

# Frequency Translator-Evaluation Board

**ABFT-20.000MHz-EVAL**



**RoHS**  
Compliant



40 x 30 x 8mm

**Moisture Sensitivity Level (MSL)–This product is not Moisture Sensitive MSL = N/A: Not Applicable**

## FEATURES:

- The ABFT Evaluation Boards are available with either the 20MHz or the 40MHz Translator on-board
- These boards provide a convenient means to conduct engineering evaluation of Abracon's Frequency Translator / Jitter Attenuator Solution
- The Evaluation Board is provided with standard SMA connectors for 10MHz Reference In, Supply Voltage and Locked Output
- The Evaluation Board can be tested over -40°C to +85°C Industrial Operating Temperature Range - to quantify frequency tracking over temperature capability of Abracon's solution

## APPLICATIONS:

- Frequency translation, clock smoothing and jitter attenuation of the input 10MHz reference
- Datacom - DSLAM, DSLAR, Access Nodes
- Cable modem head end
- Base Station - GSM, CDMA
- Telecom - SONET/SDH/ATM

## GENERAL DESCRIPTION

ABFT Evaluation Boards comprise of the Ultra Low Jitter ABFT Frequency Translator / Jitter Attenuator, which is ideally suited to improve the Jitter characteristics of the input signal. This device is designed to provide input clock smoothing - while providing Phase and Frequency Locked higher frequency translated output. Typical application will take a 10MHz reference frequency and phase & frequency lock it to either a 20MHz or a 40MHz Low Jitter VCXO. The implemented technology significantly attenuates the jitter content of the 10MHz reference signal; while keeping the higher frequency RF Output - Frequency and Phase Coherent with the input 10MHz reference signal.

## STANDARD SPECIFICATIONS:

| Parameters                                         | Minimum           | Typical                      | Maximum          | Units       | Notes                                                                                                                                                           |
|----------------------------------------------------|-------------------|------------------------------|------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Resonant Frequency                                 |                   | 20.000<br><i>Or</i><br>40.00 |                  | MHz         | See options                                                                                                                                                     |
| Operating Temperature                              | -40               |                              | +85              | °C          |                                                                                                                                                                 |
| Storage Temperature                                | -40               |                              | +85              | °C          |                                                                                                                                                                 |
| Supply Voltage (Vdd)                               | 3.135             | 3.3                          | 3.465            | V           | 3.3V±5%                                                                                                                                                         |
| Input Signal Characteristics                       |                   |                              |                  |             | Input signal must be with-in ±20.00 ppm from 10.00MHz carrier for the ABFT device to achieve lock                                                               |
| Frequency<br>Signal level                          | 9.999800<br>0.300 | 10.000000                    | 10.000200<br>3.3 | MHz<br>Vp-p |                                                                                                                                                                 |
| Lock Time                                          |                   | < 20                         | 50               | ms          |                                                                                                                                                                 |
| Frequency Stability Over Temperature<br>(Note # 1) | -25.00            |                              | +25.00           | ppb         | Referenced to the stable input reference of 10.00MHz (such as a Stratum-III TCXO or an OCXO)                                                                    |
| Internal Frequency Pull Range                      | ±100.00           |                              |                  | ppm         | This is the internal pull range of the ABFT device providing sufficient correction range to account for internal aging, stand-alone temperature variation, etc. |
| Supply Current (I <sub>DD</sub> )                  |                   | < 14.0                       | 20.00            | mA          | Under Lock                                                                                                                                                      |
| <b>RF output Characteristics</b>                   |                   |                              |                  |             |                                                                                                                                                                 |
| Output Load:                                       |                   |                              | 15  10           | pF  kΩ      |                                                                                                                                                                 |
| Rise Time (Tr)                                     |                   | 853                          | 1200             | ps          |                                                                                                                                                                 |
| Fall Time (Tf)                                     |                   | 526                          | 1200             | ps          |                                                                                                                                                                 |
| Symmetry                                           |                   | 48/52                        | 55               | %           |                                                                                                                                                                 |
| Output Voltage (V <sub>OH</sub> )                  | 45                |                              |                  | V           | @1/2Vdd                                                                                                                                                         |
| Output Voltage (V <sub>OL</sub> )                  | 0.9*Vdd           |                              | 0.1*Vdd          | V           |                                                                                                                                                                 |
| Stand alone Aging (Note # 2)                       | -5.0              |                              | +5.0             | ppm         | @+25°C First year                                                                                                                                               |
|                                                    | -12.0             |                              | +12.0            |             | @+25°C After 10 years                                                                                                                                           |

(Note # 1): The frequency stability over temperature of the ABFT device is greatly dependant on the short term perturbations of the input reference signal.

