

EMC & OPTICS

Price List Calibrations 2013

Seibersdorf Labor GmbH – EMC & Optics

Tel.: +43 (0) 50550-2849 | Mail: rf-calibration@seibersdorf-laboratories.at | www.seibersdorf-laboratories.at/rf

Valid from 2013-01-01

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel.: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBATWW

1 Calibration of Antennas

1.1 Calibration of Antennas for Radiated Emission Measurements

The following table recommends the calibration procedures for the most common radiated emission test standards, this makes the choice easy. You are very welcome to consult Seibersdorf Laboratories for your individual quotation.

Radiated Emission Test Standard	Calibration Standard (Recommended)	Price list Chapter/Code
ANSI C63.4	ANSI C63.5	1.1.1, 1.1.2, 1.1.5
CISPR 11, 13, 14, 16-2-3, 22	ANSI C63.5	1.1.1, 1.1.2, 1.1.5
CISPR 25	SAE ARP 958	1.1.3, 1.1.5
DO 160F	SAE ARP 958	1.1.3, 1.1.5
Fully Anechoic Room, Precompliance	Freespace Calibration	1.1.4
IEC 61000-6-3 IEC 61000-6-4	ANSI C63.5	1.1.1, 1.1.2, 1.1.5
MIL Std. 461	SAE ARP 958	1.1.5, 1.1.6

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBATWW

1.1.1 Calibration of Broadband Antennas according to ANSI C63.5

Free space antenna factor calibration of a broadband antenna according to ANSI C63.5:2006 on our reference open-area test site above groundplane.

Details:

Test distance: 10 m (from reference point)
 Antenna height (TX): 2 m
 Antenna height (RX): height scan 1 – 4 m
 Polarization: horizontal
 Environment: open area test site
 Results: free space antenna factor
 VSWR (horizontal polarization, 2 m height)
 balun unsymetry (vertical polarization; up to 300 MHz)

Additionally (not specified and required by ANSI C63.5) we offer the evaluation of the polarization and distance dependence of the antenna factor:

- calibration in horizontal and vertical polarization
- calibration in 10 m and 3 m distance

No.	Antenna Type	Frequency Range	“Freespace”AF	Evaluation
			Price	polarization or distance Price
A1a	Biconical antenna	20 - 300 MHz	800,-	600,-
A1b	Log.-periodic antenna	200 - 1000 MHz	800,-	600,-
A1c	Biconical log-per antenna	30 - 1000 MHz	890,-	700,-
A1d	Biconical log-per antenna	30 - 2000 MHz	1020,-	820,-
A1e	Biconical log-per antenna	30 - 3000 MHz	1 180,-	900,-
A1f	Biconical log-per antenna	30 - 6000 MHz	1 490,-	1 150,-
A1i	Biconical antenna or Broadband dipole	30 - 1000 MHz	890,-	700,-
A1j	Biconical antenna or Broadband dipole	80 - 3000 MHz	1 180,-	900,-

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
 www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
 Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBAAATWW

Free space antenna factor calibration of a broadband antenna according to ANSI C63.5:2006 under quasi free-space conditions.

Details for horn antenna calibrations:

Test distance: 3 m (from aperture)
 Environment: quasi free-space
 Result: free-space antenna factor

A1k	Horn antenna or log.per antenna	0.75 – 18 GHz	800,-
A1l	Horn antenna or log.per antenna	0.85 – 26.5 GHz (>20 GHz out of scope of accreditation)	1 180,-
A1m	Horn antenna or log.per antenna	18 – 40 GHz (>20 GHz out of scope of accreditation)	1 080,-

Options

No.	Description	Price
A1x	Indication of the antenna gain (mismatch considered) in addition to the antenna factor for calibrations A1a, A1b, A1c, A1d, A1e, A1f, A1i, A1j, A1k, A1l, A1m	270,-
A1y	Indication of the antenna VSWR in addition to the antenna factor for calibrations A1k, A1l, A1m	270,-

1.1.2 Calibration of Tuned Dipole Antennas according to ANSI C63.5

The calibration of the antenna factor is done by substitution against Seibersdorf Precision Reference Dipoles (PRD) on our open-area test site above groundplane.

Details:

Test distance: 10 m
 Antenna height (TX): 2 m
 Polarization: horizontal
 Environment: open area test site
 27 Frequencies: 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 125, 140, 150, 160, 175, 180, 200, 270, 300, 400, 500, 600, 700, 800, 900 and 1000 MHz
 Results: antenna factor

No.	Antenna Type	Frequency Range	Price
A1p	Tunable dipole antenna	30 – 1000 MHz	1 960,-

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
 www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
 Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBATWW

1.1.3 Calibration of Broadband Antennas according to SAE ARP 958

Antenna factor calibration of a broadband antenna according to SAE ARP 958 on our reference open-area test site above groundplane.

Details:

Test distance: 1 m (from antenna tip)
 Antenna height (TX, RX): 3 m
 Polarization: vertical
 Environment: open area test site
 Results: antenna factor or gain*
 (Please specify if you require antenna factor or gain data, if not we will determine the antenna factor.)

