

FCC SAR TEST REPORT

APPLICANT

KPhone USA Inc.

PRODUCT NAME

smart phone

MODEL NAME

K5

TRADE NAME

KPHONE

BRAND NAME

KPHONE

FCC ID

2AFJ5K5

STANDARD(S)

47CFR 2.1093

IEEE 1528-2013

ISSUE DATE

2015-09-14

SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.

Syster

Certification

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TEST REPORT DECLARATION

Applicant	KPhone USA Inc.			
Applicant Address	8333 Foothill Blvd.#840 Rancho Cucamonga, CA 91730			
Manufacturer	Beijing Benywave Wireless Communication Co.,Ltd			
Manufacturer Address	Beijing OPTO-Mechatronics Industrial Park (OIP),Tongzhou District, Beijing, China 101111			
Product Name	smart phone			
Model Name	K5	K5		
Brand Name	KPHONE			
HW Version	TBT5755_P2_001			
SW Version	575511_1001_VXXXX			
Test Standards	47CFR 2.1093; IEEE 1528-2013			
Test Date	2015-08-26 to 2015-08-28			
30 A	Head	0.227W/kg	To the state of th	
The Highest Reported	Body-worn	1.248W/kg	Limit(\\\/\ka\): 1 6\\\/\ka	
1g-SAR(W/kg)	Hotspot	1.349W/kg	Limit(W/kg): 1.6W/kg	
	Simultaneous	1.412W/kg		

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Approved by	S. Markey	Zeng Dexin	A COL
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1.TECHNICAL INFORMATION

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

1.1 Identification of Applicant

Company Name:	KPhone USA Inc.
Address:	8333 Foothill Blvd.#840 Rancho Cucamonga, CA 91730

1.2 Identification of Manufacturer

Company Name:	Beijing Benywave Wireless Communication Co.,Ltd
Address:	Beijing OPTO-Mechatronics Industrial Park (OIP),Tongzhou District,
MORLY MOY	Beijing, China 101111

1.3 Equipment Under Test (EUT)

Model Name:	K5	
Trade Name:	KPHONE	
Brand Name:	KPHONE	
Hardware Version:	TBT5755_P2_001	
Software Version:	575511_1001_VXXXX	
Tx Frequency Bands:	GSM 850: 824-849 MHz; GSM 1900: 1850-1910 MHz;	
	WCDMA Band II: 1850-1910MHz; WCDMA Band IV:1710-1755MHz; WCDMA Band V: 824-849 MHz;	
	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 12; EDGE: Class 12;	
GPRS Class:	Class B	
DTM:	Not support	
Antenna type:	Fixed Internal Antenna	
Development Stage:	Identical prototype	
Hotspot function:	Support	



1.3.1 Photographs of the EUT

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

1.3.2 Identification of all used EUT

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

EUT Identity	Hardware Version	Software Version
1#	TBT5755_P2_001	575511_1001_VXXXX

1.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title		
1	47 CFR§2.1093	Radiofrequency Radiation Exposure Evaluation: Portable		
	LAS TORLE MOTO	Devices		
2	IEEE 1528-2013	IEEE Recommended Practice for Determining the Peak		
	TORLE MORE AR IN	Spatial-Average Specific Absorption Rate (SAR) in the Human		
	IN TLAE OPLIA	Head from Wireless Communications Devices:		
ORLA	Mole. E Me STV	Measurement Techniques		
3	KDB 447498 D01v05r02	General RF Exposure Guidance		
4	KDB 248227 D01v02	SAR Measurement Procedures for 802.11 a/b/g Transmitters		
5	KDB 941225 D01v03	SAR Measurement Procedures for 3G Devices		
6	KDB 941225 D02v02r02	HSPA and 1x Advanced		
7	KDB 941225 D03v01	SAR Test Reduction GSM GPRS EDGE		
8	KDB 941225 D04v01	SAR for GSM E GPRS Dual Xfer Mode		
9	KDB941225 D06v01r01	Hotspot Mode SAR		
10	KDB941225 D05v02r03	SAR for LTE Devices		
11	KDB 865664 D01v01r03	SAR Measurement 100 MHz to 6 GHz		
12	KDB 865664 D02v01r01	SAR Reporting		
13	KDB648474 D04v01r02	Handset SAR		



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

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

Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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



2. SPECIFIC ABSORPTION RATE (SAR)

2.1 Introduction

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

2.2 SAR Definition

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

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

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

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

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

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

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

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

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



3. SAR MEASUREMENT SETUP

3.1 The Measurement System

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

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

The Following figure shows the system.



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

3.2 Probe

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

- Dynamic range: 0.01-100 W/kg

- Tip Diameter: 6.5 mm





- Distance between probe tip and sensor center: 2.5mm

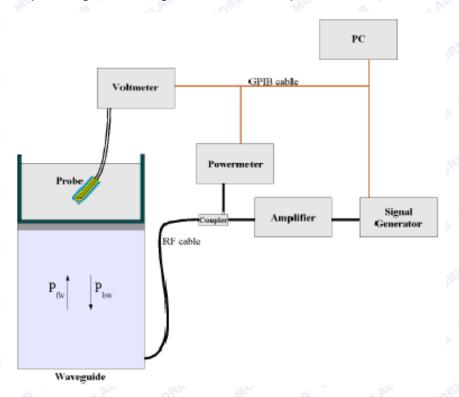
 Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)

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

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

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

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



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

Where:

Pfw = Forward Power Pbw = Backward Power

a and b = Waveguide dimensions

Skin depth



Keithley configuration:

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

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

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

(N=1,2,3)

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

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

(N=1,2,3)

Where DCP is the diode compression point in mV.

3.3 Probe Calibration Process

3.3.1 Dosimetric Assessment Procedure

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

3.3.2 Free Space Assessment Procedure

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

3.3.3 Temperature Assessment Procedure

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

Where:

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





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

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

 δT = temperature increase due to RF exposure.

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

Where:

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

 σ = simulated tissue conductivity,

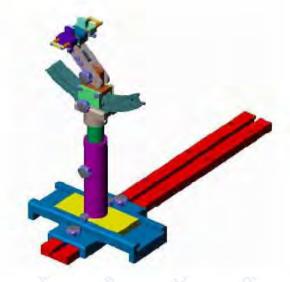
 ρ = Tissue density (1.25 g/cm³ for brain tissue)

3.4 Phantom

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

3.5 Device Holder

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



Device holder

System Material	Permittivity	Loss Tangent
Delrin	3.7	0.005



4. TISSUE SIMULATING LIQUIDS

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

The following table gives the recipes for tissue simulating liquids

Frequency Band (MHz)	750	83	35	1750	19	000 110 110	2450	2600
Tissue Type	Body	Head	Body	Body	Head	Body	Body	Body
Ingredients (% by we	ight)	LAB	OPLA	MOR	S W	LAB	ORLA	anc.
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	Q.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

Temperature	e: 22.0~23.8°0	C, humidity: 54~60%.				
Date	Freq.(MHz	Liquid Parameters	Meas.	Target	Delta(%)	Limit±(%)
2015/00/26	Rody 750	Relative Permittivity(cr):	54.48	55.55	-1.93	5
2015/08/26	Body 750	Conductivity(σ):	0.93	0.96	-3.12	5 5
2015/00/26	Hood 925	Relative Permittivity(cr):	41.36	41.5	-0.34	5
2015/08/26	Head 835	Conductivity(σ):	0.91	0.90	1.11	5
2045/00/20	Dody 025	Relative Permittivity(cr):	55.69	56.10	-0.73	5
2015/08/26	Body 835	Conductivity(σ):	0.97	0.95	2.11	5
2015/09/27	Dody 1750	Relative Permittivity(cr):	53.56	53.40	-0.30	5
2015/08/27	Body 1750	Conductivity(σ):	1.47	1.49	-1.34	5
2015/00/27	Head 1000	Relative Permittivity(cr):	39.98	39.90	0.20	5
2015/08/27	Head 1900	Conductivity(σ):	1.41	1.42	-0.70	5
2045/00/27	D = d : 4000	Relative Permittivity(cr):	53.10	53.3	-0.38	5
2015/08/27	Body 1900	Conductivity(σ):	1.53	1.52	0.66	5
2045/00/20	Head 0450	Relative Permittivity(cr):	39.11	39.20	-0.23	5
2015/08/28	Head 2450	Conductivity(σ):	1.79	1.80	-0.56	5
2045/00/20	D-4: 0450	Relative Permittivity(cr):	52.52	52.70	-0.34	5
2015/08/28	Body 2450	Conductivity(σ):	1.94	1.95	-0.51	5
2045/00/22	Dady 2000	Relative Permittivity(cr):	52.45	52.50	-0.10	5
2015/08/28	Body 2600	Conductivity(σ):	2.10	2.16	-2.78	5



5. UNCERTAINTY ASSESSMENT

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

5.1 UNCERTAINTY EVALUATION FOR EUT SAR TEST

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



		. 40		100	~~		70,		
2LAB CORL	1	VB In.	aLP.	300	Line	More	" B W.	0	1
Output power Power drift -	6.6.2	4.04	R	$\sqrt{3}$	1 , 1	1	2.33	2.3	∞
SAR drift measurement	"B W	CLAP		RLA	Mole	S VIII.	LAB	3	ORL
Phantom and Tissue Para	meters	MOL	.0	LAB	.(RLA	MOL	0 1	
Phantom Uncertainty	E.3.1	0.05	R	$\sqrt{3}$	1,	1 1 N	OF	0.0	∞
(Shape and thickness tolerances)	NOTE OF	AB M	MORLA	3 MOF	L.A. A	Mole	0.03	3	8
Liquid conductivity -	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.1	∞
deviation from target value	AL	MORIE	2 11	AB	,	QLAP.	MORL	3	
Liquid conductivity -	E.3.3	5.00	N	1,108	0.64	0.43	3.20	2.1	М
measurement uncertainty	MORT	Mo	. 0	3	LAR	MORL	MO.	5	8
Liquid permittivity -	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.0	8
deviation from target value	Mo	A.B		QLAB	MORL	Mc	O.B	4	الله
Liquid permittivity -	E.3.3	10.0	N 🐠	1 6	0.6	0.49	6.00	4.9	М
measurement uncertainty	o.B	0	LAB	MORL	4110			0	- 0
Combined Standard	ORL	Mo	RSS	9	LAB	JORL	11.55	10.	3
Uncertainty		AB	NORLE	MO	~	9	aLAE	67	
Expanded Uncertainty	Mo.	.0	K=2	alaB	*OBI	Mc	23.11	21.	210
(95% Confidence interval)	AB	ORLA	17/	000	Di.	LAB	ORLA	33 🕔	Ole