(Note # 2): The Aging characteristics of the Quartz used inside the ABFT solution are such that, the stand-alone aging will not exceed ±12.00 ppm over a 10-year product life; referenced to the initial measured frequency post reflow in end application

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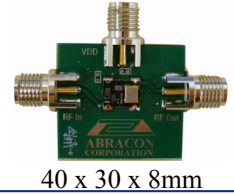
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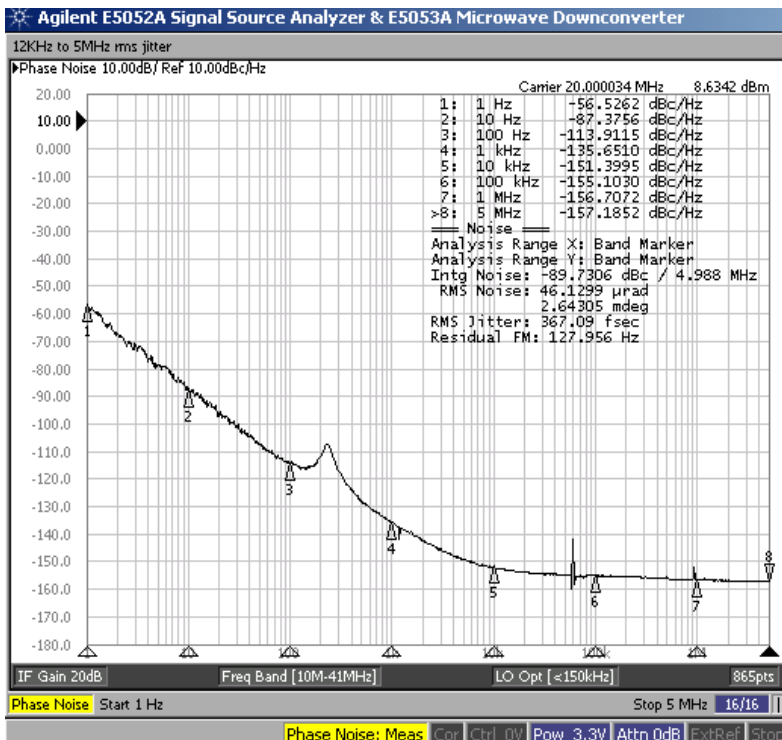
RoHS  
Compliant



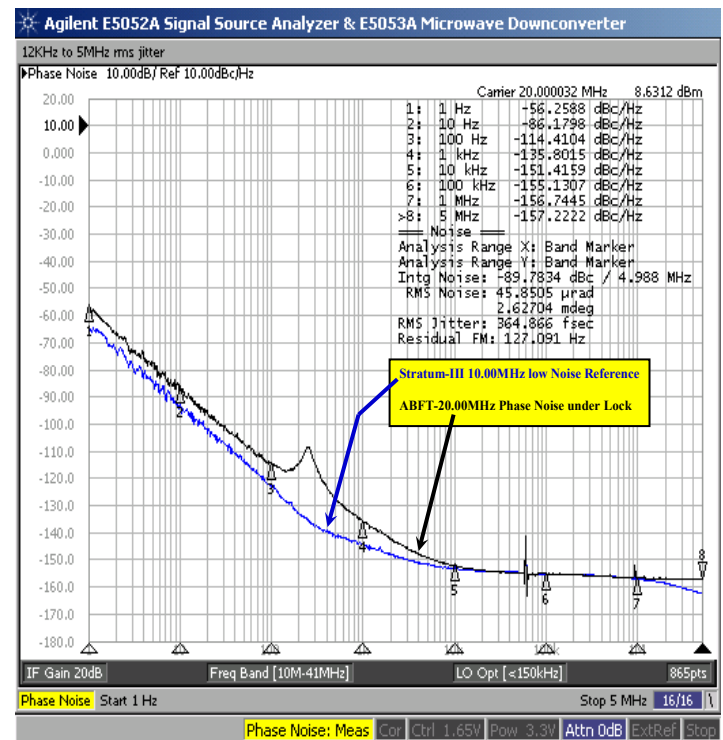
| Parameters                          | Minimum | Typical | Maximum | Units  | Notes                                                                                                                                                                                                        |
|-------------------------------------|---------|---------|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase Noise @ 20MHz carrier         |         |         |         |        | Close to the carrier phase noise is dependent on the cleanliness of the input reference. However, at 1kHz offset and beyond, ABFT phase noise is <b>practically independent</b> of the input reference noise |
| 1Hz offset from the carrier         |         | -56     |         | dBc/Hz |                                                                                                                                                                                                              |
| 10Hz offset from the carrier        |         | -87     |         |        |                                                                                                                                                                                                              |
| 100Hz offset from the carrier       |         | -113    |         |        |                                                                                                                                                                                                              |
| 1,000Hz offset from the carrier     |         | -135    | -130    |        |                                                                                                                                                                                                              |
| 10,000Hz offset from the carrier    |         | -151    | -145    |        |                                                                                                                                                                                                              |
| 100,000Hz offset from the carrier   |         | -155    | -150    |        |                                                                                                                                                                                                              |
| 1,000,000Hz offset from the carrier |         | -156    | -150    |        |                                                                                                                                                                                                              |
| 5,000,000Hz offset from the carrier |         | -157    | -155    |        |                                                                                                                                                                                                              |

