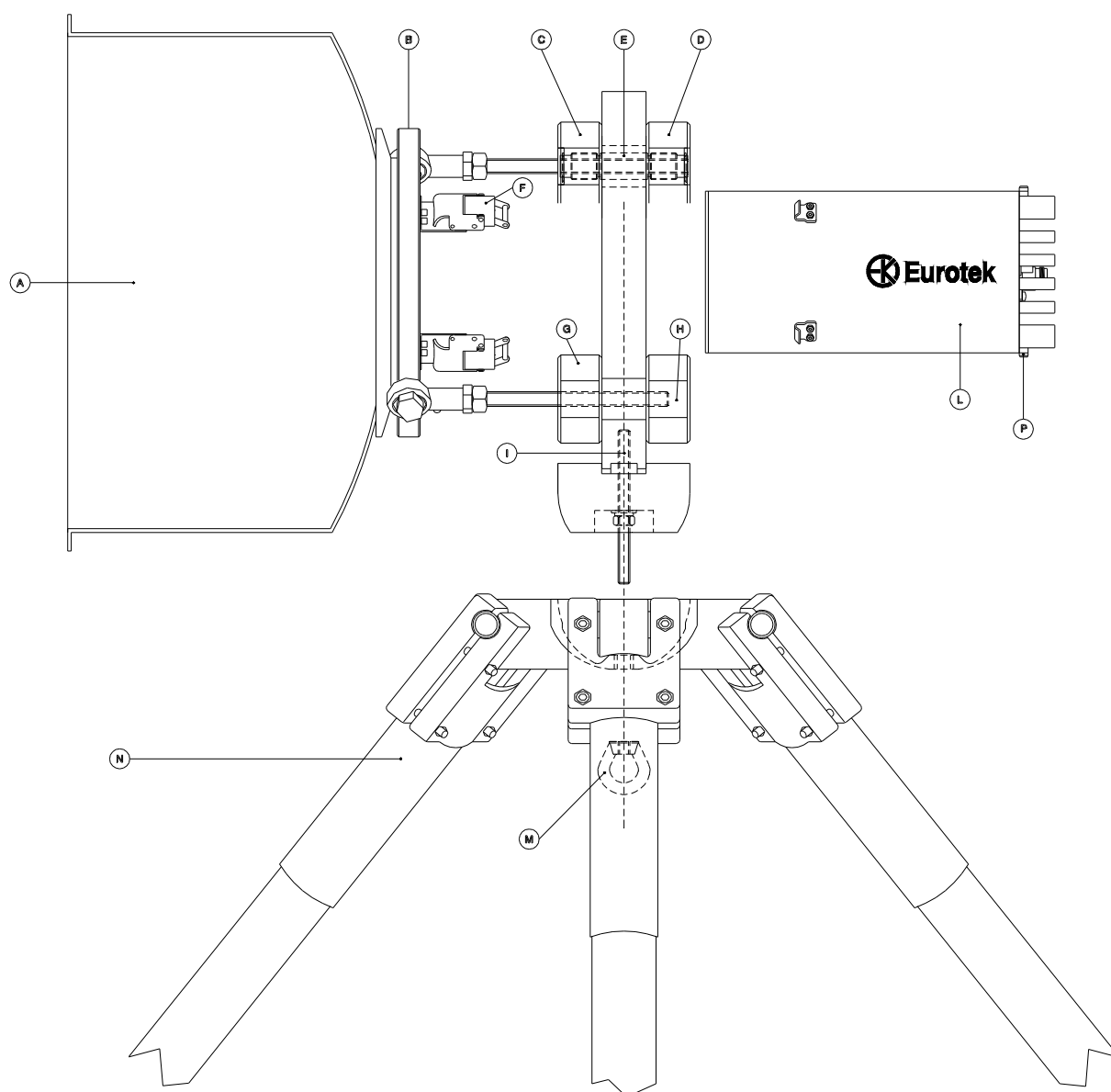
6.1. ODU assembling and supply configuration:

The ODU assembling and supply configuration are the following:

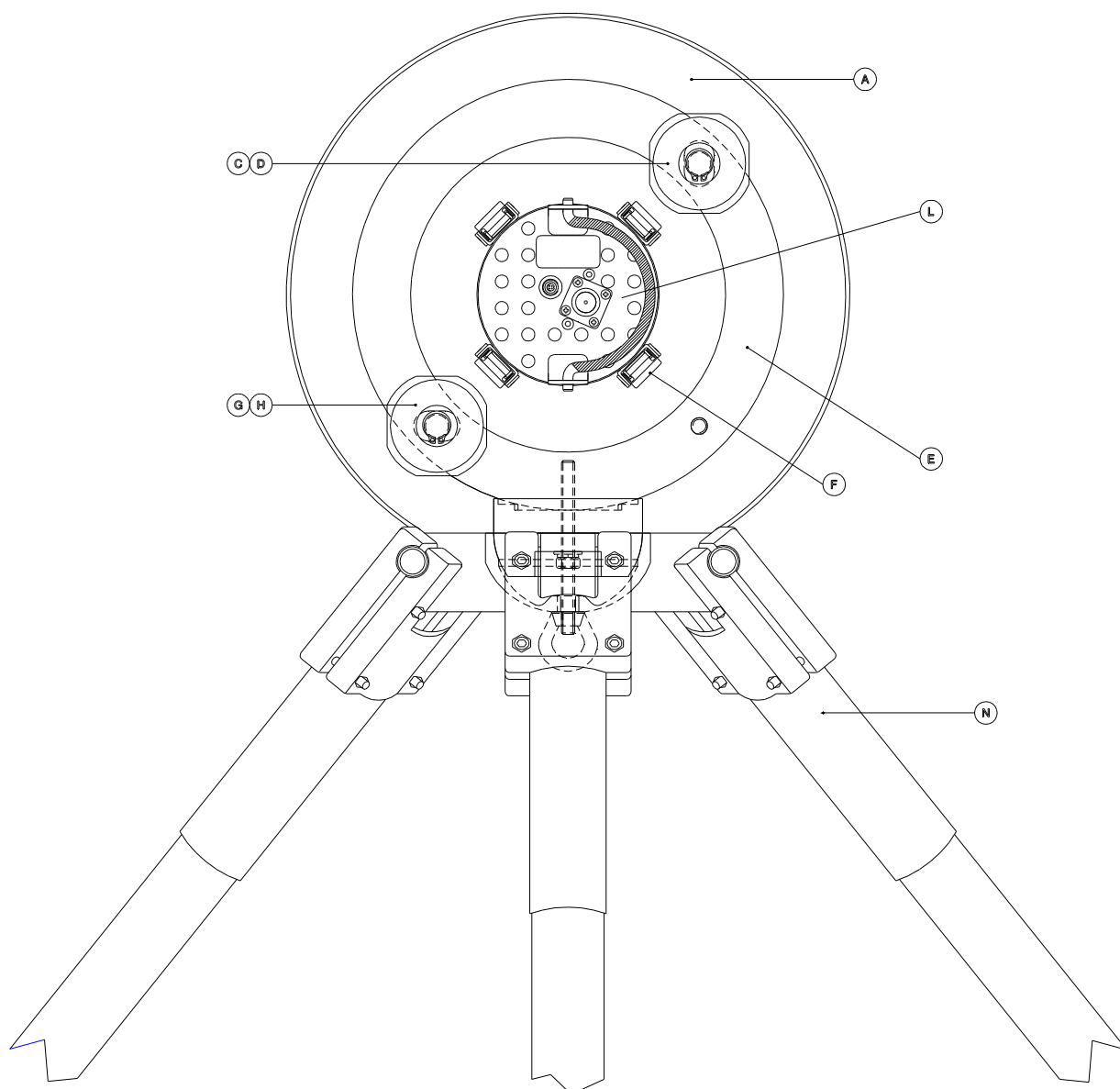
- 1) Mobile post assembling (only for A4D -ES10x/11 A4D -ES12x/11 A4D -ES13x/11 A4D -ES14x/11)
- 2) Resident post assembling (on pole) with 600mm parabolic reflector (only for A4D -ES10x/11 A4D -ES12x/11 A4D -ES13x/11 A4D -ES14x/11)
- 3) Resident post assembling (on pole) with arrangement to the flexible waveguide link only

