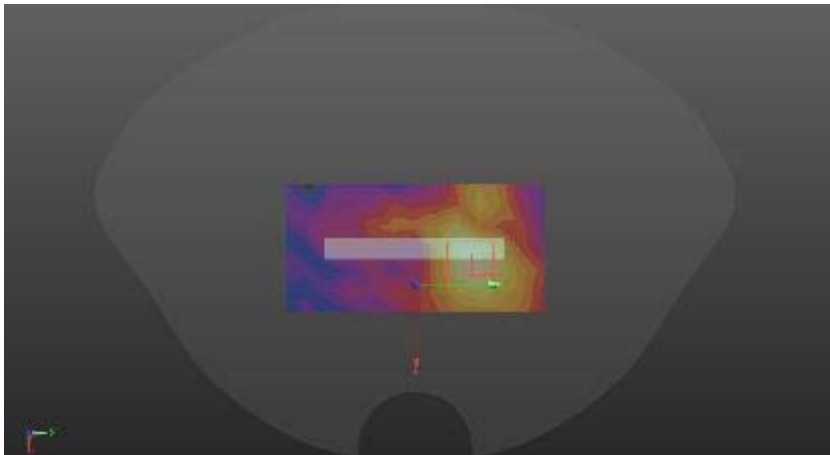
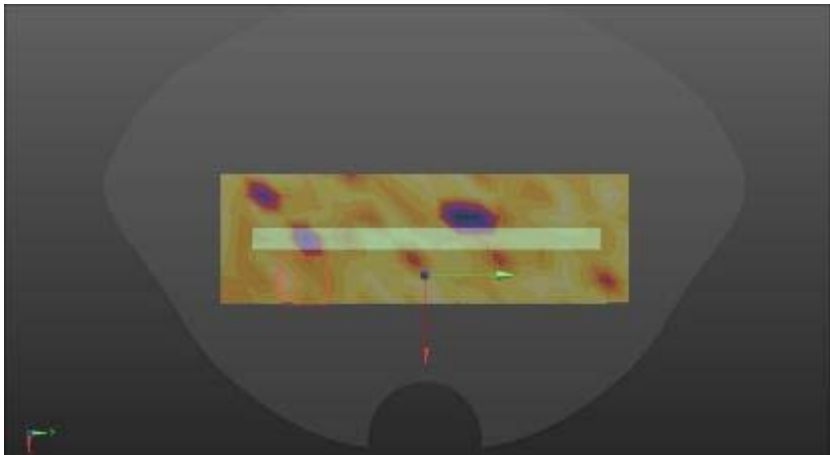
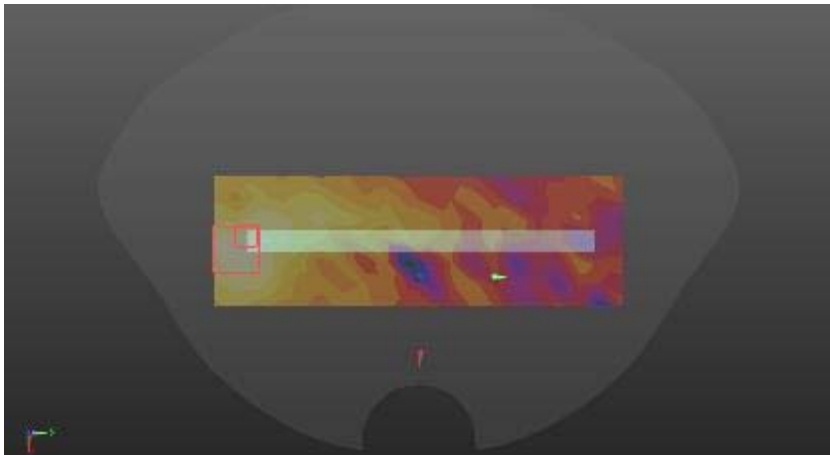


FLAT	EDGE1
Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785 \text{ MHz}$; $\sigma = 5.984 \text{ S/m}$; $\epsilon_r = 48.221$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017; - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn720; Calibrated: 10/23/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560 - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE1/Area Scan (7x13x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 0.144 W/kg Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 2.576 V/m; Power Drift = -0.18 dB Peak SAR (extrapolated) = 0.319 W/kg SAR(1 g) = 0.071 W/kg; SAR(10 g) = 0.032 W/kg Maximum value of SAR (measured) = 0.165 W/kg dB 0 -2.72 -5.45 -8.17 -10.90 -13.62  0 dB = 0.165 W/kg = -7.83 dBW/kg	

FLAT	EDGE3
Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785 \text{ MHz}$; $\sigma = 5.984 \text{ S/m}$; $\epsilon_r = 48.221$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017; - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn720; Calibrated: 10/23/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560 - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 3/Area Scan (7x20x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 0.0296 W/kg Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 1.337 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 0.0370 W/kg SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.00941 W/kg Maximum value of SAR (measured) = 0.0351 W/kg dB 0 -3.97 -7.95 -11.92 -15.90 -19.87  0 dB = 0.0351 W/kg = -14.55 dBW/kg	

FLAT	EDGE4
Communication System: IEEE 802.11n HT20 WiFi 5 GHz; Frequency: 5785 MHz Medium parameters used (interpolated): $f = 5785 \text{ MHz}$; $\sigma = 5.984 \text{ S/m}$; $\epsilon_r = 48.221$; $\rho = 1000 \text{ kg/m}^3$ Phantom section: Flat Section DASY5 Configuration: - Probe: EX3DV4 - SN3708; ConvF(4.19, 4.19, 4.19); Calibrated: 11/7/2017; - Sensor-Surface: 1.4mm (Mechanical Surface Detection) - Electronics: DAE4 Sn720; Calibrated: 10/23/2017 - Phantom: Twin-SAM 1560; Type: QD 000 P40 CD; Serial: 1560 - Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7373) Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 4/Area Scan (7x20x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$ Maximum value of SAR (measured) = 0.0959 W/kg Flat-Section MSL WIFI 5G mimoHOT/WIFI 5785 mimo EDGE 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 2.375 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 0.160 W/kg SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.022 W/kg Maximum value of SAR (measured) = 0.0939 W/kg dB 0 -3.40 -6.79 -10.19 -13.58 -16.98  0 dB = 0.0939 W/kg = -10.27 dBW/kg	

ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

DAE4 Sn:546

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E-mail: info@spera.com.cn www.spcal.com.cn

Client: **SRTC** Certificate No: **Z17-07141**

CALIBRATION CERTIFICATE

Object: **DAE4-SN:546**

Calibration Procedure(s): **PR-21-002-01**
Calibration Procedure for the Data Acquisition Electronics (DAE)

Calibration date: **October 15, 2017**

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

All calibrations have been conducted in the closed laboratory facility, environmental temperature(23±0.5)°C and humidity(50±5)%.

Calibration equipment used (NISTC critical for calibration)

Primary Standards	ID #	Calibration/Issued by Certificate No. /	Scheduled Calibration
Process Calibration No.	1011018	27-Jan-17 (Z17-1102808)	June-18

	Name	Function	Signature
Calibrated by:	Xu Jingyong	SAR Test Engineer	
Reviewed by:	Lin Hai	SAR Test Engineer	
Approved by:	Guo Jianjun	SAR Project Leader	

Valid: September 18, 2017

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Certificate No: Z17-07141

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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 this 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: Z17-07141

Page 2 of 2

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DC Voltage Measurement

A/D Converter Resolution nominal
High Range: 0.25 ~ 5.1 V, 5.1 range: 100 ~ 500 mV
Low Range: 0.05 ~ 0.19 V, 0.19 range: 1 ~ 20 mV
DAE7 measurement parameter Auto Zero Time: 2 sec. Measuring time: 3 sec

Calibration Point	X	Y	Z
High Range	405.027 ± 0.15% (k=2)	404.065 ± 0.16% (k=2)	404.212 ± 0.15% (k=2)
Low Range	3.98136 ± 0.17% (k=2)	3.98171 ± 0.17% (k=2)	3.98168 ± 0.17% (k=2)

Connector Angle

Connector Angle to be used in DASY system	736.67 ± 1°
---	-------------

Certificate No: Z17-07141

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DAE4 Sn:720

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CALIBRATION
CNAS 15076

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E-mail: csl@ttsa.com.cn Http://www.ttsa.com.cn

Client: **SRTC** Certificate No: **Z17-97215**

CALIBRATION CERTIFICATE

Object: DAE4 - SN: 720

Calibration Procedure(s): FF-Z11-002-Q1
Calibration Procedure for the Data Acquisition Electronics (DAEx)

Calibration date: October 24, 2017

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(23±2)°C and humidity<70%.

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Process Calibrator 753	18710-8	27-Jun-17 (CTTL, No.J17X05665)	June-18

Calibrated by: Yu Zongying SAR Test Engineer

Reviewed by: Lin Hao SAR Test Engineer

Approved by: Qi Danyuan SAR Project Leader

Issued: October 26, 2017

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Certificate No: Z17-97215

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国际互认
CALIBRATION
CNAS 15076

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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.

Certificate No: Z17-97215

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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	403.363 ± 0.15% (k=2)	404.822 ± 0.15% (k=2)	403.251 ± 0.15% (k=2)
Low Range	3.95425 ± 0.7% (k=2)	3.96301 ± 0.7% (k=2)	3.95640 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	24.5° ± 1°
---	------------

Certificate No: Z17-97215

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ES3DV3 Sn:3127

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E-mail: srtc@163.com

CNAN
中国合格评定国家认可委员会
CALIBRATION LABORATORY

Client: **SRTC** Certificate No.: **Z17-07142**

CALIBRATION CERTIFICATE

Object: **ES3DV3 - SN:3127**

Calibration Procedure(s): **TT-Z17-004-01**
Definition: Procedures for Dielectric G-Ratio Probe.

Calibration date: **October 11, 2017**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurement (SI). The measurement and the uncertainty with confidence probability are given in the following pages and are not of the certificate.

All calibrations have been conducted in the clean laboratory facility, environment temperature (20±2)°C and humidity (45±5)%.

Calibration Equipment used (MSTC critical for calibration)

Primary Standards	ID#	Cal Date/Calibrated by: Certificate No.	Scheduled Calibration
Power Meter: N42P	101019	27-Jun-17 (TTL No. 17005897)	Jun-18
Power sensor: N42P-P1	101047	27-Jun-17 (TTL No. 17005897)	Jun-18
Power sensor: N42P-P1	101048	27-Jun-17 (TTL No. 17005897)	Jun-18
Reference 10dB Attenuator	180306-10dB	15-Mar-18 (TTL No. 18031647)	Mar-18
Reference 10dB Attenuator	180306-20dB	15-Mar-18 (TTL No. 18031648)	Mar-18
Reference Probe ES3DV3	SN 7433	25-Oct-18 (SN 7433, Dec 18)	Dec-18
Probe	SN 3127	13-Oct-18 (SN 3127, Dec 18)	Dec-18

Secondary Standards

ID#	Cal Date/Calibrated by: Certificate No.	Scheduled Calibration
Signal Generator 83310	27-Jun-17 (TTL No. 17005895)	Jun-18
Network Analyzer 83310	10-Jun-17 (TTL No. 17005895)	Jun-18

Calibrated by: **Yu Zangyong** SRTC Test Engineer

Reviewed by: **Li Hui** SRTC Test Engineer

Approved by: **Guo Jinyun** SRTC Project Leader

Issued: October 12, 2017

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Certificate No: Z17-07142

Page 1 of 12

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E-mail: srtc@163.com

CNAN
中国合格评定国家认可委员会
CALIBRATION LABORATORY

Client: **SRTC** Certificate No.: **Z17-07142**

Calibration Certificate

Object: **ES3DV3 - SN:3127**

Calibration Procedure(s): **TT-Z17-004-01**
Definition: Procedures for Dielectric G-Ratio Probe.

Calibration date: **October 11, 2017**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurement (SI). The measurement and the uncertainty with confidence probability are given in the following pages and are not of the certificate.

All calibrations have been conducted in the clean laboratory facility, environment temperature (20±2)°C and humidity (45±5)%.