5.2 UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

a West Late	b work	С	d	e=	f	g	h=		k
	A.B	RLAL	212	f(d,k)	Mic	OB.	c*f/e	c*g/	ORL
AB ALAP OR	4	NO.	40	al Alb	٠.٥	2 les	Mo.	е	
Uncertainty Component	Sec.	Tol	Prob	Div.	Ci	Ci	1g Ui	10g	Vi
	More	(+-	· ALA	, o ^R	(1g)	(10g)	(+-%)	Ui	8
	ORI	%)	Dist.	B	LAP	.0	RLA	(+-	
3 ORLA MORE	BIN	LAB	.0	RLA	Moles	BIN	LAB	%)	RLA
Measurement System	Like	NOFE	B W	LAB	.0	RLA	MORE	2 1/1	
Probe calibration	E.2.1	4.76	N	1,101	1, 1	1 100	4.76	4.7	8
Axial Isotropy	E.2.2	2.5	R	$\sqrt{3}$	0.7	0.7	1.01	1.0	∞
Hemispherical Isotropy	E.2.2	4.0	R	$\sqrt{3}$	0.7	0.7	1.62	1.6	∞ .
Boundary effect	E.2.3	1.0	R 🐠	$\sqrt{3}$	1	1.8	0.58	0.5	∞
Linearity	E.2.4	5.0	R	$\sqrt{3}$	1 110	1 🚜	2.89	2.8	∞
System detection limits	E.2.5	1.0	R	$\sqrt{3}$	1	108	0.58	0.5	∞
Readout Electronics	E.2.6	0.02	N	1,5	1 1 AE	1	0.02	0.0	∞



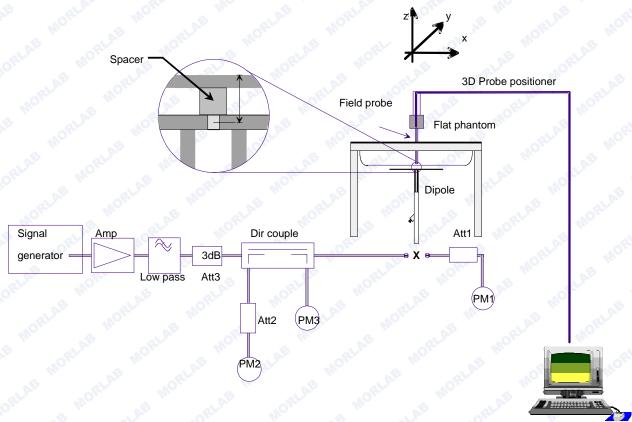
G. S.									
Reponse Time	E.2.7	3.0	R	$\sqrt{3}$	1	1,10	1.73	1.7	∞
Integration Time	E.2.8	2.0	R	$\sqrt{3}$	1 21.0	1	1.15	1.1	∞
RF ambient Conditions	E.6.1	3.0	R	$\sqrt{3}$	1	1,6	1.73	1.7	∞
Probe positioner Mechanical Tolerance	E.6.2	2.0	R	$\sqrt{3}$	1 1	1	1.15	1.1 5	8
Probe positioning with respect to Phantom Shell	E.6.3	0.05	R	$\sqrt{3}$	1	1,111	0.03	0.0	∞
Extrapolation, interpolation and integration Algoritms for Max. SAR Evaluation	E.5.2	5.0	R	$\sqrt{3}$	LAB IN	1 alone as	2.89	2.8	8
Dipole	OR	Liber	Mole	S M	, A	3	RLA	Mole	
Dipole axis to liquid Distance	8,E.4. 2	1.00	N	$\sqrt{3}$	1	1 M	0.58	0.5 8	∞
Input power and SAR drift measurement	8,6.6. 2	4.04	R	$\sqrt{3}$	1 M	1 NOPLAS	2.33	2.3	8
Phantom and Tissue Para	meters	AR	MORT	Mo	0.5	3	QLAR.	MORE	
Phantom Uncertainty (Shape and thickness tolerances)	E.3.1	0.05	R	$\sqrt{3}$	MOES ME	1 M	0.03	0.0	8
Liquid conductivity - deviation from target value	E.3.2	4.57	R	$\sqrt{3}$	0.64	0.43	1.69	1.1	∞
Liquid conductivity - measurement uncertainty	E.3.3	5.00	N	$\sqrt{3}$	0.64	0.43	1.85	1.2 4	М
Liquid permittivity - deviation from target value	E.3.2	3.69	R	$\sqrt{3}$	0.6	0.49	1.28	1.0 4	8
Liquid permittivity - measurement uncertainty	E.3.3	10.0	N	$\sqrt{3}$	0.6	0.49	3.46	2.8	M
Combined Standard Uncertainty	NB a	MORLAN	RSS	RLAB	in.	RLAB	8.83	8.3 7	OF
Expanded Uncertainty (95% Confidence interval)	OPLAS	AE MO	K=2	Mor	LAB	MORLA	17.66	16. 73	3 11



6. SAR MEASUREMENT EVALUATION

6.1 System Setup

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



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



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

6.2 Validation Results

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

Frequency	750MHz(b)	835MHz(H)	835MHz(B)	1750MHz(B)
Target value 1W (1g)	8.83W/Kg	9.68W/Kg	10.04 W/Kg	40.14 W/Kg
Test value 1g (100 mW input power)	0.841 W/Kg (08.26)	0.954 W/Kg (08.26)	0.992 W/Kg (08.26)	3.921 W/Kg (08.27)
Normalized to 1W value(1g)	8.41 W/Kg	9.54 W/Kg	9.92 W/Kg	39.21 W/Kg

Frequency	1900MHz(H)	1900MHz(B)	2450MHz(H)	2450MHz(B)	2600MHz(B)
Target value 1W (1g)	39.36 W/Kg	42.36W/Kg	54.74 W/Kg	56.13 W/Kg	57.73 W/Kg
Test value 1g (250 mW input power)	4.018 W/Kg (08.27)	4.348 W/Kg (08.27)	5.256 W/Kg (08.28)	5.443 W/Kg (08.28)	5.487 W/Kg (08.28)
Normalized to 1W value(1g)	40.18 W/Kg	43.48 W/Kg	52.56 W/Kg	54.43 W/Kg	54.87 W/Kg

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



7. OPERATIONAL CONDITIONS DURING TEST

7.1 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.

7.2 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

7.3 Measurement procedure

The Following steps are used for each test position

- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface.
- 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.

7.4 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.

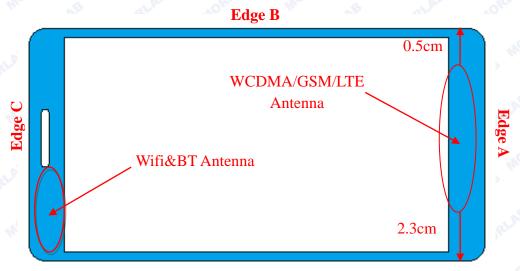


8. HOTSPOT MODE EVALUATION PROCEDURE

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

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

Edge configurations:



Edge D

Assessment	, M ^o H	otspot sic	le for SAR			
				RLAP .	Test distance	e: 10mm
Antennas	Back	Front	Edge A	Edge B	Edge C	Edge D
WCDMA/GSM	Yes	Yes	Yes	Yes	No	Yes
WLAN&BT	Yes	Yes	No	No	Yes	Yes



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

-LP	3 ORLAN MORE	Band 4	AB	RLAD	MORE	o Wo	, AB	ORLAS
VOIS.	Identify the operating frequency range of each LTE	Tx:1710- Band 7	1755 MHz	: Rx:2110-	2155 MHz			
1 1	transmission FCC band used		2570 MHz	: Rx:2620-	2690 MHz			
N. Co	by the device	Band 17						
6	3 IN CRUAD MORL	Tx:704-7	16MHz R	c:734-746	MHz			
OBE	AE RIAL	Donald.	III.C	QB.	Channel	Bandwidt	h	NO.
	RIAD	Band4	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz
411	AB . CRLAB MOR	Low	20050/	20025/	20000/	19975/	19965/	19957/
2	MORL MO. AB	LOW	1720	1717.5	1715	1712.5	1711.5	1710.7
2	a Ring MORL	Middle	20175/	20175/	20175/	20175/	20175/	20175/
ORL	HO. AE I. CLAS	Middle	1732.5	1732.5	1732.5	1732.5	1732.5	1732.5
	RLAS MORLY MO.	Lligh	20300/	20325/	20350/	20375/	20384/	20392/
111	NE III ZLAE HOR	High	1745	1747.5	1750	1752.5	1753.5	1754.2
,B	TOPLIA HOTE NE M	-alas	JORLA		Channel	Bandwidt	h opl	
. 63	A W HORLE	Band7	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz
ORL	Identify the high, middle and	Low	20850/	20825/	20800/	20775/	1	1.05
	low (L, M, H) channel numbers and frequencies		2510	2507.2	2505	2502.5	GLAS	MORIE
4119	numbers and frequencies tested in each LTE frequency	Middle	21100/	21100/	21100/	21100/		
	band	wildale	2535	2535	2535	2535	NOR!	1 1110
D.	band	High	21350/	21375/	21400/	21425/		RLAB
ORL	AE . RLAD	iligii	2560	2562.5	2565	2567.5	,	0 /
	RLAD MORL G MO.	Band17	RLAD	MORL	Channel	Bandwidt	h RLAB	MORL
es the	AE ORLAN MOR	Dallu I I	20Mhz	15MHz	10MHz	5MHz	3MHz	1.4MHz
	MORE S INC. AE	CRLA	Moke	S In	23780/	23775/	Mole	- Inc
, AS	3 RLAL MORL	Low	» '	LAU	709.0	706.5	AB	RLAY
ORL	T INC AE ORLAN	Na: NOPE	an a	108	23790/	21100/	10	, all
	RLAD MORLE THE	Middle	RLA	MOE	710.0	710.0	THE STATE OF THE S	MORL
S 1116	AR ARLAN MOR	LI! ad-	I AB	1 08	23800/	23825/	We I	, o
	MORE ME	High	MORL	Allo.	711.0	713.5	MORL	1110
3	Specify the UE category and uplink modulations used	The UE 0 16QAM.	Category is	s 4 and the	e uplink mo	odulations	used are	QPSK and
	Descriptions of the LTE	The me	lulo bos s	primarita	otoppo for	OII LTE OU	IMTC has	No. 6 \A/: F:
4	transmitter and antenna implementation & identify	Tx/Rx ar		primary at	nterma for	all LIE&U	ivi i S band	ds, a Wi-Fi



