

Appendix C for SZCR230700241006

Calibration certificate

1. Dipole
D2450V2 - SN 733(2022/11/02)
D5GHzV2 - SN 1165(2022/11/01)
2. DAE
DAE4 - SN 1663(2023/03/27)
3. Probe
EX3DV4 - SN 7636 (2023/06/05)



1. Dipole

D2450V2 - SN 733



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 CALIBRATION
 CNAS L0570



Client **SGS**

Certificate No: **Z22-60489**

CALIBRATION CERTIFICATE			
Object	D2450V2 - SN: 733		
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits		
Calibration date:	November 2, 2022		
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.			
All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity<70%.			
Calibration Equipment used (M&TE critical for calibration)			
Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106276	10-May-22 (CTTL, No.J22X03103)	May-23
Power sensor NRP6A	101369	10-May-22 (CTTL, No.J22X03103)	May-23
Reference Probe EX3DV4	SN 7464	26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Jan-23
DAE4	SN 1556	12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Jan-23
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL, No. J22X00409)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL, No.J22X00406)	Jan-23
Calibrated by:	Name Zhao Jing	Function SAR Test Engineer	Signature
Reviewed by:	Name Lin Hao	Function SAR Test Engineer	Signature
Approved by:	Name Qi Dianyuan	Function SAR Project Leader	Signature
Issued: November 7, 2022			
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Certificate No: Z22-60489

Page 1 of 6



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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM _{x,y,z}
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

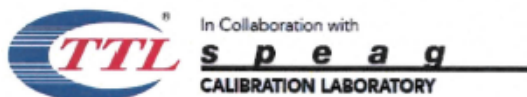
- c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- **Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- **SAR measured:** SAR measured at the stated antenna input power.
- **SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- **SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement 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%.





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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.2 W/kg ± 18.8 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.3 W/kg ± 18.7 % (k=2)



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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.2Ω+ 3.67jΩ
Return Loss	- 28.7dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.066 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 2022-11-02

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 733

Communication System: UID 0, CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.793$ S/m; $\epsilon_r = 39.42$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(7.77, 7.77, 7.77) @ 2450 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.2 V/m; Power Drift = -0.07 dB

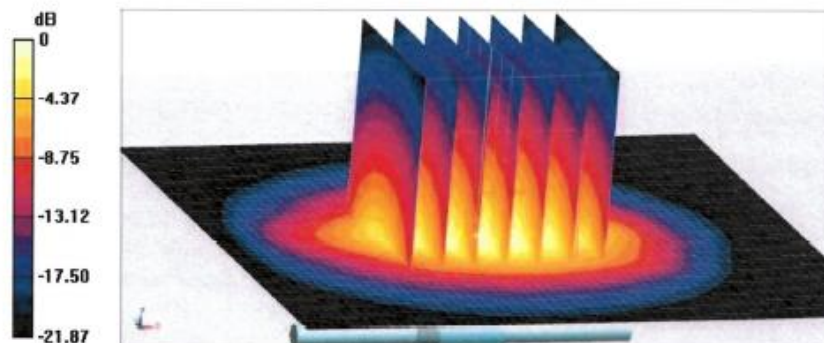
Peak SAR (extrapolated) = 26.6 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 6.07 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 49.6%

Maximum value of SAR (measured) = 21.5 W/kg



0 dB = 21.5 W/kg = 13.32 dBW/kg



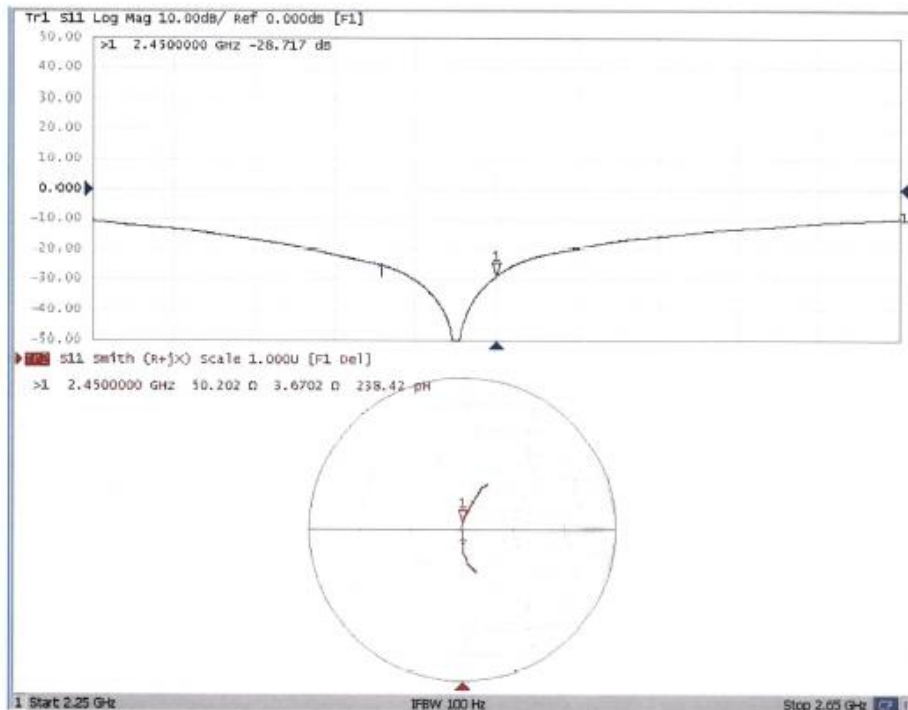
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Impedance Measurement Plot for Head TSL