Calibration Equipment used (MSTC critical for calibration)

Primary Standards	ID#	Cal Date/Calibrated by: Certificate No.	Scheduled Calibration
Power Meter: N42P	101019	27-Jun-17 (TTL No. 17005897)	Jun-18
Power sensor: N42P-P1	101047	27-Jun-17 (TTL No. 17005897)	Jun-18
Power sensor: N42P-P1	101048	27-Jun-17 (TTL No. 17005897)	Jun-18
Reference 10dB Attenuator	180306-10dB	15-Mar-18 (TTL No. 18031647)	Mar-18
Reference 10dB Attenuator	180306-20dB	15-Mar-18 (TTL No. 18031648)	Mar-18
Reference Probe ES3DV3	SN 7433	25-Oct-18 (SN 7433, Dec 18)	Dec-18
Probe	SN 3127	13-Oct-18 (SN 3127, Dec 18)	Dec-18

Secondary Standards

ID#	Cal Date/Calibrated by: Certificate No.	Scheduled Calibration
Signal Generator 83310	27-Jun-17 (TTL No. 17005895)	Jun-18
Network Analyzer 83310	10-Jun-17 (TTL No. 17005895)	Jun-18

Calibrated by: **Yu Zangyong** SRTC Test Engineer

Reviewed by: **Li Hui** SRTC Test Engineer

Approved by: **Guo Jinyun** SRTC Project Leader

Issued: October 12, 2017

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Probe ES3DV3

SN: 3127

Calibrated: October 11, 2017
Calibrated for DASY/EASY Systems
(Note: not compatible with DASY7 system)

Certificate No: Z17-07142

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DASY/EASY - Parameters of Probe: ES3DV3 - SN: 3127

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm [uV/m]	1.98	1.20	1.23	+10.0%
DCP [dB]	119.2	125.3	125.1	

Modulation Calibration Parameters

Mod	Communication System Name	A dB	B dB	C dB	D dB	VW dB	Unc (k=2)
G	CW	X	0.0	0.0	1.0	282.8	±2.5%
		Y	0.0	0.0	1.0	282.9	
		Z	0.0	0.0	1.0	279.1	

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%).

¹ The uncertainty of Norm X, Y, Z do not affect the 25-dB uncertainty inside 180, see Page 5 and Page 6.
² Numerical interpolation parameter uncertainty not required.
³ Uncertainty is determined using the mean deviation from linear response, assuming rectangular distribution and is expressed in the square of the field value.

Certificate No: Z17-07142

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ES3DV3 Sn:3127



DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Relative Permittivity ¹⁾	Conductivity [S/m] ²⁾	CorrF X	CorrF Y	CorrF Z	Alpha ³⁾	Depth [mm]	Unc. [k=2]
750	41.0	0.89	8.29	8.29	6.20	1.93	1.20	±12.1%
900	41.0	0.97	8.15	8.15	6.15	0.37	1.60	±12.1%
1010	40.0	1.40	5.05	5.05	5.05	0.07	1.25	±12.1%
2300	40.0	1.40	5.05	5.05	5.05	0.07	1.25	±12.1%
2305	39.2	1.67	4.71	4.71	4.71	0.90	1.05	±12.1%
2422	39.2	1.60	4.56	4.56	4.56	0.90	1.13	±12.1%
2500	39.0	1.58	4.52	4.52	4.52	0.90	1.19	±12.1%

¹⁾ Frequency validity above 100 MHz at a 100MHz to 200MHz and higher (Page 71, also 8 is restricted to ±0.004). The uncertainty is the RMS of CorrF, uncertainty at reference frequency is at 0% uncertainty for the indicated frequency band. Frequency validity below 100 MHz is at 1% to 20, 40, 80 and 100 MHz for 100MHz to 200MHz, 100, 100, 100 and 200 MHz respectively. Above 5.044 frequency validity can be extended to a 100MHz.
²⁾ At frequencies below 5 GHz, the validity of tissue parameters is verified; certified values is ±15% if liquid compensation formula is applied to measured SAR values. At frequencies above 5 GHz, the validity of tissue parameters is at 0% if a correction is applied. The uncertainty is the RMS of the CorrF, uncertainty for indicated liquid tissue parameters.
³⁾ Alpha/Delta are determined during calibration. SP5000 elements that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 2 GHz and below ±2% for the frequencies between 2-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No. Z17-0110

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DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Relative Permittivity ¹⁾	Conductivity [S/m] ²⁾	CorrF X	CorrF Y	CorrF Z	Alpha ³⁾	Depth [mm]	Unc. [k=2]
750	40.0	0.89	8.15	8.15	6.15	0.06	1.45	±12.1%
900	39.0	1.08	6.06	6.06	6.06	0.06	1.45	±12.1%
1010	38.3	1.52	4.68	4.68	4.68	0.05	1.29	±12.1%
2000	38.3	1.52	4.68	4.68	4.68	0.05	1.29	±12.1%
2000	37.9	1.81	4.43	4.43	4.43	0.90	1.16	±12.1%
2450	37.7	1.88	4.28	4.28	4.28	0.72	1.24	±12.1%
2500	37.0	2.35	4.07	4.07	4.07	0.50	1.12	±12.1%

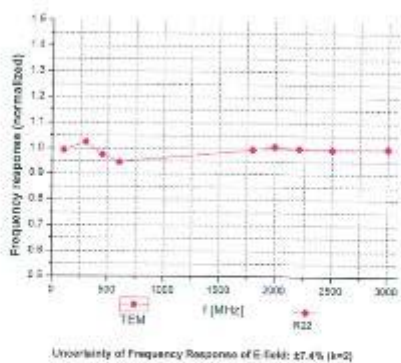
¹⁾ Frequency validity above 100 MHz at a 100MHz to 200MHz and higher (Page 71, also 8 is restricted to ±0.004). The uncertainty is the RMS of CorrF, uncertainty at reference frequency is at 0% uncertainty for the indicated frequency band. Frequency validity below 100 MHz is at 1% to 20, 40, 80 and 100 MHz for 100MHz to 200MHz, 100, 100, 100 and 200 MHz respectively. Above 5.044 frequency validity can be extended to a 100MHz.
²⁾ At frequencies below 5 GHz, the validity of tissue parameters is verified; certified values is ±15% if liquid compensation formula is applied to measured SAR values. At frequencies above 5 GHz, the validity of tissue parameters is at 0% if a correction is applied. The uncertainty is the RMS of the CorrF, uncertainty for indicated liquid tissue parameters.
³⁾ Alpha/Delta are determined during calibration. SP5000 elements that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 2 GHz and below ±2% for the frequencies between 2-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Certificate No. Z17-0110

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Frequency Response of E-Field (TEM-Cell: 10110 EXX, Waveguide: R22)

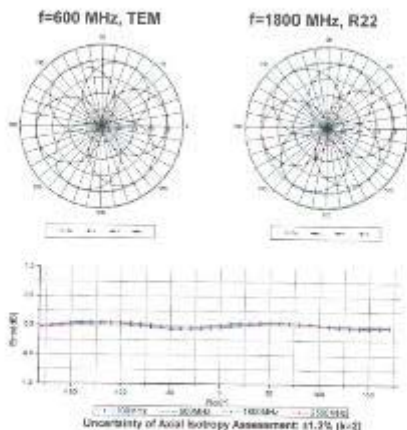


Certificate No. Z17-0110

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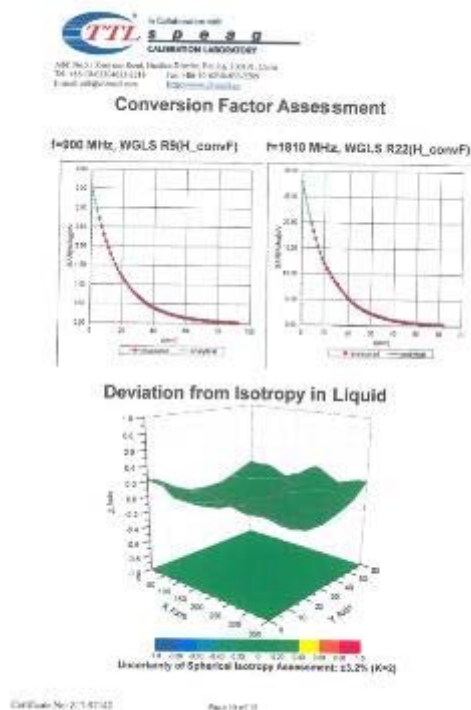
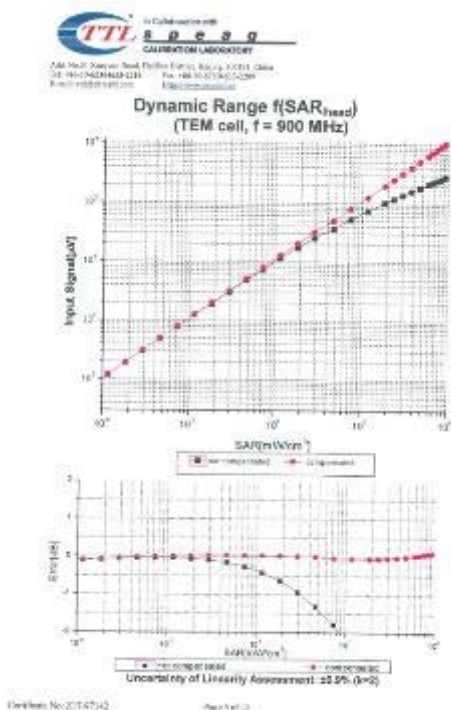
Receiving Pattern (Φ, θ=0°)



Certificate No. Z17-0110

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ES3DV3 Sn:3127



DASY/EASY – Parameters of Probe: ES3DV3 - SN: 3127

Other Probe Parameters	
Sensor Arrangement	Triangular
Connector Angle (°)	166.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	10mm
Tip Diameter	4mm
Probe Tip to Sensor X Calibration Point	2mm
Probe Tip to Sensor Y Calibration Point	2mm
Probe Tip to Sensor Z Calibration Point	2mm
Recommended Measurement Distance from Surface	2mm

Certificate No: Z17-67142 Page 13 of 11


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Appendix: Modulation Calibration Parameters

UID	Communication System Name	PAR	A dB	B dB	C dB	VR mV	Unc (k=2)
8	QW	2.00	X 2.0 2.0 2.0	1.0	282.3	±0.3%	
			Y 2.0 2.0 2.0	1.0	280.9		
			Z 2.0 2.0 2.0	1.0	279.1		
10E12	IEEE 802.11a WiFi 2.4 GHz (QSSS, 1 Mbps)	1.83	X 2.77 68.32 16.45	143.0	±0.8%		
			Y 2.75 68.35 16.32	145.0			
			Z 2.71 67.30 16.25	142.1			
10100	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	5.07	X 6.15 66.4 18.07	141.5	±0.5%		
			Y 6.15 66.40 18.06	144.2			
			Z 6.09 66.32 18.06	140.4			
10168	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	5.00	X 6.00 66.24 18.07	139.3	±0.3%		
			Y 6.10 66.33 18.05	141.5			
			Z 6.02 66.15 18.05	138.0			
10456	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	5.75	X 5.81 65.85 18.00	135.1	±0.5%		
			Y 5.82 65.82 18.01	137.8			
			Z 5.75 65.84 18.01	134.7			
10160	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	5.75	X 4.81 65.95 19.28	130.8	±0.3%		
			Y 4.82 65.98 19.27	131.3			
			Z 4.80 66.00 19.24	129.1			
10175	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	5.71	X 4.05 66.14 19.41	131.6	±0.5%		
			Y 4.07 66.08 19.35	132.0			
			Z 4.19 66.02 19.29	129.3			
10287	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	5.81	X 5.15 65.61 19.42	141.5	±0.5%		
			Y 5.13 65.41 19.26	140.7			
			Z 5.14 65.52 19.11	139.5			

Certificate No: Z17-67142 Page 14 of 11

EX3DV4 Sn:3708

TTL Calibration Laboratory
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E-mail: cti@ttest.com.cn http://www.ttest.com.cn

Client: **SRTC** Certificate No: **Z17-97214**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3708**

Calibration Procedure(s): **FF-Z11-004-01**
Calibration Procedures for Dosimetric E-field Probe

Calibration date: **November 07, 2017**

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(23±1)°C and humidity<70%.

