

TEST REPORT FOR SAR TESTING

Report No.: SRTC2020-9004(F)-20041302 (H)

Product Name: Smartphone

Product Model: HLTE103E

Applicant: Hisense International Co., Ltd.

Manufacturer: Hisense Communications Co., Ltd.

Specification: Part 2.1093

IEEE Std 1528

KDB Procedures

FCC ID: 2ADOBHLTE103E

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District, Beijing, P.R. China

Tel: 86-10-57996183 Fax: 86-10-57996388

Contents

1. GENERAL INFORMATION	2
1.1 NOTES OF THE TEST REPORT.....	2
1.2 INFORMATION ABOUT THE TESTING LABORATORY.....	2
1.3 APPLICANT’S DETAILS	2
1.4 MANUFACTURER’S DETAILS	2
1.5 TEST ENVIRONMENT	3
2. DESCRIPTION OF THE DEVICE UNDER TEST.....	3
2.1 FINAL EQUIPMENT BUILD STATUS	3
2.2 SUPPORT EQUIPMENT.....	5
3. REFERENCE SPECIFICATION	6
4. TEST CONDITIONS.....	7
4.1 PICTURE TO DEMONSTRATE THE REQUIRED LIQUID DEPTH	7
4.2 TEST SIGNAL, FREQUENCIES AND OUTPUT POWER.....	7
4.3 SAR MEASUREMENT SET-UP.....	7
4.4 PHANTOMS	8
4.5 TISSUE SIMULANTS.....	8
4.6 DESCRIPTION OF THE TEST PROCEDURE	9
5 RESULT SUMMAR	12
6 TEST RESULT.....	14
6.1 MANUFACTURING TOLERANCE.....	14
6.2 GSM MEASUREMENT RESULT.....	25
6.3 WCDMA MEASUREMENT RESULT	28
6.4 LTE MEASUREMENT RESULT	34
6.5 BLUETOOTH MEASUREMENT RESULT	60
6.6 WI-FI MEASUREMENT RESULT.....	60
6.7 STANDALONE SAR TEST EXCLUSION CONSIDERATIONS	61
6.8 RF EXPOSURE CONDITIONS	63
6.9 SYSTEM CHECKING.....	66
6.10 SAR TEST RESULT	67
6.11 SAR MEASUREMENT VARIABILITY	85
6.12 SIMULTANEOUS TRANSMISSION SAR ANALYSIS	86
7 MEASUREMENT UNCERTAINTY	87
8 TEST EQUIPMENTS	89
ANNEX A – TEST PLOTS	96
ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS.....	124

1. GENERAL INFORMATION

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).

The test results relate only to individual items of the samples which have been tested.

The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Address:	15th Building, No.30 Shixing Street, Shijingshan District, Beijing P.R. China
City:	Beijing
Country or Region:	P.R. China
Contacted person:	Liu Jia
Tel:	+86 10 57996183
Fax:	+86 10 57996388
Email:	liuji@srctc.org.cn

1.3 Applicant's details

Company:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China
City:	Qingdao
Country or Region:	P.R. China
Contacted person:	Geng Ruifeng
Tel:	+86-532-80877742
Fax:	---
Email:	gengruifeng@hisense.com

1.4 Manufacturer's details

Company:	Hisense Communications Co., Ltd.
Address:	No.218 Qianwangang Road, Economic & Technological Development Zone, Qingdao, China
City:	Qingdao
Country or Region:	P.R. China
Contacted person:	Deng Tingting
Tel:	+86-532-55753708
Fax:	---
Email:	dengtingting@hisense.com

1.5 Test Environment

Date of Receipt of test sample at SRTC:	2020.04.13
Testing Start Date:	2020.04.20
Testing End Date:	2020.04.30

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40

Normal Supply Voltage (Vdc.):	3.8
-------------------------------	-----

2. DESCRIPTION OF THE DEVICE UNDER TEST

2.1 Final Equipment Build Status

Wireless Technology and Frequency Bands	<input checked="" type="checkbox"/> GSM Band: GSM850/GSM1900 <input checked="" type="checkbox"/> WCDMA Band: FDD II/IV/V <input checked="" type="checkbox"/> LTE Band: 2/4/5/7/12 <input checked="" type="checkbox"/> Wi-Fi Band: 2.4GHz <input checked="" type="checkbox"/> BT/BLE		
Mode	GSM <input checked="" type="checkbox"/> GPRS (GMSK) <input checked="" type="checkbox"/> EGPRS (GMSK/8PSK) WCDMA <input checked="" type="checkbox"/> UMTS Rel. 99 <input checked="" type="checkbox"/> HSDPA (Rel. 5) <input checked="" type="checkbox"/> HSUPA (Rel. 6) <input type="checkbox"/> HSPA+ (Rel.7) <input type="checkbox"/> DC-HSDPA (Rel.8) Wi-Fi 2.4GHz <input checked="" type="checkbox"/> 802.11b <input checked="" type="checkbox"/> 802.11g <input checked="" type="checkbox"/> 802.11n HT20 LTE <input checked="" type="checkbox"/> QPSK <input checked="" type="checkbox"/> 16QAM <input checked="" type="checkbox"/> 64QAM		
Duty Cycle*	GPRS: 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) EDGE(GMSK/8PSK) 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) WCDMA: 100% LTE(FDD): 100%		
	unlicensed network	Data Rate (Mbps)	Test Result (%)
	802.11b	1	99.6
	802.11g	6	97.0

	802.11n (HT20)	MCS0	97.3
	BT-BR	1	76.3
	BT-EDR	2	76.5
	BT-EDR	3	76.8
	BT-LE	1	84.1
Multi-Slot Class for GPRS/EDGE	<input type="checkbox"/> Class 8 - One Up <input type="checkbox"/> Class 10 - Two Up <input checked="" type="checkbox"/> Class 12 - Four Up <input type="checkbox"/> Class 33- Four Up		
Mobile Phone Capability	<input type="checkbox"/> Class A - Mobile phones can be connected to both GPRS and GSM services simultaneously. <input checked="" type="checkbox"/> Class B - Mobile phones can be attached to both GPRS and GSM services, using one service at a time. <input type="checkbox"/> Class C - Mobile phones are attached to either GPRS or GSM voice service. You need to switch manually between services		
DTM	Not Supported		
Note	For licensed cellular network duty cycle is inherent. For unlicensed network, WLAN Duty cycle is depends on the data traffic, and the traffic allocation in operating mode could be the most conservative condition which with 100% duty cycle. SAR measurement also use non signalling mode, so the duty factor shall be taken into consideration.		