D5GHzV2 - SN 1165



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 CNAS L0570



Client **SGS**

Certificate No: **Z22-60490**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1165**

Calibration Procedure(s) **FF-Z11-003-01
 Calibration Procedures for dipole validation kits**

Calibration date: **November 1, 2022**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)°C and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106276	10-May-22 (CTTL, No.J22X03103)	May-23
Power sensor NRP6A	101369	10-May-22 (CTTL, No.J22X03103)	May-23
Reference Probe EX3DV4	SN 7464	26-Jan-22(SPEAG,No.EX3-7464_Jan22)	Jan-23
DAE4	SN 1556	12-Jan-22(CTTL-SPEAG,No.Z22-60007)	Jan-23
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	13-Jan-22 (CTTL, No. J22X00409)	Jan-23
Network Analyzer E5071C	MY46110673	14-Jan-22 (CTTL, No.J22X00406)	Jan-23

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: November 7, 2022

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEC/IEEE 62209-1528, "Measurement Procedure for The Assessment of Specific Absorption Rate of Human Exposure to Radio Frequency Fields from Hand-held and Body-mounted Wireless Communication Devices- Part 1528: Human Models, Instrumentation and Procedures (Frequency range of 4 MHz to 10 GHz)", October 2020
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- **Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- **Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- **Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- **Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- **SAR measured:** SAR measured at the stated antenna input power.
- **SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- **SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement 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%.



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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.68 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5250MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	77.3 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.1 W/kg ± 24.2 % (k=2)



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Head TSL parameters at 5600MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	5.05 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5600MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	81.3 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.1 W/kg ± 24.2 % (k=2)

Head TSL parameters at 5750MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.21 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	---	---

SAR result with Head TSL at 5750MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	77.1 W/kg ± 24.4 % (k=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	21.3 W/kg ± 24.2 % (k=2)



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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250MHz

Impedance, transformed to feed point	49.0Ω- 4.73jΩ
Return Loss	- 26.3dB

Antenna Parameters with Head TSL at 5600MHz

Impedance, transformed to feed point	53.5Ω+ 1.12jΩ
Return Loss	- 28.9dB

Antenna Parameters with Head TSL at 5750MHz

Impedance, transformed to feed point	54.8Ω- 1.85jΩ
Return Loss	- 26.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.114 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feed-point can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feed-point may be damaged.

Additional EUT Data

Manufactured by	SPEAG
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DASY5 Validation Report for Head TSL

Date: 2022-11-01

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1165

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz,
Frequency: 5750 MHz

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.677$ S/m; $\epsilon_r = 35.15$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.047$ S/m; $\epsilon_r = 34.56$; $\rho = 1000$ kg/m³

Medium parameters used: $f = 5750$ MHz; $\sigma = 5.211$ S/m; $\epsilon_r = 34.35$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(5.43, 5.43, 5.43) @ 5250 MHz; ConvF(4.91, 4.91, 4.91) @ 5600 MHz; ConvF(4.85, 4.85, 4.85) @ 5750 MHz; Calibrated: 2022-01-26
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2022-01-12
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.46 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 31.1 W/kg

SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.22 W/kg

Smallest distance from peaks to all points 3 dB below = 7.5 mm

Ratio of SAR at M2 to SAR at M1 = 65.3%

Maximum value of SAR (measured) = 18.3 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66.78 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 35.8 W/kg