6.2. ODU assembling configuration in mobile post:

Side view



Rear view (fully assembled)



LEGEND Fig. on pages 14-15	
A	Parabolic reflector
B	Circle for parabolic reflector support
C-D	Knobs for high-azimuth orientation
E	Ring for parabolic reflector support
F	Spring toggle latch
G-H	Knobs for latitude orientation
I	Fastening pivot on tripod N
L	OutDoor Unit (ODU)
M	Fastening eyebolt to the pivot L
N	Complete ODU support tripod
O	Fastening hook on ODU
P	ODU support handle

Parabolic reflector assembling shall be carry out as follows:

- 1) The overall of parabolic reflector (see fig. page 14) is supplied already assembled and complete in every its own parts (from the letter A to the letter I);
- 2) Subsequently, shall be arranged the ODU (L), to the parabolic reflector (A), hooking the four bolts (F) to the four hooks (O) on the ODU, as shown in the figure on page 14.
- 3) Now, the overall has to be fasten to the support tripod (N), putting the fastening pivot (I) in the special hole into the base of the tripod as shown in fig. on page 14, and finishing to assemble putting the eyebolt (M) screwing down it on the pivot itself, as shown in the figures on page 14 and 15.

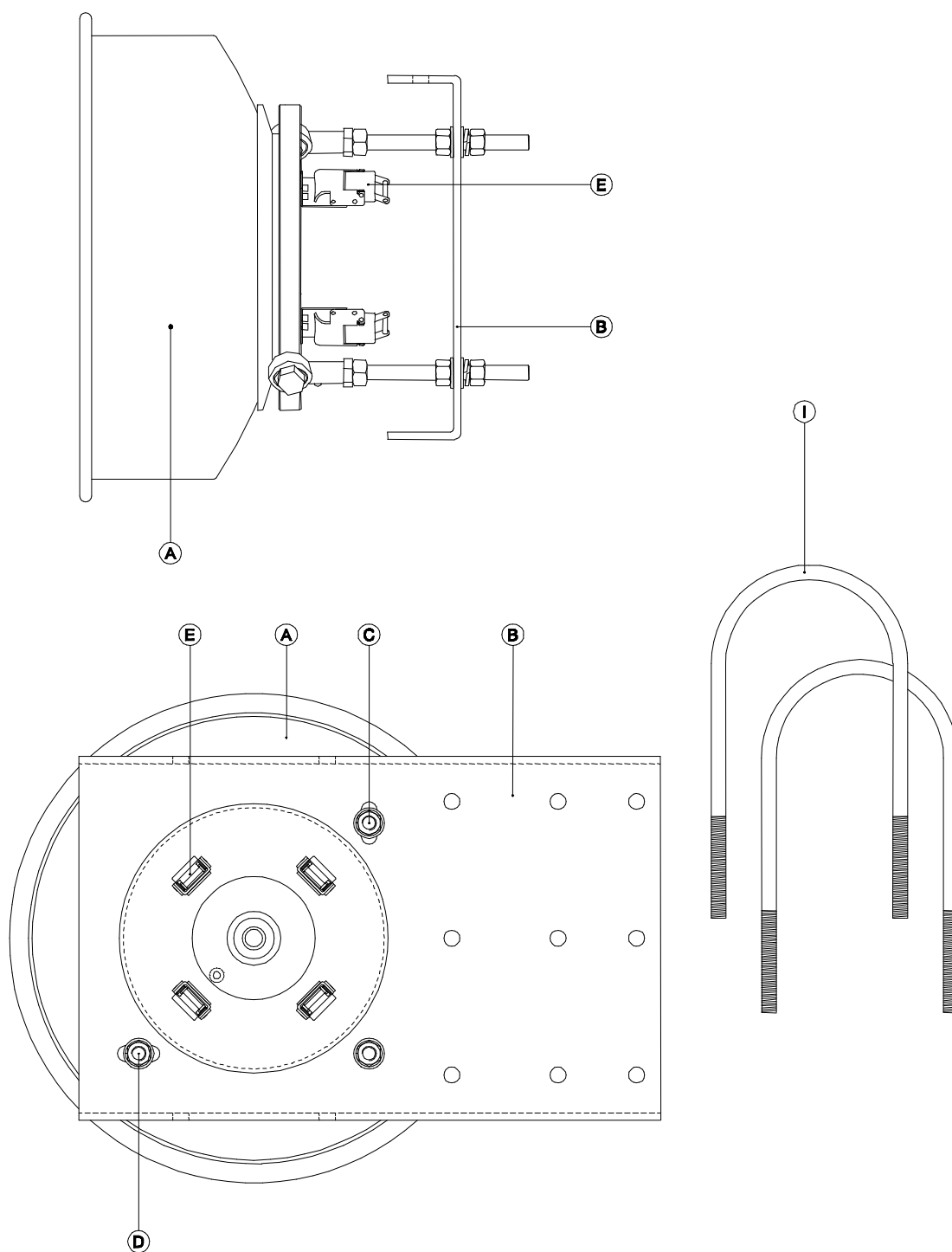
To secure a greater stability to the overall so achieved, it is advisable to hang a weight (30Kg max.) at the eyebolt (M).