2.2 Support Equipment

The following support equipment was used to exercise the DUT during testing:

State of sample	Normal
H/W Version	FS273--MB-V2.1
S/W Version	Hisense HLTE103E_20_S01_01_02_MX05
IMEI	Main supply: 868468040000770 Secondary supply: 868468040000721
Notes	As the information described above, we use test sample offered by the customer. The relevant tests have been performed in order to verify in which combination case the EUT would have the worst features.

Main and Secondary supply is different on the supplier of Camera, LCD, Battery, and Memory. There are two colors, the color difference don't affect RF performance.

Main Supply

Part Name	Model	Supplier(Brand)	Description
Camera	BC15314 V0	LUZHOU Chengxiangtong technology CO.,LTD	Front CAM
Camera	BM1A300 V0		
CTP	Y140071B2-R	Dongguan Yuye Communication Technology CO.,ted	
LCD	Y88448	Shenzhen Digital Technology Co.,Ltd	
Battery	LIW380245	SHENZHEN UTILITY POWER SOURCE CO.,LTD	
Memory	KMQE60013M-B318	SAMSUNG	

Secondary Supply

Part Name	Model Name	supplier	Remark
Camera	ST-CFKS103A-FF-V1.0	Shenzhen Union Image Co.,Ltd	Front CAM
Camera	ST-CFKS103A-13MBA-V1.0	Shenzhen Union Image Co.,Ltd	
CTP	YX57042TSBA00	Shengzhen AGS Optronics Tech(ShenZhen) , co.,	
LCD	FPC-K1398A-01	SHENZHEN KINGDOM SCIENCE & TECHNOLOGY CO.,LTD	
Battery	LIW380245	ShenzhenAerospaceElectronicCo.,Ltd.	
Memory	KMQE10013M-B318	SAMSUNG	

3. REFERENCE SPECIFICATION

Specification	Version	Title
Part 2.1093	2019	Radiofrequency radiation exposure evaluation: portable devices.
IEEE Std 1528	2013	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 447498 D01	v06	General RF Exposure Guidance
KDB 447498 D02	v02r01	SAR MEASUREMENT PROCEDURES FOR USB DONGLE TRANSMITTERS
KDB 648474 D04	v01r03	Handset SAR
KDB 941225 D01	v03r01	3G SAR Procedures
KDB 248227 D01	v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 865664 D01	v01r04	SAR Measurement from 100 MHz to 6 GHz
KDB 865664 D02	v01r02	RF Exposure Reporting
KDB 941225 D05	v02r05	SAR for LTE Devices

4. TEST CONDITIONS

4.1 Picture to demonstrate the required liquid depth

The liquid depth is large than 15cm in the used SAM phantoms in flat section, and the depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.



Liquid depth for SAR Measurement

4.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on middle channel, and few of them were also performed on lowest and highest channels.

4.3 SAR Measurement Set-up

The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit. A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors.

The PC consists of the Micron Pentium IV computer with Win7 system and SAR Measurement Software DASY5 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot.

A data acquisition electronic (DAE) circuit performs the signal amplification; signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines.

The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection

The robot uses its own controller with a built in VME-bus computer.

4.4 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528.

System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

The SPEAG device holder was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.5 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528. All tests were carried out using simulants whose dielectric parameters were within $\pm 10\%$ below 3GHz and $\pm 5\%$ above 3GHz of the recommended values when use DASY system according to KDB865664D01. All tests were carried out within 24 hours of measuring the dielectric parameters.

Tissue Stimulant Recipes	
Name	Broadband tissue-equivalent liquid
Type	HBBL600-6000V6 Simulating Liquid
Note: The stimulant could be the same for head and body.	

4.6 DESCRIPTION OF THE TEST PROCEDURE

4.6.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.



Device holder supplied by SPEAG

4.6.2 Test Exposure Conditions

4.6.2.1 Head Configuration

Measurements were made in “cheek” and “tilt” positions on both the left hand and right-hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

4.6.2.2 Body Worn Configuration

The device was placed in the SPEAG holder below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance using a separate flat spacer that was removed before the start of the measurements. And the distance is normally determined according to the actual scene which might be the worst use condition for general exposure. The device's front and rear were oriented facing the phantom since these orientations give higher results for most regular portable devices.

4.6.2.3 Hotspot Configuration

Hotspot mode SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge; for the data modes, wireless technologies and frequency bands supporting hotspot mode.

4.6.3 Scan Procedure

First, area scans were used for determination of the field distribution and the approximate location of the local peak SAR values. The SAR distribution is scanned along the inside surface, at least for an area larger than the projection of the handset and antenna. The angle between the probe axis and the surface normal line is recommended but not required to be less than 30°. The SAR distribution is first measured on a 2-D coarse grid. The scan region should cover all areas that are exposed and encompassed by the projection of the handset. There are 15 mm × 15 mm (equal or less than 2GHz), 12 mm × 12 mm (from 2GHz~4GHz) and 10mm x 10mm (from 4GHz~6GHz) measurement grid used when two staggered one-dimensional cubic splines are used to estimate the maximum SAR location.

When the reported 1g-SAR estimated by area scan is less than 1.40 w/kg.

Zoom scan was performed by using the configuration mentioned below or more conservative scan area and step to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

Below 3GHz: 32mmX32mmX30mm scan area with 8 mm X8 mm X5 mm steps

2GHz-3GHz: 32mmX32mmX30mm scan area with 8 mm X8 mm X5 mm steps

3GHz-4GHz: 28mmX28mmX28mm scan area with 7 mm X7 mm X4 mm steps

4GHz-5GHz: 25mmX25mmX24mm scan area with 5 mm X5 mm X3 mm steps

5GHz-6GHz: 25mmX25mmX22mm scan area with 5 mm X5 mm X2 mm steps

4.6.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within DASY5 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation of Large Sets of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighboring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

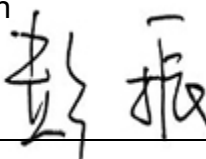

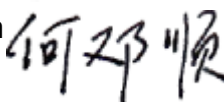
5 RESULT SUMMAR

The maximum reported SAR values for Head configuration and Body Worn configuration are given as follows. The device conforms to the requirements of the standard(s) when the maximum reported SAR value is less than or equal to the limit.

