Version 1.0.0 Date: 2/5/2017. Initial release.

Considering for next version:

* The test plan is quite long: may be let TRL calibration be a separate part is better
* A test plan for NRL arch is quite similar (except for different angle of incident and reflection wave). May be we don’t need to write a completely new
* Expected result requires more information:
  + Step 6: currently less than -40dB. A spec of Keysight’s cal kit. Maybe we don’t need that much if we build our own
  + Step 7: phase response close to 0 (how close?)
* Step 9: comparing to previous measurement of PVC response. We need to find a measurement of our accessible sample. And decide how much agreement do we need between our measurement and datasheet.

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| Test Writer: Ha Tran | | | | | | |
|  | Test Case Name | PVC validation of waveguide method | Test ID | | 1 |  |
|  | Description |  | Test Type | | White box | |
|  | Required hardware | VNA, 2 waveguide, SMA cable, calibration kit Sample and sample holder |  |  |  |  |
|  | Required software | MATLAB for extraction process |  |  |  |  |
|  | Version | 1.0.0 |  |  |  |  |
| Tester information | | | | | | |
|  | Name of tester |  | Date | |  |  |
|  | Hardware, software version |  | Time | |  |  |
| Step | Action | Expected result | Pass | Fail | N/A | Comment |
| 1 | Connect 2 ports of VNA to two waveguide |  |  |  |  |  |
| 2 | Set VNA to TRL calibration |  |  |  |  |  |
| 3 | Calibration: Connect line standard. Take measurement |  |  |  |  |  |
| 3 | Calibration: Connect short standards. Take measurement |  |  |  |  |  |
| 4 | Calibration: Connect two waveguides  directly to make thru setup and take measurement. |  |  |  |  |  |
| 5 | Turn on VNA correction |  |  |  |  |  |
| 6 | Use a termination to terminate two waveguides. Measure return loss | return loss < -40dB |  |  |  |  |
| 7 | Use a known line (different from TRL calibration kit). Set the Electrical Delay in VNA to the delay of the known line. Measure phase of S21, S12 | Flat 0 phase response |  |  |  |  |
| 8 | Connect a sample holder with sample inside to the two waveguide. Measure S21, S12 |  |  |  |  |  |
| 9 | Use S21, S12 with provided MATLAB code for material parameter extraction | Compare to PVC's properties |  |  |  |  |