

FCC SAR TEST REPORT

APPLICANT

TCL Communication Ltd.

PRODUCT NAME

Mobile WIFI Router

MODEL NAME

Y859ND

TRADE NAME

ALCATEL ONETOUCH

BRAND NAME

ALCATEL ONETOUCH

FCC ID

2ACCJB035

STANDARD(S)

47CFR 2.1093 IEEE 1528-2013

ISSUE DATE

SHENZHEN MORLAB COMMUN

ECHNOLOGY Co., Ltd.

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		Change History	
Issue	Date	Reason for change	
1.0	2015-10-30	First edition	MO BY
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TEST REPORT DECLARATION

Applicant	TCL Communication Ltd.		
Applicant Address	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park, Pudong, Shanghai, China		
Manufacturer	TCL Mobile Communication Co. Ltd. Huizhou		
Manufacturer Address	70 Huifeng 4rd., ZhongKai High-Technology Development District, Huizhou, Guangdong, PRC. 516006		
Product Name	Mobile WIFI Router		
Model Name	Y859ND		
Brand Name	ALCATEL ONETOUCH		
HW Version	V2.0		
SW Version	Y859_00_03.28_17		
Test Standards	47CFR 2.1093; IEEE 1528-2013		
Test Date	2015-10-16 to 2015-10-17		
The Highest Reported	Body	1.183W/Kg	1 :: t(\0,0/1)> . 4 . C\0,1/1
1g-SAR(W/kg)	Simultaneous	1.388W/Kg	Limit(W/kg): 1.6W/kg

Tested by		LIN Jui	
Mole		Liu Jun	
Reviewed by		Zhu Zhan	
W.C.Off.	20,	Zhu Zhan	
Approved by		Zeng Devin	
	1 10	Zeng Dexin	



1.TECHNICAL INFORMATION

Note: the Following data is based on the information by the applicant.

1.1 Identification of Applicant

Company Name:	TCL Communication Ltd.	
Address:	5F, C-Tower, No.232, Liangjing Road, Zhangjiang High-tech Park,	
B ORLA MOR	Pudong,Shanghai,China	

1.2 Identification of Manufacturer

Company Name:	TCL Mobile Communication Co. Ltd. Huizhou
Address:	70 Huifeng 4rd., ZhongKai High-Technology Development District,
B THE SLAB LORLE	Huizhou, Guangdong, PRC. 516006

1.3 Equipment Under Test (EUT)

Model Name:	Y859ND		
Trade Name:	ALCATEL ONETOUCH		
Brand Name:	ALCATEL ONETOUCH		
Hardware Version:	V2.0		
Software Version:	Y859_00_03.28_17		
Tx Frequency Bands:	GSM 850: 824-849 MHz; GSM 1900: 1850-1910 MHz; WCDMA Band II : 1850-1910MHz; WCDMA Band V: 824-849 MHz; LTE Band 2: 1850-1910MHz;LTE Band 5: 824-849 MHz; LTE Band 7: 2500-2570MHz;LTE Band 17: 704-716MHz; WiFi 802.11b/g/n20/n40; WiFi 802.11n MIMO 2x2		
Uplink Modulations:	GSM/GPRS: GSMK; EDGE: GMSK/8PSK; WCDMA/HSDPA/HSUPA/HSPA+:QPSK; FDD-LTE:QPSK/16QAM; WIFI 802.11b: DSSS; WIFI 802.11g: OFDM; WIFI 802.11n20:OFDM; WIFI 802.11n40:OFDM;		
Multislot Class:	GPRS: Class 12; EDGE: Class 12;		
GPRS Class:	Class B		
DTM:	Not support		
Antenna type:	Fixed Internal Antenna		
Development Stage:	Identical prototype		



1.3.1 Photographs of the EUT

Please refer to the External Photos for the Photos of the EUT

1.3.2 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the Following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	V2.0	Y859_00_03.28_17

1.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title		
1	47 CFR§2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices		
210	IEEE 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		
3	KDB 447498 D01v05r02	General RF Exposure Guidance		
4	KDB 248227 D01v02	SAR Measurement Procedures for 802.11 a/b/g Transmitters		
5	KDB 941225 D01v03	SAR Measurement Procedures for 3G Devices		
6	KDB 941225 D02v02r02	HSPA and 1x Advanced		
7	KDB 941225 D03v01	SAR Test Reduction GSM GPRS EDGE		
8	KDB 941225 D04v01	SAR for GSM E GPRS Dual Xfer Mode		
9	KDB941225 D05v02r03	SAR for LTE Devices		
10	KDB941225 D06v01r01	Hotspot Mode SAR		
11	KDB 865664 D01v01r04	SAR Measurement 100 MHz to 6 GHz		
12	KDB 865664 D02v01r01	SAR Reporting		



1.5 Device Category and SAR Limits <u>Uncontrolled Environment</u>

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Note: This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.



2. SPECIFIC ABSORPTION RATE (SAR)

2.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are Middle than the limits for general population/uncontrolled.

2.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density. (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \Big(\frac{dW}{dm} \Big) = \frac{d}{dt} \Big(\frac{dW}{\rho dv} \Big)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by,

$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

Where C is the specific head capacity, δT is the temperature rise and δt the exposure duration, or related to the electrical field in the tissue by

$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where σ is the conductivity of the tissue, ρ is the mass density of the tissue and |E| is the rms electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.



3. SAR MEASUREMENT SETUP

3.1 The Measurement System

Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the Following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The Following figure shows the system.



The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

3.2 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 37/08 EP80 with Following specifications is used

- Dynamic range: 0.01-100 W/kg

- Tip Diameter: 6.5 mm





- Distance between probe tip and sensor center: 2.5mm

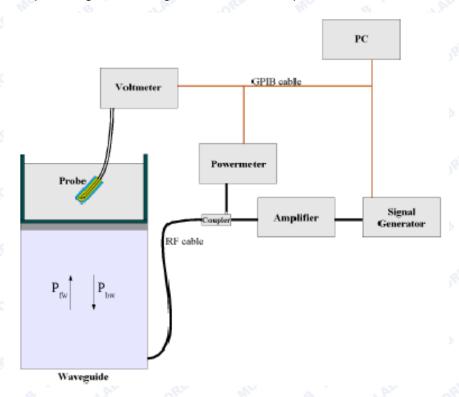
 Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)

Probe linearity: <0.25 dB
Axial Isotropy: <0.25 dB
Spherical Isotropy: <0.25 dB

- Calibration range: 835to 2500MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and surface normal line: less than 30°

Probe calibration is realized, in compliance with CENELEC EN 62209 and IEEE 1528 std, with CALISAR, Antennessa proprietary calibration system. The calibration is performed with the EN 622091 annex technique using reference guide at the five frequencies.



$$SAR = \frac{4\left(P_{fw} - P_{bw}\right)}{ab\delta} \cos^2\left(\pi \frac{y}{a}\right) e^{-(2z/\delta)}$$

Where:

Pfw = Forward Power Pbw = Backward Power

a and b = Waveguide dimensions

Skin depth



Keithley configuration:

Rate = Medium; Filter =ON; RDGS=10; FILTER TYPE =MOVING AVERAGE; RANGE AUTO After each calibration, a SAR measurement is performed on a validation dipole and compared with a NPL calibrated probe, to verify it.

The calibration factors, CF(N), for the 3 sensors corresponding to dipole 1, dipole 2 and dipole 3 are:

$$CF(N)=SAR(N)/Vlin(N)$$

(N=1,2,3)

The linearised output voltage Vlin(N) is obtained from the displayed output voltage V(N) using

$$Vlin(N)=V(N)*(1+V(N)/DCP(N))$$

(N=1,2,3)

Where DCP is the diode compression point in mV.

3.3 Probe Calibration Process

3.3.1 Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. SATIMO Probe calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm²) using an with CALISAR, Antenna proprietary calibration system.

3.3.2 Free Space Assessment Procedure

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm².

3.3.3 Temperature Assessment Procedure

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulating head tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

Where:

 $\delta t = \text{exposure time (30 seconds)},$





$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

C = heat capacity of tissue (brain or muscle),

 δT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. The electric field in the simulated tissue can be used to estimate SAR by equating the thermally derived SAR to that with the E- field component.

Where:

$$SAR = \frac{\sigma |E|^2}{\rho}$$

 σ = simulated tissue conductivity,

 ρ = Tissue density (1.25 g/cm³ for brain tissue)

3.4 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

3.5 Device Holder

The positioning system allows obtaining cheek and tilting position with a very good accuracy. In compliance with CENELEC, the tilt angle uncertainty is Middle than 1°.



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005



4. TISSUE SIMULATING LIQUIDS

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in below table.

The following table gives the recipes for tissue simulating liquids

Frequency Band (MHz)	750	83	35	1750	19	000 110111	2450	2600
Tissue Type	Body	Head	Body	Body	Head	Body	Body	Body
Ingredients (% by we	ight)	LAB	OPLA	MOR	S W	LAB	ORLA	W _O
Deionised Water	50.00	50.36	50.20	68.80	54.90	40.40	73.20	68.1
Salt(NaCl)	0.80	1.25	0.90	0.20	0.18	0.50	0.10	0.10
Sugar	48.80	0.00	48.50	0.00	0.00	58.00	0.00	0.00
Tween 20	0.00	48.39	0.00	0.00	0.00	0.00	0.00	0.00
HEC	0.20	0.00	0.20	0.00	0.00	1.00	0.00	0.00
Bactericide	0.20	0.00	0.20	0.00	0.00	0.10	0.00	0.00
Triton X-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DGBE	0.00	0.00	0.00	31.00	44.92	0.00	26.70	31.8
Diethylenglycol monohexylether	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Target dielectric para	meters	ORL	We	A.B	RLAR	MORL	Me	aB T
Dielectric Constant	55.50	41.50	56.10	53.40	39.90	53.30	52.70	52.5
Conductivity (S/m)	0.96	0.90	0.95	1.49	1.42	1.52	1.95	2.16

Note: Please refer to the validation results for dielectric parameters of each frequency band.

The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using an Agilent 85033E Dielectric Probe Kit and an Agilent Network Analyzer.



Table 1: Dielectric Performance of Tissue Simulating Liquid

Temperature: 22.0~23.8°C, humidity: 54~60%.										
Date	Freq.(MHz	Liquid Parameters	Meas.	Target	Delta(%)	Limit±(%)				
2015/10/16	Dody 750	Relative Permittivity(cr):	54.48	55.55	-1.93	5				
2015/10/16	Body 750	Conductivity(σ):	0.93	0.96	-3.12	9 5				
2045/40/40	Dody 025	Relative Permittivity(cr):	55.69	56.10	-0.73	5				
2015/10/16	Body 835	Conductivity(σ):	0.97	0.95	2.11	5				
2015/10/17	Dady 1000	Relative Permittivity(cr):	53.10	53.3	-0.38	5				
2015/10/17	Body 1900	Conductivity(σ):	1.53	1.52	0.66	5				
2015/10/17	Pody 2450	Relative Permittivity(cr):	52.52	52.70	-0.34	5				
2015/10/17	Body 2450	Conductivity(σ):	1.94	1.95	-0.51	5				
2045/00/47	Dody 2000	Relative Permittivity(cr):	52.45	52.50	-0.10	5				
2015/09/17	Body 2600	Conductivity(σ):	2.10	2.16	-2.78	5				



5. UNCERTAINTY ASSESSMENT

The Following table includes the uncertainty table of the IEEE 1528. The values are determined by Antennessa.

