ATTACHMENT "A"
OMB STANDARD FORM LLL
(2 Pages)

ATTACHMENT "A"

DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB
0348-0046

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action:	2. Status of Federal Action:	3. Report Type:
☐ a. contract b. grant c. cooperative agreement d. loan e. loan guarantee f. loan insurance	☐ a. bid/offer/application b. initial award c. post-award	☐ a. initial filing b. material change **For Material Change Only:** year _____ quarter _____ date of last report _ -

4. Name and Address of Reporting Entity:	5. If Reporting Entity in No. 4 is a Subawardee, Enter Name and Address of Prime:
☐ Prime ☐ Subawardee Tier _____, *if known*: **Congressional District**, *if known*: 4c	**Congressional District**, *if known*:
6. Federal Department/Agency:	**7. Federal Program Name/Description:** CFDA Number, *if applicable*: _____
8. Federal Action Number, *if known*:	**9. Award Amount**, *if known*: $
10. a. Name and Address of Lobbying Registrant (*if individual, last name, first name, MI*):	**b. Individuals Performing Services** (*including address if different from No. 10a*) (*last name, first name, MI*):
11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.	Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____
Federal Use Only:	Authorized for Local Reproduction Standard Form LLL (Rev. 7-97)

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.

2. Identify the status of the covered Federal action.

3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.

4. Enter the full name, address, city, State and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.

5. If the organization filing the report in item 4 checks "Subawardee," then enter the full name, address, city, State and zip code of the prime Federal recipient. Include Congressional District, if known.

6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.

7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.

8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."

9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.

10. (a) Enter the full name, address, city, State and zip code of the lobbying registrant under the Lobbying Disclosure Act of 1995 engaged by the reporting entity identified in item 4 to influence the covered Federal action.

    (b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).

11. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

According to the Paperwork Reduction Act, as amended, no persons are required to respond to a collection of information unless it displays a valid OMB Control Number. The valid OMB control number for this information collection is OMB No. 0348-0046. Public reporting burden for this collection of information is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, DC 20503.

ATTACHMENT "B"
SF-3881, ACH VENDOR/MISCELLANEOUS PAYMENT ENROLLMENT FORM
(1 Page)

ATTACHMENT "B"

ACH VENDOR/MISCELLANEOUS PAYMENT ENROLLMENT FORM

OMB No. 1510-0056
Expiration Date 01/31/2000

This form is used for Automated Clearing House (ACH) payments with an addendum record that contains payment-related information processed through the Vendor Express Program. Recipients of these payments should bring this information to the attention of their financial institution when presenting this form for completion.

PRIVACY ACT STATEMENT

The following information is provided to comply with the Privacy Act of 1974 (P.L. 93-579). All information collected on this form is required under the provisions of 31 U.S.C. 3322 and 31 CFR 210. This information will be used by the Treasury Department to transmit payment data, by electronic means to vendor's financial institution. Failure to provide the requested information may delay or prevent the receipt of payments through the Automated Clearing House Payment System.

AGENCY INFORMATION

FEDERAL PROGRAM AGENCY
Broadcasting Board of Governors

AGENCY IDENTIFIER:	AGENCY LOCATION CODE (ALC):	ACH FORMAT:
95	95-68-0001	☐ CCD+ ☐ CTX ☐ CTP

ADDRESS:
330 Independence Avenue, SW, Washington, D.C. 20237

CONTACT PERSON NAME:	TELEPHONE NUMBER: ( )
VENDOR TYPE: (See instructions for vendor types)	DUNS:
1099 VENDOR:	HOME ALLOTMENT NO:

PAYEE/COMPANY INFORMATION

NAME	SSN NO. OR TAXPAYER ID NO.
ADDRESS	
CITY/STATE:	ZIP CODE:
CONTACT PERSON NAME:	TELEPHONE NUMBER: ( )

FINANCIAL INSTITUTION INFORMATION

NAME:	
ADDRESS:	
CITY/STATE:	ZIP CODE:
ACH COORDINATOR NAME:	TELEPHONE NUMBER: ( )
NINE-DIGIT ROUTING TRANSIT NUMBER: (SHOULD BEGIN WITH 0,1,2, OR 3)	
DEPOSITOR ACCOUNT TITLE:	
DEPOSITOR ACCOUNT NUMBER:	LOCKBOX NUMBER:
TYPE OF ACCOUNT: ☐ CHECKING ☐ SAVINGS ☐ LOCKBOX	
SIGNATURE AND TITLE OF AUTHORIZED OFFICIAL: (Could be the same as ACH Coordinator)	TELEPHONE NUMBER: ( )

