



ADRV902x JCOM Transmitter Device Model

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INTRODUCTION

This preliminary applications information document describes how to use Analog Devices, Inc. ADRV902x JESD204C channel object model (JCOM) transmitter MathWorks® Matlab®-based model. It also describes the results expected when the model is used in a JESD204C class C-M reference system

Rev. PrA

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TABLE OF CONTENTS

Introduction 1

Revision History 2

Software Requirements 3

 JCOM Reference Implementation Validation 3

Usage 3

REVISION HISTORY

2/2019—Revision 0: Initial Version

SOFTWARE REQUIREMENTS

- Operating systems: Linux, Microsoft® Windows®, or Apple® macOS®.
- MathWorks® Matlab®, versions 2013a and later.
- MathWorks® Matlab® toolboxes: Control System Toolbox™, RF Toolbox™, and Signal Processing Toolbox™.
- JCOM reference implementation versions: J40.

JCOM REFERENCE IMPLEMENTATION VALIDATION

The following tool is required to perform this verification:

- Linux: md5sum – This utility is typically installed by default in all major distributions. It can be obtained as part of GNU's core utilities packages:
<https://www.gnu.org/software/coreutils>.
- Apple® macOS®: md5 – This utility is part of the operating system and should be installed by default.
- Microsoft® Windows®: certutil – This utility is part of the certificate services and should be installed by default.

The tool needs to be in the executable path to be called by the ADRV902x transmitter model.

USAGE

The ADRV902x transmitter model implements a JCOM transmitter model as described in JESD204C.1 clause E.1, with a maximum data rate of 24.33Gbps. The model may be used to obtain the JCOM of a system, as shown in Figure 1.

JESD204C compliance of the ADRV902x transmitter model may be verified with the JCOM reference implementation configuration file, as shown in the example below:

```
# ADRV902x transmitter test config
# File: adrv902x_tx.cfg

FB, 24.0
TX_MODEL, adrv902x
TX_API_VERSION, 1.0
RX_MODEL, class_cm_rx
RX_ARGS, '(RX (FB_MAX 24))'
RX_API_VERSION, 1.0
VICTIM_PATH, REF_CHANNEL(0.309)
```

This example configuration file assumes that the directory structure follows the standard JCOM reference implementation structure shown with the ADRV902x transmitter model in the +adrv902x MathWorks® Matlab® package directory in Figure 2.

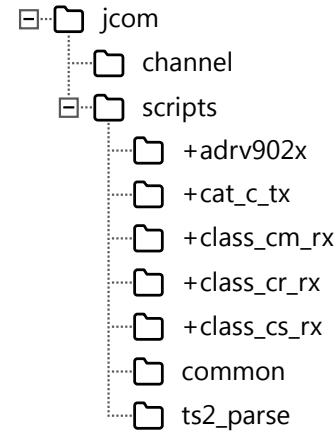


Figure 2: Standard JCOM Directory Structure Showing a +adrv902x MathWorks® Matlab® Package (Where the ADRV902x Transmitter Model Should Be Placed for Usage with the Example JCOM Configuration File— adrv902x_tx.cfg).