SAR(1 g) = 8.17 W/kg; SAR(10 g) = 2.33 W/kg

Smallest distance from peaks to all points 3 dB below = 7.5 mm

Ratio of SAR at M2 to SAR at M1 = 62.3%

Maximum value of SAR (measured) = 20.0 W/kg



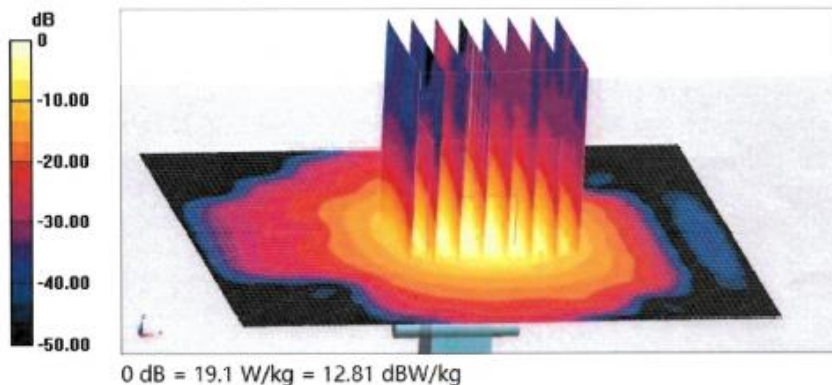
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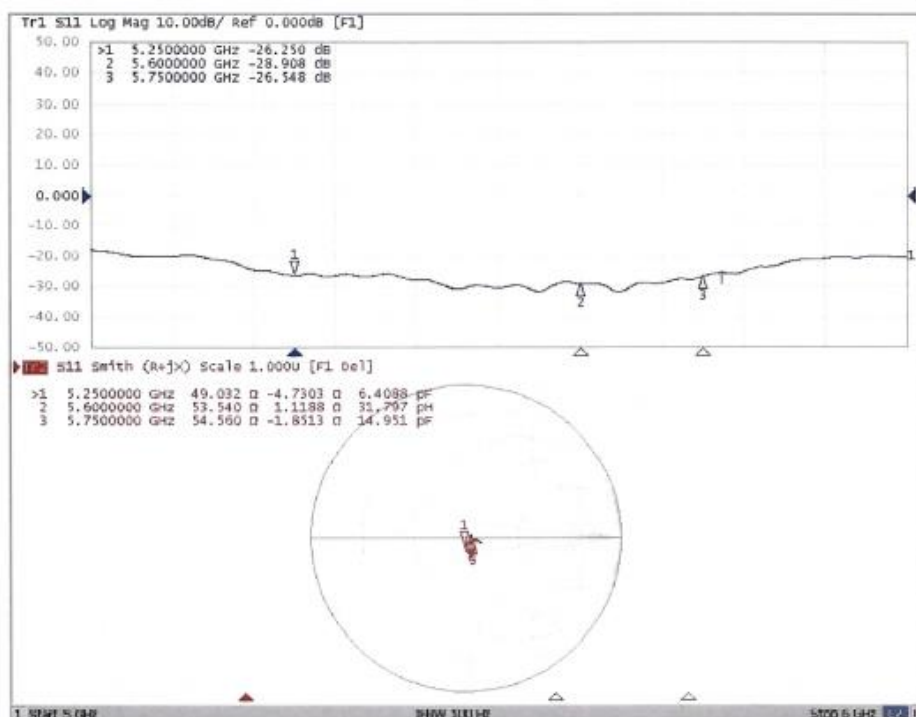
Dipole Calibration /Pin=100mW, d=10mm, f=5750 MHz/Zoom Scan,
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.99 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 35.9 W/kg
SAR(1 g) = 7.76 W/kg; SAR(10 g) = 2.15 W/kg
Smallest distance from peaks to all points 3 dB below = 6.8 mm
Ratio of SAR at M2 to SAR at M1 = 61.4%
Maximum value of SAR (measured) = 19.1 W/kg





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Impedance Measurement Plot for Head TSL



2. DAE4 - SN 1663



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CALIBRATION CERTIFICATE			
Object	DAE4 - SN: 1663		
Calibration Procedure(s)	FF-Z11-002-01 Calibration Procedure for the Data Acquisition Electronics (DAEx)		
Calibration date:	March 27, 2023		
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.			
All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.			
Calibration Equipment used (M&TE critical for calibration)			
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	1971018	14-Jun-22 (CTTL, No.J22X04180)	Jun-23
Calibrated by:	Name Yu Zongying	Function SAR Test Engineer	Signature
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	
Issued: March 28, 2023			
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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.





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DC Voltage Measurement

A/D - Converter Resolution nominal
 High Range: 1LSB = 6.1μV, full range = -100...+300 mV
 Low Range: 1LSB = 61nV, full range = -1.....+3mV
 DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec




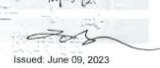
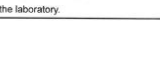
Calibration Factors	X	Y	Z
High Range	405.048 ± 0.15% (k=2)	405.004 ± 0.15% (k=2)	404.684 ± 0.15% (k=2)
Low Range	4.00278 ± 0.7% (k=2)	3.98104 ± 0.7% (k=2)	4.00564 ± 0.7% (k=2)



Connector Angle

Connector Angle to be used in DASY system	53.5° ± 1°
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3. EX3DV4 - SN 7636

			
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CALIBRATION CERTIFICATE			
Object	EX3DV4 - SN : 7636		
Calibration Procedure(s)	FF-Z11-004-02 Calibration Procedures for Dosimetric E-field Probes		
Calibration date:	June 05, 2023		
This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.			
All calibrations have been conducted in the closed laboratory facility: environment temperature(22.3°C) and humidity<70%.			
Calibration Equipment used (M&TE critical for calibration)			
Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101547	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Power sensor NRP-Z91	101548	14-Jun-22(CTTL, No.J22X04181)	Jun-23
Reference 10dBAttenuator	18N50W-10dB	19-Jan-23(CTTL, No.J23X00212)	Jan-25
Reference 20dBAttenuator	18N50W-20dB	19-Jan-23(CTTL, No.J23X00211)	Jan-25
OCF DAK-3.5	SN 1040	18-Jan-23(SPEAG, No.OCF-DAK3.5-1040_Jan23)	Jan-24
Reference Probe EX3DV4	SN 7517	27-Jan-23(SPEAG, No.EX-7517_Jan23)	Jan-24
DAE4	SN 1555	25-Aug-22(SPEAG, No.DAE4-1555_Aug22)	Aug-23
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGenerator MC3700A	6201062605	14-Jun-22(CTTL, No.J22X04182)	Jun-23
Network Analyzer E5071C	MY46110673	10-Jan-23(CTTL, No.J23X00104)	Jan-24
Reference 10dBAttenuator	BT0520	11-May-23(CTTL, No.J23X04061)	May-25
Reference 20dBAttenuator	BT0267	11-May-23(CTTL, No.J23X04062)	May-25
Calibrated by:	Name: Yu Zongying	Function: SAR Test Engineer	Signature: 
Reviewed by:	Name: Lin Hao	Function: SAR Test Engineer	Signature: 
Approved by:	Name: Qi Dianyuan	Function: SAR Project Leader	Signature: 
Issued: June 05, 2023			
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Client: SGS		Certificate No: J23Z60232	
Glossary:			
TSL	tissue simulating liquid		
NORMx,y,z	sensitivity in free space		
ConvF	sensitivity in TSL / NORMx,y,z		
DCP	diode compression point		
CF	crest factor (1/duty_cycle) of the RF signal		
A,B,C,D	modulation dependent linearization parameters		
Polarization Φ	Φ rotation around probe axis		
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), $\theta=0$ is normal to probe axis		
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system		
Calibration is Performed According to the Following Standards:			
a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013			
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016			
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010			
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"			
Methods Applied and Interpretation of Parameters:			
<ul style="list-style-type: none"> NORMx,y,z: Assessed for E-field polarization $\theta=0$ (fs900MHz in TEM-cell; f> 1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2 field uncertainty inside TSL (see below ConvF). NORM(f)x,y,z = NORMx,y,z * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF. DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media. PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics. Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z: A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode. ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for fs900MHz) and inside waveguide using analytical field distributions based on power measurements for f<900MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha_depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from fs50MHz to fs100MHz. Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna. Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required. Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required). 			
Certificate No: J23Z60232		Page 2 of 22	