Exposure Position	Frequency Band	Main supply 1g-SAR Result(W/kg)	Highest 1g-SAR Result(W/kg)		Limit(W/kg)/1g	Result
Head	GSM 850	0.21	1.11	1.11	1.60	Pass
	GSM 1900	0.05				
	WCDMA Band II	0.07				
	WCDMA Band IV	0.10				
	WCDMA Band V	0.19				
	LTE Band 2	0.07				
	LTE Band 4	0.11				
	LTE Band 5	0.19				
	LTE Band 7	0.01				
	LTE Band 12	0.11				
	WLAN 2.4GHz	1.11				
Body-Worn & Hotspot (10mm Gap)	BT/BLE	0.23	0.89	1.11	1.60	Pass
	GSM 850	0.32				
	GSM 1900	0.37				
	WCDMA Band II	0.38				
	WCDMA Band IV	0.64				
	WCDMA Band V	0.23				
	LTE Band 2	0.57				
	LTE Band 4	0.89				
	LTE Band 5	0.35				
	LTE Band 7	0.83				
	LTE Band 12	0.25				
WLAN 2.4GHz	0.41					
Hotspot (10mm Gap)	BT/BLE	0.12	1.07	1.07	1.60	Pass
	GSM 850	0.18				
	GSM 1900	0.46				
	WCDMA Band II	0.22				
	WCDMA Band IV	0.51				
	WCDMA Band V	0.23				
	LTE Band 2	0.71				
	LTE Band 4	1.03				
	LTE Band 5	0.20				
	LTE Band 7	1.07				
	LTE Band 12	0.16				
WLAN 2.4GHz	0.42					

Simultaneous Transmission Summary

Exposure Position	Frequency Band	1g-SAR Result (W/kg)	Highest 1g-SAR Result(W/kg)	Limit (W/kg)/1g	Result
Head	GSM & Wi-Fi	1.29	1.29	1.60	Pass
	WCDMA & Wi-Fi	1.28			
	LTE & Wi-Fi	1.29			
	GSM & BT/BLE	0.44			
	WCDMA & BT/BLE	0.42			
	LTE & BT/BLE	0.42			
Body-Worn & Hotspot (10mm Gap)	GSM & Wi-Fi	0.78	1.30	1.60	Pass
	WCDMA & Wi-Fi	1.06			
	LTE & Wi-Fi	1.30			
	GSM & BT/BLE	0.48			
	WCDMA & BT/BLE	0.76			
	LTE & BT/BLE	1.01			
Hotspot (10mm Gap)	GSM & Wi-Fi	0.59	1.07		
	WCDMA & Wi-Fi	0.64			
	LTE & Wi-Fi	1.07			

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Mr. He Dengshun 	Issued date: 20200430

6 TEST RESULT

6.1 Manufacturing Tolerance

GSM

GSM850

Carrier frequency (MHz)	Channel No.	Tolerance (dBm)
824.2	128	29.5~33.5
836.4	189	
848.8	251	

GPRS/EGPRS (GMSK):

Carrier frequency (MHz)	Channel No.	TX Mode	Tolerance (dBm)
824.2	128	4Downlink1uplink	29.5~33.5
836.4	189		
848.8	251		
824.2	128	3Downlink2uplink	27.5~31.5
836.4	189		
848.8	251		
824.2	128	2Downlink3uplink	25.0~29.0
836.4	189		
848.8	251		
824.2	128	1Downlink4uplink	23.0~27.0
836.4	189		
848.8	251		

EGPRS (8PSK):

Carrier frequency (MHz)	Channel No.	TX Mode	Tolerance (dBm)
824.2	128	8PSK 4Downlink1uplink	23.0~27.0
836.4	189		
848.8	251		
824.2	128	8PSK 3Downlink2uplink	21.0~25.0
836.4	189		
848.8	251		
824.2	128	8PSK 2Downlink3uplink	18.0~22.0
836.4	189		
848.8	251		
824.2	128	8PSK 1Downlink4uplink	16.0~20.0
836.4	189		
848.8	251		

PCS1900:

Carrier frequency (MHz)	Channel No.	Tolerance (dBm)
1850.2	512	26.0~30.0
1880.0	661	
1909.8	810	

GPRS/EGPRS (GMSK):

Carrier frequency (MHz)	Channel No.	TX Mode	Tolerance (dBm)
1850.2	512	4Downlink1uplink	26.0~30.0
1880.0	661		
1909.8	810		
1850.2	512	3Downlink2uplink	24.5~28.5
1880.0	661		
1909.8	810		
1850.2	512	2Downlink3uplink	23.0~27.0
1880.0	661		
1909.8	810		
1850.2	512	1Downlink4uplink	20.5~24.5
1880.0	661		
1909.8	810		

EGPRS (8PSK):

Carrier frequency (MHz)	Channel No.	TX Mode	Tolerance (dBm)
1850.2	512	8PSK 4Downlink1uplink	23.0~27.0
1880.0	661		
1909.8	810		
1850.2	512	8PSK 3Downlink2uplink	21.5~25.5
1880.0	661		
1909.8	810		
1850.2	512	8PSK 2Downlink3uplink	18.5~22.5
1880.0	661		
1909.8	810		
1850.2	512	8PSK 1Downlink4uplink	16.5~20.5
1880.0	661		
1909.8	810		

WCDMA

WCDMA band II

Mode		Carrier frequency (MHz)	Channel No.	Tolerance (dBm)
Release 99	RMC,12.2kbps	1852.4	9262	19.0~23.0
		1880.0	9400	
		1907.6	9538	
	RMC,64kbps	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	RMC,144kbps	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	RMC,384kbps	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
AMR,12.2kbps	1852.4	9262		
	1880.0	9400		
	1907.6	9538		
HSDPA	Subtest 1	1852.4	9262	19.0~23.0
		1880.0	9400	
		1907.6	9538	
	Subtest 2	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	Subtest 3	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	Subtest 4	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
HSUPA	Subtest 1	1852.4	9262	19.0~23.0
		1880.0	9400	
		1907.6	9538	
	Subtest 2	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	Subtest 3	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	Subtest 4	1852.4	9262	
		1880.0	9400	
		1907.6	9538	
	Subtest 5	1852.4	9262	
		1880.0	9400	
		1907.6	9538	

