By e-mail

PRASAR BHARATI
(INDIA's PUBLIC SERVICE BROADCASTER)
O/o ADDITIONAL DIRECTOR GENERAL (E) (WZ)
ALL INDIA RADIO & DOORDARSHAN
OLD C.G.O. BUILDING, 3RD FLOOR
101, M.K.ROAD, MUMBAI-20.

ADG(E-WZ)/AIRP/(100W FM TR 36 Stations)/ 11TR/ 2022-23 Date: 03.06.2022

Sub: Budgetary quote for the work of hauling up of 2-bay antenna and hoisting of 7/8" dia. RF cable and Painting of Tower/Mast with cable tray at 36-Nos of LPTV locations in West Zone.

Sir,

This office is interested to carry out the work of hauling up of 2-bay antenna and hoisting of 7/8" RF cable and Painting of Tower/Mast with cable trayat 36-Nos of LPTV locationsin West Zone. Please consider the notes given below and the LPTV sitelocation with tower heights while quoting the budgetary rates.

Please submit the budgetary quote in your company's letter head with seal &signature to this office at the earliest not later than **20.06.2022** to enable us to calculate the estimated price of the work. The prospective bidders can also send budgetary quotes by e-mail. ddgairprojectwz@gmail.com aeairp3.cewz@prasarbharati.gov.in

Sr. No.	Description of Stores/works	Qty	Rate per site
1)	**Hauling up of new 2-bay FM Antenna and 7/8" RF Cable as per following:** **a.** Hauling up of New 2-Bay, FM Antenna system on 45M/60 M SS/Guy Tower is to be carried out as per attached drawings, specifications and OEM Manual. **i.** Supply of 2" (50 mm) diameter C class GI pipe of 4 mtr length for fixing 2 FM dipoles (provided by AIR) for making 2 Bay FM antenna system (Drawing/Manual pages No.1 to 6, 29 to 31 can be referred.). Clamps for fixing of FM Dipoles will be provided by AIR. **ii.** Hauling of 2 bay antenna system on the tower at about 45 M height as per arrangement shown in the illustration drawing with a distance of 310 mm from the face of Tower. The required pipes, clamps, brackets including other accessories for completion of fixing of 2 bay antenna system on tower are to be supplied by tenderer. The work will be carried out under the supervision of Engineer on site/I.O. **(Note: The 2-Bay FM Antenna will be tuned/ adjusted for VSWR up to 1.00 to 1.05.)** **b. Hauling up of 70 meters, 7/8" dia. RF Co-axial Cable for connecting 2-bay VHF FM Antenna is to be carried out.** i.Hauling up of 7/8" dia.RF Cable on 45M/60 M SS/Guy Tower, along with one of the leg of tower and up to Transmitter hall through Horizontal cable tray. ii.Erection of the RF Cable & earthing cable with clamps, nut-bolts approximately at one-meter interval on vertical and horizontal cable tray. **The RF cable, earthing kit, earthing cable, clamps and nut-bolts will be provided by AIR.** **c.** Laying and connecting of Single core 10 sq.mm PVC insulated multi-strand flexible copper cable for earthing at three distinct points of RF cable (Near 2 bay antenna, at half length of RF cable	**36**	

	and cable outlet point outside Transmitter Hall) to the earthing meant for RF cable earthing.		
2	**Painting:** The Tower/Mast and cable tray has to be painted with Anti rust type special polymer paint. Tower/Mast has to be painted with 1 coat of polyEpoxy primer as per IS 5666 and 2 coats of Poly epoxy paint as per IS2932 in alternate bands of Orange and White as per Aviation Standard. ** The Tower/Mast Details (Site location & height) are provided as under. **Note: Quote separately for 45M SS Tower (24 Nos), 45M Guyed Mast (09 Nos) & 60 M SS Tower (02 Nos).**	**45M SS Tower** **45M Guyed Mast** **60M SS Tower**	

1. *The work is to be carried out during Non-Transmission hours, with prior consultation and approval with the engineer at site.*
2. *All the tools required for the work should be provided by the contractor and shall not be loosely carried but in a bag.*
3. *Contractor is responsible for following the safety precautions of his men engaged in the work.*
4. *The contractor will indemnify and hold the indentor harmless against compensation if any due to unforeseen happenings during the execution of the work & he shall abide by the work compensations act in force.*
5. ***The successful Contractor has to enter in to an agreement with this office on placement of work order and the work should be executed as per the agreement terms, procedure / specifications attached with the Work Order.***
6. ***<u>Insurance Charges</u>: Contractor should provide insurance coverage for his workers at his own cost. The All India Radio shall not be responsible for any loss of life / property belonging to the contractor and shall not pay any compensation what so ever.***
7. *Work insurance certificate for said work must be submitted to the engineer at site before starting the work.*
8. ***Only those Contractors who have done similar works are eligible and they have to submit a copy of similar past works along with completion certificate from the end user.***
9. ***The contractor has to give their registration details in the quotation.***
10. ***Completion Time: The entire work should be completed within 120 days, from the date of acceptance of the work order. The contractor may apply for DP extension, if site is not ready/ handed over.***
11. ***Guarantee Period: 1 year from the date of completion and acceptance of the work.***
12. ***The Contractor is liable to pay for any property loss incurred to AIR during the work.***
13. ***Payment will be made after submitting work completion issued by Engineer on site/IO.***

LPTV SITES LOCATION AND TOWER HEIGHTS

Sr. No.	LPTV Location	SS Tower / Guy-wired Mast	Height of Tower /Mast in Meters
1	NarayanPur (Chattisgarh)	**GUY-WIRED**	45
2	Bailadila (Chattisgarh)	**GUY-WIRED**	45
3	Rajaharajharan (Balod) (Chattisgarh)	Self-Supported	45
4	Amreli (Gujarat)	Self-Supported	45
5	Botad (Gujarat)	Self-Supported	45
6	Kevadia Colony(Gujarat)	**GUY-WIRED**	45
7	Modasa (Gujarat)	Self-Supported	**45**
8	Rapar (Gujarat)	Self-Supported	**45**
9	Surendra Nagar (Gujarat)	Self-Supported	**45**
10	Tharad (Gujarat)	**GUY-WIRED**	**45**
11	Valsad (Gujarat)	Self-Supported	**45**
12	Veraval (Gujarat)	Self-Supported	**45**
13	Khambalia (Gujarat)	Self-Supported	**45**
14	Radhanpur (Gujarat)	Self-Supported	**150**
15	Dahod (Gujarat)	Self-Supported	**45**
16	Badwani (Madhya Pradesh)	Self-Supported	**45**
17	Burhanpur (Madhya Pradesh)	Self-Supported	**45**
18	Damoh (Madhya Pradesh)	Self-Supported	**45**
19	Kurwai (Madhya Pradesh)	Self-Supported	**60**
20	Kukdeshwar (Madhya Pradesh)	**GUY-WIRED**	**45**
21	Murwara (Katni)(Madhya Pradesh)	Self-Supported	**60**
22	Narsinghpur (Madhya Pradesh)	Self-Supported	**45**
23	Panna (Madhya Pradesh)	Self-Supported	**45**
24	Piparia (Madhya Pradesh)	**GUY-WIRED**	**45**
25	Seoni (Madhya Pradesh)	Self-Supported	**45**
26	Shajapur (Madhya Pradesh)	Self-Supported	**45**
27	Sheopur Kalan (Madhya Pradesh)	Self-Supported	**45**
28	Nagda (Madhya Pradesh)	Self-Supported	45
29	Achalpur (Maharashtra)	Self-Supported	45
30	Aheri (Gadchiroli) (Maharashtra)	**GUY-WIRED**	**45**
31	Hingoli (Maharashtra)	Self-Supported	**45**