Calibration Equipment used (MATE critical for calibration)

Primary Standards	ID #	Cal Date/Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter	NRP2	101919 27-Jun-17 (CTTL No.J17X05857)	Jun-18
Power sensor	NRP-Z91	101547 27-Jun-17 (CTTL No.J17X05857)	Jun-18
Power sensor	NRP-Z91	101548 27-Jun-17 (CTTL No.J17X05857)	Jun-18
Reference 10dB Attenuator	18N5RW-10dB	13-Mar-16 (CTTL No.J16X01547)	Mar-18
Reference 20dB Attenuator	18N5RW-20dB	13-Mar-16 (CTTL No.J16X01548)	Mar-18
Reference Probe EX3DV4	SN 3617	23-Jan-17 (SPEAG No EX3-3617_Jan17)	Jan-18
DAE4	SN 549	13-Dec-16 (SPEAG No DAE4-549_Dec16)	Dec-17

Secondary Standards	ID #	Cal Date/Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator MG370DA	620102805	27-Jun-17 (CTTL No.J17X05856)	Jun-18
Network Analyzer E5071C	MY48110673	13-Jan-17 (CTTL No.J17X02085)	Jan-18

Calibrated by: **Yu Zongying** SAR Test Engineer

Reviewed by: **Lin Hai** SAR Test Engineer

Approved by: **Qi Diaryuan** SAR Project Leader

Issued: November 06, 2017

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

Certificate No: Z17-97214

Page 1 of 12

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Glossary:

TSL: tissue simulating liquid
NORM_{x,y,z}: sensitivity in free space
ConvF: sensitivity in TSL / NORM_{x,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 @: rotation around probe axis
Polarization @: rotation around an axis that is in the plane normal to probe axis (at measurement center), i
@=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 2016
d) K2B 855664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization @=0 (for 300MHz to 1.8GHz) in TEM-cell, >1800MHz: waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E^2 field uncertainty inside TSL (see below ConvF).
- NORM_{x,y,z} = NORM_{x,y,z} * Frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.3. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,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.
- A_{x,y,z}, B_{x,y,z}, C_{x,y,z}, V₀, x₀, y₀, z₀, A₀, B₀, C₀ 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 1500MHz) and inside waveguide using analytical field distributions based on power measurements for f>1800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (shape, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,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 500MHz to 1000MHz.
- 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 NORM_{x,y,z} (no uncertainty required).

Certificate No: Z17-97214

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Probe EX3DV4

SN: 3708

Calibrated: November 07, 2017

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system)

Certificate No: Z17-97214

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ₀ (V/m) ^A	0.19	0.36	0.44	±10.0%
DCP(mV) ^B	95.1	102.7	105.5	

Modulation Calibration Parameters

UID	Communication System Name	A dB	B dB/μV	C dB	D dB	VR mV	Unc ^E (k=2)
0	CW	X 0.0	0.0	1.0	0.00	95.9	±3.1%
		Y 0.0	0.0	1.0		149.0	
		Z 0.0	0.0	1.0		169.4	

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

^A The uncertainties of Norm₀ X, Y, Z do not effect the E^2 field uncertainty inside TSL (see Page 6 and Page 9).
^B Numerical linearization parameter: uncertainty not required.
^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: Z17-97214

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EX3DV4 Sn:3708



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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Relative Permittivity ¹	Conductivity [S/m]	ConvF X	ConvF Y	ConvF Z	Alpha ²	Depth ³ (mm)	Unc. (k=2)
900	41.5	0.97	9.07	9.07	9.07	0.15	1.37	±12.1%
1810	40.0	1.40	7.77	7.77	7.77	0.24	1.04	±12.1%
2000	40.0	1.40	7.80	7.80	7.80	0.28	0.88	±12.1%
2450	39.2	1.80	7.19	7.19	7.19	0.34	1.03	±12.1%
5200	36.0	4.66	5.64	5.64	5.64	0.40	1.35	±13.3%
5300	35.9	4.76	5.43	5.43	5.43	0.40	1.35	±13.3%
5500	35.6	4.96	5.03	5.03	5.03	0.40	1.50	±13.3%
5600	35.5	5.07	4.89	4.89	4.89	0.40	1.60	±13.3%
5800	35.3	5.27	5.03	5.03	5.03	0.45	1.45	±13.3%

¹ Frequency validity above 300 MHz of a 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.

² At frequency below 3 GHz, the validity of tissue parameters (α and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (α and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

³ 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.

Certificate No: Z17-97214

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

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Relative Permittivity ¹	Conductivity [S/m]	ConvF X	ConvF Y	ConvF Z	Alpha ²	Depth ³ (mm)	Unc. (k=2)
900	56.0	1.05	9.18	9.16	9.16	0.17	1.40	±12.1%
1810	53.3	1.52	7.70	7.70	7.70	0.20	1.13	±12.1%
2000	53.3	1.52	7.76	7.76	7.76	0.14	1.60	±12.1%
2450	52.7	1.95	7.30	7.30	7.30	0.66	0.70	±12.1%
5200	49.0	5.30	4.79	4.79	4.79	0.45	1.80	±13.3%
5300	48.9	5.42	4.56	4.56	4.56	0.45	1.80	±13.3%
5500	48.6	5.65	4.17	4.17	4.17	0.50	1.75	±13.3%
5600	48.5	5.77	4.10	4.10	4.10	0.50	1.60	±13.3%
5800	48.2	6.00	4.19	4.19	4.19	0.55	1.85	±13.3%

¹ Frequency validity above 300 MHz of a 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.

² At frequency below 3 GHz, the validity of tissue parameters (α and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (α and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

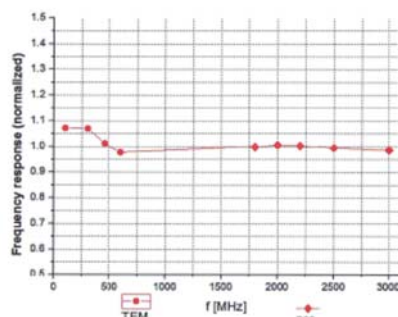
³ Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ±1% for frequencies below 3 GHz and below ±2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from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

Certificate No: Z17-97214

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Frequency Response of E-Field (TEM-Cell: IF110 EXX, Waveguide: R22)



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

Certificate No: Z17-97214

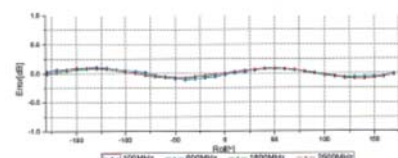
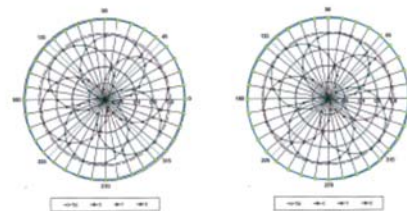
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Receiving Pattern (Φ, θ=0°)

f=600 MHz, TEM

f=1800 MHz, R22

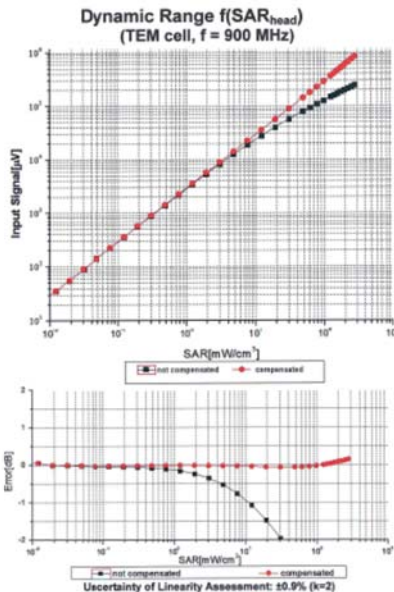


Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

Certificate No: Z17-97214

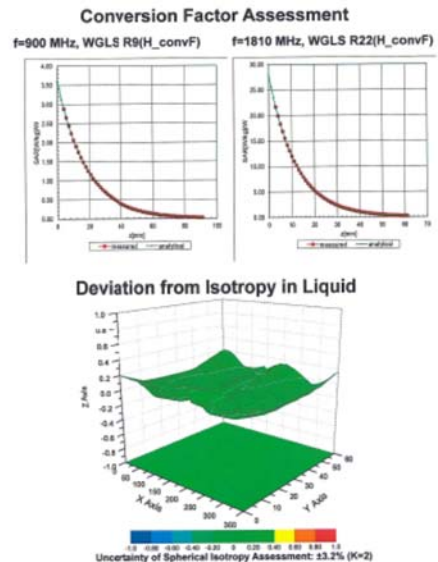
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EX3DV4 Sn:3708



Certificate No: Z17-97214

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Certificate No: Z17-97214

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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	177.2
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

Certificate No: Z17-97214

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Appendix (Additional assessments outside the scope of FCC approved dual-logo scope)

Modulation Calibration Parameters

UID	Communication System Name	PAR	A	B	C	VR	Unc ¹
0	CW	0.00	X 0.0 0.0 1.0 95.9	Y 0.0 0.0 1.0 149.0	Z 0.0 0.0 1.0 169.4		±3.1%
10011	UMTS-FDD (WCDMA)	2.91	X 2.97 64.29 16.82 147.4	Y 3.15 66.44 17.98 144.1	Z 3.21 67.23 18.44 141.7		±1.8%
10021	GSM-FDD (TDMA GMSK)	9.39	X 0.95 57.62 9.60 48.2	Y 1.22 59.57 9.93 44.1	Z 1.13 59.66 9.94 43.4		±2.4%
10062	IEEE 802.11a/b WPAN 5 GHz (OFDM 6 Mbps)	8.68	X 9.01 65.22 19.38 92.1	Y 8.26 63.95 18.73 71.9	Z 8.53 64.77 19.13 85.3		±2.1%

Certificate No: Z17-97214

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D750V3 Sn:1101

TTL CALIBRATION LABORATORY
In Collaboration with
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中国合格评定国家认可委员会

Client: SRTC Certificate No: 217-67134

CALIBRATION CERTIFICATE

Object: D750V3-SN:1101

Calibration Procedure(s): PT-011-002-01
Defender Procedures for specific calibration item

Calibration date: September 12, 2017

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

All operations have been conducted in the stated laboratory facility, environment temperature (23°C), and humidity (70%).

Calibration Equipment used (MPE criteria for calibration)

Primary Standards	ID#	Cal Date/Calibrated by: Certificate No. ()	Scheduled Calibration
Power Meter: NRPV2	109108	22-Mar-17 (CITL No. 21701344)	Mar-18
Power source: NRPV2	109108	22-Mar-17 (CITL No. 21701344)	Mar-18
Reference Power: P0254	814133	20-Sep-16 (SPTL No. 21701344_Sep16)	May-17
ISN#4	814133	19-Jun-17 (CITL No. 21701344)	Jun-18

Reference Standards	ID#	Cal Date/Calibrated by: Certificate No. ()	Scheduled Calibration
Signal Generator: S438C	8144011011	19-Jun-17 (CITL No. 21701344)	Jun-18
Network Analyzer: S207C	8144011011	19-Jun-17 (CITL No. 21701344)	Jun-18

Calibrated by: Name: Zhen Jiang Function: SAR Test Engineer Signature: [Signature]

Reviewed by: No Copying Function: SAR Test Engineer Signature: [Signature]

Approved by: Qi Chenyuan Function: SAR Project Leader Signature: [Signature]

Issued: September 15, 2017

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Certificate No: 217-67134

Page 1 of 8

TTL CALIBRATION LABORATORY
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Client: SRTC Certificate No: 217-67134

Glossary:

TSL: Human simulating liquid
Conductivity: TSL/NORM, per
N/A: not applicable or not measured

Calibration is performed according to the following standards:

- IEEE Std 1528-2013, IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques, June 2013
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Part 1: Device used next to the ear" [Frequency range of 300MHz to 6GHz], July 2015
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
- ICNIRP 1998, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- ICNIRP System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Calibration 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 extended parallel to the body axis.
- Feed Point Resistance and Return Loss: These parameters are required with the dipole positioned under the liquid filled phantom. This impedance is obtained from the measurement of the SWR conductivity to the feed point. The Return Loss only requires 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 estimated: 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%.