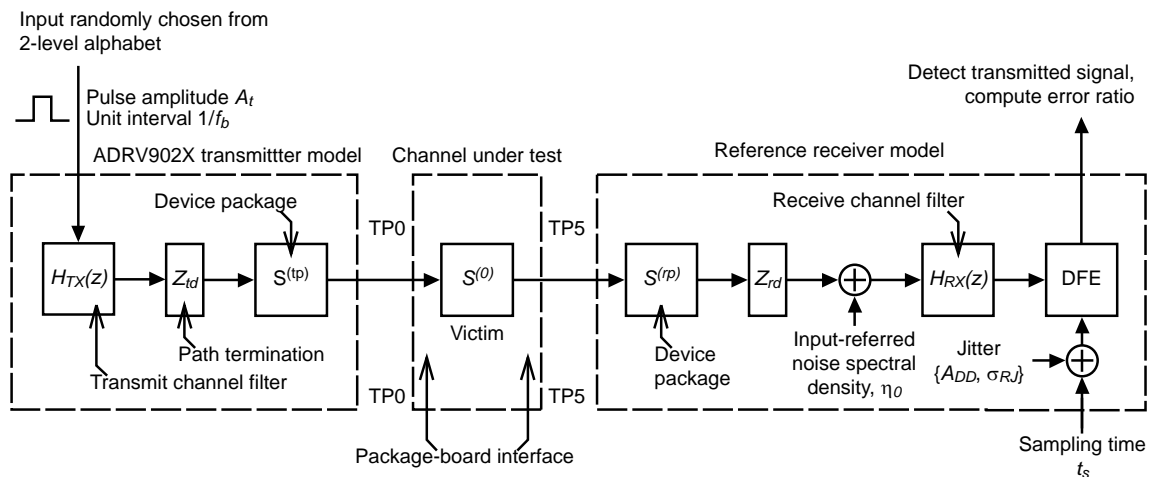


Figure 1. Serial Link Model for JCOM Simulation (Crosstalk Channels Not Shown for Simplicity)

ADRV902X Transmitter JCOM Model

Preliminary Applications Information

When JCOM is run within MathWorks® Matlab® with the example configuration file and directory structure, the output shown in the example on the next page should be the result (JCOM J40 output shown):

```
>> addpath common
>> warning('off', 'all')
>> jcom('adrv902x_tx.cfg');
JESD204C.1 JCOM (Revision J40)
Reference implementation of JESD204C.1 clause 5.2.9

Configuration source: adrv902x_tx.cfg
+-----+-----+-----+-----+
| k | Type | TX | RX | Channel |
+-----+-----+-----+-----+
| 0 | Victim | TxAPI (0, 'adrv902x', '') | RxAPI (0, 'class_cm_rx', '(RX (FB_MAX 24))') | REF_CHANNEL(0.309) |
+-----+-----+-----+-----+

OP_DIAGNOSTICS = 0
OP_DISPLAY_WINDOW = 0
OP_CSV_REPORT = 0
OP_SAVE_FIGURE_TO_CSV = 0
OP_SAVE_MODEL_DATA = 0
OP_RESULT_DIR = ./jcom/scripts/jcom_results
OP_SAVE_FIGURES = 0
OP_PORT_ORDER = [1 3 2 4]

-----
Victim transmitter (Analog Devices, Inc. ADRV902x transmitter model (initial public release))
Model locked
Receiver (Class C-M reference receiver model)
Class: C-M
Max. data rate: 24.00000[Gbps]
Filter settings: 4
DFE taps: 3
Total lanes: 3
Link max. data rate: 24.00000[Gbps]

-----
--- JCOM case summary (1/3) -----
TX lane: 1 (index 1)
Filter setting: 6
RX lane: 1 (index 1)
Filter setting: 3
IL @ fb/2: 19.254[dB]
JCOM: 5.598dB >= 2.000dB ---> PASS
-----
--- JCOM case summary (2/3) -----
TX lane: 1 (index 1)
Filter setting: 6
RX lane: 4 (index 2)
Filter setting: 3
IL @ fb/2: 19.694[dB]
JCOM: 5.104dB >= 2.000dB ---> PASS
-----
--- JCOM case summary (3/3) -----
TX lane: 1 (index 1)
Filter setting: 6
RX lane: 7 (index 3)
Filter setting: 3
IL @ fb/2: 19.963[dB]
JCOM: 4.863dB >= 2.000dB ---> PASS
-----
--- JCOM final results -----
JCOM: 4.863dB (4.863003dB) PASS
fb: 24.00000[Gbps]
Worst case: 3
TX (Analog Devices, Inc. ADRV902x transmitter model (initial public release))
```

```
RX (Class C-M reference receiver model)
Lane: 7
Filter setting: 3
DFE taps: t(1) = 20mV, t(2) = 2mV, t(3) = 2mV
DFE taps: t(1) = 0.362784, t(2) = 0.041977, t(3) = 0.042095
PCB IL @ fb/2: 20.830190dB
Total IL @ fb/2: 19.963212dB
Run time: 24[sec]
-----
>>
```