

# **FCC SAR TEST REPORT**

**APPLICANT** 

**ZTE Corporation** 

PRODUCT NAME

LTE Digital Mobile Handset

MODEL NAME

ZTE Blade A511, Blade A511

TRADE NAME

ZTE

BRAND NAME

ZTE

FCC ID

**SRQ-A511** 

STANDARD(S)

47CFR 2.1093

IEEE 1528-2013

**ISSUE DATE** 

2016-03-29

SHENZHEN MORI

ONS TECHNOLOGY Co., Ltd.

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		Change History	
Issue	Date	Reason for change	12
1.0	2016-03-29	First edition	CREE
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# **TEST REPORT DECLARATION**

Applicant	ZTE Corporation				
Applicant Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshar District, Shenzhen, Guangdong, P.R. China				
Manufacturer	ZTE Corporation				
Manufacturer Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R. China				
Product Name	LTE Digital Mobile Handset				
Model Name	ZTE Blade A511, Blade A511				
Brand Name	ZTE	ZTE			
HW Version	V1AMB_A				
SW Version	A476_TELCEL_I	MxCommon_1.00			
Test Standards	47CFR 2.1093; IEEE 1528-2013				
Test Date	2016-03-16 to 2015-03-18				
	Head	0.265W/kg			
The Highest Reported	Body-worn	0.841W/kg	Limit(\\//ka): 1 6\\//ka		
1g-SAR(W/kg)	Hotspot	0.841W/kg	Limit(W/kg): 1.6W/kg		
	Simultaneous	0.946W/kg	100		

Tested by	 Chen Shengkui	
1	Chen Shengkui	

Reviewed by

Approved by



# 1. SUMMARY OF MAXIMUM SAR VALUE

M. C. ST.	10 M	The Ole Min
Mode/Band	Test Position	SAR-1g(W/kg)
	Head	0.092
GSM850	Body-worn (10mm Gap)	0.566
TLAE OFLAN MO	Hotspot Mode (10mm Gap)	0.566
MORE IN LAR	Head	0.014
GSM1900	Body-worn (10mm Gap)	0.167
E ME SLAB ORLAS	Hotspot Mode (10mm Gap)	0.167
The Moke & Me	Head	0.077
WCDMA V	Body-worn (10mm Gap)	0.304
	Hotspot Mode (10mm Gap)	0.304
ORLA MORE	Head	0.030
WCDMA II	Body-worn (10mm Gap)	0.253
	Hotspot Mode (10mm Gap)	0.253
AB GLAL MO	Head	0.052
LTE Band 2	Body-worn (10mm Gap)	0.332
	Hotspot Mode (10mm Gap)	0.332
Me AB RIAN	Head	0.265
LTE Band 4	Body-worn (10mm Gap)	0.841
	Hotspot Mode (10mm Gap)	0.841
"OEL NO. OE	Head	0.063
LTE Band 7	Body-worn (10mm Gap)	0.231
	Hotspot Mode (10mm Gap)	0.231
Up. Work	Head	0.182
LTE Band 17	Body-worn (10mm Gap)	0.582
	Hotspot Mode (10mm Gap)	0.582
ALAB ORL	Head	0.180
WLAN 2.4GHz	Body-worn (10mm Gap)	0.105
	Hotspot Mode (10mm Gap)	0.105
AB TLAB	Head	N/A
Bluetooth	Body-worn (10mm Gap)	N/A
	Hotspot Mode (10mm Gap)	N/A

#### Note:

- 1.The SAR limit(1.6W/kg) for general population/uncontrolled exposure is specified in FCC 47 CFR part2(2.1093) and ANSI/IEEE C95.1-1991.
- 2. Since the Bluetooth maximum power is less than  $P_{Ref}$  and maximum SAR for others transmitter is less than 1.2W/kg, SAR testing for Bluetooth is not required.





# 2.TECHNICAL INFORMATION

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

# 2.1 Identification of Applicant

Company Name:	ZTE Corpora	ation	LAB	.0	RLA	MOL	I THE
Address:	ZTE Plaza,	Keji	Road	South,	Hi-Tech,	Industrial	Park,Nanshan
B ORLA MORE	District,Sher	zhen,	Guang	dong,P.F	R.China		AB GRLA

# 2.2 Identification of Manufacturer

Company Name:	ZTE Corpo	ration	6	40.	al AB	ORL	MO. TE W.
Address:	ZTE Plaza	a, Keji	Road	South,	Hi-Tech,	Industrial	Park,Nanshan
E N. SLAE JORLA	District,She	enzhen	,Guang	dong,P.F	R.China		

# 2.3 Equipment Under Test (EUT)

Model Name:	ZTE Blade A511, Blade A511			
Trade Name:	ZTE NO ALP			
Brand Name:	ZTE OF THE STATE O			
Hardware Version:	V1AMB_A			
Software Version:	A476_TELCEL_MxCommon_1.00			
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 4: 1710-1755MHz; LTE Band 7: 2500-2570MHz; LTE Band 17:704-716MHz; 802.11 b/g/n20: 2412-2462 MHz; Bluetooth2.1+EDR; Bluetooth4.0: 2402-2480 MHz;			
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; Bluetooth: GFSK/π/4-DQPSK/8-DPSK; Bluetooth4.0: GFSK			
Multislot Class:	GPRS: Class 33; EDGE: Class 33;			
GPRS Class:	Class B			
Antenna type:	Fixed Internal Antenna			
Hotspot function:	Support			
SIM cards description	SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.			



## 2.3.1 Photographs of the EUT

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

#### 2.3.2 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#	V1AMB_A	A476_TELCEL_MxCommon_1.00

## 2.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title			
109	47 CFR§2.1093	Radiofrequency Radiation Exposure Evaluation: Portable			
	LAE TORLE MOTO	Devices			
2	IEEE 1528-2013	IEEE Recommended Practice for Determining the Peak			
	HORLE MORE AR IN	Spatial-Average Specific Absorption Rate (SAR) in the Human			
	IN TLAE OPLIA	Head from Wireless Communications Devices:			
ORLA	Moter of Mr.	Measurement Techniques			
3	KDB 447498 D01v05r02	General RF Exposure Guidance			
4	KDB 248227 D01v02	SAR Measurement Procedures for 802.11 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	KDB 941225 D06v01r01	Hotspot Mode SAR			
10	KDB 941225 D05v02r05	SAR for LTE Devices			
11 _	KDB 865664 D01v01r03	SAR Measurement 100 MHz to 6 GHz			
12	KDB 865664 D02v01r01	SAR Reporting			
13	KDB 648474 D04v01r02	Handset SAR			



# 2.5 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.





# 3. SPECIFIC ABSORPTION RATE (SAR)

#### 3.1 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.

#### 3.2 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. ( $\rho$ ). 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,  $\delta T$  is the temperature rise and  $\delta t$  the exposure duration, or related to the electrical field in the tissue by

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

Where  $\sigma$  is the conductivity of the tissue,  $\rho$  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.



# 4. SAR MEASUREMENT SETUP

#### 4.1 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.

#### 4.2 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

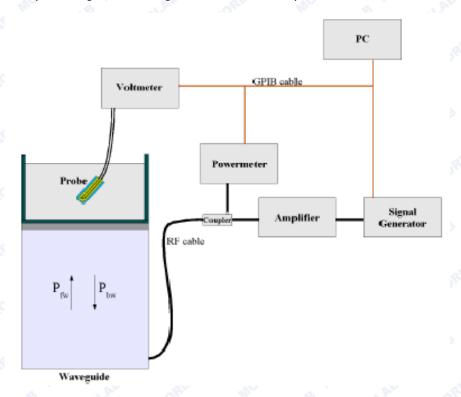
 Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)

Probe linearity: <0.25 dB</li>
Axial Isotropy: <0.25 dB</li>
Spherical Isotropy: <0.25 dB</li>

- 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:

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

(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.

#### 4.3 Probe Calibration Process

#### 4.3.1 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.

#### 4.3.2 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/cm<sup>2</sup>.

#### 4.3.3 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),

 $\delta T$  = 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

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

 $\sigma$  = simulated tissue conductivity,

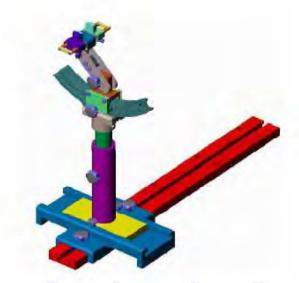
ρ = Tissue density (1.25 g/cm³ for brain tissue)

#### 4.4 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.

#### 4.5 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			





## 5. 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	835		1750 1900			2450	2600
Tissue Type	Body	Head	Body	Body	Head	Body	Body	Body
Ingredients (% by we	ight )	LAB	OPLA	MOR	S W	LAB	ORLA	W <sub>C</sub>
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	a.B
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** 

RLA M	e: 22.0~23.8°( Freq.(MHz	C, humidity: 54~60%.	MORLAD	~ MORL	AE MO.	GLAG IV
Date	OR!)AL	Liquid Parameters	Meas.	Target	Delta(%)	Limit±(%)
0010/00/10	Llood 7E0	Relative Permittivity(cr):	41.2	41.96	-1.81	5
2016/03/16	Head 750	Conductivity(σ):	0.91	0.89	2.25	<u> 5</u>
2016/03/16	Pody 750	Relative Permittivity(cr):	54.48	55.55	-1.93	5
2016/03/16	Body 750	Conductivity(σ):	0.93	0.96	-3.12	5
2016/02/16	Head 835	Relative Permittivity(cr):	41.36	41.5	-0.34	5
2016/03/16	nead 635	Conductivity(σ):	0.91	0.90	1.11	5
2016/03/16	Pody 925	Relative Permittivity(cr):	55.69	56.10	-0.73	5
2010/03/10	Body 835	Conductivity( $\sigma$ ):	0.97	0.95	2.11	5
2016/03/17	Head 1750	Relative Permittivity(cr):	40.20	40.08	0.30	5
2016/03/17	пеац 1750	Conductivity(σ):	1.31	1.37	-4.38	5
2016/02/17	Body 1750	Relative Permittivity(cr):	53.56	53.40	-0.30	5
2016/03/17	Body 1750	Conductivity(σ):	1.47	1.49	-1.34	5
2016/03/17	Head 1900	Relative Permittivity(cr):	39.98	39.90	0.20	5
2016/03/17	пеац 1900	Conductivity(σ):	1.41	1.42	-0.70	5
2016/03/17	Body 1900	Relative Permittivity(cr):	53.10	53.3	-0.38	5
2016/03/17	Бойу 1900	Conductivity(σ):	1.53	1.52	0.66	5
2016/03/18	Head 2450	Relative Permittivity(cr):	39.11	39.20	-0.23	5
2010/03/10	Head 2450	Conductivity(σ):	1.79	1.80	-0.56	5
2016/03/18	Pody 2450	Relative Permittivity(cr):	52.52	52.70	-0.34	5
2010/03/10	Body 2450	Conductivity(σ):	1.94	1.95	-0.51	5
2016/03/18	Head 2600	Relative Permittivity(cr):	38.53	39.01	-1.23	5
2010/03/18	⊓eau 2000	Conductivity(σ):	1.92	1.96	-2.04	5
2016/03/18	Body 2600	Relative Permittivity(er):	52.45	52.50	-0.10	5
2010/03/18	Douy 2000	Conductivity(σ):	2.10	2.16	-2.78	5



# 6. UNCERTAINTY ASSESSMENT

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

# **6.1 UNCERTAINTY EVALUATION FOR EUT SAR TEST**

AL 101		. 60	1				- 0	الداور	
a mortage in mortage	b more	C	d	e= f(d,k)	f MORLAS	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
S ORLE MORE	S III	CAB		QL.A.	410 le.	- Pull	ALOE .	%)	QL.P
Measurement System	L.Bar	TOIL.	10	LAB	40	QLA.	40 Per	10	
Probe calibration	E.2.1	4.76	N	1 <sub>m</sub> oR	1 11	1 1	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	8
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	4	1,6	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1 10	1	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	18	1.0RLA	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1 110	1 08	1	0.02	0.0	∞
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	10111	1 , 1100	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1	21	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	10	1 RLAS	1.73	1.7	∞
Probe positioner  Mechanical Tolerance	E.6.2	2.0	Rall	$\sqrt{3}$	1 alas	Î <sup>no</sup>	1.15	1.1 5	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	M <sup>o</sup>	1 <sub>R</sub> LAB	0.03	0.0	8
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	AB ME	1 MORLAR	2.89	2.8 9	8
Test sample Related	.A.	VO Gr	Me	, AB		RI.A.	MORL	III.	
Test sample positioning	E.4.2.	0.03	N	1 <sub>MORE</sub>	AE ME	1 AP	0.03	0.0	N- 1
Device Holder Uncertainty	E.4.1.	5.00	N	1 110	1 🙎	1	5.00	5.0	N-
	407		-	. 40	A 10 A		*		



