RINA SIMTEX
CERTIFIED MANAGEMENT SYSTEM

SOCIETATEA NAȚIONALĂ DE RADIOCOMUNICAȚII S.A. RADIOCOM

APPROVED,

Chief Technology Officer

1/2 9 19.11.2024

TECHNICAL REQUREMENTS

FM TRANSMITTERS 5kW and 10kW

and

FM BAND PASS FILTERS

CPV code: 32210000-8 Radio and television equipment (Rev. 2)

Full solid state FM-VHF transmitter 10kW – 11 pcs.

Full solid state FM-VHF transmitter 5kW – 12 pcs.

FM band pass filter – 10 pcs.

Broadcasting Department Manager

Radio Broadcasting Chief Engineer

Bucharest, 2024

DELIVERY CONDITIONS AND LOCATIONS

I. Delivery locations

No.	Site	TX Power	Band Pass Filters	Delivery address
1	Bucegi-Coştila	2x10kW	1x10kW	Site TV&FM Bucegi-Coştila, Vârful Costila, Masivul Bucegi, cota 2498, O.P.1, Busteni, County Prahova • Phone: 00 40 31 500 3868
2	Bihor	2x10kW	1x10kW	Site TV&FM Bihor, Vf. Curcubăta Mare, Village Arieşeni, County Alba • Phone: 00 40 72 076 7439
3	Harghita	3x5kW	1x5kW	Site TV&FM Harghita – Harghita Băi, nr.2, County Harghita • Phone: 00 40 72 076 7443
4	Mogoşa	2x10kW	1x10kW	Site TV&FM Mogoşa, Baia Sprie – extravilan, next to Cabana Mogoşa, County Maramureş • Phone: 00 40 72 076 7437
5	Păltiniş (Oncești-Sibiu)	2x5kW	1x5kW	Site TV&FM Păltiniş, Vârful Oncești, Staţiunea Păltiniş, County Sibiu • Phone: 00 40 72 076 7438
6	Rarău	3x5kW	1x5kW	Site TV&FM Rarău, Vârful Rarău, Rezervaţia Pietrele Doamnei, City Câmpulung Moldovenesc, County Suceava • Phone: 00 40 72 076 7667
7	Măgura-Odobeşti	2x5kW	1x5kW	Site TV&FM Măgura-Odobeşti, Vârful Măgura, Village Boloteşti, County Vrancea • Phone: 00 40 72 076 7619
8	Cerbu	3x10kW	1x10kW	Site TV&FM Cerbu, Village Novaci, County Gorj, • Phone: 00 40 72 076 7836
9	Măgura Boiu	2x5kW	1x5kW	Site TV&FM Măgura-Boiu, Vârful Boiu, County Hunedoara, • Phone: 00 40 72 076 7837
10	Semenic	2x10kW	1x10kW	Site TV&FM Semenic, Vârful Gozna, Village Văliug, County Caraş-Severin, • Phone: 00 40 72 076 7838

II. Delivery time: maximum 8 months

III. Warranty period: minimum 60 months

FORM XX

Tenderer

.....

(Company name)

Summary
Of prices for products

A. FULL SOLID STATE FM-VHF TRANSMITTER, BUCEGI-COȘTILA

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Bucegi-Coștila
1	**FM TRANSMITTER 10kW** 104,10 MHz 97,60 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Bucegi-Coștila
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE A:

FORM XX

B. FULL SOLID STATE FM-VHF TRANSMITTER, BIHOR

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Bihor
1	**FM TRANSMITTER 10kW** 91,00 MHz 105,80 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Bihor
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE B:

FORM XX

C. FULL SOLID STATE FM-VHF TRANSMITTER, HARGHITA

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Harghita
1	**FM TRANSMITTER 5kW** 103,40 MHz 106,80 MHz 98,90 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	3 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	3 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	3 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	3 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Harghita
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE C:

FORM XX

D. FULL SOLID STATE FM-VHF TRANSMITTER, MOGOȘA

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Mogoșa
1	**FM TRANSMITTER 10kW** 102,50 MHz 100,10 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Mogoșa
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE D:

FORM XX

E. FULL SOLID STATE FM-VHF TRANSMITTER, PĂLTINIȘ (ONCEȘTI – SIBIU)

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Păltiniș
1	**FM TRANSMITTER 5kW** 101,80 MHz 103,70 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Păltiniș
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE E:

FORM XX

F. FULL SOLID STATE FM-VHF TRANSMITTER, RARĂU

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Rarău
1	**FM TRANSMITTER 5kW** 96,00 MHz 98,70 MHz 90,80 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	3 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	3 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	3 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	3 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Rarău
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE F:

FORM XX

G. FULL SOLID STATE FM-VHF TRANSMITTER, MĂGURA-ODOBEȘTI

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Măgura-Odobești
1	**FM TRANSMITTER 5kW** 102,50 MHz 101,00 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Măgura-Odobești
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE G:

FORM XX

H. FULL SOLID STATE FM-VHF TRANSMITTER, CERBU

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Cerbu
1	**FM TRANSMITTER 10kW** 92,90 MHz 89,50 MHz 105,00 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	3 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	3 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	3 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	3 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Cerbu
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE H:

FORM XX

I. FULL SOLID STATE FM-VHF TRANSMITTER, MĂGURA-BOIU

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Măgura-Boiu
1	**FM TRANSMITTER 5kW** 103,40 MHz 105,00 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Măgura-Boiu
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE I:

FORM XX

J. FULL SOLID STATE FM-VHF TRANSMITTER, SEMENIC

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Semenic
1	**FM TRANSMITTER 10kW** 102,50 MHz 105,60 MHz	According with Technical Specifications, -Full Solid State FM Transmitter, with: - 2 exciters - interface for monitor and remote (including web interface) and "pc" monitor and remote operation	2 pcs.	
2	RDS ENCODER SET - Fully compliant with IEC standard 62106 *RDS encoders will be included in the exciters	-Scrolling PS and Radio Text messaging -PS Static and PS Dynamic -25 AF (alternate frequencies) at least	2 sets	
3	AUDIO PROCESSOR SET *Audio processors will be included in the exciters	-Multiband processing (5 bands), (multiple correction curves), EQ, AGC, Clipping -Processing/ bypass selectable	2 sets	
4	AUDIO and MODULATION MONITOR	-FM demodulator -Modulation monitor and metering main parameters (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, alarm transmission via SNMP for deviations from threshold values, alarm records) -Web interface -Audio monitoring from the demodulator (audio amplifier + speakers) -All necessary cables for equipment monitoring	2 pcs.	
5	TECHNICAL MANUAL and COMPLETE DOCUMENTATION	-In English	1 set	