	· · · · · · · · · · · · · · · · · · ·	V. 40,		70			0		100
	whether it is a standalone	O.B							
	transmitter operating	anort. W							
	independently of other	QLAB							
	wireless transmitters in the	MOLO							
	device or sharing hardware	AB ORL							
	components and/or	B							
	antenna(s) with other	ORLAL M							
0	transmitters etc.	MC AE	-01	LAL	MORI	MI	, all		al.Ab
ORL	Identify the LTE Band	MORE	MIC	a.B		RLAB	MORL	Mo	3
	Voice/data requirements in	OB BLD							
11/1	each operating mode and	" Mo.							
AB	exposure condition with	Mobile Heten	ot Mos	النبدما	ha taat	ad accer	ding to C	Continu C	of this
5	respect to head and body test	Mobile Hotsp	OL WIOC	ie wiii	be test	ed accord	uing to s	section s	o or triis
ORLA	configurations, antenna	report.							
	locations, handset flip-cover	E M							
-11	or slide positions, antenna	AL MORL							
AB .	diversity conditions, etc.	AB							
	Identify if Maximum Power	MORE IN		AB	RLA	"IC	Per C	III.	AB.
aLA	Reduction (MPR) is optional	T.A.B							
	1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2								
VO	or mandatory, i.e. built-in by	As per 3GPP			100	Y .			
NO.	10 AB	As per 3GPP Table 6.2.3-1			100	Y .	(MPR) f	or Powe	er Class
NOT THE	or mandatory, i.e. built-in by				100	Y .	(MPR) f	or Powe	er Class
YE M	or mandatory, i.e. built-in by design:	Table 6.2.3-1		num P	100	eduction	AE MC	or Powe	er Class
NE HI	or mandatory, i.e. built-in by design: only mandatory MPR may be	Table 6.2.3-1	: Maxir	num P	ower R	eduction	AE MC	CRLAS	er Class
NORLA	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR	Table 6.2.3-1	: Maxir	num P	ower R	eduction	AE MC	CRLAS	AE MC
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum	Table 6.2.3-1	: Maxir Chan band	num P nel width (bandwi	eduction	Transı	nission	MPR
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently	Table 6.2.3-1 3 Modulation	Chan band	nel width (3.0 MHz	bandwi	idth /	Transı 15 MHz	mission 20 MHz	MPR (dB)
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR	Table 6.2.3-1 3 Modulation	Chan band	nel width (bandwi	eduction	15 MHz > 16	20 MHz > 18	MPR
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE;	Modulation QPSK 16 QAM	Chan band 1.4 MHz > 5 ≤ 5	nel width (3.0 MHz > 4 ≤ 4	bandwi N _{RB}) 5 MHz > 8 ≤ 8	10 MHz > 12 ≤ 12	15 MHz > 16 ≤ 16	20 MHz > 18 ≤ 18	MPR (dB) ≤ 1 ≤ 1
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable	Table 6.2.3-1 3 Modulation QPSK	Chanband 1.4 MHz > 5	nel width (3.0 MHz > 4	bandwi N _{RB}) 5 MHz > 8	idth / 10 MHz > 12	15 MHz > 16	20 MHz > 18	MPR (dB) ≤ 1
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block)	Modulation QPSK 16 QAM 16 QAM	: Maxir Chan band 1.4 MHz > 5 ≤ 5 > 5	num P nel width (3.0 MHz > 4 ≤ 4 > 4	ower R bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in	Modulation QPSK 16 QAM	: Maxir Chan band 1.4 MHz > 5 ≤ 5 > 5	num P nel width (3.0 MHz > 4 ≤ 4 > 4	ower R bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards	Modulation QPSK 16 QAM 16 QAM	: Maxir Chan band 1.4 MHz > 5 ≤ 5 > 5	num P nel width (3.0 MHz > 4 ≤ 4 > 4	ower R bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR)	Modulation QPSK 16 QAM 16 QAM	: Maxir Chan band 1.4 MHz > 5 ≤ 5 > 5	num P nel width (3.0 MHz > 4 ≤ 4 > 4	ower R bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled.	Modulation QPSK 16 QAM 16 QAM	: Maxir Chan band 1.4 MHz > 5 ≤ 5 > 5	num P nel width (3.0 MHz > 4 ≤ 4 > 4	ower R bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
6	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled. Include the maximum	Modulation QPSK 16 QAM 16 QAM	Chan band 1.4 MHz > 5 ≤ 5 > 5 ported	nel width (3.0 MHz > 4 ≤ 4 > 4	bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8 ign, but	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16 or SAR te	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1
E ME	or mandatory, i.e. built-in by design: only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled. Include the maximum average conducted output	Modulation QPSK 16 QAM 16 QAM A-MPR is sup	Chan band 1.4 MHz > 5 ≤ 5 > 5 ported	nel width (3.0 MHz > 4 ≤ 4 > 4	bandwi N _{RB}) 5 MHz > 8 ≤ 8 > 8 ign, but	idth / 10 MHz > 12 ≤ 12 > 12	Transi 15 MHz > 16 ≤ 16 > 16 or SAR te	20 MHz > 18 ≤ 18 > 18	MPR (dB) ≤ 1 ≤ 1



PRIA MINISTRA	UL modulation used in each frequency band: a) with 1 RB allocated at the low, centred, high end of a channel b) using 50% RB allocation low, centered, high end within a channel c) using 100% RB allocation Include the maximum average conducted output power measured for the other wireless mode and frequency	This	s is	included in tl	ne section	13 of this repo	RLAB HC	BRIAS HORLAS
RL	ldentify the simultaneous transmission conditions for the voice and data configurations supported by	A.B	MOP.	Simultaneo	ous transm	ission condition	าร	Sum of
10	all wireless modes, device configurations and frequency bands, for the head and body	AB .	#	LTE Data	UMTS	802.11b/g/n	ВТ	WWAN& WLAN
10.	exposure conditions and		2	- all	×	×	OB III	×
	device operating	MOBI	3	×	AB III	RIAS MO	×	×
ALA'	configurations (handset flip or	*	4	AL WOR	×	A.B. M.	×	×
Mc	cover positions, antenna diversity conditions etc.)	AB	10.	MORLAR AE	MORLAG	AE MORLAE	Wo.	RLAB MORI
RLASSA HICK	When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the	No	ot ap	oplicable.				



simultaneous voice/data	AB TLAB JORLE MOL AB MILAB 10
transmission configurations	TORLY MORE OF THE TARE OF THE MORE OF THE
for such wireless	ME SLAF ORLAN MORN OF ME SLAF ORLAN
configurations and frequency	HOPE S THE STAR OFFICE HOPE S THE STAR
bands; and also include	AE ORLAN MORE S ME LAE ORLAN MORE
details of the power reduction	THE LAS OFLAR MORE THE LAS
implementation and	CREATE MORE ME AB CELAR MORE MICH
measurement setup	AE RIAD MORE MO AE TIAD



11.SAR EVALUATION PROCEDURES&POWER MEASUREMENT FOR

"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

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

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 > ½ 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

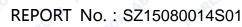
For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ 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 4

Band Width	Channel	Freq.(MHZ)	Modulation	RB Con	Average Powe	
Danu widin	Charmer			RB Size	RB Offset	(dBm)
AB	ir. We	0	AB	21. 1 W	0 4	20.35
M		QLA.	OBE IN	1.3	49	19.56
AB		WOL.	AB	OR!	99	19.70
MORL AF		3LAP	QPSK	50	0	19.55
		MOLO	S III	50	25	19.81
"OBT	Mo	S 0	A ORL	50	49	19.89
S. Dr.	AB -	1700 01010	S Mr.	100	0	19.68
AL		1720.0	al.h.	1	0	19.48
E Mr.	20050	RLIN	Op. M.	100	49	18.75
3LAE		MC TE	LAB	1010	99	19.67
NOW		RLA	16-QAM	50	0	19.45
2LAB		MO	e LA	50	25	19.40
Morra		AB RI	Mole	50	49	19.65
\$		Mor	.0	100	0	18.76
ALC STORY	4	D.B.	AL MC	1	0	20.76
MORLAR MO		ORL	No.	21	49	20.89
		Mrs. A.B.	RLA	WO.1	99	20.22
	M	LAE MORL	QPSK	50	0	19.91
				50	25	19.89
				50	49	19.75
				100	0	20.09
20MHz	20175	1732.5	MOTES AB INC	1	0	20.09
A.B				OR I	49	20.12
ORL		LAB	ORL	Was 1	99	19.35
N. A.B		"IOFE"	16-QAM	50	0	20.05
ORL		ELAE MORI		50 50	25	20.10
Ph.				50	49	19.85
A.D.	True Mo.			100	0	18.85
W.	0.6	QL.	D. 18	1	0	20.58
OLAE .		Mo.	LAB	401	49	19.61
OF		QLA.	MORE	1 0	99	19.63
LAB		Mor	QPSK	50	0	19.65
MORE		al al	MORE	50 50	25	19.65
0	LAE H MO	Fr. Mor	.0	50	49	19.53
Om	II WILL	1745.0	RLA	100	0	19.53
.6		1745.0	- 0	100	0	20.01
RLA	20300	ME	RLAI	400	49	18.53
0,	W. AE	ORL	MO.	1 21/2	99	20.25
-RLAI		M	16-QAM	50	99	19.89
MO		AB ORL	10 30 1101	50	25	19.89
AB .		MIC	o B	50	25 49	19.12
			A 37	UG W	49	19.03



Band Width	Channel	Freq.(MHZ)	Modulation	RB Con	Average Powe	
Bariu Widili	Chamilei			RB Size	RB Offset	(dBm)
AL	110	. 6	AL	RI. 1 W	0 4	20.35
Me		QLAI	OLE III.	1.0	37	19.56
LAB		MOL	A.B	081	74	19.70
ORL		QL.All	QPSK	36	0	19.55
DE DE		MOLO	a m.	36	18	19.81
MORLE	Ple Contraction of the Contracti	as as	ORL	36	35	19.73
a liv	LAB -	1717 11014	2 ///	75	0	19.68
AL		1717.5	all a	1 1/1	0 🗳	19.48
0	20025	ORLA DE	Or S III.	1,00	37	18.75
al.All		MC VE	2LAL	011	74	19.67
VOI.		ORL IV	16-QAM	36	0	19.63
al Al		MIC	B aLA	36	18	19.58
MOL		AB ORL	More	36	35	18.85
0		MO		75	0	18.76
"IO	0	, Ale	JEL. MC	1 0	0	20.76
SE SLAB		NORL	QPSK 16-QAM	21	37	20.89
ORL-M	M 20175	M. AE		410.1	74	20.22
MORLAR		1732.5		36	0.0	20.11
				36	18	19.60
				36	35	19.75
Server of				75	0	20.09
15MHz				1.3	0	20.04
AB				OP 1	37	20.12
ORL				III 1	74	19.35
, AB		MOL		36	0	19.98
ORL		JELAE MORL		36	1 8	20.03
Z W				36	35	18.90
AL	Tr. Alb Mo.			75	0 🕙	18.85
S In.			41 Jan	10.6	0	20.58
3LAE		MP TE	3LAE	NOFE	37	19.61
Or		CRL A	MOL	1 . 6	74	19.63
al.Ar		MIS	QPSK	36	0	19.65
MOL		AB SEL	Mor	36	18	19.70
B	LAP H MO	Mo		36	35	19.53
110	A MI	4747.5	RILL MO	75	0	19.51
NB T		1747.5	.0	1	o o	20.01
ORLAN	20325	m. AE	RLL	110.	37	18.53
20		ORL	We To	1 21.0	74	20.25
SRLA		S Mr.	16-QAM	36	0	20.05
Mo	HAE IN MOR	LAP ORL	. 5 37 111	36	18	19.85
AB at		W.	AB	36	35	18.75
		AB	PL. WO	75	0	18.52



Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Powe	
Banu Widin	Charmer	rieq.(IVII IZ)		RB Size	RB Offset	(dBm)
AB	il.		LAB	RI. 1 N	0	19.87
M		QLA.	ORL	1.0	24	19.60
AB		WOL.	AB	ORI	49	19.78
ORL		3LAP	QPSK	25	0	19.68
, A.F		MOLO	a Ni	25	12	19.56
10R1	Mo	20 01	AORIL AORIL	25	24	19.71
S. Dr.	AB -	Err 1717 MORE	S Mr.	50	0	19.75
AL		1715.0	2LA	1	0	19.86
S W	20000	RLIN	Op. Un.	1,000	24	20.05
3LAL		MC TE	LAB	1010	49	19.76
OF		RLA	16-QAM	25	0	20.02
LAB		MO	e LA	25	12	19.55
Mole		AB CEL	MORE	25	24	19.05
· O		P.L. MO.	.0	50	0	18.81
AL MORE	480	D.B	all all	1 4	0	21.49
.0		ORL	9	21	24	20.08
RLA.		NA DE	QLA.	Mos	49	20.01
NO.	M	LAE MORLE	QPSK	25	0	19.89
AE MORLA				25 25	12	20.05
				25 25	24	19.97
				50	0	19.97
10MHz		1732.5	Olega, Mag	1.0	0	20.93
O.B	20175	MORL	N	and the same	24	20.93 18.95
ORL		LAB	ORL	Was 1	49	20.63
D.B	MORLAL	F. LE MORL	16-QAM	25	0	20.82
ORL				25 25	12	20.82
M				25 25	24	19.98
AB O	The Wor			50	0	19.98
Miles	0.19	ala	200	1	0	19.02
LAB		MO. B	LAB	1014	24	20.02
OR		- QLA	MORE	1 . 0	49	19.97
LAP		MOL	QPSK	25	0	
MORY		all al	Q. OILE	25 25	12	20.01 20.11
0	LAP II A	Bright	D.	25 25	24	20.11
201	H 110	o B	QLA.	25 50	0	19.57
. 6		1750.0	D	50	0	
QLA.	20350	Mr. OB	al Al	1102	24	19.83
0,0		ORLA	Mor			20.30
ZLA!		MILE	16-QAM	1	49	21.05
MOL		AB ARL	10-QAIVI	25	0	20.08
B		MIC		25	12	20.03
		0.	QLA.	25	24	19.89



Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	nfiguration	Average Powe
				RB Size	RB Offset	(dBm)
AB	140	0	AB	^{QL} 1 N	0	20.05
MORLAE MA		QLA.	ORL	1.0	12	19.65
		WO.	AB	OPT	24	18.95
		QLA.	QPSK	12	0	19.54
		MOL	G W	12	6	19.11
MORE	allo	D 21	MORIE	12	1 1	19.05
.0	LAB	1712.5		25	0	19.23
,A. ano		1712.5	RIA	1 1	0	20.21
. 3	19975	ORL	0, 8	1.00	12	18.83
QLA.		ME	QLA!	011	24	19.24
No.		ORLIN	16-QAM	12	0	20.15
RLA		MIC	E QLA	12	6	19.88
Mo.		LAP ORI	MO	12	11	19.50
OB SLAN	LA MO	HIC HICK	3	25	0	18.96
AE MO GLAE	.0	LAB	ORL MC	1.0	0	21.37
		MORE	Q.E	21	12	20.04
ORL		LAB	ORL	w ¹⁰ 1	24	20.01
MORLAR		1732.5	QPSK	12	0.0	19.98
				12	6	20.07
	M			12	11	20.11
5MHz				25	0	19.97
SIVII IZ		1732.5	Ole Mis	1.3	0	20.66
LAB	20175	AE MON RLAE	16-QAM	1	12	19.20
OF				Mar 1	24	19.85
LAB		WO.		12	0	20.50
Moles		all al		12	∞ 6	20.33
4		ir. Wo.		12	11 die	20.06
AL MO	MIC	.3		25	0	19.03
-8		ORL	10.	1	0	20.86
ORLA.		M. O.B.	RLA	011	12	19.76
10.		ORL	W. S	1	24	19.79
ORLA"		du-	QPSK	12	0	19.90
Mo		LAB JORL	Mo	12	6	18.98
AB A	H WO	, W	AB	12	11	19.67
Mo		1752.5	SEL MO	25	0	19.77
AB	20275	1101-1-02.0	A.F	1	0	19.93
ORL	20375	al Ab	ORL	41 ⁰ 1	12	19.20
, AB		More	a Mr.	1 1	24	18.81
"OBJ		A	16-QAM	12	0	20.01
S W		We Work	W	12	6	19.91
AT 40		.0	ALAE O	12	11	19.85
bu	.0	alik	240	25	0	18.73



Band Width	Channel	Freq.(MHZ)	Modulation	RB C	Average Powe	
Danu widin	Channel	Fieq.(IVIDZ)		RB Size	RB Offset	(dBm)
AB	NIC.		AB	1	0 0	20.05
Mc		QLA.	ORL	1.3	7	19.65
AB		MOL S	, AE	OP1	14	18.95
ORL		3 LAP	QPSK	8	0	19.54
, AE		MOLO	S In.	8	4	19.34
JORL	Mo	A 1	AD ADRIL	8	<i>₹</i> 7	19.05
S. Mr.	AB -	CLA another	NI.	15	0	19.23
AL		1711.5	2LA	1	0	20.21
S. Mr.	19965	RLIN	Op. A	100	7	18.83
3LAE		MO.	LAB	40 ¹⁰ 1	14	19.24
NOW		RLA	16-QAM	8	0	20.11
LAB		MO.	0	8	4	19.88
MORE		all al	"In "Wolfer	8	7	19.00
0		Er. Mo.	. 6	15	0	18.96
10 to 100	0.10	al.	1 1	0	21.37	
. 6		ORLAN	40, 8 "	1	7	20.04
N		ME	QLA.	. 6 3 7		
	MORLAE	1732.5 5	QPSK	1	14	20.01
				8	0	19.98
				8	4	20.07
	М			8	7	19.70
3MHz	20175			15	0	19.97
.6				1.0	0	20.66
RLA	MOF			- CP1	7	19.20
NO.				1	14	19.85
RLA		M		8	0	20.68
Mo.		LAB ORL	Mo.	8	4	20.50
B		M	o.B	8	7 1	19.88
WO.		100	all a	15	0	19.03
OB		"Obr	No.	1	0	20.86
ORL		A. A.E	ORLAN	01	7	19.76
N. S.		"OBT	MIC	1	14	19.79
RLIN		d Mr.	QPSK	8	0	19.90
Me		LAV JORE	Mo	8	4	18.98
AB A	H MO	di.	AB	8	7	19.69
Mo		1753.4	art of	15	0	19.77
AB	00001	T. 00.4	O.B	1	0	19.93
ORI	20384	LAB	ORL	WO. 1	7	19.20
O.B		MORE	W. C.	1 📣	14	18.81
ORL		. 6	16-QAM	8	0	20.02
Me		LAL MORL	INC	<i>∞</i> 8	4	19.64
AS AS		S W.	AB	8	7	19.10
Mo		LAB	DRILL MI	15	0	18.73



Band Width	Channel	Freq.(MHZ)	Modulation	RB C	Average Powe	
Danu Widin	Chamilei	Fieq.(IVITZ)	Wodulation	RB Size	RB Offset	(dBm)
AP	35. 110	0	, Ale	23. 1	0 0	21.03
M		QLA.	ORL	1.0	2	20.85
LAB		MOL S	, AE	OPI	5	20.64
NORL		3 LAP	QPSK	3	0	21.02
II. AE		MOLO	S W	3	1/10	20.85
"Obr	Mo	S 01	AL	3	<i>∞</i> 2	20.55
S bu	AB -	Chr 1710 MORE	S W	6	0	20.67
AL		1710.7	2LA	1	0	21.01
S. Mr.	19957	RLIN	Op. A	1.00	2	20.00
3LAB		MO.	LAB	40 ¹⁰ 1	5	20.72
MOLE		RLA	16-QAM	3	0	20.90
LAB		MO.	0	3	1	20.72
MORE		AB al	MOPER	3	2	20.72
.0		WO.	.0	6	0	19.97
,A. ano	400	0.6	al. an	1	0	6. 3
. 6		1732.5	QPSK 16-QAM	21/100	2	22.01
al Al	M 20175			- 637		20.83
NO.				1	5	20.75
S MORLAL				3	0	20.81
				3	1	20.77
				3	2	20.64
1.4MHz				6	0	20.62
.0				1.0	0	21.03
RLA	20170				2	20.71
40.				1	5	20.38
RLA		Page 1		3	0	20.93
Wo.		LAB ORL		3	2	20.66
NB .	LAL			3	5	20.32
. MO	10.			6	0	19.62
3		ORL	28	100	0	21.05
RLIN		Mr. AE	QRL.III	1	2	20.38
W. VE		*OBT	MIC	1	5	21.96
RLA		du.	QPSK	3	0	20.49
Mo		LAE JORL	Wo.	3	1	20.47
AB	A H	W.	Q.B	3	2	20.43
Mo		1754.2	SPL M	6	0	21.03
O.B	R.L.A.	1734.2	0B	21	0	21.02
ORL	20392	AB	ORLA.	41 ⁰ 1	2	20.85
N.B		MORL	We "	1 📣	5	20.56
ORLAN	VE MOK	0	16-QAM	3	0	21.05
M		LAL JORL	Mo	<i>∞</i> 3	ala 1	20.38
AB A		N.	AB	3	2	20.20
Mo		LAB	DRIV MI	6	0	19.98



LTE BAND 7

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	nfiguration	Average Powe
Danu Widin	Channel	Freq.(IVIHZ)	Modulation	RB Size	RB Offset	(dBm)
LAR	35. 440	. 45	ALAB C	RI 1 1	0	21.93
in the		QLA.	ORE	1.0	49	20.85
LAB		MO	AB	OP1	99	20.64
MORLE		QLA!	QPSK	50	0	20.92
I. AF		MOLO	G III	50	25	20.85
MORL	LAE LE	0B Q1	MORI	50	49	20.72
. 6		2510	0	100	0	20.67
LAN		2510	RIA	1 1	0	21.01
. 6	20850	ORL	, &	1.00	49	20.00
RLA		ME	alAl	011	99	20.72
WO.		ORLAN	16-QAM	50	0	20.88
RI.A.		Mo	S QLA	50	25	20.55
MO.		LAP ORI	AL MORE	50	49	20.01
NB .	LA NO	IMP	.0	100	0	19.97
MO	.0	LAB	ORL MIC	1 4	0	21.98
D.B		"IOE"	ORLAB	1	49	20.83
ORL		LAB		w 1	99	20.75
M 20MHz	MORE	QPSK	50	0.01	20.81	
	.0	I GRILL	50	25	20.54	
	LA MORE	MIC	50	49	20.64	
	2535	A.A.B	100	0 4	20.62	
ZUIVII IZ	21100	2000	Ole Mis	1.3	0	21.03
LAB			LAB	1	49	20.71
MORE			16-QAM	1 0	99	20.38
LAB		Mo.		50	0	20.86
MORE		OB GI	MORE	50	25	20.45
.6		WO.	' Q	50	49	20.01
The MO	M	S	al.A. ao	100	0	19.62
.0	LAB	ORL	-0	1	0	21.05
RLA		M. OB	RLA	011	49	20.38
MO.		ORL	Mo.	1	99	21.96
RLA		Hu.	QPSK	50	0	20.89
Mo		LAB ORL	Wo.	50	25	20.47
AB	LL SIO	du.	AB	50	49	20.43
MO	H	2560	SEL MO	100	0	21.03
AB	21350	1010 2000	O.B	1	0	21.02
ORL	MORLAE	ALAB.	ORL	4 ⁰ 1	49	20.85
M		MOKE	of the	1	99	20.56
ORL		MO. B. M.	16-QAM	50	0	20.89
Jun-		LINE MORE	NA.	5 0	25	20.22
LAE 40		.0	OLAP CO	50	49	20.10
M	INC.	al.A.	Die Ma	100	0	19.98



