

**APPLICATION NOTE****Evaluation Board : P/N VWA 0000955 AA****QFN : VWA0000947AA****X-band 5 bits Digital Attenuator in QFN 4x4mm 24L  
Evaluation Board**

|           | Writer     | Controller | Approving |
|-----------|------------|------------|-----------|
| Name      | CTU        | DLB        |           |
| Date      | 12/12/2016 | 16/12/2016 |           |
| Signature | OK         | OK         |           |

## I. HISTORIC

| Edition | Date       | Description of changes |  |
|---------|------------|------------------------|--|
| 1.0     | 12/12/2016 | Creation               |  |
|         |            |                        |  |
|         |            |                        |  |
|         |            |                        |  |
|         |            |                        |  |

## II. REFERENCE DOCUMENTS

| Document Title | Reference Document | Date | Edition |
|----------------|--------------------|------|---------|
|                |                    |      |         |
|                |                    |      |         |
|                |                    |      |         |
|                |                    |      |         |
|                |                    |      |         |

## III. SUMMARY

|       |                                                |   |
|-------|------------------------------------------------|---|
| I.    | HISTORIC .....                                 | 2 |
| II.   | REFERENCE DOCUMENTS .....                      | 2 |
| III.  | SUMMARY .....                                  | 2 |
| IV.   | Introduction .....                             | 3 |
| IV-1. | Description .....                              | 3 |
| IV-2. | Evaluation Board PHOTO .....                   | 3 |
| V.    | Interface and components .....                 | 4 |
| V-1.  | Evaluation board VWA 0000955 AA Interface..... | 4 |
| V-2.  | PCB layout .....                               | 5 |
| V-3.  | Interface cable overview .....                 | 6 |
| VI.   | Operating conditions and truth table .....     | 7 |
| VII.  | Absolute maximum ratings .....                 | 7 |

## IV.INTRODUCTION

### IV-1. Description

The VWA0000955AA is a 5 bits Digital attenuator packaged in QFN and reported on a PCB “evaluation board”. It is working in the DC-18GHz frequencies. It uses the VWA0000947AA component (VWA5001000AA die integrated in 4x4mm plastic QFN).

The evaluation board is composed by 2 mains parts:

- A Digital attenuator packaged in QFN (VWA0000947AA) (1)
- A test structure support : PCB with SMA connectors (2)

The QFN Digital attenuator VWA0000947AA uses the die VWA5001000AA in a 4x4mm plastic QFN.

The test structure support uses a RF PCB with SMA connectors, decoupling components, one DC connector to bias and control the component, and a heat sink. Supply cable are also provided.

This document describes the way to use the evaluation board VWA0000955AA.

RF features and results are not included.