FORM XX

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP Semenic
6	COMMISSIONING and SITE ACCEPTANCE TESTS	No of supplier specialist & working days. Supplier will support all cost for travelling, accommodation, daily expenses. Buyer will support transport from hotel to site and back.	1 set	

TOTAL PRICE J:

FORM XX

K. SPARE PART KIT for 5kW and 10kW

No	FURNITURE	REQUIREMENTS	QTY	PRICE (EURO) CIP
1	RECOMMENDED SPARE PARTS *The supplier will provide a complete list with the spare parts and price for each item/each set, following that the beneficiary establishes the benchmarks and the quantities considered necessary.	Each set will contain recommended minimum spare parts kit (electronic boards/ modules, hot-swapped power supply, power amplifiers or RF modules for PA repair, air filters, air fan etc.). The 10 sets will be identical depending on the power of the transmitter. The total value of the recommended set of spare parts will be a maximum of 5% of the value of the transmitters, value related to position 1 of the quotations per location from A to J.	10 sets (one set for each site, per transmitter power 5kW or 10kW)	

TOTAL PRICE K:

FORM XX

L. BAND PASS FILTER (min. 3 CAVITIES) 5 kW

No	Site	Furniture	Requirements	Qty	PRICE (EURO) CIP-site
1	Harghita	BAND PASS FILTER (3 CAVITIES)	min. 3 cavities, 5 kW, tuned to 98,90 MHz	1 pc.	
2	Păltiniș (Onceşti-Sibiu)	BAND PASS FILTER (3 CAVITIES)	min. 3 cavities, 5 kW, tuned to 103,70 MHz	1 pc.	
3	Rarău	BAND PASS FILTER (3 CAVITIES)	min. 3 cavities, 5 kW, tuned to 90,80 MHz	1 pc.	
4	Măgura-Odobești	BAND PASS FILTER (3 CAVITIES)	min. 3 cavities, 5 kW, tuned to 102,50 MHz	1 pc.	
5	Măgura-Boiu	BAND PASS FILTER (3 CAVITIES)	min. 3 cavities, 5 kW, tuned to 105,00 MHz	1 pc.	

TOTAL PRICE L : _____

M. BAND PASS FILTER (min. 3 CAVITIES) 10 kW

No	Site	Furniture	Requirements	Qty	PREȚ (EURO) CIP-site
1	Bucegi-Coştila	BAND PASS FILTER (3 CAVITIES)	min 3 cavities, 10 kW, tuned to 97,60 MHz	1 pc.	
2	Bihor	BAND PASS FILTER (3 CAVITIES)	min 3 cavities, 10 kW, tuned to 105,80 MHz	1 pc.	
3	Mogoşa	BAND PASS FILTER (3 CAVITIES)	min 3 cavities, 10 kW, tuned to 102,50 MHz	1 pc.	
4	Cerbu	BAND PASS FILTER (3 CAVITIES)	min 3 cavities, 10 kW, tuned to 105,00 MHz	1 pc.	
5	Semenic	BAND PASS FILTER (3 CAVITIES)	min 3 cavities, 10 kW, tuned to 102,50 MHz	1 pc.	

TOTAL PRICE M : _____

FORM XX

N. FACTORY TRAINING AND FACTORY ACCEPTANCE TESTS

No	Furniture	Requirements	Qty	PRICE (EURO)
1	FACTORY TRAINING and FACTORY ACCEPTANCE TESTS	8 persons/ 5 working days, including: _ Air Transport _Hotel Accommodation _Lunch on working day _Living expenses: 100 euro / day / person _Local transport _Insurances	1 Set	

TOTAL PRICE N:

FORM XX

LIST

Site / Frequency / Band Pass Filters

No	Subsidiary RADIOCOM	No site	Site	Frecquency (MHz)	No/TX Power	Band Pass Filters/ Frecquency
1	București	1	Bucegi	104,10	2 x 10kW	1 x 10 kW tuned to 97,60MHz
2			Bucegi	97,60		
3	Cluj	2	Bihor	91,00	2 x 10kW	1 x 10 kW tuned to 105,80MHz
4			Bihor	105,80		
5		3	Harghita	103,40	3 x 5kW	1 x 5 kW tuned to 98,90MHz
6			Harghita	106,80		
7			Harghita	98,90		
8		4	Mogosa	102,50	2 x 10kW	1 x 10 kW tuned to 102,50MHz
9			Mogosa	100,10		
10		5	Păltiniș (Onceşti-Sibiu)	101,80	2 x 5kW	1 x 5 kW tuned to 103,70MHz
11			Păltiniș (Onceşti-Sibiu)	103,70		
12	Iași	6	Rarau	96,00	3 x 5kW	1 x 5 kW tuned to 90,80MHz
13			Rarau	98,70		
14			Rarau	90,80		
15		7	Magura-Odobesti	102,50	2 x 5kW	1 x 5 kW tuned to 102,50MHz
16			Magura-Odobesti	101,00		
17	Timișoara	8	Cerbu	92,90	3 x 10kW	1 x 10 kW tuned to 105,00MHz
18			Cerbu	89,50		
19			Cerbu	105,00		
20		9	Măgura Boiu	103,40	2 x 5kW	1 x 5 kW tuned to 105,00MHz
21			Măgura Boiu	105,00		
22		10	Semenic	102,50	2 x 10kW	1 x 10 kW tuned to 102,50MHz
23			Semenic	105,60		

FORM XX

Quotation Grand TOTAL

Item	Description	PRICE (EURO) CIP
Total price A	FULL SOLID STATE FM-VHF TRANSMITTER, 2x10kW Bucegi-Coștila	
Total price B	FULL SOLID STATE FM-VHF TRANSMITTER, 2x10kW Bihor	
Total price C	FULL SOLID STATE FM-VHF TRANSMITTER, 3x5kW Harghita	
Total price D	FULL SOLID STATE FM-VHF TRANSMITTER, 2x10kW Mogoșa	
Total price E	FULL SOLID STATE FM-VHF TRANSMITTER, 2x5kW Păltiniș (Oncești-Sibiu)	
Total price F	FULL SOLID STATE FM-VHF TRANSMITTER, 3x5kW Rarău	
Total price G	FULL SOLID STATE FM-VHF TRANSMITTER, 2x5kW Măgura-Odobești	
Total price H	FULL SOLID STATE FM-VHF TRANSMITTER, 3x10kW Cerbu	
Total price I	FULL SOLID STATE FM-VHF TRANSMITTER, 2x5kW Măgura-Boiu	
Total price J	FULL SOLID STATE FM-VHF TRANSMITTER, 2x10kW Semenic	
Total price K	SPARE PART KIT 5kW and 10 kW	
Total price L	BAND PASS FILTER (min.3 CAVITIES) 5 kW	
Total price M	BAND PASS FILTER (min.3 CAVITIES) 10 kW	
Total price N	Factory training and Factory acceptance tests	