LTE BAND 7 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation		RB Configuration		
AP ALL AND		,		RB Size	RB Offset	(dBm)	
A. C	in the	. 6	All	RI. 1 W	0 4	21.03	
Mo		QLA!	ORL	1.3	37	20.85	
AB		MOL	AB	081	74	20.64	
ORL		LAL	QPSK	36	0	21.02	
'N'		Morra	a m	36	18	20.85	
10R1	L 20825	B 01	NO REL	36	35	20.74	
S Di.		A.M. OFOT MOIN	S W	75	0	20.67	
AL AC		2507.5	al h	1 1	0	21.01	
S In		Plik	Or W	1.00	37	20.00	
3LAL		MO. TE	LAB	011	74	20.72	
VOICE		RLA	16-QAM	36	0	20.76	
LAV		W.C.	e LA	36	18	20.58	
Morris		AB CL	Mole	36	35	20.11	
. O		W. Wo.	.0	75	0	19.97	
MO MIC	49	A.B	all all	1 4	0	22.01	
.0		ORL	0,	Q Property	37	20.83	
NORLES MORLES	ME	RLA	WO.	74	20.75		
	ORL	QPSK	36	0	20.73		
	HILL	3 RLA	36	18	20.71		
	LAB ORL	Mo.	36	35	20.64		
	No.	a.B	75	0	20.62		
15MHz	21100	2535	2535	1.0	0	21.03	
A.B	21100	16-0		OP!	37	20.71	
ORL			ORL	110	74	20.71	
A.B			16-QAM	36	0	20.85	
ORL		.0	10 07 111	36 36			
M		LAL	MILE		18	20.56	
AE O		0	AB	36 75	35 0	19.98 19.62	
Mic	0.00		200	1	0	21.05	
AB		WO.	AB	, OF			
OR		QLAL.	MORT	1 0	37	20.38 21.96	
AB		MOLO	QPSK		74		
MORIE		OB OL	Qi Oit	36 36	0	20.49 20.47	
6	LAP	MOLO	O La		18		
0	H MO	.0	alar ao	36	35	20.38	
O UI		2562.5	21 411	75	0	21.03	
al.Al	21375	MIC .B	3LAB	10°4	0	21.02	
OF	In AB	QRL.A.	More	1	37	20.85	
3LAB		16-QA	16 0 4 14	1 200	74	20.56	
Mole			10-QAIVI	36	0	20.76	
S WE OF		MO	MOL	36 36	18 35	20.58 20.21	
	ALL MOSTLE MICE					00 04	



LTE BAND 7 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Powe	
Bariu Widili	Chamer	rieq.(IVII IZ)	Modulation	RB Size	RB Offset	(dBm)
AB	W.	0	AB	R. 1 W	0	21.83
M		QLA.	OBL	1.0	24	20.59
AB		WOL.	AB	081	49	20.61
ORL		3LAP	QPSK	25	0	20.62
, AE		MOLO	S III	25	12	20.60
"OBT	L 20800	20 01	A ORL	25	24	20.52
S. Dr.		Ser and	S MI	50	0	20.59
AL		2505	al.h.	1	0	21.26
S Mr.		RLL	Op. Un.	100	24	19.72
3LAE		MO. TE	LAB	1010	49	19.75
OF		RLA	16-QAM	25	0	20.97
LAB		MO	e LA	25	12	20.77
Moke		AB QL	MOFE	25 25	24	20.08
3		Er. Mo.	.0	50	0	19.73
allo,	100	D.B	all all	1	0	21.81
. 6		ORL	0.	1	24	20.69
ORLA" MOR	MI O.B	RLA	WO.	49	20.70	
0.		ORL	QPSK	25	0	20.70
10MHz 21100	M	BALA	25 25	12	19.98	
	LAB ORL	WO.	25 25	24	20.06	
	HILL	NB	50	0	20.06	
	2535	2535	1	0	21.02	
0.B	21100	16-04	0B		24	21.02
ORL			ORLAN	Was 1	49	20.76
D.B			16-QAM	25	0	
ORLAN		0	10 07 1111	25 25	12	21.05 21.63
M		LAL	MILE		24	
AD O		G In.	AB	25		20.66
ME	- 20	al.	500	50	0	20.15
AB		WOLC &	AB	1	0	21.92
ORL		ZLAIL CONTRACTOR	A ORL	<u></u>	24	20.55
AB		MOL	QPSK	1	49	20.30
ORL		3 al	QI OIL	25	0	20.60
S 40.	AB A	Bry Wolfe	S. Mr.	25	12	20.59
.40	H 110	.0	alar o	25	24	20.12
S- bu		2565	31 111	50	0	20.32
3LAE	21400	WILL TO	2LAB	1	0	21.16
OF	N. A.F	RLA	Mole	1	24	19.43
ALAP		Mo	16-QAM	1.00	49	19.55
MOL		AB -al	10-QAW	25	0	21.10
.0		110,	MO. B. M.	25	12	19.96
On		O.B	RLA	25	24	19.50
W. 10		D. 40.	50	0	19.48	



LTE BAND 7 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Power	
band widin	Channel	Freq.(IVIHZ)	Modulation	RB Size	RB Offset	(dBm)
AP	Ser. Me	0	AB	Riv 1 W	0	21.52
Mc		QLA!	ORL ME	1.3	12	20.26
AB		Morra		OP.L	24	20.21
ORL		3 LAP	QPSK	12	0	21.33
, AE		MOLO	S III	12	6	21.35
"OBT	MORE MIC	A A	A ORL	12	1 1	21.37
S. Mr.	AB L	0500.5	S III.	25	0	20.16
AL	20775	2502.5	alpha ac	1 11	0	21.17
S lan	10.00	ORLIN .	Op. a Mr.	1	12	19.21
al Al		MO	2LAP	-10 ¹⁰ 1	24	21.28
VOL.		RLL	16-QAM	12	0	21.08
3LAF		MO	B LA	12	6	20.75
MOL		AB ARI	Mole	12	11	20.02
.0		Tr. MOL	.0	25	0 111	19.19
MO.	- W	, Alb	PL. MC	1 0	0	21.05
.0		ORL	OFLAE .	21	12	20.30
RLA		W. VIE		110	24	20.29
M VO	ORL	QPSK	12	0.0	21.02	
	M	E RLA	12	6	21.05	
	LAB	Mo	© 12	11	21.06	
	la la	AB .	25	0	20.39	
5MHz	21100	2535	Oke Me	1.0	0	19.77
AB	BLIGG		AB	081	12	19.34
ORL			16-QAM	Mrs 1	24	19.39
AE				12	0	20.45
ORL		-B		12	<i>ॐ</i> 6	20.22
J. Mr.		ELA MOR	Miles	12	11	20.01
AD		.3	aLAB .C	25	0.3	19.16
J. W.	AB	ORL.	2. 40.	100	0	21.25
QLAE.		MO. TB	3LAB	,0 ¹⁰	12	21.21
OF		RLA	Morr	1 . 9	24	21.20
al.At		Me	QPSK	12	0	21.16
MOL		AB ARL	MOL	12	6	21.23
		luc.		12	11	21.05
	Н	0507.5	RLL MO	25	0	21.17
A	21425	2567.5	.3	21	0	20.51
ORLAN	MOF	M. AE	RLA	110,1	12	19.02
100		*ORT	MO	1 21.1	24	20.47
ORLA"		CAE MIC ORLOS	16-QAM	12	0	20.46
Me			Wo.	√ 12	6	20.55
AB C		du.	AB	12	11	20.01
WO.	AP	PLT. WO	25	0	19.16	



LTE BAND 17(Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	Average Power	
Danu widin	Chamei	Freq.(IVIDZ)	Modulation	RB Size	RB Offset	(dBm)
AF	Sr. Mo	. 6	LAB	R. 1 W	0	22.13
Me		QLAL	Okr W	1.0	24	20.34
LAB		MO. STUB	AB	OP1	49	20.28
ORL			QPSK	25	0	20.39
LAF		MOL	a la	25	12	20.36
MORE	MC ALAB THE	OB OL	MORL	25	24	20.23
. 6		700.0	0 10.	50	0	20.34
AL		709.0	QLA M	1 1	0	21.83
B	23780	ORLAN	0, 8	100	24	19.35
QLA.		ME	QLAP.	1011	49	19.28
No.		ORLAN	16-QAM	25	0	21.77
QLA.		W.	B ala	25	12	20.03
MOL		AB ORL	More	25	24	19.22
B	alar anor	MIC	.0	50	0	19.34
MO	. 6	I.Ab	ORL MIC	1	0	21.82
OB.		WOLF W	OB.	1	24	20.20
ORL		LAB	ORL	W 1	49	20.19
ORLAR	MORE	QPSK	25	0	20.30	
	. a "	GRL	25	12	20.24	
Mo	M M	LATE	Mo	25	24	20.13
10MHz		710.0	710.0	50	0	20.25
TUIVITZ		MORL RLAB NO.	Ote We	1.3	0	21.28
LAB	23790		LAB	1	24	21.18
OF			16-QAM	1 0	49	20.87
LAB				25	0	21.15
MORE		all all	MORE	25	№ 12	20.98
6		I'm MO	. 6	25	24	20.88
-10°	III.	.0	ala.	50	0.	20.28
-0	LAB	ORL	9.	1	0	22.05
RLA		AND A.E	RLA	1	24	20.34
0.		ORL	MO.	1	49	20.25
QL.A.		M	QPSK	25	0	20.36
Mo.		Ab ORL	WO.	25	12	20.25
B	True H MOR	HI.	AB	25	24	20.18
MO		711.0	Ri. MC	50	0	20.26
AB	20000	11.0 W	a.B	1	0	21.34
ORL	23800	LAB	ORL	41 ⁰ 1	24	21.03
A.B		MORE	M. OF	1 04	49	21.21
ORL		- W	16-QAM	25	0	21.30
M		LA. MORLE	HILL	2 5	12	21.11
AD AO		-B	SLAP O	25	24	20.98
MIC	2LA.	Die W	50	0	19.26	



LTE BAND 17 (Continue)

