

ANNEX B - RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:720



400 No.31 Keeruan Road, Xidian District, Beijing, 100191, China
Tel: +86-10-42289613-2713 Fax: +86-10-42289613-2264
E-mail: info@ttml.com.cn Website: www.ttml.com.cn

Client: **SRTC** Certificate No: **Z18-02399**

CALIBRATION CERTIFICATE

Object: **DAE4, SN: 720**

Calibration Procedure(s): **PP-211.612.01
Calibration Procedure for the Data Acquisition Electronics (DAE)**

Calibration date: **October 15, 2018**

The calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the associated data with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the client laboratory facility, environment temperature(20±0.2°C) and humidity(45%).

Calibration Equipment Used (METS or/and for calibration)

| Primary Standards | ID# | Cal/Caliby/Calibrated by, Certificate No. | Scheduled Calibration |
|------------------------|---------|---|-----------------------|
| Process Calibrator 763 | 1871110 | 20-Jun-18 (CCTL, No. J18K0504) | June-19 |

Calibrated by: **Yu Zengping** SAR Test Engineer
Reviewed by: **Lin Jiao** SAR Test Engineer
Approved by: **Qi Chenyan** SAR Project Leader

Signature: *[Signatures]*

Issued: October 17, 2018

The calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: Z18-02399 Page: 1 of 7




400 No.31 Keeruan Road, Xidian District, Beijing, 100191, China
Tel: +86-10-42289613-2713 Fax: +86-10-42289613-2264
E-mail: info@ttml.com.cn Website: www.ttml.com.cn

Glossary:
DAE: data acquisition electronics
Connector angle: information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.

Certificate No: Z18-02399 Page: 2 of 7



400 No.31 Keeruan Road, Xidian District, Beijing, 100191, China
Tel: +86-10-42289613-2713 Fax: +86-10-42289613-2264
E-mail: info@ttml.com.cn Website: www.ttml.com.cn

DC Voltage Measurement
AD - Conversion Resolution: nominal
High Range: 11.99 mV ± 0.1 μV Full Range: -100, +100 mV
Low Range: 11.99 mV ± 0.1 μV Full Range: -1, +1 mV
DASY Measurement parameters: Auto Zero Time: 3 sec, Measuring Time: 3 sec

| Calibration Factors | X | Y | Z |
|---------------------|-----------------------|-----------------------|-----------------------|
| High Range | 483.742 ± 0.19% (k=2) | 494.773 ± 0.19% (k=2) | 493.238 ± 0.19% (k=2) |
| Low Range | 3.80274 ± 0.7% (k=2) | 3.81000 ± 0.7% (k=2) | 3.80888 ± 0.7% (k=2) |

Connector Angle

| | |
|--|----------|
| Connector Angle to be used in DAE system | 20° ± 1° |
|--|----------|

Certificate No: Z18-02399 Page: 3 of 7

EX3DV4 Sn:3708 (1/7)

Calibration Laboratory of Survey & Patent Engineering AG
 Accredited by the State Administration for Market Regulation
 The State Accreditation Service is one of the agencies in the EA Multilateral Agreement for the recognition of calibration certificates.

Accreditation No.: **SCS 8108**

Issue: **SRTC (Accred)** Certificate No.: **EX3-3708_DatE**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3708**

Calibration according to: **ISO CALIBRUS CA-CAL-10 VE DA CAL 14.04 GA CAL 10.16, GA CAL 25.04, DA CAL 25.04**
 Calibration procedure for distributed E-field systems

Calibration date: **October 22, 2018**

This calibration certificate documents the conditions for technical services, which enable the stated values of measurements (M). The measurement uncertainty and conditions are available on the pages on the following pages and are part of the certificate.

All calibration values have been verified for standard laboratory humidity and temperature (23 ± 0.5 °C and humidity = 50%).

Calibration Equipment used (MPP): not to be calibrated

| Parameter | Unit | Cal. Date / Certificate No. | Subsequent Calibration |
|------------------------|------------------|---------------------------------|------------------------|
| Power Meter DHP | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 21.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference 75 Ω 40V/25V | dB, 40V/1V (20V) | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference Power EX3DV4 | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Gain | dB/dB | 21.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference Antennas | dB | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |

Calibrated by: **Stefan Linder** (Survey Laboratory Technician)

Approved by: **Guido Huber** (Technical Manager)

Issue Date: **11. 2018**

Certificate No.: **EX3-3708_DatE** Page 1 of 7

Calibration Laboratory of Survey & Patent Engineering AG
 Accredited by the State Administration for Market Regulation
 The State Accreditation Service is one of the agencies in the EA Multilateral Agreement for the recognition of calibration certificates.