### IV-2. Evaluation Board PHOTO

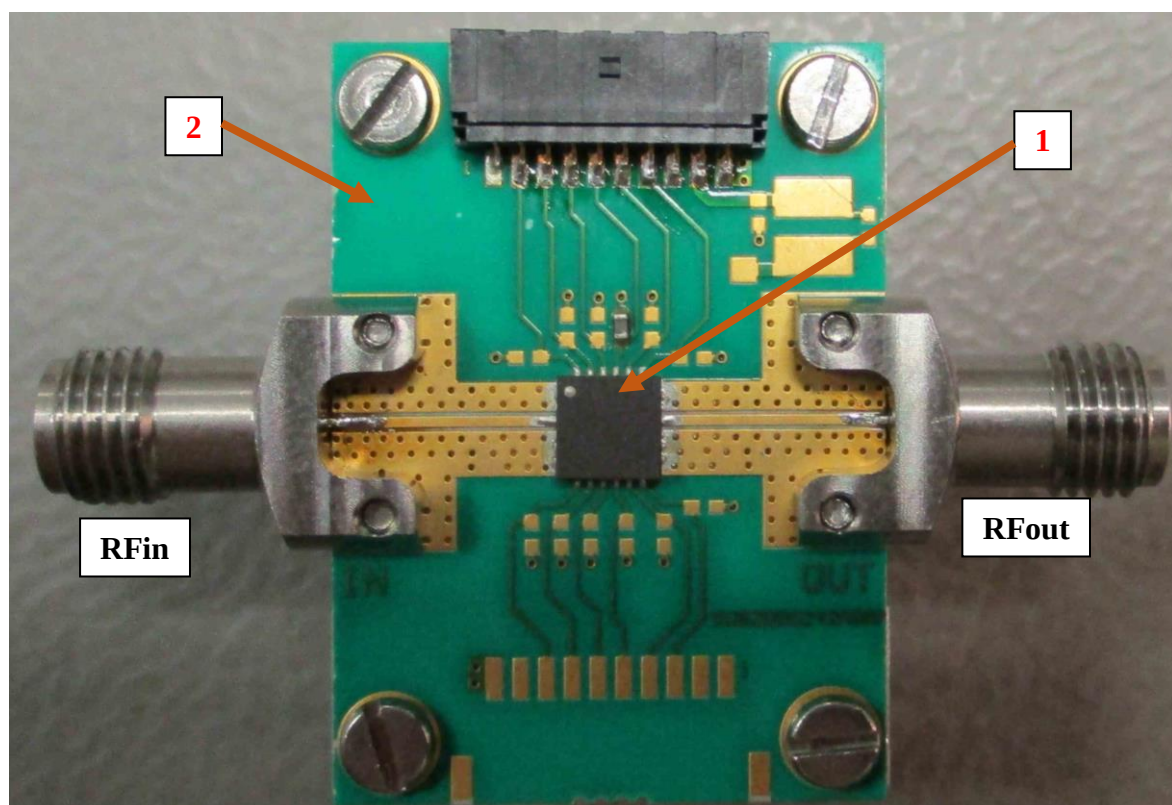


Figure 1: Evaluation board VWA0000955AA photo

|                                                   |                        |                   |
|---------------------------------------------------|------------------------|-------------------|
| Document Reference : VWA0000955AA_AN              | Document Edition : 1.0 | Date : 12/12/2016 |
| Modele : VW-K-048 Edition :1 Date 27 octobre 2010 |                        | Page 3/7          |