Certificate No: 217-67134

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Client: SRTC Certificate No: 217-67134

Measurement Conditions

SAR system configuration, as far as is relevant given the test:

Device	Model	Frequency
SAR Device	000730	32.0 ± 0.4%
Reference	Advanced Calibration	
Phantom	Trade-Off Phantom (TTL)	
Electric Field Vector - TSL	10 mm	with spacer
Zero Scan Resolution	0.1 μV, or 0.5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters are calculated from the test:

Parameter	Temperature	Permittivity	Conductivity
Measured Head TSL parameters	22.0 ± 0.2 °C	41.8	0.75 mS/m
Measured Head TSL parameters	22.0 ± 0.2 °C	41.8 ± 0.5%	0.50 mS/m ± 0.5%
Head TSL temperature change during test	< 0.2 °C		

SAR result with Head TSL

SAR measured	Conditions
SAR measured	250 mW input power
SAR for nominal Head TSL parameters	normalized to 1W
SAR measured over 18 cm ² (18 g) of Head TSL	Conditions
SAR measured	220 mW input power
SAR for nominal Head TSL parameters	normalized to 1W

Body TSL parameters

The following parameters are calculated from the test:

Parameter	Temperature	Permittivity	Conductivity
Measured Body TSL parameters	22.0 ± 0.2 °C	40.5	0.46 mS/m
Measured Body TSL parameters	22.0 ± 0.2 °C	40.5 ± 0.5%	0.35 mS/m ± 0.5%
Body TSL temperature change during test	< 0.2 °C		

SAR result with Body TSL

SAR measured	Conditions
SAR measured	250 mW input power
SAR for nominal Body TSL parameters	normalized to 1W
SAR measured over 18 cm ² (18 g) of Body TSL	Conditions
SAR measured	220 mW input power
SAR for nominal Body TSL parameters	normalized to 1W

Certificate No: 217-67134

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Client: SRTC Certificate No: 217-67134

Appendix (Additional assessments outside the scope of CNAS L0573)

Antenna Parameters with Head TSL

Parameter	Value
Impedance, transformed to feed point	32.0 ± 0.4%
Return Loss	> 20 dB

Antenna Parameters with Body TSL

Parameter	Value
Impedance, transformed to feed point	32.0 ± 0.2%
Return Loss	> 20 dB

General Antenna Parameters and Design

Parameter	Value
Electrical Delay (one direction)	1.15 ns

After long-term use with 100W reduced power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of a standard printed circuit board. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is made of a standard short-circuited 50-Ω dipole. On both sides of the dipole, small metal rings are added to the dipole arms in order to improve matching when inserted according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this design. The overall dipole length is 100 mm according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

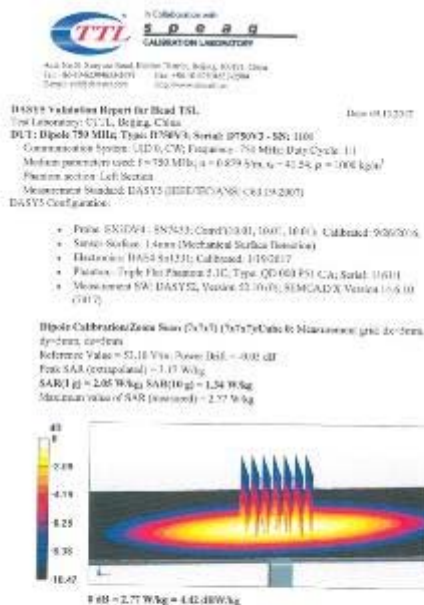
Additional EUT Data

Parameter	Value
Manufactured by	SRTC

Certificate No: 217-67134

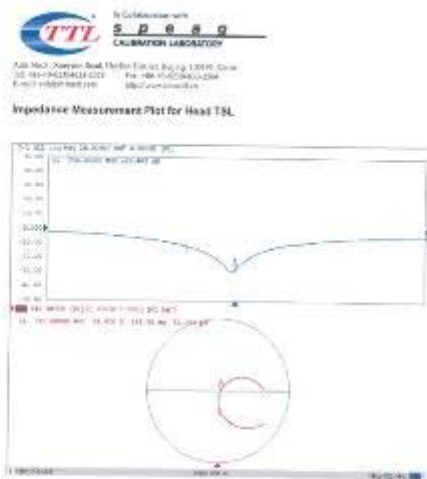
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D750V3 Sn:1101



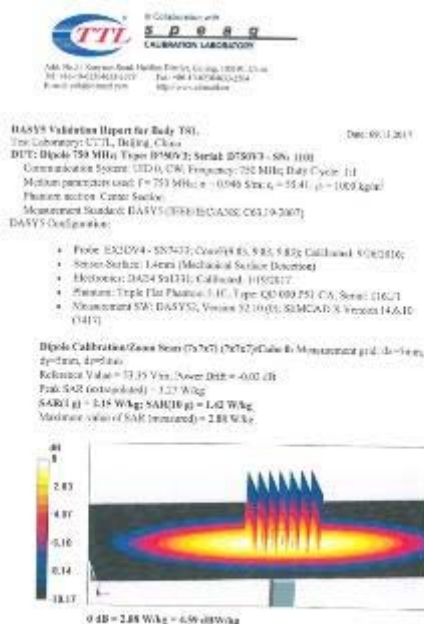
Certificate No: Z1707124

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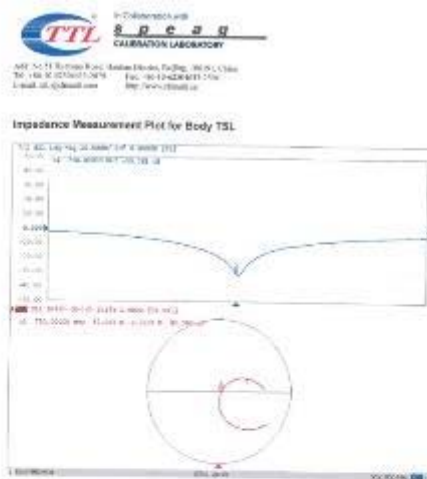
Certificate No: Z1707124

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Certificate No: Z1707124

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Certificate No: Z1707124

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D835V2 Sn:4d023

TTL Calibration Laboratory
In Collaboration with
CNAS
CALIBRATION LABORATORY

Client: SRTC Certificate No.: Z17-01136

CALIBRATION CERTIFICATE

Model: D835V2-SN:4d023

Calibration Procedure: EEC 211 (05.01)
Calibration Procedures for dipole validation etc.

Calibration date: September 13, 2017

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

All calibrations have been conducted in the stated laboratory facility environment (temperature/pressure and humidity) 70%.

Calibration Equipment used (MUTUAL for calibration)

Primary Standards	Q#	Cal Date/Calibrated by Certificate No.	Expiry Date
Power Meter N9910C	122186	02 Mar-17 (TTL No. 17031240)	Mar-18
Power source N9910C	122186	02 Mar-17 (TTL No. 17031240)	Mar-18
Reference Pulse EX3024	SN 1433	20 Mar-17 (TTL No. 17031240)	Mar-18
SWR	SN 1433	20 Mar-17 (TTL No. 17031240)	Mar-18

Secondary Standards	Q#	Cal Date/Calibrated by Certificate No.	Expiry Date
Signal Generator G4430C	M10011492	13 Jan-17 (TTL No. 17031240)	Jan-18
Reference Antenna G4430C	M10011492	13 Jan-17 (TTL No. 17031240)	Jan-18

Calculated by: Zhao Jing Function: SAR Test Engineer Signature: [Signature]

Reviewed by: Yu Zongying Function: SAR Test Engineer Signature: [Signature]

Approved by: Qi Danyuan Function: SAR Project Leader Signature: [Signature]

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

Issued: September 13, 2017

Certificate No.: Z17-01136 Page 1 of 3

TTL Calibration Laboratory
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CALIBRATION LABORATORY

Client: SRTC Certificate No.: Z17-01136

Glossary:

TSL: (Radio simulating) TSL

ConcF: (Radio simulating) TSL

N/A: not applicable or not requested

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 assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Part 1: Device used next to the ear (frequency range of 300MHz to 3GHz), July 2010
- c) IEC 62209-2, Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Part 2: Device used next to the ear (frequency range of 300MHz to 3GHz), March 2010
- d) KDS898884, SAR Measurement Requirements for 100 MHz to 3 GHz

Additional Documentation:

i) ETSI SAR 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 to lead 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 flow phantom. The impedance stated is determined 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 corrected: SAR as measured, normalized to an input power of 1W at the antenna connector.
- SAR for normal TSL parameters: The measured TSL parameters are used to calculate the normal 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%.

Certificate No.: Z17-01136 Page 2 of 3

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Client: SRTC Certificate No.: Z17-01136

Measurement Conditions

Calibration Conditions: SAR Test

Calibration Date: 2017-09-13

Calibration Location: Advanced Calibration

Phantom: Triple Rectangular 1.0

Children Dipole Center: TSL

Zero Bias Frequency: 30.0 MHz ± 5.0 MHz

Frequency: 30.0 MHz ± 5.0 MHz

Head TSL parameters

The following parameters are used for SAR calculation:

Parameter	Value	Unit
Normal Head TSL parameters	22.0 °C	°C
Measured Head TSL parameters	22.0 ± 0.2 °C	°C
Head TSL temperature change during test	+1.0 °C	°C

SAR result with Head TSL

Parameter	Value	Unit
SAR averaged over 1 cm ² of Head TSL	0.00	W/kg
SAR measured	0.00	W/kg
SAR for normal Head TSL parameters	0.00	W/kg
SAR averaged over 10 cm ² of Head TSL	0.00	W/kg
SAR measured	0.00	W/kg
SAR for normal Head TSL parameters	0.00	W/kg

Body TSL parameters

The following parameters are used for SAR calculation:

Parameter	Value	Unit
Normal Body TSL parameters	22.0 °C	°C
Measured Body TSL parameters	22.0 ± 0.2 °C	°C
Body TSL temperature change during test	+1.0 °C	°C

SAR result with Body TSL

Parameter	Value	Unit
SAR averaged over 1 cm ² of Body TSL	0.00	W/kg
SAR measured	0.00	W/kg
SAR for normal Body TSL parameters	0.00	W/kg
SAR averaged over 10 cm ² of Body TSL	0.00	W/kg
SAR measured	0.00	W/kg
SAR for normal Body TSL parameters	0.00	W/kg

Certificate No.: Z17-01136 Page 3 of 3

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Client: SRTC Certificate No.: Z17-01136

Appendix (Additional assessments outside the scope of GNAS L0573)

Antenna Parameters with Head TSL

Parameter	Value	Unit
Impedance, transformed to feed point	51.00 ± 0.01	Ω
Return Loss	-28.18	dB

Antenna Parameters with Body TSL

Parameter	Value	Unit
Impedance, transformed to feed point	15.00 ± 0.01	Ω
Return Loss	-28.18	dB

General Antenna Parameters and Design

Parameter	Value	Unit
Electrical Delay (one direction)	1.498	ns

After long term use with 150W radiated power, only a slight warming of the dipole near the feedpoint was observed.

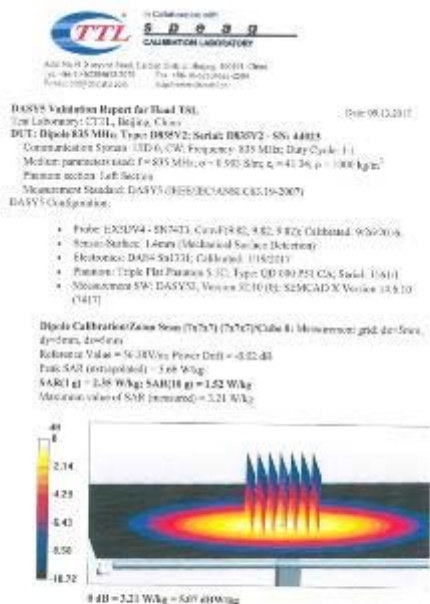
The dipole is made of copper wire with gold plating. The center conductor of the feeding cable is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC signals. On some of the dipole arms and when connected to the dipole arms, a certain degree of mismatching may occur due to the mismatching of the antenna impedance to the feeding cable impedance. 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 coupling connectors near the feedpoint may be damaged.

Additional EUT Data

Parameter	Value	Unit
Manufactured by	SRTC	

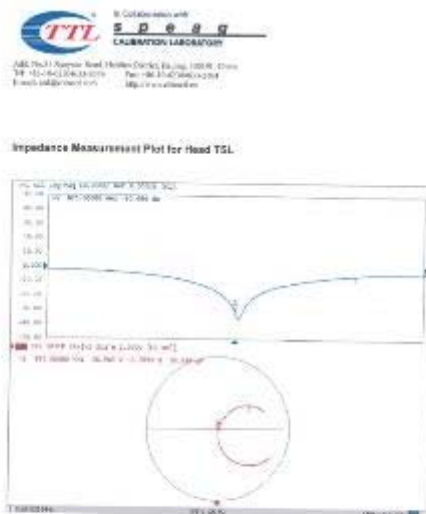
Certificate No.: Z17-01136 Page 4 of 3

D835V2 Sn:4d023



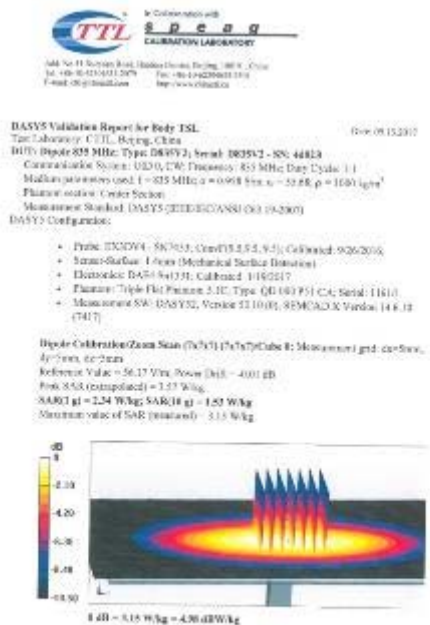
Certification No. Z1740118

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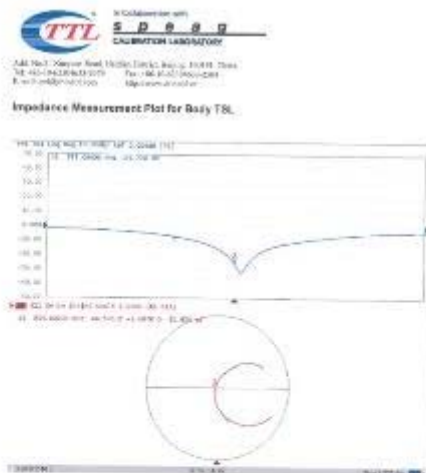
Certification No. Z1740118

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D1800V2 Sn:2d084

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Client: SRTC Certificate No.: Z17-07138

CALIBRATION CERTIFICATE

Client: SRTC
Certificate No.: Z17-07138

Calibration Model/eq: PP-Z17-001-01
Calibration Procedure for dipole calibration

Calibration date: September 18, 2017

This calibration Certificate conforms the necessity to national standards, which makes the physical value in measurement. The measurement and the uncertainty with coverage probability are given in the following pages and are part of the certificate.