32	Nandurbar (Maharashtra)	Self-Supported	45
33	Satana (Maharashtra)	**GUY-WIRED**	45
34	Shirdi (Maharashtra)	Self-Supported	45
35	Sironch (Maharashtra)	**GUY-WIRED**	45
36	Washim (Maharashtra)	Self-Supported	45

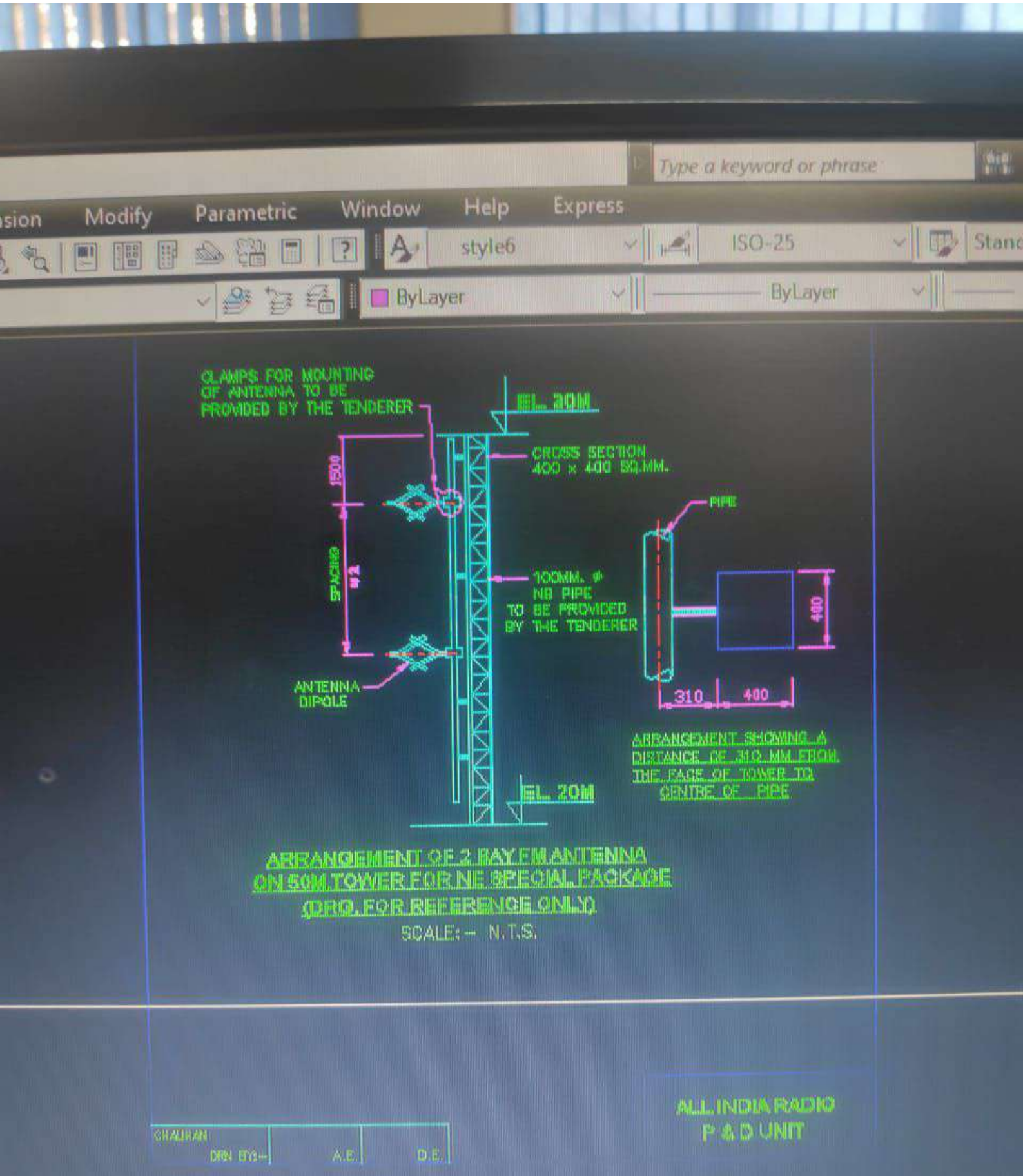
भवदीय / **Yours faithfully,**

03/06/2022

(के. एस. लखने/ **K. S. Lakhane)**

सहायकआभियंता/**Assistant Engineer**

कृतेअपरमहानिदेशाक(अभि)(प.क्षे.)/**O/o ADG (E) (WZ),**

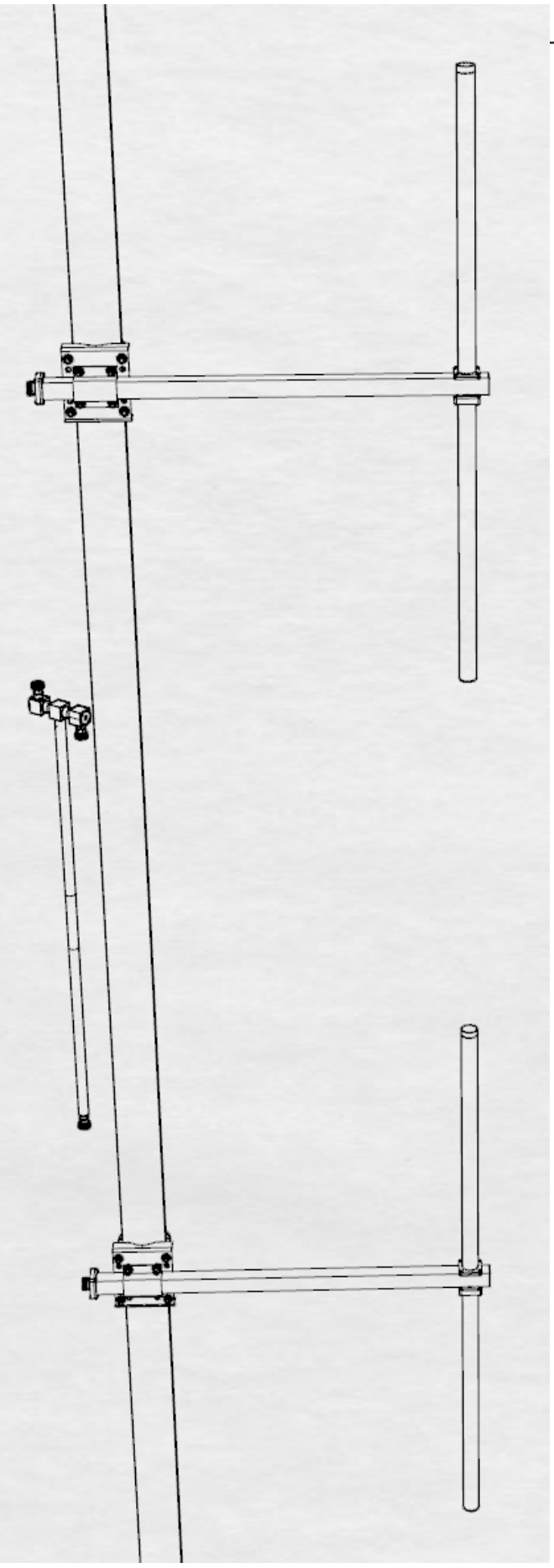


Antenna System Proposal-
FM Dipoles NFVX1001-1 Array (2 Bays)

TECHNICAL DOCUMENTATION

I TECH S.r.l. - Via per Casorate 13/B, 21010 Cardano al Campo (VA) -ITALY E-mail: broadcasting@irte.it tel. +39 0331 797286