WCDMA band IV

Mode		Carrier frequency (MHz)	Channel No.	Tolerance (dBm)
Release 99	RMC,12.2kbps	1712.4	1312	19.0~23.0
		1732.4	1412	
		1752.6	1513	
	RMC,64kbps	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	RMC,144kbps	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	RMC,384kbps	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
AMR,12.2kbps	1712.4	1312		
	1732.4	1412		
	1752.6	1513		
HSDPA	Subtest 1	1712.4	1312	19.0~23.0
		1732.4	1412	
		1752.6	1513	
	Subtest 2	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	Subtest 3	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	Subtest 4	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
HSUPA	Subtest 1	1712.4	1312	19.0~23.0
		1732.4	1412	
		1752.6	1513	
	Subtest 2	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	Subtest 3	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	Subtest 4	1712.4	1312	
		1732.4	1412	
		1752.6	1513	
	Subtest 5	1712.4	1312	
		1732.4	1412	
		1752.6	1513	

WCDMA band V

Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
Release 99	RMC,12.2kbps	826.4	4132	19.0~23.0
		836.6	4183	
		846.6	4233	
	RMC,64kbps	826.4	4132	
		836.6	4183	
		846.6	4233	
	RMC,144kbps	826.4	4132	
		836.6	4183	
		846.6	4233	
	RMC,384kbps	826.4	4132	
		836.6	4183	
		846.6	4233	
AMR,12.2kbps	826.4	4132		
	836.6	4183		
	846.6	4233		
HSDPA	Subtest 1	826.4	4132	19.0~23.0
		836.6	4183	
		846.6	4233	
	Subtest 2	826.4	4132	
		836.6	4183	
		846.6	4233	
	Subtest 3	826.4	4132	
		836.6	4183	
		846.6	4233	
	Subtest 4	826.4	4132	
		836.6	4183	
		846.6	4233	
HSUPA	Subtest 1	826.4	4132	19.0~23.0
		836.6	4183	
		846.6	4233	
	Subtest 2	826.4	4132	
		836.6	4183	
		846.6	4233	
	Subtest 3	826.4	4132	
		836.6	4183	
		846.6	4233	
	Subtest 4	826.4	4132	
		836.6	4183	
		846.6	4233	
	Subtest 5	826.4	4132	
		836.6	4183	
		846.6	4233	

LTE

Note: RB allocation mentioned below is for all Bandwidths, and the Frequency Range are divided to 3 ranges (Low, Mid, High)

Band 2

BW	Modulation	RB allocation with different offset	Frequency range	Tolerance (dBm)
All Bandwidth	QPSK	1	Low	20.0~24.0
			Mid	
			High	
		50%	Low	19.5~23.5
			Mid	
			High	
		100%	Low	19.5~23.5
			Mid	
			High	
	16QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
		100%	Low	18.5~22.5
			Mid	
			High	
	64QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
100%		Low	18.5~22.5	
		Mid		
		High		

Band 4

BW	Modulation	RB allocation with different offset	Frequency range	Tolerance (dBm)
All Bandwidth	QPSK	1	Low	20.0~24.0
			Mid	
			High	
		50%	Low	19.0~23.0
			Mid	
			High	
		100%	Low	19.0~23.0
			Mid	
			High	
	16QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
		100%	Low	18.5~22.5
			Mid	
			High	
	64QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
100%		Low	18.5~22.5	
		Mid		
		High		

Band 5

BW	Modulation	RB allocation with different offset	Frequency range	Tolerance (dBm)
All Bandwidth	QPSK	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	19.0~23.0
			Mid	
			High	
		100%	Low	19.0~23.0
			Mid	
			High	
	16QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
		100%	Low	18.5~22.5
			Mid	
			High	
	64QAM	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
100%		Low	18.5~22.5	
		Mid		
		High		

Band 7

BW	Modulation	RB allocation with different offset	Frequency range	Tolerance (dBm)
All Bandwidth	QPSK	1	Low	20.0~24.0
			Mid	
			High	
		50%	Low	20.0~24.0
			Mid	
			High	
		100%	Low	20.0~24.0
			Mid	
			High	
	16QAM	1	Low	20.0~24.0
			Mid	
			High	
		50%	Low	19.0~23.0
			Mid	
			High	
		100%	Low	19.0~23.0
			Mid	
			High	
	64QAM	1	Low	20.0~24.0
			Mid	
			High	
		50%	Low	19.0~23.0
			Mid	
			High	
100%		Low	19.0~23.0	
		Mid		
		High		

Band 12

BW	Modulation	RB allocation with different offset	Frequency range	Tolerance (dBm)
All Bandwidth	QPSK	1	Low	19.5~23.5
			Mid	
			High	
		50%	Low	18.5~22.5
			Mid	
			High	
		100%	Low	18.5~22.5
			Mid	
			High	
	16QAM	1	Low	19.0~23.0
			Mid	
			High	
		50%	Low	18.0~22.0
			Mid	
			High	
		100%	Low	18.0~22.0
			Mid	
			High	
	64QAM	1	Low	19.0~23.0
			Mid	
			High	
		50%	Low	18.0~22.0
			Mid	
			High	
100%		Low	18.0~22.0	
		Mid		
		High		

Bluetooth

Modulation type	Tolerance (dBm)		
	2402MHz(Ch0)	2441MHz(Ch39)	2480MHz(Ch78)
GFSK	3.5~7.5		
$\pi/4$ DQPSK	0.0~4.0		
8DPSK	-1.5~2.5		

Bluetooth (BLE)

Modulation type	Average Power Output (dBm)		
	2402MHz (Ch0)	2440MHz (Ch19)	2480MHz (Ch39)
GFSK (LE 1Mbps)	-7.0~-3.0		

WLAN 2.4GHz

Modulation type	Tolerance (dBm)		
	2412MHz	2437MHz	2462MHz
11b	14.7~18.7		
11g	13.0~17.0		
11n HT20	13.0~17.0		

6.2 GSM Measurement result

GSM850

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	Frame average power(dBm)
824.2	128	32.98	23.95
836.4	189	33.03	24.00
848.8	251	33.00	23.97