Accreditation No.: **SCS 8108**

Issue: **SRTC (Accred)** Certificate No.: **EX3-3708_DatE**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3708**

Calibration according to: **ISO CALIBRUS CA-CAL-10 VE DA CAL 14.04 GA CAL 10.16, GA CAL 25.04, DA CAL 25.04**
 Calibration procedure for distributed E-field systems

Calibration date: **October 22, 2018**

This calibration certificate documents the conditions for technical services, which enable the stated values of measurements (M). The measurement uncertainty and conditions are available on the pages on the following pages and are part of the certificate.

All calibration values have been verified for standard laboratory humidity and temperature (23 ± 0.5 °C and humidity = 50%).

Calibration Equipment used (MPP): not to be calibrated

| Parameter | Unit | Cal. Date / Certificate No. | Subsequent Calibration |
|------------------------|------------------|---------------------------------|------------------------|
| Power Meter DHP | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 21.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference 75 Ω 40V/25V | dB, 40V/1V (20V) | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference Power EX3DV4 | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Gain | dB/dB | 21.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Reference Antennas | dB | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 20V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |
| Power Meter DHP 2P | dB, 40V/1V | 20.09.18 (776), 21.08.18 (1882) | Ann 2 |

Calibrated by: **Stefan Linder** (Survey Laboratory Technician)

Approved by: **Guido Huber** (Technical Manager)

Issue Date: **11. 2018**

Certificate No.: **EX3-3708_DatE** Page 1 of 7

EX3DV4 - SN:3708

October 22, 2018

Probe EX3DV4

SN:3708

Manufactured: July 21, 2009
 Calibrated: October 22, 2018

Calibrated for DASY/EASY Systems
 (Note: Not compatible with DASY2 systems)

Certificate No.: **EX3-3708_DatE** Page 3 of 7

EX3DV4 - SN:3708

October 22, 2018

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Basic Calibration Parameters

| Parameter | Mean 1 | Mean 2 | Mean 3 | Unc. (k=2) |
|----------------|--------|--------|--------|------------|
| NIST 1990/1992 | 0.26 | 0.26 | 0.27 | ± 0.11 % |
| DHP 2017 | 0.24 | 0.26 | 0.26 | |

Modulation Calibration Parameters

| Mod | Carrier | A | B | C | D | E | F | G | H | Unc. (k=2) |
|-----|---------|-----|-----|-----|------|------|------|------|------|------------|
| 1 | AM | 0.5 | 0.2 | 1.2 | 0.22 | 1.02 | 1.02 | 1.02 | 1.02 | ± 0.5 % |
| 2 | FM | 0.2 | 0.2 | 1.2 | 1.02 | 1.02 | 1.02 | 1.02 | 1.02 | ± 0.5 % |
| 3 | PM | 0.2 | 0.2 | 1.2 | 1.02 | 1.02 | 1.02 | 1.02 | 1.02 | ± 0.5 % |

Note: For details on UFD parameters see Appendix.

Sensor Model Parameters

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
| 1 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
| 2 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |
| 3 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 |

The reported uncertainty of measurements is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Footnotes:
 1) The properties of items 1-12 are also the properties of the probe.
 2) Uncertainty is determined using the new definition from 2010 regarding applying probability distribution and is expressed by the square of the standard deviation.

Certificate No.: **EX3-3708_DatE** Page 4 of 7

EX3DV4 Sn:3708 (2/7)

EX3DV4 - SN:3708 October 20, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Free Space Spreading Media

| Frequency ¹ | Maximal Permittivity | Conductivity (S/m) | Coef. X | Coef. Y | Coef. Z | Alpha ² | Delta ³ (dB) | Unc. (dB) |
|------------------------|----------------------|--------------------|---------|---------|---------|--------------------|-------------------------|-------------|
| 470 | 40.5 | 0.07 | 8.78 | 8.79 | 8.79 | 0.10 | 1.01 | ± 0.13 (3%) |
| 750 | 41.8 | 0.08 | 8.85 | 8.86 | 8.86 | 0.08 | 0.80 | ± 0.12 (3%) |
| 820 | 41.8 | 0.08 | 8.95 | 8.96 | 8.96 | 0.07 | 0.80 | ± 0.12 (3%) |
| 1430 | 40.3 | 0.09 | 8.80 | 8.80 | 8.78 | 0.08 | 0.80 | ± 0.12 (3%) |
| 1710 | 40.1 | 0.07 | 8.20 | 8.20 | 8.20 | 0.08 | 0.84 | ± 0.12 (3%) |
| 1920 | 40.0 | 0.09 | 7.80 | 7.80 | 7.80 | 0.08 | 0.80 | ± 0.12 (3%) |
| 2400 | 40.0 | 0.08 | 7.80 | 7.80 | 7.80 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3300 | 38.0 | 0.07 | 7.00 | 7.01 | 7.01 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3400 | 38.2 | 0.08 | 7.10 | 7.10 | 7.10 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3600 | 38.0 | 0.08 | 7.00 | 7.00 | 7.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3900 | 38.0 | 0.08 | 6.90 | 6.90 | 6.90 | 0.08 | 0.80 | ± 0.12 (3%) |
| 4000 | 38.0 | 0.08 | 6.90 | 6.90 | 6.90 | 0.08 | 0.80 | ± 0.12 (3%) |
| 4500 | 36.0 | 0.08 | 6.40 | 6.40 | 6.40 | 0.08 | 0.80 | ± 0.12 (3%) |
| 5000 | 35.0 | 0.08 | 6.20 | 6.20 | 6.20 | 0.08 | 0.80 | ± 0.12 (3%) |
| 5500 | 34.0 | 0.08 | 6.00 | 6.00 | 6.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 6000 | 33.0 | 0.07 | 5.70 | 5.70 | 5.70 | 0.08 | 0.80 | ± 0.12 (3%) |