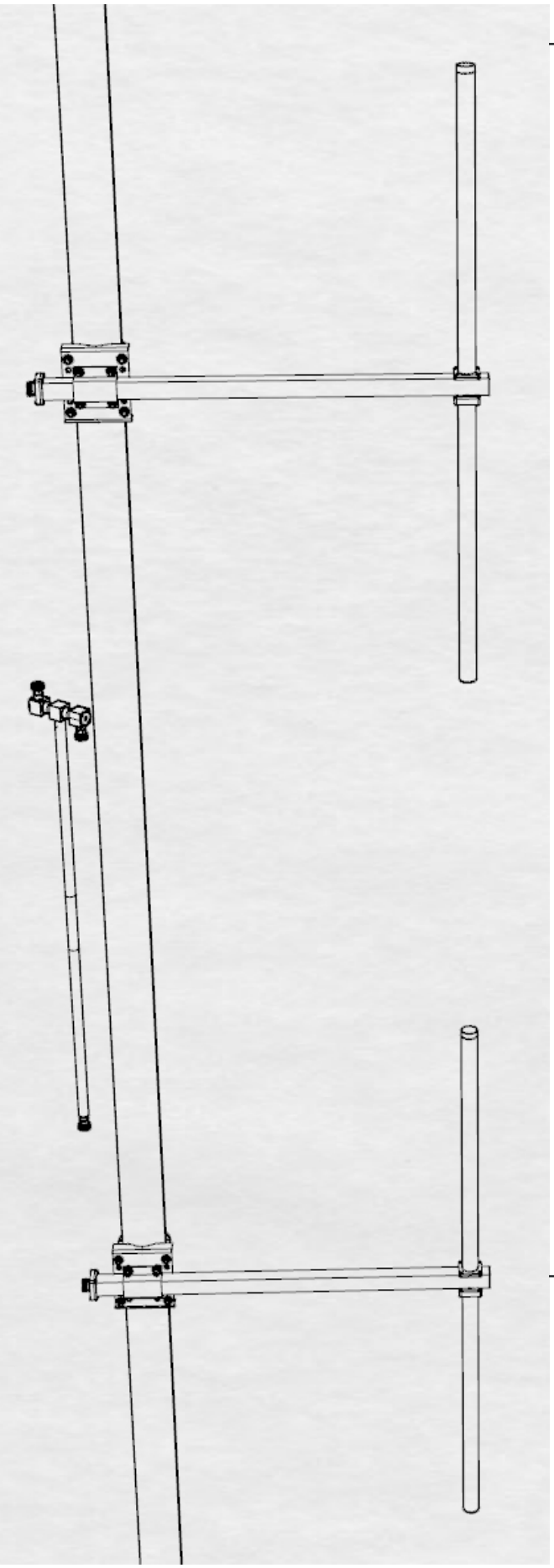
-Antenna System FM Dipole NFVX1001-1 / 2 Bays



GENERAL DESCRIPTION

The IRTE broad band antenna system type NFVX1001-1 /2BAYS has a slim and lightweight layout, this as resulted in low wind load, low weight and facilities during installation process.
This system is an array of two vertical polarized dipole suitably designed to be installed on side of the tower by using a pole.
Each dipole is provided with a special pipe clamp (50 ÷ 114mm diameter) and is individually fed through a 7-16 DIN female input,
moreover it is protected against ice and snow by means of suitable feed point radome and the max power handling capability is 3 kW at 108MHz.
The antenna splitting system is made with coaxial cables and power divider arrangement, whose type and dimensions are chosen in
accordance to the desired power handling capability, gain and pattern. The input of the power distribution network is 1 x 7-16 DIN Female.
Each dipole is individually fed through one 1/2" foam dielectric cable (7-16 DIN Male) that can handle 3 kW at 108MHz .
The two ways power divider feeds the antenna and it is located at the center of the antenna array.
The entire antenna system is adequately protected against heavy rain fall and humid climate of tropical region.
Each component / sub system of the antenna system is adequately protected for extreme weather conditions of extreme day and night temperature variations. All antenna system components are watertight and tested separately in the factory. The electrical phases of each cable has also been checked.
Antenna system will be supplied complete with dipoles, power dividers, branch cables, mounting brackets for dipoles, supporting clamps for power dividers and tie locks for branch cables., supporting pole and drawings.

-Antenna System FM Dipole NFVX1001-1 / 2 Bays



ELECTRICAL CHARACTERISTICS

Frequency Range:	87.5 MHz ÷ 108 MHz
Polarization:	Vertical
Input Impedance:	50 OHM
VSWR:	<1.2:1 within the 100-105 MHz sub-band
	<1.1:1 optimized for the operating frequency
Antenna System Gain:	≥4.5 dBd
Max Power Handling:	3 kW
Connectors:	7-16 DIN Female (Dipoles, Power Splitter)
	7-16 DIN Male (Branch feeders)

Note: all components are DC grounded

POWER HANDLING CALCULATION

Component	Input / Output connectors	Power handling capability (kW)
NFVX1001-1 FM Dipole	7/16 DIN Female	3
1/2" Foam branch cable	7/16 DIN Male	3.79
FM splitter DFB2XX00	7/16 DIN Female	3

PEAK GAIN CALCULATION

Frequency (MHz)	**88**	**100**	**108**
Vertical Gain (dBd)	2.85	3.2	3.45
Horizontal Directivity (dB)	1.92	1.68	1.61
3m Branch cables Loss (dB)	-0.06	-0.065	-0.067
Power Splitter Loss (dB)	-0.005	-0.005	-0.005
Beam Tilt Loss (dB)*	0	0	0
Peak Gain (dBd)	**4.71**	**4.81**	**4.99**

* TBD

MECHANICAL CHARACTERISTICS

Components weight:	Dipoles (with Clamps):	~ 10 kg each
	Power Divider (with clamps):	~ 7 kg
	Branch Feeders:	~ 2 kg each
	Whole system approx weight:	~ 31 kg
Operating temperature:	-5°C ÷ 55°C	
Wind Speed (survival):	200 km/h	
Wind Load:	750 N	

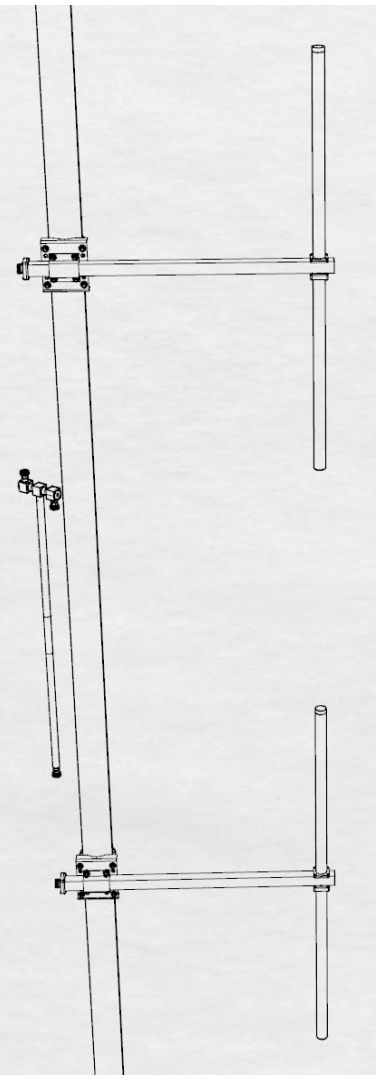
08/20 *Data on this datasheet can vary without previous notice*

-Antenna System FM Dipole NFVX1001-1 / 2 Bays

ANTENNA SYSTEM COMPONENT LIST

Q.ty	Part number	Description
2	NFVX1001-1	FM Dipole Input 7-16 DIN (Pole Clamps included)
1	DFB2XX00	FM Power Splitter in & 2x out 7-16 DIN (Pole Clamps Included)
2	JF0XX003	Branch Feeder Cables Type LCF 1/2" (Avg length 3 m) with two 7-16 DIN Male connectors
4	Colson	Cable Ties
1	--------	Technical Antenna System Documentation

-Antenna System FM Dipole NFVX1001-1 / 2 Bays



ANTENNA SYSTEM UNPACKING AND ASSEMBLING OPERATIONS:

All materials should be thoroughly inspected upon their arrival for external damage. This will insure that any missing or damaged material can be replaced before installation. Crate's content must be checked with the packing list.
Coaxial components not yet installed in the antenna system should be kept indoor protected from dust and/or moisture. All the coaxial cables (not yet installed) and power splitters are shipped with plastic or metallic caps in place. Do not remove these protections until each component is to be installed.
The supplied antenna is assembled on company and its parameter are checked. Once the tests are finished the antenna is shipped disassembled for the transportation and installation facilities. Installation procedure of the antenna can be carried out in several methods according to installer's equipment and tools. Before the antenna lifting is necessary to install the mechanical interface in the right position for proper H.R.P. orientation. For the installation a clear dry day is suggested.
1)Fasten the brackets on the dipole in the correct position; 2)fasten the FM dipoles on their mountings. NOTE : The dipoles must be installed oriented to the direction of the area to be covered (all in same direction); 3)Install the power splitter by means of supplied brackets.
4) Connect the antenna dipoles to the power splitter outputs by means of supplied branch cables. Major attention is required during the antenna hoisting in order to avoid damage to the dipoles and other components; 5) Check the perfect vertical alignement of the antennas.