## PHASE NOISE

Phase Noise under lock (ABFT-20.00MHz with input connected to a low noise, stable 10.00MHz Stratum-III reference signal)



DetailedComparative Phase Noise Plot  
(Stratum-III 10.0MHz as Reference)



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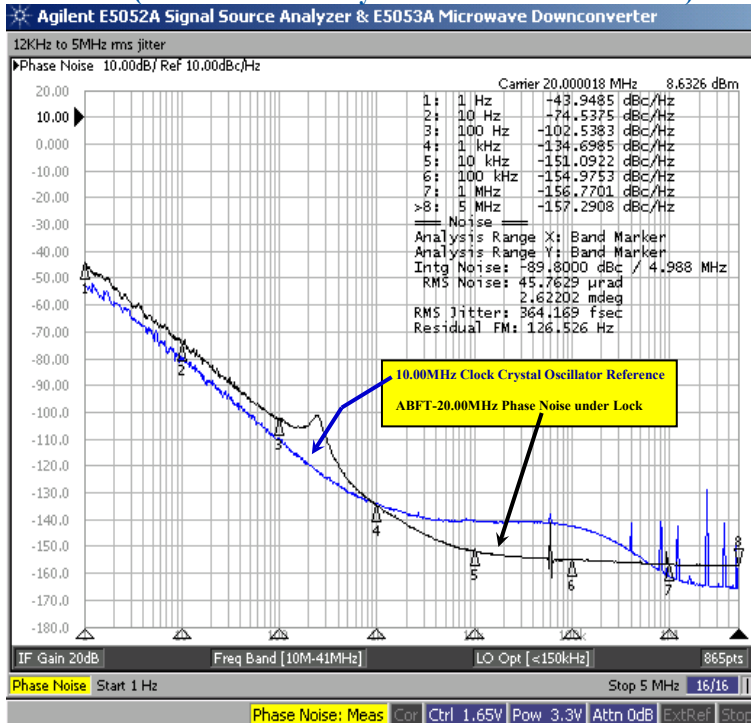
RoHS  
Compliant



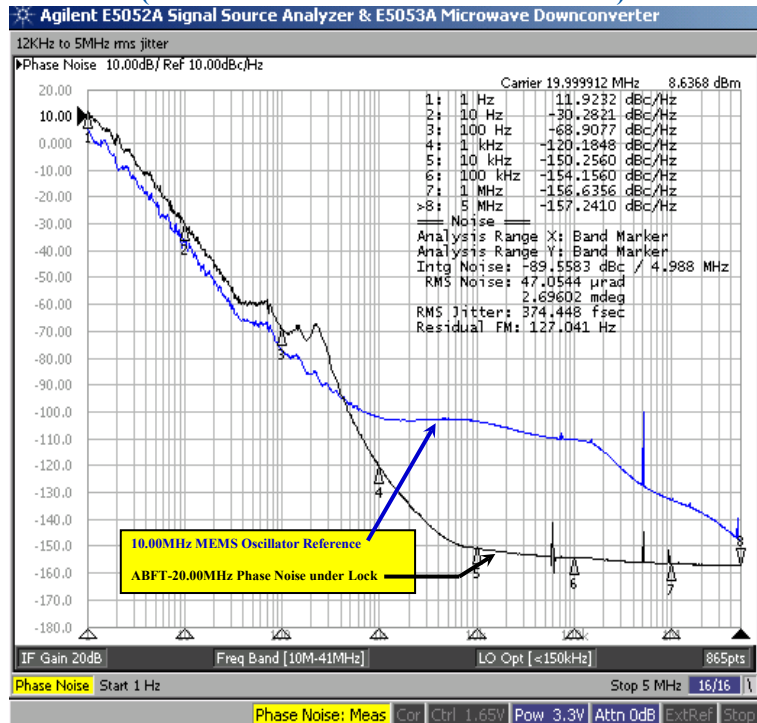
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## PHASE NOISE