5.1 UNCERTAINTY EVALUATION FOR EUT SAR TEST

							3/3		
a not morting in the morting	b	C	d	e= f(d,k)	MORLAR	g	h= c*f/e	i= c*g/ e	k
Uncertainty Component	Sec.	Tol (+- %)	Prob Dist.	Div.	Ci (1g)	Ci (10g)	1g Ui (+-%)	10g Ui (+- %)	Vi
Measurement System	AR	ORLAN	1110	. 6	4110	LAB	ORLAN	70)	Oak
Probe calibration	E.2.1	4.76	N	1.0RL	1 1	1	4.76	4.7	∞
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1.0	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	10	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	1.00	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1 110	1 🚜	1	0.02	0.0	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	10	1 ala	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1	1"	1.15	1.1 5	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	11 0	1 _{RLAB}	0.03	0.0	8
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	AB W	1 HORLAE	2.89	2.8	8
Test sample Related	AL	MORE	41/6	, AB		RLAL .	MORIL	NI NI	9
Test sample positioning	E.4.2.	0.03	N	1 _{north}	1 ME	1 NORLAR	0.03	0.0	N- 1
Device Holder Uncertainty	E.4.1.	5.00	N	1 110	1 💸	1	5.00	5.0	N-



		. 40		100	~~		70,		
2LAB CORL	1	VB In.	al.P	300	L	More	" B W.	0	1
Output power Power drift -	6.6.2	4.04	R	$\sqrt{3}$	1	1	2.33	2.3	∞
SAR drift measurement	"B W	CLAP		RLA	Mole	B W	LAB	3	ORL
Phantom and Tissue Para	meters	MOL	.0	LAB	.(RLA	MOL	0 1	
Phantom Uncertainty	E.3.1	0.05	R	$\sqrt{3}$	1,	1 1 N	OF	0.0	∞
(Shape and thickness tolerances)	NOTE OF	AB III	MORLA	3 MOF	L.R. A	Morr	0.03	3	.8
Liquid conductivity -	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.1	∞
deviation from target value	AL	MORIE	2 11	AB	,	QLAP.	MORL	3	
Liquid conductivity -	E.3.3	5.00	N	1,108	0.64	0.43	3.20	2.1	М
measurement uncertainty	MORT	Mo	. 0	3	LAR	MORL	MO.	5	8
Liquid permittivity -	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.0	8
deviation from target value	Mo	A.B		QLAB	MORL	Mc	O.B	4	all
Liquid permittivity -	E.3.3	10.0	N 🐠	1 6	0.6	0.49	6.00	4.9	М
measurement uncertainty	o.B	0	LAB	MORL	Me			0	- 0
Combined Standard	ORL	Mo	RSS	9	LAB	MORL	11.55	10.	8
Uncertainty		AB	NORLA	MO	_	3 10.	aLAB	67	
Expanded Uncertainty	Mo.	.0	K=2	alas	JORL	Mc	23.11	21.	al.P
(95% Confidence interval)	AB	ORLA	11/1	.6	Di.	LAB	ORLA	33	Ole

5.2 UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

a MO AB ABLAB	b of	С	d	e=	f	g	h=	√i=	k
	O.B	RLAD	100	f(d,k)	W.	OB	c*f/e	c*g/	ORL
AB ALAB AOR		No.	.0	al Alb	~0	Riv	Mo.	е	
Uncertainty Component	Sec.	Tol	Prob	Div.	Ci	Ci	1g Ui	10g	Vi
	More	(+-	·	, OP	(1g)	(10g)	(+-%)	Ui	8
	ORI	%)	Dist.	B	LAP	.0	RI.A.	(+-	
	BHILL	LAB		RLA	Mokr	G MC	LAB	%)	RLP
Measurement System	Like	Moles	S III.	LAB	.0	RLA	Moke	2 1/1	
Probe calibration	E.2.1	4.76	N	1,101	1,	1 A.P.	4.76	4.7	8
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	1.6	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1 110	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	108	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1	1	1	0.02	0.0	∞



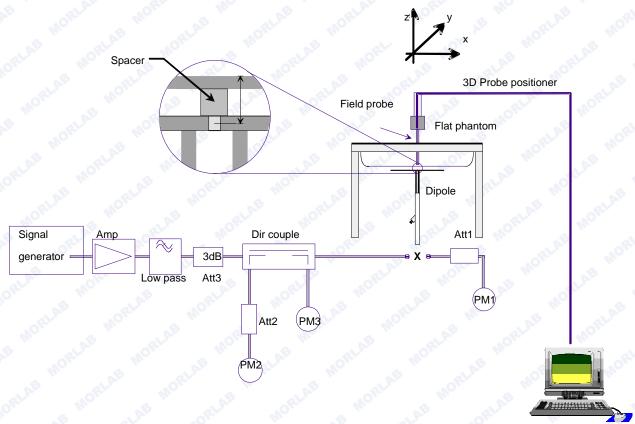
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1,10	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1 21.0	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1,0	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1 H	1	1.15	1.1 5	8
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1,110	0.03	0.0	8
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	10°	1,000,45	2.89	2.8	8
Dipole	O.P.	Liber	MOLE	NI MILE	. 6	3	RLAS	MORE	
Dipole axis to liquid Distance	8,E.4. 2	1.00	N	$\sqrt{3}$	10 h	1 MARIAN	0.58	0.5 8	∞
Input power and SAR drift measurement	8,6.6. 2	4.04	R	$\sqrt{3}$	LAE W	1 NOPLAS	2.33	2.3	8
Phantom and Tissue Para	meters	LAR	MORE	Mo		3	RLAR	MORI	
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R III	$\sqrt{3}$	110 EE	1 M	0.03	0.0	8
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.1	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	$\sqrt{3}$	0.64	0.43	1.85	1.2	М
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.0	8
Liquid permittivity - measurement uncertainty	E.3.3	10.0	Net	$\sqrt{3}$	0.6	0.49	3.46	2.8	M
Combined Standard Uncertainty	, O	MORLAN	RSS	ORLAR	m.	ALAE .	8.83	8.3	OF
Expanded Uncertainty (95% Confidence interval)	ORLA	AB MO	K=2	, me	LAE	MORLA	17.66	16. 73	3 11



6. SAR MEASUREMENT EVALUATION

6.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below



The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The power meter PM1 measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz,100 mW is used for 3.5 GHz to



6 GHz) at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2.

6.2 Validation Results

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

Frequency	750MHz(b)	835MHz(B)	1900MHz(B)	2450MHz(B)	2600MHz(B)
Target value 1W (1g)	8.83W/Kg	10.04 W/Kg	42.36W/Kg	56.13 W/Kg	57.73 W/Kg
Test value 1g (100 mW input power)	0.841 W/Kg (10.16)	0.992 W/Kg (10.16)	4.348 W/Kg (10.17)	5.443 W/Kg (10.17)	5.487 W/Kg (10.17)
Normalized to 1W value(1g)	8.41 W/Kg	9.92 W/Kg	43.48 W/Kg	54.43 W/Kg	54.87 W/Kg

Note: System checks the specific test data please see Annex D



7. OPERATIONAL CONDITIONS DURING TEST

7.1 Body-worn Configurations

The body-worn configurations shall be tested with the supplied accessories (belt-clips, holsters, etc.) attached to the device in normal use configuration.

For body-worn and other configurations a flat phantom shall be used which is comprised of material with electrical properties similar to the corresponding tissues.

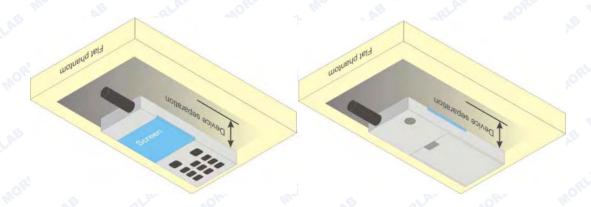


Illustration for Body Worn Position

7.2 Measurement procedure

The Following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- 3. Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to 16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- 4. Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8 * 4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.



7.3 Description of interpolation/extrapolation scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe body. The probe tip must not be in contact with the phantom surface in order to minimize measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is based on a fourth-order least-square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited time (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8 mm. To obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1 gram requires a very fine resolution in the three dimensional scanned data array.



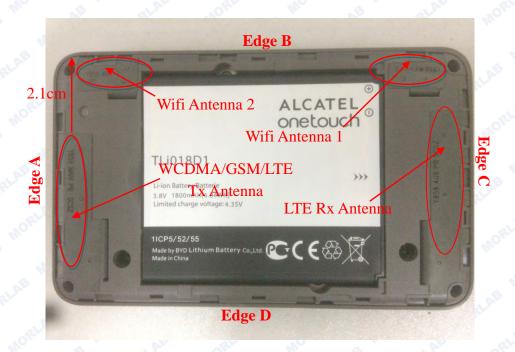


8. HOTSPOT MODE EVALUATION PROCEDURE

The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hot Spot SAR v01r01.

SAR must be tested for all surfaces and edges (side) with a transmitting antenna with in 2.5 cm from that surface or edge, at a test separation distance of 10 mm, in the wireless mode that support wireless routing.

Edge configurations:



Assessment	"ORL	otspot sid	e for SAR	AB	Wo.	20
				VB W	Test distance	: 10mm
Antennas	Back	Front	Edge A	Edge B	Edge C	Edge D
GSM/WCDMA/LTE	Yes	Yes	Yes	Yes	No	Yes
WLAN(ANT 1)	Yes	Yes	Yes	Yes	No	No
WLAN(ANT 2)	Yes	Yes	No	No	Yes	Yes



9. Information Related to LTE Test parameter(Per 941225 D05v02r03)

aLA'	ORLAND MORLE	Band 2	AB	RLAS	Mobile	e wo.	LAE	ORLAS
	SE ME TLAE SORLA	Tx:1850-	-1910 MHz	Rx:2110-	2155 MHz			
	Identify the operating	Band 5						
1	frequency range of each LTE	Tx: 824 -	- 849MHz	Rx: 869 - 8	394MHz			
S.F.	transmission FCC band used	Band 7						
	by the device	Tx:2500-	-2570 MHz	Rx:2620-	2690 MHz			
	AE TRIAB	Band 17						
	BLAP MORL MO	Tx:704-7	16MHz R	k:734-746	MHz	,B	QLAB.	MORL
	AE RLAB MOR	Band2	10°	, a	Channel	Bandwidtl	h _{Mo} s	- C
	MORL MO. AB III	Dariuz	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz
	a lab Mort	Low	20050/	20025/	20000/	19975/	19965/	19957/
2	MO. DE W. STAE	LOW	1720	1717.5	1715	1712.5	1711.5	1710.7
_	RLAE TOPLE	Middle	20175/	20175/	20175/	20175/	20175/	20175/
	AE IN TLAE SOR	wildale	1732.5	1732.5	1732.5	1732.5	1732.5	1732.5
	Identify the high, middle and	Lliab	20300/	20325/	20350/	20375/	20384/	20392/
	low (L, M, H) channel	High	1745	1747.5	1750	1752.5	1753.5	1754.2
Pille	numbers and frequencies	- OPL	MO	. 6	Channel	Bandwidt	h	NOR
	tested in each LTE frequency	Band7	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz
	band	, N	20850/	20825/	20800/	20775/	W.	6.
	ORLE MORE AE IN	Low	2510	2507.2	2505	2502.5	ORI	
	MI TLAE CORLAR	WO.	21100/	21100/	21100/	21100/	.0	LAB
	MORE TE ME	Middle	2535	2535	2535	2535	/	0 /
	TLAE ORLAN MORE	.0.	21350/	21375/	21400/	21425/	ALAB	ORLA
	IN THE SLAB OF	High	2560	2562.5	2565	2567.5	MORY	
P	Specify the UE category and	The UE	Category is	s 4 and the	e uplink m	dulations	used are	QPSK and
3	uplink modulations used	16QAM.			ORLAN			
RLP	Descriptions of the LTE	ORL	NO.	. 6	W. P.	3	LLA	NOR
	transmitter and antenna	S MIL						
	implementation & identify	'U'						
	whether it is a standalone	AB						
	transmitter operating	The mod	dule has a	primary a	ntenna for	all LTE&U	MTS band	ds, a Wi-F
1 AS	independently of other	Tx/Rx ar	ntenna.					
	wireless transmitters in the	"HO"						
	device or sharing hardware	AP						
	components and/or	.3						
	antenna(s) with other	a Laboratoria						



	transmitters etc.	20							
	Identify the LTE Band	ORLA	0,	O U		.0	Richard	Mor	9 1/1
	Voice/data requirements in	MELAB							
	each operating mode and	MORL							
	exposure condition with	Makita History	- (NA	MORE	W 	A.P.	C (Santian O	MORL
5	respect to head and body test	Mobile Hotsp	OT IVIOC	ie Will	be test	ed accord	ling to s	section 9	or this
	configurations, antenna	report.							
	locations, handset flip-cover	MIC AE							
	or slide positions, antenna	MORIL							
	diversity conditions, etc.	OF PLA	70	NORL.	PI.			QLA ^E	MORL
111	Identify if Maximum Power	Mo	0.B	~	QLAB	MORL	Mc	, ale	A.
	Reduction (MPR) is optional	RLAD	ORL	, MO	· 	8			
	or mandatory, i.e. built-in by	As per 3GPP			YO,		/A455	,	alaB
	design:	Table 6.2.3-1	: Maxir	num P	ower R	eduction	(MPR) 1	or Powe	r Class
	only mandatory MPR may be	3	S.	*Okr.	41	O. ~	Ja.	al AB	ORL
	considered during SAR	NIO.	Chan	nel I	bandwi	idth /	Trans	mission	10.
	testing, when the maximum	Modulation	band	width (N _{RB})	9	LAB	ORL	MPR
3	output power is permanently	Modulation	1.4	3.0	5	10 💨	15	20	(dB)
	limited by the MPR	ORLE	MHz	MHz	MHz	MHz	MHz	MHz	
	implemented within the UE;	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
	and only for the applicable	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
	RB (resource block)	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
	configurations specified in	MOL VE III							
	LTE standards	A-MPR is sup	ported	by desi	ign, but	disable fo	or SAR to	esting.	
	b) A-MPR (additional MPR) must be disabled.	AB MI BLA							
77	a	MOIT MOTO	.6	M	LAB	ORLA	1110	~ G	Min
	Include the maximum average conducted output	2LAB							
	average conducted output power measured on the	MOIN 'E IN							
	required test channels for	ORLA							
	each channel bandwidth and	AE MAGALA							
	, , , , , , , , , , , , , , , , , , ,	MOIN							
7	UL modulation used in each	This is include	ed in th	e sectio	on 11 of	this repor	t.ae M		
7	UL modulation used in each frequency band:	This is include	ed in th	e sectio	on 11 of	this repor	T.AB MC		
7	UL modulation used in each frequency band: a) with 1 RB allocated at the	This is include	ed in th	e sectio	on 11 of	this repor	t.as mu		
7 JRLA	UL modulation used in each frequency band: a) with 1 RB allocated at the low, centred, high end of a	This is include	ed in th	e sectic	on 11 of	this repor	T.AE MORLAE		
7 III	UL modulation used in each frequency band: a) with 1 RB allocated at the	This is include	ed in th	e sectic	on 11 of	this repor	t. ie mo		



