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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) 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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.5 ± 6 %	2.02 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	46.8 Ω - 6.6 jΩ
Return Loss	- 22.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	44.1 Ω - 4.9 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 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 overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 30, 2007

DASY5 Validation Report for Head TSL

Date: 22.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

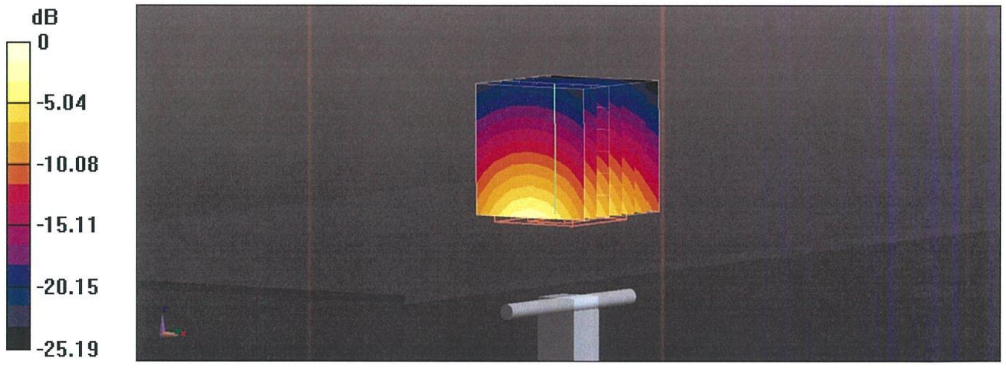
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1012

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.02 S/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

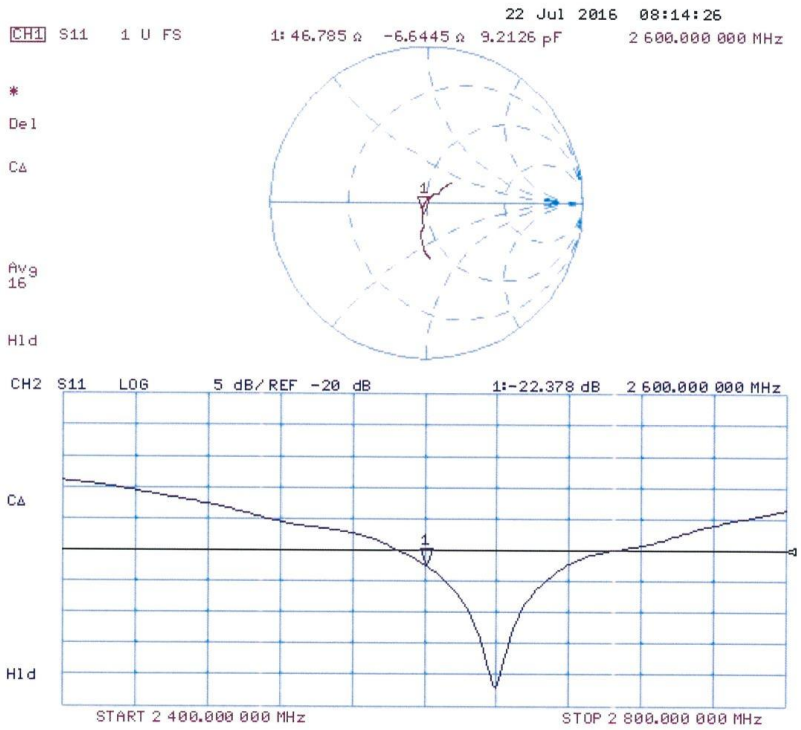
- Probe: EX3DV4 - SN7349; ConvF(7.56, 7.56, 7.56); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.3 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 30.9 W/kg
SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.39 W/kg
Maximum value of SAR (measured) = 24.7 W/kg



0 dB = 24.7 W/kg = 13.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2; Serial: D2600V2 - SN:1012