All calibration have been conducted in the stated laboratory facility, environment, atmosphere and humidity.

Calibration Equipment used (NIST or other for calibration)

Primary Standards	Q#	Cal Date/Calibrated By: Certificate No.	Scheduled Calibration
Power Meter: N9912	100108	30-Mar-17 (JCTL, No. J17011014)	Mar-18
Power sensor: N9912B1	100108	30-Mar-17 (JCTL, No. J17011014)	Mar-18
Reference Probe: P3000A	SM7435	26-Sep-16 (SPTA, No. 16-03015)	Sep-17
OMG	SM1331	19-Jun-17 (JCTL, SPTA, No. 17-07015)	Jun-18

Secondary Standards	Q#	Cal Date/Calibrated By: Certificate No.	Scheduled Calibration
Signal Generator: S4400C	N991071508	19-Jun-17 (JCTL, No. J17000305)	Jun-18
Network Analyzer: E5071C	N991071508	19-Jun-17 (JCTL, No. J17000305)	Jun-18

Calibrated by: Zhang Yong SAR Test Engineer
Reviewed by: Yu Zhenping SAR Test Engineer
Approved by: G. Danyuan SAR Project Leader

Issued: September 18, 2017
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Continue No. Z17-07138

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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 60529-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 30MHz to 2GHz)", February 2005
- c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 2GHz)", March 2010
- d) IEC 62209-2, SAR Measurement Requirements for 100 MHz to 2 GHz

Additional Documentation:

- a) IAS-418 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Variation 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 space to position its feed point exactly below the center marking of the flat phantom section, with the antenna 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 shown is transformed from the measurement of the SMA connector to the feed point. The Return Loss shows a low reflected power. No uncertainty required.
- Electrical Delay: Consistency delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured SAR: SAR measured at the stated antenna input power.
- SAR normalized SAR: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for normal TSL parameters: The measured TSL parameters are used to calculate the normal 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%.

Continue No. Z17-07138

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Measurement Conditions

Q#1800V2, SAR1800V2, SAR1800V2, SAR1800V2

Parameter	Value	Unit
Q#1800V2	1800V2	1800V2
Antenna Parameters	Advanced Configuration	
Phantom	Trunk Fat Phantom & TSL	
Distance Dipole Center - TSL	50 mm	mm
Zone Scan Resolution	50 mm x 50 mm	mm
Frequency	1800 MHz ± 1 MHz	MHz

Head TSL parameters

The following parameters and uncertainties apply:

Parameter	Value	Unit
Head TSL parameters	20.0 °C	°C
Measured Head TSL parameters	40.0 ± 0.2 °C	°C
Head TSL temperature change during test	± 0.2 °C	°C

SAR result with Head TSL

Parameter	Value	Unit
SAR averaged over 1 cm ² of Head TSL	0.0001	W/kg
SAR measured	0.0001	W/kg
SAR for normal Head TSL parameters	0.0001	W/kg
SAR averaged over 10 cm ² of Head TSL	0.0001	W/kg
SAR measured	0.0001	W/kg
SAR for normal Head TSL parameters	0.0001	W/kg

Body TSL parameters

The following parameters and uncertainties apply:

Parameter	Value	Unit
Body TSL parameters	20.0 °C	°C
Measured Body TSL parameters	40.0 ± 0.2 °C	°C
Body TSL temperature change during test	± 0.2 °C	°C

SAR result with Body TSL

Parameter	Value	Unit
SAR averaged over 1 cm ² of Body TSL	0.0001	W/kg
SAR measured	0.0001	W/kg
SAR for normal Body TSL parameters	0.0001	W/kg
SAR averaged over 10 cm ² of Body TSL	0.0001	W/kg
SAR measured	0.0001	W/kg
SAR for normal Body TSL parameters	0.0001	W/kg

Continue No. Z17-07138

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Appendix (Add) and measurements outside the scope of CNAS L8072

Antenna Parameters with Head TSL

Parameter	Value	Unit
Impedance, transformed to feed point	40.0 ± 0.2	Ω
Return Loss	20.0	dB

Antenna Parameters with Body TSL

Parameter	Value	Unit
Impedance, transformed to feed point	40.0 ± 0.2	Ω
Return Loss	20.0	dB

General Antenna Parameters and Design

Parameter	Value	Unit
Electrical Delay from connector	1.35 ns	ns

After being tested with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of stainless steel wire. 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 devices, small metal tabs are added to the dipole arms in order to improve matching when used according to the position description in the Measurement Condition. However, the SAR values can be affected by this change. The overall dipole length is 180 mm, as required in the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connection near the feedpoint may be damaged.

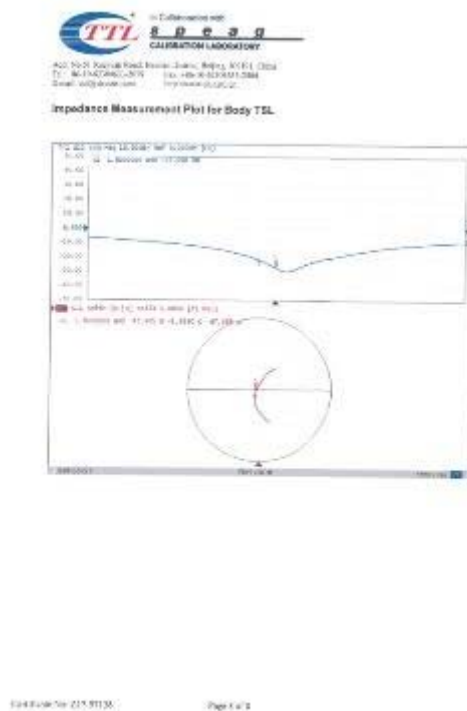
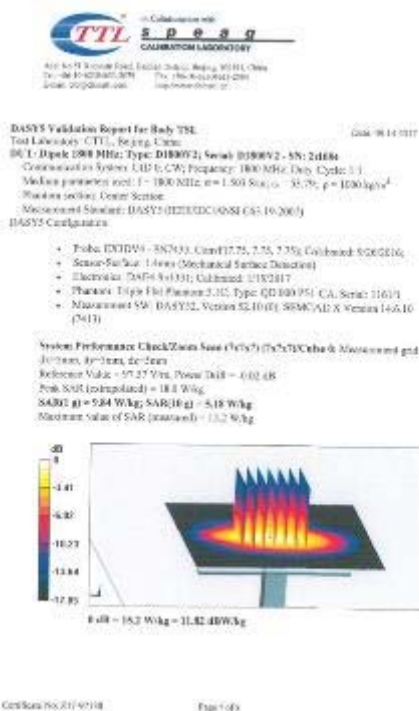
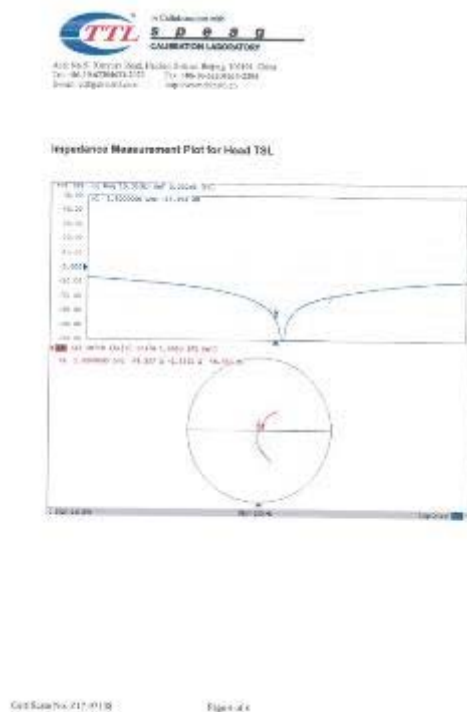
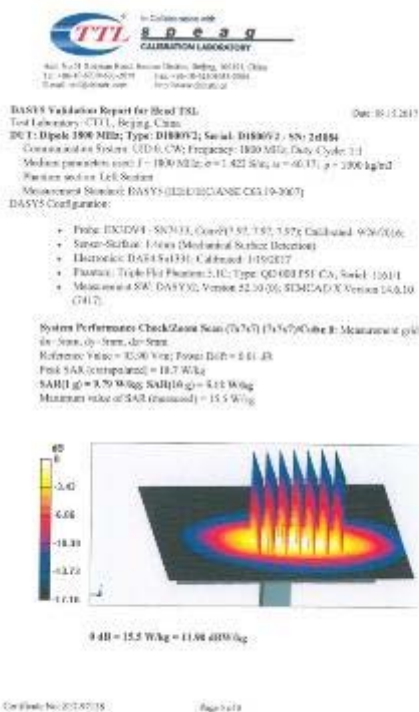
Additional EUT Data

Parameter	Value	Unit
Manufacturer	SPTA	

Continue No. Z17-07138

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D1800V2 Sn:2d084



D2000V2 Sn:1009

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Client: **SRTC** Certificate No.: **Z18-97021**

CALIBRATION CERTIFICATE

Object: **D2000V2 - SN: 1009**

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

Calibration date: **February 1, 2018**

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(23±1)°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: NRV-D	102188	02-Mar-17 (CTTL No. J17AD1254)	Mar-18
Power sensor: NRV-Z5	100569	02-Mar-17 (CTTL No. J17AD1254)	Mar-18
Reference Probe: EX30V4	SN 7464	12-Sep-17 (SPEAG No. EX3-7464_Sep17)	Sep-18
DAE4	SN 1225	02-Oct-17 (SPEAG No. DAE4-1525_Oct17)	Oct-18

Secondary Standards	ID #	Cal Date/Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator: E4438C	MY49271430	23-Jan-18 (CTTL No. J18AC0960)	Jan-19
Network Analyzer: E5071C	MY48110673	24-Jan-18 (CTTL No. J18AC0961)	Jan-19

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

Issued: February 4, 2018

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Client: **SRTC** Certificate No.: **Z18-97021**

Glossary:

TSL: tissue simulating liquid
ConvF: sensitivity in TSL / NORM_{M,y,z}
N/A: not applicable or not measured

Calibration is Performed According to the Following Standards:

- 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
- IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2018
- IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 300MHz to 6GHz)", March 2010
- KD8865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

- DA5Y4/S 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

SAR test configuration, as for as not given on page 1.

DA5Y4 Version	DA5Y42	52.10.0.1448
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	2000 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mS/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.9 ± 0.5	1.42 mS/m ± 0.5 %
Head TSL temperature change during test	<1.0 °C	—	—

SAR result with Head TSL

SAR averaged over 1 cm ² (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.2 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	40.3 mW/g ± 18.3 % (k=2)
SAR averaged over 10 cm ² (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.17 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	20.4 mW/g ± 18.7 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mS/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 0.5	1.58 mS/m ± 0.5 %
Body TSL temperature change during test	<1.0 °C	—	—

SAR result with Body TSL

SAR averaged over 1 cm ² (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	40.3 mW/g ± 18.4 % (k=2)
SAR averaged over 10 cm ² (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.18 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	20.4 mW/g ± 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	49.60 - 2.05j
Return Loss	-33.6dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.30 - 1.63j
Return Loss	-27.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.047 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint 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 central 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 feedpoint may be damaged.

