

CONTENTS

FOREWORD	10
ORIGINAL UPNP DOCUMENTS (informative)	12
1 Overview and Scope	14
1.1 Introduction	14
1.2 Notation	14
1.2.1 Data Types	15
1.2.2 Strings Embedded in Other Strings	15
1.2.3 Extended Backus-Naur Form	15
1.3 Derived Data Types	16
1.3.1 Comma Separated Value (CSV) Lists	16
1.4 Management of XML Namespaces in Standardized DCPs	17
1.4.1 Namespace Prefix Requirements	19
1.4.2 Namespace Names, Namespace Versioning and Schema Versioning	20
1.4.3 Namespace Usage Examples	21
1.5 Vendor-defined Extensions	22
1.6 References	22
2 Service Modeling Definitions	25
2.1 ServiceType	25
2.2 Terms and Abbreviations	25
2.2.1 Abbreviations	25
2.2.2 Terms	25
2.3 ScheduledRecording Service Architecture	31
2.3.1 <i>recordSchedule</i>	31
2.3.2 <i>recordTask</i>	32
2.4 State Variables	33
2.4.1 State Variable Overview	33
2.4.2 <i>SortCapabilities</i>	35
2.4.3 <i>SortLevelCapability</i>	35
2.4.4 <i>StateUpdateID</i>	35
2.4.5 <i>LastChange</i>	36
2.4.6 <i>A_ARG_TYPE_PropertyList</i>	38
2.4.7 <i>A_ARG_TYPE_DataTypeID</i>	39
2.4.8 <i>A_ARG_TYPE_ObjectID</i>	39
2.4.9 <i>A_ARG_TYPE_ObjectIDList</i>	39
2.4.10 <i>A_ARG_TYPE_PropertyInfo</i>	39
2.4.11 <i>A_ARG_TYPE_Index</i>	39
2.4.12 <i>A_ARG_TYPE_Count</i>	39
2.4.13 <i>A_ARG_TYPE_SortCriteria</i>	39
2.4.14 <i>A_ARG_TYPE_RecordSchedule</i>	39
2.4.15 <i>A_ARG_TYPE_RecordTask</i>	40
2.4.16 <i>A_ARG_TYPE_RecordScheduleParts</i>	40
2.5 Eventing and Moderation	41
2.6 Actions	41
2.6.1 <i>GetSortCapabilities()</i>	42
2.6.2 <i>GetPropertyList()</i>	43
2.6.3 <i>GetAllowedValues()</i>	44

2.6.4	<u>GetStateUpdateID()</u>	45
2.6.5	<u>BrowseRecordSchedules()</u>	46
2.6.6	<u>BrowseRecordTasks()</u>	50
2.6.7	<u>CreateRecordSchedule()</u>	52
2.6.8	<u>DeleteRecordSchedule()</u>	54
2.6.9	<u>GetRecordSchedule()</u>	56
2.6.10	<u>EnableRecordSchedule()</u>	57
2.6.11	<u>DisableRecordSchedule()</u>	58
2.6.12	<u>DeleteRecordTask()</u>	59
2.6.13	<u>GetRecordTask()</u>	60
2.6.14	<u>EnableRecordTask()</u>	61
2.6.15	<u>DisableRecordTask()</u>	62
2.6.16	<u>ResetRecordTask()</u>	63
2.6.17	<u>GetRecordScheduleConflicts()</u>	63
2.6.18	<u>GetRecordTaskConflicts()</u>	65
2.6.19	Common Error Codes	66
2.7	State Diagram of <u>recordTask</u>	67
2.7.1	A Full-Featured State Diagram	67
2.7.2	A Minimal-Implementation State Diagram	72
2.7.3	<u>recordTask</u> State Example	75
2.8	ScheduledRecording Service Priority Model	76
2.8.1	Introduction of the ScheduledRecording Service Priority Model	76
2.8.2	Ordered Priority within Each Priority Level	77
2.8.3	Setting the Initial Priority Level of a <u>recordSchedule</u>	78
2.8.4	Sorting <u>recordSchedule</u> Instances Based on their Current Priority Settings	80
2.9	Theory of Operation	80
2.9.1	Introduction	80
2.9.2	Checking the Capabilities of a ScheduledRecording Service	80
2.9.3	Adding a Scheduled Recording Entry to the List	90
2.9.4	Deleting a <u>recordSchedule</u>	103
2.9.5	Browsing <u>recordSchedule</u> and <u>recordTask</u> instances	103
2.9.6	Rating System	109
2.9.7	Conflict Detection and Resolution	110
3	XML Service Description	111
4	Test	120
Annex A (normative) srs XML Document		121
A.1	<u>A_ARG_TYPE_RecordSchedule</u> AVDT XML Document	121
A.2	<u>A_ARG_TYPE_RecordTask</u> AVDT XML Document	122
A.3	<u>A_ARG_TYPE_RecordScheduleParts</u> AVDT XML Document	122
Annex B (normative) AV Working Committee Extended Properties		124
B.1	Base Properties	124
B.1.1	<u>@id</u>	124
B.1.2	<u>title</u>	125
B.1.3	<u>class</u>	125
B.1.4	<u>additionalStatusInfo</u>	125
B.1.5	<u>cdsReference</u>	126
B.2	Priority Properties	126
B.2.1	<u>priority</u>	127