	2			100	~~		70,		
2LAE CRL	1	VB W.	all a	300	L	More	" B W.	0	ী
Output power Power drift -	6.6.2	4.04	R	$\sqrt{3}$	1 , 1	1	2.33	2.3	∞
SAR drift measurement	" B W	ALAB		RLA	Mole	B W	LAB	3	ORL
Phantom and Tissue Para	meters	MOL	· @	LAB	.(	RLA	MOL	0 1	
Phantom Uncertainty	E.3.1	0.05	R	$\sqrt{3}$	100	1	.08	0.0	∞
(Shape and thickness	Moles	BALL		8	LA	MOE	0.03	3	8
tolerances)	ORI	Jan.	MOKE	S MIC	, A		RLAN	J. F.	
Liquid conductivity -	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.1	8
deviation from target value	AL	ORL	2 111	AB	,	QLAP.	MORL	3	3
Liquid conductivity -	E.3.3	5.00	N	1,10P	0.64	0.43	3.20	2.1	М
measurement uncertainty	MORL	Mo	0	3	LAB	MORL	MO.	5	3
Liquid permittivity -	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.0	8
deviation from target value	MO.	QB		QLAB	MORL	Mc	, all	4	all
Liquid permittivity -	E.3.3	10.0	N 🐠	1 🔞	0.6	0.49	6.00	4.9	М
measurement uncertainty	.0	0	LAB	NORLIN	PILC	3		0	
Combined Standard	ORL	Mo	RSS	6	LAB	JORL	11.55	10.	3
Uncertainty	a1	AB	ORLA	MO		100	LAB	67	
Expanded Uncertainty	Mo.	.0	K=2	alaB	ORL	41/C	23.11	21.	~ D
(95% Confidence interval)	AB	ORLA	177	200	by.	LAB	ORLAN	33 🦠	Ole

#### 6.2 UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

a No.	b of	С	d	e=	f RLA	g	h=	4 <u>1</u> 2	k
	AB .	PLAD	110	f(d,k)	WO.	OB.	c*f/e	c*g/	ORL
AB BLAD OF	4	NO.	28	al Alb	۸۵	R.L.	Mo.	е	
<b>Uncertainty Component</b>	Sec.	Tol	Prob	Div.	Ci	Ci	1g Ui	10g	Vi
	Nor	(+-	· ala	, of	(1g)	(10g)	(+-%)	Ui	3
	ORI	%)	Dist.	- B /n	- LAF	.0	R.L. Davis	(+-	
ORLA" MOR	S W	LAB	.6	RLA	Moles	. a M	LAB	%)	RLP
Measurement System	Like	NOFEE	9 111	LAB	.0	RLA	MORE	2 11	
Probe calibration	E.2.1	4.76	N	1,10	10 1110	1 JUNE	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	148	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1 1100	1 .	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	10RL	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1 8	1 AR	1	0.02	0.0	∞



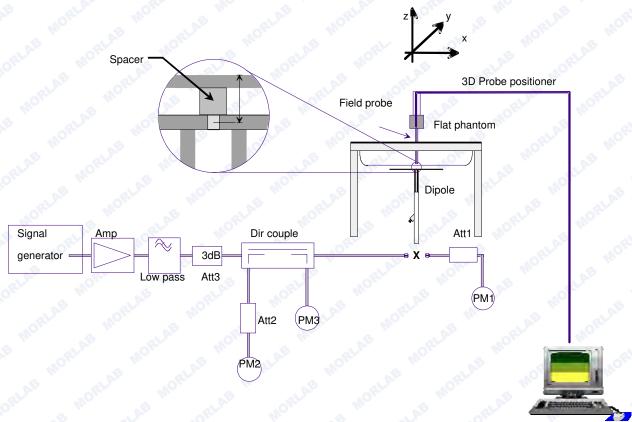
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1,110	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1 21.0	1	1.15	1.1	8
RF ambient Conditions	E.6.1	3.0	R 🕠	$\sqrt{3}$	1	108	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1 H	1 ORLA	1.15	1.1	∞
Probe positioning with respect to Phantom Shell	E.6.3	0.05	RILL	$\sqrt{3}$	1	1,1110	0.03	0.0	8
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	LAS M	RLAE IN	2.89	2.8	80
Dipole									
Dipole axis to liquid Distance	8,E.4. 2	1.00	N	$\sqrt{3}$	1010	1 M	0.58	0.5 8	8
Input power and SAR drift measurement	8,6.6. 2	4.04	R	$\sqrt{3}$	AB M	1 NORLAS	2.33	2.3	∞
Phantom and Tissue Para	meters	LARE	MORE	We	6	3	RLAR	MORE	
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	WORK WE	1 III	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 4	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	N	$\sqrt{3}$	0.6	0.49	3.46	2.8	М
Combined Standard Uncertainty	AB . G	ORLA	RSS	ORLAB	in.	RLAE .	8.83	8.3	Ore
Expanded Uncertainty (95% Confidence interval)	OPLA	AE MO	K=2	, m	LAB	MORLA	17.66	16. 73	3



## 7. SAR MEASUREMENT EVALUATION

#### 7.1 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.

#### 7.2 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(H)	750MHz(b)	835MHz(H)	835MHz(B)	1750MHz(H)	1750MHz(B)
Target value 1W (1g)	8.52W/Kg	8.83W/Kg	9.68W/Kg	10.04 W/Kg	38.24W/Kg	40.14 W/Kg
Test value 1g (100 mW input power)	0.837 W/Kg (03.16)	0.836 W/Kg (03.16)	0.950W/Kg (03.16)	0.986 W/Kg (03.16)	3.810 W/Kg (03.17)	3.924 W/Kg (03.17)
Normalized to 1W value(1g)	8.36 W/Kg	8.36 W/Kg	9.50 W/Kg	9.86 W/Kg	38.10 W/Kg	39.24 W/Kg

Frequenc y	1900MHz(H)	1900MHz(B)	2450MHz(H)	2450MHz(B)	2600MHz(H)	2600MHz(B)
Target value 1W (1g)	39.36 W/Kg	42.36W/Kg	54.74 W/Kg	56.13 W/Kg	55.29W/Kg	57.73 W/Kg
Test value 1g (100 mW input power)	4.012 W/Kg (03.17)	4.336 W/Kg (03.17)	5.249 W/Kg (03.18)	5.439 W/Kg (03.18)	5.452 W/Kg (03.18)	5.460 W/Kg (03.18)
Normalize d to 1W value(1g)	40.12 W/Kg	43.36 W/Kg	52.49 W/Kg	54.39 W/Kg	54.52 W/Kg	54.60 W/Kg

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





# 8. OPERATIONAL CONDITIONS DURING TEST

#### 8.1 Information on the testing

The mobile phone antenna and battery are those specified by the manufacturer. The battery is fully charged before each measurement. The output power and frequency are controlled using a base station simulator. The mobile phone is set to transmit at its highest output peak power level.

The mobile phone is test in the "cheek" and "tilted" positions on the left and right sides of the phantom. The mobile phone is placed with the vertical centre line of the body of the mobile phone and the horizontal line crossing the centre of the earpiece in a plane parallel to the sagittal plane of the phantom.





**Illustration for Tilted Position** 

Description of the "cheek" position:

The mobile phone is well placed in the reference plane and the earpiece is in contact with the ear. Then the mobile phone is moved until any point on the front side get in contact with the cheek of the phantom or until contact with the ear is lost.

Description of the "tilted" position:





The mobile phone is well placed in the "cheek" position as described above. Then the mobile phone is moved outward away from the month by an angle of 15 degrees or until contact with the ear lost.

Remark: Please refer to Appendix B for the test setup photos.

#### 8.2 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** 

#### 8.3 Measurement procedure

The Following steps are used for each test position

- 1. 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.
- 2. 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.

# 8.4 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.



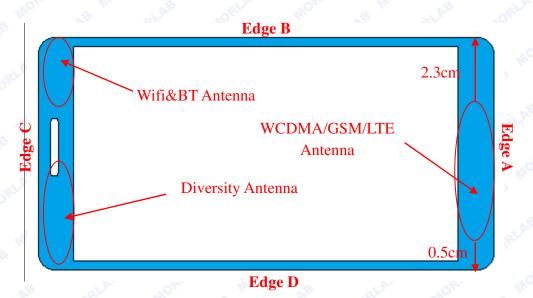


## 9. HOTSPOT MODE EVALUATION PROCEDURE

The SAR evaluation procedures for Portable Devices with Wireless Router function is according to KDB 941225 D06 Hot Spot SAR v02r01.

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	Но	tspot sid	le for SAR					
				Test distance: 10mm				
Antennas	Back	Front	Edge A	Edge B	Edge C	Edge D		
LTE/WCDMA/GSM	Yes	Yes	Yes	Yes	No No	Yes		
WLAN&BT	Yes	Yes	No No	Yes	Yes	No		



# 10. Information Related to LTE Test parameter(Per 941225 D05v02r04)

	Dana i i	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz			
CLAS MORLA MORE	Rand17	LAB	ORLA	Channel	Bandwidt	h LAB	ORLAN			
MORE INC.	High	2560	2562.5	2565	2567.5	/	ORV /			
INC. LAB TRIAL	NORS.	21350/	21375/	21400/	21425/	9 1	A.B.			
ORIAD MORL A MO.	Middle	2535	2535	2535	2535	/				
RL MO AB AR	Record	21100/	21100/	21100/	21100/	"IORY	" Mo.			
LAB PORLAB MORL	Low	2510	2507.2	2505	2502.5		/ AE			
MORE AND AR	RLI	20850/	20825/	20800/	20775/	L.R.C.	OR.			
MIC AE TRIAB	Band7	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz			
ORLAR MORR A MC	D = 12	GRLAD	MOR	Channel	Bandwidt	h	AL			
RE ME AB	nigh	1745	1747.5	1750	1752.5	1753.5	1754.2			
AB ORLAN MORL	Lliab	20300/	20325/	20350/	20375/	20384/	20392/			
MORE AND	Midale	1732.5	1732.5	1732.5	1732.5	1732.5	1732.5			
MIC AB TRIAB	NAI al all a	20175/	20175/	20175/	20175/	20175/	20175/			
ORLAND MORL MO.	Low	1720	1717.5	1715	1712.5	1711.5	1710.7			
pand	AS ALL	20050/	20025/	20000/	19975/	19965/	19957/			
		20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz			
Identify the high, middle and low (L, M, H) channel numbers and frequencies	all	200	17.17.10	W. C.			ORG			
	High	10		O.F.	0.1	"4O.	1754.2			
	AB N	. 67		- A		V	20392/			
PEL MON AB IN	Middle	8,	2110		D. D.	-0.1	1732.5			
OF THE STAFF TOPILA	440						20175/			
MORLE MOR	Low					Dir	19957/ 1710.7			
MOR. OF WALAR	1081'A.						1.4MHz			
TLAB ORLAS MOR	Band2	T. CAP	ام		T da	1	S			
GIA MORE ME	Tx:704-7	16MHz R	c:734-746	- Os	, DE	ORLA"	HORE			
IB INC SLAB . ORLAR	Band 17	MC MC	LAB	ORLA						
by the device	Tx:2500-2570 MHz Rx:2620-2690 MHz									
transmission FCC band used	Band 7									
frequency range of each LTE	Tx:1710-1755 MHz Rx:2110-2155 MHz									
Identify the operating	Band 4									
T INC AE TRIAL	Tx:1850-	1910 MHz	: Rx:1930-	1990 MHz						
The same and the s	frequency range of each LTE transmission FCC band used by the device  Identify the high, middle and low (L, M, H) channel	Identify the operating frequency range of each LTE transmission FCC band used by the device  Identify the high, middle and low (L, M, H) channel numbers and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high, middle and frequencies tested in each LTE frequency band  Identify the high middle and frequencies tested in each LTE frequency band	Identify the operating frequency range of each LTE transmission FCC band used by the device	Tx:1850-1910 MHz Rx:1930-18	Tx:1850-1910 MHz Rx:1930-1990 MHz   Band 4   Tx:1710-1755 MHz Rx:2110-2155 MHz   Band 4   Tx:1710-1755 MHz Rx:2110-2155 MHz   Band 7   Tx:2500-2570 MHz Rx:2620-2690 MHz   Band 17   Tx:704-716MHz Rx:734-746 MHz   Band 17   Tx:704-716MHz Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2620-2690 MHz   Band 17   Tx:704-716MHz   Rx:2600-2690 MHz   Band 17   Tx:704-716MHz   Rx:2600-2690 MHz   Band 17   Tx:704-716MHz	Tx:1850-1910 MHz Rx:1930-1990 MHz   Band 4   Tx:1710-1755 MHz Rx:2110-2155 MHz   Band 7   Tx:2500-2570 MHz Rx:2620-2690 MHz   Band 17   Tx:704-716MHz Rx:734-746 MHz   Band 17   Tx:705   Tx:7	Tx:1850-1910 MHz Rx:1930-1990 MHz			



