JOINT STOCK COMPANY GASCOM

REGULATIONS

ON INTERACTIONS WITH USERS OF YAMAL-200 (90 E) SATELLITE CAPACITY

KOROLIOV, MOSCOW REGION

CONTENTS

1. INTRODUCTION

1.1. Satellite Yamal-200 was launched into orbit on November 24, 2003. The Satellite is placed and operated in orbital position 90E.

1.2. The Satellite is operated by GASCOM.

1.3. Satellite Yamal-200, 90E Capacity can be used for a wide range of telecommunications services:

- Backbone trunking;
- Internet access;
- Package TV and radio broadcasting (MCPC mode);
- TV and radio broadcasting (SCPC mode);
- VSAT networks services, including Ku-band with a simplified method of its registration (Order of Frequency Commission 32/4 dated 24. 02. 04r.).

1.4. These Regulations contain Yamal-200, 90E Satellite information necessary for Satellite Capacity users and determine the order of interaction between GASCOM and the users, including the following:

- Basic Satellite parameters;
- Payload features;
- Procedures of admitting CUSTOMER's Earth Stations to work with Yamal-200, 90E Satellite;
- The order of technical assistance to CUSTOMER.

1.5. GASCOM provides Yamal-200, 90E Satellite Capacity for operation:

- Month to month and long term basis for full time services (the Capacity is available 7 days a week, 24 hours a day);
- On a temporary basis (one short-time use of the Capacity, multiple regular use of the Capacity).

Here in use may be:

- Full Transponder Capacity;
- Partial Transponder Capacity.

2. SATELLITE YAMAL-200, 90E CAPACITY PERFORMANCE

2.1 General Information about Yamal-200, 90E Satellite

2.1.1. Yamal-200, 90E (90E) Satellite was manufactured on the basis of units and systems with flight qualification with Payload components of the world leading producers such as Alcatel Espace, Alenia Spazio and NEC.

2.1.2. Basic Satellite parameters:

- Satellite mass - 1330 kg.
- Payload power - min 2,0 kW.
- Accuracy of Satellite station keeping in latitude and longitude ± 0,10 deg;
- Accuracy of Satellite axes orientation ± 0,10 deg;
- Lifetime - 12 years.