B.2.2	<u>desiredPriority</u>	128
B.2.3	<u>desiredPriority@type</u>	129
B.3	Output Control Properties	130
B.3.1	<u>recordDestination</u>	130
B.3.2	<u>desiredRecordQuality</u>	132
B.4	Content Identification Related Properties	134
B.4.1	<u>scheduledCDSObjectID</u>	134
B.4.2	<u>scheduledChannelID</u>	135
B.4.3	<u>scheduledStartDateTime</u>	136
B.4.4	<u>scheduledDuration</u>	136
B.4.5	<u>scheduledProgramCode</u>	137
B.5	Matching Content Criteria Properties	137
B.5.1	<u>matchingName</u>	138
B.5.2	<u>matchingID</u>	139
B.6	Matching Qualifying Criteria Properties	140
B.6.1	<u>matchingChannelID</u>	140
B.6.2	<u>matchingStartDateTimeRange</u>	140
B.6.3	<u>matchingDurationRange</u>	141
B.6.4	<u>matchingRatingLimit</u>	141
B.6.5	<u>matchingEpisodeType</u>	143
B.7	Content Control Properties	144
B.7.1	<u>totalDesiredRecordTasks</u>	144
B.7.2	<u>scheduledStartDateTimeAdjust</u>	145
B.7.3	<u>scheduledDurationAdjust</u>	145
B.7.4	<u>activePeriod</u>	145
B.7.5	<u>durationLimit</u>	146
B.7.6	<u>channelMigration</u>	147
B.7.7	<u>timeMigration</u>	147
B.7.8	<u>allowDuplicates</u>	147
B.8	Storage Related Properties	148
B.8.1	<u>persistedRecordings</u>	148
B.9	Schedule State Properties	149
B.9.1	<u>scheduleState</u>	149
B.9.2	<u>abnormalTasksExist</u>	151
B.10	Statistics Properties	151
B.10.1	<u>currentRecordTaskCount</u>	151
B.10.2	<u>totalCreatedRecordTasks</u>	151
B.10.3	<u>totalCompletedRecordTasks</u>	152
B.11	Task General Properties	152
B.11.1	<u>recordScheduleID</u>	152
B.11.2	<u>recordedCDSObjectID</u>	152
B.12	Task Content Identification Properties	153
B.12.1	<u>taskCDSObjectID</u>	153
B.12.2	<u>taskChannelID</u>	154
B.12.3	<u>taskStartDateTime</u>	154
B.12.4	<u>taskDuration</u>	154
B.12.5	<u>taskProgramCode</u>	155
B.12.6	<u>recordQuality</u>	155
B.13	Task Matched Content Criteria Properties	157

B.13.1	<u>matchedName</u>	157
B.13.2	<u>matchedID</u>	158
B.14	Task Matched Qualifying Criteria Properties	158
B.14.1	<u>matchedRating</u>	158
B.14.2	<u>matchedRating@type</u>	159
B.14.3	<u>matchedEpisodeType</u>	159
B.15	Task Matched Content Control Properties	159
B.15.1	<u>taskStartDateTimeAdjust</u>	159
B.15.2	<u>taskDurationAdjust</u>	160
B.15.3	<u>taskDurationLimit</u>	160
B.15.4	<u>taskDurationLimit@effect</u>	160
B.15.5	<u>taskChannelMigration</u>	160
B.15.6	<u>taskTimeMigration</u>	161
B.16	Task State Properties	161
B.16.1	<u>taskState</u>	161
B.17	ContentDirectory Service Imported Properties	169
Annex C	(normative) AV Working Committee Class Definitions	174
C.1	Class Hierarchy	174
C.1.1	Relationships between Classes and Properties	175
C.1.2	<u>recordScheduleParts</u> Properties	176
C.1.3	<u>recordSchedule</u> Properties	180
C.1.4	<u>recordTask</u> Properties	183
C.2	Class Definitions	187
C.3	<u>object</u> Base Class	187
C.3.1	<u>object.recordSchedule</u> Class	189
C.3.2	<u>object.recordTask</u> Class	198
Annex D	(normative) EBNF Syntax Definitions	200
D.1	Priority Syntax	200
D.2	Date&time Syntax	200
D.3	Class Name Syntax	201
Annex E	(informative) ScheduledRecording Service Relationship to ContentDirectory Service	202
Annex F	(informative) ScheduledRecording Service Relationship to EPG	203
Annex G	(informative) AVDT Examples	204
G.1	<u>A ARG TYPE RecordSchedule</u> AVDT Example	204
G.2	<u>A ARG TYPE RecordTask</u> AVDT Example	220
G.3	<u>A ARG TYPE RecordScheduleParts</u> AVDT Example	238