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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7636									
Basic Calibration Parameters									
	Sensor X	Sensor Y	Sensor Z	Unc (k=2)					
Norm($\mu V/(Vm)^{\frac{1}{2}}$) ^A	0.65	0.70	0.68	±10.0%					
DCP(mV) ^B	114.5	112.0	108.9						
Calibration Results for Modulation Response									
UID	Communication System Name	A dB	B dB μV	C	D dB	VR mV	Max Dev.	Max Unc ^E (k=2)	
0	CW	X	0.0	0.0	1.0	0.00	214.1	±2.1%	
		Y	0.0	0.0	1.0		221.3	±4.7%	
		Z	0.0	0.0	1.0		215.8		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	1.52	60.00	5.73	60	±2.3%	±9.6%	
		Y	1.63	60.61	6.04	10.00	60		
		Z	1.60	60.62	6.14	60			
10353-AAA	Pulse Waveform (200Hz, 20%)	X	0.81	60.00	4.43	80	±3.0%	±9.6%	
		Y	6.00	64.00	5.00	6.90	80		
		Z	0.79	60.00	4.57	80			
10354-AAA	Pulse Waveform (200Hz, 40%)	X	0.30	140.17	1.27	95	±2.6%	±9.6%	
		Y	0.05	135.86	1.29	3.98	95		
		Z	0.05	133.83	1.40	95			
10355-AAA	Pulse Waveform (200Hz, 60%)	X	0.10	158.70	18.91	120	±1.4%	±9.6%	
		Y	0.00	155.51	44.53	2.22	120		
		Z	0.00	155.38	41.51	120			
10387-AAA	QPSK Waveform, 1 MHz	X	0.43	60.40	8.64	150	±4.3%	±9.6%	
		Y	0.35	60.00	8.64	1.00	150		
		Z	0.43	60.00	8.68	150			
10388-AAA	QPSK Waveform, 10 MHz	X	1.12	63.17	11.45	150	±1.4%	±9.6%	
		Y	0.91	61.68	10.31	0.00	150		
		Z	1.08	62.30	11.24	150			
10396-AAA	64-QAM Waveform, 100 kHz	X	1.96	66.12	16.95	150	±1.0%	±9.6%	
		Y	1.73	64.63	16.42	3.01	150		
		Z	1.67	63.90	16.12	150			
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	3.79	65.04	14.76	150	±5.0%	±9.6%	
		Y	3.57	66.29	14.82	0.00	150		
		Z	3.81	65.78	14.83	150			
Note: For details on UID parameters see Appendix									
The reported uncertainty of measurement 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%.									
^A The uncertainties of Norm X, Y, Z do not affect the E ² -field uncertainty inside TSL (see Page 5). ^B Numerical linearization parameter: uncertainty not required. ^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.									
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DASY/EASY – Parameters of Probe: EX3DV4 – SN: 7636

Sensor Model Parameters

	C1 ff	C2 ff	α V ⁻¹	T1 ms.V ⁻²	T2 ms.V ⁻¹	T3 ms	T4 V ⁻²	T5 V ⁻¹	T6
X	9.81	68.74	31.29	0.92	0.00	4.90	0.45	0.00	1.02
Y	7.71	54.90	32.15	0.92	0.00	4.90	0.31	0.00	1.02
Z	9.96	72.07	33.11	0.92	0.00	4.90	0.00	0.02	1.02

Other Probe Parameters


Sensor Arrangement	Triangular
Connector Angle (°)	127.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	1.4mm



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DASY/EASY – Parameters of Probe: EX3DV4 – SN:7636

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz] ^c	Relative Permittivity ^f	Conductivity (S/m) ^f	ConvF X	ConvF Y	ConvF Z	Alpha ^g	Depth ^d (mm)	Unc. (k=2)
750	41.9	0.89	10.76	10.76	10.76	0.16	1.30	±12.7%
835	41.5	0.90	10.40	10.40	10.40	0.14	1.40	±12.7%
1750	40.1	1.37	8.89	8.89	8.89	0.27	1.03	±12.7%
1900	40.0	1.40	8.63	8.63	8.63	0.26	0.99	±12.7%
2100	39.8	1.49	8.57	8.57	8.57	0.25	1.08	±12.7%
2450	39.2	1.80	8.05	8.05	8.05	0.65	0.68	±12.7%
2600	39.0	1.96	7.85	7.85	7.85	0.48	0.82	±12.7%
3300	38.2	2.71	7.44	7.44	7.44	0.39	1.00	±13.9%
3600	37.9	2.91	7.20	7.20	7.20	0.42	1.05	±13.9%
3700	37.7	3.12	7.00	7.00	7.00	0.41	1.00	±13.9%
3900	37.5	3.32	6.91	6.91	6.91	0.40	1.25	±13.9%
4100	37.2	3.53	6.87	6.87	6.87	0.35	1.25	±13.9%
5250	35.9	4.71	5.65	5.65	5.65	0.40	1.45	±13.9%
5600	35.5	5.07	5.10	5.10	5.10	0.50	1.30	±13.9%
5750	35.4	5.22	5.15	5.15	5.15	0.40	1.50	±13.9%

