ANNEX 1

Technical terms and conditions to the information interchange links between TSNC and XSM

1. Interface for communication between TSNC and XSM

All the abbreviations used in the present text (IMSI, IMEI, LAC, CL, HLR, VLR etc.) meet the ETSI-GSM standard. For other mobile radio system standards another notions should be used with abbreviations, accepted corresponding standards.

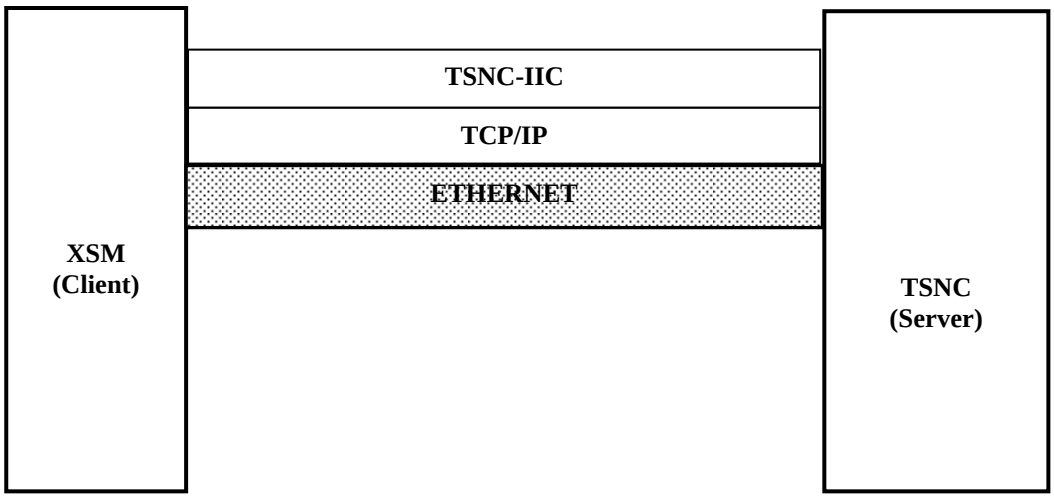
1.1. The communication between TSNC and XSM should be executed via connection lines(up to 4) E1 G703 for translation of speech, transmitted in voice paths of calls and via Ethernet link, used for transmission of managing information and for information about calls.

1.2.1. Digital transmission system should be formed by primary group PCM-30 with the rate 2048 Mbit/s according to ITU-T Recom.G.732 with time slots 64 kbit/s.

1.2.2. Time slots (TS) 1...15,17…29 should be used for information's translation, transmitted in voice paths from calling subscriber to XSM. Time slot 16, 30, 31 not used.

2. The information interchange protocol in the data transmission channel

2.1. Data interchange protocol between TSNC and XSM is TCP\IP.



3. Format of control commands and messages, transmitted via the data transmission channels between TSNC and XSM

3.1. Format of an information field of manage commands and messages, transmitted via the data transmission channel between TSNC and XSM.

3.1.1. The information field of manage commands (commands, hereafter), transmitted from XSM to TSNC, should have the following format:

3.1.1. The information field of manage commands (commands, hereafter), transmitted from CP to XSM, should have the following format:

Header
Contents of command

The header has the following format:

	<----------1 byte ---------->							
	D7	D6	D5	D4	D3	D2	D1	D0
1	Command code							
2	Command length in bytes							

First byte defines code of command.
Second byte defines a field length (quantity of bytes) for the contents of command.

3.1.2. The following commands should be transmitted from XSM to TSNC:

Connection to voice path
(COMMAND №7)

DESCRIPTION: on command is executed specified E1 timeslots connection to voice path of call.
CODE of COMMAND=07H
FORMAT of COMMAND:

	1 byte <---------->	
	Header of command	
1	Number of call	Call's identifier
2		
3	E1 number(0-3)	
4	time slot Arx	
5	time slot Atx	

DESCRIPTION of PARAMETERS:
- **Number of call** – number, assigned by TSNC to every connection.
- **E1 number** E1 should be used for voice translation from calling subscriber(A) to XSM.
- **time slot Arx** Time slot should be used for voice translation from Rx-path of calling subscriber(A) to XSM.
- **time slot Atx** Time slot should be used for voice translation from Tx-path of calling subscriber(A) to XSM.

Clearing of monitoring connecting line (COMMAND №8)
DESCRIPTION: the command allows to clear E1 timeslots connection to voice path of existing call.

CODE of COMMAND=08H

FORMAT of COMMAND:

	1 byte <---------->	
	Header of command	
1	Number of call	Call's identifier
2		
3	E1 number(0-3)	
4	time slot Arx	
5	time slot Atx	

DESCRIPTION of PARAMETERS:

- **Number of call** – number, assigned by TSNC to every connection.
- **E1 number** E1 should be used for voice translation from calling subscriber(A) to XSM.
- **time slot Arx** Time slot should be used for voice translation from Rx-path of calling subscriber(A) to XSM.
- **time slot Atx** Time slot should be used for voice translation from Tx-path of calling subscriber(A) to XSM.