78		LALL HOPLE HE LEE TOPLAND HOPLE HE
B	a channel	TAR ORLAND MORE S ME LAR ORLAND
	c) using 100% RB allocation	HOPE HIS LES TRADE HOPE HIS LES
BLA	Include the maximum	ORLAND MORE MID AB CREATE MORE
NO.	average conducted output	INC. OF L. STUDE WORL MO. OF L. ST
8	power measured for the other	This is included in the section 13 of this report.
3	wireless mode and frequency	AE THE SLAB LORLE MOTE AE TO SLAB
	bands	ORLE MORE WE WE WINDER
ALA!	Identify the simultaneous	Me LAE ORLAN MORE SIME LAE ORLAND
Ole	transmission conditions for	MORE THE LAB SELAE MORE MICE
	the voice and data	AE SELAE MORE INC. AE SELAE MORE
411	configurations supported by	INC. AB THE SELAND MORLY MON AB IN
N. Co	all wireless modes, device	STAR HOLL HO. TE W. STAR HORL
2	configurations and frequency	MO. OF ILLUS HORLY MON SE IN STAR
10	bands, for the head and body	TORLY MON IE IN TIME TORLY MON
79	exposure conditions and	SE IN SLAE JORLA MORE SE IN SLAE JORI
111	device operating	MORE IN TAR ORLAN MORE AND
B	configurations (handset flip or	LAE ORLAN MORE SINCE LAE ORLAND
	cover positions, antenna	MORE THE AR ARLAND MORE MICH
RLA	diversity conditions etc.)	RIAE HORL HO LE L'ELAE MORLE
O.	e all of	MO, TE , STAIR TOET, MO, TE II,
200	When power reduction is	AB MORLY MOY AR IN CLASS MORLY MOY
5	applied to certain wireless	NE IN GLAS TORLY HOT NE IN GLAS
	modes to satisfy SAR	AORLIN MOR SE IN SLAB LORLIN MOR SE
LA	compliance for simultaneous	TAR ORLAN MORE B ME THE ORLAN
Ole	transmission conditions, other	MORE THE LAB OFLAR MORE SIME
	equipment certification or	AE GRIAL MORE S INC AE GRIAL MORE
4 hu	operating requirements,	AE ORLAN MORE MIL AE
	include the maximum	CHAR MORL MIC AB L CHAR MORL
0.5	average conducted output	MO. DE IN GLAD MORLY MO. DE IN GLAD
11	power measured in each	Not applicable.
	power reduction mode	NE W. STUE TONIN HOLE OF ILLE OFF
MIC	applicable to the	HOR S IN SLAB OFFIRM HOR S IN
B	simultaneous voice/data	TARE ORLAN MORE SINE THE TREE SPLAN
	transmission configurations	HORE THE LAB TRIAL HORE THE AB
RLA	for such wireless	CRLAR MORL MC AB TRIAR MORL
	configurations and frequency	MO AB THE STATE MORE MO. AB IN ST.
-40	bands; and also include	NE HORL HO! LE IN GLAS LORLY HORL
B Lu.	details of the power reduction	OF IN STAR SORLY MOTOR OF IN STAR
	implementation and	all to the the star toke the



measurement setup

10. SAR EVALUATION PROCEDURES&POWER MEASUREMENT FOR LTE

"1. QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*. When the *reported* SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and *required test channels* is not required for 1 RB allocation; otherwise, SAR is required for the remaining *required test channels* and only for the RB offset configuration with the highest output power for that channel.6 When the *reported* SAR of a *required test channel* is > 1.45 W/kg, SAR is required for all three RB offset configurations for that *required test channel*.

2. QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1. are applied to measure the SAR for QPSK with 50% RB allocation.

3. QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output

power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB

allocations and the highest *reported* SAR for 1 RB and 50% RB allocation in 1. and 2. are ≤ 0.8

W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR

is > 1.45 W/kg, the remaining *required test channels* must also be tested.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 1. and 2.and 3. to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the *reported* SAR for the QPSK configuration is > 1.45 W/kg.

4. Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures



required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> \frac{1}{2}$ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

The equivalent channel configuration for the RB allocation, RB offset and modulation etc. Is determined for the smaller channel bandwidth according to the same number of RB allocated in The largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to 5MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing."



LTE BAND 2

Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Power
band widin	Chamilei			RB Size	RB Offset	(dBm)
AB	ST. M.C	0,	AB	R. 1 W	0 4	22.72
MI		QLA!	OKT WE	1.3	49	22.62
AB		MOL S	, AB	OP.L	99	22.87
ORL		3 LAP	QPSK	50	0	21.86
AF ORLA	MOLO	S III	50	25	21.85	
ORL	nuc.	S 01	AL TORIL	50	49	21.84
e la	LAB -	4000	S III.	100	0	21.86
AL		1860	alpha ac	1	0.	21.57
S In.	18700	ORLING	OL N	1	49	21.76
al Al		INC. VE	3LAP	-101-1	99	21.99
VO.		Richard	16-QAM	50	0	21.96
al.Al		MIC	B ZLA	50	25	21.97
MOL		LAB ARI	MOL	50	49	21.95
NO.	LAT INC	Mo	2	100	0	21.07
110	0	Ale	ORL. MC	1.0	0	23.11
MORLAE MORLAE		"OBT	A CO	1	49	23.05
		III.	ORLAN	1 1 ·	99	23.17
		S MORL	QPSK	50	0	22.03
				50	25	22.10
Mo	M	CLAP MORE		50	49	22.18
00041.1-	Tr. 110	4000		100	0	22.22
20MHz		1880		1.0	0	22.02
AB	18900			1	49	22.37
ORL				1 6	99	22.51
AB		MOLO	16-QAM	50	0	22.54
MORL		al al	"OFT	50	25	22.49
0		ET. MOIL	S In.	50	49	22.01
A	MIC	3	alate no	100	0	21.27
6	LAB	ORL	0, 0	1	0	22.79
QLA.		ME	QL.A.	011	49	22.74
lo.		ORLAN	More	1 . 8	99	22.58
-QLA!		We	QPSK	50	0	22.27
MO		AB ORL	MO	50	25	22.15
B	LAT H MO	W. W.	o.B	50	49	22.13
110		1900	RI. MO	100	0	22.20
N.B	RLAN	1900	o.B	1	0	22.74
19100	19100	AB	ORL	1 1	49	22.70
N. B		MORE	W. O.B.	1 1	99	22.66
ORLA		. 6	16-QAM	50	0	22.65
Me		LAL	Me	50	25	22.59
AP O		D. M.	LAB	50	49	22.48
M		al Ar	DE MIC	100	0	21.32



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Power
Bariu Widiri	Onamie			RB Size	RB Offset	(dBm)
AB	AL MIC	. 6	LAB	RI. 1 N	0	22.69
M		QLA.	ORL	1.0	37	22.75
AB		MOL	QPSK	ORI	74	22.88
ORL		2LAL		36	0	21.90
n. A.F		MOLO	a Ni	36	18	21.85
10RI	Allo	S 01	ORL	36	35	21.81
S. Mr.	AB -	STA NOTE	NI.	75	0	21.87
AL		1857.5	al har	1 1	0	22.06
III.	18675	RLA	Ope. Un.	1	37	22.09
LAB		MO.	LAB	1011	74	22.09
OF		RLA	16-QAM	36	0	21.90
LAB		WO.	e Value	36	18	21.90
Mokra		AB GL	MORE	36	35	21.87
		Br., Mo.	. 6	75	0	21.87
ANO	400	O.B.	al.a	1	0	
		ORL	0,	21,100	37	22.85 22.96
		ME	QLA.	WO.		
	M 18900	1880	QPSK		74	23.07
				36	0	21.96
				36	18	21.94
				36	35	22.17
15MHz			16-QAM	75	0	22.20
3				1.0	0	22.25
RLIN				- R1	37	22.05
10		AORI.		1 2	74	22.24
RLA		AE ME ORL		36	0	21.95
MO				36	18	21.99
NB C		L. M.	A.B	36	35	22.17
W _O		100	100 HO	75	0	22.20
O.B		"Oler I	A.B	1	0	23.07
ORL		LAB	ORL	1	37	23.02
A.B		MORE	o Doll	1	74	23.11
ORL		. 6	QPSK	36	0	22.29
M		A ANDRE	Me	36	18	22.10
, of	True H IIIO	. 6	LAB	36	35	22.10
W		1902.5	See We	75	0	22.33
LAB	19125	MO.	AB	1	0	22.28
OR	19120	2LAP	"OFF	1	37	22.36
AB		MOL	a Mr. AF	1	74	22.43
"OBL		28 N	16-QAM	36	0	22.34
S bu		NO NO NO NO	W.	36	18	22.35
AT AO		.0	CLAP CO	36	35	22.16
W.		al Par	Die. We	75	0	22.36



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe
Danu Widin	Charmer			RB Size	RB Offset	(dBm)
AL	35	. 60	LAB	RI. 1 W	0 4	21.89
MIC		QLA.	Okr III	1.0	24	21.85
LAB		MO. S	AB	OPT	49	21.86
ORL		al.Al.	QPSK	25	0	21.81
AF	LAP ORLA	MOLO	a m.	25	12	21.83
MORL	and a	al al	MORL	25	24	21.86
9	LAB -	4055	S Dir	50	0	21.87
AL		1855	alike ac	1 1	0	22.22
0 10.	18650	ORLAND B	Or S III	1.00	24	22.21
al All		ME	2LAL	1010	49	2218
VO.		CRLIN	16-QAM	25	0	22.10
al.A.		Mo	B aLA	25	12	22.05
Morra		AB ORL	More	25	24	21.95
.0		PUC.		50	0	20.92
"IO	۵.	, Ale	JEIL MC	1 0	0	22.83
MORLAS MORLAS	"OBT		21	24	22.98	
		Mr. AE	ORLAN	410.	49	22.96
		"OBT	QPSK 25 25 25 50 1		0	22.04
		S In			12	22.05
	М	S.A. MORL			24	22.13
	True IIIO	1000		- N P	0	22.16
10MHz		1880		0	22.29	
AB	18900	WOL W		OR!	24	22.33
ORL		2LAB	AORL	We 1	49	22.31
, AE		MOL	16-QAM	25	0	22.33
10RI		3 N	ORL	25	1 2	22.30
S bu		WOLL WOLL	No.	25	24	22.34
AL		.0	aLAB .O	50	0 🕙	21.25
d lin	, Alb	ORL.	2.	10.6	0	22.81
2LAP		Will TE	3LAB	,OF	24	22.78
Or		RLA	Mor	1 . 9	49	22.77
2LAP		MIS	QPSK	25	0	22.19
MOL		AB ABL	MOIN	25	12	22.15
9	LAB H MO	MO.	.0	25	24	22.14
	A MIL	4005	RLL MO	50	0	22.17
		1905	.3	21	0	21.50
ORLA	19150	W. AB	RLA	Mo.	24	21.48
10		JORL	W. S.	1 21	49	21.39
ORLA"		Ph.	16-QAM	25	0	21.35
MO.		LAP ORL	Wo.	25	12	21.32
AB A		W. Hu	AB	25	24	21.28
. ₁₁₀		LAB	RI. WO	50	0	21.15



Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Power	
				RB Size	RB Offset	(dBm)
AR C	35	0	AB	R ¹ 1 W	0	22.98
MIC		QLA!	ORL	1.5	12	22.95
AB		More	AB	081	24	22.91
ORL		3 LAP	QPSK	12	0	22.88
u. VE		MOLO	S W.	12	6	22.67
NORTH	nuc.	S 01	W. ORL	12	1 1	22.54
0 ///	LAB -	1050.5	S U.	25	0	21.83
AL		1852.5	al.A.	1 4	0	22.71
8 10.	18625	ORLAN	Or a un	1	12	22.68
al Al		INC. VE	3LAP	-10 ¹⁰ 1	24	22.55
NO.		Richard	16-QAM	12	0	21.95
al.A.		MIC	B ZLA	12	6	21.87
MOL		LAB ARI	MOL	12	11	21.56
O.B	LA.	Mo	3	25	0	20.86
NO.	0	Ale	ORL MC	1.0	0	22.84
MORLAS MORLAS	"OBT		1	12	22.64	
		W. AE	ORLAN	1 1 1	24	22.55
		NORL	QPSK	12	0.0	22.04
		.0	J.B. ORLAN	12	6	21.89
	M	AAL MORE	MIC	12	11	21.69
ENALL-	YL 110	4000	AB	25	0	22.04
5MHz		1880	Die bli	1.3	0	21.71
AB	18900	MOL	AB	- C-1	12	21.69
ORL		ELAS MORLAS	16-QAM	1 6	24	21.57
. AB				12	0	21.64
MORL				12	<i>∞</i> 6	21.58
0				12	11 de	21.52
AL NO	MIC	3	alai no	25	0	21.08
9	LAB	ORL	0, 0	1	0	22.18
QLA.		Mrs all	RI.A.	011	12	22.21
lo.		ORL	Mor	1 . 9	24	22.29
alar		W	QPSK	12	0	22.36
Mo.		LAP ORL	MO	12	6	22.28
B	LAT H MO	W. W.	A.B	12	11	22.02
110		1907.5	SEL. MO	25	0	21.04
O.B	RLA.	1907.5	o.B	1	0	22.27
ORL	19175	LAB	ORL	WO. 1	12	22.22
N. O.B		MOR	Mr al	1 21	24	22.25
ORLE		. 6	16-QAM	12	0	21.98
M		LAL	Me	<i>∞</i> 12	6	21.65
AP O		. 65	LAB	12	11	21.48
M		2LAL	DEL ME	25	0	21.13



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Power
Danu Widin	Challie	r ieq.(ivi⊓∠)	เงเงนนเสแงก	RB Size	RB Offset	(dBm)
AF	ST. W.C	. 6	LAB.	1	0	22.76
Me		QLA.	OBE W	1.3	7	22.68
AB		WOL.	, AB	OP1	14	22.81
ORL		3LAP	QPSK	8	0	22.79
AE SELM	MOLO	S. W.	8	4	22.53	
10R1	the state of	20 01	A ORL	8	<i>ॐ</i> 7	22.06
S. Mr.	AB -	Live another	J. Miles	15	0	21.90
AL		1851.5	2LA	1	0	22.15
S W	18615	RLL	Op. In	100	7	22.18
3LAL		MC.	2LAB	-10 ¹²	14	22.22
VOL		RLA	16-QAM	8	0	21.88
LAF		Mo	e LA	8	4	21.55
More		AB GL	MOLE	8	7	21.08
S		Mo.	.0	15	0 111	21.00
-10°	"O - 100	D.B.	AL A	13	0	22.20
M		ORL		1	7	22.19
		MI O.B	RLA	WO 1	14	22.19
	LAB	ORL	QPSK	8	0.0	22.02
		P. C.		8	4	21.98
	N	LAB		- 8 - ⊗ 8	7	21.98
	IVI	HILL		15	0	22.15
3MHz		1880 16-QAN	Olega, W.	13	0	22.13
O.B	18900		16-QAM		7	22.33
ORL				1	14	22.44
A.E				8	0	22. 44 22.56
ORL				8	<i>№</i> 4	22.24
M				8	7	22.24
AP . O		. 6	ALAB	15	0	21.18
lillo.	0.19	ala	200	13	0	22.97
LAB		MO. B	AB	016	7	
OR		al At	MORL	1	14	22.66 22.94
LAB		MOL	QPSK	8	0	
MORE		all at	GI OIL	8	4	22.86 22.54
9 W.	AB II A	NO PO	B 100	8	7	22.54
ANO (H 110	00	QLAL .	8 15	0	
Do Los		1908.5	34 A 111	15	0	22.08
RLA.	19185	Mr. VB	2LAP	100	7	21.70
O		ORLA	MOL			21.84
2LAE		MILE	16-QAM	1	14	22.28
MOL		AB ARL	10-QAIVI	8	0	22.21
.0		MIC	.0	8	4	22.15
10 ¹ L		20	21.1	8 15	7	22.18 21.16



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe
Dana Widin	Gridinion	r req.(ivii iz)	Woodlation	RB Size	RB Offset	(dBm)
LAR	NO.	. 6	ALAID .	1	0 0	22.77
MIC		RLA	Okr W	1.0	2	22.81
LAB		WO. B	AB	1	5	22.72
10 ter	QLA!	QPSK	3	0	22.86	
LAF	LAP ORLA	MOLO	a li	3	1/10	22.88
MORE	W.	aB al	MORI	3	∞ 2	22.89
. 63	LAB -	1050.7	9 /10.	6	0	21.84
A		1850.7	QL.A.	1	0	22.21
. 6	18607	ORLIN	0, 8	1	2	22.12
QL.A.		ME	QL.A.	, OF	5	22.23
NO.		ORLAN	16-QAM	3	0	22.26
BLAN		MC	e all	3	1	22.18
MOL		AB ORL	MOL	3	2	22.11
oB .	LAO	IND.	.0	6	0	20.91
WO.	. 0	AB	ORL OF	1.0	0	22.91
ORLAE MORLAE	MORI	AB.	1	2	22.86	
		II.	ORLAND	WO. 1	5	22.93
III OF		ORL	QPSK	3	0.0	23.13
ORLA"		9 4		3	a 1	23.10
MIC	M	LAL		ॐ 3	2	23.11
4 40411-	110	4000		6	0	22.16
1.4MHz		1880	Ole. W	1 0	22.25	
AB	18900	401	16-QAM	081	2	21.96
ORL		LAS HORLAS		1	5	22.02
A.F				3	0	23.14
NORL				3	<i>№</i> 2	23.12
e br			8 60	3	5	23.11
,A.	INC.	, B	QLAN .	6	0	22.16
De las	LAB	ORL	D	.1	0	22.01
QLA.		We of	QLA!	016	2	23.11
NO.		ORLA	Morra	1	5 6	22.91
QLA!		Me	QPSK	3	0	23.10
Mor		LAB ORL	MOL	3	A A 1	23.08
AB .	LAT H MO	Mo	00	3	2	22.96
" MO	Co Mi	1909.3	PL. M	6	0	22.25
DB.		1909.3	.0	1	0	21.91
ORL	19193	W. VE	RLA	WO. 1	2	21.77
A.B.		NORTH	Me	1 📣	5.0	21.83
ORL M.		S W.	16-QAM	3	0	21.77
MIC		LAN	MIC	<i>∞</i> 3	2LB 1 .	21.62
AB TAR		MOA. WAS	AB	3	2	21.59
110		AR	JEIL MI	6	0	21.35



Band Width	Channel	Freq.(MHZ)	Modulation	RB Con	figuration	Average Powe (dBm)
Bariu Wiutri	Charmer	Freq.(MHZ)	Modulation	RB Size	RB Offset	
LA	ie. blu.	S	QLA	1 1	0	23.19
B 10.		ORLA	O. S. W.	100	24	23.22
RI.AL		MIL OF	2LAL	.4011	49	23.19
WO.	O. B. W.	ORL	QPSK	25	0	22.25
RI.A.		MIC	CB QLA	25	12	22.15
MOL	. 6 L	AB ORI	MOIN	25	24	22.16
AB		829		50) ter 0 4/1	22.39
" MC		629	OLIT. MIC	1 4	0	22.72
AB	20450	MORL	AB AB	27.18.0	24	22.68
ORL		, AE	ORLAN	10°1	49	22.46
AF		MORE	16-QAM	25	0.0	22.89
ORL		. 6	RE ORLE	25	12	22.67
W		ALA. MORI	MIS	25	24	22.45
AB HORLAS HORLAS HORLAS	, w.	AB	50	0	21.37	
	QL.A.	Oke W	1.3	0	23.10	
	MO.	AB	1	24	23.10	
	ala	NORL	1 2	49	23.04	
	MOL	QPSK	25	010	22.22	
	al al	. NORL	25	№ 12	22.20	
G. M.	M	MOIN	8 10.	25	24	22.19
10MHz		836.5	al All	50	0.	22.27
TOME		030.5	10.	10.6	0	22.23
QLA!	20525	Mr. OB	2LAB	40 ¹ 1	24	22.36
VO.		ORLAN	WO.	1 . 0	49	22.37
ELA		Me	16-QAM	25	0	22.41
MOL		AB ORL	MOIN	25	12	22.37
B		R. HILL	S. Comments	25	24	22.23
MO	4	AB	arl. MC	50	0	21.26
OB.	QLA.	MORE	N.B	1.0	0	21.78
ORL		II. AB	ORL	1 1	24	21.83
NE OE		MORLE	We als	1 1	49	21.82
ORL		.0	QPSK	25	0	22.10
Mor		A MORE	IN.	25	12	22.14
AP .O	H WO	- C	ALAE C	25	24	22.16
Me		844	Die Me	50	0	22.13
ALAE .	00000	MO STA	T.A.B	1	0	21.76
OK	20600	-QLA	MORE	1 1	24	21.69
LAP ORLA		Mo.	S LAF	1	49	21.81
MORE		AB al	16-QAM	25	∞ 0	21.76
.0		Br. Mor		25	12	21.48
MO1		A.B	RLA	25	24	21.36
4.		agl.	, w.	50	0	21.11



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Power
				RB Size	RB Offset	(dBm)
all all	is the	N.B	-RIA	1 1	0	23.21
.6	LAB	ORL	No.	100	12	23.20
RLAN	MOE	ME	RLA	011	24	23.02
Mo.	LAF	ORL	QPSK	12	0	23.18
RLA	MORE	MILE	CB CLA	12	6	23.09
MO.	. a L	LAP ORI	MOL	12	11	22.99
AB .	el.A.	826.5	.0	25	0 4/1	22.28
Tr. Mo	. 6	020.5	ORL. MC	1.4	0	23.58
NB	20425	MORL	No.	27.18.	12	23.35
ORLA	Mor	W. AE	ORLAN	1 1	24	23.22
MIC OF	QLA!	JORL	16-QAM	12	0	22.66
ORLAN	MOL	S 40.	I'E ORLA	12	6	22.39
MIC	3	LAL JORI	INC	12	11	22.18
AB	er ino	S. Mr.	AB	25	0	21.23
MIC		2LA	Oke We	1.3	0	21.80
AB GRIA	RLL	"IOL	AE	P.L.	12	21.84
ORL	ME	3LAP	ORL	We 1	24	21.77
MORLAS MORI	RLA	MOL	QPSK	12	0	21.33
	MO	LAB MORL		12	∞ 6	21.21
	M			12	11	21.19
A SALL SO	be. See Mr.	000.5		25	0	21.18
5MHz	AB	836.5	2. 4.	-108	0	21.80
LAB	20525	Mo,	LAB	10 ^{FE} 1	12	21.77
MOLE	M. O.F.	RLA	MOK	1 0	24	21.91
LAB	ORL	WO.	16-QAM	12	0	22.01
"IOIL"	U	AB CEL	MORE	12	6	21.92
.0	LAB	Er. Mo.	-0	12	11	21.52
-Jan 1110	PIL.	O.B	al All	25	0	21.30
	LAR	OPE	.0	1	0	23.15
RLA	"IOK"	W. O.B.	-QLA	10° 1	12	23.18
Mo.	LAP	ORL	Mo.	1 1	24	23.21
RLA	MORE	M	QPSK	12	0	23.22
Mo	.0	LAP JORI	Mo	√ 12	6	23.19
AB	H MO	W	AB	12	11	23.05
MO	-0	ALAIP -	DRL. MO	25	0	22.24
AB	RLA	846.5	O.B	1	0	22.58
ORL	20625	LAB	ORL	Mon	12	22.50
W. O.B	QLA.	MORE	M OF	1081	24	22.48
ORL	Mor	.6	16-QAM	12	<u>∠4</u> . 0	22.35
M	AB	A.A. MORL	- Mo.	12	6	22.33
AB O	T. MO	Co las	LAB	12	11	21.98
Mo	20	2LA	PER MIC	25	0	21.98