TOTAL PRICE: _____

TECHNICAL FEATURES

FOR VHF FM SOLID STATE TRANSMITTER

I. CONFIGURATION

- **Full Solid State FM transmitter:**
  - **-air cooled transmitter**
  - **-digitally μP controlled transmitter**
  - **-front Panel Diagnostic Display with detailed system information**
  - **-with 2 exciters (one main and one active reserve, with automatic switching)**
  - **-local monitoring system (FM demodulator and audio amplifier + speakers)**
  - **-all equipment will be included in the same rack**

II. CHARACTERISTICS

1. Frequency range	: 87.5 ÷ 108 MHz software digitally programmable
2. Exciter	: 2 exciters with digital processing in stand-by configuration (one main and one active reserve), with automatic changeover system in fault case, containing oscillator, stereo encoder and RF driver amplifier, having included one audio processor and one RDS encoder each
2.1 Digital controlled oscillator	: included
2.2 Stereo encoder	: included
2.3 Digital Composite Limiter	: included
2.4 Digital modulator	: included
2.5 RDS coder	: included in exciters fully compliant with IEC 62106
3. Frequency stability	: +/-150Hz
4. Nominal frequency deviation	: ± 75 kHz (CCIR 450 - 1)
5. Modulation capability	: ± 150 kHz
6. Class of emission	: F8EH
7. Stereo emissions	: according to CCIR recommendation 450, section 2 (pilot tone procedure)

III. RF OUTPUT

1. Output RF power : according with quotation request

2. Output impedance : 50 Ω unbalanced

3. VSWR : a. Automatic power reduction for VSWR below 1.5:1, according ETS 300 384
b. Transmitter should be protected for short and open circuit conditions

4. Spurious emissions, including harmonics

a. 9 kHz-1 GHz : according ETSI EN 302 018, article 4.2.10
max -16 dBm (25 microW) for tx 5 kW
better than -85 dBc for tx 10 kW

b. 108 MHz-137 MHz max -16 dBm (25 microW)

5. Out-of-band emissions : according ETSI EN 302 018, article 4.2.12

6. Output Connector : EIA 1 5/8

IV. MODULATION INPUTS

1. Input : - 1xAnalog LEFT, RIGHT;
-input 2xDigital XLR, can be used with signals:

- AES/EBU (AES3) (sample rate up to 96kHz; data rate up to 196kb/s, 16/24/32 bits)

and/or

- MPX over AES (AES192);

-1xMPX (analog);
-1xRDS input (for external encoder)
-audio player from external memory support (SD card or USB)
The transmitters will be provided with: automatic switching between input sources with silent detection based on user-configurable audio level and time thresholds

V. TRANSMISSION CHARACTERISTICS

Stereo operation

1. **The frequency range of the modulation signal** : 30 Hz to 15 kHz

2. **Input impedance** : 600 ohms, balanced for analog
   110 ohms, balanced for digital

3. **AF input level** : 0 dBu to +10 dBu for analog
   -10 dBFS to 0 dBFS for digital

4. **Pre emphasis** : 0 µs, 50 µs and 75µs selectable

5. **Amplitude-frequency response** : ± 0.2 dB (without pre-emphasis)
   referred to f_{mod} =400 Hz, 30 Hz to 15 kHz, : ± 0.2 dB (with pre-emphasis)
   left channel, right channel

6. **Crosstalk between left and right channels** : > 55 dB
   100% modulation, 30 Hz to 15 kHz

7. **THD, 30 Hz to 15 kHz,**

   - **with 75 kHz frequency deviation** : < 0.05%
   - **with 100 kHz frequency deviation** : < 0.05%
     left channel, right channel

8. **Intermodulation distortion (L or R)** : < 0.2%
   60Hz/7kHz, 4:1, +4dBu

9. **FM S/N ratio, referred to f_{mod}=400 Hz at**
   75 kHz frequency deviation, peak value
   measurement, left channel, right channel
   - **weighted** : ≥ 80 dB
   - **unweighted** : ≥ 76 dB

10. **Asynchronous AM Noise referred to**
    100% AM modulation at 400 Hz, 50 µs
    Pre-emphasis and without FM modulation : > 55 dB

11. **Synchronous AM Noise referred to**
    100% AM modulation at 400 Hz, 50 µs
    Pre-emphasis with FM modulation at 75 kHz : > 50 dB

Mono operation

12. Amplitude frequency characteristic referred to f_{mod}=400 Hz, 30 Hz to 15 kHz : ± 0.2 dB

13. FM S/ N ratio, referred to f_{mod}=400 Hz at 75 kHz frequency deviation, peak value measurement

- **weighted** : ≥ 80 dB
- **unweighted** : ≥ 76 dB

14. Asynchronous AM Noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis and without FM modulation : > 55 dB

15. Synchronous AM Noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis with FM modulation at 75 kHz : > 50 dB;

VI.SUPPLY, COOLING, ENVIRONMENT

1. **Supply voltage** : 400 Vac (-15%/ +14%), 50 Hz ± 3 Hz; 4 wires + ground (3 phase)
2. **Power factor** : > 0.95;
3. **Overall efficiency** : > 70%
4. **Cooling** : Air-cooling with built - in blowers and fans, automatic fold back and shut down of the RF output power has to be provided in case of temperature fault or air pressure fault.
5. **Operating temperature range** : 0°C la + 45°C;
6. **Maximum relative humidity** : 95%, noncondensing;
7. **Altitude** : up to 3000 m;

VII.SPECIFIC REQUIREMENTS

1. The FM transmitter should assure an uninterrupted and unattended operation during 24 hours/day.

2. The equipment quoted must conform to the latest international standards of safety and EMC. The conformance to such standards must be stated in compliance statement (Supplier will indicate Standard's Name and Number).

3. The transmitter shall be characterized by high reliability, high MTBF (15000 hours). A declaration must be provided by the manufacturer.

4. The transmitter must have the final stage with modular architecture; in case of one power amplifier fault, the transmitter must be able to operate at reduced power, but not less than 75% of the rated power. Power supplies must be "hot-swapped".