GPRS/EGPRS (GMSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)	Frame average power(dBm)
824.2	128	4Downlink1uplink	33.04	24.01
836.4	189		32.98	23.95
848.8	251		33.01	23.98
824.2	128	3Downlink2uplink	31.07	25.05
836.4	189		30.99	24.97
848.8	251		31.04	25.02
824.2	128	2Downlink3uplink	28.84	24.58
836.4	189		28.8	24.54
848.8	251		28.82	24.56
824.2	128	1Downlink4uplink	26.61	23.60
836.4	189		26.55	23.54
848.8	251		26.57	23.56

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)	Frame average power(dBm)
824.2	128	8PSK 4Downlink1uplink	26.59	17.56
836.4	189		26.79	17.76
848.8	251		26.36	17.33
824.2	128	8PSK 3Downlink2uplink	24.48	18.46
836.4	189		24.54	18.52
848.8	251		23.79	17.77
824.2	128	8PSK 2Downlink3uplink	21.85	17.59
836.4	189		21.47	17.21
848.8	251		21.25	16.99
824.2	128	8PSK 1Downlink4uplink	19.74	16.73
836.4	189		19.64	16.63
848.8	251		19.58	16.57

PCS1900

GSM Measured Power:

Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)	Frame average power(dBm)
1850.2	512	29.82	20.79
1880.0	661	29.75	20.72
1909.8	810	29.84	20.81

GPRS/EGPRS (GMSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)	Frame average power(dBm)
1850.2	512	4Downlink1uplink	29.82	20.79
1880.0	661		29.75	20.72
1909.8	810		29.84	20.81
1850.2	512	3Downlink2uplink	28.24	22.22
1880.0	661		28.03	22.01
1909.8	810		27.86	21.84
1850.2	512	2Downlink3uplink	26.22	21.96
1880.0	661		25.97	21.71
1909.8	810		25.80	21.54
1850.2	512	1Downlink4uplink	24.19	21.18
1880.0	661		23.94	20.93
1909.8	810		23.77	20.76

EGPRS (8PSK) Measured Power:

Carrier frequency (MHz)	Channel No.	TX Mode	RF Power Output (dBm)	Frame average power(dBm)
1850.2	512	8PSK 4Downlink1uplink	25.77	16.74
1880.0	661		26.68	17.65
1909.8	810		25.73	16.70
1850.2	512	8PSK 3Downlink2uplink	24.08	18.06
1880.0	661		25.02	19.00
1909.8	810		24.13	18.11
1850.2	512	8PSK 2Downlink3uplink	21.65	17.39
1880.0	661		22.38	18.12
1909.8	810		22.05	17.79
1850.2	512	8PSK 1Downlink4uplink	20.24	17.23
1880.0	661		20.17	17.16
1909.8	810		19.58	16.57

Division Factors (for Measured Power and Frame Average Power):

To average the power, the division factor is as follows:

1TX-slot (1uplink) = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (3uplink) = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (4uplink) = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the frame average conducted power, the SAR measurements are performed with **2Txslots (2uplink)** of GPRS850 (GMSK) and **2Txslots (2uplink)** of GPRS1900 (GMSK).

6.3 WCDMA Measurement result

Release 99

The following procedures are according to FCC KDB Publication 941225 D01.

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	RMC mode AMR mode	12.2kbps RMC 12.2kbps RMC in 3.4 kbps SRB
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

Release 5

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM(dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/18	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.

Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Release 6

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (S F)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (S F)	β_{ed} (code s)	CM ⁽²⁾ (dB)	MP R (d B)	AG ⁽⁴⁾ Index	E-TF CI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/25	1039/25	4	1	1.0	2.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4	2	2.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	2.0	21	81

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
 Note2: CM=1 for $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
 Note3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period(TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.
 Note4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period(TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.
 NOTE5: Testing UE using E-DPDCH Physical layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
 NOTE6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Release 7

The following 1 Sub-test was completed according to Release 7 procedures in section 5.2 of 3GPP TS34.121.

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TF CI (Note 5)	E-TF CI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}: 30/15$ $\beta_{ed2}: 30/15$	$\beta_{ed3}: 24/15$ $\beta_{ed4}: 24/15$	3.5	2.5	14	105	105

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.
 Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
 Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.
 Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
 Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

Release 8

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH_Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

Inf. Bit Payload

CRC Addition CRC

Code Block Segmentation

Turbo-Encoding (R=1/3) Tail Bits

1st Rate Matching

RV Selection

Physical Channel Segmentation

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for

HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM(dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/18	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.

Note3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

WCDMA band II

Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
Release 99	RMC,12.2kbps	1852.4	9262	22.62
		1880.0	9400	22.78
		1907.6	9538	22.43
	RMC,64kbps	1852.4	9262	22.53
		1880.0	9400	22.71
		1907.6	9538	22.42
	RMC,144kbps	1852.4	9262	22.56
		1880.0	9400	22.72
		1907.6	9538	22.40
	RMC,384kbps	1852.4	9262	22.50
		1880.0	9400	22.78
		1907.6	9538	22.32
	AMR,12.2kbps	1852.4	9262	22.50
		1880.0	9400	22.78
		1907.6	9538	22.41
HSDPA	Subtest 1	1852.4	9262	21.76
		1880.0	9400	21.80
		1907.6	9538	21.73
	Subtest 2	1852.4	9262	21.69
		1880.0	9400	21.72
		1907.6	9538	21.69
	Subtest 3	1852.4	9262	21.65
		1880.0	9400	21.67
		1907.6	9538	21.63
	Subtest 4	1852.4	9262	21.59
		1880.0	9400	21.61
		1907.6	9538	21.55
HSUPA	Subtest 1	1852.4	9262	21.68
		1880.0	9400	21.69
		1907.6	9538	21.64
	Subtest 2	1852.4	9262	21.71
		1880.0	9400	21.74
		1907.6	9538	21.67
	Subtest 3	1852.4	9262	21.66
		1880.0	9400	21.64
		1907.6	9538	21.62
	Subtest 4	1852.4	9262	21.70
		1880.0	9400	21.74
		1907.6	9538	21.66
	Subtest 5	1852.4	9262	21.62
		1880.0	9400	21.64
		1907.6	9538	21.59