ATTACHMENT "C"
TUBE SPECIFICATION SHEETS
(33 Pages)

TDP
TUBE CQK 650-1

TECHNICAL SPECIFICATIONS

TYPICAL OPERATING CONDITIONS

Frequency	26 MHz
Anode voltage	14 kV
Anode current	11 A
Screen grid voltage	1450 V
Screen grid current	3.3 A
Control grid voltage	-1000 V
Control grid current	3.7 A

HEATER POWER SUPPLY

Filament voltage	15 V
Filament current	1700 A

MAXIMUM RATINGS

Anode voltage	18 kV
Anode dissipation	830 kW
Control grid dissipation	7.5 kW
Screen grid dissipation	11 kW

DIMENSIONS

Diameter	405 mm
Length	775 mm
Mass	130 kg

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

Manufacturer	Transmitter specifications	Power in kW
BBC Brown Boveri	SK 55	500
Thales	TSW 2500	500

THIS TUBE IS AVAILABLE FROM

Manufacturer	Rebuilder	Distributor
Thales Electron Devices	California Tube Laboratory Boston Kumsan	

PRICE LEVEL (US$)

1	2	3	4	5	6
0 - 10	10 - 100	100 - 1000	1000 - 10,000	10,000 - 50,000	50,000 - 100,000

2 3 4 5 6 8 BY C F ML Q RS TH YL

For more information, contact

[illegible]
[illegible]
P.O. Box 1
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BELGIUM

Tel : [illegible]
Fax : [illegible]
Cell : [illegible]
email : [illegible]
web : [illegible]

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General Data

Tentative Data

2

Cathode: thoriated tungsten, directly heated

Filament voltage		20	V
Filament current	appr.	430	A
Max. starting current		1800	A
Cold resistance	appr.	0,005	Ω
Mutual conductance (V_a= 10 kV, V_{g2}= 900 V, I_a = 15 A)	appr.	220	mA/V
Amplification factor μ_{g2g1}	appr.	5,5	

Capacitances:

$C_c - g_1$ = 285 pF		$C_{g1} - a$ = 4,1 pF 1)	
$C_{g1} - g_2$ = 325 pF		$C_c - a$ = 0,9 pF 1)	
$C_c - g_2$ = 30 pF		$C_{g2} - a$ = 108 pF	

1) Measured with shielding plate (50 x 50 cm) in screen grid plane.

Mechanical Details:

	CQK 200-3	CQS 200-3	
Max. length	710	640	mm
Max. diameter	325	430	mm
Weight less packing appr.	67	59	kg
Weight with packing appr.	112	105	kg
Position of mounting: vertical	Anode up	Anode up or down	

Maximum operating values

DC anode voltage		22	kV
DC screen grid voltage		2,2	kV
DC control grid voltage		- 1,5	kV
Anode dissipation	CQS 200-3	200	kW
	CQK 200-3	300	kW
Screen grid dissipation		6000	W
Control grid dissipation		2000	W
Peak cathode current		300	A
Frequency		30	MHz

Cooling

Vapour cooling

Boiler SG 200 see HR 407882 or SG 201 see HR 408406 or
SG 202 see HR 408487 or SG 209 see HR 414556

Condensed vapour cooling

Minimum waterflow	90	l/min
At P_a > 180 kW the waterflow	≥ 0,5	l/min kW
Temperature of outlet water	max. 90	°C
The tube with accessories see survey sheets		
Temperature of ceramic cylinder and all metal-ceramic seals	max. 220	°C
Airflow on filament header	min. 6	m^3/min
Airflow for cooling ring	min. 2	m^3/min

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Class B, AF Power Amplifier and Modulator

Maximum ratings:	DC anode voltage		22	kV
	DC screen grid voltage		2000	V
	Signal DC anode current		28	A
	Power input		650	kW
	Screen grid dissipation		6,0	kW
	Anode dissipation	CQS 200-3	200	kW
		CQK 200-3	300	kW