5. The transmitter should have adequately protection against fire, rust and corrosion. A declaration must be provided by the manufacturer.

6. Transmitter should display main parameters on the front panel display.

7. Adequate protection system shall be provided to safe guard the transmitter from damage under fault conditions. The protection system should be fast acting to safe guard the components.

8. Typical requirements regarding the protection matter:

- **Over- load protection for transmitter.**
- **Protection against over temperature.**
- **Main power supply protection.**
- **Protection at low airflow level (Low Airflow).**
- **Protection against high VSWR including open and short conditions at output.**
- **Immediate power fold-back under severe/damaging fault conditions. Details of fold-back to be provided.**

9. The FM transmitter must be provided with a calibrated test port for power measurement and an RF port for connection to local monitoring equipment.

10. The FM transmitter must to be provided with automatic switch-on at short interrupting of the main power supply (3 interrupts up to 1 second (in 5 seconds interval)). A declaration must be provided by the manufacturer. This should be confirmed by the factory test report supplied with the transmitters.

11. The FM transmitter will be provided only with air cooling system, and the transmitter rack must be equipped with hot air exhaust fans, the number of fans being determined according to the transmitter's emission power, respectively the number of modules amplification.

12. A proposal factory training and factory acceptance is required (see Offer List)

13. A proposal for commissioning (verifying the installation made by customer) on site and site acceptance tests is required (no of persons/ day).

14. A proposal is required for the set of recommended spare parts (included in the quotation price). The total value of the recommended set of spare parts will be a maximum of 5% of the value of the transmitters, value related to position 1 of the quotations per location from A to J, (see list of offers). The Supplier will provide a complete list with the spare parts and price for each item/each set, following that the beneficiary establishes the benchmarks and the quantities considered necessary.

15. The FM transmitter must be provided with local and complete remote monitoring and control system with GUI web interface for remote operation.

Minimum requirements:

a) Remote

1. Remote control
- full transmitter parameters control

2. Remote indication
- on / off status
- RF forward and reflected power
- Audio input status
- Deviation meter
- Alarms: no carrier, no audio, active fold-back, -3dB carrier
- Fault: RF chain and exciter, power amplifier stage, VSWR, temperature, interlock, main power supply.

3. Control and monitoring via SNMP protocol via TCP/IP port

b) Local:

Display of following parameters:

1. Transmitter operating parameters (frequency, output and reflected power, main power supply voltage and currents, audio input status, alarm list and history);

2. Fault diagnostic: RF chain and exciter, power amplifier stage, VSWR, temperature, interlock, main power supply;

3. Alarms: no carrier, no audio, active fold-back;

4. Exciter operating parameters, including power level;

5. Deviation meter.

c) Monitoring equipment

Remote interface:

•PC remote and monitor facilities: hardware + software firmware;

•All necessary devices and software to integrate the transmitter into the Radiocomunicatii monitoring system (e.g. SNMP protocol, MIB files etc.);

Audio and modulation monitoring:

• FM demodulator

• Modulation monitor and main parameter metering (total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, transmission of alarms via SNMP for deviations from the threshold values, alarm records)

• Web interface

• Audio monitoring from the demodulator (audio amplifier + speakers)

• All necessary cables for equipment monitoring

16. In the furniture the supplier will provide as "technical documentation", for all furniture, the following items:

Documentation for the mechanical-electrical fitting
Technical manuals containing:

- Specifications,
- Installation & initial turn on,
- Operators guide,
- Controls and indicators,
- Overall system theory,
- Maintenance & alignments,
- Troubleshooting,
- General description & radiation diagram of the transmitter
- Boards Diagrams
- Component Parts list etc.

17. All equipment must be conform to the articles of Directive of 2014/53/UE (Directive RED) of the European Parliament and of the council of 16 April 2014 and its amendment acts on radio equipment and telecommunications terminal equipment, and to all European Community standards that apply to the respective type of equipment (including standards for toxic substances), otherwise the equipment cannot be imported under the Romanian law.

All equipment must be "CE" and "RoHS" certified. The supplier has to provide the conformity certificates for all equipment.

The manufacturer must be ISO 9001:2015 and ISO 14001:2015 certified (or equivalent).

18. All parameters and values must be specified in the technical specifications documentation, released by manufacturer, and will be attached as reference. (Must be indicated pages for each required parameter for reference.)

19. Must be quoted prices for each item in quotation lists, including spare parts kit. The parts included in the spare parts kit will be quoted individually.

20. Warranty period: minimum 60 months for transmitters and auxiliary equipment.

21. Each transmitter will be delivered with a factory test report, which includes at least the measurements and checks required by the FM transmitter test document (attached).

TECHNICAL FEATURES
for
FM Band Pass Filter 5 kW

Type: min. 3 cavities;

Frequency range: 87.5 MHz – 108 MHz;

Impedance: 50 ohms;

Power = 5kW, according to the quotations;

Frequency = according with frequency specified in quotation list;

Selectivity: selectable +/- 0.8 MHz to +/- 1.6 MHz;

VSWR at Fc: < 1.08;

Insertion loss: < 0.3 dB, selectivity +/-1.6 MHz;

Temperature range: -10°C to +45°C;

Cooling: natural heat dissipation;

RF connector: 1 5/8 EIA

TECHNICAL FEATURES
for
FM Band Pass Filter 10 kW

Type: min. 3 cavities;

Frequency range: 87.5 MHz – 108 MHz;

Impedance: 50 ohms;

Power = 10kW, according to the quotations;

Frequency = according with frequency specified in quotation list;

Selectivity: selectable +/- 0.8 MHz to +/- 1.6 MHz;

VSWR at Fc: < 1.08;

Insertion loss: < 0.2 dB, selectivity +/-1.6 MHz;

Temperature range: -10°C to +45°C;

Cooling: natural heat dissipation;

RF connector: 1 5/8 EIA

ANEXA XX

TECHNICAL PROPOSAL FORM
TECHNICAL COMPLIANCE FOR FM TRANSMITTERS 5/10KW

No	Technical characteristics	Details	Mandatory	Method of fulfillment of the requirement	Reference
I	**CONFIGURATION**				
1	Full Solid State FM transmitter,	air cooled transmitter	Yes		
		digitally µP controlled transmitter	Yes		
		front Panel Diagnostic Display with detailed system information	Yes		
		with 2 exciters (one main and one active reserve, with automatic switching)	Yes		
		local monitoring system (FM demodulator and audio amplifier + speakers)	Yes		
		all equipment will be included in the same rack	Yes		
II	**CHARACTERISTICS**				
1	Frequency range	87.5 ÷108 MHz software digitally programmable	Yes		
2	Exciter	2 exciters with digital processing in stand-by configuration (one main and one active reserve), with automatic changeover system in fault case, containing oscillator, stereo encoder and RF driver amplifier, having included one audio processor and one RDS encoder each	Yes		