Band Width	Channel	Freq.(MHZ)	Modulation	RB Cor	figuration	Average Powe
				RB Size	RB Offset	(dBm)
. 6	I Alb	ORL	0. "	100	0	21.13
	MORE	MC VB	2LAP	011	12	20.29
	A.B	ORLAN	MOL	1 .9	24	22.02
	ORL	Mo	QPSK	12	0	21.06
	S Mr.	AB ORL	MOL	12	6	21.15
	ALAL L NO	INC	20	12	11	21.23
	//	700 5	ORLA ME	25	0	21.12
	2LAP	706.5		21	0	21.15
	23755	W. VE	RLL	WO.	12	20.85
	3LAL	ORL	MO	1 1	24	21.93
	Morra	Z W	16-QAM	12	0	21.20
	20	LAD	MO	√ 12	6	20.69
	WILL WO	Z M	AB	12	11	20.36
	.3	LAB	ORL MC	25	0	20.23
	QP.L.	110.	AB	OP I	0	21.95
	MO	T.A.B	ORL	INC 1	12	21.88
	RLA	MOLE	A MILL	1 081.	24	22.02
	WO.	3 N	QPSK	12		21.04
	AB	Like MORE	M	12	6	20.98
	М	.0	CLAB CO	12	11	20.95
	A.B.	ari.A.	Ole. W	25	0	21.06
5MHz	ORL	710.0	a LARE	1011	0	20.69
	23790	RLAN	MOL	1 . 9	12	20.07
	ORL	WO.	e LAI	1.0Pc	24	20.11
	lu lu	OB CAL	16-QAM	12	0	21.02
	LAB	T. MO.	.0	12	6	20.69
	No.	a.B	RLAN	12	11	20.33
	LAB	ORLA	D	25	0	20.01
	10°	W. OB	Ql.	1	0	22.02
	LAB	ORL	Mo.	1 24	12	22.05
	MORE	M	B ala	140	24	21.95
	.0	LAP ORL	QPSK	1 2	0	21.19
	CLA MOE	INC	O.B	12	6	21.20
	н	LAB	ORL MC	12	11	21.15
	RL	MORE N	o.B	25	0	21.08
	Mo.	713.5	OPL	1	0	21.18
	23825	MOR	W. O.E.	1.084.8	12	21.39
	MO	.8 "	ORLA	1	24	21.40
	NB a	LAL	16-QAM	12	0	21.20
	3 Ordin Moh	6	AAB A	12	6	20.96
	N.B	QLA.	DEE INC	12	11	20.96
AB RLA	MOL W	A.B	25	0	19.91	



9. MEASUREMENT OF CONDUCTED OUTPUT POWER

1. WCDMA mode conducted output power values

band	W	CDMA 8	50	W	CDMA 1	700	W	CDMA 19	900
ARFCN	4132	4183	4233	1312	1413	1513	9262	9400	9538
subtest		dBm			dBm			dBm	
non	24.54	24.29	24.07	23.06	23.36	22.94	22.17	22.32	22.34
1 1	24.41	24.30	24.00	23.20	23.45	22.89	22.06	22.21	22.28
2	24.40	24.29	24.01	23.15	23.42	22.84	22.09	22.18	22.25
3	23.91	23.78	23.50	22.64	22.93	22.56	21.58	21.67	21.74
4	23.90	23.79	23.52	22.66	22.95	22.58	21.57	21.64	21.73
1/10	24.28	24.02	23.84	23.27	23.48	22.85	19.61	21.95	22.24
2	22.27	22.03	21.82	21.26	21.45	20.84	17.60	19.94	20.23
3	23.28	23.02	22.83	22.25	22.47	21.81	18.59	20.93	21.24
4	22.26	22.02	21.81	21.25	21.46	20.83	17.60	19.92	20.21
5	24.27	24.01	23.82	23.26	23.45	22.84	19.60	21.94	22.24
1,10	24.49	24.28	24.56	23.18	23.68	24.96	21.17	21.03	21.14
40		4	it Power	test of \	VCDMA	/HSDPA/	HSUPA/	HSPA+ v	vas
	ARFCN subtest non 1 2 3 4 1 2 3 4 1 7 The Conc	ARFCN 4132 subtest non 24.54 1 24.41 2 24.40 3 23.91 4 23.90 1 24.28 2 22.27 3 23.28 4 22.26 5 24.27 1 24.49 The Conducted R	ARFCN 4132 4183 subtest dBm non 24.54 24.29 1 24.41 24.30 2 24.40 24.29 3 23.91 23.78 4 23.90 23.79 1 24.28 24.02 2 22.27 22.03 3 23.28 23.02 4 22.26 22.02 5 24.27 24.01 1 24.49 24.28	ARFCN 4132 4183 4233 subtest dBm non 24.54 24.29 24.07 1 24.41 24.30 24.00 2 24.40 24.29 24.01 3 23.91 23.78 23.50 4 23.90 23.79 23.52 1 24.28 24.02 23.84 2 22.27 22.03 21.82 3 23.28 23.02 22.83 4 22.26 22.02 21.81 5 24.27 24.01 23.82 1 24.49 24.28 24.56 The Conducted RF Output Power	ARFCN 4132 4183 4233 1312 subtest dBm 24.54 24.29 24.07 23.06 1 24.41 24.30 24.00 23.20 2 24.40 24.29 24.01 23.15 3 23.91 23.78 23.50 22.64 4 23.90 23.79 23.52 22.66 1 24.28 24.02 23.84 23.27 2 22.27 22.03 21.82 21.26 3 23.28 23.02 22.83 22.25 4 22.26 22.02 21.81 21.25 5 24.27 24.01 23.82 23.26 1 24.49 24.28 24.56 23.18 The Conducted RF Output Power test of Value	ARFCN 4132 4183 4233 1312 1413 subtest dBm dBm dBm non 24.54 24.29 24.07 23.06 23.36 1 24.41 24.30 24.00 23.20 23.45 2 24.40 24.29 24.01 23.15 23.42 3 23.91 23.78 23.50 22.64 22.93 4 23.90 23.79 23.52 22.66 22.95 1 24.28 24.02 23.84 23.27 23.48 2 22.27 22.03 21.82 21.26 21.45 3 23.28 23.02 22.83 22.25 22.47 4 22.26 22.02 21.81 21.25 21.46 5 24.27 24.01 23.82 23.26 23.45 1 24.49 24.28 24.56 23.18 23.68 The Conducted RF Output Power test of WCDMA	ARFCN 4132 4183 4233 1312 1413 1513 subtest dBm non 24.54 24.29 24.07 23.06 23.36 22.94 1 24.41 24.30 24.00 23.20 23.45 22.89 2 24.40 24.29 24.01 23.15 23.42 22.84 3 23.91 23.78 23.50 22.64 22.93 22.56 4 23.90 23.79 23.52 22.66 22.95 22.58 1 24.28 24.02 23.84 23.27 23.48 22.85 2 22.27 22.03 21.82 21.26 21.45 20.84 3 23.28 23.02 22.83 22.25 22.47 21.81 4 22.26 22.02 21.81 21.25 21.46 20.83 5 24.27 24.01 23.82 23.26 23.45 22.8	ARFCN 4132 4183 4233 1312 1413 1513 9262 subtest dBm dBm dBm 22.94 22.17 1 24.54 24.29 24.07 23.06 23.36 22.94 22.17 1 24.41 24.30 24.00 23.20 23.45 22.89 22.06 2 24.40 24.29 24.01 23.15 23.42 22.84 22.09 3 23.91 23.78 23.50 22.64 22.93 22.56 21.58 4 23.90 23.79 23.52 22.66 22.95 22.58 21.57 1 24.28 24.02 23.84 23.27 23.48 22.85 19.61 2 22.27 22.03 21.82 21.26 21.45 20.84 17.60 3 23.28 23.02 22.83 22.25 22.47 21.81 18.59 4 22.26 22.02 21.81	ARFCN 4132 4183 4233 1312 1413 1513 9262 9400 subtest dBm dBm dBm non 24.54 24.29 24.07 23.06 23.36 22.94 22.17 22.32 1 24.41 24.30 24.00 23.20 23.45 22.89 22.06 22.21 2 24.40 24.29 24.01 23.15 23.42 22.84 22.09 22.18 3 23.91 23.78 23.50 22.64 22.93 22.56 21.58 21.67 4 23.90 23.79 23.52 22.66 22.95 22.58 21.57 21.64 1 24.28 24.02 23.84 23.27 23.48 22.85 19.61 21.95 2 22.27 22.03 21.82 21.26 21.45 20.84 17.60 19.94 3 23.28 23.02 22.83 22.25

2. GSM Mode

Band	Channel	Frequency (MHz)	Output Power(dBm)
CCM	128	824.2	32.96
GSM	190	836.6	32.99
850	251	848.8	33.01
DOG	512	1850.2	28.64
PCS	661	1880.0	28.20
1900	810	1909.8	28.00



3. GPRS Mode Conducted peak output power

A \$ 3 '			. 6.91		. 3/2		
Dand	Channal	nel Frequency (MHz)	Output Power(dBm)				
Band Channel	Channel		Slot 1	Slot 2	Slot 3	Slot 4	
0014	128	824.2	32.49	31.34	30.31	29.30	
GSM	190	836.6	32.40	31.25	30.22	29.21	
850	251	848.8	32.30	31.15	30.12	29.11	
DOC	512	1850.2	27.99	26.84	25.81	24.80	
PCS	661	1880.0	27.62	26.47	25.44	24.43	
1900	810	1909.8	27.49	26.34	25.31	24.30	

GPRS Time-based Average Power

Band	Channel	Frequency		Output Power(dBm)				
Dand	Onamici	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4		
MO.	128	824.2	23.46	25.32	26.05	26.29		
GSM	190	836.6	23.37	25.23	25.96	26.20		
850	251	848.8	23.27	25.13	25.86	26.10		
DOC 1110	512	1850.2	18.96	20.82	21.55	21.79		
PCS 1900	661	1880.0	18.59	20.45	21.18	21.42		
	810	1909.8	18.46	20.32	21.05	21.29		

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

Dond	Channel	Frequency (MHz)	Output Power(dBm)				
Band			Slot 1	Slot 2	Slot 3	Slot 4	
GSM	128	824.2	29.77	28.62	27.59	26.58	
	190	836.6	29.84	28.69	27.66	26.65	
850	251	848.8	29.83	28.68	27.65	26.64	
DOC	512	1850.2	27.40	26.25	25.22	24.21	
PCS 1900	661	1880.0	27.09	25.94	24.91	23.90	
	810	1909.8	27.17	26.02	24.99	23.98	

EDGE Time-based Average Power

Band	Channel	Frequency		Output P	ower(dBm)	
Bana	Onamici	(MHz)	Slot 1	Slot 2	Slot 3	Slot 4
COM	128	824.2	20.74	22.60	23.33	23.57
GSM	190	836.6	20.81	22.67	23.40	23.64
850	251	848.8	20.80	22.66	23.39	23.63
DCC	512	1850.2	18.37	20.23	20.96	21.20
1900	661	1880.0	18.06	19.92	20.65	20.89
	810	1909.8	18.14	20.00	20.73	20.97