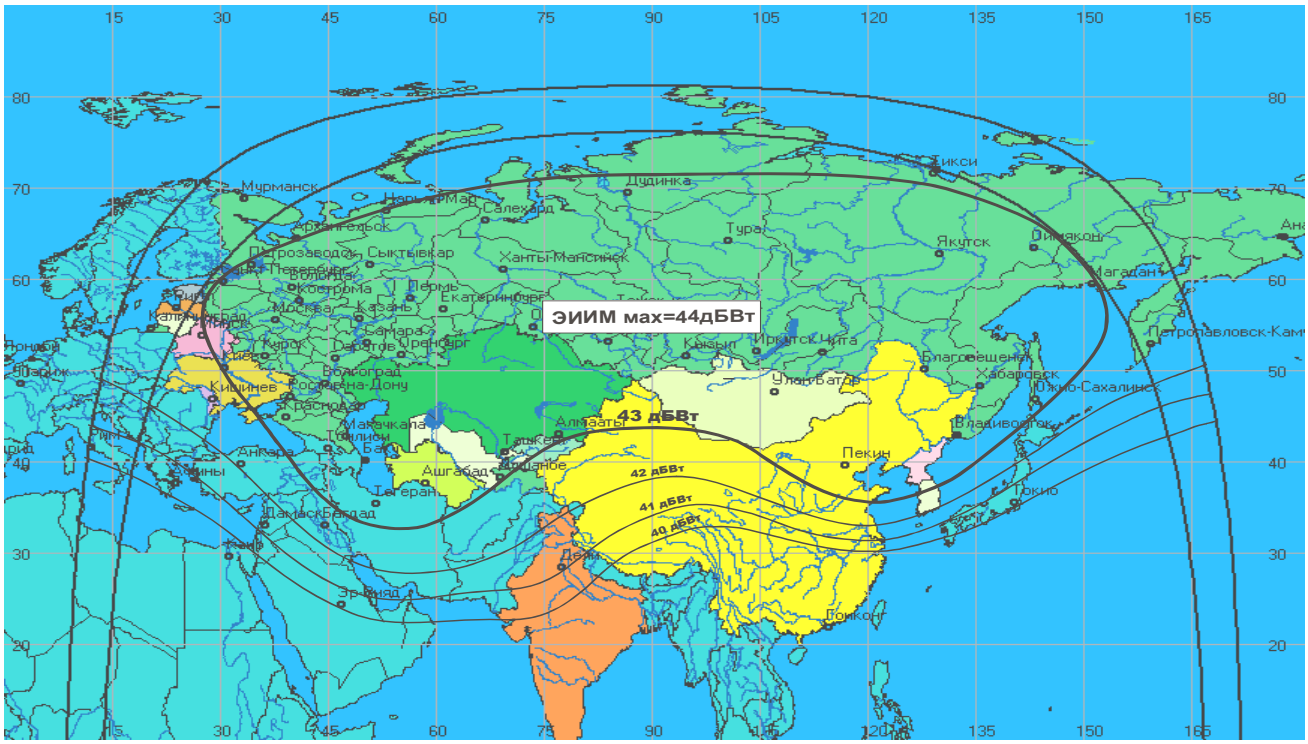
2.2. Payload composition

- 9 C-band active transponders of 72 MHz operating bandwidth and with 55 W saturated output power of each transponder linearized transmitters;
- Receive and transmit antennas, C-band, which form shaped footprint;
- 6 Ku-band active transponders of 72 MHz operating bandwidth and with 120 W saturated output power of each transponder linearized transmitters;
- Receive and transmit antennas, Ku-band, which form shaped footprint;
- Radio beacon, Ku-band.

2.3. Payload Features, C-band

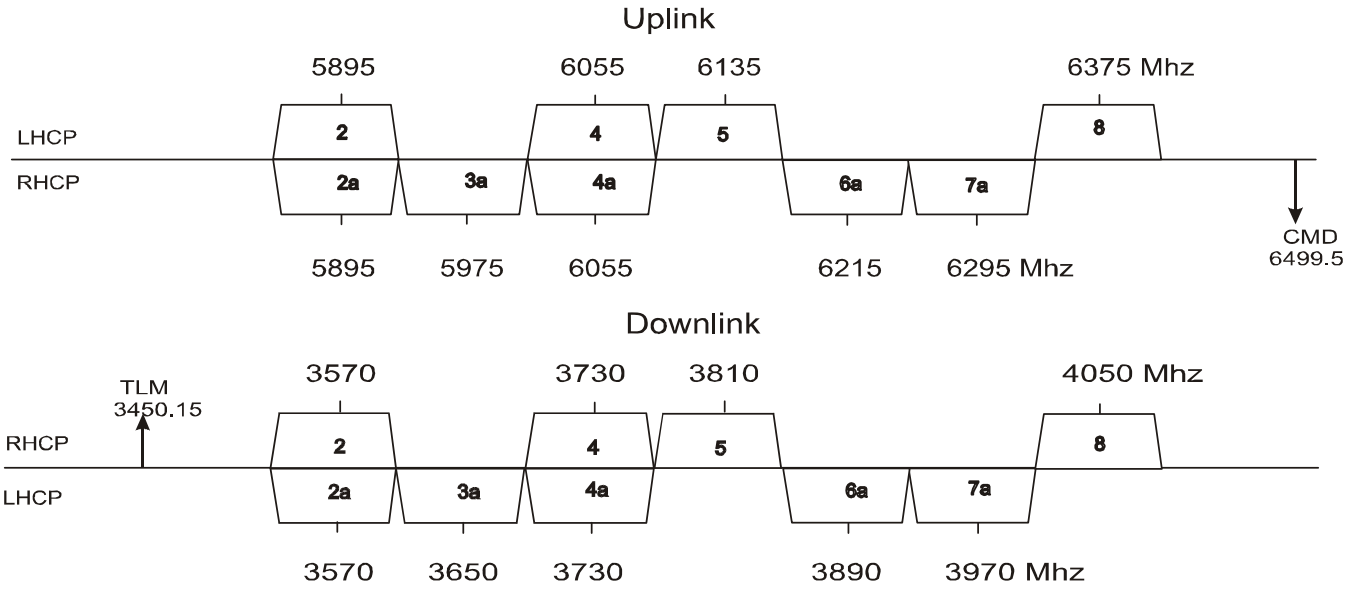
Coverage Zone for Receive

Coverage Zone for Transmit



Frequency and Polarization Plan

№ transponder	Transponder central frequency, MHz		Polarization	
	Receive	Transmit	Receive	Transmit
2	5895	3570	Left circular	Right circular
4	6055	3730	Left circular	Right circular
5	6135	3810	Left circular	Right circular
8	6375	4050	Left circular	Right circular
2a	5895	3570	Right circular	Left circular
3a	5975	3650	Right circular	Left circular
4a	6055	3730	Right circular	Left circular
6a	6215	3890	Right circular	Left circular
7a	6295	3970	Right circular	Left circular



Equivalent Isotropic Radiated Power (EIRP)

EIRP of Transponders at saturation with one carrier loaded in a Transponder central frequency is min 43 dBW.