No.	Antenna Type	Frequency Range	Price
A2a	Biconical antenna	20 – 300 MHz	800,-
A2b	Log.-periodic antenna	200 – 1000 MHz	800,-
A2d	Conical spiral antenna	200 - 1000 MHz or 1 - 10 GHz	800,-
A2e	Biconical log-per ant.	30 - 1000 MHz	890,-
A2f	Biconical log-per ant.	30 - 2000 MHz	890,-
A2g	Biconical log-per ant.	30 - 3000 MHz	960,-
A2h	Biconical log-per ant.	30 - 6000 MHz	1 490,-

Details for horn antenna calibrations:

Test distance: 1 m (from aperture)
 Environment: quasi free-space
 Results: antenna factor or gain*

(Please specify if you require antenna factor or gain data if not we will determine the antenna factor.)

A2c	Horn antenna or log.per antenna (without VSWR)	0.75 – 18 GHz	800,-
A2i	Horn antenna or log.per antenna	0.85 – 26.5 GHz (>20 GHz out of scope of accreditation)	1 180,-
A2j	Horn antenna or log.per antenna (without VSWR)	18 – 40 GHz (>20 GHz out of scope of accreditation)	1 080,-

Options

No.	Description	Price
A2x	Indication of the antenna gain (mismatch considered) in addition to the antenna factor for calibrations A2a, A2b, A2c, A2d, A2e, A2f, A2g, A2h	270,-
A2y	Indication of the antenna VSWR in addition to the antenna factor for calibrations A2a, A2b, A2c, A2d, A2e, A2f, A2g, A2h	270,-

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
 www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
 Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBAAWWW

1.1.4 Calibration of Broadband Antennas in Free Space Environment

Antenna factor calibration of a broadband antenna in a quasi free space environment.

Details:

Test distance: 3 m (from reference point of the antenna)
 Antenna height (TX, RX): 6 m
 Polarization: vertical
 Environment: quasi free-space
 Results: antenna factor or gain
 (Please specify if you require antenna factor or gain data if not we will determine the antenna factor.)

No.	Antenna Type	Frequency Range	Price
A2Fa	Biconical antenna	20 – 300 MHz	800,-
A2Fb	Log.-periodic antenna	200 – 1000 MHz	800,-
A2Fe	Biconical log-per ant.	30 - 1000 MHz	890,-
A2Ff	Biconical log-per ant.	30 - 2000 MHz	890,-
A2Fg	Biconical log-per ant. or Broadband dipole	30 - 3000 MHz	930,-
A2Fh*	Biconical log-per ant.*	30 - 6000 MHz*	1 440,-
A2Fi	Biconical antenna or Broadband dipole	30 - 1000 MHz	890,-
A2Fj	Biconical antenna or Broadband dipole	80 - 3000 MHz	930,-
A2Fk	Broadband dipole (e.g. sPOD: 1.5 m distance)	1 – 6 GHz or 6-18 GHz	800,-

* The calibration is split - calibrations in the frequency range 30 – 3000 MHz are performed as described above, calibrations from 3000 MHz – 6000 MHz are performed under quasi free-space conditions (fully anechoic chamber) with a test distance of 1 m or 3 m measured from the tip of the antenna.

Options

No.	Description	Price
A2Fx	Indication of the antenna gain (mismatch considered) in addition to the antenna factor for calibrations A2Fa, A2Fb, A2Fe, A2Ff, A2Fg, A2Fh, A2Fi, A2Fj	270,-
A2Fy	Indication of the antenna VSWR in addition to the antenna factor for calibrations A2Fa, A2Fb, A2Fe, A2Ff, A2Fg, A2Fh, A2Fi, A2Fj, A2Fk	270,-

1.1.5

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel.: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
 www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
 Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBAAWWW

1.1.6 Calibration of Active Rod Antennas

The active rod antenna is calibrated using the calibration kit described in SAE-ARP 958 or ANSI C63.5. We are able to calibrate the monopole antenna types:

- EMCO3401B
- EMCO3403
- Schwarzbeck VAMP 9243
- Schwarzbeck VAMP 9240
- Rohde & Schwarz HFH2-Z6
- Eaton 94607-1
- A.H. Systems SAS-550-1B
- A.H. Systems SAS-550-2B
- PMM RA-01
- PMM RA-01-HV
- others upon request.

Details:

Method: ECSM – equivalent capacitance substitution method
 Results: antenna factor

No.	Antenna Type	Frequency Range	Price
A2m	Active rod antenna	30 Hz ^{*)} - 30 MHz	800,-

*) the accredited frequency range is 1 kHz – 30 MHz.

1.1.7 Calibration of Magnetic Loop Antennas

The calibration of magnetic loop antennas is performed by generating a known magnetic field in a TEM cell.