5. WiFi Average output power

		Frequency	Output Power(dBm)				
Band	Channel	(MHz)	802.11b	802.11g	802.11n20		
		(2)	(DSSS)	(OFDM)	(OFDM)		
S W	J13	2412	14.65	12.44	11.43		
WiFi	6	2437	13.69	11.76	10.75		
ME	11	2462	14.48	12.68	11.55		



6. BT+EDR 2.1 peak output power

Bond	Channel	Frequency		Output Power(dl	Bm)
Band	Channel	(MHz)	GFSK	π/4-DQPSK	8-DPSK
AB OF	0 10	2402	8.55	7.95	8.37
BT	39	2441	8.54	8.58	8.38
RLAB	78	2480	8.16	7.79	7.99

Band	Channel	Frequency	Output Power(dBm)	
		(MHz)	GFSK	
ORLA	0	2402	-1.15	
BT	19	2441	-1.17	
MORE	39	2480	-0.45	



10. TEST RESULTS LIST

Summary of Measurement Results (GSM 850MHz Band)

		Doving Toot	Doving Toot	CAD(M/Ka)	Cooling	Scaled SAR	Plot
Phantom Config	gurations	Device Test	Device Test	SAR(W/Kg),	Scaling	and an	
		Positions	channel	1g Peak	Factor	(W/Kg), 1g	No.
Right Side Of Head		Cheek/Touch		0.106	ORLA	0.119	
		Ear/Tilt	ORLAN	0.065		0.073	1110
Left Side Of Head		Cheek/Touch	054	0.138	4.440	0.154	9 1
		Ear/Tilt 251		0.054	1.119	0.060	
AE MORL	CCM	Back upward	LAB	0.296		0.331	RLA
	GSM	Front upward	ORL THE	0.313		0.350	
	Ok.	W. VE	128	0.914	1.047	0.957	alloi
	ORLA	Back upward	190	0.931	1.069	0.995	B
Body	2 Mic	AB SPLA	251	0.952	1.094	1.041	
(10mm	110	Ser Mo	128	1.013	1.047	1.061	RLAN
Separation)	GPRS	Front upward	190	1.026	1.069	1.097	
	ORL	INC. AE	251	1.141	1.094	1.248	2
	RLAF	Edge A	, Me all	0.702	MORE	0.735	B
S MORLE	Mo.	Edge B	251	0.626	1.047	0.655	
	40	Edge D	AB	0.143		0.150	CLAR



Summary of Measurement Results (GSM 1900MHz Band)

Temperature: 21	.0~23.8°C	, humidity: 54~60	0%.	-LAE	ORLAN	MORE	<i></i>
Phantom Configurations		Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Right Side Of Head		Cheek/Touch	Cheek/Touch		RL	0.071	3
		Ear/Tilt	ORLA	0.015	LAB	0.016	0,
Left Side Of Head		Cheek/Touch	F401.HE	0.048	1,000	0.052	, OP
		Ear/Tilt	512	0.022	1.086	0.024	9
MORE G	0014	Back upward	AB ORI	0.730	B	0.793	
	GSM	Front upward	· B W	0.588	RLA	0.639	LAB
	.0	LAB	512	0.846	1.047	0.886	OF
	ORLA	Back upward	661	0.808	1.140	0.921	OR.
MORAL AS F			810	0.795	1.175	0.934	Q bu
Body	Mole	Front upward	512	0.604	1.047	0.632	
(10mm	GPRS	ORLA	512	0.932	1.047	0.976	4
Separation)	.0 4	Edge A	661	0.912	1.140	1.040	Office
	ORLAN		810	0.893	1.175	1.049	AR!
		Edge B	512	0.161	1.047	0.169	S Me
	MORIE	Edge D	512	0.107	1.047	0.112	

Note:

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

Band	Channel	Slots	Power level	Duty Cycle	
GPRS850	128	4	5	1:2	
GPRS1900	512	4	0 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 Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Right Side	Cheek/Touch	RLAD	0.144	A.B	0.160	
Of Head	Ear/Tilt	MO. AE	0.069	MORL	0.077	RLA
Left Side	Cheek/Touch	MORL	0.153	RLAD	0.170	5
Of Head	Ear/Tilt	AB SEL	0.086	Mo	0.096	-110
AB	Back upward	4132	0.315	1.112	0.350	AB .
Body	Front upward	RLAB	0.428	A.B	0.476	6
(10mm	Edge A	MC AE	0.294	MORIL	0.327	RLA
Separation)	Edge B	MORL	0.129	RLAB	0.143	Mo
RLAP MO	Edge D	all al	0.101	Mo.	0.112	

Summary of Measurement Results (WCDMA 1700MHz Band)

Temperature: 21.0~2	23.8°C, humidity: 54	~60%.	Mo. VB	al AB	JORL	Mor
Phantom Configurations	Device Test Positions	Device Test channel	SAR(W/Kg), 1g Peak	Scaling Factor	Scaled SAR (W/Kg), 1g	Plot No.
Right Side	Cheek/Touch	LAB	0.105	~B	0.108	7
Of Head	Ear/Tilt	4.440	0.047	4.000	0.049	SLAB
Left Side	Cheek/Touch	1413	0.085	1.033	0.088	WOL
Of Head	Ear/Tilt	ME	0.039	Moles	0.040	.08
10, 8 11.	TLAB ORLA	1312	0.794	1.107	0.879	· B
ORLA	Back upward	1413	0.812	1.033	0.839	RILL
E NICOLAE		1513	0.801	1.138	0.912	LAB
Body	Front upward	1413	0.744	1.033	0.769	MOLE
(10mm	Mole	1312	0.809	1.107	0.896	N. O.
Separation)	Edge A	1413	0.837	1.033	0.865	8
ORLAL W		1513	0.813	1.138	0.925	al A
S ME AE	Edge B	1413	0.105	1.033	0.108	AB
MORL	Edge D	1413	0.084	1.033	0.087	MORE



Summary of Measurement Results (WCDMA 1900MHz Band)

Plan Car	23.8°C, humidity: 54		CAD(\A\/\/ca)	Cooling	Cooled CAD	Dlot
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" MO	0.085		0.088	9
Of Head	Ear/Tilt	Ear/Tilt		4.000	0.018	RLA
Left Side	Cheek/Touch	9400	0.077	1.038	0.080	We
Of Head	Ear/Tilt	RLAD	0.014		0.015	-MO
A.B	RLA MORE	9262	0.984	1.079	1.062	OB
MORL	Back upward	9400	1.021	1.042	1.064	Riv
AB TELAB	MORT. MC	9538	0.995	1.038	1.033	RLA
MO	E RLAN	9262	0.951	1.079	1.026	Mo
Body	Front upward	9400	0.988	1.042	1.029	.,,0
(10mm	-RLAB MORL	9538	0.969	1.038	1.006	of the
Separation)	N. P.	9262	1.084	1.079	1.170	RL
AB RIAB	Edge A	9400	1.147	1.042	1.195	10
MOL	E RIAB	9538	1.101	1.038	1.143	Mo.
RLAS MORL	Edge B	9400	0.138	1.038	0.143	
No. Bu	Edge D	9400	0.101	1.038	0.105	. 6

Note:

- When the 1-g SAR for the mid-band channel or the channel with the highest output power satisfy the following conditions, testing of the other channels in the band is not required. (Per KDB 447498 D01 General RF Exposure Guidance v05r02)
 - ≤ 0.8 W/kg and transmission band ≤ 100 MHz
 - ≤ 0.6 W/kg and, 100 MHz < transmission bandwidth ≤ 200 MHz
 - ≤ 0.4 W/kg and transmission band > 200 MHz
- 2. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB Middle than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities.
- BT & WiFi SAR test is conducted according to section 12 stand-alone SAR evaluation of this report.
- 5. 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.

- 6. 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.
- 7. 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.
- 8. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB higher than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities. This module supports 3GPP release R7 HSPA+ using QPSK only without 16QAM in the uplink. So PBA is not required for HSPA+.



Summary of Measurement Results (WLAN 802.11b Band)

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	0.216	HIO.	NB TO	LAD	0.227	11
Of Head Ear/Tilt	WO.	0.195	110°	kr. Mo	AB	0.205	MORL	
Left Side	Cheek/Touch	MORL	0.103	ORLAG N	1.010	1.040	0.108	
Of Head	Ear/Tilt	0B 44	0.076				0.080	N
.02	Back upward	11	0.053	99%			0.056	12
(10mm Separation) Front upward Edge C Edge D	Front upward	MORLAE	0.030	Mor	NB W		0.032	
	Edge C		0.047	.no	Kr. MO.		0.049	MORIL
	Edge D	*ORL	0.028	' Q .	LAB		0.029	44.

Notes:

- 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:
 - When the reported SAR of the highest measured maximum output power channel for the exposure configuration is 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
 - 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.
- 2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.
- 3. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is 0.8 W/kg or all test positions are



measured.

4. Justification for test configurations for WLAN per KDB Publication 248227 D01DR02-41929 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.



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

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Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
of all	AB MO	Sry HOE	20050	0.948	1.059	1.004	7/100
ORLE		Back upward	20175	0.877	1.026	0.900	40
ZLAE		MOL	20300	0.926	1.076	0.996	2LAB
Body		Front upward	20050	0.713	1.026	0.732	
(10mm	No.4	18 AL	20050	1.125	1.059	1.191	OPL
Separation)		Edge A	20175	1.267	1.026	1.300	13
PETER MOR		LAB	20300	1.157	1.076	1.245	47
SLAB		Edge B	20050	0.182	1.026	0.187	LAB
MOR		Edge D	20050	0.125	1.026	0.128	

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

	0,0 (10,0	57 ti C Emilia 11011/1	19 4.10.4904 0.10	· · · g. a, • p a.			
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
MORL	ALAE CLAS	MORLAL	20050	0.859	1.026	0.881	er.
ORLIN	MOL	Back upward	20175	0.827	1.021	0.844	ORL
- B M	AB 10	WOL WOL	20300	0.835	1.084	0.905	
Body	VB W	Front upward	20175	0.654	1.021	0.668	Me
(10mm	No.5	Mo. 'B E	20050	0.945	1.026	0.970	LAB
Separation)	TLAB	Edge A	20175	0.848	1.021	0.866	
B	MOL	as ma	20300	0.912	1.084	0.989	ORL
-B 111	AB O	Edge B	20175	0.114	1.021	0.116	Par.
ORLA	E M	Edge D	20175	0.086	1.021	0.088	MC



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

00	7-	umidity: 50~60%. SAR Limit: 1.6W/k		r 1gram, Spa	atial Peak	MORE	3 1110
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Body	Ale MC	Back upward	00475	0.618	4.000	0.679	3
(10mm Separation)	No.6	Edge A	20175	0.701	1.099	0.770	LAB

Additional LTE test requirement for 16QAM

Not required.

Additional LTE test requirement for other bandwidth

Not required.