Typical operation ratings for 2 tubes in push-pull

DC anode voltage	22	18	14	kV
DC screen grid voltage	2000	2000	2000	V
DC control grid voltage*	- 380	- 380	- 380	V
Peak AC control grid voltage G-G	720	720	720	V
Signal DC anode current max.	48	48	48	A
Zero signal DC anode current	5	5	5	A
DC screen grid current	1,5	2,7	2,7	A
DC control grid current	0	0	0	A
Driving power	0	0	0	W
Output power	730	580	430	kW
Load resistance anode to anode	1040	830	615	Ω

* = adjust to zero signal DC anode current

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Class C, anode and screen modulated RF power-amplifier (sinusoidal operation)

Maximum ratings:	DC anode voltage up to 30 MHz	15	kV
(carrier conditions)	DC screen grid voltage	1200	V
	AC screen grid voltage	850	V*
	DC control grid voltage	- 1500	V
	DC anode current	32	A
	Screen grid dissipation	6	kW
	Control grid dissipation	2	kW
	DC control grid current	5	A
	Power input	480	kW
	Anode dissipation CQS 200-3	125	kW
	Anode dissipation CQK 200-3	200	kW
	Grid resistor (tube not conductive)	10	kΩ

Typical operation ratings:

(Carrier conditions for max. modulation factor of 1.0)

DC anode voltage		15	12,5	10	kV
DC screen grid voltage		900	900	900	V
Peak AC screen grid voltage		760	760	760	V*
DC control grid voltage		- 700	- 670	- 650	V
Peak AC control grid voltage		1100	1050	1030	V
DC anode current		32,5	30	30	A
DC screen grid current	appr.	4,6	4,8	4,8	A
DC control grid current	appr.	4,2	4,0	4,1	A
Driving power	appr.	4400	4000	3960	W
Power output		368	280	216	kW
Power output at f ≤ 3 MHz		378	290	224	kW
Frequency		30	30	30	MHz

* Modulation factor 1.0

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Class C, RF Power amplifier without modulation

Maximum ratings:	DC anode voltage up to 30 MHz	22	kV
	DC screen grid voltage	1200	V
	DC control grid voltage	- 1500	V
	DC anode current	36	A
	Screen grid dissipation	6	kW
	Control grid dissipation	2	kW
	DC control grid current	5	A
	Power input	790	kW
	Anode dissipation CQS 200-3	200	kW
	CQK 200-3	300	kW
	Grid resistor (tube not conductive)	10	kΩ

Typical operation ratings:

				↓	
DC anode voltage		22	18	14	kV
DC screen grid voltage		900	900	900	V
DC control grid voltage		- 640	- 610	- 580	V
Peak AC control grid voltage		1050	1020	990	V
DC anode current		35,3	35,3	35,3	A
DC screen grid current	appr.	5,9	5,9	5,9	A
DC control grid current	appr.	4,7	4,8	4,9	A
Driving power	appr.	4700	4630	4560	W
Power output		611	491	370	kW
Power output at $f \leq 3$ MHz		625	503	381	kW
Frequency		30	30	30	MHz

TDP
TUBE CQK 50-2

TECHNICAL SPECIFICATIONS

TYPICAL OPERATING CONDITIONS	
Frequency	26 MHz
Anode voltage	11 kV
Anode current	10.5 A
Screen grid voltage	800 V
Screen grid current	1.4 A
Control grid voltage	-650 V
Control grid current	0.7 A
HEATER POWER SUPPLY	
Filament voltage	12.6 V
Filament current	335 A
MAXIMUM RATINGS	
Anode voltage	15 kV
Anode dissipation	100 kW
Control grid dissipation	0.7 kW
Screen grid dissipation	2.2 kW
DIMENSIONS	
Diameter	230 mm
Length	595 mm
Mass	38 kg

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

Manufacturer	Transmitter specifications	Power in kW
BBC Brown Boveri	SK 51	100
	SK 53	250

THIS TUBE IS AVAILABLE FROM

Manufacturer	Rebuilder	Distributor
Thales Electron Devices	California Tube Laboratory	
	Econco	
	Freeland Products	

PRICE LEVEL (US$)

1	2	3	4	5	6
0 - 10	10 - 100	100 - 1000	1000 - 10,000	10,000 - 50,000	50,000 - 100,000

2 3 4 5 6 8 BY C F ML Q RS TH YL

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4

ST2_CT12

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- CTL / CTK 12-1 -
- CTL / CTK 12-3 -