Details:

Environment: TEM Cell
 Results: antenna factor

No.	Antenna Type	Frequency Range	Price
A2n	Loop antenna	20 Hz - 30 MHz	800,-

1.2 Calibration of Antennas for Test Site Validations

At this special calibration the antenna pair reference (APR) and the sum of the antenna factors (DAF = Dual Antenna Factor) of transmit- and receive antenna is determined for the configuration(s) of a reference site method (RSM) and normalized site attenuation measurement (NSA). This improves the accuracy of the antenna factor and is essential for accurate site attenuation measurements.

1.2.1 Broadband Antenna Pairs above Reflecting Groundplane

Details:

Test distance:	3 m or 10 m
Antenna height (TX)::	1 m and 2 m for horizontal polarization
Antenna height (TX):	1 m and 1.5 m for vertical polarization
Antenna height (RX):	heightscan 1 m – 4 m
Environment:	open area test site
Results:	antenna pair reference (APR) and dual antenna factor (DAF)

For precision site validations we recommend to use the same antenna mast also for calibration of the antenna pair. This includes coupling effects between antenna and antenna mast which is critical for vertical polarization of biconical antennas in the calibration factor. In our company we use Maturo AM4.0.

No.	Antenna Type	Frequency Range	Price
A3a	biconical antenna	30 – 200 MHz	2 090,-
A3b	log.-periodic antenna	200 – 1000 MHz	2 090,-
A3c	biconical log. periodic antenna	30 – 1000 MHz	3 060,-

1.2.2 Tuned Half-Wave Dipole Pairs above Reflecting Groundplane

Details:

Test distance:	3 m or 10 m
Antenna height:	2 m for horizontal polarization
Antenna height:	2.75 m for vertical polarization
Environment:	open area test site
27 Frequencies:	30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 125, 140, 150, 160, 175, 180, 200, 270, 300, 400, 500, 600, 700, 800, 900 and 1000 MHz
Results:	dual antenna factor (DAF) and antenna pair reference (APR)

No.	Antenna Type	Frequency Range	Price
A3p	Tuneable dipole antenna pair	30 - 1000 MHz	3 950,-

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
 www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
 Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBAAWW

1.2.3 Broadband Antenna Pairs in Free Space Environment

Calibration of an antenna pair in a quasi free space environment or on a fully anechoic test site.

Details:

Test distance:	3 m or 5 m
Environment:	Quasi free-space or free-space
Polarization:	vertical
Results:	antenna pair reference (APR) and dual antenna factor (DAF)

No.	Antenna Type	Frequency Range	Price
A3d	2 biconical antennas	30 - 200 MHz	800,-
A3e	2 log.-periodic antennas	200 - 1000 MHz	800,-
A3g	2 horn antenna or 2 log.per antennas	1 - 18 GHz	800,-
A3h*	TX: small biconical antenna RX: biconical log-per antenna	30 – 1000 MHz	900,-
A3i*	TX: small biconical antenna RX1: biconical antenna RX2: log. per. antenna	30 – 1000 MHz	1 490,-

* according to CISPR 16-1-4

1.2.4 Calibration of Antennas for Site VSWR Measurements according to CISPR 16-1-4

Calibration of broadband omnidirectional antennas used for site validations according to the Site-VSWR procedure specified in CISPR 16-1-4 with a frequency resolution of 1 GHz.

Details:

Test distance:	1.5 m
Environment:	fully anechoic test site
Results:	antenna factor VSWR radiation pattern (E-Plane, H-Plane)

The ÖKD certificate includes the directional pattern in E-plane and H-plane with a resolution of 1°, the antenna factor and the VSWR.

No.	Antenna Model	Frequency Range	Price
A4a	POD 16	1 – 6 GHz	1 580,-
A4b	POD 618	6 – 18 GHz	1 700,-
A4c	SBA 9113	0.5 – 3 GHz	1 580,-
A4d	SBA 9112	3 – 18 GHz	1 700,-
A4e	SBA 9119	1 – 6 GHz	1 580,-
A4s	Calibration of an antenna set (2 antennas) according to A4a+A4b or A4c+A4d or A4e+A4d	(0.5) / 1 – 18 GHz	2 240,-

Errors and changes excepted, any former price lists become invalid. Payment: 30 days net after receipt of invoice. Prices in EUR, valid EXW Seibersdorf (Incoterms ICC 2010), exclusive VAT. The General Terms of Delivery of the Seibersdorf Labor GmbH (AIT - Supply- and Payment conditions) are exclusively applicable.

Seibersdorf Labor GmbH | 2444 Seibersdorf, Austria | Tel: +43 (0) 50550-2500 | Fax: +43 (0) 50550-2502 | E-Mail: office@seibersdorf-laboratories.at
www.seibersdorf-laboratories.at | Regional court Wiener Neustadt | Company no: 319187v | DVR no: 4000728 | VAT: ATU64767504 | Tax no: 192/6571 | Certified according to ISO 9001:2008
Bank details: Erste Bank der Österreichischen Sparkassen AG | Sort Code 20111 | Account no 291-140-380/00 | IBAN AT112011129114038000 | BIC GIBATWW