

Guideline for Executing Interconnection Tests of  
Digital Visual Telephone Terminals

HATS Conference  
(Promotion Conference of Harmonization of Advanced Telecommunication Systems)  
Multimedia Communication Test Implementation Liaison Committee

Guideline for Executing Interconnection Tests of  
Digital Visual Telephone Terminals

Revision history

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TTC-G-001-V1E

Guideline for Executing Interconnection  
Tests of Digital Visual  
Telephone Terminals

# 保存版

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THE TELECOMMUNICATION TECHNOLOGY COMMITTEE

TTC Guideline for Execution of Interconnection Tests

Guideline for Executing Interconnection  
Tests of Digital Visual Telephone Terminals

1992

THE TELECOMMUNICATION TECHNOLOGY COMMITTEE

TTC Guideline for execution of interconnection tests

Revision history

(Guideline for executing interconnection tests of digital visual telephone terminals)

Version No.	Date of enactment	Content of revision
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## **Chapter 1 Background and objectives**

### **1.1 Background**

Visual telephone systems using motion pictures have been considered as a promising application in the ISDN environment, and worldwide effort has been dedicated to their development. In the conventional systems, however, picture coding algorithms or communication procedures have not been standardized, which has prohibited mutual communication between different visual telephone systems.

In order to resolve this problem, a picture coding algorithm and communication procedures for visual telephone systems were standardized in TSS (CCITT) and recommended in December 1990. In view of these activities in TSS, The Telecommunication Technology Committee (TTC) in Japan dedicated its efforts to formulating national standards conforming to corresponding TSS recommendations, and implemented these standards following the recommendations in TSS.

Digital visual telephone systems are expected to spread due to the enactment of these standards and development of ISDN services. For their favorable development and prevalence, however, it is important to resolve several problems concerning mutual connections between visual telephone systems of different manufacturers each conforming to the standards, and feedback the connection test results into the standards.

### **1.2 Objectives**

Considering that visual telephone system products conforming to the above mentioned standards will be put on the market by several manufacturers in the next few years, we believe it is indispensable to achieve mutual interconnection of different products for facilitating service development of digital visual telephone systems. Due to the anticipated diversification of system functions, however, mutual interconnections may not be achieved even if two products are manufactured conforming to the standards, and verification of connectability by means of interconnection tests will therefore be required.

This "Guideline" specifies the content and procedure of these interconnection tests to ensure interconnectability of visual telephone products of different manufacturers.

Interconnection tests based on this "Guideline" will be performed by the "Digital Video Conference and Videophone TILCs (Test Implementation Liaison Committees)" under the management of the Communications Industry Association of Japan (CIAJ), and are expected to prepare the

environment for future development of digital visual telephone services in Japan. At the same time, the effectiveness of the standards will also be enhanced, and the test results will be utilized as information whenever a new standard is enacted.

### **1.3 Scope of interconnection tests**

The first version of the interconnection tests guideline deals with terminals up to "Type X, Mode: a0, b1, b2" based on the Standards JT-H320, H230, H261, H242 and H221 which were enacted by The Telecommunication Technology Committee (TTC), except terminals of "Type Y, Mode: g" which are treated as optional.

This scope does not include all of the above standards specifications, but only specifies the execution of interconnection tests which is the most urgent task. These specifications will be enhanced whenever required.



## Chapter 2 Basic test requirements

### 2.1 Standards to be observed

Figure 2.1 shows the configuration of the visual telephone system specified in JT-H320. Typical standards to be observed for interconnection of this system are listed below.

#### 2.1.1 Audiovisual teleservices

- (1) JT-H320 Narrow-band visual telephone systems and terminal equipment
- (2) JT-H261 Video codec for audiovisual services at p x 64 kbit/s
- (3) JT-H242 System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s
- (4) JT-H230 Frame-synchronous control and indication signals for audiovisual systems
- (5) JT-H221 Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices

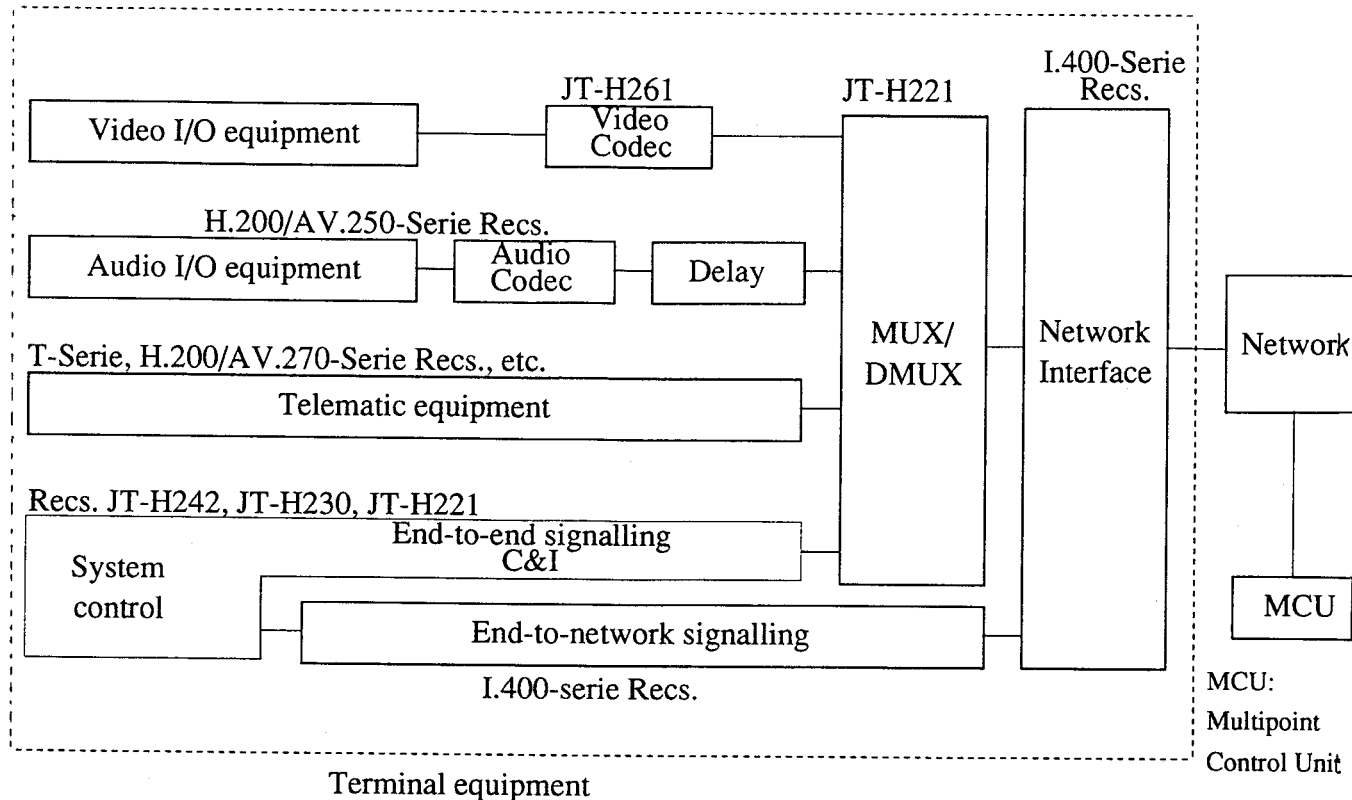
#### 2.1.2 Audio codecs

- (1) JT-G711 Pulse code modulation (PCM) of voice frequencies
- (2) JT-G722 7 kHz audio-coding within 64 kbit/s
- (3) JT-G725 System aspects for the use of the 7 kHz audio codec within 64 kbit/s

#### 2.1.3 User-network interfaces

- (1) JT-I411 ISDN user-network interfaces - Reference configurations
- (2) JT-I430 Basic user-network interface - Layer 1 specification
- (3) JT-I431 Primary rate user-network interface - Layer 1 specification (Note 1)
- (4) JT-Q920 ISDN user-network interface data link layer - General aspects
- (5) JT-Q921 ISDN user-network interface - Data link layer specification
- (6) JT-Q930 ISDN user-network interface layer 3 - General aspects
- (7) JT-Q931 ISDN user-network interface layer 3 specification for basic call control

Note 1: in the case of Type Y, Mode:g.



## 2.2 Connection to the network

### 2.2.1 Conditions for connection to the network

This test is executed using NTT INS Net 64 and INS Net 1500, and the following conditions should be met.

#### (1) INS Net Interface

NTT Technical Reference Documents	Interfaces in INS Net Services
Volume 1	30 May 1990 (Third Edition)
Volume 2	30 October 1990 (Second Edition)
Volume 3	30 November 1990 (Second Edition)

#### 2.2.2 Formalities for connection to the network

(1) A tested terminal which is connected to INS Net should obtain one of the following approvals before the test:

- 1) Technical Requirements Compliance Approval by Japan Approvals Institute for Telecommunication Equipment (JATE)
- 2) Compliance Approval of NTT

(2) Execution of the test for terminals which have interface points other than T-points, requires further discussion.