INDUSTRIAL HIGH μ TRIODE

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TECHNICAL SPECIFICATION

2. SPECIFICATIONS

2.1 ELECTRICAL SPECIFICATIONS

			min	max	unit
Filament current for Vf = 5.8 V			125	155	A
Interelectrode capacitances					
- K - G.....			55	65	pF
- K - A.....			0.12	0.24	pF
- G - A.....			17	25	pF
Amplification factor				-	
Vg = 0 V	Ia = 1 A	Va = 10 kV	155	235	V/V
Control grid voltage at transition point					
	Ia = 1 A	Va = 10 kV	0	25	V
Control grid reverse current at transition point					
	Ia = 1 A	Va = 10 kV		1	mA

2.2 MECHANICAL SPECIFICATIONS

. dimensions according NT CTL 12-1, NT CTK 12-1, NT CTL 12-3 and NT CTK 12-3
- see appendix 1

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3.1.3 Water cooling : CTK 12

See cooling curves NC CTK 12-1.

Cooling by distilled or deionized water :

. Maximum water temperature at tube inlet	60 ° C
. Maximum water temperature at tube outlet	90 ° C
. Minimum water resistivity	50 kΩ.cm
. Maximum water pressure at tube inlet	5 bar
. Maximum temperature at any point of the tube envelope	220 ° C
. Minimum air flow on filament head	0.5 m^3/min

Cooling by industrial water :

. Maximum water temperature at tube outlet	60 ° C
. Maximum hardness water	11 ° F (6 DG)
. pH	7 to 9
. Minimum water resistivity	5 kΩ.cm
. Maximum water pressure at tube inlet	5 bar
. Maximum temperature at any point on the tube envelope	220 °C
. Minimum air flow on filament head	0.5 m^3/min

3.2 HEATING VOLTAGE

Direct, DC or single phase AC heating.

Operating heating voltage : 5.8 V + 5%
- 10%

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b/ Operating examples with common grid

	Ex. 1 B Class	Ex. 2 A-B Class	Ex. 3 (3) Pulses < 1 ms	
Operating frequency	30	30	30	MHz
Anode DC voltage	11	11	11	kV
Grid DC voltage	- 50	- 15	0	V
Peak grid AC voltage	290	215	405	V
Anode DC current	3.8	3.3	2.2 (2)	A
Peak cathode current	17	13.4	35	A
Grid DC current	1.1	1	0.6 (2)	A
Anode dissipation	12	11.9	9.1 (2)	kW
Grid dissipation	230	170	210 (2)	W
Drive power	1.15	0.84	3.8	kW
Output power (1)	30	25	60	kW
Duty cycle			0.25	

(1) disregarding circuit losses

(2) average value

(3) for pulse operation, contact THOMSON TUBES ELECTRONICS.

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Normale Betriebsdaten
Typical Operating Conditions
Caractéristiques normales de service

CQL 5-1 **6**

Klasse B NF-Verstärker und Modulator
Class B A.F. Power Amplifier and Modulator
Classe B amplificateur BF et modulateur

Maximalwerte Maximum ratings Valeurs maxima	.....	V_a	=	7,5	kV
		V_{g2}	=	1,5	kV
		I_{as}	=	4	A
		P_a	=	6	kW
		P_{g2}	=	250	W
		P_{g1}	=	75	W

Normale Betriebsdaten für 2 Röhren in Gegentakt
Values for 2 tubes in push-pull
Caractéristiques normales pour 2 tubes en push-pull

V_a	7	6	5	4	kV
V_{g2}	1,25	1,25	1,25	1,25	kV
V_{g1}	−325	−310	−280	−270	V
$V_{(g_1-g_1)p}$	236	270	240	250	V
I_{ao}	700	850	1 000	1 250	mA
I_{as}	3,65	4,25	4,4	5,1	mA
I_{g2s}	240	300	330	350	mA
I_{g2o}	0	0	0	0	mA
P_{g1s} ≈	0	0	0	0	W
R_{a-a}	4,1	2,9	2,4	1,5	kΩ
P_o	17,5	17	13,5	11,5	kW

Klasse C HF-Verstärker mit Schirmgittermodulation
Class C Screen-Modulated R.F. Power Amplifier
Classe C amplificateur HF, à modulation par grille-écran

Maximalwerte Maximum ratings Valeurs maxima	.....	V_a	=	7,5	kV
		V_{g2}	=	750	V
		I_a	=	3	A
		P_a	=	5	kW
		P_{g2}	=	75	W