Gain to Noise temperature ratio (G/T)

G/T in maximum of onboard shaped antenna pattern at any Transponder gain is min + 1,0 dB/K.

Saturation Flux Density

Minimum level of input signals flux density that provides saturation of Transponder power amplifiers in maximum of onboard shaped antenna pattern does not exceed minus 97 dBW/m2.

Gain

Each Transponder can be switched into either fixed gain mode or automatic gain control mode individually and independently from the Earth. Fixed gain mode is switched as standard.

a) Fixed gain mode

The fixed gain mode provides the gain regulation of each Transponder individually and independently by the command from the Earth with the step 0,5 ± 0,3 dB within the range not less than 20 dB below the gain level corresponding to the minimum flux density of saturation input power as defined in the preceding paragraph.

b) Automatic Gain Control Mode (AGC)

AGC circuit provides automatic setting of Transponder gain necessary for the maintenance of the output power level set upon the command from the Earth when the power flux density of the input signal changes.

There is an opportunity of individual and independent setting of the required Transponder output power level by the command from the Earth with the step 0,5 ± 0,3 dB within the range from saturation power down to the level below the saturation level by 6 dB.

The set level of Transponder output power is maintained with inaccuracy not more than ± 0,5 dB with min 20 dB at dynamic range of input signal change.

Polarization

Cross-polarization decoupling, provided by the onboard transmit/receive antenna within the coverage zone including the zone edge is min 27 dB.

Frequency-Response Characteristic (FRC)

FRC irregularity of each Transponder within the limits of the set deviation from the Transponder central frequency does not exceed the figures listed in the following table:

Deviation from the Transponder central frequency, MHz	±25	±36
FRC irregularity, dB (max)	1,0	2,5

Group Delay Flatness

Group-delay flatness of the full path of each Transponder within the set deviation from the Transponder central frequency does not exceed the figures listed in the following table:

Deviation from the Transponder central frequency, MHz	±12	±20	±27	±36
Group-delay flatness, ns, (max)	8	15	20	75

Amplitude Linearity

- The ratio of the carrier level to the third order intermodulation products when measuring in the mode with two nonmodulated carriers with equal input power generating the total output power 3 dB lower than the saturation power, makes up min 26 dB.
- The ratio of intermodulation products to the signal level when loading the Transponder with noise signals (NPR) and the output power level 3 dB lower than the saturation power, makes up max minus 16 dB.