8	TELAS MORL MO	Low	/SLAE	1.00	237		23775/	<i>in</i> .		<i>)</i>
	MC AB THE STANK	ORE	We.	.0	709	0.0	706.5	,	Mo.	٥
	HORL AS HO. SRIAE	Middle	1 110	1	2379 710	0	21100/ 710.0	LAB	/	
	RLAD OF MORL TLAD MIL.	High	1	1101	238	00/	23825/ 713.5	MOR	/	3 MORL
	Constitutes LIE and some and	The UE Cod	-071-	4					0	DOK
ماء	Specify the UE category and uplink modulations used	The UE Cat 16QAM.	egory is	4 and tr	ne upiin	k modi	ulations	usea	are Qi	PSK an
RELA	Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.	The module Tx/Rx anter		rimary a	antenna	ı for all	LTE&U	JMTS	bands	, a Wi-F
	A	Ms.	Δ.							
HI HI	Identify the LTE Band Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.	Mobile Hots report.	spot Mo	de will	be test	ed acc	cording	to Se	ection s	9 of thi
in Richard	Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna		P TS 36	.101 v11	.0.0 (20	012-03	LE HO	RL MORI	AB MC	RLAE N
m <sup>r</sup>	Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.  Identify if Maximum Power Reduction (MPR) is optional	As per 3GP Table 6.2.3	P TS 36 1: Maxi	.101 v11 <b>mum P</b>	.0.0 (20 ower R	012-03 <b>educt</b> i	) ion (MP	PR) fo	AB MC	er Clas
nn nn	Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.  Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design:	As per 3GP Table 6.2.3	P TS 36 1: Maxi Char band 1.4	101 v11 mum P	.0.0 (20 ower R bandwi N <sub>RB</sub> )	012-03 educti dth	) ion (MP / Tra	PR) for	r Powersission	er Clas
nn nn	Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.  Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR	As per 3GP Table 6.2.3	P TS 36 1: Maxi Char band	.101 v11 mum P	.0.0 (20 ower R bandwi N <sub>RB</sub> )	012-03 educti dth	) ion (MP / Tra 15	PR) for	r Powe	er Clas
HI RELATION OF THE SELECTION OF THE SELE	Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.  Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum	As per 3GP Table 6.2.3 3	P TS 36 1: Maxi Char band 1.4 MHz	101 v11 mum P nnel width (	.0.0 (20 ower R bandwi N <sub>RB</sub> ) 5 MHz	012-03 educti dth 10 MHz	) ion (MP / Tra	PR) fo	r Powersission 20 MHz	er Clas MPR (dB)



	and only for the applicable RB (resource block) configurations specified in	A-N	/IPR	is supported	l by desigr	n, but disable fo	or SAR to	esting.
	LTE standards							
	b) A-MPR (additional MPR)	AB						
3 (11)	must be disabled.		٥	M. AE	a <sup>R1</sup>	MORE	All Marie	AB
	Include the maximum	OP						
	average conducted output	di.						
	power measured on the	,						
	required test channels for	AB						
	each channel bandwidth and							
	UL modulation used in each	OR!						
70	frequency band:	Thi	s is	included in th	ne section	11 of this repor	t. N	
	a) with 1 RB allocated at the	4						
	low, centred, high end of a channel	AB						
	b) using 50% RB allocation							
	low, centered, high end within	,0 <sup>R1</sup>						
	a channel	MIL						
	c) using 100% RB allocation	•						
	5) J.			- AV	-10 <sub>10</sub>	all a		
	Include the maximum	The same						
P.II.	Include the maximum average conducted output	, land						
	S W OF	Thi	s is	included in th	ne section	13 of this repo	rt.AB	
3	average conducted output	Thi	s is	included in th	ne section	13 of this repo	rt. AB MC	
	average conducted output power measured for the other	Thi	s is	included in th	ne section	13 of this repo	ri.he mo	NORLAS MORLAS
B RLA	average conducted output power measured for the other wireless mode and frequency bands	Thi	s is	included in th	ne section	13 of this repo	rt. AB MC	JELE MORLAS
RLA	average conducted output power measured for the other wireless mode and frequency	Thi	s is	included in th	ne section	13 of this repo	TLAE MC	JELLE MOELLE
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous	Thi	s is	MORLE MOR	MOPLAE N	13 of this repo	MORLAF	JELLE MORLAE MO
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for	Thi	s is	MORLE MOR	MOPLAE N	AGE HORLAS	MORLAF	Sum of
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device	This	s is	Simultaneo	MOPLAE N	ission condition	MORLAF	Sum of WWAN& WLAN
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by	Thi	NE NOR!	Simultaneo WWAN	us transm	ission condition	ns	WWAN&
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency	This	#	Simultaneo WWAN LTE Data	us transm	ission condition WLAN 802.11b/g/n	ns	WWAN& WLAN
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body	Thi:	#	Simultaneo WWAN LTE Data	us transm UMTS	ission condition WLAN 802.11b/g/n	ns	WWAN& WLAN ×
RLA	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and	Thi:	# 1 2	Simultaneo WWAN LTE Data	us transm UMTS	ission condition WLAN 802.11b/g/n	ns BT	WWAN& WLAN ×
RLP HI	average conducted output power measured for the other wireless mode and frequency bands  Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating	Thi:	# 1 2 3	Simultaneo WWAN LTE Data	us transm UMTS	ission condition WLAN 802.11b/g/n	BT ×	WWAN& WLAN  ×  ×



applied to certain wireless satisfy SAR modes to compliance for simultaneous transmission conditions, other equipment certification operating requirements, include the maximum average conducted output power measured in each reduction mode power applicable to the simultaneous voice/data configurations transmission wireless such configurations and frequency and also include details of the power reduction implementation and measurement setup





# 11.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

December 1	Observat	Fuer (MI 17)	Madulatia	RB Con	figuration	Average Powe	
Band Width	Channel	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)	
and a	0,	AT ART	W.	1	0	22.07	
3	aLAP 10	MIC	.3	21.45	49	22.09	
The MO	e W	AB	CRILLE ME	1 0	99	22.10	
	2LAB	JORL	QPSK	50	0	21.16	
RLA	MOL	M. AB	ORLL)	50	25	21.13	
MC VE	al Al	ORL	MO.	50	49	21.17	
RLA	WOL.	- Mil	E RIA	100	0	21.14	
MIC	.0	1860	lu-	<b>№</b> 1	alm o	21.23	
AB	18700	lu.	AB	RL. I	49	21.18	
Mc	.0	LAB	ORL	1.0	99	21.24	
AB	RLA	Mole	16-QAM	50	0	20.56	
ORL	MO	LAB		50	25	20.64	
W. VE	RLA	MORE	all all	50	49	20.59	
OPL	Mo	-0 N	ORL	100	<del>49</del>	20.15	
M	, A.C	The Most	4110	100	0 41	22.26	
LAID 40	yr. Mo	-0	aLAB C	11/2	49	22.29	
M	A.B	RLA	Oler W	LAB	99	22.24	
al Alb	ORL	Mo. B	QPSK	50	0	21.22	
MOFE	М	1880	QI OIX	50			
LAF			LE MORLAS		25	21.16	
*WOLETA				50	49	21.23	
20MHz				100	0	21.21	
A. ano	18900	o.B	CLA"	1.0	49	21.53	
. 6	LAB	ORLE	D	o's Par		21.59	
RLA	MORE	ME	16-QAM		99	21.45	
MO.	T.A.F.	ORL	10-QAIVI	50	0	20.68	
QLA.	MORL	ME	B QLA	50	25	20.72	
Mor	G III	AB ORL	MOLO	50	49	20.65	
<b>S</b>	T-0	+110	00	100	0	20.24	
MO	S M	LAB	JELF MC		0	22.17	
0B	RLA	MORI	N. D.	10P	49	21.87	
ORL	MO.	T.A.B	QPSK	A.M.	99	21.66	
M. O.B	QLAL	MORL	GI OIL	50 50	0	21.10 21.05	
ORL	Mor	.0	PRLIN		25		
ME	H	LAL	ME	50	49	20.98	
AB A	Fr. MO	1900	A.P. 6	100	0	21.06	
Mo	19100	QLA!	Oker Mc	1 1	0	21.55	
AB	ORLING	MOL & L	, AB	OK! AL	49	21.33	
ORL	Mr. VE	3LAE	16-QAM	50	99	21.21	
u. UE	RLA	MOL	10-QAIVI	50	0	20.42	
ORL	Mo	10 N	ORL	50	25	20.37	
July 1	AB	The MORE	W.	50	49	20.39	
O. C.				100	0	19.99	



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe	
band widin	Guarinei			RB Size	RB Offset	(dBm)	
Mo	.0	CUL OFF	III.O.	.61	0	22.03	
OB.	2LA 10	MIC	OB.	all 1	37	22.05	
IL. MC	. 6	LAB	ORL	1.6	74	22.06	
OB	al Ar	"OBT	QPSK	36	0	21.17	
ORLA	WO.	II. AE	ORLA	36	18	21.12	
ME	al.Al	MORL	We of	36	35	21.09	
ORL	Mo	4057.5	E ORLE	75	0	21.17	
M	OB C	1857.5	la.	S 1	0	21.19	
AB	18675	9	LAB	RL 1 W	37	21.08	
Mich	o.B	QLA!	ORL	100	74	21.12	
AB	ORLAN	MO. S	16-QAM	36	0	20.85	
MORE	Me AB	QLA.	MORI	36	18	20.76	
T.AE	ORLAN	MOLO	S III.	36	35	20.64	
MORE	Mic	all al	MORI	75	<b>∞</b> 0	20.12	
S In	LAR OF	110	0.	LAE 1	0	22.12	
AL	NIC.	J. 1	QLAL INC	e 41	37	22.08	
S In.	AB	ORLAND BY	OL MILE	100	74	22.10	
2LAL	"OBT	MC VE	QPSK	36	0	21.26	
NOF	W. VE	CRILIN	More	36	18	21.29	
2LAP	М	Mo	B SLAI	36	35	21.24	
1110	IVI	AB LOOK ORL	MOL	75	0	21.30	
15MHz	LAB 10F	1880	.0	21.12 1	0	21.52	
, In the same	18900	, AB	SRLIN MIC	1 4	37	21.42	
20	3LAE	*OBT	- A	al Paris	74	21.47	
ORLA"	MOL	W. VE	16-QAM	36	0	20.88	
MO.	LAB	AORL	MO	36	18	20.81	
RLA	MOLE	W.	BORLA	36	35	20.76	
Mo	3	LAD	Me	75	0	20.29	
AB C	The Mon	4	AB	22. 1 (1)	0	22.19	
Mo	.0	2LAB	ORL MC	168	37	22.12	
AB	RLA	WOL W	AB	OP.	74	22.09	
ORL	MC VE	3LAB	QPSK	36	0	21.15	
In. W.	RLA	More	a Mr. AF	36	18	21.22	
ORI	H	as all	ORL	36	35	21.19	
S bu	AB III	1000 400	N.	75	0 11	21.05	
AL O	W. WO.	1902.5	al Ar	1 1	0	21.11	
N. Phil	19125	ORLA N	Die W	AAB	37	21.08	
2LAE	ORL	Mo.	LAB	"OFF	74	21.05	
NOIL.	M. OB	QLA.	16-QAM	36	0	20.55	
LAB	ORL	Wo.	3 AAR	36	18	20.55	
MORE	M	AB QL	MOR	36	35	20.49	
4	AB OF	" "IO"		75	0	20.58 19.96	



Donal Width	Channal	Frog (MUZ)	Modulation	RB Configuration		Average Powe	
Band Width	Channel	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)	
Me	. 60	LAW ORL	Mo	. 6 1	0	21.99	
AB .	alar ano	MILE	60	21.7 1 .0	24	21.87	
II.		LAB	ORLING	1.0	49	21.91	
OB.	QLA!	MORI	QPSK	25	0	21.10	
ORLA	MOL	W. AB	ORLA	25	12	21.08	
III. OE	QLA	MORL	We of	25	24	21.06	
ORL	WO.	9 10== 1	E ORL	50	0	21.10	
Mo	NB .	1855	49.5	AB 1	0	21.15	
AB O	18650	. 6	AB C	Ran 1 M	24	21.10	
Mich	63	QLA.	OR M	100	49	21.08	
A.A.B	ORL	40,	16-QAM	25	0	20.54	
MORE	We of	QLAP.	MORE	25	12	20.39	
LAP	ORLAN	MOL	e . A	25	24	20.46	
MORI	Me	S al	ORL	50	0	20.06	
. 6	LAG	in Me	. 60	aLAB 1	0	22.18	
.A. ano	in William	o.B	QLAT INC	1.0	24	22.21	
. 6	LAB	ORLA	0, 0	A.A.C	49	22.19	
RI.A.	MORE	We of	QPSK	25	0	21.16	
NO.	M	1880	E HORLAS	25	12	21.20	
RLA				25	24	21.22	
40141				50	0	21.25	
10MHz				21.1 1 1	0	21.59	
MO	18900	LAB	ORL. MC	1.6	24	21.49	
AB.	QL.A.	"OBT	OB.	2	49	21.45	
OPLA	MO. B	LAB	16-QAM	25	0	20.88	
ME OF	QLA!	MORE	ME	25	12	20.76	
ORL	Mor	.6	G ORL	25	24	20.91	
MILE	NB C	LAL	Miles	50	0	20.25	
AB C	in We	. 6	CLAR.	7 1 19	0.	21.88	
Me	OB	RLA	Oke We	108	24	21.81	
LAB	ORL	Mo.	LAB	OPI	49	21.76	
NOW.	W. DE	RLA	QPSK	25	0	20.92	
LAB	ORL	Mo.	B LAS	25	12	20.82	
Mok	Н	AB COL	MOFE	25	24	20.86	
.0	LAP	1005	-0	50	0 411	20.89	
0/10	M	1905	RILL MO	1 .	0	20.76	
.0	19150	ORL	0	ay All	24	20.71	
RLA	Mole	W. VE	RLA	"IOL	49	20.64	
10.	LAB	ORL	16-QAM	25	0.0	20.22	
RLA	MORE	NA.	3 RLA	25	12	20.18	
Mo.	.0	AP ORL	Wo.	25	24	20.16	
0	LA	W.	<b>₹</b>	50	0	19.87	



Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe	
				RB Size	RB Offset	(dBm)	
Me	. 6	LAR	W.	Ø 1	0	22.23	
AB .		MIC	60	QLA 1 an	12	22.18	
IL. MO		AB	ORLING MC	1 0	24	22.16	
S. B		MORL	QPSK	12	0	21.11	
ORLA		W. AB	ORLA	12	6	21.08	
We of	QLA!	MORLE	INC.	12	11	21.04	
ORLA	WO.	1050 5	B ORL	25	0	21.07	
ME		1852.5	lu.	6B 1	0	21.56	
AB	18625	O W.	AB	RL 1 W	12	21.51	
MIC		3LAL	Okr W	100	24	21.49	
AB		WOLC &	16-QAM	12	0	20.22	
NORL		2LAL	"OBY	12	6	20.19	
M. VE		MOL	a m	12	11	20.14	
10RL		19 av	JORL	25	0	20.05	
2 10.	, A.B	The Mon	4	LAR 1	0	22.14	
LAL		4	aLAB .C	1 11	12	22.10	
S bu.		ORLA" N	OL MILE	100	24	22.08	
2LAP		INO VE	QPSK	12	0	21.23	
NOL		ORL M.	More	12	6	21.31	
3LAL	M	Mo	B LA	12	11	21.38	
- 100	IVI	AB ORL	MOL	25	0	21.22	
5MHz	LAB	1880	.0	21.11	0	20.94	
MO	18900	AB	SRLA MIC	1.0	12	20.81	
29		"OBT		21	24	20.90	
RLL		W. VE	16-QAM	12	0	20.51	
MC VE		ORL	MIC	12	6	20.49	
RLIN		la.	Ballin	12	11	20.45	
Mo		LAB	Me	25	0	20.26	
AB	in alo	4	AB	27. 1 (1)	0	21.94	
MC		3LAB	ORL MC	100	12	21.88	
AB		"Op"	AB.	OP.	24	21.81	
ORL		3LAB	QPSK	12	0	20.92	
W. VE		Mole	a Mr.	12	6	21.12	
ORL	H	as al	ORL	12	<b>№</b> 11	21.08	
S Mr.	AB II	1007 4010	W.	25	0 41	20.85	
AT		1907.5	al A	1	0	21.02	
the same	19175	ORLA" N	Die W	A 146	12	21.08	
3LAB		Mo. "B	LAB	-40Fe	24	21.10	
NOF.		a RLA	16-QAM	12	0	20.59	
LAP		Mo.	a LAP	12	6	20.61	
MOR		AB QL	MORE	12	11	20.52	
00		T. MOI		25	0	19.81	



Band Width	Channel	Freq.(MHZ)	Modulation	RB Co	nfiguration	Average Powe	
band widin	Oname			RB Size	RB Offset	(dBm)	
Me	.0	LAL	MO	. 0.1	0	22.17	
AB	all all of	lu lu	A.B	all 1	7 - 1	22.10	
II.C	.0	CLAP.	ORL M	1.0	14	22.08	
AB.	RLA	Moles	QPSK	8	0	21.58	
ORL	Mo.	LAB	ORL	8	4	21.61	
UL O'E	LaRLAN	MORE	III.	8	7.0	21.56	
ORL	W.	1851.5	'p Okr.	15	0	21.32	
NIL.	AB	1651.5	let.	0B 1	0	21.33	
LAB	18615	. 6	aLAE	<sup>R1</sup> 1 1	7.0	21.15	
, Info	AB .	QLA.	Okr. W	100	14	21.18	
A.A.B	ORL	MO. B	16-QAM	8	0	20.85	
MORE	ME	-QLA	MORE	8	4	20.91	
LAF	ORLAN	MO	e TA	8	7	20.75	
MORE	Mo	all al	MORL	15	<b>ॐ</b> 0	20.32	
. 0	LAP	in Mo.	01	AR	0	22.36	
LAT	MIC	60	QLAL .	1 9	7	22.30	
6	AB	ORLA	0, 2	J.A.E.	14	22.32	
QLA!	"OBT	MC OB	QPSK	8	0	21.89	
MON	W. AB	ORLAN	More	8	4	21.92	
QLA!	М	MIC	B OLA	80	7	21.88	
0.41	ĮVI	1000 081	"IOL	15	0	21.48	
3MHz	LAL	1880	<b>1</b> 8	21.10	0 4	21.79	
LIP MO	18900	AB	SRL MI	1.0	7	21.80	
.0	3LAP	"OBT	- A	Q'yeller	14	21.69	
ORL.III	MOL	W. VE	16-QAM	8	0	21.12	
MC VE	LAB	ORL	Me	8 📣	4.0	21.20	
RLA	Mole	lu.	B RLL	8	7	21.15	
Mo	.0	LAB	Mo	<b>3</b> 15	0	20.51	
AB	Er. MO	4	O.B.	1 1	0 -	22.16	
MIC	.0	J.A.B	ORL ME	163	7	22.10	
AB.	RLL	110 p	A.B	- P-1	14	22.15	
ORL	We 'E	LAB	QPSK	8	0	21.59	
M. A.B	RLA	MOLE	William P.	8	4	21.61	
ORL	H	20 N	ORL	8	<i>№</i> 7	21.56	
July 1	AB II	L	III.	15	0 1	21.09	
AP	Fr. Mo.	1908.5	al his	1.	0.5	20.84	
P/I	19185	RLA	Die W	1146	7	20.81	
OLAE .	ORL	Mo. B	LAB	-10 <sup>R</sup> 1	14	20.76	
MOFA.	W. VE	QLA.	16-QAM	8	0		
LAB	ORL	MO	, 5 G/ IIVI	8	4	20.35	
MORE	Wes	AB al	MORI	8	7	20.31	
La.	AB OF	r. Mor		15	0	20.29 20.07	



Band Width	Channel	Freq.(MHZ)	Modulation	RB Co	nfiguration	Average Powe
Dana Widin	Charine	rreq.(IVIHZ)	Modulation	RB Size	RB Offset	(dBm)
MIC	.0	LAL	Mo	-61	0	22.13
AB	all and	L. W.	AB	alin 1	2	22.10
MIC	.0	3LAB	ORL	1.6	5	22.09
AB	QRL.M.	Mole	QPSK	3	0	22.30
ORL	410.	LAB	ORL	3	a 1 J	22.25
W. O.E.	Laglia	"IOF	UNIT DE	3	2	22.24
ORL	Mo.	1850.7	ib ORL	6	0	21.24
M	AB .	1650.7	lu.	<b>№</b> 1	0	21.33
LAE O	18607	.0	LAB	R 1 1	2	21.30
M	O.B	RI.A.	Okr. W	100	5	21.28
LAB	ORL	MO. B	16-QAM	3	0	20.85
MORE	MIC OF	QL.A.	MORE	3	03 1 24	20.76
AF	ORLA	MOL	6	3	2	20.81
NORL	Mo	S 2	ORL	6	<b>ॐ</b> 0	20.15
9 /4.	A.E.	The Most	0.	AP 1	0	22.31
LAL	in Mc		2LAB	1	2	22.28
S Mr.	, AB	ORLA" B	01-	1.00	5	22.26
2LAB	"OBT	MO 'B	QPSK	3	0	22.45
MOL	W. VE	RLA	WO IN COLUMN	3	1 1 ORL	22.41
LAB	М	MO.	B LA	3	2	22.39
Moles	IVI	AB GEL	MOFE	6	0	21.45
1.4MHz	LAB	1880	. 6	21.1.2.1	0 111	21.13
LA NO	18900	8900	QLA.	1.0	2	21.09
.0	ALAE ORLE	D. 8	27/18	5		
R.L.A.	"Obr	ME OF	16-QAM	3	0	21.10
Mo.	LAB	ORL	10 07 1171			20.88
QLA!	NOR	ME	B SLA	3	2	20.91
MO.	0	AB ORL	MOIN	3	5	20.82
0	LA	100		6	0	20.45
-IIO	S Di.	AB	RILL MI	1 1	0	22.13
.0	2LAL	*OBL	29	148	2	22.08
RLIV	MOL	W. VE	QPSK	WOR'S	5	22.10
Mr. E	3LAB	JORL	Ursk	3	0	22.03
RLA	MOJE	lu.	BELA	3	1	21.95
Mo	Н	LAB ORL	WO.	3	2	21.98
AB	LA MO	1909.3	L. Car	6	0	21.03
MO	19193	LAB	OFFE. MIC	1	0	20.82
AB	19193	MORE	aB.	1	2	20.69
ORL	HORLAS MORLAS	AB	, a RL.	,0°1	5	20.72
W. VE		MORIE	16-QAM	3	0	20.42
ORL.		1111	BALLA	3	1	20.39
Mich		LAP ORL	Mo	3	2	20.41
AB .	1.10	600	<b>AB</b>	6	0	20.02



# LTE BAND 4

Band Width	Channel	Freq.(MHZ)	Modulation	RB Configuration		Average Powe
Danu Widin	Chamilei	rieq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	LAP OR	IIIO	.6.1	0	22.67
AB		MILE	O.B	all 1	49	22.61
Mo		LAB	ORL ME	1.6	99	22.59
AB		Mole.	QPSK	50	0	21.72
MORE MO AR	LAB	ORL	50	25	21.69	
W. VE	Lagilar	MOLE	S MILE	50	49	21.68
ORL		1720.0	ORL	100	0	21.66
S. Mr.	AB COSTO	1720.0	M	<b>№</b> 1	0	21.71
LAP	20050		alab ac	R. 1 W	49	21.67
S Mr.		ORLAN B	01- 111	160	99	21.68
3LAE		MO TE	16-QAM	50	0	21.12
MORE TLAP	RLA	MOL	50	25	21.10	
	MIC	e ala	50	49	21.05	
MOL	MOEE ME	all al	MOK	100	<b>∞</b> 0	20.62
.0	3 IIIO ELAE MO	IIIO.	.0	LAB 1	0	22.85
-MO		AB	arla M	1 1/1	49	22.81
ORLAG II MORLAG	ORL		100	99	22.82	
	W. VIE	QPSK	50	0	21.73	
MO.		ORL	MO.	50	25	21.65
RLA	M	M	B RLA	50	49	21.69
20MHz		1732.5	Mo.	100	0	21.70
20101112	LA	1702.5	O.B	al. A. 1	0 411	22.06
NIO.	20175		ORL. MC	1 0	49	22.00
A.B			AB	Q Jan	99	22.03
ORL		LAB	16-QAM	50	0	21.25
M. O.E		MORE	HILL	50	25	21.30
ORL		- B	G CRIL	50	49	21.29
M	of a	AA MORE	MILE	<b>100</b>	0	20.71
Ab O	Mo	.0	aLAB C	21 1 11	0	22.72
HUG		RLA	Oke. We	100	49	22.69
CLAB		Mo. B	LAB	oP 1	99	22.40
NO FEE		QLAL.	QPSK	50	0	21.73
LAB		Mo.	B LAF	50	25	21.68
MORE	Н	AB aL	MORE	50	<b>49</b>	21.66
.0	LAP	1745.0	0	100	(R.L. 0 411	21.67
One	HILL	1740.0	Plum and	1 111	0	22.11
.0	20300	ORL	D	10.00	49	22.07
RLA		W. OB	RI.A.	-40 <sup>16</sup> 1	99	22.04
No.	B ME	ORL	16-QAM	50	0	21.15
RLAD	W.	3 QLA	50	25	21.20	
MOL	MOK. B ME	LAB ORL	MOL	50	49	21.18
20		MIC		100	0	20.65



Band Width	Channel	Frog (MUZ)	Modulation	RB Con	figuration	Average Power
band widin	Channel	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	CUL OFF	III.O.	.0.1	0	22.63
AB	all all of	M	O.B	all 1	37	22.58
T. MC	.0	LAB	ORL. MC	1.6	74	22.60
O.B	QLA.	"Ober 1	QPSK	36	0	21.81
ORL	Mo.	LAB	ORL	36	18	21.74
M OF	-RLA	MORE	INC. OF	36	35	21.72
ORL	WO.	4747.5	E ORLE	75	0	21.76
MILE	OB .	1717.5	lu.	6 <sup>13</sup> 1	0	21.79
AF G	20025	. 6	LAB	RI. I	37	21.72
Miles	o.B	QLA.	Okr III	100	74	21.62
AB	ORLAN	MO. S	16-QAM	36	0	21.22
MORE	W. VE	QLA.	MORI	36	18	21.18
T.A.P	ORLA	MOLO	S In.	36	35	21.16
MORL	MIC	NB al	ORL	75	0	20.74
0	LAR OF	110	0,	A A E	0	22.71
AL	MIC	A	QLAP	E 60	37	22.65
S In	AB	ORLAND BY	OL MILE	100	74	22.69
2LAL	"OBT	MC VE	QPSK	36	0	21.78
NOW	W. VE	CRILIN	More	36	18	21.70
2LAP	М	Mo	B TAI	36	35	21.69
. = 1110	(VI	AB 1700 FORL	MOL	75	0	21.81
15MHz	LAL	1732.5	.0	21.12.1	0	22.10
MO	20175	, AB	SELL MIC	1.0	37	22.02
.0	3LAE	"OBT	- A	A. P.	74	22.09
RLA	MOL	W. VE	16-QAM	36	0	21.56
MO	LAB	ORL	Mo.	36	18	21.52
RLA	MOLE	W.	B RLL	36	35	21.49
Mo	3	LAD ORL	MO	75	0	20.72
AB S	ST. MO.	4	AB	1 1	0	22.86
Mo	20	2LAB	OBJ. MO	100	37	22.72
AB	RLA	MOL N	A.B	OR -	74	22.80
ORL	MO .B	LAB	QPSK	36	0	21.82
W. VE	QRL.R.	Morri	a Mr.	36	18	21.76
JORL	H	18 N	ORL	36	35	21.79
S M	AB T	MORE	du.	75	0	21.79
AT	II. WO.	1747.5	ALA AO	1 1	0	21.74
M	20325	agl.A.	Die. We	ALA	37	21.62
2LAE	ORL	Mo.	CLAP	"OFE	74	21.64
NOK.	B MO. ORLAE	-QLAT	16-QAM	36	0	21.12
LAB		MO	3			
MO	AB OL	MORL	36	18	21.09	
La.	AB OF	MOIN	Mr.	36 75	35 0	21.16 20.73