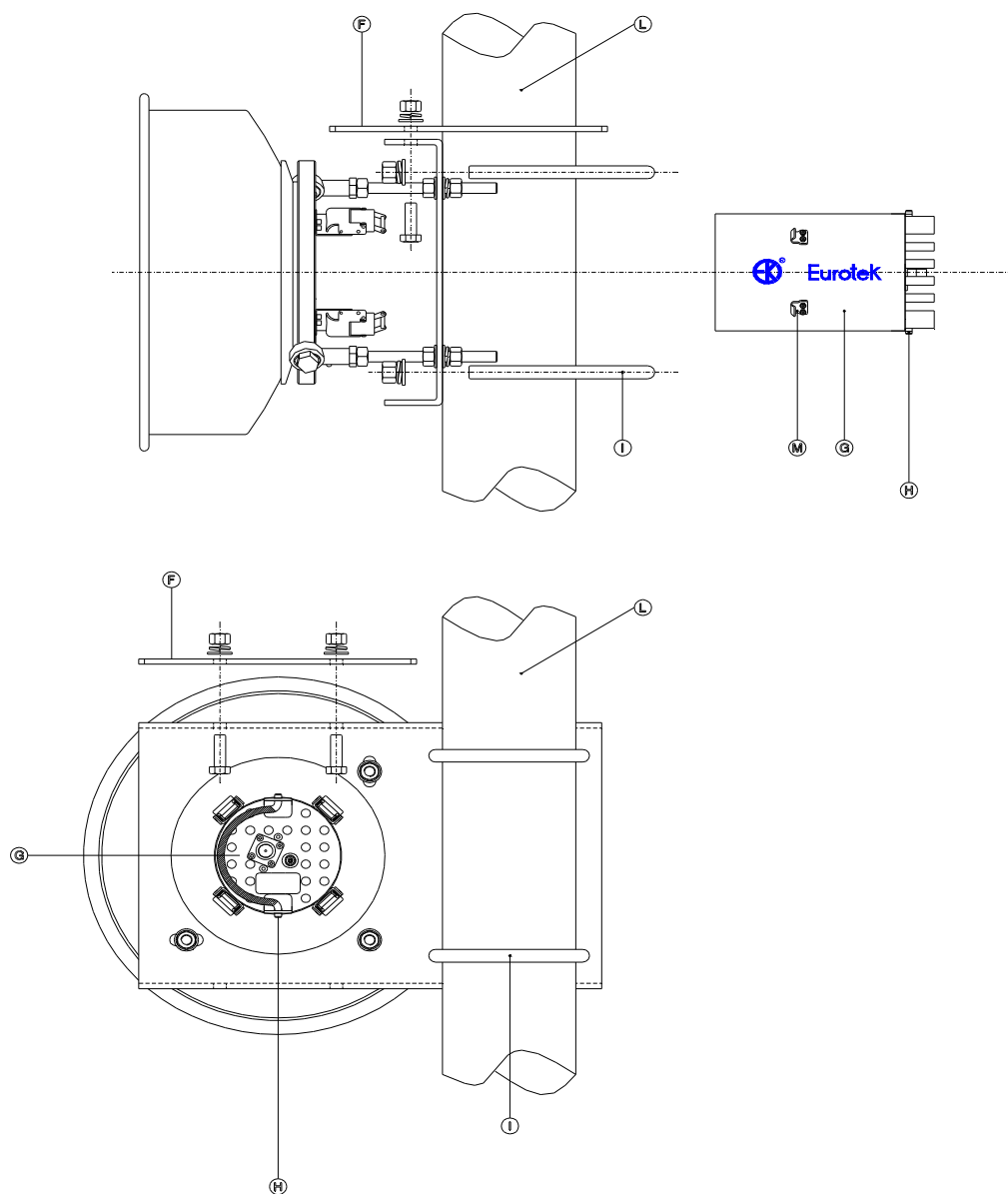
VERY IMPORTANT!

The polarization of the radiated and received electric field, is right-angled to the handle "P"; so pay attention that the handles of two units, the receiving one and the transmitting one, are oriented in the same way.

6.3. ODU in resident post assembling configuration with parabolic reflector:

The parabolic reflector is supplied already assembled and complete with every part indicated in the picture below