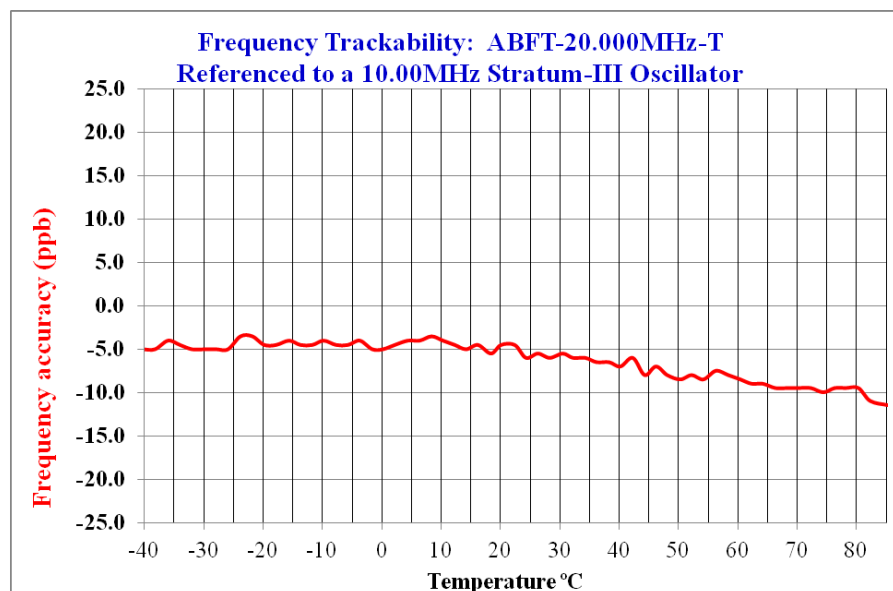
### Detailed Comparative Phase Noise Plot (10.0MHz Clock Crystal Oscillator as Reference)



### Detail Comparative Phase Noise Plot (10.0MHz MEMS Oscillator as Reference)



## FREQUENCY TRACKING OVER TEMPERATURE



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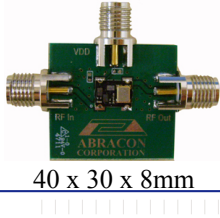


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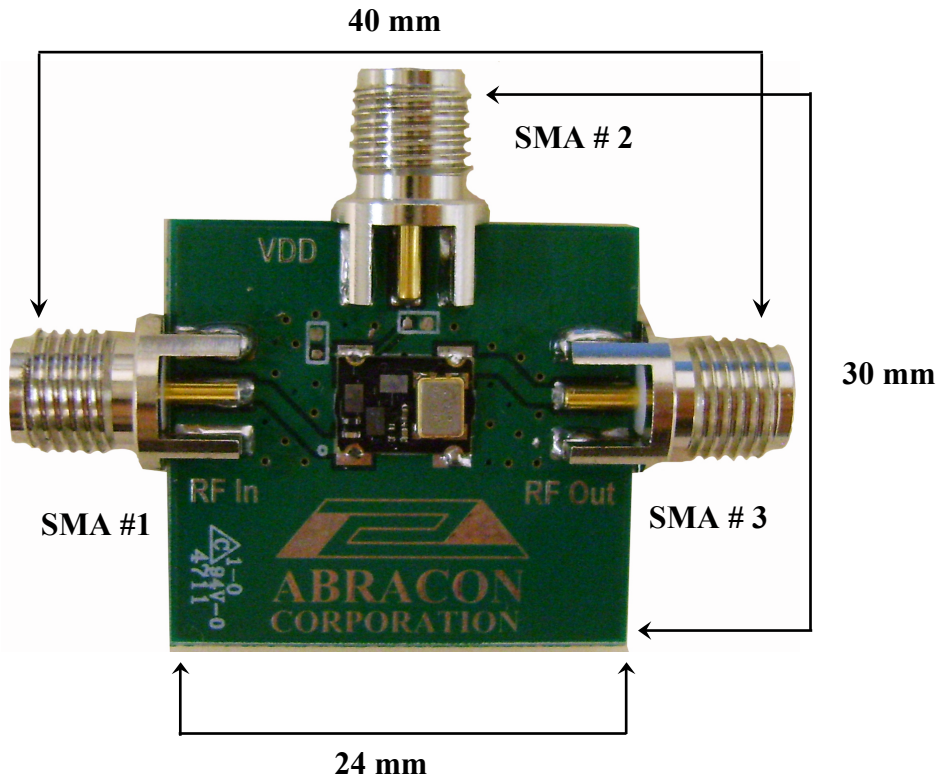


## PART IDENTIFICATION

ABFT -  MHz - EVAL

| Frequency in MHz               |
|--------------------------------|
| 20.000 MHz<br>Or<br>40.000 MHz |

## OUTLINE DIMENSIONS:



| SMA Connector # | Name   | Description                                                                                                                                  |
|-----------------|--------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1               | RF In  | 10MHz Reference Signal to be connected to this port                                                                                          |
| 2               | VDD    | +3.3V (±5%) DC Voltage to be connected to this port to bias the Frequency Translator                                                         |
| 3               | RF Out | Either a 20MHz or a 40MHz LVCMOS signal is present at this port, phase and frequency locked to the 10MHz Reference Signal present on SMA # 1 |

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