Band Width	Channel	Freq.(MHZ)	Modulation	RB Con	figuration	Average Pow
Band Width	Chamer		Modulation	RB Size	RB Offset	(dBm)
AL	NIC.	. 6	AL	RL 1 W	0 4	22.61
MIC		QLA	OLY MI	1.0	24	22.55
T.A.B		MO	AB	OP!	49	22.57
NORTH		QLA!	QPSK	25	0	21.67
AF	RLAE HORL	DRILL HOR	a m	25	12	21.61
MORLE			ORL	25	24	21.55
B In			S 10.	50	0	21.67
AL		1715.0	alle ac	L. 1 1/1	0.	21.76
6	20000	ORLAN	Or S In.	100	24	21.62
al.All		MC	2LAL	,0 <sup>16</sup>	49	21.67
VO.		ORLING	16-QAM	25	0	21.12
al Al		Me	B OLA	25	12	21.23
MOL		AB SRL	More	25	24	21.18
.0	LAL NO	INO.		50	0 411	20.60
, MO	0.	AB	SEL. MC	1 &	0	22.70
.0	MORLAL	ORL	ORLAB	27	24	22.64
ORLAN		M. AE		Mo.	49	22.59
AP CLAI	, ORL	QPSK	25	0	21.70	
ORLAN	M	2 10	BORLA	25	12	21.59
MO		LAP JORE	ME	25	24	21.62
401411	The IVI	1732.5	AB	50	0	21.67
10MHz			Ole W	1.0	0	22.04
AB	20175		16-QAM	OP.	24	21.92
ORL				Me 1	49	21.94
A.B		MOLE		25	0	21.26
ORL		3 N		25	<b>№</b> 12	21.32
J. Mr.		LIA MORE		25	24	21.24
AL AO		.0	JLAB 10	50	0	20.66
J. Illi	AB	QRL.	2. 4.	100	0	22.73
2LAB		Mo.	LAB	.0 <sup>12</sup> 1	24	22.58
OF		CRL A	Mole	1 0	49	22.67
2LAP		Mo	QPSK	25	0	21.61
MOLE		AB GRL	MOJE	25	12	21.58
9	LAP H MO	Mo		25	24	21.54
	A WIL	4750.0	RIA MO	50	0	21.62
.0		1750.0	_0	1	0	21.41
ORLAN	20350	M. AE	ORLA.	40.1	24	21.32
10		ORL	MO	1 2	49	21.35
ORLA"	LAL MORLE	No.	16-QAM	25	0	20.95
MO.		LAP ORL	Wo.	25	12	20.92
AB A		M	AB	25	24	20.83
WO.		LAB	Pr. MC	50	0	20.61



Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	figuration	Average Powe
				RB Size	RB Offset	(dBm)
Me	. &	LAN	W.	Ø 1	0	22.92
AB .		MIC	60	QLA 1 an	12	22.85
Tr. MC		AB	ORLING	1.0	24	22.87
NB.		MORL	QPSK	12	0	22.05
ORL		II.	ORLA	12	6	22.09
Mar OE	QLA.	MORLE	We of	12	11	22.15
ORL	410,	4740.5	E ORL	25	0	21.66
Mo		1712.5	lu.	6B 1	0	22.11
LAB	19975	. 6	LAB	5r 1 W	12	22.05
MIC		QLA!	OR M	100	24	22.08
AB		MOL	16-QAM	12	0	21.53
MORL		QLAIL.	ORL	12	6	21.49
T.A.F		MOL	S In.	12	11	21.52
MORI		all al	"OKT	25	0	20.57
D. Mr.	LAR	The Mo	0,	LAE 1	0	22.76
LAL		.0	QLAL IN	1 1/1	12	22.64
G In.		ORLAN	OL S MIL	JAK.	24	22.72
QLAI.		MC CB	QPSK	12	0	22.05
MOL		ORLAN	More	12	6	22.10
2LA!	М	MIC	BILA	12	11	22.09
51 MOV	ĮVI	1700 508	More	25	0	21.68
5MHz		1732.5		21.12.1	0	21.45
MO	20175	, AB	SRIM INC	1.6	12	21.51
4		"OLT	<b>1</b>	21	24	21.43
ORLAN		W. AB	16-QAM	12	0	21.10
MC VE		ORL	MIC	12	6	21.05
RLA		S. W.	Ballin	12	11	21.08
Mo		LAD	Me	25	0	20.67
AB	Tr. IIIO	- W	AB	21 1 11	0	22.78
MC		2LAE	DEL ME	100	12	22.69
AB		MOL A	AB	OP-1	24	22.62
ORL		3LAP	QPSK	12	0	22.25
W. VE		MOL	S W. DE	12	6	22.19
MORI	H	as al	*ORL	12	<b>ॐ</b> 11	22.15
B W.	LAB A	17505	S W	25	0 11	21.71
A		1752.5	all a	1 1	0	21.88
S W	20375	ORLA" N	Dr. du	AB	12	21.80
al At		MIC AB	2LAB	.40F	24	21.75
HOL		QRL. A.	16-QAM	12	0	21.21
3LAB	MORLAR	Mo	B TLAP	12	6	21.19
MOL		AB GRL	Mole	12	AP 11	21.26
. 6		IIIO.	. &	25	0 411	20.63



Band Width	Channel	Freq.(MHZ)	Modulation	RB Co	nfiguration	Average Powe
band widin	Chamilei	rieq.(IVIHZ)	Modulation	RB Size	RB Offset	(dBm)
Mo	.0	LAL	Mo	. 0. 1	0	22.55
AB	alla Mo	lu lu	A.B	all 1	7 - 1	22.49
Mc	.0	CLAP.	ORL M	1.6	14	22.51
AB.	RLA	Moles	QPSK	8	0	22.12
ORL	Mo.	LAB	ORL	8	4	22.08
UL O'E	Lagline	MORE	UNIT OF	8 📣	7.0	22.11
ORL	1110.	1711 5	ib orli	15	0	21.67
NIL.	NB	1711.5	lu.	NB 1	0	21.65
LAB	19965	. 6	aLAE	1 1	7.0	21.60
III.	OB	QLA.	Okr. W	168	14	21.56
LAB	ORL	MO. B	16-QAM	8	0	21.10
MORE	ME	-QLA	MORE	8	4	21.08
LAF	ORLAN	MO	e . A	8	7	21.16
MORE	MILE	all al	MORLE	15	<b>ॐ</b> 0	20.62
. 6	LAB	in Mo.	0)	LAR 1	0	22.65
LAP	MIC	60	QLAL .	1 9	7	22.59
6	AB	ORLA	0, 2	1.00	14	22.91
QLA!	MORL	MC OB	QPSK	8	0	22.02
MOL	W. AB	ORLAN	MOL	8	4	22.06
QLA!	М	MIC	B OLA	8.0	7	21.99
01411	ivi	1700 5051	MOL	15	0	21.70
3MHz	LAL	1732.5	.0	21.1	0	22.00
LIV MO	20175	20175	ORL MIC	1.0	7	21.95
.0	3LAF	"OBT	- A	Q'I-la	14	22.06
ORILIA.	MOL	W. VE	16-QAM	8	0	21.52
MO	LAB	ORL	Me	8 📣	4	21.46
RLL	More	lu.	B RLL	8	7	21.62
MO	.0	LAB	W.	15	0	20.70
AB C	allo	4	AB	21 1	0	22.71
MO	.0	J.A.B	ORI. M	163	7	22.62
AB	RLA	"Oby	OB.	ARIA MARIA	14	22.69
ORL	MO.	ALAID.	QPSK	8	0	22.12
M. O.B.	RLA	MOK	a Mila	8	4	22.09
ORL	H	- N	ORL	8	× 7	22.06
Jun -	AB T	Line anoper	III.	15	0	21.67
AB O	Tr. Mo.	1753.4	al his	1	0.0	21.36
ME	20384	RLAL	Oke. W.	100	7	21.29
LAB	ORL	Mo. B	AB	-10 Pe	14	21.30
MORE	M. A.B.	ala	16-QAM	8		
AB	ORLAN	MOLO	10 QAIVI		0	20.92
MO. MO.	0B 2V	"OBT	<u>8</u> 8	7	20.89	
Mar.	.0	10	U.	15	0	20.85



Band Width C	Channel	Freq.(MHZ)	Modulation	RB Co	nfiguration	Average Powe
band widin	Chamilei	rieq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	LAL	Mo	. 0.1	0	22.59
AB		III.	AB.	all 1	2	22.49
Mc		LAB	ORL M	1.0	5	22.51
O.B		WOLE .	QPSK	3	0	22.68
ORL		LAB	ORL	3	. a 1	22.61
M. O.E	Lalin	MORE	in or	3 📣	2	22.56
ORL		1710.7	'p Obr	6	0	21.67
I William		1710.7	W.	<b>S</b> 1	0	21.71
AB	19957	-0	LAB	2 1	2	21.67
M		CLA	Okr. W	100	5	21.64
LAB		1110,	16-QAM	3	0	21.12
MORE		-QLA	MOR	3	6 1 al	21.08
LAE		MO	e TA	3	2	21.16
MORE	MILE	al al	MORL	6	<b>ॐ</b> 0	20.55
.0	LAP	in Mo.	. 60	LAE 1	0 4	22.64
AL		o.B	QLAY .	1	2	22.59
. 6		ORLE	O	1,000	5	22.61
QL.A.		ME OF	QPSK	3	0	22.67
NO.		ORL	MOL	3	P LOPE	22.56
QLA	М	ME	B QLA	3.0	2	22.60
4.40411	0	4700 5	MOL	6	0	21.73
1.4MHz		1732.5	C. C.	21.10	0 4	21.38
MO.	20175	ORL. MC	1 0	2	21.28	
OB		TLAB JORL	16-QAM	27	5	21.30
ORLAN		W. AE		3	0	20.92
III CE		NORL	Mo	3 📣	2	20.96
ORLAN		S In.	BORLIN	3	5	20.94
Mo		LAL	MIC	<b>ॐ</b> 6	0	20.60
AB O	ir. Mo	0,	AB	21 1	0 -	22.79
ME		QLA.	Der W	130	2	22.71
LAB		MO. S.	AB	OR T	41 <sup>0</sup> 5	22.68
NOR		QLAL.	QPSK	3	0	22.69
AB		MOLO	a A	3	1/10	22.36
MORL	Н	all al	MORL	3	<b>∞</b> 2	22.30
. 6	LAP	1754.0	- Co	6	0 4	21.73
A.O.		1754.2	QLA.		0.0	21.47
La.	20392	ORL	D. 84	a Alb	2	21.40
RI.A.		We "B	QLAL.	10kg	5	21.42
NOT	ALAE MORLAE	QRL. AC	16-QAM	3	0	20.95
3LAE		Me	B ZLA	3	1	20.92
MOLL		AB ARL	MOL	3	2	20.89
A		110	A. V	6	0 40	20.69