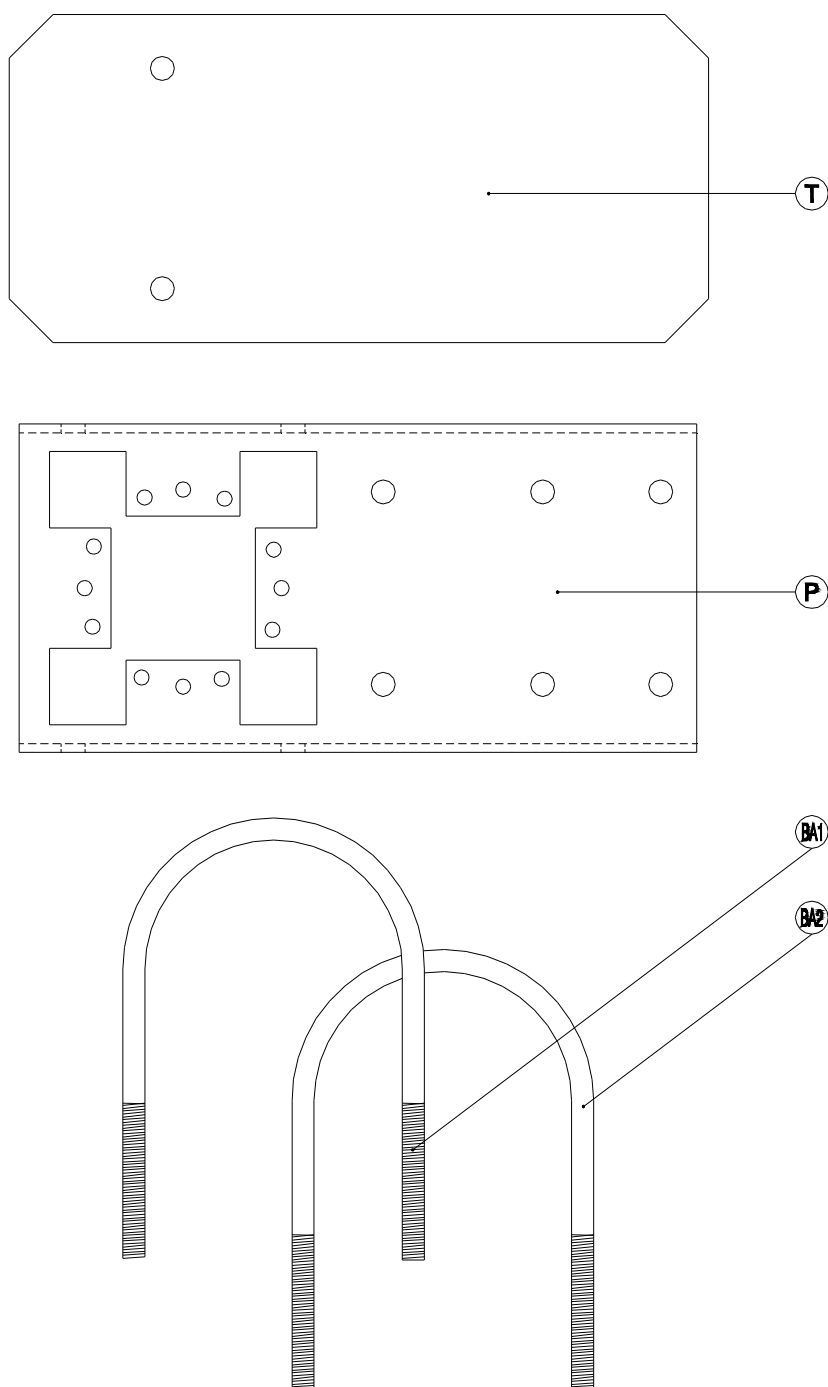


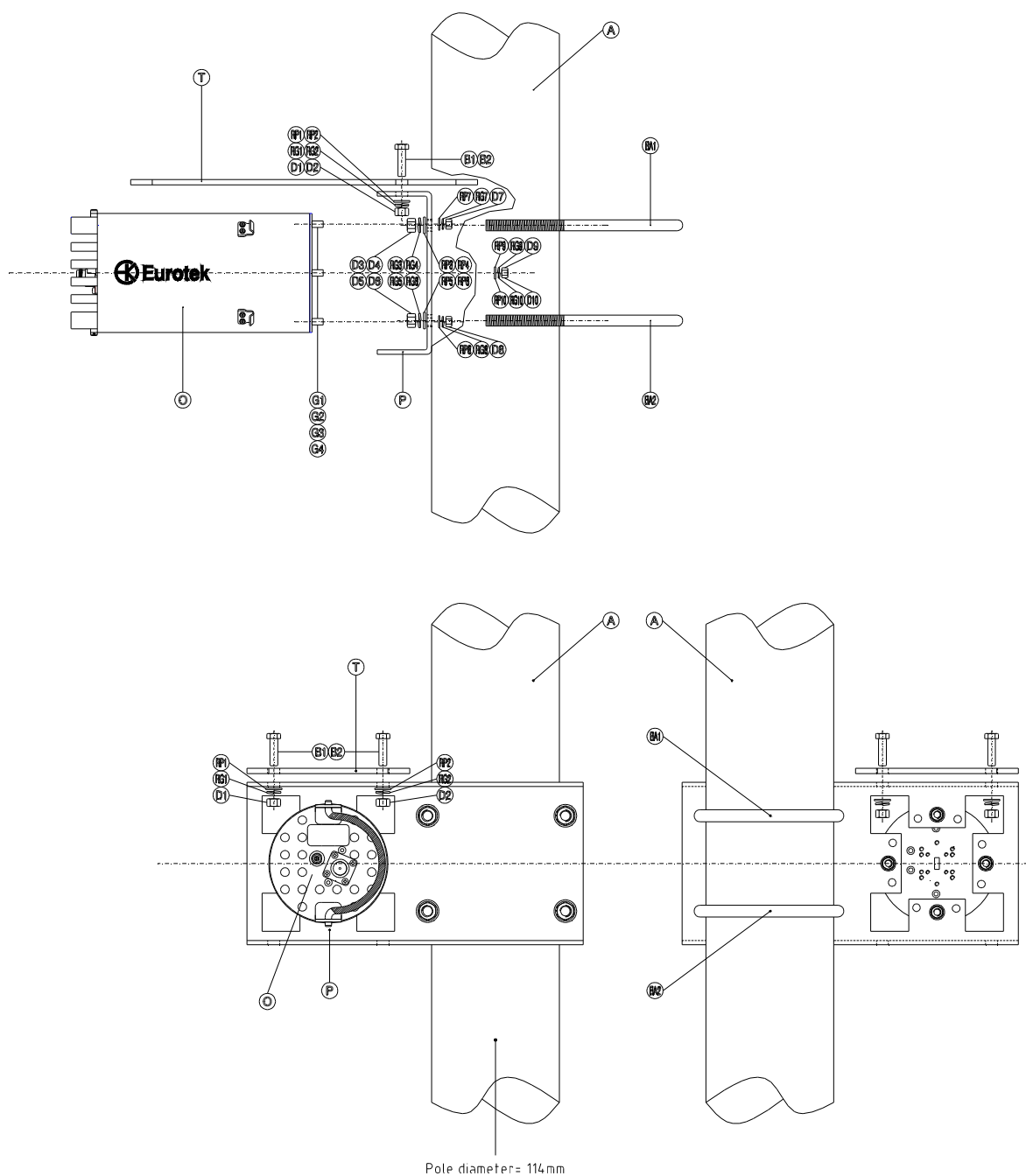
LEGEND Fig. page 17-18	
A	Parabolic reflector
B	Support plate of parabolic reflector
C	High-azimuth orientation
D	Latitude orientation
E	Spring toggle latch
F	Protection plate
G	Outdoor Unit (ODU)
H	ODU support handle
I	Fixing "U" bar
L	Support pole
M	Fastening hook on ODU

To assembling the parabolic reflector, please proceed as follows:

- 1) The overall of the parabolic reflector (A fig. page 17) together with the support plate (B fig. page 17), has to be fastened to the support pole (L fig. page 18) by the two "U" bars (I fig. page 17), with relative nuts and washers (flat + grower) $\varnothing 10$, as shown in fig. on page 18;
- 2) Subsequently, has to be arranged the protection plate (F fig. page 18), by relative nuts and bolts M10x30 included in the supply, as shown as ever in fig. on page 18;
- 3) Now, we proceed linking the ODU (G fig. page 18) to the parabolic reflector (A), hooking the four latches (E page 17) to the four hooks on the ODU (M), as shown in fig. on page 18.