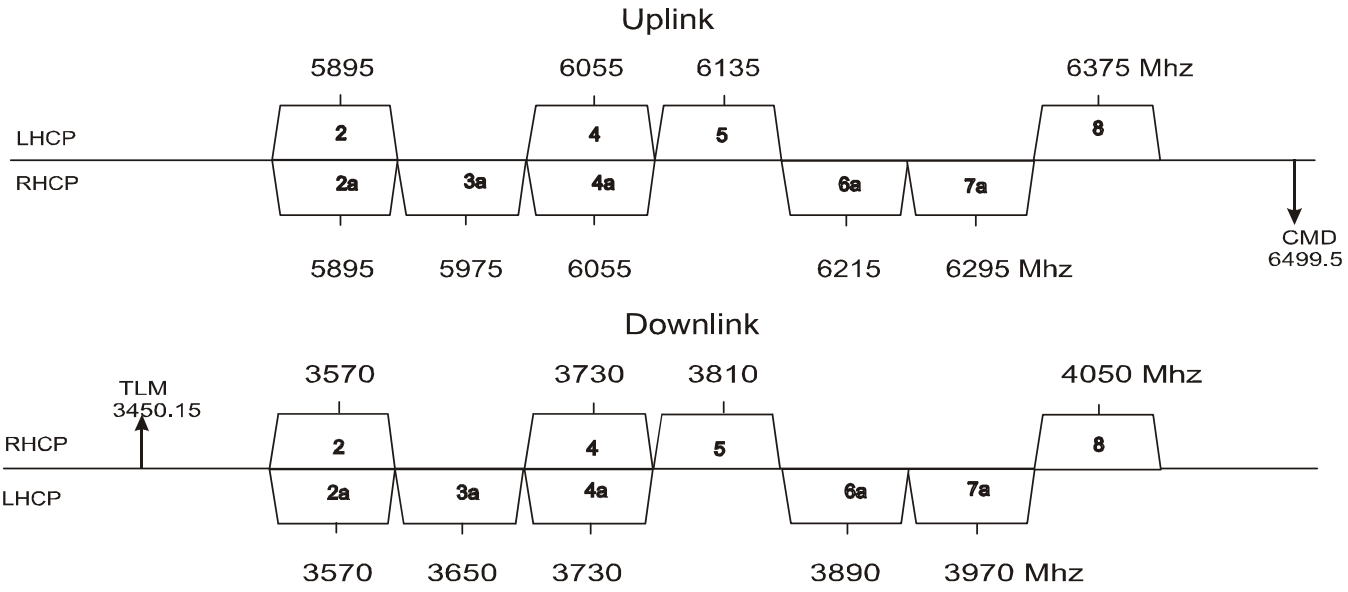
2.4. Payload Features, Ku-band

Coverage Zone for Receive

Coverage Zone for Transmit

Frequency and Polarization Plan

№ transponder	Transponder central frequency, MHz		Bandwidth, MHz	Polarization	
	Receive	Transmit		Receive	Transmit
1	14040	10990	72	Horizontal	Vertical
2	14125	11075	72	Horizontal	Vertical
3	14210	11160	72	Horizontal	Vertical
4	14300	11500	72	Horizontal	Vertical
5	14380	11580	72	Horizontal	Vertical
6	14460	11660	72	Horizontal	Vertical
Radio-beacon M1	-	11450,5	-	-	Vertical



Equivalent Isotropic Radiated Power (EIRP)

EIRP of Transponders at saturation with one carrier loaded in a Transponder central frequency in maximum of onboard shaped antenna pattern is min 48 dBW.

EIRP of radio beacon, Ku-band within and on the edge of coverage zone is min 24 dBW.

Gain to Noise temperature ratio (G/T)

G/T in maximum of onboard shaped antenna pattern at any Transponder gain is min + 3,0 dB/K.

Saturation Flux Density

Minimum level of input signals flux density that provides saturation of Transponder power amplifiers in maximum of onboard shaped antenna pattern does not exceed minus 97 dBW/m2.

Gain

Each Transponder can be switched into either fixed gain mode or automatic gain control mode individually and independently from the Earth. Fixed gain mode is switched as standard.

a) Fixed gain mode

The fixed gain mode provides the gain regulation of each Transponder individually and independently by the command from the Earth with the step 0,5 ± 0,3 dB within the range not less than 20 dB below the gain level corresponding to the minimum flux density of saturation input power as defined in the preceding paragraph.

b) Automatic Gain Control Mode (AGC)

AGC circuit provides automatic setting of Transponder gain necessary for the maintenance of the output power level set upon the command from the Earth when the power flux density of the input signal changes.

There is an opportunity of individual and independent setting of the required Transponder output power level by the command from the Earth with the step 0,5 ± 0,3 dB within the range from saturation power down to the level below the saturation level by 6 dB.

The set level of Transponder output power is maintained with inaccuracy not more than ± 0,5 dB with min 20 dB at dynamic range of input signal change.

Polarization

Cross-polarization decoupling provided by the onboard transmit/receive antenna within the coverage zone including the zone edge is min 30 dB.

Frequency-Response Characteristic (FRC)

FRC irregularity of each Transponder within the limits of the set deviation from the Transponder central frequency does not exceed the figures listed in the following table:

Deviation from the Transponder central frequency, MHz	±25	±36
FRC irregularity, dB (max)	1,0	2,0

Group Delay Flatness

Group-delay flatness of the full path of each Transponder within the set deviation from the Transponder central frequency does not exceed the figures listed in the following table:

Deviation from the Transponder central frequency, MHz	±20	±27	±36
Group-delay flatness, ns, (max)	10	20	70

Amplitude Linearity

- The ratio of the carrier level to the third order intermodulation products when measuring in the mode with two nonmodulated carriers with equal input power generating the total output power 3 dB lower than the saturation power, makes up min 25 dB.
- The ratio of intermodulation products to the signal level when loading the Transponder with noise signals (NPR) and the output power level 3 dB lower than the saturation power, makes up max minus 16 dB.