3.1.4. Following messages should be sent out of TSNC to XSM:

SMS transmission by user
(MESSAGE N 12)

DESCRIPTION: SMS content (transmitted or received by subscriber) SMS length should be no more than 45 bytes. In case the SMS contains more than 45 bytes additional messages are created to transmit the data about the SMS content setting appropriate values in header fields "**total number of messages**" and "**current message number**".

CODE of MESSAGE = 2CH

FORMAT of MESSAGE:

	1 byte <---------->	
1	Call identity	
2		
3	Type of object	
4	Attribute of telephone number	Telephone number of the subscriber transmitting
5	Number of digits in the telephone number	

6	dig 2	dig 1	SMS (PSTN or ISDN) (MS ISDN)
7	dig 4	dig 3	
.	.	.	
13	dig 16	dig 15	
14	dig 18	dig 17	
15	FFH		
16	FFH		
17	NU		
18	NU		
19	NU		
20	NU		
21	Telephone number attribute		Telephone number of the subscriber receiving SMS (PSTN or ISDN) (MS ISDN)
22	Number of digits in the telephone number		
23	dig 2	dig 1	
24	dig 4	dig 3	
.	.	.	
30	dig 16	dig 15	
31	dig 18	dig 17	
32			The content of the transmitted SMS
.			
.			
45			

3.2. Information field of packets of messages about connections of subscribers , transmitted via E1 from TSNC to XSM.

3.2.1. Information field of packets of messages (hereafter messages) about monitored connections of monitoring objects should have following typical format:

Header
Contents of message

The header should have the following typical format:

|<---------1 byte ---------->|

	D7	D6	D5	D4	D3	D2	D1	D0	
1	NU								
2	NU								
3	message's code								
4	length of message in bytes								
5	number of call								call's identifier
6									
7	NU								
8	NU								
9									
10	NU								
11	parameters of communication								
12	code of SS's phase								

- **Third byte** defines message's code. Messages codes are given in description of corresponding messages formats.

- **Fourth byte** defines message length in bytes - number in binary code.

- **Bytes from fifth to ninth** are **call's identifier,** in which: **fifth** and **sixth** bytes are presenting **number of call**

- **eleventh byte** defines parameters of communication and has following values:

D3 D2 D1 Do	- define type of communication and can have following values:
0 0 0 1	- outgoing communication;
0 0 1 0	- incoming communication;
0 1 0 0	- international transit;
1 0 0 0	- toll transit;
1 1 0 0	- cross - office communication .
D7 D6 D5 D4	- reserve: equal to 0

– **Twelfth** byte defines **code of supplementary services (SS) phase** and have the following values:

00H – normal call;
01H – order of SS service;
02H – test of SS service;
03H – abolition of SS service;
04H – SS activation (realization of service)

Message contents should have following typical format:

	<----------1 byte ---------->								
	D7	D6	D5	D4	D3	D2	D1	D0	
1	Attribute of telephone number								Calling subscriber telephone number (A)
2	Number of digits in telephone number								
3	A2							A1	
4	A4							A3	
5	A6							A5	
6	A8							A7	
7	A10							A9	
8	A12							A11	
9	A14							A13	
10	A16							A15	
11	A18							A17	
12	Attribute of telephone number								Called subscriber telephone number (B)
13	Number of digits in telephone number								
14	B2							B1	
15	B4							B3	
16	B6							B5	
17	B8							B7	
18	B10							B9	
19	B12							B11	
20	B14							B13	
21	B16							B15	
22	B18							B17	
23	Conditional number of incoming group								
24									
25	MCC.2							MCC.1	Calling subscriber location
26	MNC.1							MCC.3	
27	LAC.1							MNC.2	
28	CL.1							LAC.2	
29	FH							CL.2	
30	NU								
31	NU								
32	operation code								
33									Description Of service
34									
35									
36	Additional code								
37	MCC.2							MCC.1	Calling subscriber location
38	MNC.1							MCC.3	
39	LAC.1							MNC.2	
40	CL.1							LAC.2	
41	FH							CL.2	

– **Bytes from first up to eleventh** define the attribute of telephone number, number of

digits in telephone number and calling subscriber telephone number (subscriber A).

– **Bytes from twelfth to twenty second** define the attribute of telephone number, number of digits in telephone number and called subscriber telephone number (subscriber B).

Attribute of telephone number has following values:
01H – present exchange subscriber telephone number;
02H – local telephone network subscriber's telephone number (local number);
03H – present zonal telephone network subscriber's telephone number (zonal number);
04H – other zonal telephone network subscriber's number (toll number);
05H – another country subscriber's telephone number (international number);
06H – telephone numbers of emergency, inquiry-informational local communication services or toll and international order and inquiry services numeration;
FFH – combination without value.

- **Number of digits in the telephone number (or descriptor)** – number of digits in the field "subscriber telephone number" or in the descriptor.