Normale Betriebsdaten des **Trägers** für eine max. Modulation von 100%
Typical operating **carrier** conditions per tube for use with a max. modulation factor of 1.0
Régime de **porteuse** pour un taux de modulation de 100%

V_a	7,5	7,5	kV
V_{g2}	350	350	V
V_{g1}	−300	−300	V
V_{g1p}	375	350	V
V_{g2p}	550	550	V
I_a ≈	1,15	0,9	A
** I_{g2}	−10	−10	mA
I_{g1} ≈	30	15	mA
P_{g1s} ≈	11	7	W
P_a ≈	5	4	kW
R_a	1,6	2	kΩ
P_o	3,55	2,75	kW
f	30	30	MHz
	≤		

** $I_{g2} = f(R_a)$; ±20 mA kann als typisch bei Trägerpegel angenommen werden
may be considered typical at carrier level
peut être considéré comme valeur typique

e dem Empfänger persönlich anvertraut sind, verbleibt jeder-
it unserer Firma. Ohne unsere schriftliche Genehmigung
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itten Personen mitgeteilt oder zugänglich gemacht werden.

6 CQL 5-1

Klasse C HF-Verstärker mit Anodenmodulation
Class C Anode-Modulated R.F. Power Amplifier
Classe C amplificateur HF, à modulation par l'anode

Maximalwerte
Maximum ratings
Valeurs maxima

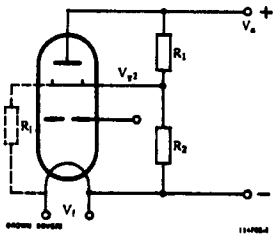
V_a	=	5	kV
V_{g2}	=	1	kV
I_a	=	2,5	A
P_{g1}	=	75	W
P_{g2}	=	250	W
P_a	=	3,5	kW

Normale Betriebsdaten des Trägers für eine max. Modulation von 100%
Typical operating carrier conditions per tube for use with a max. modulation factor of 1.0
Régime de porteuse pour un taux de modulation de 100%

V_a		5	kV
* V_{g2}		500	V
V_{g1}		—400	V
** V_{g2p}		450	V
I_a		1 400	mA
I_{g2}	≈	260	mA
I_{g1}	≈	50	mA
P_{g1s}	≈	25	W
P_o		5,8	kW
f	≤	30	MHz

* Die Schirmgitterspannung kann über einen Schirmgitterwiderstand (Potentiometer R_1/R_2) von der modulierten Anodenspannung abgenommen werden.
The screen grid voltage may be taken from the modulated anode voltage through the screen grid resistance (potentiometer R_1/R_2)
La tension modulée peut être appliquée à la grille-écran par l'intermédiaire de la résistance de grille-écran (potentiomètre R_1/R_2)

** Spitzenwerte für 100% Modulation / Peak values for a modulation factor of 1.0 / Valeurs de crête pour un taux de modulation de 100%



Klasse C HF-Verstärker unmoduliert oder FM oder Oszillator
Class C R.F. Power Amplifier, Unmodulated or FM or Oscillator
Classe C amplificateur HF, sans modulation ou à FM ou oscillateur

Maximalwerte
Maximum ratings
Valeurs maxima

f	=	< 30	31–60	61–110	MHz
V_a	=	7,5	7	6,5	kV
V_{g2}	=	1,5	1,5	1,5	V
I_a	=	3	2,8	2,6	A
P_{g1}	=	75	75	75	W
P_{g2}	=	250	250	250	W
P_a	=	5	5	5	kW

Diese Unterlagen mit allen darin enthaltenen Informationen und allen darin dargestellten Bildern sind dem Empfänger persönlich anvertraut und verbleibt jederzeit unserer Firma. Ohne unsere schriftliche Genehmigung darf sie nicht kopiert oder vervielfältigt, auch niemals Dritten Personen mitgeteilt oder zugänglich gemacht werden.

