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**ITU-T**

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OF ITU

**Series J**

**Supplement 1**

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SERIES J: TRANSMISSION OF TELEVISION, SOUND  
PROGRAMME AND OTHER MULTIMEDIA SIGNALS

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**Example of linking options between annexes of  
ITU-T Recommendation J.112 and annexes of  
ITU-T Recommendation J.83**

ITU-T J-series Recommendations – Supplement 1

(Previously CCITT Recommendations)

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## **SUPPLEMENT 1 TO ITU-T J-SERIES RECOMMENDATIONS**

### **EXAMPLE OF LINKING OPTIONS BETWEEN ANNEXES OF ITU-T RECOMMENDATION J.112 AND ANNEXES OF ITU-T RECOMMENDATION J.83**

#### **Source**

Supplement 1 to ITU-T J-series Recommendations was prepared by ITU-T Study Group 9 (1997-2000) and was approved under the WTSC Resolution No. 5 procedure on the 19th of November 1998.

## FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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**EXAMPLE OF LINKING OPTIONS BETWEEN ANNEXES  
OF ITU-T RECOMMENDATION J.112 AND ANNEXES  
OF ITU-T RECOMMENDATION J.83**

*(Geneva, 1998)*

**1 Introduction**

Recommendation J.112 includes the statement in its clause 1 **Scope**, "There is therefore the possibility that, in application, the features chosen for use with the transmission system described in a particular annex of Recommendation J.83 are not limited to only the corresponding annex of this Recommendation." In particular, this Supplement defines an example of how to use Annex B/J.112 in conjunction with Annex A/J.83, by indicating the alternative parameters required for B.4.3/J.112 to achieve linking.

**2 Alternative global parameters for Annex B/J.112 to achieve linking**

In this example: in all cases, mention of Upstream Bandwidth "5 to 42 MHz" in Annex B/J.112 shall be read as "5 to 65 MHz"; and all mention of Downstream Bandwidth "95 to 857 MHz" shall be read as "100 to 860 MHz" throughout. In the case of Annex A/J.83, all mention of "6 MHz" shall be read as "8 MHz" throughout.

**3 Alternative parameters for B.4.3/J.112 to achieve linking** (the numbering of the subclauses is the same as in Recommendation J.112):

**B.4.3 Downstream**

**B.4.3.1 Downstream protocol**

The downstream PMD layer **MUST** conform to Annex A/J.83.

**B.4.3.2 Scaleable interleaving to support low latency**

Not required.

**B.4.3.3 Downstream frequency plan**

Shall meet national requirements.

**B.4.3.4 CMTS output electrical**

The CMTS **MUST** output an RF modulated signal with the following characteristics:

**CMTS electrical output (Downstream)**

Parameter	Value
Centre Frequency ( $f_c$ )	100 to 860 MHz $\pm$ 30 kHz
Level	Adjustable over the range 50 to 61 dBmV
Modulation Type	64 QAM and 256 QAM
Symbol Rate (nominal) 64 QAM 256 QAM	6.952 Msym/s 6.952 Msym/s
Connector	F connector per IPS-SP-406

Byte/symbol mapping, differential coding and baseband filter characteristics are as in Annex A/J.83.

**B.4.3.5 Downstream electrical input to CM**

The CM MUST accept an RF modulated signal with the following characteristics:

**Electrical input to CM**

Parameter	Value
Centre Frequency	100 to 860 MHz ± 30 kHz
Level Range (one channel)	-15 dBmV to +15 dBmV
Modulation Type	64 QAM and 256 QAM
Symbol Rate (nominal)	6.952 Msym/s (64 QAM) and 6.952 Msym/s (256 QAM)
Total Input Power (40-900 MHz)	< 30 dBmV
Input (load) Impedance	75 ohms
Input Return Loss	> 6 dB (100-860 MHz)
Connector	F connector per IPS-SP-406 (common with the output)

**B.4.3.6 CM BER performance**

The bit-error-rate performance of a CM MUST be as described in this subclause.

**B.4.3.6.1 64 QAM**

**B.4.3.6.1.1 64 QAM CM BER performance**

Implementation loss of the CM MUST be such that the CM achieves a post-FEC BER less than or equal to  $10^{-8}$  when operating at a carrier to noise ratio ( $E_s/N_o$ ) of 24.5 dB or greater.

**B.4.3.6.1.2 64 QAM image rejection performance**

Performance as described in B.4.3.6.1.1 MUST be met with analogue or digital signal at +10 dBc in any portion of the RF band other than the adjacent channels.

**B.4.3.6.1.3 64 QAM adjacent channel performance**

Performance as described in B.4.3.6.1.1 MUST be met with digital signal at 0 dBc in the adjacent channels.

Performance as described in B.4.3.6.1.1 MUST be met with analogue signal at +10 dBc in the adjacent channels.

Performance as described in B.4.3.6.1.1, with an additional 0.2 dB allowance, MUST be met with digital signal at +10 dBc in the adjacent channels.



## **B.4.3.6.2 256 QAM**

### **B.4.3.6.2.1 256 QAM CM BER performance**

Implementation loss of the CM MUST be such that the CM achieves a post-FEC BER less than or equal to  $10^{-8}$  when operating at a carrier to noise ratio ( $E_s/N_o$ ) of 31 dB or greater, with input signals greater than  $-6$  dBmV.

### **B.4.3.6.2.2 256 QAM image rejection performance**

Performance as described in B.4.3.6.2.1 MUST be met with analogue or digital signal at +10 dBc in any portion of the RF band other than the adjacent channels.

### **B.4.3.6.2.3 256 QAM adjacent channel performance**

Performance as described in B.4.3.6.2.1 MUST be met with analogue or digital signal at 0 dBc in the adjacent channels.

Performance as described in B.4.3.6.2.1, with an additional 0.5 dB allowance, MUST be met with analogue signal at +10 dBc in the adjacent channels.

Performance as described in B.4.3.6.2.1, with an additional 1.0 dB allowance, MUST be met with digital signal at +10 dBc in the adjacent channels.



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