### **2.3 Pre-confirmed items**

Correct operation between terminals of the same organization participating in the interconnection test should be verified beforehand through INS Net regarding the following items:

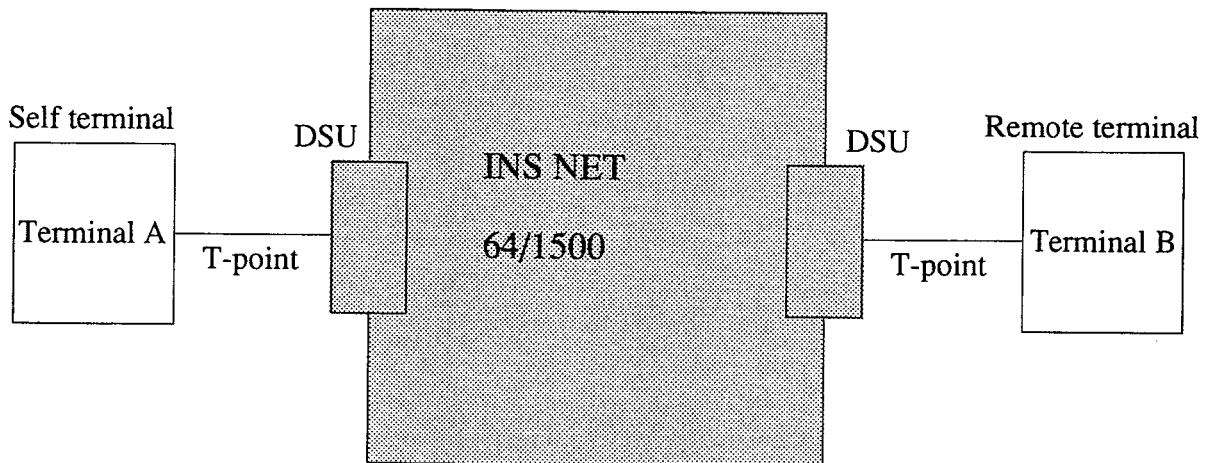
- 1) Test items specified in Section 3.5
- 2) It should be possible to receive Sequence A, execute the specified procedure and respond to it at any time during the communication. A terminal should avoid judging this situation as a fault and shifting to a deadlock status.

## Chapter 3 Execution of interconnection tests

### 3.1 Testing environments

- (1) Since INS Net 64 is used in the test, it should be available at all test participant sites at least on test days. A participant who wishes to participate in the Type Y terminal test should be able to access INS Net 1500.
- (2) The figure below shows the connection to a test circuit.

< Reference system for connection test >



- (3) Only one tested terminal is allowed to be connected to the test circuit.
- (4) A voice telephone should be available at both sites for negotiation.

### 3.2 Guide for execution of tests

- (1) In case several organizations execute a test jointly.
  - 1) A test is executed in a round robin way. When several terminals of one organization are tested, interconnection tests among these terminals should have been completed beforehand by that organization.
  - 2) A test is executed on the items specified in Section 3.5.
- (2) In case a single organization executes a test, it should execute an independent interconnection test with other terminals which have already been tested.

### 3.3 Test procedure

- (1) A calling participant shall first make a telephone (possibly loudspeaker phone) call to a called participant and notify a beginning of test. Normally this telephone call shall be held throughout the test.

- (2) A calling terminal shall make a call to the ISDN number of a called terminal used for the test.
- (3) When a call is not correctly accepted, retry shall be made up to three times. If a call is not finally accepted, procedure (7) shall be applied.
- (4) After accepting an incoming call, a called terminal shall respond according to the items listed in APPENDIX 1 and then verify correct reception of incoming audio, video or data (if included in the test items).
- (5) After verifying that communication can continue for three minutes, a calling participant shall first release a call earlier than a called participant.
- (6) A calling participant shall verify that a call is correctly released.
- (7) The calling participant and called participant shall then interchange with each other and repeat procedures (2) to (6).
- (8) When a test is performed sequentially with different communication rates for the same combination of calling and called terminals, communication rates shall proceed from low to high.
- (9) When several terminals of one participant are tested, all of the above mentioned procedures shall be repeated for each terminal.