Normale Betriebsdaten
Typical operating conditions
Caractéristiques normales

V_a		6,5	kV
V_{g2}		750	V
V_{g1}		−350	V
I_a		2,3	A
I_{g2}		0,2	A
I_{g1}	≈	50	mA
P_{ga}	≈	25	W
P_o (ampl.)		10	kW
P_o (oscill.)	≈	10	kW
Rg (oscill.)		15	kΩ
f		88-108	MHz

Klasse B HF-Linearverstärker, Einseitenbandmodulation
Class B R.F. Linear Amplifier, Single-Sideband Modulation
Classe B amplificateur HF à bande latérale unique

Maximalwerte
Maximum ratings
Valeurs maxima

V_a	=	7,5 kV
V_{g2}	=	1,5 kV
I_{as}	=	4 A
P_a	=	6 kW
P_{g2}	=	250 W
P_{g1}	=	75 W

Normale Betriebsdaten
Typical operating conditions
Caractéristiques normales

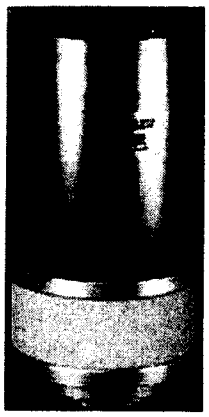
V_a		7,5	kV
V_{g2}		1,25	kV
* V_{g1}		−300	V
V_{g1p}		300	V
I_{as}		1 900	mA
I_{ao}		500	mA
I_{g2s}		200	mA
I_{g1}		0	mA
P_{g1s}	≈	0	W
P_o		10	kW
f	≤	30	MHz

* V_{g1} ist so einzustellen, dass sich der angegebene I_{ao} ergibt
V_{g1} should be adjusted such that the given value of I_{ao} is obtained
V_{g1} doit être ajustée pour que I_{ao} indiqué circule

Alle Unterlagen und alle Zeichnungen und alle Angaben, die Unterlagen an diesen Empfänger persönlich anvertraut sind, verbleibt jeder-
zeit unserer Firma. Ohne unsere schriftliche Genehmigung
dürfen sie nicht kopiert oder vervielfältigt, auch niemals
Dritten Personen mitgeteilt oder zugänglich gemacht werden.

TDP
TUBE TH 576

GENERAL DESCRIPTION



The TH 576 is a ceramic-metal tetrode of coaxial structure, employing Hypervapotron anode cooling, designed for use in AF and RF amplifiers of frequencies up to 50 MHz. This tube brings increased efficiency to medium- and short-wave transmitters. Moreover, the TH 576's Pyrobloc grids result in highly stable operating characteristics. The anode cooling technique guarantees enhanced safety margins with respect to the operating point.
The 576 delivers up to 550 kW in SW, with a high gain and a high efficiency.

TECHNICAL SPECIFICATIONS

TYPICAL OPERATING CONDITIONS	
Frequency	26 MHz
Anode voltage	14.5 kV
Anode current	41 A
Screen grid voltage	1200 V
Screen grid current	7.0 A
Control grid voltage	-700 V
Control grid current	2.0 A
HEATER POWER SUPPLY	
Filament voltage	19 V
Filament current	950 A
MAXIMUM RATINGS	
Anode voltage	15 kV
Anode dissipation	600 kW
Control grid dissipation	4 kW
Screen grid dissipation	12 kW
DIMENSIONS	
Diameter	346 mm
Length	705 mm
Mass	110 kg

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

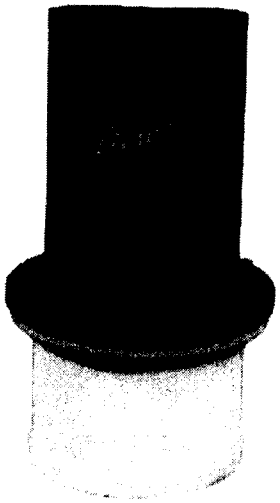
Manufacturer	Transmitter specifications	Power in kW
Telefunken Elektronik	125 B	500
	450 S	500
GEC-Marconi	B 6132	500
Thales	TSW 2000	500

THIS TUBE IS AVAILABLE FROM

Manufacturer	Rebuilder	Distributor

TDP
TUBE 4CM500,000G / TH558 / RS 2078 SK

GENERAL DESCRIPTION



The 4CM500,000G / TH558 / RS 2078 SK is a ceramic/metal, multiphase-cooled (water/vapor) power tetrode. This tube has a thoriated tungsten mesh filament and pyrolytic graphite grids which provide high-dissipation combined with low secondary emission characteristics. Base coaxial contact rings are provided for the filament, grid, and screen terminals, and these terminals are cooled with forced air. The maximu anode dissipation rating is 500 kilowatts steady state, with multiphase cooling.