6.4. ODU in resident post assembling configuration without parabolic reflector:





LEGEND Fig. page 21-22	
B1,B2	Bolt M10 x 25
BA1,BA2	“U” bar ø10mm with threaded M10 extremities
D1,D2,D3,D4,D5,D6	Nut M10
D7,D8,D9,D10	Nut M6
G1,G2,G3,G4	Stud M6x30mm for fastening to plate “P”
O	OutDoor Unit (ODU)
P	ODU support plate
A	Support pole
RG1,RG2,RG3,RG4,RG5,RG6	Grower washer ø10
RG7,RG8,RG9,RG10	Grower washer ø6
RP1,RP2,RP3,RP4,RP5,RP6	Flat washer ø10
RP7,RP8,RP9,RP10	Flat washer ø6
T	Roof for ODU support plate

The post assembling shall be done as follows:

Please join the cover plate (T) for the ODU to the support plate (P) by the nuts, the washers (flat and grower) and bolts ø10, fitting the holes on to the plates. (see fig. page 21).

Then, please fasten the overall composed by the plates (P)+(T) to the support pole (A) by the “U” bars (BA1&BA2) and relative four nuts and washers (flat and grower) ø10. (see fig. page 21).

Now, we have to fasten the ODU (O) to the support plate (P) fitting the four studs (G1÷G4) with the special holes by the four nuts and washers (flat and grower) ø6.

6.5. Pointing procedure of the parabolic reflector in mobile post configuration:

About the pointing procedure of the parabolic reflector, please proceed as follows:

- 1) The high-azimuth orientation (high-low), can be carried out in this way:
 - placed ourselves behind the parabolic reflector, please rotate at the same time the knob D (fig. page 14) in anti-clockwise direction and the C one (fig. page 14) in a clockwise direction only, until to reach the end stroke
 - at this point, rotate the knob D freely in a clockwise direction or in anti-clockwise direction, until to reach the requested position with the parabolic reflector
 - rotate at the same time the knob D in a clockwise direction and the C one in anti-clockwise direction until to clench them strongly to the ring E (fig. page 14)
- 2) The latitude orientation (right-left), can be carried out in this way:
 - placed ourselves behind the parabolic reflector, please rotate at the same time the knob H (fig. page 14) in anti-clockwise direction and the G one (fig. page 14) in a clockwise direction only, until to reach the end stroke
 - at this point, rotate the knob H freely in a clockwise direction or in anti-clockwise direction until to reach the requested position with the parabolic reflector
 - rotate at the same time the knob H in a clockwise direction and the G one in anti-clockwise direction until to clench them strongly to the ring E (fig. page 14)

6.6. Pointing procedure of parabolic reflector in resident post configuration:

About the pointing of parabolic reflector, please proceed as follows:

- 1) The high-azimuth orientation (high-low), can be carried out acting opportunely on two fastening nuts (C page 17) of the parabolic reflector (A page 17) to the support plate (B page 17) only; **all** the others fastening nuts have to be fully clenched.
- 2) The latitude orientation (right-left), can be carried out acting opportunely on two fastening nuts (D page 17) of the parabolic reflector (A) to the support plate (B) only; **all** the others fastening nuts have to be fully clenched.

VERY IMPORTANT!

To the end of fixing and pointing operations of the parabolic antenna, it's important to be sure that all the nuts are fully clenched, to avoid that sudden gusts or any other, can compromise the correct pointing and/or the assembly safety.

7. FCC Settings

The following tables specify the settings necessary to meet the FCC requirements about output spectrum for different Authorized bandwidth:

DVBS Configurations to meet FCC Spectrum Mask						
Aut. Bandwidth (MHz)	Const	Symbol Rate (MSym/s)	RollOff	Ploop	Pout (dBm)	FCC code
25	ALL	20.8	0.2	-8	IP3 – 17.5	25M7W
20	ALL	16.6	0.2	-8	IP3 – 17.5	20M7W
17	ALL	14.1	0.2	-8	IP3 – 17.5	17M7W
12	ALL	10	0.2	-9	IP3 – 18.5	12M7W
10	ALL	8.3	0.2	-9	IP3 – 18.5	10M7W
8	ALL	6.6	0.2	-9	IP3 – 18.5	8M7W

Symbol Rate (MSym/s) = Authorized bandwidth (MHz) / 1.2

DVBT Configurations to meet FCC Spectrum Mask						
Aut. Bandwidth (MHz)	Const	Carriers	Ch BW	Ploop	Pout (dBm)	FCC code
12	ALL	2K	8	-6	IP3 – 15.5	12M7W
12	ALL	4K	8	-6	IP3 – 15.5	12M7W
12	ALL	8K	8	-6	IP3 – 15.5	12M7W
10	ALL	2K	8	-9	IP3 – 18.5	10M7W
10	ALL	4K	8	-9	IP3 – 18.5	10M7W
10	ALL	8K	8	-9	IP3 – 18.5	10M7W
8	ALL	2K	8	-10	IP3 – 19.5	8M7W
8	ALL	4K	8	-10	IP3 – 19.5	8M7W
8	ALL	8K	8	-10	IP3 – 19.5	8M7W