WCDMA band IV

Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
Release 99	RMC,12.2kbps	1712.4	1312	22.82
		1732.4	1412	22.96
		1752.6	1513	22.61
	RMC,64kbps	1712.4	1312	22.70
		1732.4	1412	22.91
		1752.6	1513	22.54
	RMC,144kbps	1712.4	1312	22.70
		1732.4	1412	22.81
		1752.6	1513	22.50
	RMC,384kbps	1712.4	1312	22.80
		1732.4	1412	22.87
		1752.6	1513	22.60
	AMR,12.2kbps	1712.4	1312	22.72
		1732.4	1412	22.89
		1752.6	1513	22.51
HSDPA	Subtest 1	1712.4	1312	22.01
		1732.4	1412	22.03
		1752.6	1513	22.07
	Subtest 2	1712.4	1312	21.96
		1732.4	1412	21.98
		1752.6	1513	21.99
	Subtest 3	1712.4	1312	21.92
		1732.4	1412	21.94
		1752.6	1513	21.98
	Subtest 4	1712.4	1312	21.88
		1732.4	1412	21.91
		1752.6	1513	21.95
HSUPA	Subtest 1	1712.4	1312	21.88
		1732.4	1412	21.90
		1752.6	1513	21.91
	Subtest 2	1712.4	1312	21.85
		1732.4	1412	21.85
		1752.6	1513	21.88
	Subtest 3	1712.4	1312	21.83
		1732.4	1412	21.86
		1752.6	1513	21.89
	Subtest 4	1712.4	1312	21.80
		1732.4	1412	21.82
		1752.6	1513	21.85
	Subtest 5	1712.4	1312	21.42
		1732.4	1412	21.43
		1752.6	1513	21.45

WCDMA band V

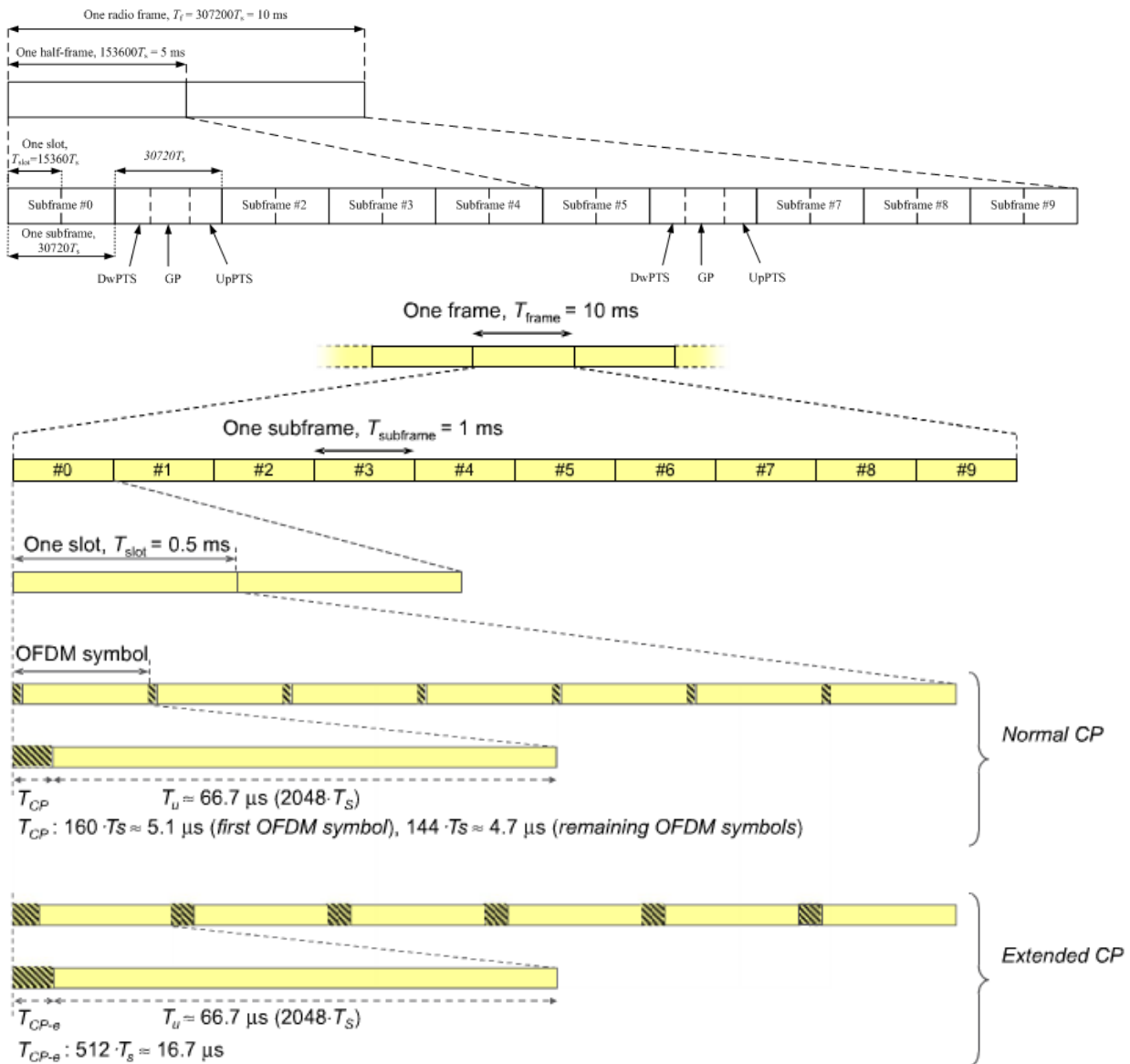
Mode		Carrier frequency (MHz)	Channel No.	RF Power Output (dBm)
Release 99	RMC,12.2kbps	826.4	4132	22.56
		836.6	4183	22.85
		846.6	4233	22.39
	RMC,64kbps	826.4	4132	22.55
		836.6	4183	22.80
		846.6	4233	22.35
	RMC,144kbps	826.4	4132	22.41
		836.6	4183	22.75
		846.6	4233	22.29
	RMC,384kbps	826.4	4132	22.45
		836.6	4183	22.78
		846.6	4233	22.30
AMR,12.2kbps	826.4	4132	22.55	
	836.6	4183	22.72	
	846.6	4233	22.33	
HSDPA	Subtest 1	826.4	4132	21.65
		836.6	4183	21.68
		846.6	4233	21.72
	Subtest 2	826.4	4132	21.62
		836.6	4183	21.63
		846.6	4233	21.69
	Subtest 3	826.4	4132	21.56
		836.6	4183	21.60
		846.6	4233	21.65
	Subtest 4	826.4	4132	21.53
		836.6	4183	21.56
		846.6	4233	21.61
HSUPA	Subtest 1	826.4	4132	21.59
		836.6	4183	21.62
		846.6	4233	21.67
	Subtest 2	826.4	4132	21.53
		836.6	4183	21.57
		846.6	4233	21.61
	Subtest 3	826.4	4132	21.50
		836.6	4183	21.55
		846.6	4233	21.58
	Subtest 4	826.4	4132	21.51
		836.6	4183	21.53
		846.6	4233	21.60
Subtest 5	826.4	4132	21.49	
	836.6	4183	21.52	
	846.6	4233	21.57	