TECHNICAL SPECIFICATIONS

Filament	Thoriated Tungsten
Voltage (DC or AC)	23.0 Volts
Current at 23.0 volts nominal	500 Amperes
Peak Maximum Filament Inrush Current at Turn-on	1000 Amperes
Amplification Factor, average Grid to Screen	4.4
Maximum Frequency of CW Ratings	50 MHz
Highest Useful Frequency With Reduced Ratings	110 MHz
Direct Interelectrode Capacitance (nominal values)	
Cg1k	445 pF
Cg2k	40 pF
Cpk	0.6 pF
Cg1g2	750 pF
Cg1p	6.5 pF
Cg2p	100 pF
Maximum Overall Dimensions	
Length	25.7 in; 65.3 cm
Diameter	12.6 in; 32.1 cm
Net Weight (approximate)	160 lbs; 73 kg
Operating Position	Vertical, base down
Cooling	Water & forced Air
Maximum Operating Temperature:	
Envelope and Ceramic/Metal Seals	130°C

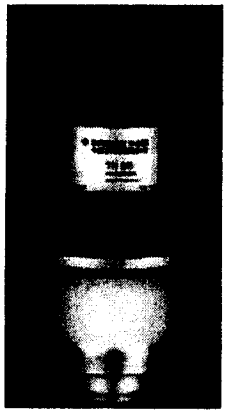
Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

Manufacturer	Transmitter specifications	Power in kW
Continental Electronics	420-B	500
	420-D	500
	[illegible]	250

TDP
TUBE TH 581

GENERAL DESCRIPTION



TECHNICAL SPECIFICATIONS

TYPICAL OPERATING CONDITIONS

Frequency	22 MHz
Anode voltage	14 kV
Anode current	10.5 A
Screen grid voltage	1000 V
Screen grid current	0.8 A
Control grid voltage	-550 V
Control grid current	0.9 A

HEATER POWER SUPPLY

Filament voltage	10 V
Filament current	240 A

MAXIMUM RATINGS

Anode voltage	15 kV
Anode dissipation	150 kW
Control grid dissipation	9.8 kW
Screen grid dissipation	2 kW

DIMENSIONS

Diameter	270 mm
Length	520 mm
Mass	75 kg

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING BROADCAST TRANSMITTERS

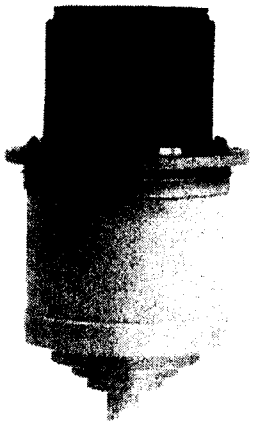
Manufacturer	Transmitter specifications	Power in kW
CBC-Marconi	[illegible]	100
Rohde & Schwarz	[illegible]	100
Thales	[illegible]	100

THIS TUBE IS AVAILABLE FROM

Manufacturer	Rebuilder	Distributor
Thales Electron Devices		

TDP
TUBE 4CM300,000GA / TH537 / CW1603J2

GENERAL DESCRIPTION



The 4CM300,000GA / TH537 / CW1603J2 is a ceramic/metal, multiphase-cooled (water/vapor) power tetrode. This tube has a thoriated tungsten mesh filament and pyrolytic graphite grids which provide high-dissipation combined with low secondary emission characteristics. Base coaxial contact rings are provided for the filament, grid, and screen terminals, and these terminals are cooled with forced air. The maximu anode dissipation rating is 300 kilowatts steady state, with multiphase cooling.

TECHNICAL SPECIFICATIONS

Filament	Thoriated Tungsten
Voltage (DC or AC)	18.0 Volts
Current at 18.0 volts nominal	430 Amperes
Peak Maximum Filament Inrush Current at Turn-on	860 Amperes
Amplification Factor, average Grid to Screen	4.3
Maximum Frequency of CW Ratings	50 MHz
Highest Useful Frequency With Reduced Ratings	110 MHz
Direct Interelectrode Capacitance (nominal values)	
Cg1k	310 pF
Cg2k	26 pF
Cpk	0.8 pF
Cg1g2	510 pF
Cg1p	4.5 pF
Cg2p	75 pF
Maximum Overall Dimensions	
Length	22.0 in; 56.0 cm
Diameter	12.3 in; 31.1 cm
Net Weight (approximate)	125 lbs; 57 kg
Operating Position	Vertical, base down
Cooling	Water & Forced Air
Maximum Operating Temperature:	
Envelope and Ceramic/Metal Seals	200°C