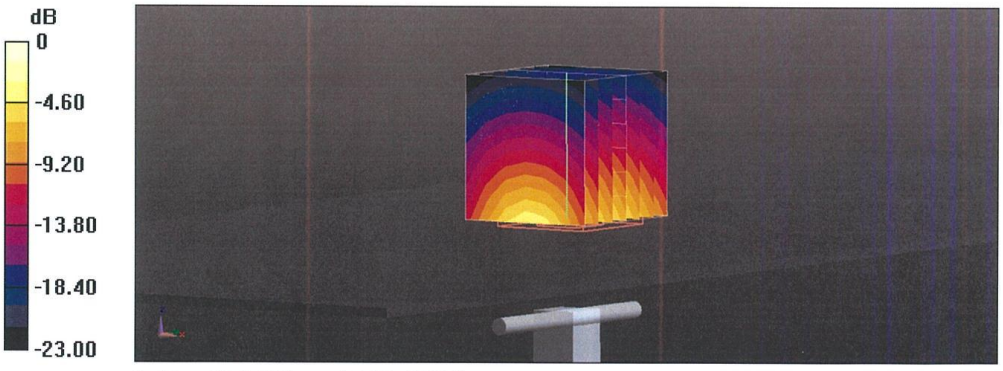
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.2 S/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.48, 7.48, 7.48); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

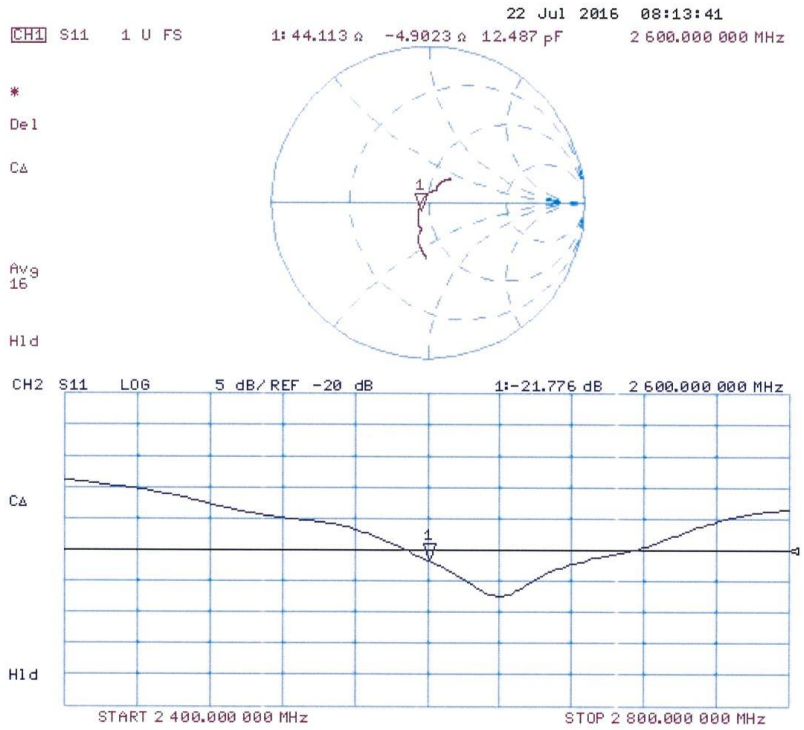
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.8 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.25 W/kg
Maximum value of SAR (measured) = 23.5 W/kg



0 dB = 23.5 W/kg = 13.71 dBW/kg

Impedance Measurement Plot for Body TSL



ANNEX I Sensor Triggering Data Summary

Per FCC KDB Publication 616217 D04v01r02, this device was tested by the manufacturer to determine the proximity sensor triggering distances for the rear and top edge of the device. The measured output power within ±5mm of the triggering points (or until touching the phantom) is included for rear and each applicable edge.

To ensure all production units are compliant it is necessary to test SAR at a distance 1mm less than the smallest distance from the device and SAR phantom (determined from these triggering tests according to the KDB 616217 D04v01r02) with the device at maximum output power without power reduction. These SAR tests are included in addition to the SAR tests for the device touching the SAR phantom, with reduced power.