3. ORDER OF INTERACTION WITH CUSTOMER

3.1. General Terms

3.1.1. Yamal-200, 90E Satellite Capacity is provided on the base of the Contract (Agreement) concluded between GASCOM (as a CONTRACTOR) and a CUSTOMER.

3.1.2. Interaction with CUSTOMER is carried out in the following directions:

- Analysis of information from the CUSTOMER;
- Admission of CUSTOMER's Earth Stations to work with Yamal-200, 90E Satellite;
- Technical assistance of contracted CUSTOMER and control of the provided Satellite Capacity use.

3.2. Information Provided by CUSTOMER and its Analysis

3.2.1. Customer provides the information about Earth Stations performances (Appendix 1) and communications channels (Appendix 5). GASCOM conducts analysis of energetic parameters and adjusts them with the used satellite capacity. The calculation method of the frequency and power capacity is described in Appendix 6.

3.2.2. The CUSTOMER provides the copies of registration documents and available licenses. GASCOM being an operator of this particular satellite network conducts the expertise of the documents for their accordance with international or Russian regulation documents.

3.3. Admission to Yamal-200, 90E Satellite Capacity

3.3.1. The CUSTOMER is obliged to get the permission for Earth Stations to have access to Yamal-200, 90E Capacity. For this purpose the CUSTOMER shall provide the specifications of Earth Stations intended for Yamal-200, 90E Capacity and pass the admission procedure.

3.3.2. Admission of the Earth Stations to the Satellite Capacity implies the following:

- Test of Earth Stations and signals parameters;
- Registration of Earth Stations test results and preparation of the Earth Station Type Certificate of Compliance of CUSTOMER's typical Earth Stations and Permission for Access to Yamal-200, 90E SatelliteCapacity;
- After signing the Contract with the CUSTOMER the admission of the CUSTOMER's Earth Stations to Yamal-200, 90E Satellite Capacity takes place.

3.3.3. GASCOM Control Station tests admitting the CUSTOMER's Earth Stations to Yamal-200, 90E Satellite Capacity. The CUSTOMER's Earth Stations shall have the service channel with the operator of GASCOM Control Station during the whole period of the work.

3.4. Technical Assistance to CUSTOMER and Control of Satellite Capacity in Use

3.4.1. Technical assistance and control of Satellite Capacity in use are carried out by GASCOM Control Station.

3.4.2. Technical assistance consists of solving the operational issues arising during the use of the provided Capacity (technical consultations, detection, localization and elimination of non-nominal situations, etc).

3.4.3. Interaction with CUSTOMER implies the following main activity:

- Control (monitoring) of the CUSTOMER operation of assigned Satellite Capacity;
- Measurement of Transponder performances in particular programs;
- Effective interaction with CUSTOMER on Satellite Capacity operation issues.

4. QUALITY CONTROL OF THE PROVIDED CAPACITY

4.1. General Terms

4.1.1. Quality control of the provided Capacity is exercised in two main directions:

- Tests of CUSTOMER's Earth Stations when admitting to Yamal-200, 90E Satellite Capacity;
- Quality control of Yamal-200, 90E Satellite Capacity.

4.1.2. Earth Stations tests are intended for confirming the compliance of the CUSTOMER's Earth Stations to GASCOM stated characteristics and requirements to ensure the correct use of the provided Capacity by the CUSTOMER and keep other Yamal-200, 90E Satellite users safe from interferences and illegal actions.

4.1.3. Quality control of Yamal-200, 90E Satellite Capacity is intended for confirming the compliance of the used Capacity with the characteristics stated in the Contract and correctness of the Capacity use by the CUSTOMER.

4.2. Admission of CUSTOMER's Earth Stations to Yamal-200, 90E Satellite Capacity

4.2.1. Tests of the CUSTOMER's Earth Stations are conducted in accordance with the Tests program provided to the CUSTOMER by the Control Station. The conditions for the CUSTOMER's Earth Stations admission to Yamal-200, 90E Capacity stipulate compliance with the technical requirements stated in the tests program and confirmed during the testing.

4.2.2. The CUSTOMER's Earth Stations, which has not passed the admission procedure, is banned to transmit the signal towards geostationary orbit without the proper permission from the operator of GASCOM Control Station.

4.2.3. If the main equipment of the CUSTOMER's Earth Stations (antennas, power amplifiers, LNA, modems etc.), which already has been admitted to Yamal-200, 90E Capacity, is replaced or upgraded, this Earth Station is obliged to repeat the admission procedure.