## V. INTERFACE AND COMPONENTS

### V-1. Evaluation board VWA 0000955 AA Interface

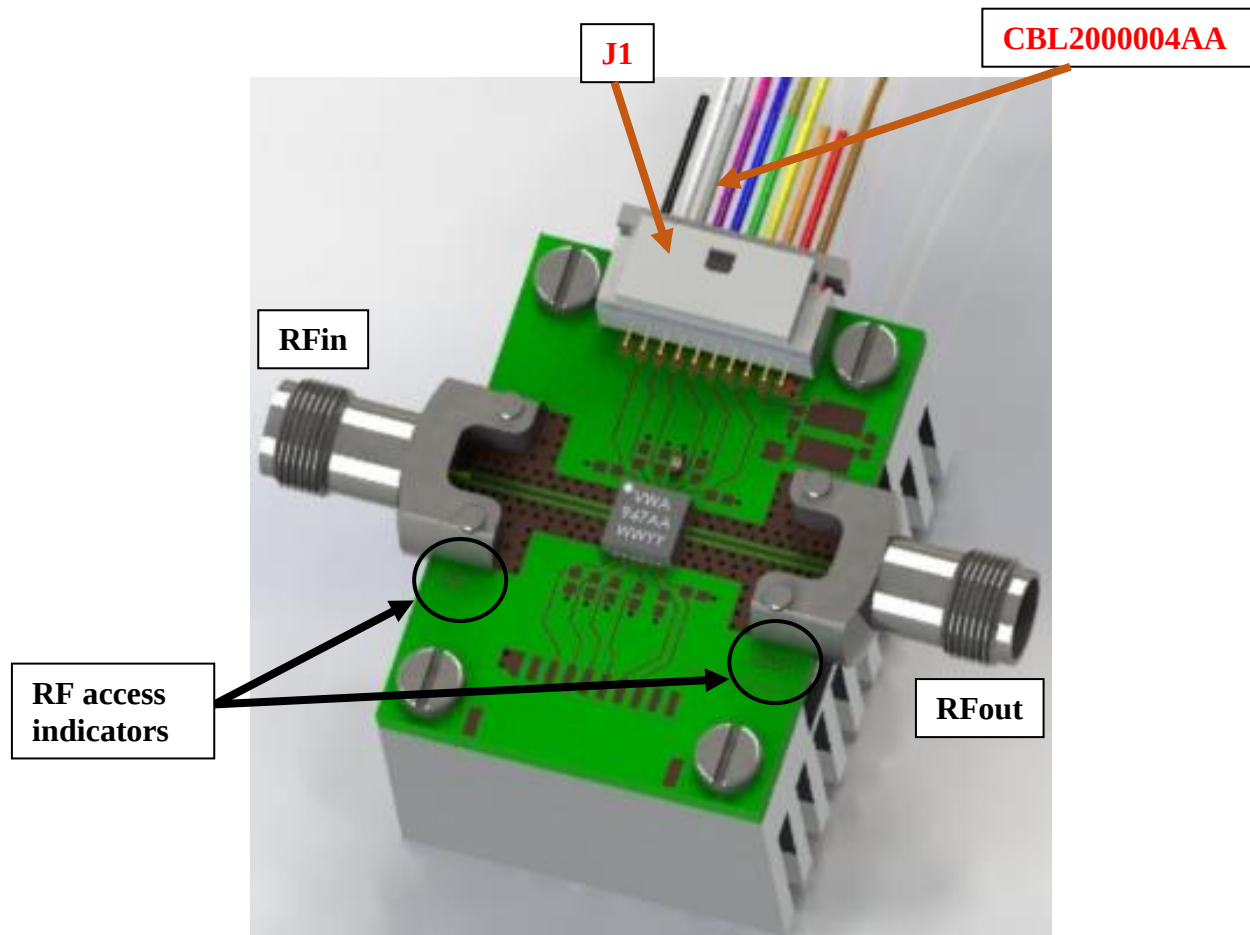


Figure 2: Evaluation board VWA0000955AA interface

| Connector | Type                    | Allocation                                                                             |
|-----------|-------------------------|----------------------------------------------------------------------------------------|
| J1        | SAMTEC<br>T1M-10-F-SH-L | Connect to CBL2000004AA cable :<br>VSS power supply, Vc1 to Vc5 Bit<br>control and GND |
| RFIN      | SMA female              | RF Input                                                                               |
| RFOUT     | SMA female              | RF Output                                                                              |

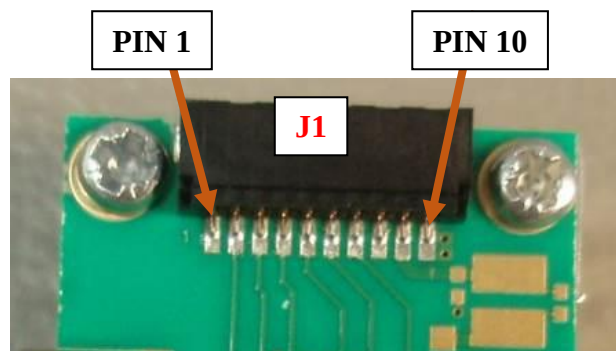


Figure 3: J1 PINOUT

| PIN | J1 Identification | PIN | J1 Identification |
|-----|-------------------|-----|-------------------|
| 1   | NC                | 6   | Vc4               |
| 2   | Vc1               | 7   | Vc5               |
| 3   | Vc2               | 8   | NC                |
| 4   | Vc3               | 9   | NC                |
| 5   | VSS               | 10  | GND               |

Figure 4: J1 PINOUT identification

## V-2. PCB layout

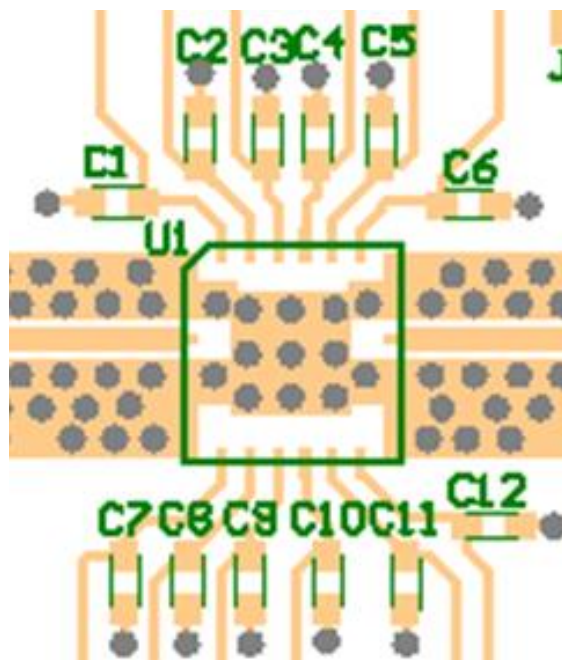


Figure 5: PCB layout

| Components | Value         | Type |
|------------|---------------|------|
| C4         | 1 $\mu$ F/16V | 0402 |

### V-3. Interface cable overview

Evaluation board VWA0000955AA interface cable:

- CBL2000004AA on J1 ( Vc1 to Vc5 / VSS power supply and GND)