During all stages of antenna installation please pay attention to the following matters :
Until actual installation is required, keep all moisture seals in place. Always keep the contact surfaces clean (inner lines and flanges). Clean if required, with alcohol or detergent, any greasy or dirty surface.
Do not forget to insert the gasket rings (O-Rings); such rings must be properly lubricated with silicone grease. Make sure that flange marks are coincident.
Check that inner lines match with their seats (if required a cone may be used to splay the inner connector). Fasten alternatively all nuts (with proper tightening torque as per drawings) for a uniform contact pressure on flange periphery.
During the installation of coaxial cables, pay attention to the minimum bending radius must be as per shown on “Technical data of coaxial cables” included in this handbook. Not to bend cables with outside temperatures below -5°C and above +60°C. Not to roll cables up (keep them as much straight as possible all along their lenght).
Use insulating supports, keeping them at a distance of out least 70mm one to each other.

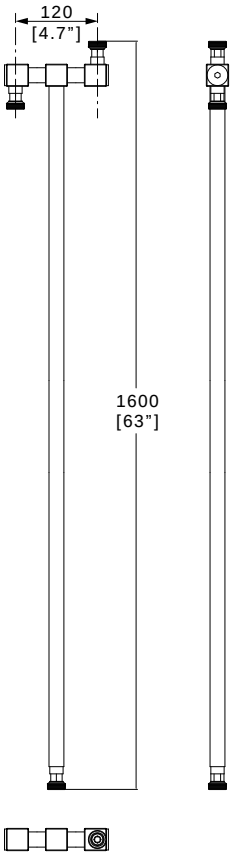
Once the antenna has been installed, before applying full power verify that installation has been carried out properly as per the enclosed drawings;check out if flanges and ring nuts are properly fastened; test the electrical characteristics (VSWR for example) meet the listed performance.
WARNINGS:
The antenna when energised can present potentially high voltage and a high intensity R.F. field in its vicinity. Do not touch any parts of the antenna system when energised. All maintenance or repairs must be done with the primary voltage to the transmitter disconnected and all transmitter remote controls disabled.

Final Checks: Each dipole is tested for minimum V.S.W.R. over the operating frequency range and no further adjustments are required during installation. All power splitters, are designed for minimum V.S.W.R. across the total bandwidth of the antenna, generally no field adjustments are necessary.

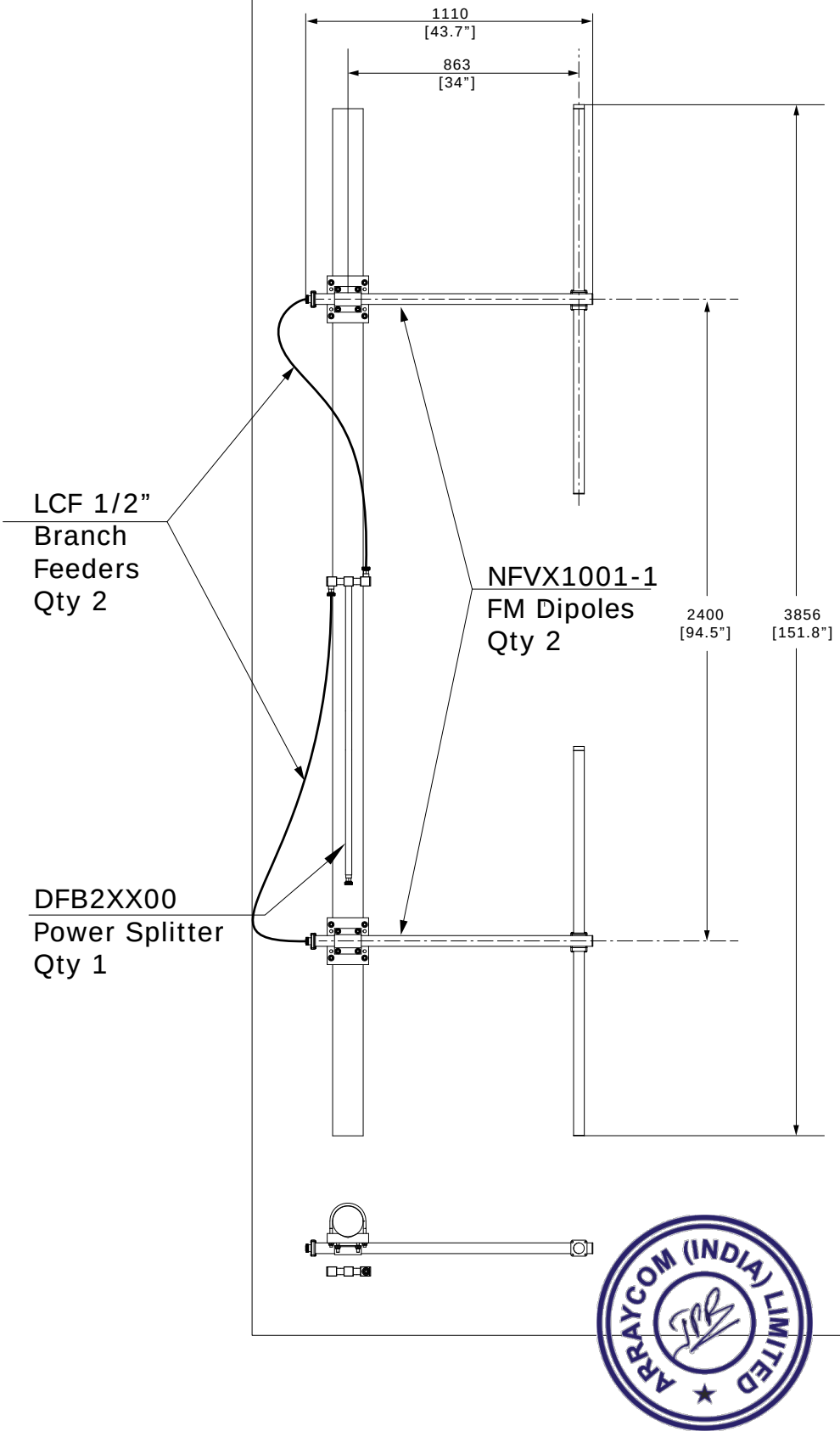
Maintenance suggestion: For a long and trouble free operational life of the antenna system supplied, periodical checks on all the relevant parts of the system are to be carried out. Specific checks that we would suggest to perform are:
Make sure that no hot spots or burn signs are there on coaxial components; that no deformed and/or cracked coaxial components and steelwork are there; that all bolts & nuts, screws etc. etc. of all the coaxial components, steel plates & junctions, are correctly tightened; that no signs of corrosion are there either on coax. components or on any parts of the steel structures.
If any of the above defects are found during the checks, proceed immediately to rectify the defect found. In the event of serious flaws, please contact our Technical Departement. Intervals after which these checks as well as ordinary maintenance are to be performed should not exceed two years.
Besides of the above checks, we suggest you also verify periodically that antenna system electrical performances are in line with the agreed specifications.