### **3.4 Summarizing of results**

When a test is completed, the verification results shall be summarized on a check sheet included in APPENDIX 1. When a participant hopes for a retry of the test, he (she) shall state that intention in a remarks column of the check sheet.

### **3.5 Test items**

For terminals conforming to Type Xb4 or Type Xb5, the following operations shall be verified according to APPENDIX 1.

- Verification of call set-up by means of out-band signaling
- Verification of audio/video communication
- Verification of call release

These test items are only for testing mutual connectability in a round robin way, and are not for verifying all of the functions (for testing of other functions, refer partly to Section 3.6 for information.).

For reference, the bit assignment in each communication mode is shown in SUPPLEMENT 1, a questionnaire sheet is included in SUPPLEMENT 2, a table of tested terminals is shown in

SUPPLEMENT 3, and a table of testing time and connected terminals is shown in SUPPLEMENT 4.

### 3.6 Optional test items (for reference)

Execution of the following test items shall be reconsidered when this "Guideline" is revised in future.

#### (1) Test of Type Y terminal

Basically this test is the same as that for Type X, but the items below shall be taken into account.

- Communication mode (mode: g, h, i, j, k, l)
- Audio coding (JT-G722)
- Mode change
- HSD on/off

#### (2) Verification of in-channel negotiation

- Audio coding : A remote terminal shall send audio in an appropriate mode which conforms to the receive capability, and audio communication shall be possible.
- Picture format : A remote terminal shall send video in an appropriate mode which conforms to the receive capability, and video communication shall be possible.
- Frame rate : A remote terminal shall send video at an appropriate frame rate which conforms to the decodable minimum picture interval (1/29.97, 2/29.97, 3/29.97, 4/29.97), and the received picture shall contain no errors.

#### (3) Verification of mode change, interconnectability, control, etc.

- Transferrate change (2B/1B)
- Communication mode change (a0/b1/b2)
- Picture format change (QCIF/FCIF)
- Functions concerning multipoint operation (MCS/MCN, MCC)
- Mandatory receive commands (VCF, VCU, LCD, LCO)

#### (4) Verification of data transmission

- LSD (ON/OFF)
- HSD (ON/OFF)

(Data content itself shall however not be verified between terminals of different manufacturers)

#### (5) Communication mode of A-law transmission and $\mu$ -law reception, communication mode of A-law transmission and A-law reception

(This test is not necessary for terminals used only domestically)

(6) Communication in 56 kbit/s mode

(If a remote terminal is not connected to a 56 kbit/s line, a normally set-up local terminal will not operate in this mode. The test procedure is thus a matter for further study)

(7) Non-mandatory maintenance commands

Conditionally mandatory:

(receiving side) LCV

(sending side) AIM/AIA, VIS/VIA

(8) Communication in mode: a1

(Video communication shall be verified by using non-standard 16 kbit/s audio coding or filling with dummy bits).

## **Chapter 4 Handling of test results and future study points**

### **4.1 Handling of test results**

If a test participant achieved satisfactory results, he (she) will be able to attach a TTC mark to the terminals or accompanying manual documents by applying for registration of the test results with TTC, following the "TTC Standards Conformity Confirmation System".

Problems or faults included in related standards which are clarified by the test will be utilized as feedback for the standardization.

### **4.2 Future study points**

The following points are not included in this first version and will require further consideration, taking into account the situation concerning recommendations and products when a revision of this document is made.

- (1) Functions in Mode: b3, c, d, e, f of Type X, functions in Mode: g, h, i, j, l of Type Y and functions in all modes of Type Z
- (2) Functions related to Telematic systems
- (3) Items concerning BC, HLC, LLC



[Terminal A]

To Mr./Miss. \_\_\_\_\_

FAX \_\_\_\_\_

Terminal Name	
Company/Organization Name	
person in charge	
TEL	
FAX	

Check Sheet

Test Date [ Year      Month      Date                    :    ~    :    ]

[Terminal B]

Remote Terminal Name[ \_\_\_\_\_ ]