LIST OF TABLES

Table 1-1:	EBNF Operators	16
Table 1-2:	CSV Examples	17
Table 1-3:	Namespace Definitions.....	18
Table 1-4:	Schema-related Information	19
Table 1-5:	Default Namespaces for the AV Specifications	20
Table 2-1:	Abbreviations	25
Table 2-1:	Properties in XML	27
Table 2-2:	State Variables	33
Table 2-3:	allowedValueList for the <i>DataTypeID</i> argument.....	35
Table 2-4:	Allowed Elements in <StateEvent> Element.....	36
Table 2-5:	Eventing and Moderation.....	41
Table 2-6:	Actions.....	41
Table 2-7:	Arguments for <i>GetSortCapabilities()</i>	42
Table 2-8:	Error Codes for <i>GetSortCapabilities()</i>	43
Table 2-9:	Arguments for <i>GetPropertyList()</i>	43
Table 2-10:	Error Codes for <i>GetPropertyList()</i>	44
Table 2-11:	Arguments for <i>GetAllowedValues()</i>	44
Table 2-12:	Error Codes for <i>GetAllowedValues()</i>	45
Table 2-13:	Arguments for <i>GetStateUpdateID()</i>	46
Table 2-14:	Error Codes for <i>GetStateUpdateID()</i>	46
Table 2-15:	Arguments for <i>BrowseRecordSchedules()</i>	46
Table 2-16:	Error Codes for <i>BrowseRecordSchedules()</i>	50
Table 2-17:	Arguments for <i>BrowseRecordTasks()</i>	51
Table 2-18:	Error Codes for <i>BrowseRecordTasks()</i>	52
Table 2-19:	Arguments for <i>CreateRecordSchedule()</i>	53
Table 2-20:	Error Codes for <i>CreateRecordSchedule()</i>	54
Table 2-21:	Arguments for <i>DeleteRecordSchedule()</i>	55
Table 2-22:	Error Codes for <i>DeleteRecordSchedule()</i>	55
Table 2-23:	Arguments for <i>GetRecordSchedule()</i>	56
Table 2-24:	Error Codes for <i>GetRecordSchedule()</i>	56
Table 2-25:	Arguments for <i>EnableRecordSchedule()</i>	57
Table 2-26:	Error Codes for <i>EnableRecordSchedule()</i>	57
Table 2-27:	Arguments for <i>DisableRecordSchedule()</i>	58
Table 2-28:	Error Codes for <i>DisableRecordSchedule()</i>	58
Table 2-29:	Arguments for <i>DeleteRecordTask()</i>	59
Table 2-30:	Error Codes for <i>DeleteRecordTask()</i>	59
Table 2-31:	Arguments for <i>GetRecordTask()</i>	60
Table 2-32:	Error Codes for <i>GetRecordTask()</i>	60
Table 2-33:	Arguments for <i>EnableRecordTask()</i>	61