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

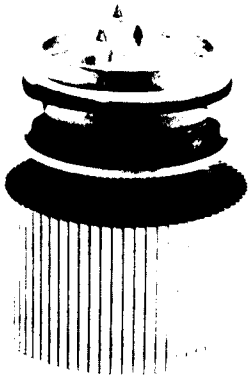
Manufacturer	Transmitter specifications	Power in kW
Continental Electronics	419 G	250
	B 6131	250
CTC-Marconi	B 6124	250
	B 6126	300
	B 6128	300
Thomcast	TRE 2331	300

10

TH 289 TETRODE

TH 289 is a forced air cooled transmitting tetrode especially intended for frequency modulation or single side band operation.

It is provided with a coaxial screen grid and its anode can dissipate up to 3 kW.



GENERAL CHARACTERISTICS

Electrical

Type of cathode	thoriated tungsten	
Type of heating	direct	
Filament voltage	6.0 ± 2 %	V
Filament current, approximate	42	A
Interelectrode capacitances (approximate) with grounded cathode (1) :		
- input	55	pF
- output	25	pF
- control grid-anode	0.7	pF
Amplification factor g_1 - g_2, average	3	
Transconductance (I a = 1 A)	19	mA/V

Mechanical

Mounting position	vertical, anode up or down	
Anode cooling	forced air	
Minimum airflow :		
- (inlet air temperature = 25 °C - Anode dissipation = 2.5 kW)	4.5	m^3/mn
Corresponding inlet air pressure :		
- normal mounting (anode down)	5	mB
- inverted mounting with TH 16044 socket	10	mB
Maximum inlet air temperature	55	°C
Maximum glass insulator and electrode terminals temperature	150	°C
Net weight, approximate	1.5	kg
Dimensions	see drawing	

Accessories

Socket for inverted mounting	TH 16044

(1) Measured with a 50 x 50 cm^2 metallic plate around screen-grid.

THOMSON-CSF
GROUPEMENT TUBES ELECTRONIQUES

OPERATING CONDITIONS

R.F. LINEAR POWER AMPLIFIER – CLASS AB –

Maximum ratings

D.C. anode volage	4.5	kV
D.C. grid n° 2 voltage	600	V
D.C. grid n° 1 voltage	- 300	V
Peak cathode current	7.5	A
Average cathode current	2.2	A
Anode dissipation	3.0	kW
Grid n° 2 dissipation	60	W
Grid n° 1 dissipation	20	W

Typical operation

D.C. anode voltage	3.2	2.0	kV
D.C. grid n° 2 voltage	450	450	V
Grid n° 1 R.F. peak voltage	135	110	V
Anode current at zero signal	0.75	0.6	A
D.C. anode current	1.3	1.4	A
D.C. grid n° 2 current, approx.	35	90	mA
D.C. grid n° 1 current, approx.	5	0	mA
Input power	4.2	2.8	kW
Anode dissipation	2.1	1.5	kW
Output power, approx.	2.1	1.3	kW

OPERATING CONDITIONS

FREQUENCY MODULATION R.F. POWER AMPLIFIER AT 110 MHz

Maximum ratings

D.C. anode voltage	4.5	kV
D.C. grid n° 2 voltage	600	V
D.C. grid n° 1 voltage	- 300	V
Peak cathode current	7.5	A
Average anode current	1.3	A
Anode dissipation	3.0	kW
Grid n° 2 dissipation	60	W
Grid n° 1 dissipation	20	W
Frequency	110	MHz

Typical operation

D.C. anode vbltage	3	4	kV
D.C. grid n° 2 voltage	450	450	V
D.C. grid n° 1 voltage	- 200	- 200	V
Grid n° 1 R.F. peak voltage	220	220	V
D.C. anode current	1.2	1.2	A
D.C. grid n°2 current, approx.	70	60	mA
D.C. grid n° 1 current, approx.	20	20	mA
Input power	3.6	4.8	kW
Anode dissipation	1.1	1.3	kW
Output power, approx. (1)	2.5	3.5	kW

(1) Without taking circuit losses into account.