LTE BAND 5 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB C	onfiguration	Average Powe
Band Width	Chamer	Freq.(IVII IZ)	Wodulation	RB Size	RB Offset	(dBm)
L.M.	ie. M.	CB.	QLA.	1	0.0	23.36
	AB	ORLAN	Or Sul	100	7	23.36
	MORI	MIC OF	QLA!	1	14	23.33
MO. S. LAB	ORL	QPSK	8	0	23.21	
	MORE	Me	CB QLA	8	4	23.15
	a L	LAB	MOL	8	7	22.85
	21.0	825.5	3	15	0 1	22.42
	. 6	625.5	ORL M	1	0	22.70
	20415	MORE	N.B	1	7	22.61
NORLE NOR	W. LAB	ORLAN	41 ⁰ 1	14	22.59	
	MORL	16-QAM	8	0.0	22.67	
	Mor	. 6	IS ORLY	8	4	22.56
AE ME LOPLAE MOT	LAV	Me	8	7	22.24	
	W	AB	15	0 4	21.26	
	OB.	QLA.	Ole W	1.0	0	23.02
	ORL	Mo. S	LAB	1	7	22.99
	We of	al.All	NORL	1	14	23.07
NORLAS MORLE	MOL	QPSK	8	0	23.10	
	all al	, NORL	8	<i>№</i> 4	22.96	
	M M	IIIO I	D bu	8	(R ¹ 7 a)	22.36
3MHz	yes Wille	836.5	al Al	15	0	22.18
SIVITZ	AB	636.5	D. "	-1	0	22.20
	20525	ME	2LAP	1	7	22.14
	W. A.F.	ORLAN	MOL	1	14	22.20
	NORL	Mo	16-QAM	8	0	22.33
	O In.	AB ORL	MOIS	8	4	22.21
	LAL	MIC	0	8	7	21.78
	- M.	A.B	ARLIN MI	15	0	21.15
	ala	10kg	N. C.	1	0	23.09
	MOL	M. AB	ORLAN	41 ⁰ 1	7	23.06
	QLA!	MORT	We wa	1 (14	23.11
	MO	. 6	QPSK	8	0	23.05
	NB .	LA	ME	<i>∞</i> 8	4	22.89
	H MO	G W	LAB	8	7	22.77
	NB .	847.5	10 Er 111	15	0	22.15
	ORL	047.5	AB	1	0	21.97
	20635	QLA!	MORL	1	7	21.92
LAB MORLAR MORLAR	MOL	S W	1.6	14	21.99	
	OB OL	16-QAM	8	0	21.88	
	The More	. 60	8	4	21.73	
	OB.	QLAT .	8	7.0	21.45	
	AB	RL	10 m	15	0	21.12



LTE BAND 5 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB C	RB Configuration		
Dana Widin	Onamie	i req.(ivii iz)	Modulation	RB Size	RB Offset	(dBm)	
ILIA MO	III.	OB.	-RIA	1	0.	23.33	
. 6		ORLA	O. S. III.	1	2	23.37	
QLA!		MORLAB	al.All	4011	5	23.35	
More			QPSK	3	0	23.35	
QLA.	RLAS		e LA	3	11111	23.33	
MOL	S III.	AB OBI	NOF	3	2	23.31	
20	LAB -	2017	-0	6	0	22.35	
LIV MO		824.7	CEL. OF	1.0	0	22.67	
.0	20407	ORL	10	1	2	22.65	
RLL		W. VE	RI.A.	100	5	22.69	
W.C.		ORL	16-QAM	3	0.01	22.52	
RLA.	LA	M	E RLP	3	1	22.39	
Mo		LAB ORI	Mor	3	2	22.22	
AB .	IE SLAV MO	III.	of the second	6	0	21.27	
MO	Mo VB	1,00	OPE IN	1.0	0	23.17	
68	AE ORLAN	"OB"	N. C. C.	081	2	23.17	
M	I.A.B	ORL	1112	5	23.20		
	MORL	QPSK	3	0	23.13		
	0 11.	S GI GIL	3	1			
	CLAP MORE	MIC	3	2	23.18		
	S 4.	AB	6	- SA 1	23.19		
1.4MHz		836.5	100 H		0	22.20	
AB	20525		16-QAM	100	0	22.33	
ORL	Mo			401	2	22.28	
M. A.B				1	5	22.30	
ORL		-0 AV		3	0	22.45	
PIL.		A.A. MORE		3	2	22.31	
AB				3	5	21.66	
lu lu	- 100	Ser Div	Oler M.	6	0	21.18	
LAB		Mo.	AB	1	0	23.14	
MOFE		-QLAT	MORE	1	2	23.07	
LAF		Mor	ODOK	1	5	23.13	
MORE		aB al	QPSK	3	0	23.14	
. E MIL		WOL.	0	3	1 0	23.12	
A. alo	H W	00	QLAL .	3	2	23.12	
D 100		848.3	D ₁₁	6	0	22.21	
al.All	20643	Mr. VB	2LAP	1	0	21.97	
NO.	20043	RLA	MOLE	1	2	21.90	
AS MORLAS MORLE	AE MON RLAS IN	B LaLA	1.6	5	21.88		
		16-QAM	3	⋄ 0	21.78		
	Mo.	~	3	RI. 1 M	21.64		
.MO!		AB	RLA	3	2 0	21.23	
~ ~	No.	a Rilling	D. W.	6	0	21.19	



LTE BAND 7

Band Width	Channel	el Freq.(MHZ)	Modulation	RB Configuration		Average Power
Bariu Wiutii	Charmer	rieq.(IVII IZ)	Modulation	RB Size	RB Offset	(dBm)
AB	ir. We	0	AB	R. 1 W	0 4	22.64
M		QLA.	OBL	1.5	49	22.56
AB		WOL.	AB	OP.	99	22.46
ORL		3 ALAR	QPSK	50	0	21.71
, AE	AF	MOLO	S III	50	25	21.66
10R1	Mo	S 01	A ORL	50	49	21.50
S bu	AB -	Str of More	S MI	100	0 1	21.53
AL	is 10 str. Mo	2510	al.h.	1	0.3	21.28
S W	20850	RLIV	Op. Un.	100	49	21.18
3LAL		MC TE	LAB	1010	99	21.15
VOIA C		RLA	16-QAM	50	0	21.36
2LAB	MORLAL MORL	MO	G LA	50	25	21.12
MOL		AB RI	Mole	50	49	21.03
AB ALAB MOT	r. Mo.		100	0	20.66	
- alo	-	D.B.	all all	1 00	0 10 10	22.20
.0		ORL		21	49	22.23
M	UL VIE	QPSK	WO.	99	22.24	
	ORL		50	0	21.51	
	M	B RLA	50	25	21.38	
	LAP ORL	Mo	30 50	49	21.24	
	PILO.	O.B	100	0	21.27	
20MHz	21100	2535	Okey HILL	100	0	21.31
A.B	21100	16-6	Q.B	1	49	21.19
ORL			ORL	1 6	99	21.19
A.B			16-QAM	50	0	21.34
ORL		.6	ORL	50	25	20.96
di-		LA MORE	M	50	49	20.54
AD 40		. 4	aLAB C	100	0	20.69
W.	0.6	QL.	D	100	0	22.16
LAB		Mo. B	LAB	.016	49	22.10
OF		, QLA	MORE	1 . 0	99	22.65
LAB		WO.	QPSK	50	0	21.70
MORE		all al	MORE	50	25	21.70
8		Br., Mor	. 6	50	49	21.33
On	H	NB	RLA	100	0	21. 4 6 21.39
.6	21350	2560	- 0	100	0	21.00
RLA	21000	ME	RLA	410.	49	21.00
0.		ORL	MO.	1 24	99	21.16
al Al	MORLAS MORLA	16-QAM	16-OAM	50	99	21.23
Mor			10 30 1101			
AB LAB OF	Mo.	.0	50 50	25 49	21.01 20.99	
	NO SEE ME					



LTE BAND 7 (Continue)

Band Width	Channel	el Freq.(MHZ)	Modulation	RB Cor	Average Power	
Danu widin	Channel	Fieq.(IVIDZ)	Wodulation	RB Size	RB Offset	(dBm)
AB	110	. 6	AB	21. 1 N	0	22.63
M		QLA.	OBE IN	1.3	37	22.47
AB		110,	AB	OP!	74	22.69
ORL ME	2LAL	QPSK	36	0	21.73	
A.F	, AP	MOLO	S III.	36	18	21.69
MORIE		A 21	W. ORL	36	35	21.56
e la	L C	0507.5	S III	75	0	21.62
AL	20825	2507.5	alpha ac	1 11	0	21.85
S In.	AB	RLIN	Op. S. Mr.	1.00	37	21.82
al All		MO	2LAP	1011	74	21.73
VOI.		RLL	16-QAM	36	0	21.63
2LA		MO	B ZLA	36	18	21.58
Mor	A MON MAR IN MO	AB ORL	MOL	36	35	21.44
3		Mo	.0	75	0	20.74
110	ORLAG MORLAG	AB	CEL. MC	1 0	0	21.96
.0		"OBT		21	37	22.09
ORLAN		Mr. AE	ORLAN	410.	74	22.15
M M	, ORL	QPSK	36	0.0	22.02	
	9 41	I.B ORLIN	36	18	22.10	
	LAL	MIC	36	35	22.28	
	0505	AB	75	0	21.49	
15MHz	21100	2535	Oles Mis	1.3	0	21.21
AB	ORLAND	16-0	AB	OP!	37	21.28
ORL			MORLE	HI.	74	21.28
, AE			16-QAM	36	0	21.32
NORTH		3 2	JORLE	36	18	21.24
S bu		WOLL WOLL	S. Mr.	36	35	21.80
ALO'		20	alar 10	75	0.	20.69
8 6.	AB	ORL.	2.	100	0	22.30
al.A.		Mr. Th	al Al	1010	37	22.46
0,		ORLA	Mor	1 . 9	74	22.64
aLAF		ME	QPSK	36	0	22.31
MOL		AB ARL	MOL	36	18	22.29
B	LAT H MO	W. W.	S	36	35	22.12
_{ell} O	S M	2562.5	RILL	75	0	21.57
O.B		2562.5	.0	21	0	20.91
ORL	21375	W. VE	ORLAN	41 ⁰ 1	37	21.02
B		MORIE	IN .E	1 1	74	21.03
ORLA		16-QAM	16-QAM	36	0	21.08
MO. SE	LAN MORL	Me	36	18	21.13	
AP A		S bu	M AE	36	35	21.14
Mo B	A.A.E	SRE MO	75	0	20.52	



LTE BAND 7 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe
Band Widin	Charmer	rieq.(IVII IZ)	Modulation	RB Size	RB Offset	(dBm)
AB	ir. We	0	AB	^{QL} 1 N	0	22.65
Me		QLA.	OBL	1.0	24	22.55
AB		WOL.	AB	ORI	49	22.48
ORL		3LAP	QPSK	25	0	21.70
, A.F		MOLO	S III	25	12	21.69
,ORL		S 01	ORL	25	24	21.59
S. Mr.	AB L	Str - More	The same	50	0 11	21.63
AL	20800	2505	al.h.	1	0	21.93
S W	20000	RLL	Op. Un.	1,000	24	21.81
3LAL		MO. TE	LAB	1010	49	21.76
VOL		RLA	16-QAM	25	0	21.94
LAF	MORLAE MORLA	MO	e LA	25	12	21.64
More		AB RI	Moles	25 25	24	21.55
10MHz M 21100	Er. MO.	.0	50	0	20.83	
	D.B	all all	1 4	0	22.09	
	ORL	9.	21	24	21.44	
	NI O.E.	QPSK	MO	49	22.15	
	ORL		25	0	21.36	
	P.T.	Balla	25 25	12	21.35	
	LAB ORL	WO.	25 25	24	21.26	
	HILL	O.B	50	0	21.20	
	2535	Okey Mic	1.0	0	21.33	
D.B	21100	WOL W	Q.B	ARY.	24	21.32
ORL		LAB	ORL	Was 1	49	21.32
O.B		16	16-QAM	25	0	21.34
ORL		. 6	ORL	25 25	12	21.34
MILE		LAL MORE	MILE	25 25	24	21.16
AP . O		. 6	LAB	50	0	20.26
lillo.	0.6	ala	200	1	0	22.41
LAB		MO. B	LAB	1014	24	22.48
OR		, QLA	MORE	1 . 0	49	22.48 22.59
AB		WO.	QPSK	25	0	22.59
MORE		all al	Q. OICE	25 25	12	21.49
9	LAE II N	MOLO	Die Marie	25 25	24	21.49 21.50
240	H 110	60	QLA.	<u>25</u> 50		
G Lin.		2565	D	50	0	21.43
RLA.	21400	Mr. CB	al Al	1102		21.41
O		ORLA	Mor		24	21.40
AE HORLAS HORLAS	16-QAM	16-OAM	1	49	21.42	
		25	0	21.50		
	MIC	Mo.	25 25	12 24	21.52	
			75	. 74	21.53	