# LTE BAND 7

Band Width	Channel	Freq.(MHZ)	Modulation	RB Con	figuration	Average Power	
Jana Wiatii	Oname	1 164.(IVII 12)	Modulation	RB Size	RB Offset	(dBm)	
We	.0	LAL	Me	.0.1	0	21.74	
AB		III.	AB	all 1	49	21.90	
MC		2LAB	ORL MC	1.6	99	21.81	
AB		"OL "	QPSK	50	0	20.88	
ORIL	AP NO LIPLAR	T.AB	ORL	50	25	20.84	
A.F		Larling	A MILES	50	49	20.99	
ORL		2510	ORL	100	0	20.99	
S. Mr.	AB	2310	lu.	S 1	0	21.24	
AL	20850	.0	alab ac	RI 1 M	49	21.42	
S. Mr.		ORLAN B	OL MIL	160	99	21.39	
3LAL		MO. TE	16-QAM	50	0	20.68	
VOL.		RLA	MOL	50	25	20.72	
2LAF	HORLAN HORLAS HORL	Mo	G ZLA	50	49	20.64	
MOL		al al	"10 P	100	0	20.12	
3		MO	20	LAP 1	0	21.92	
110		S TURE	AB	SRLIM MC	L. HI	49	21.74
.0		*ORT		TAR S	99	21.75	
RLA		W. VE	QPSK	50	0	20.95	
TRIAS TORIAS	ORL	MO	50	25	20.92		
	S. Mr.	S ORLA	50	49	20.89		
20MHz	M	2535	Mo	100	0	20.90	
ZOWITIZ	21100	0	16-QAM	21.14 1 .1	0	21.07	
MC				1.6	49	20.93	
AB				ai l	99	20.95	
ORL				50	0	20.62	
, AE		MOLO		50	25	20.59	
NORL		3 al	ORL	50	49	20.49	
S bu	OB S	LA MORE	la.	100	0	20.12	
40		.0	alar ao	1 11	0	21.96	
G Mr.		ORLAN	D. W.	1,8	49	21.50	
alar		Mr CB	2LAP	PT	99	21.18	
0,		ORL. M.	QPSK	50	0	20.75	
QLAF.		Mo	B ZLAF	50	25	20.88	
MOL	D.	AB ORL	WOL	50	49	20.39	
9	LAE H	2560		100	0 1/1	20.60	
WO.	21350	AB	RILE MO	1	0	21.27	
O.B		"OET	29	100	49	20.94	
ORLA	MORLAR MC	W. AB	.aRL	NO TO TO	99	20.63	
NB.		LAP	16-QAM	50	0	20.46	
ORLA		B 100	BARLLA	50	25	20.54	
Me		"Whi	Me	50	49	20.59	
NP (	V- 40	Lin.	S.	100	0	19.86	



Band Width	Channel	Frog (MUZ)	Modulation	RB Con	figuration	Average Powe
band widin	Gnannei	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	LAR ORI	III.O.	.0.1	0	21.18
AB	allo,	PILO.	O.B	all 1	37	21.12
Tr. MC	.0	J.A.P	ORL. MC	1.0	74	21.10
O.B	-QLA	WOLER L	QPSK	36	0	20.48
ORL	Mo.	I AE	ORL	36	18	20.52
NI OF	QLA.	MORE	INC. OF	36	35	20.49
ORL	For	0507.5	E ORL	75	0	20.53
M	20825	2507.5	la.	<b>6</b> ₿ 1	0	20.44
AB	ST' - NO	. 6	LAB	RI. I	37	20.42
HILL	QB.	QLA.	OLS IN	100	74	20.39
LAB	ORL	WO. B	16-QAM	36	0	20.02
NOR.	MC OF	al.A.	MORE	36	18	20.09
T.AP	ORLAN	MO	G TAP	36	35	20.05
MORE	Mo	as as	ORL	75	0	19.78
. 63	LAB	MO	0	AP	0	21.48
AL	in the	<b>S</b>	QLAL INC	in the	37	21.39
9 h.	AB	ORLAN	Dr. S. M.	100	74	21.40
2LAL	MORLE	MC CB	QPSK	36	0	20.56
NOL	W. LAB	ORLAN	More	36	18	20.50
al-Al-	MORI	Mo	B ala	36	35	21.49
45101	M	AE OFFI	MOL	75	0	20.50
15MHz	21100	21100	OFLAE INC	21.12	0	20.88
IIIO	21100			1.0	37	20.80
20	3LAF			21	74	20.79
RLA	MOL	W. VE	16-QAM	36	0	20.11
MC VE	3LAB	ORL	Mo.	36	18	20.09
QRI.I.	Mole	III.	E GRLA	36	35	20.03
Mo	3	LAB	Me	75	0	19.70
AB of	Tr. Mo	4	, AB	1 1	0	21.41
MO	23	2LAD	OBJ. MC	108	37	21.32
AB	RLA	WOL THE	AB	OR!	74	21.40
ORL	MIC VE	ZLAP	QPSK	36	0	20.40
W. AB	RLA	MOL	a Mr. AF	36	18	20.32
JORL	H	as al	ORL	36	35	20.36
S In	AB II	0500 40 10	di.	75	0	20.14
AP O	T. MO.	2562.5	alak 10	1 1	0	20.38
No.	21375	RLA	Die W	ALA	37	20.30
2LAB	MORLAR	Mo.	LAB	"OFF	74	20.35
NOIL.		MORLE MORLES 116	16-QAM	36	0	20.02
LAB				36	18	20.02
MORE			MOR	36	35	20.08
4	AB	The Work		75	0	20.08 19.42



Dand Midth	Chamal	Eroa (MILIZ)	Modulation	RB Cor	figuration	Average Powe
Band Width	Channel	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
W <sub>C</sub>	. 6	LAV OR	Mo	Ø 1	0	21.76
OB.	al.Al	luic Inic	OB .	QLA 1	24	21.70
T. M.C	6	AB	ORLING MIC	1 0	49	21.69
o.B	QLA!	MORL	QPSK	25	0	21.07
ORL	MOL	III.	ORLIN	25	12	21.02
MC OF	ala	MORLE	Mo	25	24	20.98
ORLAN	FOR	0505	E ORLA	50	0	21.00
MILL	20800	2505	lu.	S 1	0	20.88
AB G	ALL TOUR	8 /10.	AB	RL 1 N	24	20.80
MIC	08	alar	OR MI	100	49	20.79
AB	ORL	MOL	16-QAM	25	0	20.52
MORE	INC ORLAR	, al.A.	MORL	25	12	20.49
LAF		MO.	e m	25	24	20.38
	MILE	AB al	MORL	50	<b>∞</b> 0	21.01
.0	LAL	E. M.C.	. 60	LAP	0	21.21
ALC	M	a.B	QLA"	4 W	24	21.12
. 6	LAB	ORL	0, 0	A Alle	49	21.09
RLA	MORE	ME AE	QPSK	25	0	20.47
NO.	LAF	ORLIN	Mo.	25	12	20.38
-RI-A	MORE	M	B RLA	25	24	20.40
10MHz	M	OFOE	Mor	50	0	20.36
TUIVIEZ	21100	1100	Q.B	21.6	0	21.58
" Mo	. 6	LAB	ORL. OB MC	1.0	24	21.48
O.B	RLAN	"UOKE" I		ai l	49	21.39
ORL	Mo.	LAB	16-QAM	25	0	20.56
M. DE	-RLAW	MORE	We of	25	12	20.87
ORL	Mo.	- B	ORL	25	24	20.67
M	OB .	LA MORE	M	<b>5</b> 0	21 Pr 0	20.12
Ab 10	KL. MC	.0	CLAB	21. 1	0	21.43
W	AB.	-RLA	Die. W	1.0	24	21.38
ZLAB	ORL	Mo.	CLAP.	ORT	49	21.39
NOF	ME	RLA	QPSK	25	0	20.77
LAB	ORL	Mo	3 TLAF	25	12	20.69
Mole	H	AB GRL	MOJE	25	24	20.70
AB .	LAP	2565		50	0	20.69
. ello,	04.400	2500	RILL MO	1 1	0	20.33
28	21400	JORL N	20	100	24	20.29
ORL.	MORE	M. AE	PLA	O <sup>FC</sup> 1	49	20.18
Mr. CE		ORLAR MORLA	16-QAM	25	0	20.02
RLA			BLA	25	12	20.09
Mo	.0	LAP ORL	MO	25	24	20.05
NB C	L	le la	<b>S</b>	50	0	19.84



Band Width	Channel	Frog (MUZ)	Modulation	RB Cor	figuration	Average Powe
Danu Wiuth	Griannei	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	LAL	W.	. 6.1	0	22.20
AB		LAB	O.B	all 1	12	22.08
II.			Okr. We	1.0	24	22.12
O.B		ano Per	QPSK	12	0	21.51
ORL		LAB	ORL	12	6	21.49
W. O.E.	LORLA.	Louis	IN OF	12	11	21.42
ORL			. ORL	25	0	20.73
M	20775	2502.5	la.	<b>6</b> € 1	0	21.58
AB O	21110	. 6	LAB	RI I	12	21.50
INIC		QLA.	OR III	100	24	21.46
LAB		MOL	16-QAM	12	0	20.52
MORE	ALAE MORLAE	QLAP.	MORLE	12	6	20.43
I.A.E		MOLO	a la	12	11	20.49
MORL		S al	ORL	25	0	19.85
9		NO.	QLAB	I A I	0	21.97
LAL		<b>S</b>		e 41	12	21.90
M	ORLA"	OL SU	100	24	21.85	
	MC CE	QPSK	12	0	21.25	
	ORLAN	More	12	6	21.31	
	ME	e ala	12	11	21.38	
	AB area ORL	MOL	25	0	20.68	
5MHz	21100	21100	16-QAM	21. P. 1	0	20.84
"INO	21100			1 &	12	20.91
.0				al Paris	24	20.82
Plan		W. VE		12	0	20.26
Mo.		ORL		12	6	20.31
QRL.L		Min		12	11	20.22
W.		LAB ORL		25	alpha o	19.98
A.B	True Mo	4	O.B.	1 1	0 4	21.53
Mo		ALAID .	OBI. MC	168	12	21.42
O.B		"Oby	AB	OP!	24	21.39
ORL		ALAB.	QPSK	12	0	20.52
M. AE		MOK	a management	12	6	20.49
ORL		10 W	ORL	12	0 11	20.42
W	ρβ H	LA MORL	I'M	25	0 11	20.23
AP O		2567.5	CLAR C	1	0	20.94
FULL	21425	RLA	Die Me	AAD	12	20.94
LAB		MO. B	AB	"Ole	24	20.91
MOPE		ala	16-QAM	12		
LAE		E MORLAL MORLA	TO QAIVI	5 A. T	0 6	20.12
MORE			MORL	12		20.20
7000			M	12	11	20.16



Band Width	Channel	Frog (MUZ)	Modulation	RB Con	figuration	Average Powe
Dana Wiath	Griannei	Freq.(MHZ)	Modulation	RB Size	RB Offset	(dBm)
Me	.0	CUL OFF	W.	. 6 1	0	22.83
AB		MILE	O.B	all 1	24	22.93
II.		LAB	ORL. M	1.0	49	22.89
O.B		MORE	QPSK	25	0	21.97
ORL		LAB	ORL	25	12	21.92
We O'S	-RLA	MORE	IN OF	25	24	21.89
ORL	Mo.	700.0	. ORL	50	0	21.93
M		709.0	la.	<b>S</b> 1	0	22.04
LAB	23780	. 6	LAB	RIV 1 W	24	22.05
HILL		QL.A.	OR M	100	49	22.03
LAB		MO. B	16-QAM	25	0	21.59
MORE		QLA.	MORL	25	12	21.52
LAF		MOL	G TA	25	24	21.61
MORL		NB al	MORI	50	<b>0</b>	20.91
6	LAR OF	INO.	0	AP	0	22.85
AL NO		00	QLAL NO	in the	24	22.88
Co lar.		ORLAN	Dr. S. Mr.	100	49	22.83
QLAI.		MC CB	QPSK	25	0	21.88
MOL		ORLAND	More	25	12	21.80
2LA!	M	ME	B SLA	25	24	21.86
401411	(VI	74000 81	MOL	50	0	21.96
10MHz		710.0		21.1	0	22.34
MO	23790	AB	SRI'M MC	1 0	24	22.33
4		"OBT	28	al land	49	22.23
ORLAN		W. VE	16-QAM	25	0	21.25
MC VE		ORL	MO.	25	12	21.31
QRI.II		III.	BORLA	25	24	21.30
Mo		LAB	Me	50	0	20.97
AB C	EL MO	4	AB	1 1	0	22.98
MO		2LAD	ORL MC	100	24	22.92
AB		MOLE IN	AB AB	QR.	49	22.93
ORL		al Ab	QPSK	25	0	21.99
W. VE		MOF	a Mr.	25	12	21.92
NORL	H	as al	ORL	25	24	21.98
S In	AB II	74. 31010	N.	50	0 4	21.96
AT		711.0	alak 10	1 1	0	21.80
D. W.	23800	RLA	Die W	A.D.	24	21.79
2LAB		MO.	LAB	"OFF	49	21.67
MOL		RLA	16-QAM	25	0	21.15
LAB		WO.	3	25 25	12	21.15
MOK		AB QL	MORE	25 25	24	21.16
0		" WO	S	50	0	20.98