4.2.4. Stages of testing the CUSTOMER's Earth Stations:

- Autonomous tests of Earth Stations high-frequency equipment (preparation of the Earth Stations for testing);
- Test of the antenna, high-frequency Earth Stations parameters and signals technical performance using GASCOM Control Station and Yamal-200, 90E Satellite Capacity.

4.2.5. The CUSTOMER independently exercises autonomous tests of Earth Stations high-frequency equipment (preparation of the Earth Stations for testing).

These tests aim at the overall examination of Earth Stations high-frequency equipment for its compliance with the technical characteristics stated at the stage of the Contract drawing up. Separate characteristics are used according to the Earth Stations set forms.

Based on the results of tests the CUSTOMER should sent to GASCOM the following:

- Application for access of earth station to satellite capacity (Appendix 1);
- Reports of autonomous tests or data of ES applications.

4.2.6. Based on the application the CUSTOMER receives the program of antenna testing, the station high-frequency parameters and signals technical performance, and the permission to begin tests using the Satellite Capacity (Appendix 4).

The permission contains the agreed date and time of tests, necessary information about the provided Transponder, and reference to the points of the Test Program.

Further actions during antenna testing, the Earth Stations high-frequency parameters and signals technical performance using the Satellite Capacity are promptly coordinated by a duty operator of GASCOM Control Station through the service channel with the CUSTOMER's Earth Station. The operator of GASCOM Control Station permits the CUSTOMER's Earth Station to switch the signals on and off, adjust the signals performance and, if necessary, prolong the test period.

In case of service channel malfunction, the power of the CUSTOMER's Earth Station transmitter shall be shut off, unless otherwise agreed beforehand.

During the first switching on of the transmitters power, the staff of the CUSTOMER's Earth Station has to meet the following requirements:

- To control the signal frequency and power and the absence of spurious radiations at the transmitter output;
- To make sure that the antenna system is precisely pointed to the Satellite;
- To make sure that there are no signals at the Transponder output in the bandwidth assigned for measuring;
- To set the signal frequency and power required for measuring upon the command of the operator of GASCOM Control Station;
- To shut off the transmitter power of the Earth Station after completing the measurements.

If the transmitter power is fed into the antenna, it is banned to shift the antenna in the geostationary orbit direction.

After completing the overall testing of the Earth Station, the CUSTOMER and GASCOM draw up separate reports containing the test results. The CUSTOMER's reports are forwarded to GASCOM.

If the parameters differ from Regulations' technical requirements, the CUSTOMER either prepares his Earth Station for repeated tests or applies to GASCOM for specification of technical conditions.

4.2.7. Upon successful completion of test the CUSTOMER receives the Earth Station Type Certificate of Compliance of typical Earth Station with the requirements to Yamal-200, 90E Satellite operation (Appendix 6)

4.2.8. After signing the Contract with the CUSTOMER, the latter obtains the Permission for Access to Yamal-200, 90E Satellite Capacity (Appendix 4).

4.2.9. As agreed with GASCOM there is a possibility of pre-term testing of carriers through the CUSTOMER's Earth Stations.

4.3. Control of the Satellite Capacity in Use

4.3.1. Control of the provided Capacity use consists of operational and detailed (when necessary) Capacity monitoring by means of GASCOM Control Station and measuring Transponder performances.

4.3.2. Transponder monitoring is divided into operational and detailed. During operational monitoring the partial Transponder EIRP taken by CUSTOMER and the assigned bandwidth controlled automatically and round the clock for the compliance with the load parameters determined in the Contract.

4.3.3. Detailed monitoring can be performed if necessary both in automated and manual operational modes. During its performance signals characteristics are measured and interferences in CUSTOMER's bandwidth are revealed. Basing on the detailed monitoring data and the CUSTOMER's information, GASCOM Control Station determines the source of interference, its characteristics, degree of its disturbing influence, and takes necessary measures aimed at eliminating the conflict between Earth Stations of different customers. CUSTOMERS are to assist the Control Station operator in searching and removing the source of interference in Transponder bandwidth.

4.3.4. Measurement of Transponder performances under particular programs is to be made upon GASCOM's order, agreed with the CUSTOMER to estimate the consequences of effectively eliminated non-nominal situations on the Satellite or upon the CUSTOMER's request. GASCOM Control Station conducts these measurements when necessary either to detect the reasons of communication interruptions during unstable operation of the Satellite equipment or to measure the current Transponder performances.

4.3.5. Maintenance works on the Satellite are conducted when necessary in order to control the technical condition of Transponders, and are exercised according to the schedule, submitted by the operator of GASCOM Control Station to the CUSTOMER one month prior the works.