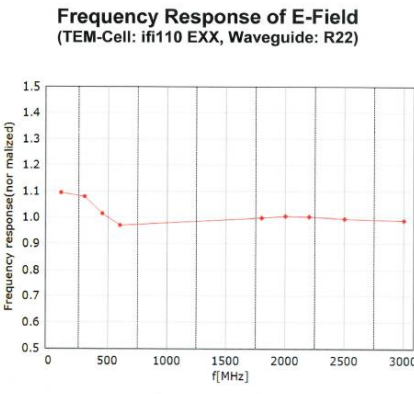
^c Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

^f At frequency up to 6 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

^g Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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Frequency Response of E-Field (TEM-Cell: if110 EXX, Waveguide: R22)

Frequency response (norm. realized) vs f [MHz]

Uncertainty of Frequency Response of E-field: ±7.4% (k=2)

Legend: * TEM, * R22

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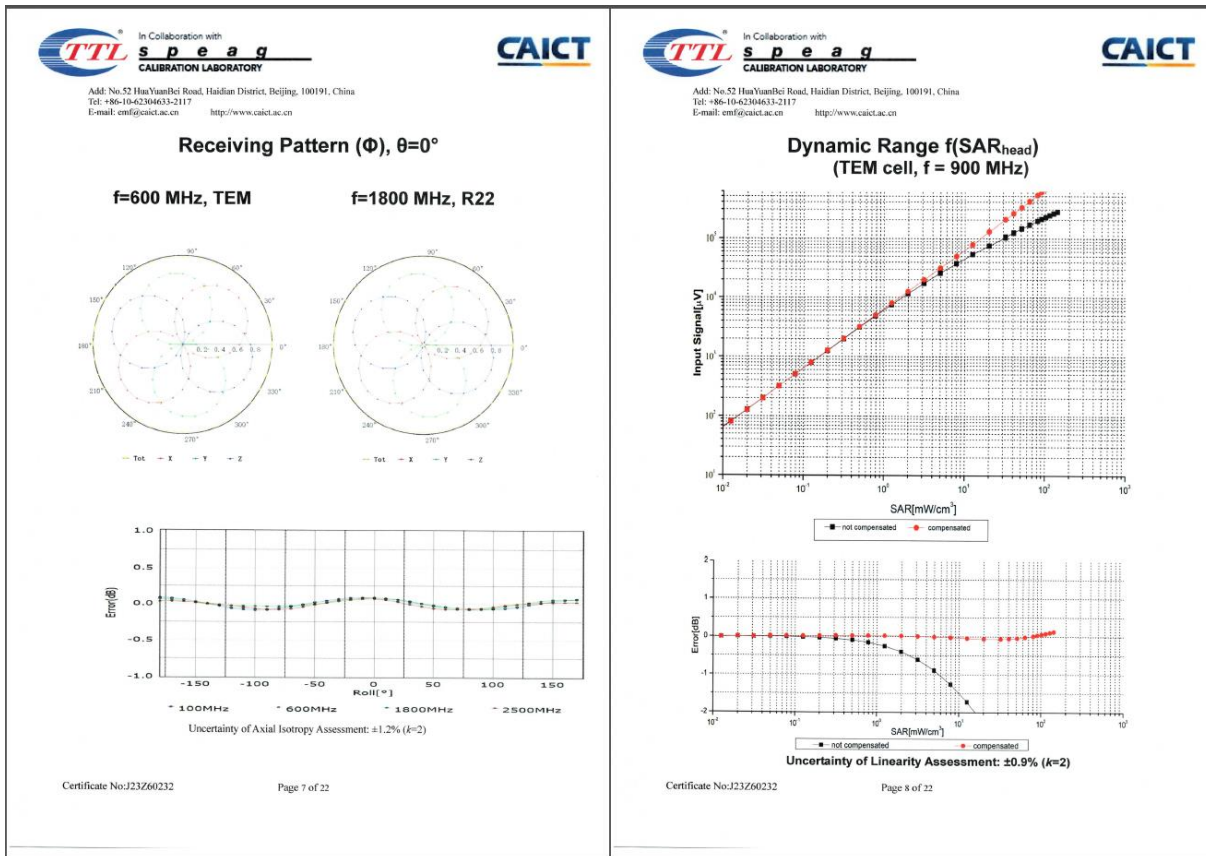
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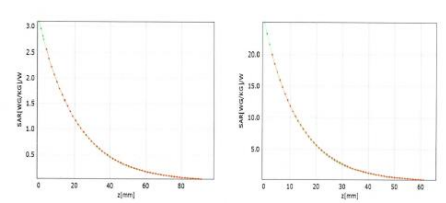