8. Channel frequency tables

Model A4D-ES6T/1 Standard Version																									
Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2
1	6412	33	6796	65	7180	97	6593.75	129	6793.75	161	6993.75	193	7193.75	FCC	225	7040	ETSI 20 MHz								
2	6424	34	6808	66	7192	98	6600	130	6800	162	7000	194	6420		226	7060									
3	6436	35	6820	67	6406.25	99	6606.25	131	6806.25	163	7006.25	195	6440		227	7080									
4	6448	36	6832	68	6412.5	100	6612.5	132	6812.5	164	7012.5	196	6460		228	7100									
5	6460	37	6844	69	6418.75	101	6618.75	133	6818.75	165	7018.75	197	6480		229	7120									
6	6472	38	6856	70	6425	102	6625	134	6825	166	7025	198	6500		230	7140									
7	6484	39	6868	71	6431.25	103	6631.25	135	6831.25	167	7031.25	199	6520		231	7160									
8	6496	40	6880	72	6437.5	104	6637.5	136	6837.5	168	7037.5	200	6540		232	7180									
9	6508	41	6892	73	6443.75	105	6643.75	137	6843.75	169	7043.75	201	6560		233	n.a.	ETSI 20 MHz								
10	6520	42	6904	74	6450	106	6650	138	6850	170	7050	202	6580		234	n.a.									
11	6532	43	6916	75	6456.25	107	6656.25	139	6856.25	171	7056.25	203	6600		235	n.a.									
12	6544	44	6928	76	6462.5	108	6662.5	140	6862.5	172	7062.5	204	6620		236	n.a.									
13	6556	45	6940	77	6468.75	109	6668.75	141	6868.75	173	7068.75	205	6640		237	n.a.									
14	6568	46	6952	78	6475	110	6675	142	6875	174	7075	206	6660		238	n.a.									
15	6580	47	6964	79	6481.25	111	6681.25	143	6881.25	175	7081.25	207	6680		239	n.a.									
16	6592	48	6976	80	6487.5	112	6687.5	144	6887.5	176	7087.5	208	6700		240	n.a.									
17	6604	49	6988	81	6493.75	113	6693.75	145	6893.75	177	7093.75	209	6720		241	n.a.									
18	6616	50	7000	82	6500	114	6700	146	6900	178	7100	210	6740		242	n.a.									
19	6628	51	7012	83	6506.25	115	6706.25	147	6906.25	179	7106.25	211	6760		243	n.a.									
20	6640	52	7024	84	6512.5	116	6712.5	148	6912.5	180	7112.5	212	6780		244	n.a.									
21	6652	53	7036	85	6518.75	117	6718.75	149	6918.75	181	7118.75	213	6800		245	n.a.									
22	6664	54	7048	86	6525	118	6725	150	6925	182	7125	214	6820		246	n.a.									
23	6676	55	7060	87	6531.25	119	6731.25	151	6931.25	183	7131.25	215	6840		247	n.a.									
24	6688	56	7072	88	6537.5	120	6737.5	152	6937.5	184	7137.5	216	6860		248	n.a.									
25	6700	57	7084	89	6543.75	121	6743.75	153	6943.75	185	7143.75	217	6880		249	n.a.									
26	6712	58	7096	90	6550	122	6750	154	6950	186	7150	218	6900		250	n.a.									
27	6724	59	7108	91	6556.25	123	6756.25	155	6956.25	187	7156.25	219	6920		251	n.a.									
28	6736	60	7120	92	6562.5	124	6762.5	156	6962.5	188	7162.5	220	6940		252	n.a.									
29	6748	61	7132	93	6568.75	125	6768.75	157	6968.75	189	7168.75	221	6960		253	n.a.									
30	6760	62	7144	94	6575	126	6775	158	6975	190	7175	222	6980		254	n.a.									
31	6772	63	7156	95	6581.25	127	6781.25	159	6981.25	191	7181.25	223	7000		255	n.a.									
32	6784	64	7168	96	6587.5	128	6787.5	160	6987.5	192	7187.5	224	7020		256	n.a.									

Model A4D-ES7T/1		Channel arrangement A Version																					
Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2	
1	7100	20 MHz	33	n.a.		65	n.a.		97	n.a.		129	n.a.		161	n.a.		193	n.a.		225	n.a.	
2	7120		34	n.a.		66	n.a.		98	n.a.		130	n.a.		162	n.a.		194	n.a.		226	n.a.	
3	7140		35	n.a.		67	n.a.		99	n.a.		131	n.a.		163	n.a.		195	n.a.		227	n.a.	
4	7160		36	n.a.		68	n.a.		100	n.a.		132	n.a.		164	n.a.		196	n.a.		228	n.a.	
5	7180		37	n.a.		69	n.a.		101	n.a.		133	n.a.		165	n.a.		197	n.a.		229	n.a.	
6	7200		38	n.a.		70	n.a.		102	n.a.		134	n.a.		166	n.a.		198	n.a.		230	n.a.	
7	7220		39	n.a.		71	n.a.		103	n.a.		135	n.a.		167	n.a.		199	n.a.		231	n.a.	
8	7240		40	n.a.		72	n.a.		104	n.a.		136	n.a.		168	n.a.		200	n.a.		232	n.a.	
9	7260		41	n.a.		73	n.a.		105	n.a.		137	n.a.		169	n.a.		201	n.a.		233	n.a.	
10	7280		42	n.a.		74	n.a.		106	n.a.		138	n.a.		170	n.a.		202	n.a.		234	n.a.	
11	n.a.		43	n.a.		75	n.a.		107	n.a.		139	n.a.		171	n.a.		203	n.a.		235	n.a.	
12	n.a.		44	n.a.		76	n.a.		108	n.a.		140	n.a.		172	n.a.		204	n.a.		236	n.a.	
13	n.a.		45	n.a.		77	n.a.		109	n.a.		141	n.a.		173	n.a.		205	n.a.		237	n.a.	
14	n.a.		46	n.a.		78	n.a.		110	n.a.		142	n.a.		174	n.a.		206	n.a.		238	n.a.	
15	n.a.		47	n.a.		79	n.a.		111	n.a.		143	n.a.		175	n.a.		207	n.a.		239	n.a.	
16	n.a.		48	n.a.		80	n.a.		112	n.a.		144	n.a.		176	n.a.		208	n.a.		240	n.a.	
17	n.a.		49	n.a.		81	n.a.		113	n.a.		145	n.a.		177	n.a.		209	n.a.		241	n.a.	
18	n.a.		50	n.a.		82	n.a.		114	n.a.		146	n.a.		178	n.a.		210	n.a.		242	n.a.	
19	n.a.		51	n.a.		83	n.a.		115	n.a.		147	n.a.		179	n.a.		211	n.a.		243	n.a.	
20	n.a.		52	n.a.		84	n.a.		116	n.a.		148	n.a.		180	n.a.		212	n.a.		244	n.a.	
21	n.a.		53	n.a.		85	n.a.		117	n.a.		149	n.a.		181	n.a.		213	n.a.		245	n.a.	
22	n.a.		54	n.a.		86	n.a.		118	n.a.		150	n.a.		182	n.a.		214	n.a.		246	n.a.	
23	n.a.		55	n.a.		87	n.a.		119	n.a.		151	n.a.		183	n.a.		215	n.a.		247	n.a.	
24	n.a.		56	n.a.		88	n.a.		120	n.a.		152	n.a.		184	n.a.		216	n.a.		248	n.a.	
25	n.a.		57	n.a.		89	n.a.		121	n.a.		153	n.a.		185	n.a.		217	n.a.		249	n.a.	
26	n.a.		58	n.a.		90	n.a.		122	n.a.		154	n.a.		186	n.a.		218	n.a.		250	n.a.	
27	n.a.		59	n.a.		91	n.a.		123	n.a.		155	n.a.		187	n.a.		219	n.a.		251	n.a.	
28	n.a.		60	n.a.		92	n.a.		124	n.a.		156	n.a.		188	n.a.		220	n.a.		252	n.a.	
29	n.a.		61	n.a.		93	n.a.		125	n.a.		157	n.a.		189	n.a.		221	n.a.		253	n.a.	
30	n.a.		62	n.a.		94	n.a.		126	n.a.		158	n.a.		190	n.a.		222	n.a.		254	n.a.	
31	n.a.		63	n.a.		95	n.a.		127	n.a.		159	n.a.		191	n.a.		223	n.a.		255	n.a.	
32	n.a.		64	n.a.		96	n.a.		128	n.a.		160	n.a.		192	n.a.		224	n.a.		256	n.a.	