2.1	Digital controlled oscillator	included	Yes		
2.2	Stereo Encoder	included	Yes		
2.3	Digital Composite Limiter	included	Yes		
2.4	Digital modulator	included	Yes		
2.5	RDS coder	included in exciters , fully compliant with IEC standard 62106	Yes		
3	Frequency stability	+/-150Hz	Yes		
4	Nominal frequency deviation	± 75 kHz (CCIR 450-1)	Yes		
5	Modulation capability	± 150 kHz;	Yes		
6	Class of emission	F8EH	Yes		
7	Stereo emissions	according to CCIR recommendation 450, section 2 (pilot tone procedure)	Yes		
III	**RF OUTPUT**				
1	Output RF power	according with quotation request	Yes		
2	Output impedance	50 Ω unbalanced	Yes		
3	VSWR	a. Automatic power reduction for VSWR below 1.5:1, according ETS 300 384	Yes		
		b. Transmitter should be protected for short and open circuit conditions	Yes		
4	Spurious emissions, including harmonics				
	a. 9 kHz-1 GHz	according ETSI EN 302 018, article 4.2.10 max -16dBm (25 microW) for tx 5kW better than -85 dBc for tx10kW	Yes		
	b. 108 MHz-137 MHz	max -16 dBm (25 microW)	Yes		
5	Out-of-band emissions	according ETSI EN 302 018, article 4.2.12	Yes		
6	Output Connector	EIA 1 5/8	Yes		
IV	**MODULATION INPUTS**				
1	Input	1xAnalog LEFT, RIGHT;	Yes		
		Input 2x Digital XLR, can be used with signals:	Yes		

		• AES/EBU (AES3) (sample rate up to 96kHz; data rate up to 196kb/s, 16/24/32 bits) and/or • MPX over AES (AES192)			
		1xMPX (analog)	Yes		
		1xRDS input (for external encoder)	Yes		
		audio player from external memory support (SD card or USB)	Yes		
		automatic switching between input sources with silent detection based on user-configurable audio level and time thresholds	Yes		
V	**TRANSMISSION CHARACTERISTICS**				
	STEREO OPERATION				
1	The frequency range of the modulation signal	30 Hz la 15 kHz	Yes		
2	Input impedance	600 ohms, balanced for analog 110 ohms, balanced for digital	Yes		
3	AF input level	0 dBu to + 10 dBu, for analog - 10 dBFS to 0 dBFS for digital	Yes		
4	Preemphasis	0 µs, 50 µs and 75µs selectable	Yes		
5	Amplitude-frequency response referred to fmod=400Hz, 30Hz to 15kHz, left channel, right channel	± 0.2 dB (without pre emphasis), ± 0.2 dB (with pre emphasis)	Yes		
6	Crosstalk between left and right channels 100% modulation, 30 Hz to 15 kHz	> 55 dB	Yes		
7	THD, 30 Hz - 15 kHz, left channel, right channel		Yes		
a	- with 75 kHz frequency deviation	< 0.05%	Yes		
b	- with 100 kHz frequency deviation	< 0.05%;	Yes		

8	Intermodulation distortion (L or R) 60Hz/7kHz, 4:1, +4dBu	< 0.2%	Yes		
9	FM S/N ratio, referred to fmod=400 Hz at 75 kHz frequency deviation, peak value measurement, left channel, right channel		Yes		
	- weighted	≥ 80 dB	Yes		
	- unweighted	≥ 76 dB	Yes		
10	Asynchronous AM noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis and without FM modulation	> 55 dB	Yes		
11	Synchronous AM noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis with FM modulation at 75 kHz	> 50dB	Yes		
	MONO OPERATION				
12	Amplitude-frequency characteristic referred to fmod=400Hz, 30Hz to 15kHz	± 0.2 dB	Yes		
13	FM S/N ratio, referred to fmod=400 Hz at 75 kHz frequency deviation, peak value measurement		Yes		
	- weighted	≥ 80 dB	Yes		
	- unweighted	≥ 76 dB	Yes		
14	Asynchronous AM noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis and without FM modulation	> 55 dB	Yes		
15	Synchronous AM noise referred to 100% AM modulation at 400 Hz, 50 µs Pre-emphasis with FM modulation at 75 kHz	> 50dB	Yes		
VI	**SUPPLY, COOLING, ENVIRONMENT**				
1	Supply voltage	400 Vac (-15%/ +14%), 50 Hz ± 3 Hz, 4 wire + ground (3 phase)	Yes		
2	Power factor	> 0.95	Yes		
3	Overall efficiency	> 70%	Yes		
4	Cooling	Air-cooling with built - in blowers and fans, automatic fold back and shut down of the RF output power has to be	Yes		

		provided in case of temperature fault or air pressure fault.			
5	Operating temperature range	0°C to + 45°C	Yes		
6	Maximum relative humidity	95% noncondensing	Yes		
7	Altitude	up to 3000 m	Yes		
VII	**SPECIFIC REQUIREMENTS**				
1	**The FM transmitter should assure an uninterrupted and unattended operation during 24 hours/ day.**		Yes		
2	**The equipment quoted must conform to the latest international standards of safety and EMC. The conformance to such standards must be stated in compliance statement (Oferrer will indicate Standard's Name and Number).**		Yes		
3	**The transmitter shall be characterized by high reliability, high MTBF (15000 hours). A declaration must be provided by the manufacturer.**		Yes		
4	**The transmitter must have the final stage with modular architecture; in case of one power amplifier fault, the transmitter must be able to operate at reduced power, but not less than 75% of the rated power. Power supplies must be "hot-swapped".**		Yes		
5	**The transmitter should have adequately protection against fire, rust and corrosion. A declaration must be provided by the manufacturer.**		Yes		
6	**Transmitter should display main parameters on the front panel display.**		Yes		
7	**Adequate protection system shall be provided to safe guard the transmitter from damage under fault conditions. The protection system should be fast acting to safe guard the components.**		Yes		
8	**Typical requirements regarding the protection matter: - Over- load protection for transmitter. - Protection against over temperature. - Main power supply protection. - Protection at low airflow level (Low Airflow). - Protection against high VSWR including open and short conditions at output. - Immediate power fold-back under severe/damaging fault conditions. Details of fold-back to be provided.**		Yes		
9	**The FM transmitter must be provided with a calibrated test port for power measurement and an RF port for connection to local monitoring equipment.**		Yes		

