

# ATTACHMENT A

## Technical Specification: Unified Royalty Data Schema (URDS)

Form 1042-S Enhancement Framework

Version 1.0 | November 2025

### 1. EXECUTIVE SUMMARY

The Unified Royalty Data Schema (URDS) is a comprehensive data architecture designed to standardize and automate cross-border royalty payment reporting through Form 1042-S. This specification defines machine-readable data structures, validation rules, and API interfaces that enable real-time treaty verification, automated withholding calculations, and seamless integration between corporate ERP systems and IRS digital infrastructure.

### 2. SYSTEM ARCHITECTURE

#### 2.1 Core Components

The URDS framework consists of three integrated layers:

- **Data Layer:** Standardized JSON/XML schemas for royalty transaction data
- **Validation Layer:** AI-powered rule engines for treaty verification and rate calculation
- **Integration Layer:** RESTful APIs for secure data exchange with IRS systems

#### 2.2 Data Flow Architecture

Transaction Origination → ERP System → URDS Validation → IRS Gateway  
→ Form 1042-S Generation

### 3. DATA SCHEMA SPECIFICATION

#### 3.1 Core Data Elements

Field Name	Data Type	Description	Validation Rules
transaction_id	UUID v4	Unique identifier for each royalty transaction	Required, Unique
payee_lei	String(20)	Legal Entity Identifier of payee	ISO 17442 format
patent_pool_id	String(50)	Identifier for patent pool administrator	Optional
treaty_article	String(20)	Applicable tax treaty article	Format:

		reference	COUNTRY-ART-PARA
place_of_use	ISO 3166	Jurisdiction where IP is utilized	Valid country code
withholding_rate	Decimal(5,4)	Applied withholding tax rate	Range: 0.0000-0.3000
license_contract_id	String(100)	Reference to underlying license agreement	Required

### 3.2 JSON Schema Example

```
{
  "urds_version": "1.0",
  "transaction": {
    "transaction_id": "550e8400-e29b-41d4-a716-446655440000",
    "timestamp": "2025-11-15T10:30:00Z",
    "payment_details": {
      "amount_usd": 1000000.00,
      "payment_type": "ROYALTY",
      "income_code": "10",
      "payee": {
        "lei": "5493006MHB84DD0ZWV18",
        "name": "Samsung Electronics Co., Ltd.",
        "tax_residence": "KR",
        "beneficial_owner": true,
        "withholding": {
          "treaty_claimed": true,
          "treaty_article": "US-KR-12-2",
          "statutory_rate": 0.30,
          "treaty_rate": 0.10,
          "applied_rate": 0.10,
          "tax_withheld": 100000.00,
          "intellectual_property": {
            "patent_pool_id": "HEVC-ADVANCE-001",
            "license_contract_id": "HEVC-2025-KR-001",
            "place_of_use": ["US", "CA", "MX"],
            "technology_field": "H04N19/00"
          }
        }
      }
    }
  }
}
```

## 4. VALIDATION RULES ENGINE

### 4.1 Treaty Rate Validation Agent

Automated verification process:

1. Extract payee tax residence from LEI database
2. Query applicable US bilateral tax treaty
3. Identify relevant article for royalty income
4. Calculate treaty-compliant withholding rate
5. Compare with applied rate and flag discrepancies

### 4.2 Beneficial Ownership Verification

- Trace ownership chains through LEI parent relationships

- Validate treaty eligibility based on residence certification
- Cross-reference with IRS W-8BEN-E documentation
- Flag potential treaty shopping arrangements

### **4.3 Anomaly Detection Patterns**

- Duplicate treaty claims from same payee
- Misclassified income types (royalty vs. business income)
- Withholding rate outliers by jurisdiction
- Unusual payment patterns or amounts

## **5. API INTEGRATION SPECIFICATION**

### **5.1 RESTful Endpoints**

**POST /api/v1/urds/validate**

Validates URDS transaction data against treaty rules

**POST /api/v1/urds/submit**

Submits validated transaction for Form 1042-S generation

**GET /api/v1/urds/status/{transaction\_id}**

Retrieves processing status and validation results

### **5.2 Authentication & Security**

- OAuth 2.0 authentication with JWT tokens
- TLS 1.3 encryption for all data transmission
- API rate limiting: 1000 requests per hour
- Audit logging of all API interactions

## **6. IMPLEMENTATION ROADMAP**

### **Phase 1: Q1 2026 - Patent Pool Pilot**

- Deploy URDS with 2 major patent pools
- Test validation engine accuracy
- Measure processing time improvements

### **Phase 2: Q3 2026 - IRS Integration**

- Connect URDS to IRS digital gateway
- Beta test with 10-20 withholding agents

- Refine validation rules based on feedback

### **Phase 3: 2027 - Full Deployment**

- Scale to all electronic Form 1042-S filers
- Integrate with OECD CTS framework
- Establish continuous improvement process

## **7. EXPECTED PERFORMANCE METRICS**

- Transaction validation time: <500ms per transaction
- Treaty rate accuracy: 99.5%
- API availability: 99.9% uptime
- Refund processing reduction: 40-50%
- Audit efficiency improvement: 60%

## **8. COMPLIANCE & STANDARDS ALIGNMENT**

- OECD Common Transmission System (CTS) compatible
- ISO 20022 financial messaging standards
- XBRL taxonomy for financial reporting
- FATCA/CRS reporting framework alignment
- IRS Modernized e-File (MeF) system integration

## **9. CONCLUSION**

The Unified Royalty Data Schema represents a paradigm shift in cross-border tax reporting, moving from retrospective manual processes to real-time automated verification. By implementing URDS, the IRS can achieve substantial efficiency gains, reduce refund processing times, and enhance compliance accuracy while positioning the United States as a leader in digital tax administration innovation.

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