Model A4D-ES10T/1 Channel arrangement Standard Version																			
Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2
1	10310	20 MHz	33	n.a.		65	n.a.		97	n.a.		129	n.a.		161	n.a.		193	n.a.
2	10330		34	n.a.		66	n.a.		98	n.a.		130	n.a.		162	n.a.		194	n.a.
3	10350		35	n.a.		67	n.a.		99	n.a.		131	n.a.		163	n.a.		195	n.a.
4	10370		36	n.a.		68	n.a.		100	n.a.		132	n.a.		164	n.a.		196	n.a.
5	10390		37	n.a.		69	n.a.		101	n.a.		133	n.a.		165	n.a.		197	n.a.
6	10410		38	n.a.		70	n.a.		102	n.a.		134	n.a.		166	n.a.		198	n.a.
7	10430		39	n.a.		71	n.a.		103	n.a.		135	n.a.		167	n.a.		199	n.a.
8	10450		40	n.a.		72	n.a.		104	n.a.		136	n.a.		168	n.a.		200	n.a.
9	10520	20 MHz	41	n.a.		73	n.a.		105	n.a.		137	n.a.		169	n.a.		201	n.a.
10	10540		42	n.a.		74	n.a.		106	n.a.		138	n.a.		170	n.a.		202	n.a.
11	10560		43	n.a.		75	n.a.		107	n.a.		139	n.a.		171	n.a.		203	n.a.
12	10580		44	n.a.		76	n.a.		108	n.a.		140	n.a.		172	n.a.		204	n.a.
13	10600		45	n.a.		77	n.a.		109	n.a.		141	n.a.		173	n.a.		205	n.a.
14	10620		46	n.a.		78	n.a.		110	n.a.		142	n.a.		174	n.a.		206	n.a.
15	10640		47	n.a.		79	n.a.		111	n.a.		143	n.a.		175	n.a.		207	n.a.
16	10660		48	n.a.		80	n.a.		112	n.a.		144	n.a.		176	n.a.		208	n.a.
17	n.a.	20 MHz	49	n.a.		81	n.a.		113	n.a.		145	n.a.		177	n.a.		209	n.a.
18	n.a.		50	n.a.		82	n.a.		114	n.a.		146	n.a.		178	n.a.		210	n.a.
19	n.a.		51	n.a.		83	n.a.		115	n.a.		147	n.a.		179	n.a.		211	n.a.
20	n.a.		52	n.a.		84	n.a.		116	n.a.		148	n.a.		180	n.a.		212	n.a.
21	n.a.		53	n.a.		85	n.a.		117	n.a.		149	n.a.		181	n.a.		213	n.a.
22	n.a.		54	n.a.		86	n.a.		118	n.a.		150	n.a.		182	n.a.		214	n.a.
23	n.a.		55	n.a.		87	n.a.		119	n.a.		151	n.a.		183	n.a.		215	n.a.
24	n.a.		56	n.a.		88	n.a.		120	n.a.		152	n.a.		184	n.a.		216	n.a.
25	n.a.		57	n.a.		89	n.a.		121	n.a.		153	n.a.		185	n.a.		217	n.a.
26	n.a.		58	n.a.		90	n.a.		122	n.a.		154	n.a.		186	n.a.		218	n.a.
27	n.a.		59	n.a.		91	n.a.		123	n.a.		155	n.a.		187	n.a.		219	n.a.
28	n.a.		60	n.a.		92	n.a.		124	n.a.		156	n.a.		188	n.a.		220	n.a.
29	n.a.		61	n.a.		93	n.a.		125	n.a.		157	n.a.		189	n.a.		221	n.a.
30	n.a.		62	n.a.		94	n.a.		126	n.a.		158	n.a.		190	n.a.		222	n.a.
31	n.a.		63	n.a.		95	n.a.		127	n.a.		159	n.a.		191	n.a.		223	n.a.
32	n.a.		64	n.a.		96	n.a.		128	n.a.		160	n.a.		192	n.a.		224	n.a.