-Antenna System FM Dipole NFVX1001-1 / 2 Bays

DFB2XX00
2 ways In/out 7-16 DIN
FM 50 OHM
Power Splitter

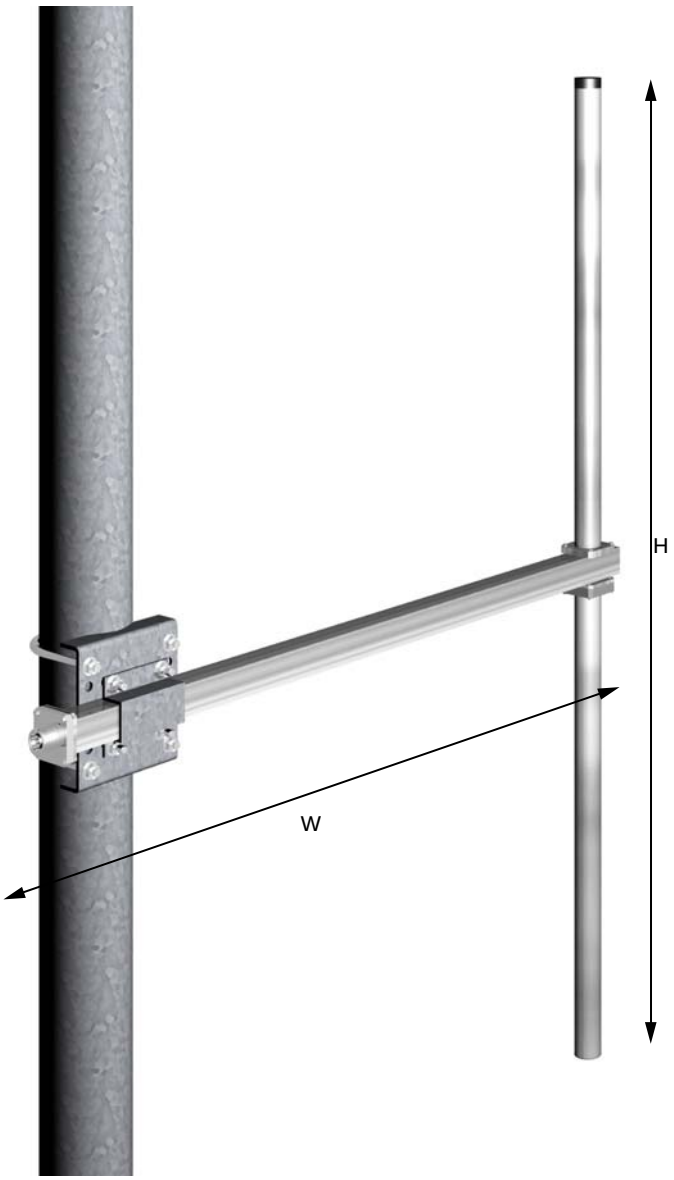


Antenna System Layout



NFVX1001-1 FM Dipole

Band FM	Operative Frequency 87.5 - 108 MHZ	Input: 7-16 FEMALE



H: 1450 mm [57.1”] W:1110 mm [43.7”]

MAIN FEATURES

Product code: NFVX1001-1

Electrical characteristics

Frequency Range	87.5 - 108 MHz
Input impedance	50 OHM
Polarization	Vertical
Gain	2 dBd (@ 98 MHz)
VSWR	<1.25
Max input Power	1.0 kW
all metal parts are ground connected	

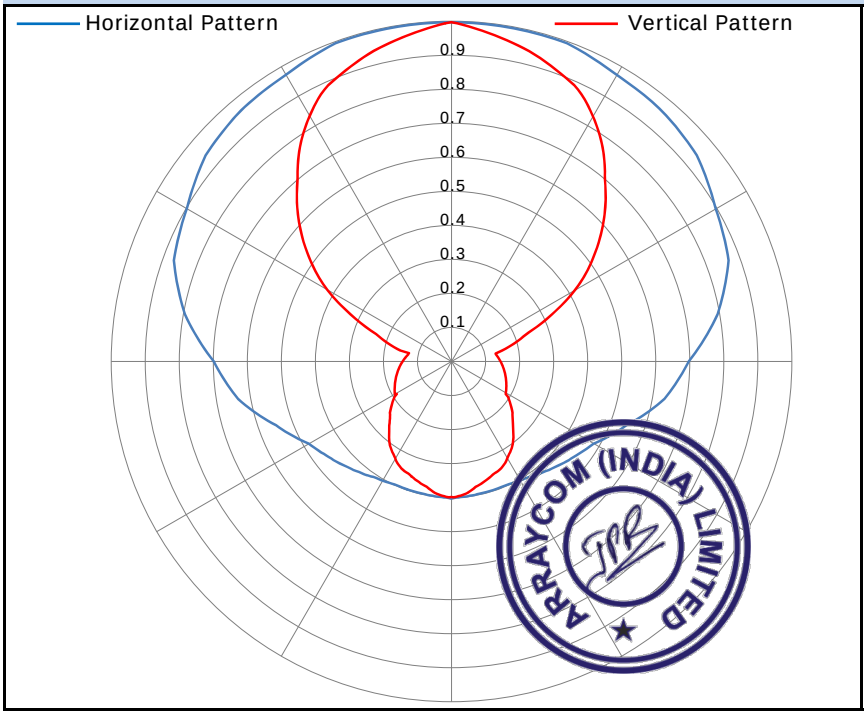
Mechanical characteristics

Input Connector	DIN 7-16 Female Straight
Weight/Mass NFV71001	88.2 N (9 Kg | 19.8 lbs))
Wind loads (wind=160 Kph)	62 N (Front thrust)
	110 N (Side thrust)
Max Wind (survival)	220 Kph
Operating temperature	-50°C to +70°C
Pressurization	100 KPa (1 Atm)
Mounting:	Pole Brackets Ø 50-114 pole

Materials

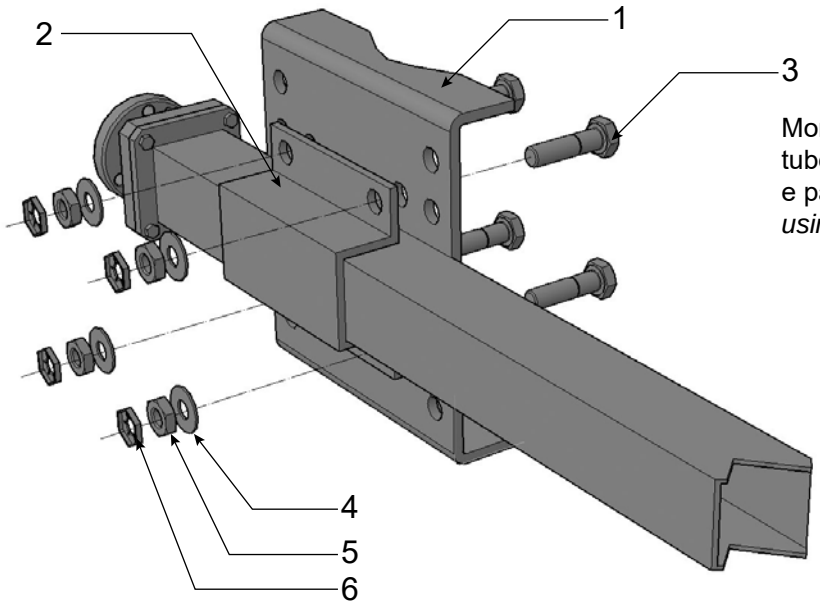
External parts/Dipoles	Stainless Steel
Brackets	Stainless Steel/Hot dip galv. steel
Internal Lines	Silver Plated Brass
Hardware	Stainless Steel
Radome	Fiberglass