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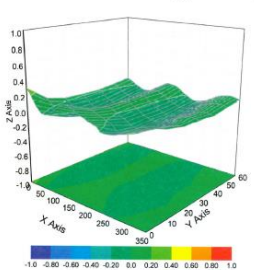
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Tel: +86-10-62304633-2117
E-mail: emf@caict.ac.cn http://www.caict.ac.cn

Conversion Factor Assessment

f=750 MHz,WGLS R9(H_convF) f=1750 MHz,WGLS R22(H_convF)




Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±3.2% (k=2)

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Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	UncE (k=2)
0		CW	CW	0.00	±4.7%
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	±9.6%
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	±9.6%
10012	CAB	IEEE 802.11b WFI 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	±9.6%
10013	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	±9.6%
10021	DAC	GSM-FDD (TDMA, GMSK, TN 0)	GSM	9.39	±9.6%
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	9.57	±9.6%
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	6.56	±9.6%
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	±9.6%
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	±9.6%
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	4.80	±9.6%
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	±9.6%
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	±9.6%
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	±9.6%
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	±9.6%
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.18	±9.6%
10033	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH1)	Bluetooth	7.74	±9.6%
10034	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH3)	Bluetooth	4.53	±9.6%
10035	CAA	IEEE 802.15.1 Bluetooth (PI4-DQPSK, DH5)	Bluetooth	3.83	±9.6%
10036	CAA	IEEE 802.15.1 Bluetooth (B-PSK, DH1)	Bluetooth	8.01	±9.6%
10037	CAA	IEEE 802.15.1 Bluetooth (B-PSK, DH3)	Bluetooth	4.77	±9.6%
10038	CAA	IEEE 802.15.1 Bluetooth (B-PSK, DH5)	Bluetooth	4.10	±9.6%
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	±9.6%
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI4-DQPSK, Halfrate)	AMPS	7.78	±9.6%
10044	CAA	IS-91E/WTIA-553 FDD (FDMA, FM)	AMPS	0.00	±9.6%
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	±9.6%
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	±9.6%
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	±9.6%
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	±9.6%
10059	CAB	IEEE 802.11b WFI 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	±9.6%
10060	CAB	IEEE 802.11b WFI 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	±9.6%
10061	CAB	IEEE 802.11b WFI 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	±9.6%
10062	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	±9.6%
10063	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	±9.6%
10064	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 12 Mbps)	WLAN	9.00	±9.6%
10065	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 16 Mbps)	WLAN	9.09	±9.6%
10066	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	±9.6%
10067	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6%
10068	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	±9.6%
10069	CAD	IEEE 802.11ah WFI 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	±9.6%
10071	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	8.83	±9.6%
10072	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	±9.6%
10073	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	±9.6%
10074	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	±9.6%
10075	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	±9.6%
10076	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	±9.6%
10077	CAB	IEEE 802.11g WFI 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	±9.6%
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	±9.6%
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI4-DQPSK, Fullrate)	AMPS	4.77	±9.6%
10060	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	±9.6%
10097	CAC	UMTS-FDD (HS-DRPA)	WCDMA	3.98	±9.6%
10098	DAC	UMTS-FDD (HS-DRPA, Subband 2)	WCDMA	3.68	±9.6%
10099	CAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	±9.6%
10100	CAC	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	8.67	±9.6%
10101	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6%

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E-mail: cmf@caict.ac.cn				E-mail: cmf@caict.ac.cn			
http://www.caict.ac.cn				http://www.caict.ac.cn			
10102	CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.80	±0.6%		
10103	DAC	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±0.6%		
10104	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	±0.6%		
10105	CAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	±0.6%		
10108	CAE	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	±0.6%		
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±0.6%		
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	±0.6%		
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.44	±0.6%		
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	±0.6%		
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	±0.6%		
10114	CAG	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	3.10	±0.6%		
10115	CAG	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	±0.6%		
10116	CAG	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	±0.6%		
10117	CAG	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.27	±0.6%		
10118	CAD	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	±0.6%		
10119	CAD	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	±0.6%		
10140	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	±0.6%		
10141	CAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	±0.6%		
10142	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±0.6%		
10143	CAD	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	±0.6%		
10144	CAC	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	±0.6%		
10145	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.78	±0.6%		
10146	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	±0.6%		
10147	CAC	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	±0.6%		
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±0.6%		
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±0.6%		
10151	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±0.6%		
10152	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	±0.6%		
10153	CAE	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	±0.6%		
10154	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	±0.6%		
10155	CAF	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±0.6%		
10156	CAF	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	±0.6%		
10157	CAF	LTE-FDD (SC-FDMA, 50% RB, 16-QAM)	LTE-FDD	6.49	±0.6%		
10158	CAE	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.62	±0.6%		
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.96	±0.6%		
10160	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.62	±0.6%		
10161	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	±0.6%		
10162	CAG	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	±0.6%		
10163	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	±0.6%		
10167	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	±0.6%		
10168	CAG	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	±0.6%		
10169	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±0.6%		
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±0.6%		
10171	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	±0.6%		
10172	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±0.6%		
10173	CAE	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±0.6%		
10174	CAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	±0.6%		
10175	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±0.6%		
10176	CAF	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±0.6%		
10177	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	±0.6%		
10178	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.62	±0.6%		
10179	AAE	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.60	±0.6%		
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.60	±0.6%		
10181	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	±0.6%		
10182	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	±0.6%		
10183	CAG	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	±0.6%		
10184	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	±0.6%		
10185	CAI	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	±0.6%		
10186	CAG	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	±0.6%		