Summary of Measurement Results (LTE Band 7 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	Test	Device Test	Device Test	SAR	Scaling	Scaled	Plot
Configurations	Mode	Positions	channel	(W/Kg)	Factor	SAR	No.
all al	AP	Br. Mo.	20850	0.746	1.016	0.758	9
	OB W	Back upward	21100	0.815	1.005	0.819	111
	ORL	MO. OB	21350	0.819	1.009	0.826	al AB
	al Al	NORL	20850	0.880	1.016	0.894	
Body	Mor	Front upward	21100	0.944	1.005	0.949	JORL
(10mm	No.9	KI'M MOIL	21350	0.932	1.009	0.940	9
Separation)	ORLAB	2LAB	20850	1.121	1.016	1.139	M
		Edge A	21100	1.342	1.005	1.349	14
	II.	ORLAN	21350	1.226	1.009	1.237	
	Mole	Edge B	21100	0.455	1.005	0.457	ORLA
e m	AB .C	Edge D	21100	0.155	1.005	0.156	Bur

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

1 OWOI DINCHING.	070 1070	T TOWN	lg avolagea eve	r rgram, opt	T Can	UI.	4
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
IN ORLE	Mora	Back upward	20850	0.725	1.019	0.739	NORLA
of a	AB	Mo.	20850	0.836	1.019	0.852	3
ORL. MOL	NB W.	Front upward	21100	0.825	1.045	0.862	177
Body	ORLIN	MOL VE IN	21350	0.814	1.027	0.836	2LAB
(10mm	No.10	ORL	20850	1.083	1.019	1.104	
Separation)	MOL	Edge A	21100	0.991	1.045	1.036	ORL
-B 111	AB C	ALIA MORE	21350	0.985	1.027	1.012	9
ORLA MOR	"E W	Edge B	20850	0.282	1.019	0.287	977
LAB	ORLA	Edge D	20850	0.117	1.019	0.119	LAB



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

- CP	J	umidity: 50~60%. SAR Limit: 1.6W/k		r 1gram, Spa	atial Peak	MORE	B MC ON
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
Body	AR MC	Front upward	04400	0.708	4.004	0.772	9
(10mm Separation)	No.6	Edge A	21100	0.854	1.091	0.932	-LAB

Additional LTE test requirement for 16QAM

Not required.

Additional LTE test requirement for other bandwidth

Not required.

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

Temperature: 21.	0~23.8°C, h	umidity: 50~60%.					
Power Drift limit:-	5%~+5%	SAR Limit: 1.6W/k	Kg averaged ove	r 1gram, Spa	atial Peak	MO	QE .
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
ORLA	10	Back upward	JELAE MOR	0.083	ZLAB	0.090	15
Body	ORLA	Front upward	CLAB	0.082	Mole	0.089	LAB
(10mm	No.11	Edge A	23780	0.057	1.089	0.062	
Separation)	Mole	Edge B	3 ORLAN	0.054	~B ///	0.059	ORLA
-E 1112	AB 40	Edge D	- B MI	0.035	RLA	0.038	la.



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

		umidity: 50~60%.		Mole	VE W	RLAB	ORL
Power Drift limit:-	-5%~+5%	SAR Limit: 1.6W/k	Kg averaged ove	r 1gram, Spa	atial Peak	HOLE	3 60.
Phantom Configurations	Test Mode	Device Test Positions	Device Test channel	SAR (W/Kg)	Scaling Factor	Scaled SAR	Plot No.
IN INDRUM.	Morra	Back upward	.C NORLAN	0.053	65	0.054	NORL
Body	Ale	Front upward	OB III	0.046	ORL	0.047	9
(10mm	No.12	Edge A	23780	0.034	1.026	0.035	4
Separation)	ORL	Edge B	RLAB	0.020	Mor	0.021	al Alb
	a A	Edge D	"IO"	0.014	P ~ @	0.014	

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.



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.
- Per KDB 447498, when the SAR procedures require multiple channels to be tested and the 1-g SAR for the highest output channel is less than 0.8 W/kg and peak SAR is less than 1.6W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.
- 3. The WCDMA mode is test with 12.2kbps RMC and TPC set to all "1", if maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit (i.e. 1.2W/Kg 1g) and maximum average output of each RF channel with HSDPA/HSUPA active is less than 1/4 dB higher than that measured without HSDPA/HSUPA using 12.2kbps RMC, according to KDB 941225D01v02, SAR is not required for this handset with HSPA capabilities. This module supports 3GPP release R7 HSPA+ using QPSK only without 16QAM in the uplink. So PBA is not required for HSPA+.



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	33.01	1.119
LAB	ORLAND MORE THE LAB	29.30	1.047
GPRS 850	PCL = 5, PWR =29+-0.5(4 slots)	29.21	1.069
	MORE MIC AE TRIAB	29.11	1.094
GSM 1900	PCL = 0, PWR =28.5+-0.5	28.64	1.086
PLAS MORE	THE ARE SELAN MORE	24.80	1.047
GPRS1900	PCL = 0, PWR =24.5+-0.5(4 slots)	24.43	1.140
	IC. AB I. SELAB MORE MO.	24.30	1.175
WCDMA 850	Max output power =24(+1/-2)	24.54	1.112
No.	E SELAN MORE ME AE	23.06	1.107
WCDMA 1700	Max output power =22.5(+1/-2)	23.36	1.033
	SELAS MORL MO. AE IN	22.94	1.138
WCDMA 1900	AB GLAS MORE ME	22.17	1.079
	Max output power =21.5(+1/-2)	22.32	1.042
	E W SLAS MOSL MO. DE	22.34	1.038
CLAR TORK	the of Grue Work	20.75	1.059
	Max output power =20.5+-0.5(1RB)	20.89	1.026
LTE DANIDA	O. TE W. STIPE MOST. HO.	20.68	1.076
LTE BAND4	HORE HAD BE STAFF	19.89	1.026
(QPSK)	Max output power =19.5+-0.5(50RB)	19.91	1.021
	HOT AE RELATE HORLE	19.65	1.084
	Max output power =20+-0.5(100RB)	20.09	1.099
ORL	O DE TURE TOPLE MO	21.93	1.016
	Max output power =21.5+-0.5(1RB)	21.98	1.005
LTE DANIDZ	E III SLAE LORLE MOLE IN	21.96	1.009
LTE BAND7	MO JE R TLAB TOPLE	20.92	1.019
(QPSK)	Max output power =20.5+-0.5(50RB)	20.81	1.045
	OF THE TLAB TOPLE MOR	20.89	1.027
	Max output power =20.5+-0.5(100RB)	20.62	1.091
LTE BAND17	Max output power =22+-0.5(1RB)	22.13	1.089
(QPSK)	Max output power =20+-0.5(25RB)	20.39	1.026
802.11b	Max output power =14.5+-0.5	14.65	1.084



11. REPEATED SAR MEASUREMENT

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

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

			Meas.S	SAR(W/kg)	Largest to
Band	Test Position	Test Channel	Original	Repeated	Smallest SAR Ratio
GPRS 850	Body	251	1.141	1.150	1.008
GPRS 1900	Body	512	0.932	0.924	1.009
WCDMA 1700	Body	1413	0.837	0.844	1.008
WCDMA 1900	Body	9400	1.147	1.155	1.007
LTE Band 4	Body	20175	1.267	1.281	1.011
LTE Band 4 (repeated)	Body	20175	1.281	1.274	1.005
LTE Band 7	Body	21100	1.342	1.323	1.014
LTE Band 7 (repeated)	Body	21100	1.323	1.318	1.004



12. 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)	31.62	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤ -	Yes
ВТ	7.94	3.0 for 1-g SAR	No

Test distance	Age to the same of	THE ARE OFLAT MORE INC	
Band	Highest power(mW) per tune up	1-g SAR test threshold	Test required?
WIFI(2.4G)	31.62	[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)] ≤	Yes
ВТ	7.94	3.0 for 1-g SAR	No MO

The SAR test for BT is not required.

The SAR test for 802.11b (2.4GHz) is required, 802.11g/HT20/HT40 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=1.58 mW; min. test separation distance= 5mm for Head; f=2.4GHz)

BT estimated Head SAR =0.328W/Kg (1g)

(Max power=1.58 mW; min. test separation distance= 10mm for Body; f=2.4GHz)

BT estimated Body SAR =0.164W/Kg (1g)





Simultaneous SAR

	LAB	Si	multaneous t	ransmission con	ditions	
	More	WWAN	ORLA	WLAN	1 411	Sum of
#	LTE Data	GSM	UMTS	802.11b/g/n	ВТ	WWAN& WLAN
1	×	S W	AB	×	OR	×
2	AB	×	Mokr	×	QRI.AL	×
3	MORE	INC. AF	×	×	Mo	×
4	×	MORE	Me	AB SELF	×	×
5	MIC	×	RLAI MC	MO	×	ALLAN X MORE
6	ELAL MOS	III.	×	RLAN	×	×

Note:

- 1. When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the Wi-Fi transmitter and another WWAN transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions. The "Portable Hotspot" feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.
- 2. The hotspot SAR result may overlap with the body-worn accessory SAR requirements, per KDB 941225 D06, the more conservative configurations can be considered, thus excluding some unnecessary body-worn accessory SAR tests.
- 3. GSM supports voice and data transmission, though not simultaneously. WCDMA supports voice and data transmission simultaneously.
- 4. Simultaneous Transmission SAR evaluation is not required for BT and WiFi, because the software mechanism have been incorporated to guarantee that the WLAN and Bluetooth transmitters would not simultaneously operate.
- 5. Per KDB 447498D01v05r01, Simultaneous Transmission SAR Evaluation procedures is as followed:
 - Step 1: If sum of 1 g SAR < 1.6 W/kg, Simultaneous SAR measurement is not required.
 - Step 2: If sum of 1 g SAR > 1.6 W/kg, ratio of SAR to peak separation distance for pair of transmitters calculated.





Step 3: If the ratio of SAR to peak separation distance is ≤ 0.04, Simultaneous SAR measurement is not required.

Step 4: If the ratio of SAR to peak separation distance is > 0.04, Simultaneous SAR measurement is required and simultaneous transmission SAR value is calculated.

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

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

6. Applicable Multiple Scenario Evaluation

Test Position	Main Ant. SARMax (W/Kg)	Bluetooth SAR(W/Kg)	WiFi SARMax(W/Kg)	∑1-g SARMax(W/Kg)	
				BT&Main Ant	WiFi&Main Ant
Head SAR	0.170	0.328	0.227	0.498	0.397
Body SAR	1.248	0.164	0.056	1.412	1.304

Simultaneous Transmission SAR evaluation is not required for WiFi and WCDMA&GSM<E, because the sum of 1g SARMax is **1.304** W/Kg < 1.6W/Kg for Wifi and WCDMA&GSM<E. Simultaneous Transmission SAR evaluation is not required for BT and WCDMA&GSM<E, because the sum of 1g SARMax is **1.412** W/Kg < 1.6W/Kg for BT and WCDMA&GSM<E. (According to KDB 447498D01v05r01, the sum of the Highest <u>reported</u> SAR of each antenna does not exceed the limit, simultaneous transmission SAR evaluation is not required.)



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



17. ANNEX A GENERAL INFORMATION

1. Identification of the Responsible Testing Laboratory

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

2. Identification of the Responsible Testing Location

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



3. List of Test Equipments

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

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