LTE BAND 7 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Power	
Band Width	Charine		Modulation	RB Size	RB Offset	(dBm)
LAR	111	AE MORIAE	LAB	RI 1 W	0	22.65
M			OEL	1.0	12	22.66
LAB			AB	1	24	22.64
MOFEL	TLAE MIC TOPLAE	BLAL	QPSK	12	0	22.67
LAF		WO.	G " LA	12	6	22.68
MORE		aB al	MORL	12	ॐ 11	21.62
.0	LAID L	2502.5	0.	25	0	21.68
A. ano	20775	2502.5	RLA	1 1	0	21.87
-3		ORL	80. B	1.00	12	21.85
RLA.		ME	RLA	1011	24	21.82
NO.		ORL	16-QAM	12	O OFFILE	21.89
RLA		MILE	E GLA	12	6	21.77
Mo.		LAP ORI	Mo.	12	11	21.63
AB .	LA	INC.	.0	25	0 1111	20.74
" IIIO	.0	LAB	ORL. MC	1 0	0	22.19
AB	ALAE MORLAE	"UOLE"	QPSK	1	12	22.18
ORL		LAB		w ¹⁰ 1	24	22.16
a.E		MOKE		12	0	21.23
ORL		. 6	I GRILL	12	6	21.22
M 5MHz	The Moke	MIC	12	11	21.21	
	2535	A.A.B	25	0	21.27	
SIVITIZ	21100	100	"Die	1.3	0	21.06
LAB			LAB	- P1	12	21.05
VOE .			16-QAM	III a	24	21.08
LAP				12	0	21,11
MORE		all al		12	<i>№</i> 6	21.14
0		OF LIVE MORE		12	(R) 11 (III	21.10
ALC:	er We	.3		25	0	20.25
. 6	LAB	ORL	9	100	0	22.57
RLA		ME	RLA	.011	12	22.55
No.		ORL	Mo.	1 .	24	22.56
RLA		M	QPSK	12	0	21.52
MO		LAB ORL	MOL	12	6	21.52
OB .		HILL	a.B	12	11	21.52
110	H	2567.5	PL. MO	25	0	21.53
NB	21425	2507.5	o.B	1	0	21.21
ORL		LAB	ORL	1 1 I	12	21.12
N. S. B.	ORLAE MORLAE	MORT	Mr. VE	1 1	24	21.35
ORLAN		0	16-QAM	12	0	21.22
Me		LAT MORE	Me	√ 12	6 AC	21.21
AB		S W.	LAB	12	11	21.00
Mo	MO	LAB	Par Mo	25	0	20.61



LTE BAND 17 (Continue)

Band Width	Channel	nnel Freq.(MHZ)	Modulation	RB Configuration		Average Power
Danu Wiuin	Chamilei	Freq.(IVITZ)	Modulation	RB Size	RB Offset	(dBm)
AB	32 110	0)	AB	21. 1 N	0 4	23.13
Me	OB	QLA!	ORL	1.3	24	23.27
AB	ORL.	More	AB	OP!	49	23.04
ORL	ORLAR ME ORLAR	3LAL	QPSK	25	0	22.22
W. DE		MOLO	a m	25	12	22.21
MORLE	MIC	S 01	NO REL	25	24	22.35
S bu	AB -	The Top office	S W	50	0 1	22.28
AL	ST. W.C.	709.0	al h	1 11	0.3	22.41
S bu	23780	RLIN	Or W	1.00	24	22.48
3LAP	ORL	MO	LAB	1010	49	22.44
NOW	Mr. AE	RLA	16-QAM	25	0	22.48
A.A.	MORLAE MORL	W.	e LA	25	12	22.37
MOL		AB CL	Mole	25 25	24	22.12
AE HOLLAND ROS	Mo.	.0	50	0	21.50	
	A.B	all all	1 4	0	23.13	
-6	PRIAR THORIAGE	ORL	0,	21,188	24	23.13
RLA		NI DE	QLA.	110,1	49	22.99
Vo.		ORL	QPSK	25	0	22.31
M	HILL	3 QI OIL	25 25	12	22.28	
	LAB ORL	Mo	25	24	22.28	
	MIC	o.B	50	0	22.16	
10MHz	. 6	710.0	Jegan Mc	1	0	
OB.	23790	790	0B	ORLAN	24	22.29 22.23
ORLA	MO. B		16-QAM	Wall of	49	22.23
NE OF	QLA!			4.3	0	
ORL	More	0 10	10 97 1111	25		22.15
Mo	NB .	LAL	MIC	25	12	22.10
NB O	110	S In.	AB	25 50	24	22.01
MIC		al.a	32	50	0	21.34
AB	RLIN	"LOLO S	AB	1	0	23.21
ORL	We "B	3LAB	ORL	4 0	24	23.10
AB	RLA	MOL	QPSK	1	49	23.14
MORIL	Mo	all all	QI-SIX	25	0	22.25
S Un.	AB of	"In all Old	W.	25	12	22.22
.0	The H MO		OLAE TO	25 50	24	22.17
W.	AB	711.0	31 41	50	0	22.31
2LAB	23800	Mo.	ALAIS .	101	0	22.05
OF	Mr = 1000	a RLA	Mole	1	24	21.94
LAB	ORL	WO.	16 0 4 14	1.00	49	21.85
MORI.	AB al	16-QAM	25	0	22.06	
•	LAB	MO	.0	25	12	21.95
40	MIC	NB	ALA.	25	24	21.74
14.		D. 10.	50	0	21.33	



LTE BAND 17 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	nfiguration	Average Power
				RB Size	RB Offset	(dBm)
LAB	We We	. 6	LAB	RI. 1 N	0	22.37
Mc		QLA.	ORL	1.0	12	22.43
AB		MO.	AB	OP.	24	22.48
INC. INC.	al.All	QPSK	12	0	22.27	
W. VE	AP ORLA	MOLO	a m.	12	6	22.26
MORL	allo	S 0	N. NORL	12	2 11	22.27
. 63	LAB -	700 5	O III.	25	0	22.31
AL	WO STE MIC	706.5	21.10	L. 1 W	0	22.36
. 6	23755	ORLA	0, 20,	1.00	12	22.39
QL.A.		MIC OF	2LAL	011	24	22.45
101		RLIN	16-QAM	12	0	22.44
QLA!	MORLAL S MORL	Mo	B SLA	12	6	22.34
MOL		LAP ORI	MOL	12	11	22.33
AB ALAL MO	Mo		25	0	22.29	
IIIO VB	AB	ORL ME	1.0	0	23.21	
NB	ORLAS MORLA	MORL	NE NE	1	12	23.21
ORL		II. A.B	ORLAN	WO. 1	24	23.06
M 5MHz	MORL	QPSK	12	0	22.29	
	- B - 1	I B ORLA	12	6	22.20	
	LAN	ME	12	11	22.16	
	710.0	AB	25	0	22.32	
SIVITZ	1.	23790	Ole Mi	1.3	0	22.11
LAB	23790		LAB		12	22.10
OPL		QL.A.	MORLE	1 6	24	22.04
LAB		"IO"	16-QAM	12	0	22.15
MORE		al al	"OFT	12	<i>∞</i> 6	22.26
0		T. MOIL	0	12	11	22.21
AO	in W	3	alan no	25	0	21.26
. 6	LAB	ORL		1	0	23.15
RLA		ME	RLAL	014	12	23.08
Vo.		ORL	Mo.	1 . 9	24	23.05
RLAN		INC	QPSK	12	0	22.18
MO.		AP ORL	MO	12	6	22.15
AB .	LA H	W. W.	A.B	12	11	22.14
110		713.5	JEL. MO	25	0	22.16
AB.	RI.A.	7 13.5	o.B	1	0	21.91
ORL	23825	LAB	ORL	1 1 I	12	21.87
n of	OF QLAR	MORE	M. OF	1 21	24	21.83
ORLA	B 1112	16-QAM	12	0	22.02	
M		THE HORL LAB MO.	We	<i>∞</i> 12	6	22.14
AB			LAB	12	11	22.15
M	MC	2LA	DE ME	25	0	21.16



11. MEASUREMENT OF CONDUCTED OUTPUT POWER

1. WCDMA mode conducted output power values

	band	W	CDMA 8	50	W	CDMA 19	900
Item	ARFCN	4132	4183	4233	9262	9400	9538
	subtest		dBm			dBm	
5.2(WCDMA)	non	23.83	23.71	23.68	23.51	23.94	23.80
MORLAN MO	1	23.50	23.74	23.75	23.48	23.89	23.70
	2	23.49	23.72	23.70	23.47	23.86	23.62
HSDPA	3	22.99	23.22	23.20	22.91	23.36	23.12
AE N. RLAE	4	22.93	23.21	23.19	22.90	23.35	23.11
MO		23.89	23.77	23.74	23.52	23.79	23.71
	2	23.90	23.75	23.73	23.49	23.77	23.70
HSUPA	3	22.91	22.73	22.74	22.50	22.75	22.69
	4	21.89	21.76	21.75	21.51	21.78	21.72
	5	23.88	23.74	23.76	23.53	23.76	23.70
HSPA+	1	23.86	23.76	23.66	23.51	23.76	23.58
Note	The Conducted RF Output Power test of WCDMA /HSDP /HSUPA/HSPA+ was tested by power meter.						

2. GPRS Mode Conducted peak output power

.07	10.				- Ch	- 1	
Band	Channal	Frequency (MHz)	Output Power(dBm)				
	Channel		Slot 1	Slot 2	Slot 3	Slot 4	
0014	128	824.2	33.63	32.22	30.66	29.45	
GSM	190	836.6	33.54	32.13	30.57	29.36	
850	251	848.8	33.42	32.01	30.45	29.24	
DCC	512	1850.2	30.38	28.97	27.41	26.20	
PCS 1900	661	1880.0	30.62	29.21	27.65	26.44	
	810	1909.8	30.09	28.68	27.12	25.91	



GPRS Time-based Average Power

45.3	N'						
Band	Channel	Frequency (MHz)	Output Power(dBm)				
	Onamici		Slot 1	Slot 2	Slot 3	Slot 4	
0014	128	824.2	24.60	26.20	26.40	26.44	
GSM	190	836.6	24.51	26.11	26.31	26.35	
850	251	848.8	24.39	25.99	26.19	26.23	
DCC	512	1850.2	21.35	22.95	23.15	23.19	
PCS 1900	661	1880.0	21.59	23.19	23.39	23.43	
	810	1909.8	21.06	22.66	22.86	22.90	

Timeslot consignations:

No. Of Slots	Slot 1	Slot 2	Slot 3	Slot 4
Slot Consignation	1Up4Down	2Up3Down	3Up2Down	4Up1Down
Duty Cycle	1:8	1:4	1:2.67	1:2
Correct Factor	-9.03dB	-6.02dB	-4.26dB	-3.01dB

3. EDGE Mode Conducted peak output power

	C2.V			0.7				
Pond	Channel	Frequency		Output Power(dBm)				
Band	Channel	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4		
COM	128	824.2	30.39	28.98	27.50	26.21		
GSM	190	836.6	30.53	29.12	27.64	26.35		
850	251	848.8	30.58	29.17	27.69	26.40		
DOC	512	1850.2	28.99	27.58	26.10	24.81		
PCS	661	1880.0	29.08	27.67	26.19	24.90		
1900	810	1909.8	28.75	27.34	25.86	24.57		



EDGE Time-based Average Power

	.0"		. 95		.0.	10.	
Band Channel	Channel	Frequency	Output Power(dBm)				
Bana	Orialino	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4	
CCM	128	824.2	21.36	22.96	23.24	23.20	
GSM -	190	836.6	21.50	23.10	23.38	23.34	
	251	848.8	21.55	23.15	23.43	23.39	
DOC O	512	1850.2	19.96	21.56	21.84	21.80	
PCS	661	1880.0	20.05	21.65	21.93	21.89	
1900	810	1909.8	19.72	21.32	21.60	21.56	
			. 11				

4. Wifi average output power(ATN1)

Band Channel	Ob a see al	Frequency	0	output Power(dE	3m)
	Channel	(MHz)	802.11b	802.11g	802.11n 20
MORL	1	2412	12.33	10.24	7.79
Wifi	6	2437	12.30	9.92	7.49
Mo.	11	2462	10.50	8.58	6.04

Band	Channel	Frequency	Output Power(dBm)	
		(MHz)	802.11n40	
LAB	3 1	2422	6.00	
Wifi	6	2437	5.25	
ORLA	9	2452	4.65	



5. Wifi average output power(ANT2)

Band Channel	Chanal	Frequency	C	Output Power(dE	Bm)
	(MHz)	802.11b	802.11g	802.11n20	
S W	10	2412	11.37	9.56	6.49
Wifi	6	2437	10.87	8.70	6.20
M. A.B	11	2462	11.00	8.79	6.25

			Output
Band	Channel	Frequency	Power(dBm)
		(MHz)	802.11n40
ORL	3	2422	4.74
Wifi	6	2437	5.12
MO	9	2452	4.97

6. Wifi MIMO 2x2 average output power

		Frequency	Output Power(dBm)
Band	Channel	(MHz)	MIMO 2x2
		(1411 12)	802.11n20
A NOR	1 111	2422	10.20
Wifi	6	2437	9.90
"OBT	11 💉	2452	9.16

		Frequency	Output Power(dBm)
Band	Channel	(MHz)	MIMO 2x2
		(···· · -)	802.11n40
10°	3	2422	9.01
Wifi	6	2437	8.19
8 11	9 9	2452	7.82



12. TEST RESULTS LIST

Summary of Measurement Results (GSM 850MHz Band)