Note: UMTS SAR was tested under Rel.99 RMC 12.kbps mode per KDB Publication 941225 D01.for other higher release configuration, SAR was not required since any average output power was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg with RMC mode.

6.4 LTE Measurement result

General description:

TDD-LTE frame structure



Uplink-downlink configuration

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Special sub-frame configuration

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			-		
8	$24144 \cdot T_s$			-		

Special sub-frame with cyclic prefix uplink

Special sub-frame configuration	Duty factor with normal cyclic prefix in uplink	Duty factor with extended cyclic prefix in uplink
Normal cyclic prefix in downlink	0~4	7.13%
	5~9	14.3%
Extended cyclic prefix in downlink	0~3	7.13%
	4~7	14.3%

So we perform SAR test with maximum duty factor equal to 63.3% by using uplink-downlink configuration 0.

Note: One sub-frame is $30720T_s=1\text{ms}$, when UpPTS(uplink) in special sub-frame with extended cyclic prefix, duty factor = $5120/30720=0.167$. There are 5 sub-frames in half frame(3up link), so the final duty factor is $(30720 \cdot 3 + 5120) / (30720 \cdot 5) = 63.3\%$ which we used to evaluate the SAR compliance (worst case)

LTE Band 2

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1850.7	18607	1.4	1	0	23.84
				1	5	23.69
				3	2	22.96
				6	0	22.80
	1880	18900		1	0	23.55
				1	5	23.52
				3	2	22.83
				6	0	22.67
	1909.3	19193		1	0	23.53
				1	5	23.47
				3	2	22.82
				6	0	22.77
16QAM	1850.7	18607	1.4	1	0	23.06
				1	5	22.85
				3	2	22.10
				6	0	21.93
	1880	18900		1	0	22.46
				1	5	22.60
				3	2	21.89
				6	0	21.89
	1909.3	19193		1	0	22.83
				1	5	22.70
				3	2	21.89
				6	0	21.88
64QAM	1850.7	18607	1.4	1	0	23.30
				1	5	23.19
				3	2	22.15
				6	0	21.91
	1880	18900		1	0	22.56
				1	5	22.64
				3	2	22.14
				6	0	21.88
	1909.3	19193		1	0	23.24
				1	5	23.09
				3	2	22.05
				6	0	21.91

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1851.5	18615	3	1	0	23.83
				1	14	23.54
				8	4	22.96
				15	0	22.80
	1880	18900		1	0	23.62
				1	14	23.42
				8	4	22.80
				15	0	22.76
	1908.5	19185		1	0	23.61
				1	14	23.43
				8	4	22.70
				15	0	22.88
16QAM	1851.5	18615	3	1	0	23.03
				1	14	22.90
				8	4	22.05
				15	0	21.91
	1880	18900		1	0	22.44
				1	14	22.52
				8	4	22.01
				15	0	21.99
	1908.5	19185		1	0	22.84
				1	14	22.66
				8	4	21.97
				15	0	21.92
64QAM	1851.5	18615	3	1	0	23.30
				1	14	23.09
				8	4	22.19
				15	0	21.98
	1880	18900		1	0	22.62
				1	14	22.74
				8	4	22.14
				15	0	21.88
	1908.5	19185		1	0	23.15
				1	14	23.21
				8	4	22.05
				15	0	21.86

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1852.5	18625	5	1	0	23.76
				1	24	23.61
				12	6	22.95
				25	0	22.73
	1880	18900		1	0	23.62
				1	24	23.45
				12	6	22.91
				25	0	22.75
	1907.5	19175		1	0	23.56
				1	24	23.51
				12	6	22.80
				25	0	22.82
16QAM	1852.5	18625	5	1	0	23.05
				1	24	22.85
				12	6	22.04
				25	0	21.93
	1880	18900		1	0	22.48
				1	24	22.57
				12	6	21.88
				25	0	22.04
	1907.5	19175		1	0	22.88
				1	24	22.76
				12	6	21.96
				25	0	21.88
64QAM	1852.5	18625	5	1	0	23.29
				1	24	23.22
				12	6	22.22
				25	0	21.95
	1880	18900		1	0	22.71
				1	24	22.66
				12	6	22.09
				25	0	21.94
	1907.5	19175		1	0	23.19
				1	24	23.14
				12	6	22.01
				25	0	21.93

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1855	18650	10	1	0	23.76
				1	49	23.54
				24	12	23.04
				50	0	22.70
	1880	18900		1	0	23.55
				1	49	23.43
				24	12	22.87
				50	0	22.68
	1905	19150		1	0	23.59
				1	49	23.41
				24	12	22.71
				50	0	22.90
16QAM	1855	18650	10	1	0	23.00
				1	49	22.85
				24	12	22.10
				50	0	21.94
	1880	18900		1	0	22.45
				1	49	22.47
				24	12	22.02
				50	0	22.00
	1905	19150		1	0	22.86
				1	49	22.63
				24	12	21.83
				50	0	21.86
64QAM	1855	18650	10	1	0	23.31
				1	49	23.17
				24	12	22.11
				50	0	21.93
	1880	18900		1	0	22.60
				1	49	22.66
				24	12	22.10
				50	0	21.89
	1905	19150		1	0	23.14
				1	49	23.11
				24	12	22.04
				50	0	21.84