Additional EUT Data

Manufactured by	
	SPEAG

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D2000V2 Sn:1009

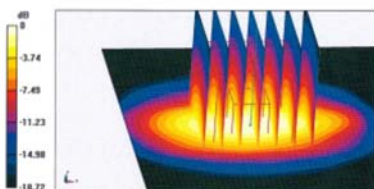


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E-mail: ctt@china-test.com http://www.china-test.com

DASY5 Validation Report for Head TSL
Test Laboratory: CTTI, Beijing, China
DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009
Communication System: UTD 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2000$ MHz; $\alpha = 1.416$ S/m; $\sigma = 38.89$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.39, 8.39, 8.39); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DA64 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube @; Measurement grid:
 $d_x=5$ mm, $d_y=5$ mm, $d_z=5$ mm
Reference Value = 95.48 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg = 12.10 dBW/kg

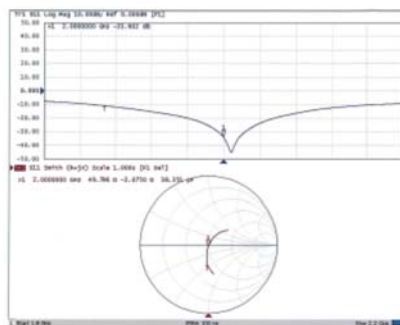
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Impedance Measurement Plot for Head TSL



Certificate No: Z18-97021

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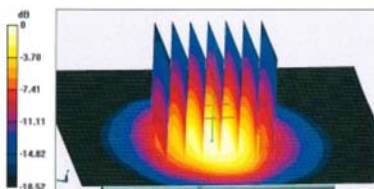


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Tel: +86-10-42204633-2079 Fax: +86-10-42204633-2504
E-mail: ctt@china-test.com http://www.china-test.com

DASY5 Validation Report for Body TSL
Test Laboratory: CTTI, Beijing, China
DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1009
Communication System: UTD 0, CW; Frequency: 2000 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2000$ MHz; $\alpha = 1.564$ S/m; $\sigma = 51.8$; $\rho = 1000$ kg/m³
Phantom section: Center Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.24, 8.24, 8.24); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DA64 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

System Performance Check/Zoom Scan (7x7x7) (7x7x7)Cube @; Measurement grid:
 $d_x=5$ mm, $d_y=5$ mm, $d_z=5$ mm
Reference Value = 93.84 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



0 dB = 16.3 W/kg = 12.12 dBW/kg

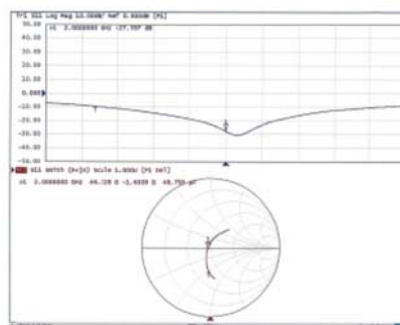
Certificate No: Z18-97021

Page 7 of 8



Address: No.31 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-42204633-2079 Fax: +86-10-42204633-2504
E-mail: ctt@china-test.com http://www.china-test.com

Impedance Measurement Plot for Body TSL



Certificate No: Z18-97021

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D2450V2 Sn:738

Calibration Certificate

Client: SRTC Certificate No: Z17-07140

Model: D2450V2 Sn: 738

Calibration Procedures: JJF 211-2003.21
Calibration date: September 15, 2017

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

All calibrations have been conducted in the classed laboratory facility, environment temperature (20±2)°C and humidity <70%.

Calibration Equipment used (MPE):

Primary Standards	IC #	Calibrated by Certificate No.	Scheduled Calibration
Power Meter: N4250	58-1006	22-May-17 (JTC, No. J1701314)	Mar-18
Power Sensor: N4250	58-1006	22-May-17 (JTC, No. J1701314)	Mar-18
Reference Probe EXD04	58-1003	26-Sep-17 (SPS, No. 1701314)	Jun-18
DMA	58-1003	16-Jun-17 (JTC, SPS, No. 1701314)	Jun-18

Secondary Standards

IC #	Calibrated by Certificate No.	Scheduled Calibration
Signal Generator: E44000	13-Jun-17 (JTC, No. J1701314)	Jun-18
Network Analyzer: E44000	13-Jun-17 (JTC, No. J1701314)	Jun-18

Calibrated by: Zhao Jiguo SRTC Test Engineer

Reviewed by: Yu Zongyong SRTC Test Engineer

Approved by: G. Baiyuan SRTC Project Manager

Issue Date: September 15, 2017

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Certificate No: Z17-07140 Page: 1 of 8

Calibration Certificate

Client: SRTC Certificate No: Z17-07140

Model: D2450V2 Sn: 738

Calibration Procedures: JJF 211-2003.21
Calibration date: September 15, 2017

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

All calibrations have been conducted in the classed laboratory facility, environment temperature (20±2)°C and humidity <70%.

Calibration Equipment used (MPE):

Primary Standards	IC #	Calibrated by Certificate No.	Scheduled Calibration
Power Meter: N4250	58-1006	22-May-17 (JTC, No. J1701314)	Mar-18
Power Sensor: N4250	58-1006	22-May-17 (JTC, No. J1701314)	Mar-18
Reference Probe EXD04	58-1003	26-Sep-17 (SPS, No. 1701314)	Jun-18
DMA	58-1003	16-Jun-17 (JTC, SPS, No. 1701314)	Jun-18

Secondary Standards

IC #	Calibrated by Certificate No.	Scheduled Calibration
Signal Generator: E44000	13-Jun-17 (JTC, No. J1701314)	Jun-18
Network Analyzer: E44000	13-Jun-17 (JTC, No. J1701314)	Jun-18

Calibrated by: Zhao Jiguo SRTC Test Engineer

Reviewed by: Yu Zongyong SRTC Test Engineer

Approved by: G. Baiyuan SRTC Project Manager

Issue Date: September 15, 2017

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Certificate No: Z17-07140 Page: 1 of 8

Measurement Conditions

Calibration system configuration: as per the full system page 1

Parameter	Value	Unit
Calibration	Antenna Calibration	
Reference	Traceable to NIST	
Calibration Date	2017.09.15	
Calibration Location	China, Beijing	
Calibration Method	As per the full system page 1	

Head TSL parameters

The following parameters are not applicable to this antenna.

Parameter	Value	Unit
Head TSL parameters	20.0 ± 0.1	dB
Measured Head TSL parameters	20.0 ± 0.1	dB
Head TSL temperature change during test	< 0.1	°C

SAR result with Head TSL

Parameter	Value	Unit
SAR averaged over 1 cm ³ of head TSL	13.1	W/kg
SAR measured	20.0 mW input power	
SAR for normal Head TSL parameters	20.0 mW input power	
SAR averaged over 18 cm ³ of head TSL	20.0	W/kg
SAR measured	20.0 mW input power	
SAR for normal Head TSL parameters	20.0 mW input power	

Body TSL parameters

The following parameters are not applicable to this antenna.

Parameter	Value	Unit
Body TSL parameters	20.0 ± 0.1	dB
Measured Body TSL parameters	20.0 ± 0.1	dB
Body TSL temperature change during test	< 0.1	°C

SAR result with Body TSL

Parameter	Value	Unit
SAR averaged over 1 cm ³ of body TSL	13.1	W/kg
SAR measured	20.0 mW input power	
SAR for normal Body TSL parameters	20.0 mW input power	
SAR averaged over 18 cm ³ of body TSL	20.0	W/kg
SAR measured	20.0 mW input power	
SAR for normal Body TSL parameters	20.0 mW input power	

Certificate No: Z17-07140 Page: 1 of 8

Appendix (Additional assessments outside the scope of CNAS 1667)

Antenna Parameters with Head TSL

Parameter	Value	Unit
Impedance, transformed to feed point	17.0 ± 0.5	Ω
Return Loss	24.0	dB

Antenna Parameters with Body TSL

Parameter	Value	Unit
Impedance, transformed to feed point	17.0 ± 0.5	Ω
Return Loss	24.0	dB

General Antenna Parameters and Design

Parameter	Value	Unit
Electrical Safety (low frequency)	1.0	W/kg

After long term use with 100W rated power, only a slight warming of the dipole can be felt at the feed point.

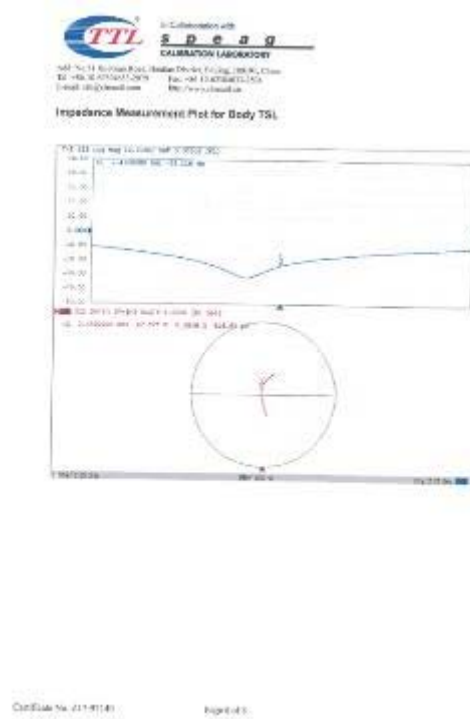
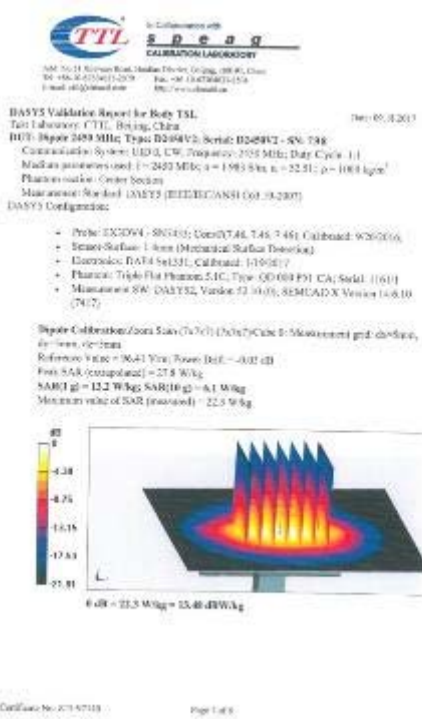
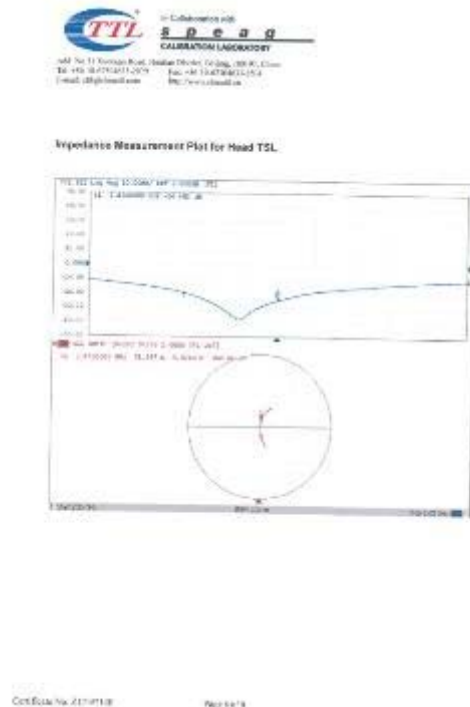
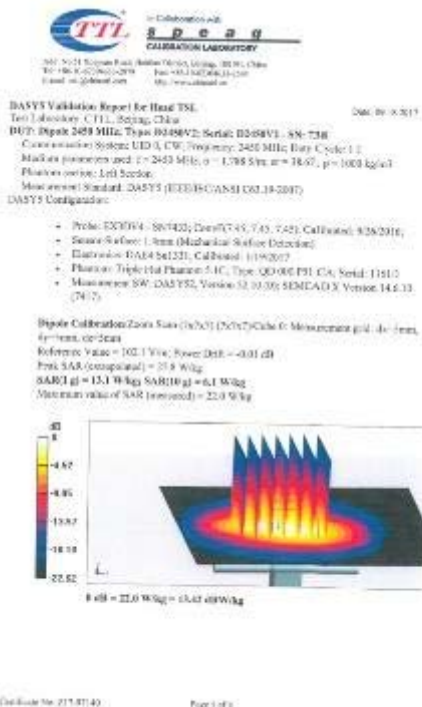
The dipole is made of standard stainless steel. The nominal conductor of the feeding line is directly connected to the second arm of the dipole. The nominal conductor of the feeding line is directly connected to the second arm of the dipole. The nominal conductor of the feeding line is directly connected to the second arm of the dipole. The nominal conductor of the feeding line is directly connected to the second arm of the dipole.