Figure 6: CBL2000004AA

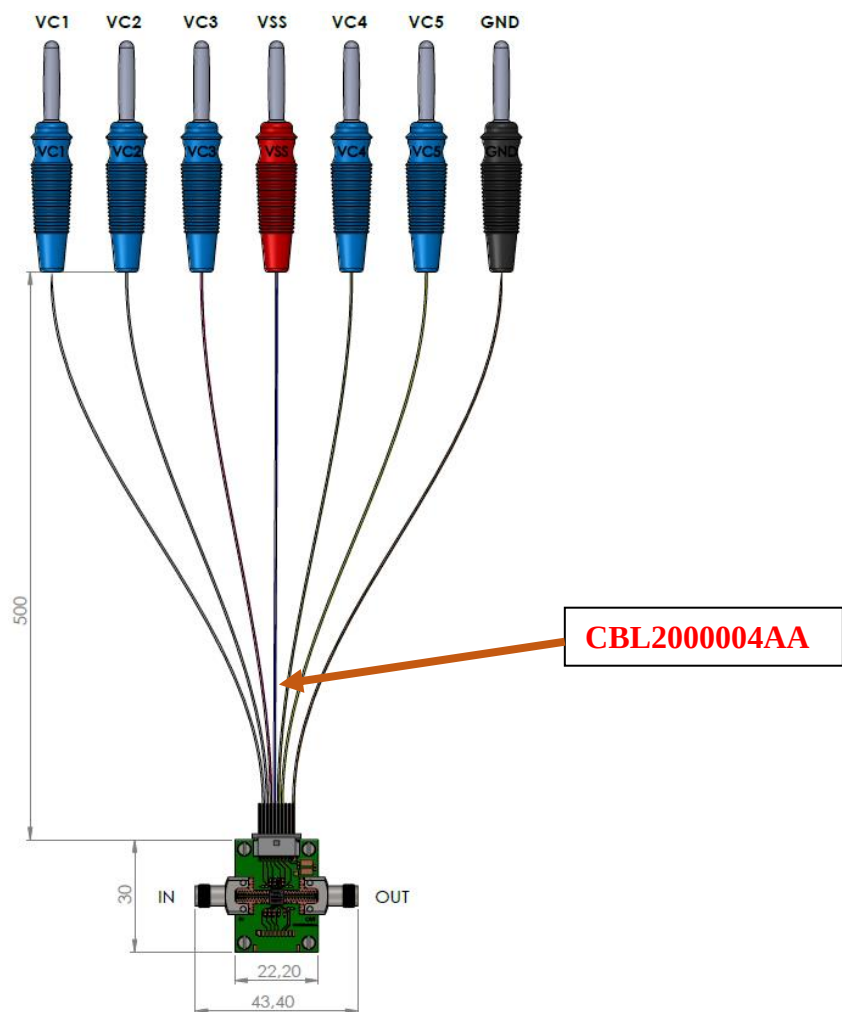


Figure 7: Cable interface

|                                                   |                        |                   |
|---------------------------------------------------|------------------------|-------------------|
| Document Reference : VWA0000955AA_AN              | Document Edition : 1.0 | Date : 12/12/2016 |
| Modele : VW-K-048 Edition :1 Date 27 octobre 2010 |                        | Page 6/7          |

## VI. OPERATING CONDITIONS AND TRUTH TABLE

| Operating conditions        | Symbols           | Min | Typ. | Max | Units |
|-----------------------------|-------------------|-----|------|-----|-------|
| Supply voltage              | VSS               |     | -7.5 |     | V     |
| Supply current (@VSS=-7.5V) | ISS               |     | 9    |     | mA    |
| Control voltage High        | (Vc1 to Vc5) High | 2.0 |      | 5.0 | V     |
| Control voltage Low         | (Vc1 to Vc5) Low  | 0.0 |      | 0.8 | V     |

Figure 8: Operating conditions

| Attenuation level (dB) | Vc1 | Vc2 | VC3 | Vc4 | Vc5 |
|------------------------|-----|-----|-----|-----|-----|
| 0                      | 0   | 0   | 0   | 0   | 0   |
| 0.9                    | 1   | 0   | 0   | 0   | 0   |
| 1.8                    | 0   | 1   | 0   | 0   | 0   |
| 3.6                    | 0   | 0   | 1   | 0   | 0   |
| 7.2                    | 0   | 0   | 0   | 1   | 0   |
| 14.4                   | 0   | 0   | 0   | 0   | 1   |
| 27.9                   | 1   | 1   | 1   | 1   | 1   |

Figure 9: Logic truth table

## VII. ABSOLUTE MAXIMUM RATINGS

| Maximum ratings | Symbols | Min | Max | Units |
|-----------------|---------|-----|-----|-------|
| Supply voltage  | VSS     | -15 |     | V     |
| Supply current  | ISS     |     | 15  | mA    |
| CW Input Power  | Pin     |     | +30 | dBm   |

Operation of this device above any of these parameters may cause permanent damages.

**End of the document**