¹ Frequency validity above 300 MHz and a 100 MHz only applies to model v4.4 and higher (see Page 1), and is restricted to 10 MHz. The uncertainty in the E-field of the Coef² components of calibration frequency and the uncertainty for the calibration frequency term (frequency validity above 300 MHz) is ± 0.20, 0.20 and 0.20 dB for Coef² components of 20, 30, 40, and 50 dB/m respectively. Measurement frequency validity can be extended to 10 MHz.

² An uncertainty below 0.10 dB, the validity of these parameters is not to be used for accuracy to 1% of gain (comparison between a specific measurement setup). At frequencies below 0.10 dB, the validity of these parameters is not to be used for accuracy to 1% of the E-field of the Coef² components for individual target loss components.

³ Alpha/Delta are determined using spherical SF600 antennas. The accuracy is due to the frequency effect after compensation is about 0.05 dB for frequencies below 3 GHz and below 0.1% for frequencies below 3 GHz in any direction other than half the plane by the antenna from the location.

EX3DV4 - SN:3708 October 20, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Body Tissue Spreading Media

| Frequency ¹ | Maximal Permittivity | Conductivity (S/m) | Coef. X | Coef. Y | Coef. Z | Alpha ² | Delta ³ (dB) | Unc. (dB) |
|------------------------|----------------------|--------------------|---------|---------|---------|--------------------|-------------------------|-------------|
| 800 | 50.7 | 0.04 | 9.70 | 9.70 | 9.70 | 0.08 | 1.01 | ± 0.13 (3%) |
| 750 | 50.8 | 0.04 | 9.51 | 9.51 | 9.51 | 0.08 | 0.80 | ± 0.12 (3%) |
| 820 | 50.2 | 0.07 | 9.80 | 9.80 | 9.79 | 0.07 | 0.84 | ± 0.12 (3%) |
| 1430 | 50.6 | 0.09 | 7.80 | 7.80 | 7.80 | 0.08 | 0.80 | ± 0.12 (3%) |
| 1710 | 50.4 | 0.08 | 7.00 | 7.00 | 7.00 | 0.07 | 0.80 | ± 0.12 (3%) |
| 1920 | 50.0 | 0.07 | 7.00 | 7.00 | 7.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 2400 | 50.0 | 0.07 | 7.00 | 7.00 | 7.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3300 | 48.0 | 0.07 | 7.00 | 7.00 | 7.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3400 | 48.2 | 0.08 | 7.10 | 7.10 | 7.10 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3600 | 48.0 | 0.08 | 7.00 | 7.00 | 7.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 3900 | 48.0 | 0.08 | 6.90 | 6.90 | 6.90 | 0.08 | 0.80 | ± 0.12 (3%) |
| 4000 | 48.0 | 0.08 | 6.90 | 6.90 | 6.90 | 0.08 | 0.80 | ± 0.12 (3%) |
| 4500 | 46.0 | 0.08 | 6.40 | 6.40 | 6.40 | 0.08 | 0.80 | ± 0.12 (3%) |
| 5000 | 45.0 | 0.08 | 6.20 | 6.20 | 6.20 | 0.08 | 0.80 | ± 0.12 (3%) |
| 5500 | 44.0 | 0.08 | 6.00 | 6.00 | 6.00 | 0.08 | 0.80 | ± 0.12 (3%) |
| 6000 | 43.0 | 0.07 | 5.70 | 5.70 | 5.70 | 0.08 | 0.80 | ± 0.12 (3%) |