We tested the power with the mode at highest reported SAR and got the different proximity sensor triggering distances for rear and top edge. But the manufacturer has declared 14mm is the most conservative triggering distance for all bands and all positions. So base on the most conservative triggering distance of 14mm, additional SAR measurements were required at 13mm from the rear and top edge.

Rear

Moving device toward the phantom:

KDB 616217 6.2.6 Measured Power [dBm]											
Distance [mm]	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**
GPRS 850 3Tx	29.60	29.62	29.60	29.59	29.61	24.13	24.15	24.15	24.14	24.16	24.14
WCDMA 850	21.96	21.94	21.94	21.94	21.95	19.55	19.56	19.54	19.55	19.55	19.56
LTE B2	22.94	22.93	22.93	22.93	22.92	14.81	14.80	14.82	14.81	14.81	14.82
Distance [mm]	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
GPRS 1900 4Tx	25.56	25.58	25.56	25.56	25.57	16.18	16.17	16.18	16.18	16.19	16.17
Distance [mm]	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
WCDMA 1900	22.36	22.35	22.36	22.36	22.37	12.07	12.08	12.08	12.09	12.08	12.07
LTE B4	22.02	22.01	22.02	22.03	22.01	13.56	13.55	13.56	13.57	13.55	13.54
LTE B5	22.07	22.08	22.07	22.09	22.07	20.41	20.41	20.42	20.43	20.42	20.41
Distance [mm]	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
LTE B7	22.15	22.14	22.14	22.16	22.15	12.41	12.41	12.43	12.43	12.42	12.41
LTE B38	22.35	22.34	22.34	22.33	22.34	18.32	18.33	18.33	18.31	18.32	18.33

Moving device away from the phantom:

KDB 616217 6.2.6 Measured Power [dBm]											
Distance [mm]	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
GPRS 850 3Tx	24.15	24.13	24.14	24.15	24.13	24.12	29.61	29.62	29.60	29.60	29.61
WCDMA 850	19.56	19.55	19.54	19.54	19.55	19.54	21.95	21.96	21.95	21.94	21.94
LTE B2	14.81	14.81	14.82	14.82	14.81	14.82	22.92	22.94	22.94	22.93	22.93
Distance [mm]	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
GPRS 1900 4Tx	16.18	16.18	16.17	16.19	16.17	16.18	25.57	25.56	25.55	25.56	25.57
Distance [mm]	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
WCDMA 1900	12.07	12.08	12.08	12.09	12.07	12.07	22.35	22.35	22.36	22.37	22.36
LTE B4	13.56	13.57	13.56	13.54	13.55	13.56	22.01	22.02	22.03	22.03	22.02
LTE B5	20.42	20.43	20.41	20.41	20.42	20.41	22.07	22.07	22.08	22.09	22.08
Distance [mm]	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
LTE B7	12.42	12.41	12.41	12.42	12.41	12.42	22.16	22.14	22.15	22.15	22.15
LTE B38	18.33	18.34	18.32	18.33	18.32	18.33	22.33	22.34	22.34	22.35	22.34

Top Edge

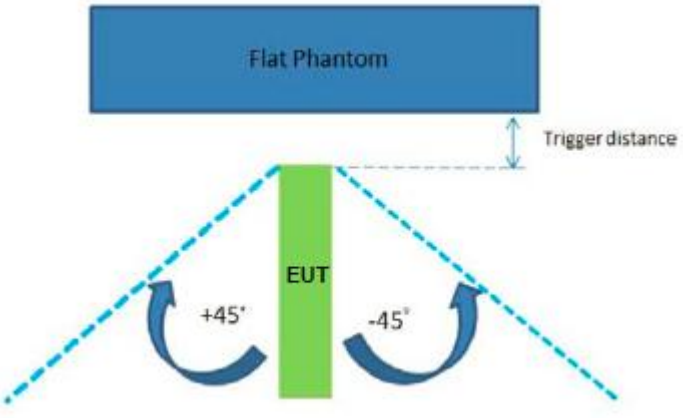
Moving device toward the phantom:

KDB 616217 6.2.6 Measured Power [dBm]											
Distance [mm]	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**
GPRS 850 3Tx	29.62	29.64	29.63	29.62	29.63	24.15	24.16	24.16	24.17	24.17	24.15
WCDMA 850	21.95	21.96	21.96	21.95	21.94	19.57	19.57	19.56	19.56	19.57	19.58
WCDMA 1900	22.38	22.38	22.36	22.37	22.36	12.08	12.08	12.09	12.10	12.09	12.08
LTE B2	22.91	22.92	22.92	22.93	22.92	14.80	14.81	14.82	14.81	14.81	14.82
LTE B7	22.16	22.17	22.18	22.17	22.17	12.44	12.45	12.43	12.43	12.44	12.43
Distance [mm]	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
GPRS 1900 4Tx	25.54	25.53	25.52	25.53	25.54	16.20	16.22	16.21	16.21	16.22	16.22
Distance [mm]	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
LTE B4	22.04	22.04	22.03	22.05	22.03	13.58	13.57	13.56	13.57	13.57	13.58
Distance [mm]	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
LTE B5	22.05	22.04	22.05	22.05	22.07	20.40	20.40	20.42	20.41	20.42	20.41
LTE B38	22.35	22.34	22.35	22.34	22.34	18.34	18.33	18.33	18.34	18.33	18.32

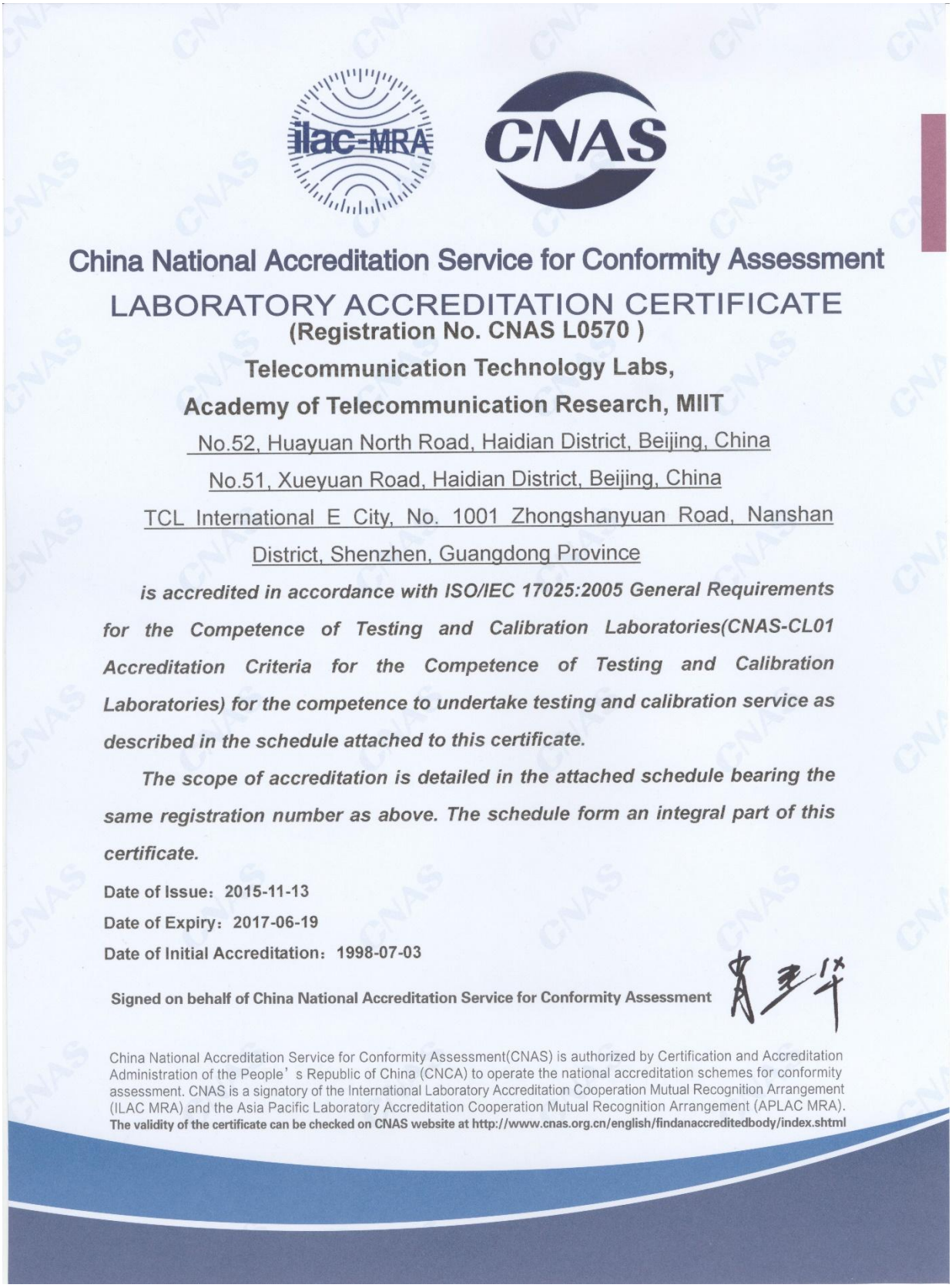
Moving device away from the phantom:

KDB 616217 6.2.6 Measured Power [dBm]											
Distance [mm]	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
GPRS 850 3Tx	24.16	24.15	24.17	24.16	24.15	24.16	29.63	29.63	29.62	29.64	29.64
WCDMA 850	19.57	19.56	19.57	19.57	19.57	19.56	21.97	21.96	21.96	21.94	21.95
WCDMA 1900	12.09	12.10	12.11	12.10	12.09	12.09	22.37	22.37	22.36	22.38	22.37
LTE B2	14.82	14.83	14.81	14.81	14.82	14.82	22.93	22.91	22.92	22.92	22.93
LTE B7	12.43	12.43	12.44	12.44	12.45	12.45	22.18	22.17	22.17	22.18	22.17
Distance [mm]	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**
GPRS 1900 4Tx	16.21	16.21	16.22	16.23	16.21	16.22	25.55	25.53	25.52	25.53	25.55
Distance [mm]	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**
LTE B4	13.57	13.58	13.57	13.56	13.58	13.56	22.05	22.05	22.04	22.04	22.05
Distance [mm]	**22**	**21**	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**
LTE B5	20.42	20.41	20.41	20.42	20.40	20.42	22.06	22.05	22.06	22.05	22.06
LTE B38	18.34	18.34	18.34	18.33	18.33	18.32	22.33	22.34	22.35	22.35	22.34

Per FCC KDB Publication 616217 D04v01r02, the influence of table tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, at 14mm for top edge. Rotating the tablet around the edge next to the phantom in ≤10° increments until the tablet is ±45° from the vertical position at 0°, and the maximum output power remains in the reduced mode.



ANNEX J Accreditation Certificate



China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(Registration No. CNAS L0570)

Telecommunication Technology Labs,

Academy of Telecommunication Research, MIIT

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TCL International E City, No. 1001 Zhongshanyuan Road, Nanshan District, Shenzhen, Guangdong Province

is accredited in accordance with ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake testing and calibration service as described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule form an integral part of this certificate.

Date of Issue: 2015-11-13

Date of Expiry: 2017-06-19

Date of Initial Accreditation: 1998-07-03

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment(CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Laboratory Accreditation Cooperation Mutual Recognition Arrangement (APLAC MRA).
The validity of the certificate can be checked on CNAS website at http://www.cnas.org.cn/english/findanaccreditedbody/index.shtml