Band Width Channel		Freq.(MHZ)	Modulation	RB Cor	figuration	Average Power
	,		RB Size	RB Offset	(dBm)	
Me	.0	LAT OF	III.C.	. 6.1	0	23.12
AB .	all all	W.	O.B	all 1	12	23.08
1110	.0	LAB	ORL. MC	1.0	24	23.02
Q.B	R.L.A.	"WOLE"	QPSK	12	0	22.25
ORL	Mo.	LAB	ORL	12	6	22.31
IN O.F	Lala	MORE	IN OF	12	11	22.28
ORL	Mo.	700 F	S ORL	25	0	21.95
M	QB.	706.5	la.	<b>S</b> 1	0	22.47
LAB	23755	. 6	LAB	RIV 1 W	12	22.40
HILL	A.B	RI.A.	Oken	108	24	22.38
LAB	ORL	MO. S	16-QAM	12	0	21.52
MORI	M.C. O.F	al.Al	MORLE	12	6	21.49
I.AF	ORL	MOLO	S N. A.	12	11	21.42
MORE	M	al al	MORLE	25	<b>0</b>	20.98
. 6	LAN	NIC.	0,	LAB	0	22.92
LAL	Ser West	<b>3</b>	QLAIL INC	e 41	12	22.90
S In	AB	ORLAN	Dr. W.	100	24	22.95
2LAL	MORI	MIC OF	QPSK	12	0	22.15
MOL	In.	ORLAN	More	12	6	22.09
al-Al-	М	Mo	B ala	12	11	22.20
51 M		AB 740 0 0RL	MOL	25	0	21.98
5MHz	ALAL MO	710.0		21.12	0	21.70
LIV MO	23790	AB	SRL MIC	1 0	12	21.58
	al All	"Obr	25	Qi Ja	24	21.60
ORL IN	MOL	W. VE	16-QAM	12	0	21.32
MO. VE	ZLA!	ORL	Mo. T	12	6	21.29
QRL.ha	MOLE	N.	BRILL	12	11	21.30
Mo	.0	LAP ORL	MIC	25	0	21.07
AB of	ST. MO	4	AB	1 1	0	22.94
MIC	29	LAB	ORL MC	168	12	22.86
AB	RLA	MOLE. L	AB	OP.	24	22.82
ORL	MO.	LAB	QPSK	12	0	22.16
W. VE	RLA	MOL	AL AL	12	6	22.09
ORL	H	3 N	ORL	12	<b>ॐ</b> 11	22.18
M	AB II	Elin Moles	W	25	0 4/2	21.89
LAP O	Er. MO	713.5	OLPAN AC	1	0	22.13
M	23825	RLA	Die We	ALA	12	22.09
CLAB	ORL	Mo. B	SLAP.	"OFF	24	22.11
anore.	M. O.B.	, all All	16-QAM	12		21.56
M. JAB ORLA	ORLAN	Mor	3 37 1171		0 6	21.39
MORE	M	all al	MORL	12 12	11	
10.	AB	NO I	lu.	25	0	21.46 20.82



#### 12. MEASUREMENT OF CONDUCTED OUTPUT POWER

# 1. WCDMA mode conducted output power values

	band	WCDMA 850			W	WCDMA 1900		
Item	ARFCN	4132	4175	4233	9262	9400	9538	
	subtest		dBm			dBm		
5.2(WCDMA)	non	23.15	23.33	23.47	22.52	22.86	22.28	
RLAB	1 1	23.46	23.68	23.76	22.96	23.26	22.64	
HCDDA	2	23.45	23.66	23.75	22.95	23.25	22.63	
HSDPA	3	22.96	23.18	23.26	22.46	22.76	22.14	
	4	22.95	23.17	23.25	22.45	22.75	22.13	
MO	.s 1	23.53	23.71	23.79	22.97	23.31	22.77	
	2	21.52	21.70	21.80	20.95	21.29	20.75	
HSUPA	3	22.51	22.69	22.78	21.96	22.31	21.73	
	4	21.50	21.68	21.76	20.93	21.30	20.76	
	5	23.52	23.70	23.78	22.92	23.28	22.73	
HSPA+	. T	23.49	23.70	23.88	22.97	23.32	22.70	
Note:		The Conducted RF Output Power test of WCDMA /HSDPA /HSUPA/HSPA+ was tested by power meter.						

# 2. GSM Mode

Band	Channel	Frequency (MHz)	Output Power(dBm)
CCM	128	824.2	33.07
GSM 850	190	836.6	33.07
850	251	848.8	33.00
DOC	512	1850.2	29.64
PCS	661	1880.0	29.62
1900	810	1909.8	29.91



# 3. GPRS Mode Conducted peak output power

Dond	Channal	Shannal Frequency		Output Power(dBm)		
Band	Channel	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4
CCM	128	824.2	32.20	31.12	30.07	29.05
GSM	190	836.6	32.32	31.24	30.19	29.17
850	251	848.8	32.28	31.20	30.15	29.13
DOO	512	1850.2	28.68	27.60	26.55	25.53
PCS	661	1880.0	28.64	27.56	26.51	25.49
1900	810	1909.8	28.95	27.87	26.82	25.80

# GPRS Time-based Average Power

Band Channel		Frequency	Output Power(dBm)			
Bana	Onamici	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4
CCM	128	824.2	23.17	25.22	25.81	26.04
GSM	190	836.6	23.29	25.18	25.93	26.16
850	251	848.8	23.25	21.58	25.89	26.12
DOC	512	1850.2	19.65	21.54	22.29	22.52
PCS	661	1880.0	19.61	21.85	22.25	22.48
1900	810	1909.8	19.92	19.20	22.56	22.79

### 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

	<u> </u>			40	No.	
Dond	Frequency		Output Power(dBm)			
Band	Channel	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4
CCM	128	824.2	29.10	28.02	26.97	25.95
GSM	190	836.6	29.28	28.20	27.15	26.13
850	251	848.8	29.30	28.22	27.17	26.15
DOC	512	1850.2	28.33	27.25	26.20	25.18
PCS	661	1880.0	28.21	27.13	26.08	25.06
1900	810	1909.8	28.54	27.46	26.41	25.39

# EDGE Time-based Average Power

	3					
Band	Band Channel		Output Power(dBm)			
Bana	Orianiioi	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4
CCM	128	824.2	20.07	22.18	22.71	22.94
GSM	190	836.6	20.25	22.20	22.89	23.12
850	251	848.8	20.27	21.23	22.91	23.14
DOC. NO	512	1850.2	19.30	21.11	21.94	22.17
PCS	661	1880.0	19.18	21.44	21.82	22.05
1900	810	1909.8	19.51	16.16	22.15	22.38

# 4. WiFi Average output power

		Frequency	Output Power(dBm)			
Band	Channel	(MHz)	802.11b	802.11g	802.11n20	
		()	(DSSS)	(OFDM)	(OFDM)	
ORLA	MORE 1	2412	15.41	12.96	13.15	
WiFi	6	2437	15.58	13.23	13.17	
NORE	71	2462	15.54	12.92	12.85	

Band	Channel	Frequenc y (MHz)	Output Power(dBm) 802.11n40
QLAB	3	2422	12.68
Wifi	6	2437	12.51
LAE JOE	9 🗥	2452	12.64



# 5. BT+EDR 2.1 peak output power

Band	Channel	Channel Frequency		Output Power(dBm)		
Danu	Channel	(MHz)	GFSK	π/4-DQPSK	8-DPSK	
in Wo	0	2402	1.42	0.76	0.88	
BT	39	2441	2.27	1.66	1.75	
MO. OB	78	2480	0.52	-0.15	-0.08	

Band	Channel	Frequency	Output Power(dBm)
		(MHz)	GFSK
S W	0 0	2402	-2.32
ВТ	19	2441	-1.49
LAB	39	2480	-3.27



# 13. TEST RESULTS LIST

Summary of Measurement Results (GSM 850MHz Band)

Temperature: 21.	.0~23.8°C,	humidity: 54~60%	6. MORI	IN AE	ORLA!	MORL	e Mc
Phantom Config	Phantom Configurations		Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Right Sig	le	Cheek/Touch	OF M	0.092	ORLAS	0.102	0
Of Head	t	Ear/Tilt	ORLAN	0.041		0.045	110
Left Side	e Rilling	Cheek/Touch	190	0.068	1.104	0.075	B
Of Head	Of Head		190	0.037	1.104	0.041	4
LAB ORL	CCM	Back upward	AB	0.336		0.371	RLA
S MC	GSM	Front upward	ORL MC	0.091		0.100	
Body	Ok.	Back upward	RLA	0.566	, AB	0.611	110
(10mm	ORLAI	Front upward	NIC AF	0.153		0.165	B
Separation)	GPRS	Edge A	190	0.179	1.079	0.193	
AB GRL	110	Edge B	AB	0.099		0.107	RLAN
MO.	OB.	Edge D	ORL MO	0.508		0.548	0

Summary of Measurement Results (GSM 1900MHz Band)

Temperature: 21	.0~23.8°C	, humidity: 54~60	)%.	ALAE ME	P. P.	io.	QLAB
Phantom Config	Phantom Configurations		Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Right Sid	Right Side Of Head		AB ORI	0.008	FLAE MO	0.008	
Of Head			661	0.003		0.003	AB
Left Side		Cheek/Touch		0.014	1.021	0.014	OR
Of Head	RLAD	Ear/Tilt	001	0.009	1.021	0.009	RLP
MORE	0014	Back upward		0.167		0.171	W.
	GSM	Front upward	AB ARI	0.055	Wo.	0.056	- AT
MO.	(6)	Back upward	IIIO	0.161	RIAL M	0.169	QB.
Body	10	Front upward	RLAD	0.057	O.B	0.060	ORL
·	(10mm Separation) GPRS	Edge A	661	0.097	1.047	0.102	all
Separation)		Edge B	MORL	0.014		0.015	W.
	MORL	Edge D	all al	0.005	Mor	0.005	



#### Note:

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

Band	Channel	Slots	Power level	Duty Cycle
GPRS850	190	4	5 10	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)

Phantom	Device Test	Device Test	SAR(W/Kg),	Scaling	Scaled SAR	Plot
Configurations	Positions	channel	1g Peak	Factor	(W/Kg), 1g	No.
Right Side	Cheek/Touch	RLA	0.077	AB	0.078	
Of Head	Ear/Tilt	ME	0.035	MORT	0.036	ORLA
Left Side	Cheek/Touch	MORT	0.056	RLAL	0.056	Me
Of Head	Ear/Tilt	AB ORL	0.033	Mo	0.033	-10
AB	Back upward	4182	0.304	1.007	0.306	AB.
Body	Front upward	RLAL	0.081	N.B	0.082	
(10mm	Edge A	MC AE	0.096	MOET	0.097	RLA
Separation)	Edge B	MORL	0.027	RLAB	0.027	Mo
RLAE MO	Edge D	all al	0.295	Mo.	0.297	(

### Summary of Measurement Results (WCDMA 1900MHz Band)

Temperature: 21.0~2	3.8°C, humidity: 54	~60%.	Mo.	3LAB	ORL	Mor
Phantom	Device Test	Device Test	SAR(W/Kg),	Scaling	Scaled SAR	Plot
Configurations	Positions	channel	1g Peak	Factor	(W/Kg), 1g	No.
Right Side	Cheek/Touch	LAB O	0.030	-B	0.031	RL
Of Head	Ear/Tilt	P. W.	0.013	ORLA	0.013	LAB
Left Side	Cheek/Touch	ORLA	0.030	LAB	0.031	Mor
Of Head	Ear/Tilt	ME	0.004	Mok	0.004	OP
MOL B.	Back upward	9400	0.253	1.033	0.261	G W
Body	Front upward	LAB	0.120	B M	0.124	RLA
(10mm	Edge A	e. B	0.173	ORLAN	0.179	LAB
Separation)	Edge B	ORLA	0.037	LAB	0.038	Mole
TLAE ORL	Edge D	IN SLAB	0.018	MOKE	0.019	ORI

#### 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 v06)
  - ≤ 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 941225D01v03, SAR is not required for this handset with HSPA capabilities.
- BT & WiFi SAR test is conducted according to section 12 stand-alone SAR evaluation of this report.
- 6. 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.
- 7. 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.
- 8. 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.
- 9. 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 941225D01v03, 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+.
- 10. SIM 1 and SIM 2 is a chipset unit and tested as a single chipset. The SIM 1 is chosen for test.





#### Summary of Measurement Results (WLAN 802.11b Band)

Temperature: 21	.0~23.8°C, humic	dity: 54~60%	o. 11012					
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.
Right Side	Cheek/Touch	RLAD	0.180	Me	NB .	LAB	0.198	
Of Head	Ear/Tilt	Mo.	0.076	-11C	Par. MO		0.084	MORIL
Left Side	Cheek/Touch	MORL	0.130	OB III	QLAB	MORL	0.143	,
Of Head	Ear/Tilt	AB .	0.055	000/	HO,	4.400	0.061	M
	Back upward	L. I	0.050	99%	1.010	1.102	0.055	al.Ab
Body	Front upward	RLAB	0.043	Mor	OB W.		0.047	
(10mm E	Edge C	Mo.	0.105	e mo	RI. MO		0.116	ORL
Separation)	Edge D	"ORL	0.046		ZLAE		0.051	Ja.

#### Notes:

- 1. 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:
  - 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is



measured.

4. Justification for test configurations for WLAN per KDB Publication 248227 D02DR02-41929 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.



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

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

A THE THIRTH	070 1070	C7 11 1 2 11 11 11 11 11 11 11 11 11 11 11	ig are agea ere	· · · g. a, • p ·	ation i cont		
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	AB	Cheek/Touch	OB AND	0.033	RLA	0.035	(A)
Of Head	OB III.	Ear/Tilt	OET. MO.	0.016	ZLAB	0.017	111
Left Side	ORLA	Cheek/Touch	2LAB	0.052	MOL	0.055	2LAB
Of Head	A. SLA	Ear/Tilt	MOL	0.021	OP	0.022	
ORL	No.1	Back upward	18900	0.332	1.050	0.349	ORL
Body	AB	Front upward	- B M	0.169	RLA	0.177	100
(10mm	'B W.	Edge A	ORLA" MO	0.228	LAB	0.239	1110
Separation)	ORLA	Edge B	LAB	0.042	Moke	0.044	LAB
	in alar	Edge D	MOR	0.034	· OP	0.036	

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

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

Power Drift limit:	-5%~+5% \ T	SAR Limit: 1.6W/F	(g averaged over	r 1gram, Spa	atial Peak	r. 1110	
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	MORL	Cheek/Touch	RLAB	0.030	Mor	0.032	QLAB
Of Head	CLAF	Ear/Tilt	MO. OE	0.014	MOR	0.015	, E
Left Side	Wo.	Cheek/Touch	MORL	0.045	00	0.048	MORL
Of Head	AB	Ear/Tilt	00 11.	0.018	RL	0.019	
ORL	No.2	Back upward	18900	0.328	1.064	0.349	1110
Body	ORLIN	Front upward	2LAE	0.157	Morra	0.167	aLAB
(10mm	a. alap	Edge A	MOL	0.221	OP	0.235	
Separation)	MOL	Edge B	BORLAN	0.037	VB W	0.039	OPLA
	AB 40	Edge D	AB PILL	0.031	RLL	0.033	10.