List of Test Items

No	Item	Judgment criterion	Result ○ or ×	Remarks (problems, etc.)				
Making a call	1	Initial Channel call set-up	Terminal A can correctly make a call to Terminal B					
	2	Additional Channel call set-up			Terminal B Telephone No.			
	3	Verification of audio communication	Verification of audio and video communications in all modes. Verified modes should be recorded if possible (note).		Mode	a <sub>0</sub>	b <sub>1</sub>	b <sub>2</sub>
	4	Verification of video communication			audio			
					QCIF	/		
			FCIF	/				
5	Call release by Terminal B	A call should be correctly released when Terminal B has released a call						
Receiving a call	6	Initial Channel call set-up	A call should be correctly accepted when Terminal B has made a call					
	7	Additional Channel call set-up			Terminal A Telephone No.			
	8	Verification of audio communication	Verification of audio and video communications in all modes. Verified modes should be recorded if possible (note).		Mode	a <sub>0</sub>	b <sub>1</sub>	b <sub>2</sub>
	9	Verification of video communication			audio			
					QCIF	/		
			FCIF	/				
10	Call release by Terminal A	A call should be correctly released when Terminal A has released a call						

Note) When a communication mode is automatically selected and manual mode change is difficult, checking of functions which are implemented but require mode change may be omitted. In this case, draw a slanting stroke in the corresponding column.

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SUPPLEMENT 1 Bit assignment

Frame structure in mode a0

Audio : JT-G711  $\mu$ -law ; 56kbit/s

Bit No. 8; Oct. No. 17~80 : spare

FAS+BAS : 1.6kbit/s

Oct. No.	Bit No.							
	1	2	3	4	5	6	7	8
1	A1	A2	A3	A4	A5	A6	A7	F
2	A8						A14	A
.	.						.	S
8	.						.	
9	A57	A58	A59	A60	A61	A62	A63	B
10	.							A
.	.							S
16	A106	A107	A108	A109	A110	A111	A112	
17	A113	A114					A119	spare
18	A120						A126	
.	.						.	
.	.						.	
80	A554	A555	A556	A557	A558	A559	A560	

Frame structure in mode b1

Audio : JT-G711  $\mu$ -law ; 56kbit/s

Video : JT-H261; 68.8kbit/s

FAS+BAS : all B channels

Oct. No.	Initial Channel							Additional Channel						
	1	2	3	..	6	7	8	1	2	3	..	6	7	8
1	A1	A2	A3	..	A6	A7	F	V1	V2	V3	..	V6	V7	F
2	A8					A14	A	V8					V14	A
.	.					.	S	.					.	S
8	.					.		.					.	
9	A57	A58	A59	..	A62	A63	B	V57	V58	V59	..	V62	V63	B
10	A64					A70	A	V64					V70	A
.	.					.	S	.					.	S
16	A106	A107	A108	..	A111	A112		V106	V107	V108	..	V111	V112	
17	A113	A114	A115	..	A118	A119	V113	V114	V115	V116	..	V119	V120	V121
18	A120					A126	V122	V123					V129	V130
.	.					.	.	.					.	.
.	.					.	.	.					.	.
80	A554	A555	A556	..	A559	A560	V680	V681	V682	V683	..	V686	V687	V688

Frame structure in mode b2 (part1)

Audio : JT-G722 ; 56kbit/s

Video : JT-H261; 68.8kbit/s

FAS+BAS : all B channels

Oct. No.	Initial Channel							Additional Channel						
	1	2	3	..	6	7	8	1	2	3	..	6	7	8
1	A1	A2	A3	..	A6	A7	F	V1	V2	V3	..	V6	V7	F
2	A8					A14	A	V8					V14	A
.	.					.	S	.					.	S
8	.					.		.					.	
9	A57	A58	A59	..	A62	A63	B	V57	V58	V59	..	V62	V63	B
10	A64					A70	A	V64					V70	A
.	.					.	S	.					.	S
16	A106	A107	A108	..	A111	A112		V106	V107	V108	..	V111	V112	
17	A113	A114	A115	..	A118	A119	V113	V114	V115	V116	..	V119	V120	V121
18	A120					A126	V122	V123					V129	V130
.	.					.	.	.					.	.
.	.					.	.	.					.	.
80	A554	A555	A556	..	A559	A560	V680	V681	V682	V683	..	V686	V687	V688

Frame structure in mode b2 (part2)

Audio : JT-G722 ; 48kbit/s

Video : JT-H261; 76.8kbit/s

FAS+BAS : all B channels

Oct. No.	Initial Channel							Additional Channel						
	1	2	3	..	6	7	8	1	2	3	..	6	7	8
1	A1	A2	A3	..	A6	V1	F	V2	V3	V4	..	V7	V8	F
2	A7				A12	V9	A	V10	V11	V12	..	V15	V16	A
.	.				.	.	S	.					.	S
8	.				.	.		.					.	
9	A49	A50	A51	..	A54	V65	B	V66	V67	V68	..	V71	V72	B
10	A55				A60	V73	A	V74					V80	A
.	.				.	.	S	.					.	S
16	A91	A92	A93	..	A96	V121		V122	V123	V124	..	V127	V128	
17	A97	A98	A99	..	A102	V129	V130	V131	V132	V133	..	V136	V137	V138
18	A103				A108	V139	V140	V141					V147	V148
.	.				.	.	.	.					.	.
.	.				.	.	.	.					.	.
80	A475	A476	A477	..	A480	V759	V760	V761	V762	V763	..	V766	V767	V768