4.3.6. The CUSTOMER is obliged to arrange a permanent official communication link with the operator of GASCOM Control Station for prompt interaction when preparing, loading and operating the provided Satellite Capacity.

4.3.7. The CUSTOMER is obliged to inform immediately the operator of GASCOM Control Station about the detected mass communication failure through links of his network, and after failure analysis about the cause of this failure (group equipment failure of CUSTOMER's network or assumed Transponder failure).

4.3.8. The CUSTOMER is obliged to submit the information about frequency plans of networks operating within the used bandwidths.

4.3.9. The CUSTOMER may conduct any mode changes, including switching the carriers on and off, only upon the agreement with the operator of GASCOM Control Station.

4.3.10. The operator of GASCOM Control Station informs the CUSTOMER about CUSTOMER's breach of requirements to Transponder Capacity operation, stipulated by the Contract which are revealed by operational monitoring.

4.3.11. The operator of GASCOM Control Station and the CUSTOMER exchange the information about the revealed interferences and coordinate their actions for detecting the source of interference in the transponder bandwidth. The operator of GASCOM Control Station provides available free Capacity if technical conditions allow, till the interferences are eliminated.

4.4.12. As extra services the CUSTOMER may be provided with regular reports on the current parameters of carriers in his network as well as measurements to detect the reasons of improper performance of separate links within the CUSTOMER's network(s).

Appendix 1

To Regulations

(Prototype)

REQUEST #_____
FOR ACCESS TO YAMAL-200, 90E SATELLITE CAPACITY FOR EARTH STATION TESTING

CUSTOMER IDENTITY:

2. EARTH STATIONS (ES) SPECIFICATION

Parameters	*ES # 1*	*ES # N*
Earth Station Name (Code)*		
Earth Station Type*		
Location of Earth Station*		
Longitude, deg.*		
Latitude, deg.*		
Diameter of Antenna dish, m		
Antenna Type (single-reflector, double-reflector) availability of auto-tracking device		
Antenna Manufacturer, Code (Model)		
Transmission:		
• Transmit Gain of Antenna, dB		
• Attenuation of Antenna transmit waveguide, dB		
• Transmitter Type (Kly, TWT, SSPA), Manufacturer, Code (Model)		
• Max Power of Transmitter, W		
• Max EIRP, dBW		
• Tx Cross-Polarization Isolation, dB		
Reception:		
• Receive Gain of Antenna, dB		
• Attenuation of Antenna receive waveguide, dB		
• LNA Type, Manufacturer, Model (Code)		
• LNA Noise Temperature, K		
• G/T, dB/K		
• Rx Cross-Polarization Isolation, dB		
Modem Equipment, Manufacturer, Model (Code)		

3. CUSTOMER REQUEST ACCEPTANCE

On behalf of
Date:……
Signature:……
Name:……..
Title:……..

Note:

1. All blanks should be filled for only the first ES of each type. For each following typical ES you should fill in the blanks marked with "*"
2. ES is considered to be typical if
   - CUSTOMER confirms that configuration and parameters of ES equipment entirely match the ones specified in documentation for this ES type;
   - ES Installation and commissioning are done in accordance with the same design documentation;
   - ES will be applied within the frequency range of the same Transponder

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Appendix 2
To Regulations

TEST PROGRAM OF EARTH STATIONS

#	Measured Parameter	Note
1	Receive Equipment Quality	Compulsory to perform
2	Cross-Polarization Isolation for Transmission	
3	Maximum ES EIRP	May be excluded at admission of typical Earth Station
4	Level of ES Spurious Signals	
5	Receive and Transmit Antenna Pattern	
6	ES G/T	
7	EIRP Stability	
8	HF Carrier Frequency Stability	
9	ES Antenna Gain	

Program of testing is performed by commands of Gascom Control Station

Appendix 3
To Regulations

(Prototype)

EARTH STATION TYPE COMPLIANCE CERTIFICATE #_____
Joint Stock Company GASCOM confirms that as the result of the tests the Earth Station Type (*Type*) with parameters as Request # _____ is in compliance with GASCOM requirements and may be permitted to operate via the **Transponder #_____ of Yamal-200, 90E Satellite (90E)** after signing the Contract on Providing Yamal-200, 90E Satellite Capacity Services.
Date:…… Signature:…… Name:…….. Title:……..
Copy of Request and Test Report is attached

Appendix 4
To Regulations

(Prototype)

PERMISSION FOR ACCESS TO YAMAL-200, 90E SATELLITE CAPACITY
Joint Stock Company GASCOM permit to operate the Earth Station (*Location*, *Code*, *Type / # of Type Compliance Certificate*) via the **Transponder #_____ of Yamal-200, 90E Satellite (90E)** according to the Contract on Providing Yamal-200, 90E Satellite Capacity Services #_____dated_____.
Date:…… Signature:…… Name:…….. Title:……..