10	**The FM transmitter must to be provided with automatic switch-on at short interrupting of the main power supply (3 interrupts up to 1 second (in 5 seconds interval)). A declaration must be provided by the manufacturer. This should be confirmed by the factory test report supplied with the transmitters.**		Yes		
11	**The FM transmitter will be provided only with air cooling system, and the transmitter rack must be equipped with hot air exhaust fans, the number of fans being determined according to the transmitter's emission power, respectively the number of modules amplification.**		Yes		
12	**A proposal factory training and factory acceptance is required (see Offer List)**		Yes		
13	**A proposal for commissioning (verifying the installation made by customer) on site and site acceptance tests is required (no of persons/ day).**		Yes		
14	**A proposal is required for the set of recommended spare parts (included in the quotation price). The total value of the recommended set of spare parts will be a maximum of 5% of the value of the transmitters, value related to position 1 of the quotations per location from A to J, (see list of offers). The Supplier will provide a complete list with the spare parts and price for each item/each set, following that the beneficiary establishes the benchmarks and the quantities considered necessary.**		Yes		
15	**The FM transmitter must be provided with local and complete remote monitoring and control system with GUI web interface for remote operation.**		Yes		
	Minimum requirements:				
a)	**Remote**		Yes		
1	Remote control	• full transmitter parameters control	Yes		
2	Remote indication	• ON / OFF status • RF forward and reflected power • Audio input status • Deviation meter • Alarms: no carrier, no audio, active fold-back, -3dB carrier • Fault: RF chain and exciter, power amplifier stage, VSWR, temperature, interlock, main power supply.	Yes		

3	Control and monitoring via SNMP protocol via TCP/IP port		Yes		
b)	**Local**				
	Display of following parameters:	1. **Transmitter operating parameters** (frequency, output and reflected power, main power supply voltage and currents, audio input status, alarm list and history)	Yes		
		2. **Fault diagnostic**: RF chain and exciter, power amplifier stage, VSWR, temperature, interlock, main power supply	Yes		
		3. **Alarms**: no carrier, no audio, active fold-back	Yes		
		4. **Exciter operating parameters, including power level**	Yes		
		5. **Deviation meter**	Yes		
c)	**Monitoring equipment**	**Remote interface:**	Yes		
		• PC remote and monitor facilities: hardware + software firmware;	Yes		
		•All necessary devices and software to integrate the transmitter into the Radiocomunicatii monitoring system (e.g. SNMP protocol, MIB files etc.);	Yes		
		Audio and modulation monitoring:	Yes		
		• FM demodulator	Yes		
		• Modulation monitor and main parameter metering(total deviation, pilot tone deviation, RDS deviation and PS Dynamic and Radio Text display, transmission of alarms via SNMP for deviations from the	Yes		

		threshold values, alarm records)			
		• Web interface	Yes		
		• Audio monitoring from the demodulator (audio amplifier + speakers)	Yes		
		• All necessary cables for equipment monitoring	Yes		
16	In the furniture the supplier will provide as "technical documentation", for all furniture, the following items:	**Documentation for the mechanical-electrical fitting**	Yes		
		Technical manuals containing:	Yes		
		• Specifications			
		• Installation & initial turn on			
		• Operators guide			
		• Controls and indicators			
		• Overall system theory			
		• Maintenance & alignments			
		• Troubleshooting			
		• General description & radiation diagram of the transmitter			
		• Boards Diagrams			
		• Component parts list etc.			
17	**All equipment must be conform to the articles of Directive of 2014/53/UE (Directive RED) of the European Parliament and of the council of 16 April 2014 and its amendment acts on radio equipment and telecommunications terminal equipment, and to all European Community standards that apply to the respective type of equipment (including standards for toxic substances), otherwise the equipment cannot be imported under the Romanian law.** **All equipment must be "CE" and "RoHS" certified. The supplier has to provide the conformity certificates for all equipment.** **The manufacturer must be ISO 9001:2015 and ISO 14001:2015 certified (or equivalent).**	Yes		
18	**All parameters and values must be specified in the technical specifications documentation, released by manufacturer, and will be attached as reference. (Must be indicated pages for each required parameter for reference.)**	Yes		

19	**Must be quoted prices for each item in quotation lists, including spare parts kit. The parts included in the spare parts kit will be quoted individually.**	Yes		
20	**Warranty period: minimum 60 months for transmitters and auxiliary equipment.**	Yes		
21	**Each transmitter will be delivered with a factory test report, which includes at least the measurements and checks required by the FM transmitter test document (attached).**	Yes		

ANEXA XX

TECHNICAL PROPOSAL FORM
TECHNICAL COMPLIANCE FOR FM BAND PASS FILTER 5KW

Technical characteristics	Details	Mandatory	Method of fulfillment of the requirement	References
Cavities	min. 3	Yes		
Frequency range	87.5 MHz ÷ 108 MHz	Yes		
Impedance	50 ohms	Yes		
Power	5kW, according to the quotations	Yes		
Frequency	according with frequency specified in quotation list	Yes		
Selectivity	selectable +/-0.8 MHz to +/-1.6 MHz	Yes		
VSWR at Fc	<1.08	Yes		
Insertion loss	<0.3 dB , selectivity +/-1.6 MHz	Yes		
Temperature range	-10°C to +45°C	Yes		
Cooling	natural heat dissipation	Yes		
RF connector	1 5/8 EIA	Yes		

ANEXA XX

TECHNICAL PROPOSAL FORM
TECHNICAL COMPLIANCE FOR FM BAND PASS FILTER 10KW

Technical characteristics	Details	Mandatory	Method of fulfillment of the requirement	References
Cavities	min. 3	Yes		
Frequency range	87.5 MHz ÷ 108 MHz	Yes		
Impedance	50 ohms	Yes		
Power	10kW, according to the quotations	Yes		
Frequency	according with frequency specified in quotation list	Yes		
Selectivity	selectable +/-0.8 MHz to +/-1.6 MHz	Yes		
VSWR at Fc	<1.08	Yes		
Insertion loss	<0.2 dB , selectivity +/-1.6 MHz	Yes		
Temperature range	-10°C to +45°C	Yes		
Cooling	natural heat dissipation	Yes		
RF connector	1 5/8 EIA	Yes		