E/EM Radiation Patterns (Vertical Polarization)

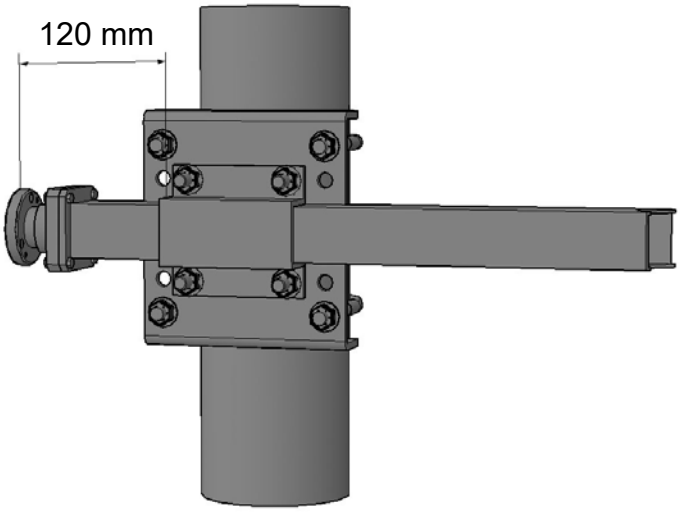


I TECH S.r.l. - Via per Casorate 13/B, 21010 Cardano al Campo (VA) -ITALY E-mail: broadcasting@irte.it tel. +39 0331 797286

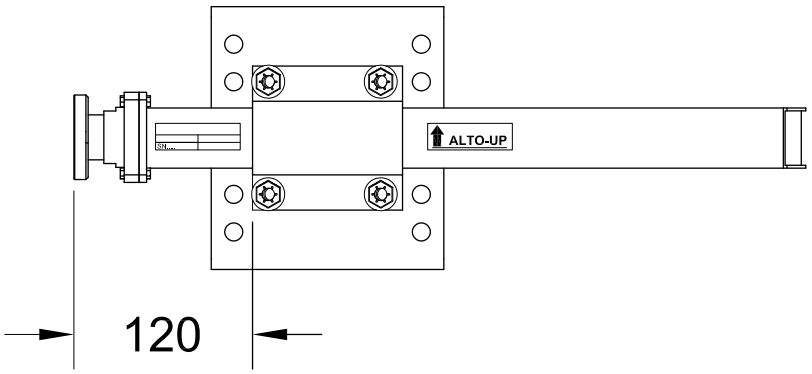
Pole mount Brackets
suitable for Ø50-114mm poles

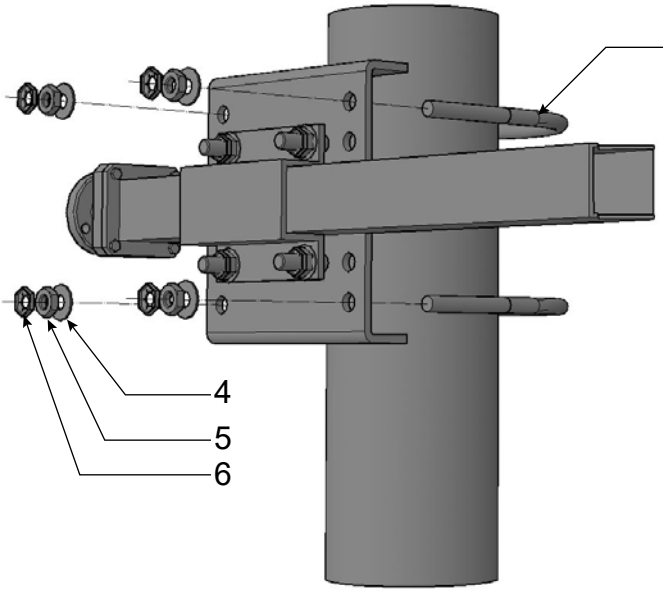


Montare staffa a omega (2) e controstaffa (1) sul tubo quadro del dipolo tramite 4 viti M10x35 dadi, rondelle e palnut. / *Mount the brackets onto the dipole body using 4 M10x35 bolts, Nut, washer and Palnuts.*



NB Rispettare la distanza indicata e il verso (ALTO) indicato con etichetta adesiva. / *Pay attention to the distance as illustrated below and to the direction of mounting (UP label)*





Staffare l'antenna al palo tramite i cavallotti
Fix Dipole to the support pole with the 2 U Bolts

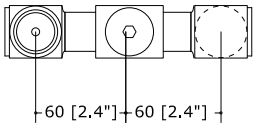
KIT Staffe e viteria (Acciaio Inox/Ferro zincato a caldo)
Brackets and Hardware Kit (Stainless Steel/Hot-Dip Galv. Steel)

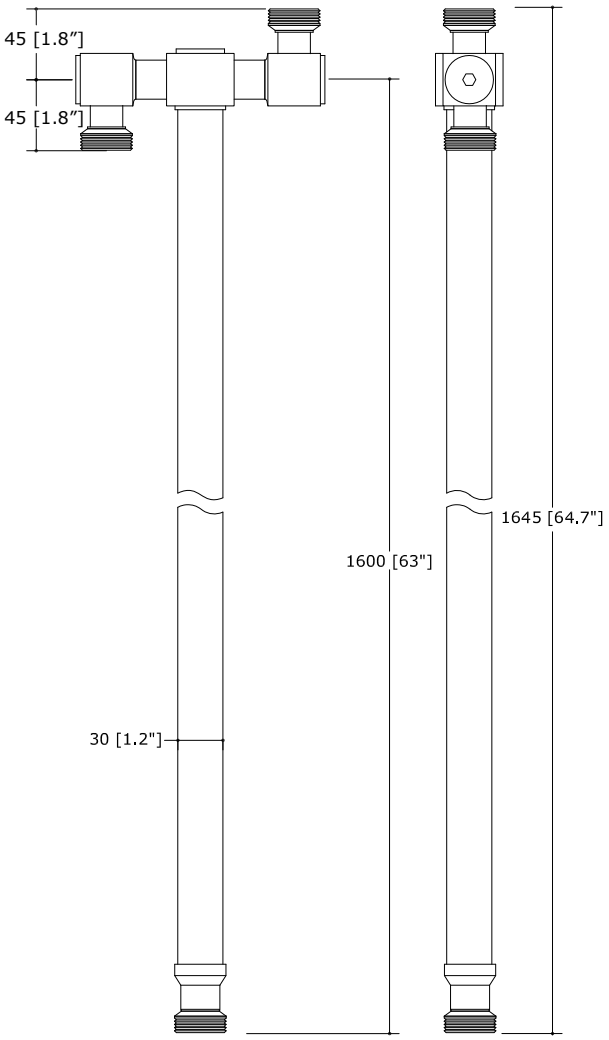
1) Controstaffa per palo / *Brackets for Pole* Ø 50-114 mm CS903068	Q.ty 1
2) Staffa ad omega / *Omega Brackets* CS903069	Q.ty 1
3) Vite / *Bolt* M10 x 35	Q.ty 4
4) Rondella piana / *Flat Washer* M10	Q.ty 8
5) Dado medio / *Nut* M10	Q.ty 8
6) Palnut M10	Q.ty 8
7) Cavallotto / *U Bolt* M10 CS903067	Q.ty 2

ARRAYCOM (INDIA) LIMITED

DFB2XX00 Divisore/*Power Divider*, FM, 7-16 DIN Input

Dimensions in millimeters (inches)





FM Band	Frequenza di utilizzo *Operative Frequency* 87.5 - 108 MHZ	Input: 7-16 DIN Female Out: 2 x 7-16 DIN Female