- **Telephone number of the calling or called subscriber:**
  In the field **"telephone number"** full international telephone numbers should be stated. Bytes from **fourteenth to twenty second** contain all digits, dialled by subscriber A, including prefixes of outlet to telephone network.
  Note: values of numbering information in the field "telephone number or descriptor of the monitored object" for each standard of mobile radio system should be agreed with the producer when agreeing the specification.

– **Twenty third and twenty fourth** bytes define connecting lines incoming group conditional number. They are used in case of calling subscriber telephone number determination impossibility during incoming communication to monitored subscriber. Incoming group conditional number should be represented corresponding to the table received at the CP in message N 10 under command N 16.
–
– **Twenty fifth and twenty sixth**
– Bytes form **Twenty fifth and twenty eleven**
– Define calling subscriber location in the mobile radio network:
MCC – mobile radio country code;
MNC – mobile radio network code;
LAC – service area;
CL – mobile communication network cell.
thirty second byte content should have **code of connection termination**, characterizing one of following events:
– 01H – disconnection for technical reasons;
– 02H – disconnection after incomplete dialling
– 03H – disconnection in case of busy called subscriber;
– 04H - disconnection if subscriber B doesn't answer;
– 05H – disconnection after conversation state;
– 06H – disconnection at the connection denial caused for the reason of the called subscriber being unregistered.

- **Thirty third, thirty fourth, thirty fifth and thirty sixth** bytes – are used for coding of services in message "**Using of SS services**". In other messages mentioned bytes have value **FFH**.
- Bytes form **thirty seventh to fourty first** define called subscriber location in the mobile radio network:

MCC – mobile radio country code;
MNC – mobile radio network code;
LAC – service area;
CL – mobile communication network cell.

1.2.2. The following messages about connections are to be transmitted form the TSNC to the XSM:

Reception of called subscriber complete telephone number
(MESSAGE №1.1)

Fields "description of service" and "additional code" in message №1.1 should have FFH value. These fields are used for cases of SS services order, test, abolition and use. In these cases special message №1.4 "SS services using" should be sent to the CP.

CODE of MESSAGE=41H
FORMAT of MESSAGE corresponds to typical format (see p.3.2.1)

Called subscriber answer
(MESSAGE 1.2)

DESCRIPTION: message is sent after called subscriber answer.
CODE of MESSAGE=42H
FORMAT of MESSAGE corresponds to typical format (see p.3.2.1).
Content of all fields should correspond to message №1.1 analogous fields' content.

Disconnection
(MESSAGE №1.3)

DESCRIPTION: message is sent after completion of connection between subscribers:
- After one of subscribers rings off of successful call;
- After calling subscriber rings off in case of abandoned call.

CODE of MESSAGE=43H
FORMAT of MESSAGE corresponds to typical format (p.3.2.1).

Contents of all fields except thirty second byte should correspond to message №1.1 analogous fields' content.

SS services using
(MESSAGE №1.4)

DESCRIPTION: message is formed in case of SS services order, test, usage and abolition by

exchange monitored subscriber.

CODE of MESSAGE=44H
FORMAT of MESSAGE corresponds to typical format (p.3.2.1)

- Code of the service provided to the subscriber, should be transmitted into the **"service description" field** (bytes from thirty third up to thirty fifth). List of service codes should be based upon corresponding ETSI-GSM recommendations
- **Field "additional code"** (thirty sixth byte) should contain service codes, not mentioned by the ETSI-GSM recommendations. List of such service codes should be presented by the producer of switching equipment and this list should be agreed with certification centre within specification agreement stage.
- **Other fields** of message №1.4 are filled according to principles, mentioned for typical message and should correspond to message №1.1 analogous fields contents.

subscriber status change
(MESSAGE N 1.5)

DESCRIPTION: the message is transmitted along subscriber registration and deregistration.

CODE of MESSAGE = 45
FORMAT of MESSAGE corresponds to typical format (see p. 3.2.1.)

- Bytes **from first to eleventh** should contain subscriber telephone number.
- Bytes **from twelfth to twenty sixth, thirty first and from thirty third to thirty sixth** take FFH value.
- The content of the **thirty second** byte ("operation code" field) should embody the **subscriber status code** and take following values:

01H – monitored subscriber registration in the HLR or VLR database;
02H – monitored subscriber deregistration from the HLR or VLR database;
03H – monitored subscriber being included into the HLR database by the network operator;
04H – monitored subscriber being excluded from the HLR database by the network operator.

- Bytes **from thirty seventh to forty first** define the monitored subscriber location within the mobile radio network (at **thirty second** byte having 01H or 02H value).

Subscriber location change
(MESSAGE N 1.6)

DESCRIPTION: the message is transmitted in case of subscriber location change.

CODE of MESSAGE = 46H
MESSAGE FORMAT corresponds to typical format (see p. 3.2.1).

- Content of all fields except **thirty second byte** should correspond to the content of similar fields of messages N 1.1 or N 1.2 for active subscriber status and of message N 1.5 for passive subscriber status.