ANNEX XX

EVALUATION FACTORS

No	Valuation factors/sub factors	Minimum required value	Maximum score allotted	Algorithm for calculating the score of admissible bids
1	**Technical performances**	according with table bellow	60	*** According to "Table for Technical Performances (stereo operation)"**
2	**Delivery time**	Maximum 8 months	5	* Maximum score (5) for the admissible offer with the shortest delivery time. * Score for the remaining admissible tenders: **P Time $_x$ = Time $_{Min}$ /Time x * maximum score allocated**, where: **P Time $_x$**- score obtained by the admissible tender under evaluation. **Time $_{Min}$** - the shortest of the delivery times of the admissible offers. **Time x** - delivery time of the admissible offer under evaluation
3	**Waranty**	Minimum 60 months	5	* Maximum score (5) for the admissible offer with the longest warranty period. * Score for the remaining admissible tenders: **P Time $_x$ = Time x / Time $_{Max}$ * maximum score allocated**, where: **P Time $_x$**- score obtained by the admissible tender under evaluation. **Time $_{Max}$** - the longest of the warranty times of the admissible offers. **Time x** - warranty period of the admissible offer under evaluation
4	**Price Offer [Lei / Euro]**	<9.835.000 (Lei) <1.967.000 (Euro)	30	* Maximum score (30) for the admissible offer with the lowest price. * Score for the remaining admissible tenders: **P Price $_x$= (Price $_{Min}$ /Price x) * maximum score allocated**, where: **P price $_x$** - the score obtained by the admissible tender under evaluation. **Price $_{Min}$** - the lowest of the prices of admissible offers. **Price x** - the price of the admissible offer under evaluation
	TOTAL		**100**	

1	Table for Technical Performances (stereo operation)			
1.1	**Stereo amplitude response (AES/Analog inputs)**	± 0,2 dB (referred to selected pre-emphasis curve)	10	min.point (1) for minimum required value (c) max. points (10) for most performant value (b) span = 9 x is vendor value AFC=Amplitude-Frequency Characteristic Formula: **10-((AFCx-AFCb)/(AFCc-AFCb))*span**
1.2	**THD (Total Harmonics Distortion on AES/Analog inputs) 30 Hz - 15kHz, with 75 kHz frequency deviation**	< 0,05 %	10	min.point (1) for minimum required value (c) max. points (10) for best value (b); span = 9 x is vendor value THD=Total Harmonics Distorsion Formula: **10-((THDx-THDb)/(THDc-THDb))*span**
1.3	**S/N ratio, referred to fmod=400Hz, at 75 kHz frequency deviation, weighted**	≥ 80 dB	10	min.point (1) for minimum required value (c) max. points (10) for best value (b); span = 9 x is vendor value SNR=Signal/Noise Ratio Formula: **10-((SNRx-SNRb)/(SNRc-SNRb))*span**
1.4	**Crosstalk between left and right channels 100% modulation, 30 Hz to 15 kHz**	> 55 dB	10	min.point (1) for minimum required value (c) max. points (10) for best value (b); span = 9 x is vendor value XTLK=Crosstalk Formula: **10-((XTLKx-XTLKb)/(XTLKc-XTLKb))*span**
1.5	**Intermodulation distortion (L or R) 60Hz/ 7kHz, 4:1, +4dBu**	< 0.2%	10	min.point (1) for minimum required value (c) max. points (10) for best value (b); span = 9 x is vendor value ITHD=Intermodulation distortion Formula: **10-((ITHDx-ITHDb)/(ITHDc-ITHDb))*span**
1.6	**Overall efficiency**	> 70%	10	min.point (1) for minimum required value (c) max. points (10) for best value (b); span = 9 x is vendor value OE=Overall Efficiency Formula: **10-((OEx-OEb)/(OEc-OEb))*span**
Total for Technical performances			60	

ANNEX XX

FM TRANSMITTERS TESTS

And

ACCEPTANCE

- **FACTORY TESTS**
- **SITE TESTS**

I. FACTORY TEST (on dummy load)

TX s.n.....

Exciter no.....(s.n.....)

Date.....

1. PERFORMANCE

A) OPERATING FREQUENCY: Pass/ Fail

Carrier stability: ____better than +/-150Hz

Pilot tone stability: _____kHz (19 kHz ± 1 Hz)

B) AMPLITUDE - FREQUENCY RESPONSE: Pass/ Fail

VALUE: WITHOUT PRE –EMPHASIS: WITHIN ± 0.2 dB

0 dB REF LEVEL = 400 Hz @ 75 kHz DEVIATION

Freq.	Tx @ 75 kHz		
	WITHOUT PRE-EMPHASIS		WITHOUT PRE-EMPHASIS
	LEFT CHANNEL	RIGHT CHANNEL	MONO
30 Hz			
60 Hz			
125 Hz			
1 kHz			
2 kHz			
6 kHz			
10 kHz			
12 kHz			
15 kHz			

VALUE: **WITH PRE –EMPHASIS: WITHIN ± 0.2 dB**

0 dB REF LEVEL = 400 Hz @ 75 kHz DEVIATION

Freq.	Tx @ 75 kHz		
	WITH PRE- EMPHASIS		WITH PRE- EMPHASIS
	LEFT CHANNEL	RIGHT CHANNEL	MONO
30 Hz			
60 Hz			
125 Hz			
1 kHz			
2 kHz			
6 kHz			
10 kHz			
12 kHz			
15 kHz			

C) STEREO CROSS TALK: Pass/ Fail

VALUE: 30 Hz TO 15 kHz: BETTER THAN 55 dB

FREQUENCY	Tx @ 75 kHz	
	LEFT TO RIGHT	RIGHT TO LEFT
30 Hz		
60 Hz		
125 Hz		
400 Hz		
1 kHz		
2 kHz		

6 kHz		
10 kHz		
12 kHz		
15 kHz		

D) THD: Pass/ Fail

VALUE: <0.05% @ 75 kHz DEVIATION

	Tx @ 75 kHz		
FREQUENCY	STEREO		MONO
	LEFT	RIGHT	
30 Hz			
60 Hz			
125 Hz			
400 Hz			
1 kHz			
2 kHz			
6 kHz			
10 kHz			
12 kHz			
15 kHz			

VALUE: 0.05% @ 100 kHz DEVIATION

	Tx @ 100 kHz		
FREQUENCY	STEREO		MONO
	LEFT	RIGHT	
30 Hz			
60 Hz			
125 Hz			
400 Hz			
1 kHz			
2 kHz			
6 kHz			
10 kHz			
12 kHz			
15 kHz			