SPECIFICHE TECNICHE

Codice Prodotto/*Product Code*: DFB27700

Caratteristiche Elettriche/*Electrical characteristics*

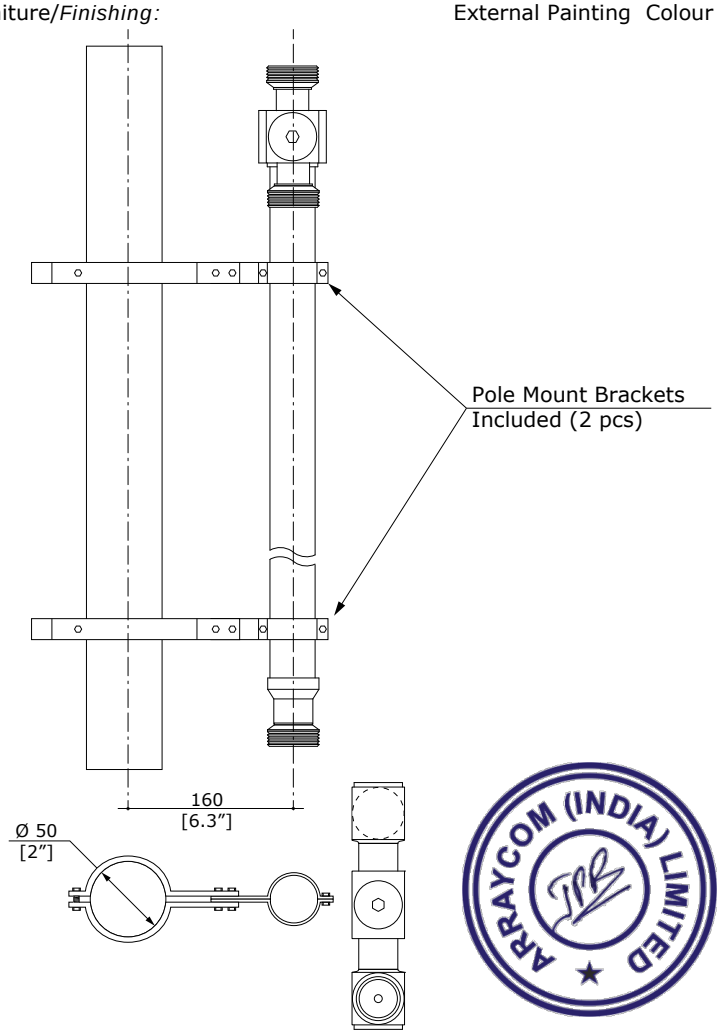
Banda di Frequenza/*frequency range*:	87.5 - 108 MHz
Impedenza d'ingresso/*Input Impedance*:	50 OHM
Flangia d'ingresso/*Input flange*:	7-16 DIN female
Flange d'uscita/*Output Flanges*:	7-16 DIN female (2x)
VSWR:	≤1.06
Potenza Max/*Max Power (rms)*:	3 kW (@ 108 MHz)

Caratteristiche Meccaniche/*Mechanical characteristics*

Peso (Massa)/*Weight(Mass)*:	62.8 N (6.4 Kg | 14 lbs)
Temperatura Operativa/*temperature Range*:	-40° C - +70° C
Pressurizzazione/*Pressurization*:	300 hPa (300 mBar)

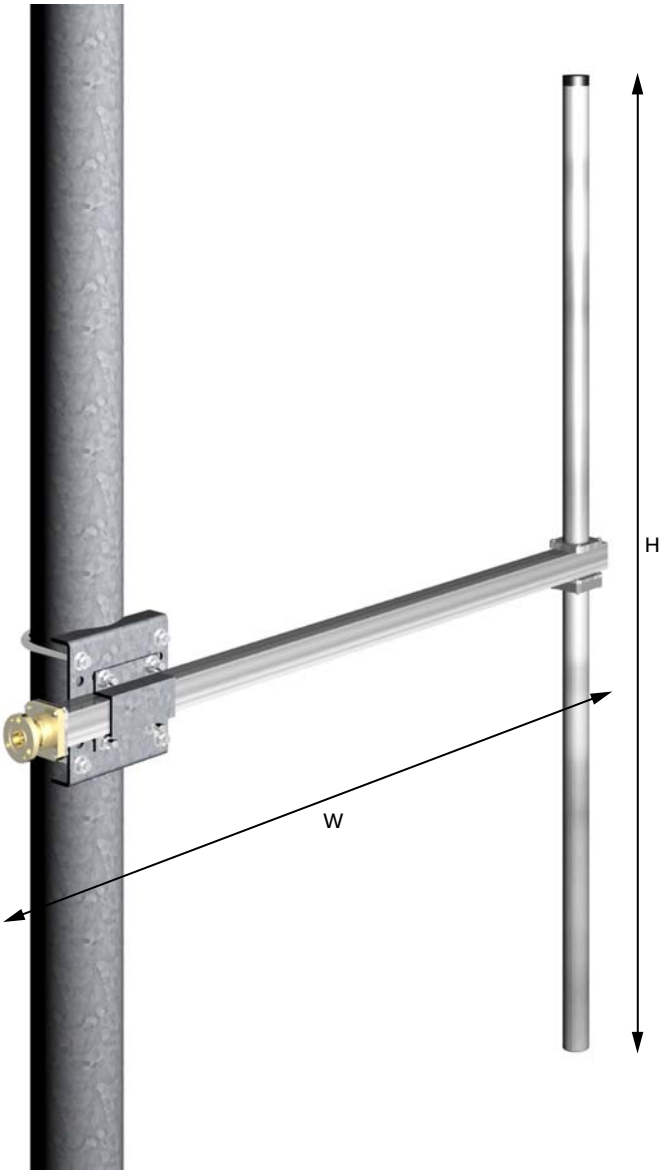
Materials

Linee interne/*Internal lines*:	Silver Plated Brass
Isolatori/ *Insulators*:	Teflon
Linee Esterne/*External Lines*:	Brass-Copper
Finiture/*Finishing:*	External Painting Colour RAL7001



NFV71001-1 / NFVX1001-1 FM Dipole

Band FM	Operative Frequency 87.5 - 108 MHZ	Input: 7/8" EIA Input: 7-16 DIN



H: 1450 mm [57.1"] W:1110 mm [43.7"]

MAIN FEATURES

Product code: NFV71001-1

Electrical characteristics

Frequency Range		87.5 - 108 MHz
Input impedance		50 OHM
Polarization		Vertical
Gain		2 dBd (@ 98 MHz)
VSWR		<1.25
Max input Power	NFV71001-1 (7/8")	5 kW
	NFVX1001-1 (7-16)	3 kW