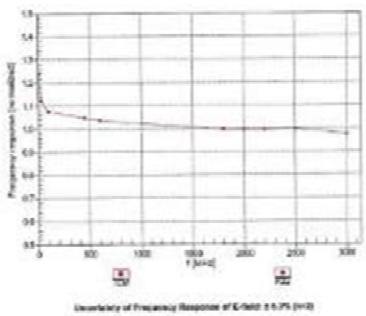
¹ Frequency validity above 300 MHz and a 100 MHz only applies to model v4.4 and higher (see Page 1), and is restricted to 10 MHz. The uncertainty in the E-field of the Coef² components of calibration frequency and the uncertainty for the calibration frequency term (frequency validity above 300 MHz) is ± 0.20, 0.20 and 0.20 dB for Coef² components of 20, 30, 40, and 50 dB/m respectively. Measurement frequency validity can be extended to 10 MHz.

² An uncertainty below 0.10 dB, the validity of these parameters is not to be used for accuracy to 1% of gain (comparison between a specific measurement setup). At frequencies below 0.10 dB, the validity of these parameters is not to be used for accuracy to 1% of the E-field of the Coef² components for individual target loss components.

³ Alpha/Delta are determined using spherical SF600 antennas. The accuracy is due to the frequency effect after compensation is about 0.05 dB for frequencies below 3 GHz and below 0.1% for frequencies below 3 GHz in any direction other than half the plane by the antenna from the location.

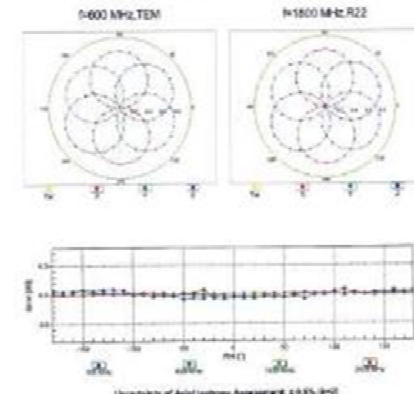
EX3DV4 - SN:3708 October 20, 2019

Frequency Response of E-Field
(TEM-Gate 9110 EDG, Waveguide: R22)

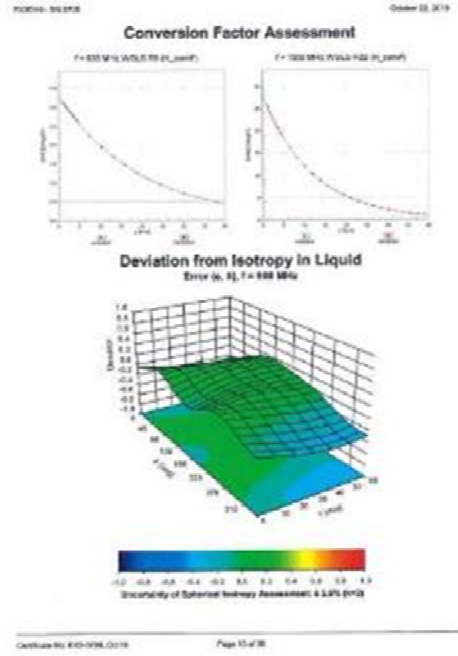
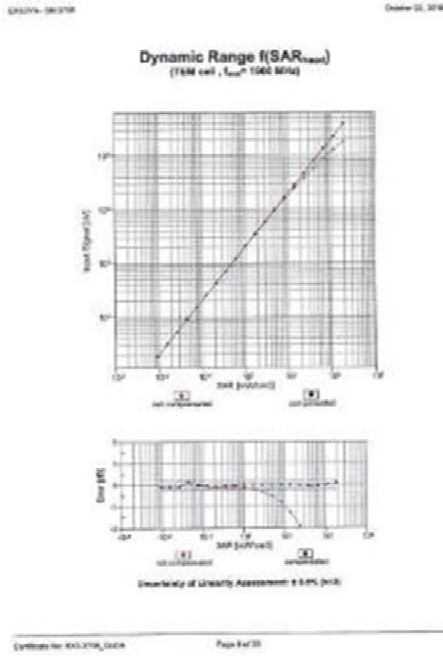


EX3DV4 - SN:3708 October 20, 2019

Receiving Pattern (θ = 0°)



EX3DV4 Sn:3708 (3/7)



EX3DV4 - SN:3708 October 23, 2019

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Other Probe Parameters

| | |
|---|---------------|
| Sensor Attachment | Y-String (in) |
| Connector Angle (°) | 3.5° |
| Maximum Surface Detection Mode | enabled |
| Optics System Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 10 mm |
| Tip Diameter | 2.3 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 1.4 mm |

Certificate No. SRT-2019_0014 Page 11 of 33