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10299	CAB	LTE-TDD (SC-FDMA 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	+9.6%		
10270	CAB	LTE-TDD (SC-FDMA 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	+9.6%		
10274	CAB	UMTS-FDD (HSPA, Subnet 5, 3GPP Re8.10)	WCDMA	4.87	+9.6%		
10275	CAD	UMTS-FDD (HSPA, Subnet 5, 3GPP Re8.4)	WCDMA	3.96	+9.6%		
10277	CAD	PHS (QPSK)	PHS	11.81	+9.6%		
10278	CAD	PHS (QPSK, BW 884MHz, Roll-off 0.5)	PHS	11.81	+9.6%		
10279	CAS	PHS (QPSK, BW 884MHz, Roll-off 0.38)	PHS	12.18	+9.6%		
10280	CAG	CDMA2000, RC1, SC35, Full Rate	CDMA2000	3.91	+9.6%		
10291	CAG	CDMA2000, RC3, SC35, Full Rate	CDMA2000	3.46	+9.6%		
10292	CAG	CDMA2000, RC3, SC32, Full Rate	CDMA2000	3.39	+9.6%		
10293	CAG	CDMA2000, RC1, SC3, Full Rate	CDMA2000	3.50	+9.6%		
10295	CAG	CDMA2000, RC1, SC3, 1/8th Rate 26 fr.	CDMA2000	12.49	+9.6%		
10297	CAF	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	+9.6%		
10298	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	+9.6%		
10299	CAF	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	+9.6%		
10300	CAC	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	+9.6%		
10301	CAC	IEEE 802.16e WIMAX (20.18.5ms, 10MHz, QPSK, PUSC)	WIMAX	12.03	+9.6%		
10302	CAB	IEEE 802.16e WIMAX (20.18.5ms, 10MHz, QPSK, PUSC, 3CTRL)	WIMAX	12.57	+9.6%		
10303	CAB	IEEE 802.16e WIMAX (31.15.5ms, 10MHz, 64QAM, PUSC)	WIMAX	12.52	+9.6%		
10304	CAB	IEEE 802.16e WIMAX (20.18.5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	+9.6%		
10305	CAB	IEEE 802.16e WIMAX (31.15.10ms, 10MHz, 64QAM, PUSC)	WIMAX	15.24	+9.6%		
10306	CAB	IEEE 802.16e WIMAX (20.18.10ms, 10MHz, 16QAM, PUSC)	WIMAX	14.67	+9.6%		
10307	AB	IEEE 802.16e WIMAX (20.18.10ms, 10MHz, QPSK, PUSC)	WIMAX	14.49	+9.6%		
10308	AB	IEEE 802.16e WIMAX (20.18.10ms, 10MHz, 16QAM, PUSC)	WIMAX	14.46	+9.6%		
10309	AB	IEEE 802.16e WIMAX (20.18.10ms, 10MHz, 16QAM, AMC 2x3)	WIMAX	14.57	+9.6%		
10310	AB	IEEE 802.16e WIMAX (20.18.10ms, 10MHz, QPSK, AMC 2x3)	WIMAX	14.57	+9.6%		
10311	AB	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	+9.6%		
10313	AD	IDEN 1.3	IDEN	10.51	+9.6%		
10314	AD	IDEN 1.6	IDEN	13.48	+9.6%		
10315	AD	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc dc)	WLAN	1.71	+9.6%		
10316	AD	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc dc)	WLAN	8.36	+9.6%		
10317	AAA	IEEE 802.11g WiFi 2.4 GHz (OFDM, 6 Mbps, 96pc dc)	Generic	10.00	+9.6%		
10322	AAA	Pulse Waveform (200Hz, 10%)	Generic	6.99	+9.6%		
10323	AAA	Pulse Waveform (200Hz, 20%)	Generic	3.98	+9.6%		
10324	AAA	Pulse Waveform (200Hz, 40%)	Generic	2.22	+9.6%		
10325	AAA	Pulse Waveform (200Hz, 60%)	Generic	0.97	+9.6%		
10326	AAA	Pulse Waveform (200Hz, 80%)	Generic	5.10	+9.6%		
10327	AAA	QPSK Waveform, 1 MHz	Generic	6.22	+9.6%		
10328	AAA	QPSK Waveform, 10 MHz	Generic	6.27	+9.6%		
10329	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	+9.6%		
10330	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	+9.6%		
10400	AD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 96pc dc)	WLAN	8.60	+9.6%		
10401	AAA	IEEE 802.11ac WiFi (40MHz, 64-QAM, 96pc dc)	WLAN	8.60	+9.6%		
10402	AAA	IEEE 802.11ac WiFi (80MHz, 64-QAM, 96pc dc)	WLAN	8.53	+9.6%		
10403	AAA	CDMA2000 (1xEV-DO, Rev A)	CDMA2000	3.78	+9.6%		
10404	AAA	CDMA2000 (1xEV-DO, Rev A)	CDMA2000	3.77	+9.6%		
10408	AD	CDMA2000, RC3, SC32, SCH0, Full Rate	LTE-TDD	7.62	+9.6%		
10410	AAA	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Sub=2,3,4,7,8,9)	Generic	5.22	+9.6%		
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	WLAN	8.84	+9.6%		
10415	AAA	IEEE 802.11n WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc dc)	WLAN	1.54	+9.6%		
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc dc)	WLAN	8.23	+9.6%		
10417	AAA	IEEE 802.11n WiFi 5 GHz (OFDM, 6 Mbps, 96pc dc)	WLAN	8.23	+9.6%		
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 96pc, Long)	WLAN	8.14	+9.6%		
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 96pc, Short)	WLAN	8.19	+9.6%		
10422	AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	+9.6%		
10423	AAA	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	+9.6%		
10424	AAA	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.40	+9.6%		
10425	AAA	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	+9.6%		
10426	AAA	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	+9.6%		