all metal parts are ground connected

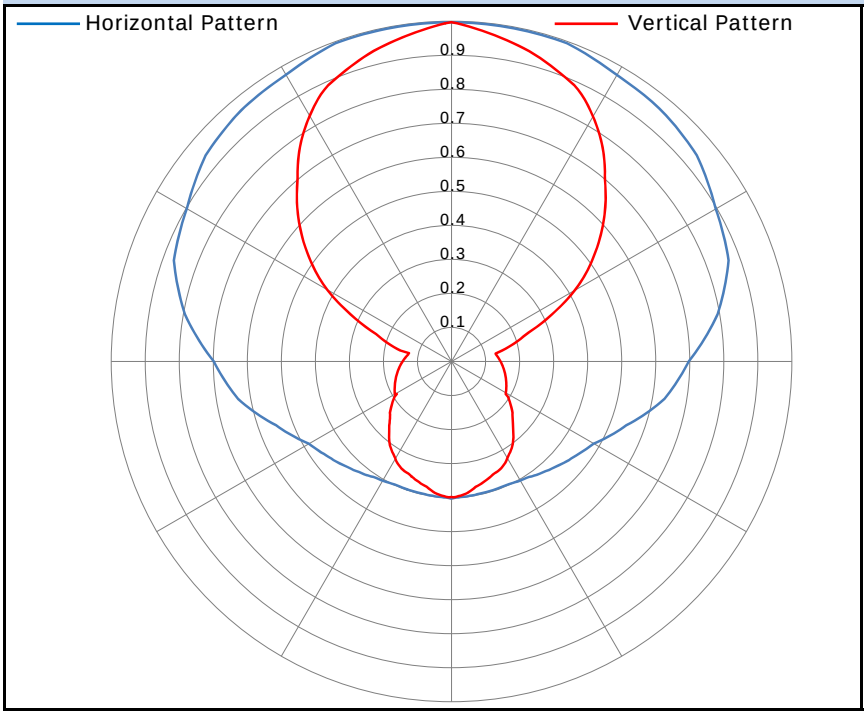
Mechanical characteristics

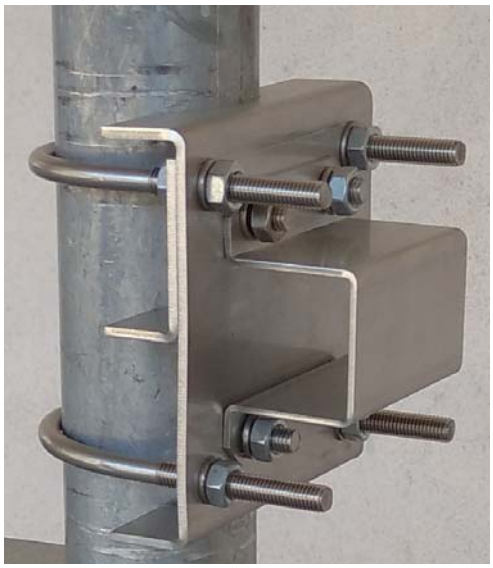
Input Connector	EIA 7/8"
	7-16 DIN Female
Weight/Mass NFV71001	83.4 N (8.5 Kg | 18.7 lbs))
Wind loads (wind=160 Kph)	110 N (Front thrust)
	160 N (Side thrust)
Max Wind (survival)	220 Kph
Operating temperature	-50°C to +70°C
Pressurization	100 KPa (1 Atm)
Mounting:	Pole Brackets Ø 60-114 pole

Materials

External parts/Dipoles	Stainless Steel
Brackets	Hot dip galvanized steel
Internal Lines	Silver Plated Alu/Brass
Hardware	Stainless Steel
Radome	Fiberglass

E/EM Radiation Patterns (Vertical Polarization)

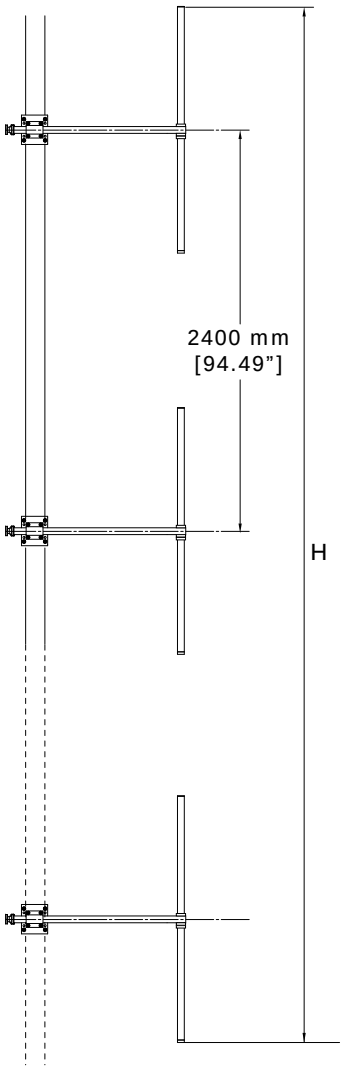




Pole Clamp included

I TECH S.r.l. - Via per Casorate 13/B, 21010 Cardano al Campo (VA) -ITALY E-mail: broadcasting@irte.it tel. +39 0331 797286

NFV71001-1 / NFVX1001-1 FM Dipoles Arrays

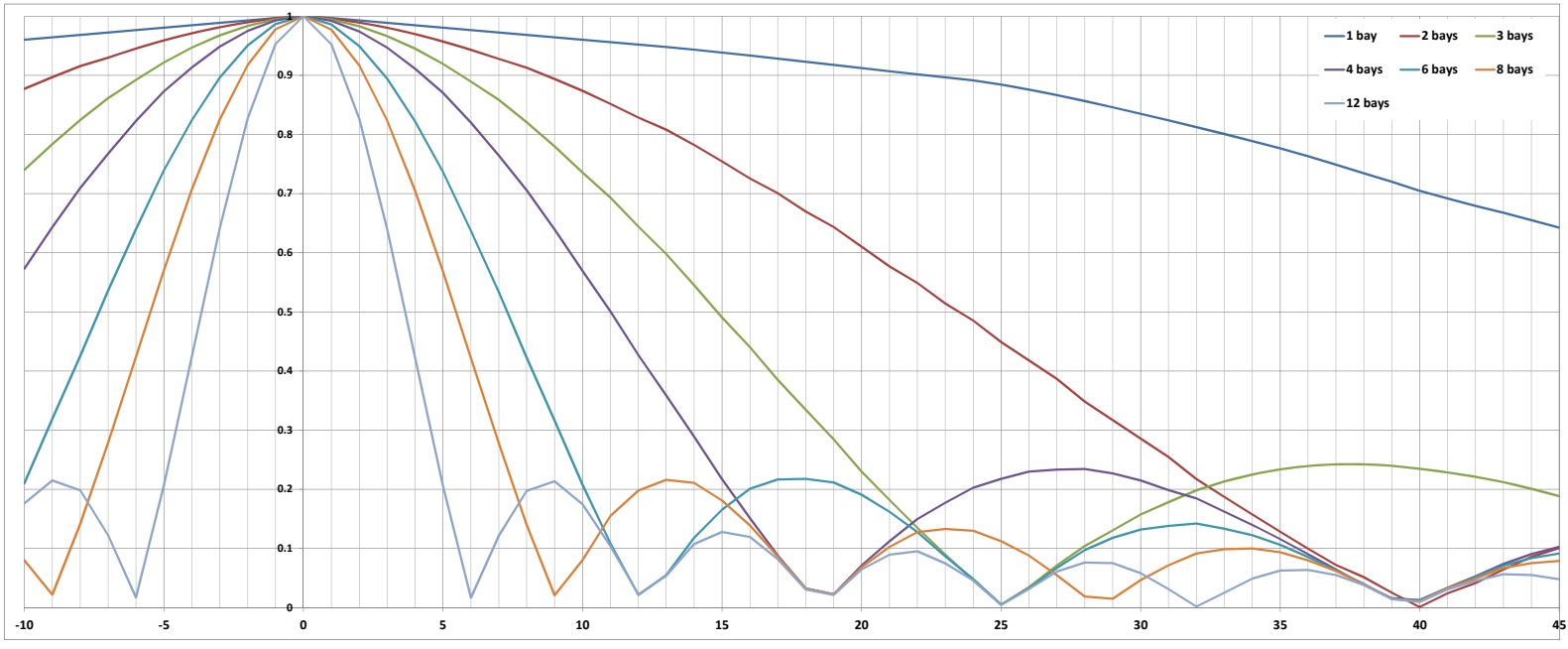


Arrays of FM Dipoles

Bays (Nr)	Gain (dBd)	Height (m/ft)	Weight (kg/lbs)*
1	2	1.46 (4.77)	8.5 (18.7)
2	5	3.86 (12.65)	17 (37.4)
3	6.7	6.26 (20.52)	25.5 (56.1)
4	8	8.66 (28.4)	34 (74.8)
6	9.7	13.46 (44.14)	51 (112.2)
8	11	18.26 (59.89)	68 (149.6)
12	12.7	27.86 (91.39)	102 (224.4)

* Pole, Power dividers, cables NOT considered

E/EM Vertical Radiation Patterns



I TECH S.r.l. - Via per Casorate 13/B, 21010 Cardano al Campo (VA) -ITALY E-mail: broadcasting@irte.it tel. +39 0331 797286