Questionnaire on tested terminal capability

Item	Terminal capability	
Audio	<input type="checkbox"/> A-law <input type="checkbox"/> JT-G725 Type1 <input type="checkbox"/> Other ( )	<input type="checkbox"/> $\mu$ -law <input type="checkbox"/> JT-G725 Type2
Picture format (Receive)	<input type="checkbox"/> QCIF/FCIF <input type="checkbox"/> Other ( )	<input type="checkbox"/> QCIF
Minimum picture interval (Receive)	<input type="checkbox"/> 1 / 29.97 sec <input type="checkbox"/> 3 / 29.97 sec	<input type="checkbox"/> 2 / 29.97 sec <input type="checkbox"/> 4 / 29.97 sec
Transfer rate	<input type="checkbox"/> 64 kbit/s <input type="checkbox"/> 384 kbit/s	<input type="checkbox"/> 2 × 64 kbit/s <input type="checkbox"/> Other
Picture format (Send)	<input type="checkbox"/> QCIF/FCIF <input type="checkbox"/> Other ( )	<input type="checkbox"/> QCIF
Minimum picture interval (Send) (Note2)	<input type="checkbox"/> 1 / 29.97 sec <input type="checkbox"/> 3 / 29.97 sec <input type="checkbox"/> 5 / 29.97 sec <input type="checkbox"/> 7 / 29.97 sec	<input type="checkbox"/> 2 / 29.97 sec <input type="checkbox"/> 4 / 29.97 sec <input type="checkbox"/> 6 / 29.97 sec <input type="checkbox"/> Other
LSD Send/Receive	<input type="checkbox"/> _____ kbit/s <input type="checkbox"/> _____ kbit/s	<input type="checkbox"/> _____ kbit/s
HSD Send/Receive	<input type="checkbox"/> _____ kbit/s <input type="checkbox"/> _____ kbit/s	<input type="checkbox"/> _____ kbit/s

(Note1) Please note if communication is not possible in some combinations of capabilities listed in the table above.

(Note2) Minimum picture interval (send) should be described as far as possible. Please note Q or F on the right of the frame rate if its relation to QCIF/FCIF is known.



SUPPLEMENT 4-1 (Example)

Testing time and connected terminals (Testing Date : Month, Date)

Type X

First called terminal

First calling terminal

Organization name and Terminal name	ABC CODEC-1	XYZ CD-XXX	XYZ CD-YYY		Remarks
ABC CODEC-1	-	9:00-10:30	10:30-12:00		Only QCIF is tested
	-	Xa(a <sub>0</sub> ) Xb4(b <sub>1</sub> ) LSD2400 Xb5(b <sub>2</sub> ) LSD1200	Xa(a <sub>0</sub> )		
XYZ CD-XXX	9:00-10:30	-			
	Xa(a <sub>0</sub> ) Xb4(b <sub>1</sub> ) LSD4800 Xb5(b <sub>2</sub> ) LSD2400	-			
XYZ CD-YYY	10:30-12:00		-		
	Xa(a <sub>0</sub> )		-		
				-	
				-	

Upper column indicates testing time

SUPPLEMENT 4-2 (Example)

Testing time and connected terminals (Testing Date : Month, Date)

Type Y

First called terminal

First calling terminal

Organization name and Terminal name	ABC CODEC-2	XYZ CD-XXX	UUU D-YYY		Remarks
ABC CODEC-2	-	13:00-14:00	14:00-15:00		
	-	Y1(g) LSD4800	Y1(g) LSD1200 HSD		
XYZ CD-XXX	13:00-14:00	-	15:00-16:00		
	Y1(g) LSD4800	-	Y1(g)		
UUU D-YYY	14:00-15:00	15:00-16:00	-		
	Y1(g) LSD1200 HSD	Y1(g)	-		
				-	
				-	

Upper column indicates testing time

\*\* When you use this guideline, please ask TTC about any change of contents.

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