Phanto Configura	0,	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
BUILD	LAB	Back upward	O MIC	0.718	ORLAN	0.728	1
Body	VOICE	Face upward	ORLAN	0.707		0.717	MO
(10mm	GPRS	Edge A	128	0.174	1.014	0.176	B
Separation)	GFKS	Edge B	MORE	0.235		0.238	. 0
	P	Edge D	AB OF	0.298		0.302	RLA

Summary of Measurement Results (GSM 1900MHz Band)

Temperature: 2	21.0~23.8°C	C, humidity: 54~60%	6.	a W	AB OF	II MORE	
Phanto Configura	.0	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
MOST		Back upward	MOR	0.431	ORLAN	0.438	@ NO.
Body	Moke	Face upward	ORLA	0.430		0.437	2
(10mm	GPRS	Edge A	661	0.238	1.016	0.242	LAB
Separation)	GPRS	Edge B	KILL MOP	0.098		0.100	0,0
	ORLA	Edge D	LAB	0.183		0.186	, OP

Note:

1. GPRS/EDGE test Scenario (Based on the Max. Time-based Average Power)

Band	Channel	Slots	Power level	Duty Cycle
GPRS850	128	4	INE 5 PLA	1:2
GPRS1900	661	4	0	1:2

2. SAR is not required for EDGE mode because its output power is less than that of GPRS mode.



Summary of Measurement Results (WCDMA 850MHz Band)

Temperature: 21.0~23.8°C	C, humidity: 54~60%	6.	LAB	OPLAR	alour a	
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
AB THE SLAB	ORLAN MORL	4132	0.856	1.040	0.890	-LAB
MOLO	Back upward	4183	0.855	1.069	0.914	0,
CLAE D. A. ORLA	MOLE	4233	0.851	1.076	0.916	3
Body (10mm Separation)	Face upward	MO.	0.745	ORLA	0.775	8 111
(10mm Separation)	Edge A	4122	0.202	1.040	0.210	
	Edge B	4132	0.184		0.191	ALAB
	Edge D	JALIA MO	0.201	ZLAB	0.209	0,

Summary of Measurement Results (WCDMA 1900MHz Band)

mperature: 21.0~23.8°	l	-0.	The MOL	9 6	1,00	ORLA
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
A MORIAR MORL	MOJE	9262	0.927	1.119	1.037	B
	Back upward	9400	1.148	1.014	1.164	2
	01.	9538	1.013	1.047	1.061	ORL
	Face upward	9262	0.844	1.119	0.944	
Dody		9400	1.053	1.014	1.068	Mo
Body 10mm Separation)		9538	0.968	1.047	1.013	
Tomin Separation)	ARLAN MORE	9262	0.944	1.119	1.056	a.B
Edg	Edge A	9400	1.167	1.014	1.183	4
	MORT. M	9538	1.059	1.047	1.109	
	Edge B	9400	0.308	1.014	0.312	Mo
	Edge D	9400	0.567	1.014	0.575	



Note:

- When the 1-g SAR for the mid-band channel or the channel with the highest output power satisfy the following conditions, testing of the other channels in the band is not required. (Per KDB 447498 D01 General RF Exposure Guidance v05r02)
 - ≤ 0.8 W/kg and transmission band ≤ 100 MHz
 - ≤ 0.6 W/kg and, 100 MHz < transmission bandwidth ≤ 200 MHz
 - ≤ 0.4 W/kg and transmission band > 200 MHz
- 2. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB Middle than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities.
- 3. WiFi SAR test is conducted according to section 12 stand-alone SAR evaluation of this report.
- 4. During 802.11 testing, engineering testing software installed on the EUT can provide continuous transmitting RF signal. The RF signal utilized in SAR measurement has almost 100% duty cycle, and its crest factor is 1.
- 5. IEEE Std 1528-2013 require the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
- 6. Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than 1.6W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.
- 7. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB higher than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities. This module supports 3GPP release R7 HSPA+ using QPSK only without 16QAM in the uplink. So PBA is not required for HSPA+.



Summary of Measurement Results (LTE Band 2 bandwidth 20MHz with QPSK 1RB)

SLAR OFF	My S	al Al	OPE	0	ALPIE .	
Phantom	Device Test	Device Test	SAR(W/Kg),	Scaling	Scaled SAR	Plot
Configurations	Positions	channel	1g Peak	Factor	(W/Kg), 1g	No.
MORLAE MORLAE	OFLER	18700	0.834	1.030	0.859	alaB
	Back upward	18900	0.859	1.026	0.881	NO.
	MOL VE W.	19100	0.828	1.050	0.869	.01
	Face upward	18700	0.958	1.030	0.987	B
MORLE MON		18900	0.967	1.026	0.992	
Body (10mm Separation)	NOET. MO.	19100	0.917	1.050	0.963	QLAB
(Torriiri Geparation)	RLAD M	18700	0.989	1.030	1.019	N.
	Edge A	18900	1.020	1.026	1.047	10
	ILE MORL.	19100	0.975	1.050	1.024	5
	Edge B	18900	0.447	1.026	0.459	
	Edge D	18900	0.268	1.026	0.275	LAB

Summary of Measurement Results (LTE Band 2 bandwidth 20MHz with QPSK 50RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	6.	LAE JORL	MO	- B	al AB
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
RLAE MORL	Back upward	19100	0.689	1.054	0.726	, O
nio Padu AB	Face upward		0.701		0.739	Q.B
Body (10mm Separation)	Edge A		0.754		0.795	ORL
(10mm Separation)	Edge B		0.349		0.368	ام
	Edge D		0.184		0.194	1110.



Summary of Measurement Results (LTE Band 2 bandwidth 20MHz with QPSK 50RB)

emperature: 21.0~23.8°	C, humidity: 54~60%	% .	LAB	ORLAN	NORTH S. I	
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Body (10mm Separation)	Back upward	13	0.706	MO	0.753	J.A.B
	Face upward	18900	0.728	1.067	0.777	0,
	Edge A	ZLAB	0.854	OF	0.911	.0

Additional LTE test requirement for 16QAM
Not required.
Additional LTE test requirement for other bandwidth
Not required.

Summary of Measurement Results (LTE Band 5 bandwidth 10MHz with QPSK 1RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	6.	MC. AE	RLAB	MORL	"IIIO.
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
G HO! LAE	Back upward	ORLAG MO	0.488	1.067	0.521	6
ORLAN	Face upward		0.340		0.363	MOL
Body (10mm Sanaration)	Edge A	20450	0.159		0.170	B
(10mm Separation)	Edge B	AE MORL	0.206		0.220	0.
	Edge D		0.191		0.204	RLAD



Summary of Measurement Results (LTE Band 5 bandwidth 10MHz with QPSK 25RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	6.	LAB	ORLA	WOE B	
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
AB GLAD	Back upward	O ILAE MO	0.328	1.059	0.347	LAB
III NOW NE	Face upward		0.280		0.297	0,
Body (10mm Separation)	Edge A	20450	0.127		0.134	.0 ^{R1}
(10mm Separation)	Edge B	MORLAR	0.165		0.175	8
	Edge D		0.164		0.174	

Additional LTE test requirement for 16QAM

Not required.

Additional LTE test requirement for other bandwidth

Not required.

Additional LTE test requirement for 20MHz with QPSK 100RB

Not required.

Summary of Measurement Results (LTE Band 7 bandwidth 20MHz with QPSK 1RB)

Temperature: 21.0~23.8°	°C, humidity: 54~60%	6.	all sal	No. Mol	- Miles	100
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
MO' LAB ORL	NORL.	20850	1.034	1.014	1.048	6
	Back upward	21100	1.027	1.062	1.091	
	ORL MO	21350	1.109	1.012	1.122	RLAD
T Date AE	Face upward	21350	0.672	1.012	0.680	
Body (10mm Separation)	G ME	20850	1.019	1.014	1.033	MOR
(10mm Separation)	Edge A	21100	1.088	1.062	1.155	³ 7
	AB GRLA	21350	1.099	9 1.012	1.112	_
	Edge B	21350	0.418	1.012	0.423	RLAR
MOT AB II	Edge D	21350	0.304	1.012	0.308	9



Summary of Measurement Results (LTE Band 7 bandwidth 20MHz with QPSK 50RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	6.	LAB	ORLA	WOLF & M	
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
AB SLAB	Back upward	O ILAE MO	0.781	1.069	0.781	LAB
ILL MON NE	Face upward		0.647		0.692	0,
Body (10mm Separation)	Edge A	20850	0.764		0.795	.o ^{Rl}
(10mm Separation)	Edge B	MORLAR	0.312		0.334	8
	Edge D		0.208		0.222	

Summary of Measurement Results (LTE Band 7 bandwidth 20MHz with QPSK 100RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	%.	M. SLAB	ORLA	MOL	e u
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Body	Back upward	0	0.754	000	0.754	a
(10mm Separation)	Edge A	20850	0.738	1.000	0.738	Mo.

Additional LTE test requirement for 16QAM

Not required.

Additional LTE test requirement for other bandwidth

Not required.





Summary of Measurement Results (LTE Band 17 bandwidth 10MHz with QPSK 1RB)

Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
AE MORLAR	ORL: MO	23780	1.044	1.054	1.100	aLA!
	Back upward	23790	1.018	1.089	1.109	8
QLAB AORLE	MOL VE III	23800	1.005	1.070	1.075	.0
JOHN DE MIN	E ORLA	23780	0.871	1.054	0.918	8 44
Body	Face upward	23790	0.843	1.089	0.918	
(10mm Separation)		23800	0.866	1.070	0.927	CLAB
TORLAR MORLAR V	Edge A	Olyr, MO.	0.270	LAB	0.285	0,0
	Edge B	23780	0.333	1.054	0.351	.0
	Edge D	MORE	0.279		0.294	a hin

Summary of Measurement Results (LTE Band 17 bandwidth 20MHz with QPSK 25RB)

Temperature: 21.0~23.8°C	C, humidity: 54~60%	ó. "N	ORLA	NO.	W. STUB	.oRl
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
All HORLAND	Back upward	O'LLAR MOF	0.692	1.035	0.716	ORLAN
NE Dada GLAE	Face upward		0.459		0.475	۵۱
Body (10mm Separation)	Edge A	23780	0.194		0.201	Wo.
(10mm Separation)	Edge B	6 W. MORLAE	0.248		0.257	B
MOL VE W	Edge D		0.216		0.224	20



Summary of Measurement Results (LTE Band 17 bandwidth 10MHz with QPSK 50RB)

Temperature: 21.0~23.8°	C, humidity: 54~60%	6.	ALAE .	ORLA	WOLE .	
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Body	Back upward	23800	0.681	1.045	0.712	CLAB
(10mm Separation)	Face upward		0.439		0.459	0,

Additional LTE test requirement for 16QAM

Not required.

Additional LTE test requirement for other bandwidth

Not required.

Note:

- 1. IEEE Std 1528-2013 require the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
- 2. Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than 1.6W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.
- 3. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB higher than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities. This module supports 3GPP release R7 HSPA+ using QPSK only without 16QAM in the uplink. So PBA is not required for HSPA+.



Summary of Measurement Results (WLAN 802.11b Band ANT 1)

Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Duty Cycle	Scaling Factor (Duty Cycle)	Scaling Factor (Power)	Scaled SAR (W/Kg), 1g	Plot No.
ORL IN	Back upward	RLAR	0.158	Mos	A.E	LAB	0.165	9
Body	Front upward	MO.	0.134	00.40/	4.000	4.040	0.140	NORL
(10mm	Edge B	MORL	0.084	99.4%	1.006	1.040	0.088	
Separation)	Edge C	AB 18	0.109	ORL	Mo.		0.114	N

Summary of Measurement Results (WLAN 802.11b Band ANT 2)

Temperature: 21	.0~23.8°C, humid	dity: 54~60%	. 110	- (c)	LAB	ORLA	MOR	la la
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Duty Cycle	Scaling Factor (Duty Cycle)	Scaling Factor (Power)	Scaled SAR (W/Kg), 1g	Plot No.
MORE	Back upward	ORL	0.121	S W	LAB	ORLAN	0.125	10
Body	Front upward	S W	0.104	00.40/	MORE S	4.000	0.108	
(10mm	Edge A	LAT 1	0.068	99.4%	1.006	1.030	0.070	AB
Separation)	Edge B	AB	0.079	MORE	a me		0.082	and the same of th

Summary of Measurement Results (WLAN 802.11n20 MIMO 2x2)

Temperature: 21	.0~23.8°C, humi	dity: 54~60%	nO ^R	, all	RLAN	MORE	Me	aB.
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Duty Cycle	Scaling Factor (Duty Cycle)	Scaling Factor (Power)	Scaled SAR (W/Kg), 1g	Plot No.
Body	Back upward	AB	0.208	- N	THE SLAB	ORLA	0.224	11
(10mm	Front upward	.5	0.161	99.4%	1.006	1.071	0.173	21.
Separation)	Edge B	ORLA	0.109		LAE		0.117	J.A



Notes:

- 1. cThe EUT has two WLAN Tx antennas, but only 802.11n support MIMO 2x2
- 2. SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
- 3. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
 - 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
- 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.
 - 4. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
 - 5. Justification for test configurations for WLAN per KDB Publication 248227 D01DR02-41929 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.