Additional EUT Data

Parameter	Value	Unit
Manufacturer	SRTC	

Certificate No: Z17-07140 Page: 1 of 8

D2450V2 Sn:738



D5GHzV2 Sn:1079

 In Collaboration with T T L s p e c i a l C A L I B R A T I O N U N D E R T A K E ATTN: Mr. Sushil Sarda, Head, Quality Policy, ISO/IEC Clause 7.15.4, ISO/IEC 17025:2005 Email: s.sarda@tntl.com www.tntnl.com		  中國認可 國家認證 機構 CNAS CALIBRATION CNAS-1870	
Client:		SRTC	
		Certificate No: ZIT-07193	
CALIBRATION CERTIFICATE			
Client:		DGG-INDIA - INDIA	
Calibration Procedure(s)		F1, F2, G1, G2, G3	
Calculations performed for dipole calibration job.			
Calibration date:		September 25, 2017	
This Calibration Certificate documents the traceability to national standards, which realize the physical units or measurements (SI). The measurement and the uncertainty with confidence probability are given in the following pages and are part of the certificate.			
All calibrations have been conducted in the closest laboratory facility environment temperature/pressure and humidity/TCX.			
Calibration Equipment used (MUTU) used for calibration			
Primary Standards	ID#	Calibrated/Validated by Certificate No.	Scheduled Calibration
Punch Force MIP-2	102-196	09-Jun-17 (CTTL No.) ZIT001254	Mar-18
Punch force sensor NPT-231	100556	09-Jun-17 (CTTL No.) ZIT001254	Mar-18
Reference Probe CACOM 1505A	CM-3640	15-Jan-17 (CTTL SPQA No.) Z16-072511	Jan-18
	CM-1331	16-Jan-17 (CTTL SPQA No.) Z17-072115	Jan-18
Secondary Standards	ID#	Re-Calibrated/Validated by Certificate No.	Scheduled Calibration
Signal Generator C44380	MIR0171403	15-Jan-17 (CTTL No.) ZIT012095	Jun-18
Reference voltage DSG 6110	MIR0170875	15-Jan-17 (CTTL No.) ZIT012095	Jun-18
Calibrated by:	Name	Position	Signature
	Zhao Jing	Lab Test Engineer	[Signature]
Reviewed by:	Yu Zongping	MAN Test Engineer	[Signature]
Approved by:	Qi Dianyan	MAN Project Leader	[Signature]
Validated September 24, 2017 This calibration certificate shall not be reproduced except in full without written approval of the authority.			

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T T L S P E C I A L I Z E D
CALIBRATION LABORATORY

Attn: Mr. J. Steven Bell | Email: jbell@ttspecialty.com
1440 N. Highway 30W | Fax: fbell@ttspecialty.com
Orem, UT 84405-2202 | Web: www.ttspecialty.com

Glossary:

- TSL: Mean circulating load
- Const: Sensitivity in TS/L NORMdB/g²
- N/A: Not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1529-2013, "IEEE Recommended Practice for Determining the Peak Strain-Averaged Spacing Absorption Rate (SAR) in the Human Head from Wireless Communications Devices," Measurement Solutions™, June 2013.
- b) FCC 92202-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communications devices—Part 1: Devices used next to the ear," Frequency range of 30MHz to 6GHz, July 2015.
- c) FCC 92202-2, "Procedure to measure the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)," March 2010.
- d) ICES-960606, SAR Measurement Requirements for 100 MHz to 6 GHz.

Additional Documentation:

- a) DASNUS System Handbook

Methods Applied and Interpretation of Parameters:

- a) **Measurement Conditions:** Further details are available from the Validation Report at the end of each test case. All figures stated in the certificate are taken at the frequency indicated.
- b) **Antenna Positioning:** per TS/L The dipole is introduced with the antenna position in two point exactly below the center marking of the flat phantom section, with the same distance parallel to the body axis.
- c) **Feed Point Reference and Return Loss:** These parameters are measured with the dipole positioned under the head flat phantom. The impedance at the feed point is transformed from the measurement at the SMA connector to the feed point. The Return Loss assumes low reflected power. No uncertainty required.
- d) **Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- e) **SAR measured:** SAR measured at the stated antenna input power.
- f) **SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna contacts.
- g) **SAR for received TS/L parameter:** The measured TS/L parameters are used to calculate the normal SAR result.

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%.

			
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Measurement Conditions SPAT: Ambient dry room, as far as not given in table 1			
DA37 version	DA37P2	P2: 150 1440	
Preparation	Aluminum Preparation		
Condition	Triple Plate Thermistor, 5.52		
Distance Electrode Center - TSL	13 mm		
Electrode Electrode	50.00 ± 0.05 mm, 10.0 ± 0.1 mm	Graded Ratio = 1.4 (2° direction)	
Frequency	500.0 MHz ± 1 kHz 500.0 MHz ± 1 kHz 500.0 MHz ± 1 kHz 500.0 MHz ± 1 kHz 500.0 MHz ± 1 kHz		

		In Collaboration with TTI CALIBRATION LABORATORY			
425, 5th St. Kansas Road, New Castle, Belgium, 9101-1, (Belgium) Tel: +32 (0)3 686 00 11 Fax: +32 (0)3 686 00 12 E-mail: info@tti-belgium.com www.tti-belgium.com					
Heat TSL parameters at 5300 MHz					
The following parameters are at 250.0 MHz, unless specified					
Nominal Heat TSL parameters	22.0 °C	38.8	Conductivity		
Measured Heat TSL parameters	22.0 ± 0.2 °C	38.7 ± 0.5	4.35 mW/cm²		
Heat TSL temperature change during test	+0.1 °C	—	4.03 mW/cm² ± 8 %		
SAR result with Heat TSL at 5300 MHz					
SAR averaged over 1 cm³ (1 g) of Head TSL	Condition				
SAR measured	100 mW input power		8.73 mW/g		
SAR for nominal Heat TSL parameters	normalized to 1W		87.3 mW/g ± 24.8 % (std)		
SAR averaged over 18 cm³ (19 g) of Head TSL	Condition				
SAR measured	100 mW input power		2.32 mW/g		
SAR for nominal Head TSL parameters	normalized to 1W		23.2 mW/g ± 24.8 % (std)		
Heat TSL parameters at 8600 MHz					
The following parameters are at 250.0 MHz, unless specified					
Nominal Heat TSL parameters	22.0 °C	38.8	Conductivity		
Measured Heat TSL parameters	22.0 ± 0.2 °C	38.7 ± 0.5	4.35 mW/cm²		
Heat TSL temperature change during test	+0.1 °C	—	4.03 mW/cm² ± 8 %		
SAR result with Heat TSL at 8600 MHz					
SAR averaged over 1 cm³ (1 g) of Head TSL	Condition				
SAR measured	100 mW input power		8.54 mW/g		
SAR for nominal Heat TSL parameters	normalized to 1W		85.4 mW/g ± 24.8 % (std)		
SAR averaged over 18 cm³ (19 g) of Head TSL	Condition				
SAR measured	100 mW input power		2.31 mW/g		
SAR for nominal Heat TSL parameters	normalized to 1W		23.1 mW/g ± 24.8 % (std)		

D5GHzV2 Sn:1079

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E-mail: srtc@spc.com.cn www.spc.com.cn

Head TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	0.07 mho/cm
Measured Head TSL parameters	22.0 ± 0.2 °C	39.7 ± 0.5 %	± 0.07 mho/cm ± 0 %
Head TSL temperature change during test	± 0.2 °C	—	—

SAR result with Head TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	8.18 mW/g
SAR measured	100 mW input power	7.55 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	81.8 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	—
SAR measured	100 mW input power	2.34 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	23.4 mW/g ± 0.4 % (p=2)

Head TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	0.07 mho/cm
Measured Head TSL parameters	22.0 ± 0.2 °C	39.6 ± 0.5 %	± 0.07 mho/cm ± 0 %
Head TSL temperature change during test	± 0.2 °C	—	—

SAR result with Head TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	7.55 mW/g
SAR measured	100 mW input power	7.55 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	75.5 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	—
SAR measured	100 mW input power	2.34 mW/g
SAR for nominal Head TSL parameters	normalized to 1W	23.4 mW/g ± 0.4 % (p=2)

Certificate No. Z17-91131

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E-mail: srtc@spc.com.cn www.spc.com.cn

Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

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E-mail: srtc@spc.com.cn www.spc.com.cn

Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

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Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

Body TSL parameters at 5990 MHz
The following parameters and calculation were applied:

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	40.0	0.30 mho/cm
Measured Body TSL parameters	22.0 ± 0.2 °C	40.2 ± 0.5 %	± 0.30 mho/cm ± 0 %
Body TSL temperature change during test	± 0.2 °C	—	—

SAR result with Body TSL at 5990 MHz

	Condition	
SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	7.52 mW/g
SAR measured	100 mW input power	7.52 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	75.2 mW/g ± 0.4 % (p=2)
SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	—
SAR measured	100 mW input power	2.32 mW/g
SAR for nominal Body TSL parameters	normalized to 1W	23.2 mW/g ± 0.4 % (p=2)

Certificate No. Z17-91131

Page 1 of 1

D5GHzV2 Sn:1079

 In Cooperation with CAIRATION LABORATORY 4027 N. 13th Street, Suite 100, Tulsa, OK 74116, USA Tel: 918-442-9999/907 Fax: 918-442-9111/1234 Email: info@cair.com TTU: www.ttu.edu	
Appendix (Additional measurements outside the scope of CNAS L0573)	
Antenna Parameters with Head TSL at 6300 MHz	
Impedance, transformed to feed point	47.00 - j 7.75
Return Loss	-20.7 dB
Antenna Parameters with Head TSL at 5300 MHz	
Impedance, transformed to feed point	43.92 - j 6.620
Return Loss	-21.4 dB
Antenna Parameters with Head TSL at 2800 MHz	
Impedance, transformed to feed point	80.70 - j 2.140
Return Loss	-23.0 dB
Antenna Parameters with Head TSL at 9300 MHz	
Impedance, transformed to feed point	55.00 - j 30.0
Return Loss	-24.7 dB
Antenna Parameters with Head TSL at 5800 MHz	
Impedance, transformed to feed point	40.75 - j 5.200
Return Loss	-21.8 dB
Antenna Parameters with Body TSL at 6300 MHz	
Impedance, transformed to feed point	10.00 - j 0.100
Return Loss	-23.6 dB
Antenna Parameters with Body TSL at 9300 MHz	
Impedance, transformed to feed point	49.00 - j 4.860
Return Loss	-21.1 dB