E) INTERMODULATION DISTORSION: Pass/ Fail

VALUE: better than 0.2% USING 60Hz/7 kHz TONES, 4:1, +4dBu

STEREO		MONO
LEFT	RIGHT	
%	%	%

F) SIGNAL TO NOISE RATIO: Pass/ Fail

VALUE: BETTER THAN 80 dB (weighted)

BETTER THAN 76 dB (unweighted)

0 dB REF LEVEL = 400 Hz @ 75 kHz DEVIATION RMS DETECTOR

	STEREO		MONO
	LEFT	RIGHT	
WEIGHTED			
UNWEIGHTED			

G) AM NOISE: Pass/ Fail

VALUE: ASYNCHRONOUS: BETTER THAN 55 dB/ Pilot OFF

SYNCHRONOUS: BETTER THAN 50 dB/ Pilot ON

0 dB REF LEVEL = 400 Hz @ 75 kHz DEVIATION

ASYNCHRONOUS	**dB**
SYNCHRONOUS	**dB**

H) SPURIOUS EMISSIONS, INCLUDING HARMONICS: Pass/ Fail

a. 9 kHz-1 GHz

VALUE: max -16 dBm (25 microW) for tx 5 kW
better than -85 dBc for tx 10 kW

b. 108 MHz-137 MHz

VALUE: max -16 dBm (25 microW)

HARMONIC	LEVEL
2nd	
3rd	
4th	
5th	
6th	
7th	
8th	
9th	
10th	

SPURIOUS (frequency)	LEVEL

I) OVERALL EFFICIENCY: Pass/ Fail

VALUE: > 70%

Overall efficiency.....

2. METERING

A) FWD AND REFLECTED POWER METERING

FWD PWR		**kW**
REFL PWR **VSWR**		**W**

TOTAL OPERATING P.A. CURRENT .....AMPS

P.A. VOLTAGE .....VOLTS

Note: One power amplifier at a time will be turned off gradually and the output power will be noted, until the transmitter is completely out of service.

B) DIAGNOSTIC METERING

-to be detailed by supplier according with transmitter architecture for:

1) **CURRENTS**
2) **VOLTAGES**
3) **TEMPERATURES**

C) DRIVE

	EXCITER
FWD POWER	WATTS
REF PWR	WATTS
PA	AMPS
PA	VOLTS

D) POWER CONSUMPTION

-to be detailed by supplier according with transmitter architecture

Line 1 _____Volt	Line 1 _____Amps	Line 1 _____Watts
Line 2 _____Volt	Line 2 _____Amps	Line 2 _____Watts
Line 3 _____Volt	Line 3 _____Amps	Line 3 _____Watts

TOTAL POWER _____Watts

3. ELECTRICAL AND MECHANICAL CHECKS

1. **Check for full compliance with technical specification requested.**
2. **Check of the main parameters stability for the maximum variation of the input voltage.**
3. **Check of the main parameters in case of switch-off of one, or more power amplifiers.**
4. **Check the automatic start on a short interruption of the main power (3 interruptions up to 1 second (within 5 seconds)).**
5. **Check of the protections.**
6. **Check of the main parameters at different operating frequencies.**
7. **Check of the monitoring equipment.**
8. **Check for operating RDS System.**
9. **General mechanical checks.**
10. **Technical Documentation Provided (specifications, installation and initial turn on, operator's guide, controls and indicators, overall system theory, maintenance and alignment, troubleshooting, board diagrams, parts list, other).**
11. **Factory Test Report.**

4. HEAT RUN TEST

The transmitter will be modulated during 24 hours with audio program on dummy load.

Time		Incident Observed

After the heat run test check for excessive temperature rise.

Customer signature **Supplier signature**

ACCEPTANCE CERTIFICATE

The above listed tests have been successfully completed on the following transmitter and the results are compliant with the specifications.

Transmitter Serial Number _____

Frequency _____

Date of Manufacture _____

CUSTOMER REPRESENTATIVE

Name _____

Title _____

Date _____

SUPPLIER REPRESENTATIVE

Name _____

Title _____

Date _____

Comments:

II. SITE TESTS (on dummy load)

TX s.n.....

Exciter no.....(s.n.....)

Date.....

All tests listed under factory tests procedure to be repeated, **except that the twenty-four hours endurance test.**

All tests will also be repeated in the antenna.

Note: The transmitter will be coupled into the antenna via an existing patch panel. Switching between the antenna and the dummy load will be done from the patch panel.

The patch panel input impedance is 50 ohms.

Observation: IT IS MANDATORY AS THE TENDER TO CONTAINES A DETAILED "ACCEPTANCE TESTS PROTOCOL" INCLUDING THE INDIVIDUAL PROCEDURE AND TEST EQUIPMENTS USED TO MEASURE AND TESTING EACH PARAMETER AND FUNCTIONALITY OF THE TRANSMITTERS.

TESTING OF ACCESSORIES

The associated equipment shall be tested and inspected as per mutually acceptable Acceptance Test Protocols at the manufacturer's works as well as at the site. The tenderer shall enclose the ATP for each equipment type along with the tender.

VISUAL INSPECTION

Transmitter Rack _____

Transmitter Components _____

RF Connection _____

RF Switch Panel _____

Modulation Input Equipment _____

Test Equipment	**Manufacturer/Model**	**S / N**
1.		
2.		
3.		
4.		

ANEXA XX

BAND PASS FILTER TEST

Site Test 5kW

Power TX 5kW, according to the transmitter

Tuned Frequency.....
VALUE: according with transmitter operating frequency

The tests include:

Selectivity: .....

VALUE: for +/-0.8 MHz to +/-1.6 MHz: 20 dB

VSWR la Fc: .....

VALUE: < 1.08

Insertion loss: .....

VALUE: < 0.3 dB la Fc +/- 1.6MHz

Check of the mechanical execution;

ON SITE REPORT WILL BE PROVIDED.

ANEXA XX

BAND PASS FILTER TEST

Site Test 10kW

Power TX 10kW, according to the transmitter

Tuned Frequency.....
VALUE: according with transmitter operating frequency

The tests include:

Selectivity: .....

VALUE: for +/-0.8 MHz to +/-1.6 MHz: 20 dB

VSWR la Fc: .....

VALUE: < 1.08

Insertion loss: .....

VALUE: < 0.2 dB la Fc +/- 1.6MHz

Check of the mechanical execution;

ON SITE REPORT WILL BE PROVIDED.