Appendix 5
To Regulations

LINKS PERFORMANCE

(Prototype)

Parameters	Parameter values		
	Link 1	Link 2	Link N
Transmit ES (Type, Code) (Location 1)			
Receive ES (Type, Code) (Location 2)			
Symbol Rate, kSymbol/sec			
Modulation Type			
Coding Type			
FEC			
Allocated Bandwidth of Links (including protection intervals), kHz (see Appendix 6)			
Ratio Eb/No, dB			
Additional Information (Special Requirements)			

Appendix 6
To Regulations

CALCULATION OF ALLOCATED CAPACITY

1. Calculation of Allocated Bandwidth

1.1. Allocated bandwidth is a CUSTOMER's links aggregate bandwidth together with protection intervals which is included into the Contract on providing Satellite Capacity. The total number of CUSTOMER's separate links bandwidths together with protection intervals cannot exceed the bandwidth stipulated in the Contract.

1.2. Allocated bandwidth is controlled by GASCOM Control Station located in Medvezhyi Ozera (Bear Lakes), Moscow region.

1.3. When using modem equipment corresponding to IESS-308, the allocated bandwidth of separate links together with protection intervals is calculated according to the following formula:

$$\Delta F_a = \alpha \cdot R_s$$

where: ΔF_a – allocated bandwidth, kHz;

Rs - symbol rate, ksps;

α - ratio, calculated in the following way:

- upon the recommendation of the modem equipment manufacturer;
- equal to 1.4 if there is no manufacturer recommendation and if the channel rate is not less than 32 kbps inclusively;
- equal to 1.5 when the channel rate is not less than 32 kbps.

1.4. When the CUSTOMER plans and determines the amount of the used Capacity, the step of carriers frequencies and separate links bandwidth is taken equal to 2.5 kHz. If the equipment provides the shift step more than 2,5 kHz, e.g. 25 kHz, the carrier frequency is allocated with the actual order of repetition corresponding to the type of the equipment in use.

2. Calculation of Allocated Power

2.1. When allocating the Full Transponder Capacity, the CUSTOMER possesses the whole frequency and power capacity of this Transponder and he himself determines the mode of its operation by agreement with GASCOM.

2.2. When allocating a Partial Transponder Capacity or when several (more than two) users operate the Transponder simultaneously (each in his frequency), the Transponder transmitter is switched into the linear mode and its overall power load (OBO) is maintained at the level not more than minus 3 dB ÷ minus 4,5 dB of saturation power.

The particular OBO value for every Transponder (OBOtr) is determined by the type of carriers (signals) to be arranged therein.

For the flexible Transponders with different modulation signals the typical OBOtr = minus 3 dB.

For dedicated Transponders with 8PSK and 16QAM the typical OBOtr = minus 4,5 dB.

2.3. The use of the power capacity is controlled by GASCOM Control Station.

EIRP of the Transponder at saturation in the direction of the Control Station (EIRPtr.sat.cs) equals to 42,5 dBW.

Linear Transponder EIRP in the direction of the Control Station amounts to EIRPtr.lin.cs = (EIRPtr.sat.cs - OBOtr) , dBW.

3. Equivalent Allocated Bandwidth

3.1. Payment for the Partial Transponder Capacity use is performed according to the volume equal to the allocated bandwidth (Fea).

3.2. This bandwidth is proportional to the frequency (∆Foccupied / Ftr) or the power (EIRPalloc_to_cs – EIRPtr.lin.cs) part of the allocated Capacity of the Full Transponder Capacity depending on which part is larger.

3.3. The amount of the allocated EIRPalloc_to_cs is calculated on the basis of the CUSTOMER's ES performance and Links performance.

3.4. If the frequency portion of the allocated Capacity is more or equal to that of the power, the amount of EIRP allocated to the CUSTOMER is EIRPalloc_to_cs = EIRPtr.lin.cs+10log(∆Foccupied / Ftr).

3.5. EIRP allocated according to the Contract and controlled by GASCOM Control Station is stated in the Order Form and Specification (Appendix 2 to the Contract).