6. Scaling Factor calculation

Band	Tune-up power tolerance(dBm)	SAR test channel Power (dBm)	Scaling Factor
GPRS 850	PCL = 5, PWR =26+-0.5(4 slots)	26.44	1.014
GPRS1900	PCL = 0, PWR =23+-0.5(4 slots)	23.43	1.016
RLAE MORL	AR RIAL MORE	23.83	1.040
WCDMA 850	Max output power =23(+1/-2)	23.71	1.069
	AB THE RELATE MORE. MO	23.68	1.076
BLAL	MORE ME AR RELATE	23.51	1.119
WCDMA 1900	Max output power =22.5(+1/-2)	23.94	1.014
	MO. AE IN STAR MORLI	23.80	1.047
6.5	RIAN MORE MO AB	22.87	1.030
LTEDANDO	Max output power =22.5+-0.5(1RB)	22.89	1.026
LTE BAND2	HOLL HOLL SE W. STUE	22.79	1.050
(QPSK)	Max output power =22+-0.5(50RB)	22.27	1.054
	Max output power =22+-0.5(100RB)	22.22	1.067
LTE BAND5	Max output power =23+-0.5(1RB)	23.22	1.067
(QPSK)	Max output power =22+-0.5(25RB)	22.25	1.059
ZLAB CLAB	JORLS MOS AE TLAB	22.44	1.014
LTE DANIDZ	Max output power =22+-0.5(1RB)	22.24	1.062
LTE BAND7	MOTE OF THE STAR SORLAR	22.45	1.012
(QPSK)	Max output power =21.5+-0.5(50RB)	21.71	1.069
	Max output power =21+-0.5(100RB)	21.50	1.000
, The SLAB	ORLE MOT IE II.	23.27	1.054
LTE DANIDAZ	Max output power =23+-0.5(1RB)	23.13	1.089
LTE BAND17	MORE THE SLAB OFFICE	23.21	1.070
(QPSK)	Max output power =22+-0.5(25RB)	22.35	1.035
	Max output power =22+-0.5(50RB)	22.31	1.045
802.11b ANT1	Max output power =12+-0.5	12.33	1.040
802.11b ANT2	Max output power =11+-0.5	11.37	1.030
802.11n20 MIMO 2x2	Max output power =10+-0.5	10.20	1.071



13. REPEATED SAR MEASUREMENT

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

			Meas.S	SAR(W/kg)	Largest to
Band	Test Position	Test Channel	Original	Repeated	Smallest SAR
			Original	Repeated	Ratio
WCDMA 850	Back upward	4132	0.856	0.864	1.009
3 M. SLAB	Back upward	200	1.148	1.145	1.003
WCDMA 1900	Face upward	9400	1.053	1.057	1.004
LAE ORLA	Edge A	3 MI SLAB	1.167	1.152	1.013
2	Back upward	MOL	0.859	0.862	1.003
LTE Band 2	Face upward	18900	0.967	0.959	1.008
	Edge A	Die. B We	1.020	1.028	1.008
LTC Daniel 7	Back upward	04050	1.109	1.099	1.009
LTE Band 7	Edge A	21350	1.099	1.102	1.003
LTC Dand 47	Back upward	23780	1.044	1.039	1.005
LTE Band 17	Face upward	LAB ORI	0.871	0.881	1.011



14 MULTIPLE TRANSMITTERS EVALUATION

Stand-alone SAR

Test distance: 10	"OLF WE	AB GLAS HORE HIC AB	RLAB
Band	Highest power(mW) per tune up	1-g SAR test threshold	Test required?
WIFI(802.11b)	14.13	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]	Yes
WIFI(MIMO2x2)	11.22	• [√f(GHz)] ≤ 3.0 for 1-g SAR	Yes

Simultaneous SAR

aLP.	ORLE	WO S	imultaneous t	ransmission conditions	OF S IN LAP
Office	WWAN		JELL INC	WLAN	Sum of WWAN&
#	LTE Data	GSM	UMTS	802.11b/g/n	WLAN
1	×	W. C.A.	ORLA	× ×	×
2	BORLA	×	O III	×	×
3	G M	AB	×	×	×
4	× 40	e. a	AB	ORLAN MORE	×
5	AB	×	WOLES.	Me AB ARLA	×
6	MORE	In A	×	MORE AND	× elle

Note:

- 1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another WWAN transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.
- 2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR tests.



- 3. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.
- 4. Simultaneous Transmission SAR evaluation is not required for BT and WiFi, because the software mechanism have been incorporated to guarantee that the WLAN and Bluetooth transmitters would not simultaneously operate.
- 5. Per KDB 447498D01v05r01, Simultaneous Transmission SAR Evaluation procedures is as followed:
 - Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
 - Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.
 - Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04, Simultaneous SAR measurement is not required.
 - Step 4: If the ratio of SAR to peak separation distance is > 0.04, Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.

(The ratio is determined by: (SAR1 + SAR2) ^ 1.5/Ri ≤ 0.04,

Ri is the separation distance between the peak SAR locations for the antenna pair in mm)

6. Sum of the SAR for GPRS850+WiFi

RF Exposure	Test	Simultaneous Trar	nsmission Scenario	Max ∑1-g	SPLSR	
condition position	position	GPRS850	WiFi	SAR(W/Kg)	(Yes/ No)	
Back upward Face upward	0.728	0.224	0.952	No		
	Face upward	0.717	0.173	0.890	No	
Padu M ^O	Edge A	0.176	0.070	0.246	No	
Body	Edge B	0.238	0.117	0.355	No	
	Edge C	10kl / 110	0.114	0.114	No	
	Edge D	0.302	ORLY / MOT	0.302	No	



7. Sum of the SAR for GSM1900+Wi-Fi

RF Exposure	Test	Simultaneous Tran	smission Scenario	Max ∑1-g	SPLSR
condition position	position	GPRS1900	WiFi	SAR(W/Kg)	(Yes/No)
, , <u>, , , , , , , , , , , , , , , , , </u>	Back upward	0.438	0.224	0.662	No
	Face upward	0.437	0.173	0.610	No
Dody	Edge A	0.242	0.070	0.312	No
Body	Edge B	0.100	0.117	0.217	○ No
a me	Edge C	1	0.114	0.114	No
RLAL	Edge D	0.186	7	0.186	No

8. Sum of the SAR for WCDMA850+Wi-Fi

RF Exposure	Test	Simultaneous Tra	nsmission Scenario	Max ∑1-g	SPLSR	
condition	condition position	WCDMA850	WiFi	SAR(W/Kg)	(Yes/ No)	
Back upward Face upward	0.916	0.224	1.140	No		
	0.775	0.173	0.948	No		
Body RLA	Edge A	0.210	0.070	0.280	No	
Body	Edge B	0.191	0.117	0.308	No	
	Edge C	as / ala	0.114	0.114	No	
	Edge D	0.209	1 ALAB	0.209	No	

9. Sum of the SAR for WCDMA1900+Wi-Fi

RF Exposure	Test	Simultaneous Tra	nsmission Scenario	Max ∑1-g	SPLSR	
condition	position	WCDMA1900	WiFi	SAR(W/Kg)	(Yes/ No)	
ORLA	Back upward	1.164	0.224	1.388	No	
Fa	Face upward	1.068	0.173	1.241	No	
Dodu	Edge A	1.183	0.070	1.253	No	
Body	Edge B	0.312	0.117	0.429	No	
Je. B W	Edge C	JELL / 11010	0.114	0.114	No	
ORLAN	Edge D	0.575	100	0.575	No	



10. Sum of the SAR for LTE Band 2+Wi-Fi

RF Exposure	Test	Simultaneous Trai	nsmission Scenario	Max ∑1-g	SPLSR
condition	position	LTE Band 2	WiFi	SAR(W/Kg)	(Yes/ No)
Back upward Face upward	0.881	0.224	1.105	No	
	Face upward	0.992	0.173	1.165	No
Body RLA	Edge A	1.047	0.070	1.117	. No . √
Body	Edge B	0.459	0.117	0.576	No
RLAL	Edge C	AB / BLA	0.114	0.114	No
AB	Edge D	0.275	at / sela	0.275	No

11. Sum of the SAR for LTE Band 5+Wi-Fi

RF Exposure	Test	Simultaneous Transmission Scenario		Max ∑1-g	SPLSR	
condition	position	LTE Band 5	WiFi	SAR(W/Kg)	(Yes/ No)	
Body	Back upward	0.521	0.224	0.745	No	
	Face upward	0.363	0.173	0.536	No No	
	Edge A	0.170	0.070	0.240	No	
	Edge B	0.220	0.117	0.337	No	
	Edge C	OFFE / MO	0.114	0.114	No	
MORLIN	Edge D	0.204	I III	0.204	No	

12. Sum of the SAR for LTE Band 7+Wi-Fi+ Bluetooth

RF Exposure Test condition position		Simultaneous Transmission Scenario		Max ∑1-g	SPLSR (Yes/ No)	
		LTE Band 7 WiFi		SAR(W/Kg)		
Body	Back upward	1.122	0.224	1.346	No	
	Face upward	0.680	0.173	0.853	No	
	Edge A	1.112	0.070	1.182	No	
	Edge B	0.423	0.117	0.540	No	
	Edge C	110 hr / 1 110	0.114	0.114	No	
	Edge D	0.308	1010 / 100	0.308	No	



13. Sum of the SAR for LTE Band 17+Wi-Fi+ Bluetooth

RF Exposure Test condition position		Simultaneous Transmission Scenario		Max ∑1-g	SPLSR (Yes/ No)	
		LTE Band 17 WiFi		SAR(W/Kg)		
Body	Back upward	1.109	0.224	1.333	No	
	Face upward	0.927	0.173	1.100	No	
	Edge A	0.285	0.070	0.355	No No	
	Edge B	0.351	0.117	0.468	No	
	Edge C	AE / RLA	0.114	0.114	No	
	Edge D	0.294	at / alla	0.294	No	

Note:

The Sum of the SAR is not greater than 1.6W/Kg SPLSR assessment is not required.



- 15. ANNEX A GENERAL INFORMATION
- 16. ANNEX B PHOTOGRAPHS OF THE EUT
- 17. ANNEX C PLOTS OF HIGH SAR TEST RESULTS
- 18. ANNEX D SYSTEM PERFORMANCE CHECK DATA



15. ANNEX A GENERAL INFORMATION

1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Responsible Test Lab Manager:	Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.	
AP ARL MC	Morlab Laboratory	
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang	
	Road, Block 67, BaoAn District, ShenZhen, GuangDong	
	Province, P. R. China	



3. List of Test Equipments

No.	Instrument	Туре	Cal. Date	Cal. Due	
10 KLA	PC	Dell (Pentium IV 2.4GHz, SN:X10-23533)	(n.a)	(n.a)	
2	Network Emulator	Aglient (8960, SN:10752)	2015-2-21	1year	
3	Network Analyzer	Agilent(E5071B ,SN:MY42404762)	2015-9-26	1year	
4	Voltmeter	Keithley (2000, SN:1000572)	2015-9-24	1year	
5	Signal Generator	Rohde&Schwarz (SMP_02)	2015-9-24	1year	
6	Power Amplifier	PRANA (Ap32 SV125AZ)	2015-9-24	1year	
7	Power Meter	Agilent (E4416A, SN:MY45102093)	2015-5-07	1year	
8	Power Sensor	Agilent (N8482A, SN:MY41091706)	2015-5-07	1year	
9	Directional coupler	Giga-tronics(SN:1829112)	2015-9-24	1year	
10	Probe	Satimo (SN:SN 37/08 EP80)	2015-8-17	1year	
11	Dielectric Probe Kit	Agilent (85033E)	2015-9-24	1year	
12	Phantom	Satimo (SN:SN_36_08_SAM62)	2015-9-24	1year	
13	Liquid	Satimo(Last Calibration: 2015-10-16 to 2015-10-17)		N/A	
14	Dipole 750MHz	Satimo (SN 30/13 DIP0G750-259)	2014-9-22	3year	
15	Dipole 835MHz	Satimo (SN 20/08 DIPC 99)	2014-9-22	3year	
16	Dipole 1750MHz	Satimo (SN 30/13 DIP1G750-260)	2014-9-22	3year	
17	Dipole 1900MHz	Satimo (SN 30/13 DIP1G900-261)	2014-9-22	3year	
18	Dipole 2450MHz	Satimo (SN 30/13 DIP2G450-263)	2014-9-22	3year	
19	Dipole 2600MHz	Satimo (SN 30/13 DIP2G600-265)	2014-9-22	3year	

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