 In Collaboration with TTTech CALCULATION LABORATORY 40000, 40010, 40020, 40030, 40040, 40050, 40060, 40070, 40080, 40090, 40100, 40110, 40120, 40130, 40140, 40150, 40160, 40170, 40180, 40190, 40200, 40210, 40220, 40230, 40240, 40250, 40260, 40270, 40280, 40290, 40300, 40310, 40320, 40330, 40340, 40350, 40360, 40370, 40380, 40390, 40400, 40410, 40420, 40430, 40440, 40450, 40460, 40470, 40480, 40490, 40500, 40510, 40520, 40530, 40540, 40550, 40560, 40570, 40580, 40590, 40600, 40610, 40620, 40630, 40640, 40650, 40660, 40670, 40680, 40690, 40700, 40710, 40720, 40730, 40740, 40750, 40760, 40770, 40780, 40790, 40800, 40810, 40820, 40830, 40840, 40850, 40860, 40870, 40880, 40890, 40900, 40910, 40920, 40930, 40940, 40950, 40960, 40970, 40980, 40990, 41000, 41010, 41020, 41030, 41040, 41050, 41060, 41070, 41080, 41090, 41100, 41110, 41120, 41130, 41140, 41150, 41160, 41170, 41180, 41190, 41200, 41210, 41220, 41230, 41240, 41250, 41260, 41270, 41280, 41290, 41300, 41310, 41320, 41330, 41340, 41350, 41360, 41370, 41380, 41390, 41400, 41410, 41420, 41430, 41440, 41450, 41460, 41470, 41480, 41490, 41500, 41510, 41520, 41530, 41540, 41550, 41560, 41570, 41580, 41590, 41600, 41610, 41620, 41630, 41640, 41650, 41660, 41670, 41680, 41690, 41700, 41710, 41720, 41730, 41740, 41750, 41760, 41770, 41780, 41790, 41800, 41810, 41820, 41830, 41840, 41850, 41860, 41870, 41880, 41890, 41900, 41910, 41920, 41930, 41940, 41950, 41960, 41970, 41980, 41990, 42000, 42010, 42020, 42030, 42040, 42050, 42060, 42070, 42080, 42090, 42100, 42110, 42120, 42130, 42140, 42150, 42160, 42170, 42180, 42190, 42200, 42210, 42220, 42230, 42240, 42250, 42260, 42270, 42280, 42290, 42300, 42310, 42320, 42330, 42340, 42350, 42360, 42370, 42380, 42390, 42400, 42410, 42420, 42430, 42440, 42450, 42460, 42470, 42480, 42490, 42500, 42510, 42520, 42530, 42540, 42550, 42560, 42570, 42580, 42590, 42600, 42610, 42620, 42630, 42640, 42650, 42660, 42670, 42680, 42690, 42700, 42710, 42720, 42730, 42740, 42750, 42760, 42770, 42780, 42790, 42800, 42810, 42820, 42830, 42840, 42850, 42860, 42870, 42880, 42890, 42900, 42910, 42920, 42930, 42940, 42950, 42960, 42970, 42980, 42990, 43000, 43010, 43020, 43030, 43040, 43050, 43060, 43070, 43080, 43090, 43100, 43110, 43120, 43130, 43140, 43150, 43160, 43170, 43180, 43190, 43200, 43210, 43220, 43230, 43240, 43250, 43260, 43270, 43280, 43290, 43300, 43310, 43320, 43330, 43340, 43350, 43360, 43370, 43380, 43390, 43400, 43410, 43420, 43430, 43440, 43450, 43460, 43470, 43480, 43490, 43500, 43510, 43520, 43530, 43540, 43550, 43560, 43570, 43580, 43590, 43600, 43610, 43620, 43630, 43640, 43650, 43660, 43670, 43680, 43690, 43700, 43710, 43720, 43730, 43740, 43750, 43760, 43770, 43780, 43790, 43800, 43810, 43820, 43830, 43840, 43850, 43860, 43870, 43880, 43890, 43900, 43910, 43920, 43930, 43940, 43950, 43960, 43970, 43980, 43990, 44000, 44010, 44020, 44030, 44040, 44050, 44060, 44070, 44080, 44090, 44100, 44110, 44120, 44130, 44140, 44150, 44160, 44170, 44180, 44190, 44200, 44210, 44220, 44230, 44240, 44250, 44260, 44270, 44280, 44290, 44300, 44310, 44320, 44330, 44340, 44350, 44360, 44370, 44380, 44390, 44400, 44410, 44420, 44430, 44440, 44450, 44460, 44470, 44480, 44490, 44500, 44510, 44520, 44530, 44540, 44550, 44560, 44570, 44580, 44590, 44600, 44610, 44620, 44630, 44640, 44650, 44660, 44670, 44680, 44690, 44700, 44710, 44720, 44730, 44740, 44750, 44760, 44770, 44780, 44790, 44800, 44810, 44820, 44830, 44840, 44850, 44860, 44870, 44880, 44890, 44900, 44910, 44920, 44930, 44940, 44950, 44960, 44970, 44980, 44990, 45000, 45010, 45020, 45030, 45040, 45050, 45060, 45070, 45080, 45090, 45100, 45110, 45120, 45130, 45140, 45150, 45160, 45170, 45180, 45190, 45200, 45210, 45220, 45230, 45240, 45250, 45260, 45270, 45280, 45290, 45300, 45310, 45320, 45330, 45340, 45350, 45360, 45370, 45380, 45390, 45400, 45410, 45420, 45430, 45440, 45450, 45460, 45470, 45480, 45490, 45500, 45510, 45520, 45530, 45540, 45550, 45560, 45570, 45580, 45590, 45600, 45610, 45620, 45630, 45640, 45650, 45660, 45670, 45680, 45690, 4

 **TTL**
CALIBRATION LABORATORY

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Email: info@ttnet.com.cn www.ttnet.com.cn

DABYS Validation Report for Head TSL
Test Laboratory: TTL, Beijing, China
DUT: Dipole SGL1s; Type: DSGHv2; Serial: DSGHv2 - SN: 1079
Date: 06-21-2015

Continuum/Sonication System: CMV, Frequency: 5200 MHz; Frequency: 5000 MHz;
Frequency: 5500 MHz; Frequency: 6000 MHz; Frequency: 5000 MHz;
Medium parameters used: $\sigma = 1250 \text{ kg/m}^3$; $\alpha = 4.418 \text{ m/s}$; $\sigma = 36.72$; $\mu = 1200$
 kg/m^3 ; Medium parameters used: $\sigma = 5500 \text{ kg/m}^3$; $\alpha = 4.555 \text{ m/s}$; $\sigma = 38.05$; $\mu = 1000$
 kg/m^3 ; Medium parameters used: $\sigma = 8600 \text{ kg/m}^3$; $\alpha = 4.336 \text{ m/s}$; $\sigma = 26.02$
 $\mu = 1000 \text{ kg/m}^3$; Medium parameters used: $\sigma = 5800 \text{ kg/m}^3$; $\alpha = 4.464 \text{ m/s}$; $\sigma = 35.73$; $\mu = 1000 \text{ kg/m}^3$; Medium parameters used: $\sigma = 5800 \text{ kg/m}^3$; $\alpha = 5.100 \text{ m/s}$; $\sigma = 35.43$; $\mu = 1000 \text{ kg/m}^3$

Platform section: Left Section
Measurement Standard: DABYS (IEEE/CANIS C80.19-2007)

DABYS Configuration:

- Probe: E3034A - SK8284; Conn: 5.373, 5.373, 5.373; Calibrated: 11/32/17,
Conn: 6.37, 6.37, 6.37; Calibrated: 11/32/17; Conn: 6.72, 6.72, 6.72;
Calibrated: 11/32/17; Conn: 6.72, 6.72, 6.72; Calibrated: 11/32/17,
Conn: 6.94, 6.94, 6.94; Calibrated: 11/32/17
- Series Surface: 14mm (Mechanical Surface Definition)
- Electrodes: 306A S-121; Calibrated: 2017/10/16
- Phenomena: Impedance Phenomena; Type: T2; Conn: 200 Pin CA; Serial: 1161/5
- Measurement SW: DABYS_Version: 52.10 (v); SEWICAD X Version: 14.8.10 (7471)

Dipole Calibration (Pin=100nW, d=10mm, f=5200 MHz)Zoon Scan:
dipole=1.4mm (R247)G5; d=1mm; Measurement: d=4mm; d=4mm; d=4mm
Reference Value = 59.51 mW; Power Diff = -2.01 dB
Peak SAR: 100mW/g (measured) = 13.1 W/kg
SAR(1) = 7.77 W/kg; SAR(10) = 2.24 W/kg
Maximum value of SAR (measured) = 18.2 W/kg

Dipole Calibration (Pin=100nW, d=10mm, f=5500 MHz)Zoon Scan:
dipole=1.4mm (R247)G5; d=1mm; Measurement: d=4mm; d=4mm; d=4mm
Reference Value = 65.15 mW; Power Diff = 0.16 dB
Peak SAR: 100mW/g (measured) = 13.1 W/kg
SAR(1) = 8.13 W/kg; SAR(10) = 2.32 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

ConfNo: 21474131 Page 1 of 10

3D SAR Plot:

- Color Bar: 0.00, 6.64, 13.28, 19.92, 22.19 W/kg
- Label: SAR (measured)

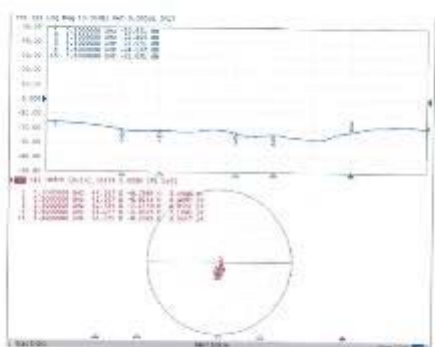
2D SAR Plot:

- Color Bar: 0.00, 6.64, 13.28, 19.92, 22.19 W/kg
- Label: SAR (measured)

D5GHzV2 Sn:1079



Impedance Measurement Plot for Head T81



Doc# 8966, No. 20140013

Figure 17-6



Q48Y6 Validation Report for Body TSL

Test Laboratory: CCTL, Beijing, China

Printed: 09.25.2017

OUT: Dipole 5GHz; Type: DSGH-QV2; Serial: DSGH-QV2 - SN: 1079

Commodore/Spectrum: CPM Frequency: 5216 MHz; 170 kHz; 5392 MHz; Frequency: 5392 MHz; Frequency: 5000 MHz; Frequency: 5893 MHz; 170 kHz; 5392 MHz; Medium parameters used: f = 5200 MHz, d = 5.352 results, c = 49.47, p = 1000 kg/m³; Medium parameters used: f = 5890 MHz, c = 5.450 results, c = 42.21, p = 1000 kg/m³; Medium parameters used: f = 5900 MHz, c = 5.722 results, c = 42.53, p = 1000 kg/m³; Medium parameters used: f = 5903 MHz, c = 5.730 results, c = 42.57, p = 1000 kg/m³; Medium parameters used: f = 5000 MHz, d = 5.335 results, c = 46.32, s = 1000 kg/m³.

Planckin action: Carter Section

Measurement Standard: OAR-5 (IEEE/ECARD) C02 10-2007)

DASY5 Configuration

- Probe: PCDW4-SK8485, Conf: [4.56, 4.55, 4.55], Calibration: 1/121217, Conf/F: 95.4, 95.4, 95.3, Calibration: 1/121217, Conf/F: 104.10, 104.10, 104.10, Calibration: 1/121217, Conf/F: [104.10, 104.10], Calibration: 1/121217, Conf/F: 53.4, 53.4, 53.3, Calibration: 1/121217
- Sensor: Surface, 1.4mm (Mechanical Surface Deformation)
- Electronics: UM24-6-1231, Serial: 20771919
- Platform: Type I, Pal Phoenix 5.10, Type: GD 00151 CA, Serial: 116161
- Measurement: GW DASY52, Version: 12.01.05, SERVICAD X Version: 14.0.10 (12/17)

Dipole Calibration (P=100mW, d=10mm, f=5200 MHz), Scan, dist=1.0mm (80x80 Cube 8; Measurement grid: dist=4mm, d=4mm, dmi=4mm)
 Reference Value = 55.16 V/m; Power Det = 2.01 dB
 Peak SAR (wetopology) = 30.0 W/kg
 SAR(1 g) = 7.80 W/kg; SAR(10 g) = 2.12 W/kg
 Maximum value of SAR (measured) = 18.21 W/kg

Dipole Calibration (Pin=100mW, $\lambda=1064\text{nm}$, $\theta=5300\text{Mrad/25000 Scan}$,
dipole1.4mm [Ref17]Cube 0: Measurement and do=4mm, dy=4mm, dz=1.4mm
Reference Value = 53.94 W/m. Power Eff= 0.21 dB
Peak SAR (measured) = 31.1 W/kg
SAR(1 g) = 7.33 W/kg; SAR(10 g) = 2.18 W/kg
Modelled value of SAR (measured) = 18.3 W/kg

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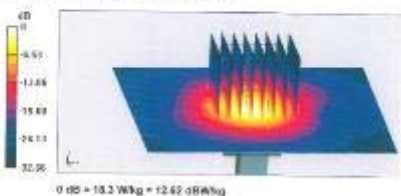
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Dipole Calibration (P=100mW, d=10mm, f=8800 MHz/Zoom Root.
 dip1=1.4mm |dip2=7.5Tube 8: Measurement grid: d=4mm, dip1=1mm, dip2=4mm
 Reference Value = 50.70 Wm, Power Del: -3.05 dB
 Peak SAR (calculated) = 33.7 W/kg
 SAR(1g) = 8.22 W/kg; SAR(10g) = 2.38 W/kg
 Maximum value of SAR (measured) = 14.8 W/kg

Disc Calibration (Pwr:100W, d=10mm, f=5000 MHz/Zoom Scan, dia=1.4mm, (bda/3)/Cable 0, Measurement gnd: standard, d=4mm, dext: ksig)
Reference Value = 67.75 W/m, Power Drift = 0.01 dB
Peak SAR (reduced) = 34.2 W/kg
SAR(1g) = 8.06 W/kg; SAR(10g) = 2.3 W/kg
Minimum value of SAR (reduced) = 19.3 W/kg

Dipole Calibration (P1=100mW, d=10mm, f=5000 MHz/Zoom Scan, d=0.4mm [8087]Cube 3: Measurement grid, d=4mm, dy=4mm, dz=1.6mm
Reference Value = 53.20 W/m² Power D/B = 6.05 dB
Peak SAR (adiabatic) = 33.3 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 14.3 W/kg

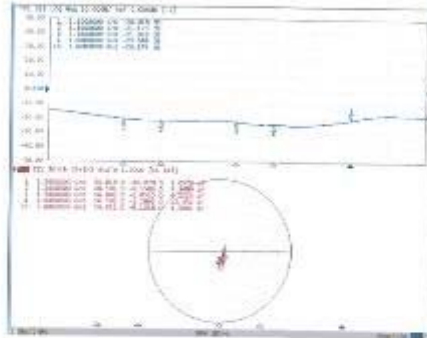


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Impedance Measurement Plot for Body TSL



Cardiac Res. 2017; 9(7): 68

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-End of the test report-