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 4 bandwidth 20MHz with QPSK 1RB)

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	mo.	Cheek/Touch	.E MORLE	0.215	.0	0.223	NORL
Of Head	AB	Ear/Tilt	00175	0.084	1.005	0.087	9
Left Side	OB III	Cheek/Touch	20175	0.265	1.035	0.274	4116
Of Head	ORLIN	Ear/Tilt	RLAG	0.114	Morr	0.118	QLAB
Mo. UB	N. QLAP	"OBT	20050	0.664	1.079	0.716	
	No.4	Back upward	20175	0.841	1.035	0.870	*ORL
Body	AB	SI'W MOL	20300	0.742	1.067	0.792	
(10mm	P. D.	Front upward	ORL MO	0.692	2LAB	0.716	446
Separation)	ORLA	Edge A	00175	0.623	1,005	0.645	CLAB
	II. SLAF	Edge B	20175	0.204	1.035	0.211	
	Mole	Edge D	3 ORLA	0.252	"B VIII.	0.261	10RL

# Summary of Measurement Results (LTE Band 4 bandwidth 20MHz with QPSK 50RB)

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

1 Ower Dillt lilling.	wei Difft illifft: -3/6 +3/6 SAR Liffitt. 1.0W/Ng averaged over Tgrafff, Spatial Fea						
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	QLAE	Cheek/Touch	Mo. OE	0.210	NOR	0.223	3
Of Head		Ear/Tilt	00475	0.079	1.004	0.084	NORL
Left Side		Cheek/Touch	20175	0.261	1.064	0.278	100
Of Head		Ear/Tilt	DET. MO.	0.110		0.117	111
QLAE.		MO. NE	20050	0.659	1.067	0.703	aLAB
MO. OB	No.5	Back upward	20175	0.837	1.064	0.891	
Body		NE W. SLA	20300	0.739	1.064	0.786	ORL
(10mm		Front upward	.0	0.688	RL	0.732	100
Separation)		Edge A	20175	0.620	1.064	0.660	M
ZLAB		Edge B	20175	0.200	1.064	0.213	LAB
MOL		Edge D	MOL	0.240		0.255	



### Summary of Measurement Results (LTE Band 4 bandwidth 20MHz with QPSK 100RB)

Temperature: 21	.0~23.8°C. h	umidity: 50~60%.	WO.	VB	QLAS	. ORL	Wo.
		SAR Limit: 1.6W/k		r 1gram, Sp	atial Peak		
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Body (10mm Separation)	No.10	Back upward	20175	0.652	1.072	0.700	S LAE M

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





Of Head

Body (10mm

Separation)

REPORT No.: SZ16010163S01

0.020

0.233

0.024

0.058

0.049

0.020

1.009

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

Ear/Tilt

Back upward

Front upward

Edge A

Edge B

Edge D

No.9

Temperature: 21.0~23.8°C, humidity: 50~60%. Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak Phantom **Device Test Device Test** SAR Test Scaling Scaled Plot Configurations Mode **Positions** channel (W/Kg) Factor SAR No. Cheek/Touch Right Side 0.027 0.027 Of Head Ear/Tilt 0.014 0.014 Left Side Cheek/Touch 0.063 0.064

0.020

0.231

0.024

0.057

0.049

0.020

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

Temperature: 21.0~23.8°C, humidity: 50~60%. Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak **Device Test Device Test** SAR Phantom Test Scaled Plot Scaling Configurations Mode Positions channel (W/Kg) Factor SAR No. Cheek/Touch 0.021 0.021 Right Side Of Head Ear/Tilt 0.011 0.011 Left Side Cheek/Touch 0.056 0.056 Of Head Ear/Tilt 0.016 0.016 No.10 Back upward 21100 0.228 1.002 0.228 Front upward 0.020 0.020 Body 0.053 (10mm Edge A 0.053 Separation) Edge B 0.044 0.044 0.018 0.018 Edge D



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 17 bandwidth 10MHz with QPSK 1RB)

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	AE MC	Cheek/Touch	OB THE	0.182	RLA	0.183	) (III
Of Head	OB III	Ear/Tilt	ORL MO	0.080	ZLAB	0.080	Mc
Left Side	ORLIN	Cheek/Touch	- CLAE	0.177	HOL	0.178	2LAB
Of Head	M. GLAF	Ear/Tilt	MOL	0.060	, of	0.060	
Ale JORL	No.11	Back upward	23790	0.582	1.005	0.585	ORL
Body	AB 10	Front upward	P. P.	0.370	RLA	0.372	100
(10mm	"B W	Edge A	ORLA	0.255	LAB	0.256	Mc
Separation)	ORLA	Edge B	LAE	0.079	Moke	0.079	LAB
MOL	M. GLAF	Edge D	MOLE	0.145	OP	0.146	

# Summary of Measurement Results (LTE Band 17 bandwidth 10MHz with QPSK 25RB)

Temperature: 21.0~23.8°C, humidity: 50~60%.

Power Drift limit:-5%~+5% SAR Limit: 1.6W/Kg averaged over 1gram, Spatial Peak

rower Dilit lillilit.	-5%~+5%	SAN LIIIIIL. 1.000/r	Ny averageu ove	rgrain, Spa	aliai Feak		
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Right Side	ORL	Cheek/Touch	RLAD	0.178	Moss	0.178	21.AB
Of Head	RLAF	Ear/Tilt	MO. OE	0.074	MOR	0.074	
Left Side	WO.	Cheek/Touch	BORLE	0.169	60	0.169	ORL
Of Head	AE INO	Ear/Tilt	00 11.	0.054	RL	0.054	40.
ORL MO	No.12	Back upward	23790	0.571	1.002	0.572	111
Body	ORLA	Front upward	2LAE	0.365	Morra	0.366	LAB
(10mm	alas.	Edge A	MOL	0.251	, OP	0.252	
Separation)	MOL	Edge B	BORLAN	0.075	VB W	0.075	ORL
	AB	Edge D	S M	0.140	RLA	0.140	la.



Additional LTE test requirement for 16QAM
Not required.
Additional LTE test requirement for other bandwidth
Not required.
Additional LTE test requirement for 10MHz with QPSK 50RB
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 941225D01v03r01, 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+.



# 4. Scaling Factor calculation

Band	Tune-up power tolerance(dBm)	SAR test channel Power (dBm)	Scaling Factor
GSM 850	PCL = 5, PWR =33+-0.5	33.07	1.104
GPRS 850	PCL = 5, PWR =29+-0.5(4 slots)	29.17	1.079
GSM 1900	PCL = 0, PWR =30+-0.5	29.91	1.021
GPRS1900	PCL = 0, PWR =25.5+-0.5(4 slots)	25.80	1.047
WCDMA 850	Max output power =22.5(+1/-2)	23.47	1.007
WCDMA 1900	Max output power =22(+1/-2)	22.86	1.033
LTE BAND2	Max output power =22+-0.5(1RB)	22.29	1.050
(QPSK)	Max output power =21+-0.5(50RB)	21.23	1.064
We	E GLAS MORE ME AR	22.67	1.079
	Max output power =22.5+-0.5(1RB)	22.85	1.035
LTE DANDA	CELAR MORL MO. AE L.	22.72	1.067
LTE BAND4	AB RIAL MORE INC.	21.72	1.067
(QPSK)	Max output power =21.5+-0.5(50RB)	21.73	1.064
	E " SLAP HORL MO. SE	21.73	1.064
	Max output power =21.5+-0.5(100RB)	21.70	1.072
LTE BAND7	Max output power =21.5+-0.5(1RB)	21.96	1.009
(QPSK)	Max output power =20.5+-0.5(50RB)	20.99	1.002
LTE BAND17	Max output power =22.5+-0.5(1RB)	22.98	1.005
(QPSK)	Max output power =21.5+-0.5(25RB)	21.99	1.002
802.11b	Max output power =15.5+-0.5	15.58	1.102



#### 14. 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.SAR(W/kg)		Largest to	
Band	Test Position	Test Channel	Original	Repeated	Smallest SAR Ratio	
LTE Band 4	Back upward	20175	0.841	0.837	1.005	



### 15. MULTIPLE TRANSMITTERS EVALUATION

#### Stand-alone SAR

Test distance	e: 5mm		
Band	Highest power(mW) per tune up	1-g SAR test threshold	Test required?
WIFI(2.4G)	39.81	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤	Yes
ВТ	1.78	3.0 for 1-g SAR	No

Test distance	e: 10mm		AB AL
Band	Highest power(mW) per tune up	1-g SAR test threshold	Test required?
WIFI(2.4G)	39.81	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤	Yes
BT	1.78	3.0 for 1-g SAR	No

The SAR test for BT is not required.

The SAR test for 802.11b (2.4GHz) is required, 802.11g/HT20 is not required, for the maximum average output power is less than 1/4 dB Higher than measured on the corresponding 802.11b channels. As per KDB 248227

The BT stand-alone SAR is not required, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[ $\sqrt{f(GHz)/x}$ ] W/kg for test separation distances  $\leq 50$  mm;

where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

(Max power=1.78 mW; min. test separation distance= 5mm for Head; f=2.4GHz)

BT estimated Head SAR =0.071W/Kg (1g)

(Max power=1.78 mW; min. test separation distance= 10mm for Body; f=2.4GHz)

BT estimated Body SAR =0.036W/Kg (1g)





#### Simultaneous SAR

	LAB	Si	multaneous t	ransmission con	ditions	
	WWAN		ORLA	WLAI	V	- Sum of
#	LTE Data	GSM	UMTS	802.11b/g/n	ВТ	WWAN& WLAN
1	×	a Me	AB	×	ORI	×
2	AB	×	MORE	×	aRLA!	×
3	MORE	IN AF	×	×	I HIC	× ×
4	×	MORE	Me	AB CEL	×	×
5	MIC	×	RIAL MC	Er Mc	×	×
6	ELAE MOS	en Me	×	RLAD	×	×

#### 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 447498D01v06, 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. Applicable Multiple Scenario Evaluation

Test	Main Ant. SARMax (W/Kg)	Bluetooth SAR(W/Kg)	WiFi SARMax(W/Kg)	∑1-g SARMax(W/Kg)	
Position				BT&Main Ant	WiFi&Main Ant
Head SAR	0.265	0.071	0.180	0.336	0.445
Body SAR	0.841	0.036	0.105	0.877	0.946

Simultaneous Transmission SAR evaluation is not required for WiFi and WCDMA&GSM&LTE, because the sum of 1g SARMax is **0.946** W/Kg < 1.6W/Kg for Wifi and WCDMA&GSM&LTE. Simultaneous Transmission SAR evaluation is not required for BT and WCDMA&GSM&LTE, because the sum of 1g SARMax is **0.877** W/Kg < 1.6W/Kg for BT and WCDMA&GSM&LTE. (According to KDB 447498D01v06, the sum of the Highest <u>reported</u> SAR of each antenna does not exceed the limit, simultaneous transmission SAR evaluation is not required.)



# **16 ANNEX A GENERAL INFORMATION**

17 ANNEX B PHOTOGRAPHS OF THE EUT

18 ANNEX C PLOTS OF HIGH SAR TEST RESULTS

19 ANNEX D SYSTEM PERFORMANCE CHECK DATA





# 20. 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
Responsible Test Lab Manager:	Province, P. R. China  Mr. Su Feng
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

# 2. Identification of the Responsible Testing Location

Name: Shenzhen Morlab Communications Technological Communication Technological Communicat			
	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	Instrument Type		Cal. Due	
1	PC	Dell (Pentium IV 2.4GHz, SN:X10-23533)	(n.a)	(n.a)	
2	Network Emulator	Aglient (8960, SN:10752)	2015-6-18	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: 2016-03-16 to 2016-03-18)	N/A	N/A	
14	Dipole 750MHz	Satimo (SN 30/13 DIP0G750-259)	2015-6-20	1year	
15	Dipole 835MHz	Satimo (SN 20/08 DIPC 99)	2015-6-20	1year	
16	Dipole 1750MHz	Satimo (SN 30/13 DIP1G750-260)	2015-6-20	1year	
17	Dipole 1900MHz	Satimo (SN 30/13 DIP1G900-261)	2015-6-20	1year	
18	Dipole 2450MHz	Satimo (SN 30/13 DIP2G450-263)	2015-6-20	1year	
19	Dipole 2600MHz	Satimo (SN 30/13 DIP2G600-265)	2015-6-20	1year	

\*\*\*\*\* END OF REPORT \*\*\*\*\*