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In Collaboration with TTL s p e e a g CALIBRATION LABORATORY			CAICT		
Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2117 E-mail: emf@caict.ac.cn http://www.caict.ac.cn			Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China Tel: +86-10-62304633-2117 E-mail: emf@caict.ac.cn http://www.caict.ac.cn		
10503	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Sub)	LTE-TDD	7.72	+9.6%
10504	AAB	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Sub)	LTE-TDD	8.31	+9.5%
10505	AAC	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Sub)	LTE-TDD	8.54	+9.6%
10506	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Sub)	LTE-TDD	7.74	+9.6%
10507	AAC	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Sub)	LTE-TDD	8.30	+9.6%
10508	AAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Sub)	LTE-TDD	8.55	+9.6%
10509	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Sub)	LTE-TDD	7.99	+9.6%
10510	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Sub)	LTE-TDD	8.49	+9.6%
10511	AAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Sub)	LTE-TDD	8.51	+9.6%
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Sub)	LTE-TDD	7.74	+9.6%
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Sub)	LTE-TDD	8.42	+9.6%
10514	AAE	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Sub)	LTE-TDD	8.45	+9.6%
10515	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc dc)	WLAN	1.58	+9.6%
10516	AAE	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc dc)	WLAN	1.67	+9.6%
10517	AAF	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc dc)	WLAN	1.58	+9.6%
10518	AAF	IEEE 802.11ah WiFi 5 GHz (OFDM, 9 Mbps, 99pc dc)	WLAN	8.23	+9.6%
10519	AAF	IEEE 802.11ah WiFi 5 GHz (OFDM, 12 Mbps, 99pc dc)	WLAN	8.39	+9.6%
10520	AAB	IEEE 802.11ah WiFi 5 GHz (OFDM, 18 Mbps, 99pc dc)	WLAN	8.12	+9.6%
10521	AAB	IEEE 802.11ah WiFi 5 GHz (OFDM, 24 Mbps, 99pc dc)	WLAN	7.97	+9.6%
10522	AAB	IEEE 802.11ah WiFi 5 GHz (OFDM, 30 Mbps, 99pc dc)	WLAN	8.45	+9.6%
10523	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 48 Mbps, 99pc dc)	WLAN	8.08	+9.6%
10524	AAC	IEEE 802.11ah WiFi 5 GHz (OFDM, 54 Mbps, 99pc dc)	WLAN	8.27	+9.6%
10525	AAC	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc dc)	WLAN	8.36	+9.6%
10526	AAF	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc dc)	WLAN	8.42	+9.6%
10527	AAF	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc dc)	WLAN	8.21	+9.6%
10528	AAF	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc dc)	WLAN	8.36	+9.6%
10529	AAF	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc dc)	WLAN	8.36	+9.6%
10531	AAF	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc dc)	WLAN	8.43	+9.6%
10532	AAF	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc dc)	WLAN	8.29	+9.6%
10533	AAE	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc dc)	WLAN	8.38	+9.6%
10534	AAE	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc dc)	WLAN	8.45	+9.6%
10535	AAE	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc dc)	WLAN	8.55	+9.6%
10536	AAF	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc dc)	WLAN	8.32	+9.6%
10537	AAF	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc dc)	WLAN	8.44	+9.6%
10538	AAF	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc dc)	WLAN	8.54	+9.6%
10540	AAA	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc dc)	WLAN	8.39	+9.6%
10541	AAA	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc dc)	WLAN	8.46	+9.6%
10542	AAA	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc dc)	WLAN	8.65	+9.6%
10543	AAC	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc dc)	WLAN	8.65	+9.6%
10544	AAC	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc dc)	WLAN	8.47	+9.6%
10545	AAC	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc dc)	WLAN	8.55	+9.6%
10546	AAC	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc dc)	WLAN	8.35	+9.6%
10547	AAC	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc dc)	WLAN	8.49	+9.6%
10548	AAC	IEEE 802.11ac WiFi (80MHz, MCS5, 99pc dc)	WLAN	8.37	+9.6%
10549	AAC	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc dc)	WLAN	8.39	+9.6%
10551	AAC	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc dc)	WLAN	8.50	+9.6%
10552	AAC	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc dc)	WLAN	8.42	+9.6%
10553	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc dc)	WLAN	8.45	+9.6%
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc dc)	WLAN	8.48	+9.6%
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc dc)	WLAN	8.47	+9.6%
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc dc)	WLAN	8.50	+9.6%
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc dc)	WLAN	8.52	+9.6%
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 99pc dc)	WLAN	8.61	+9.6%
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc dc)	WLAN	8.73	+9.6%
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc dc)	WLAN	8.56	+9.6%
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc dc)	WLAN	8.69	+9.6%
10563	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc dc)	WLAN	8.77	+9.6%
10564	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc dc)	WLAN	8.25	+9.6%
10565	AAC	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc dc)	WLAN	8.45	+9.6%
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Table with multiple columns containing test results for various standards (e.g., 10899 AAD, 10900 AAD, etc.) and their corresponding values. Includes logos for TTT Speaq and CAICT, and contact information for the Shenzhen Branch.

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