Model A4D-ES13T/1 Channel arrangement Standard Version (STD)															
Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2	Ch.	IMG2
1	12765	33	13024	65	12866.5	97	13132.5	129	13112.5	161	n.a.	193	n.a.	225	n.a.
2	12793	34	13038	66	12873.5	98	13139.5	130	13137.5	162	n.a.	194	n.a.	226	n.a.
3	12821	35	13052	67	12880.5	99	13146.5	131	13162.5	163	n.a.	195	n.a.	227	n.a.
4	12849	36	13066	68	12887.5	100	13153.5	132	13187.5	164	n.a.	196	n.a.	228	n.a.
5	12877	37	13080	69	12894.5	101	13160.5	133	n.a.	165	n.a.	197	n.a.	229	n.a.
6	12905	38	13094	70	12901.5	102	13167.5	134	n.a.	166	n.a.	198	n.a.	230	n.a.
7	12933	39	13108	71	12908.5	103	13174.5	135	n.a.	167	n.a.	199	n.a.	231	n.a.
8	12961	40	13122	72	12915.5	104	13181.5	136	n.a.	168	n.a.	200	n.a.	232	n.a.
9	13031	41	13136	73	12922.5	105	13188.5	137	n.a.	169	n.a.	201	n.a.	233	n.a.
10	13059	42	13150	74	12929.5	106	13195.5	138	n.a.	170	n.a.	202	n.a.	234	n.a.
11	13087	43	13164	75	12936.5	107	13202.5	139	n.a.	171	n.a.	203	n.a.	235	n.a.
12	13115	44	13178	76	12943.5	108	13209.5	140	n.a.	172	n.a.	204	n.a.	236	n.a.
13	13143	45	13192	77	12950.5	109	13216.5	141	n.a.	173	n.a.	205	n.a.	237	n.a.
14	13171	46	13206	78	12957.5	110	13223.5	142	n.a.	174	n.a.	206	n.a.	238	n.a.
15	13199	47	13220	79	12964.5	111	13230.5	143	n.a.	175	n.a.	207	n.a.	239	n.a.
16	13227	48	13234	80	12971.5	112	13237.5	144	n.a.	176	n.a.	208	n.a.	240	n.a.
17	12758	49	12754.5	81	13020.5	113	12712.5	145	n.a.	177	n.a.	209	n.a.	241	n.a.
18	12772	50	12761.5	82	13027.5	114	12737.5	146	n.a.	178	n.a.	210	n.a.	242	n.a.
19	12786	51	12768.5	83	13034.5	115	12762.5	147	n.a.	179	n.a.	211	n.a.	243	n.a.
20	12800	52	12775.5	84	13041.5	116	12787.5	148	n.a.	180	n.a.	212	n.a.	244	n.a.
21	12814	53	12782.5	85	13048.5	117	12812.5	149	n.a.	181	n.a.	213	n.a.	245	n.a.
22	12828	54	12789.5	86	13055.5	118	12837.5	150	n.a.	182	n.a.	214	n.a.	246	n.a.
23	12842	55	12796.5	87	13062.5	119	12862.5	151	n.a.	183	n.a.	215	n.a.	247	n.a.
24	12856	56	12803.5	88	13069.5	120	12887.5	152	n.a.	184	n.a.	216	n.a.	248	n.a.
25	12870	57	12810.5	89	13076.5	121	12912.5	153	n.a.	185	n.a.	217	n.a.	249	n.a.
26	12884	58	12817.5	90	13083.5	122	12937.5	154	n.a.	186	n.a.	218	n.a.	250	n.a.
27	12898	59	12824.5	91	13090.5	123	12962.5	155	n.a.	187	n.a.	219	n.a.	251	n.a.
28	12912	60	12831.5	92	13097.5	124	12987.5	156	n.a.	188	n.a.	220	n.a.	252	n.a.
29	12926	61	12838.5	93	13104.5	125	13012.5	157	n.a.	189	n.a.	221	n.a.	253	n.a.
30	12940	62	12845.5	94	13111.5	126	13037.5	158	n.a.	190	n.a.	222	n.a.	254	n.a.
31	12954	63	12852.5	95	13118.5	127	13062.5	159	n.a.	191	n.a.	223	n.a.	255	n.a.
32	12968	64	12859.5	96	13125.5	128	13087.5	160	n.a.	192	n.a.	224	n.a.	256	n.a.

Model A4D-ES14T/1 Channel arrangement Standard Version																			
Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2		Ch.	IMG2
1	14260	20 MHz	33	n.a.		65	n.a.		97	n.a.		129	n.a.		161	n.a.		193	n.a.
2	14280		34	n.a.		66	n.a.		98	n.a.		130	n.a.		162	n.a.		194	n.a.
3	14300		35	n.a.		67	n.a.		99	n.a.		131	n.a.		163	n.a.		195	n.a.
4	14320		36	n.a.		68	n.a.		100	n.a.		132	n.a.		164	n.a.		196	n.a.
5	14340		37	n.a.		69	n.a.		101	n.a.		133	n.a.		165	n.a.		197	n.a.
6	14360		38	n.a.		70	n.a.		102	n.a.		134	n.a.		166	n.a.		198	n.a.
7	14390	20 MHz	39	n.a.		71	n.a.		103	n.a.		135	n.a.		167	n.a.		199	n.a.
8	14410		40	n.a.		72	n.a.		104	n.a.		136	n.a.		168	n.a.		200	n.a.
9	14430		41	n.a.		73	n.a.		105	n.a.		137	n.a.		169	n.a.		201	n.a.
10	14450		42	n.a.		74	n.a.		106	n.a.		138	n.a.		170	n.a.		202	n.a.
11	14470		43	n.a.		75	n.a.		107	n.a.		139	n.a.		171	n.a.		203	n.a.
12	14490		44	n.a.		76	n.a.		108	n.a.		140	n.a.		172	n.a.		204	n.a.
13	n.a.		45	n.a.		77	n.a.		109	n.a.		141	n.a.		173	n.a.		205	n.a.
14	n.a.		46	n.a.		78	n.a.		110	n.a.		142	n.a.		174	n.a.		206	n.a.
15	n.a.		47	n.a.		79	n.a.		111	n.a.		143	n.a.		175	n.a.		207	n.a.
16	n.a.		48	n.a.		80	n.a.		112	n.a.		144	n.a.		176	n.a.		208	n.a.
17	n.a.		49	n.a.		81	n.a.		113	n.a.		145	n.a.		177	n.a.		209	n.a.
18	n.a.		50	n.a.		82	n.a.		114	n.a.		146	n.a.		178	n.a.		210	n.a.
19	n.a.		51	n.a.		83	n.a.		115	n.a.		147	n.a.		179	n.a.		211	n.a.
20	n.a.		52	n.a.		84	n.a.		116	n.a.		148	n.a.		180	n.a.		212	n.a.
21	n.a.		53	n.a.		85	n.a.		117	n.a.		149	n.a.		181	n.a.		213	n.a.
22	n.a.		54	n.a.		86	n.a.		118	n.a.		150	n.a.		182	n.a.		214	n.a.
23	n.a.		55	n.a.		87	n.a.		119	n.a.		151	n.a.		183	n.a.		215	n.a.
24	n.a.		56	n.a.		88	n.a.		120	n.a.		152	n.a.		184	n.a.		216	n.a.
25	n.a.		57	n.a.		89	n.a.		121	n.a.		153	n.a.		185	n.a.		217	n.a.
26	n.a.		58	n.a.		90	n.a.		122	n.a.		154	n.a.		186	n.a.		218	n.a.
27	n.a.		59	n.a.		91	n.a.		123	n.a.		155	n.a.		187	n.a.		219	n.a.
28	n.a.		60	n.a.		92	n.a.		124	n.a.		156	n.a.		188	n.a.		220	n.a.
29	n.a.		61	n.a.		93	n.a.		125	n.a.		157	n.a.		189	n.a.		221	n.a.
30	n.a.		62	n.a.		94	n.a.		126	n.a.		158	n.a.		190	n.a.		222	n.a.
31	n.a.		63	n.a.		95	n.a.		127	n.a.		159	n.a.		191	n.a.		223	n.a.
32	n.a.		64	n.a.		96	n.a.		128	n.a.		160	n.a.		192	n.a.		224	n.a.

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