Table 2-34:	Error Codes for <u>EnableRecordTask()</u>	61
Table 2-35:	Arguments for <u>DisableRecordTask()</u>	62
Table 2-36:	Error Codes for <u>DisableRecordTask()</u>	62
Table 2-37:	Arguments for <u>ResetRecordTask()</u>	63
Table 2-38:	Error Codes for <u>ResetRecordTask()</u>	63
Table 2-39:	Arguments for <u>GetRecordScheduleConflicts()</u>	64
Table 2-40:	Error Codes for <u>GetRecordScheduleConflicts()</u>	64
Table 2-41:	Arguments for <u>GetRecordTaskConflicts()</u>	65
Table 2-42:	Error Codes for <u>GetRecordTaskConflicts()</u>	65
Table 2-43:	Common Error Codes	66
Table 2-44:	<u>recordTask</u> State Timeline.....	76
Table 2-45:	Example 1: Fewer <u>recordSchedule</u> instances than the Number of Supported Priority Levels.	77
Table 2-46:	Example 2: More <u>recordSchedule</u> instances than the Number of Supported Priority Levels.	78
Table 2-47:	Existing <u>recordSchedule</u> Priorities.....	79
Table 2-48:	<u>desiredPriority</u> Property Set to “RS-C”.....	79
Table 2-49:	<u>desiredPriority</u> Property Set to “HIGHEST”, “L1 HI”, or “RS-A”.....	79
Table 2-50:	<u>desiredPriority</u> Property Set to “LOWEST”, “L3 LOW”, or “RS-B”.....	80
Table 2-51:	<u>desiredPriority</u> Property Set to “RS-C”.....	80
Table B-1:	Base Properties Overview	124
Table B-2:	allowedValueList for the <u>class</u> Property.....	125
Table B-3:	Priority Properties	126
Table B-4:	allowedValueList for the <u>priority</u> Property.....	127
Table B-5:	Primary allowedValueList for the <u>desiredPriority</u> Property.....	128
Table B-6:	Additional allowedValueList for the <u>desiredPriority</u> Property	129
Table B-7:	allowedValueList for the <u>desiredPriority@type</u> Property.....	130
Table B-8:	Output Control Properties.....	130
Table B-9:	<u>desiredRecordQuality</u> Example.....	132
Table B-10:	allowedValueList for the <u>desiredRecordQuality</u> Property	133
Table B-11:	allowedValueList for the <u>desiredRecordQuality@type</u> Property.....	134
Table B-12:	Content Identification Related Properties	134
Table B-13:	allowedValueList for the <u>scheduledChannelID@type</u> Property	136
Table B-14:	Matching Content Criteria Properties	137
Table B-15:	allowedValueList for the <u>matchingName@type</u> Property	138
Table B-16:	allowedValueList for the <u>matchingID@type</u> Property	139
Table B-17:	Matching Qualifying Criteria Properties	140
Table B-18:	allowedValueList for the <u>matchingRatingLimit</u> Property Using the MPAA Rating System (<u>matchingRatingLimit@type</u> = “MPAA.ORG”)	142
Table B-19:	allowedValueList for the <u>matchingRatingLimit</u> Property Using the RIAA Rating System (<u>matchingRatingLimit@type</u> = “RIAA.ORG”).....	142

Table B-20:	allowedValueList for the matchingRatingLimit Property Using the ESRB Rating System (matchingRatingLimit@type = "ESRB.ORG").....	142
Table B-21:	allowedValueList for the matchingRatingLimit Property Using the TVGUIDELINES Rating System (matchingRatingLimit@type = "TVGUIDELINES.ORG").....	142
Table B-22:	allowedValueList for the matchingRatingLimit@type Property	143
Table B-23:	allowedValueList for the matchingEpisodeType Property	144
Table B-24:	Content Control Properties	144
Table B-25:	allowedValueList for the durationLimit@effect Property	147
Table B-26:	Storage Related Properties	148
Table B-27:	Schedule State Properties	149
Table B-28:	allowedValueList for the scheduleState Property	150
Table B-29:	allowedValueList for the scheduleState@currentErrors Property	150
Table B-30:	Statistics Properties	151
Table B-31:	Task General Properties.....	152
Table B-32:	Task Content Identification Properties.....	153
Table B-33:	recordQuality Example	156
Table B-34:	allowedValueList for the recordQuality Property.....	157
Table B-35:	Task Matched Content Criteria Properties	157
Table B-36:	Task Matched Qualifying Criteria Properties	158
Table B-37:	Task Matched Content Control Properties	159
Table B-38:	State Related Properties.....	161
Table B-39:	allowedValueList for the taskState Property	162
Table B-40:	allowedValueList for the taskState Property	163
Table B-41:	allowedValueList for the taskState@phase Property.....	164
Table B-42:	allowedValueList for the taskState@xxx Properties	167
Table C-1:	Class Properties Overview for recordScheduleParts usage.....	177
Table C-2:	Class Properties Overview for recordSchedule usage	180
Table C-3:	Class Properties Overview for recordTask usage	184
Table C-4:	object Base Class Properties	188
Table C-5:	object.recordSchedule Base Class Properties	189
Table C-6:	object.recordSchedule.direct Class Properties.....	190
Table C-7:	object.recordSchedule.direct.manual Class Properties	191
Table C-8:	object.recordSchedule.direct.cdsEPG Class Properties	192
Table C-9:	object.recordSchedule.direct.cdsNonEPG Class Properties.....	193
Table C-10:	object.recordSchedule.direct.programCode Class Properties.....	193
Table C-11:	object.recordSchedule.query Class Properties	194
Table C-12:	object.recordSchedule.query.contentName Class Properties	195
Table C-13:	object.recordSchedule.query.contentID Class Properties	197
Table C-14:	object.recordTask Base Class Properties	199

LIST OF FIGURES

Figure 1: Creating a new <u>recordSchedule</u>	31
Figure 2: Capability check.	32
Figure 3: Browse <u>recordSchedule</u>	32
Figure 4: Delete a <u>recordSchedule</u>	32
Figure 5: A Full-Featured State Diagram.....	68
Figure 6: A Minimal-Implementation State Diagram.....	73
Figure 7: Class hierarchy for the ScheduledRecording service.....	174