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1857.5	18675	15	1	0	23.77
				1	74	23.61
				40	18	23.01
				75	0	22.81
	1880	18900		1	0	23.62
				1	74	23.53
				40	18	22.79
				75	0	22.71
	1902.5	19125		1	0	23.55
				1	74	23.46
				40	18	22.72
				75	0	22.89
16QAM	1857.5	18675	15	1	0	23.03
				1	74	22.92
				40	18	22.02
				75	0	22.02
	1880	18900		1	0	22.49
				1	74	22.53
				40	18	22.01
				75	0	21.99
	1902.5	19125		1	0	22.90
				1	74	22.73
				40	18	21.90
				75	0	21.84
64QAM	1857.5	18675	15	1	0	23.35
				1	74	23.20
				40	18	22.22
				75	0	21.93
	1880	18900		1	0	22.67
				1	74	22.73
				40	18	22.10
				75	0	21.94
	1902.5	19125		1	0	23.16
				1	74	23.22
				40	18	21.99
				75	0	21.96

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1860	18700	20	1	0	23.87
				1	99	23.69
				50	25	23.08
				100	0	22.81
	1880	18900		1	0	23.67
				1	99	23.56
				50	25	22.91
				100	0	22.76
	1900	19100		1	0	23.66
				1	99	23.54
				50	25	22.84
				100	0	22.90
16QAM	1860	18700	20	1	0	23.08
				1	99	22.99
				50	25	22.12
				100	0	22.06
	1880	18900		1	0	22.53
				1	99	22.61
				50	25	22.03
				100	0	22.04
	1900	19100		1	0	22.91
				1	99	22.77
				50	25	21.97
				100	0	21.96
64QAM	1860	18700	20	1	0	23.44
				1	99	23.23
				50	25	22.24
				100	0	21.99
	1880	18900		1	0	22.71
				1	99	22.75
				50	25	22.18
				100	0	22.02
	1900	19100		1	0	23.27
				1	99	23.23
				50	25	22.11
				100	0	21.99

LTE Band 4

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1710.7	19957	1.4	1	0	23.45
				1	5	23.50
				3	2	22.66
				6	0	22.63
	1732.5	20175		1	0	23.45
				1	5	23.44
				3	2	22.65
				6	0	22.62
	1754.3	20393		1	0	23.19
				1	5	23.20
				3	2	22.80
				6	0	22.53
16QAM	1710.7	19957	1.4	1	0	22.75
				1	5	22.66
				3	2	21.67
				6	0	21.67
	1732.5	20175		1	0	22.81
				1	5	22.63
				3	2	21.77
				6	0	21.74
	1754.3	20393		1	0	22.90
				1	5	22.71
				3	2	21.88
				6	0	21.74
64QAM	1710.7	19957	1.4	1	0	22.99
				1	5	23.01
				3	2	21.73
				6	0	21.77
	1732.5	20175		1	0	23.02
				1	5	22.95
				3	2	22.00
				6	0	21.74
	1754.3	20393		1	0	22.93
				1	5	22.90
				3	2	21.82
				6	0	21.82

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1711.5	19965	3	1	0	23.44
				1	14	23.43
				8	4	22.66
				15	0	22.60
	1732.5	20175		1	0	23.49
				1	14	23.34
				8	4	22.68
				15	0	22.65
	1753.5	20385		1	0	23.26
				1	14	23.13
				8	4	22.78
				15	0	22.51
16QAM	1711.5	19965	3	1	0	22.62
				1	14	22.53
				8	4	21.78
				15	0	21.72
	1732.5	20175		1	0	22.80
				1	14	22.68
				8	4	21.81
				15	0	21.83
	1753.5	20385		1	0	22.91
				1	14	22.79
				8	4	21.85
				15	0	21.72
64QAM	1711.5	19965	3	1	0	23.05
				1	14	23.06
				8	4	21.69
				15	0	21.66
	1732.5	20175		1	0	23.14
				1	14	22.85
				8	4	21.93
				15	0	21.72
	1753.5	20385		1	0	22.95
				1	14	22.83
				8	4	21.79
				15	0	21.74

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1712.5	19975	5	1	0	23.38
				1	24	23.40
				12	6	22.57
				25	0	22.68
	1732.5	20175		1	0	23.49
				1	24	23.43
				12	6	22.71
				25	0	22.76
	1752.5	20375		1	0	23.28
				1	24	23.17
				12	6	22.68
				25	0	22.62
16QAM	1712.5	19975	5	1	0	22.74
				1	24	22.67
				12	6	21.66
				25	0	21.69
	1732.5	20175		1	0	22.77
				1	24	22.64
				12	6	21.79
				25	0	21.82
	1752.5	20375		1	0	22.85
				1	24	22.81
				12	6	21.81
				25	0	21.76
64QAM	1712.5	19975	5	1	0	23.01
				1	24	22.91
				12	6	21.79
				25	0	21.79
	1732.5	20175		1	0	23.05
				1	24	22.92
				12	6	21.96
				25	0	21.72
	1752.5	20375		1	0	22.97
				1	24	22.80
				12	6	21.84
				25	0	21.84

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1715	20000	10	1	0	23.36
				1	49	23.41
				24	12	22.68
				50	0	22.63
	1732.5	20175		1	0	23.51
				1	49	23.45
				24	12	22.68
				50	0	22.75
	1750	20350		1	0	23.27
				1	49	23.12
				24	12	22.81
				50	0	22.62
16QAM	1715	20000	10	1	0	22.75
				1	49	22.58
				24	12	21.72
				50	0	21.78
	1732.5	20175		1	0	22.83
				1	49	22.61
				24	12	21.78
				50	0	21.80
	1750	20350		1	0	22.94
				1	49	22.75
				24	12	21.80
				50	0	21.85
64QAM	1715	20000	10	1	0	23.01
				1	49	22.97
				24	12	21.79
				50	0	21.76
	1732.5	20175		1	0	23.12
				1	49	22.90
				24	12	22.05
				50	0	21.64
	1750	20350		1	0	22.98
				1	49	22.78
				24	12	21.87
				50	0	21.79

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1717.5	20025	15	1	0	23.36
				1	74	23.46
				40	18	22.67
				75	0	22.62
	1732.5	20175		1	0	23.39
				1	74	23.41
				40	18	22.71
				75	0	22.67
	1747.5	20325		1	0	23.32
				1	74	23.12
				40	18	22.79
				75	0	22.65
16QAM	1717.5	20025	15	1	0	22.72
				1	74	22.61
				40	18	21.79
				75	0	21.64
	1732.5	20175		1	0	22.84
				1	74	22.64
				40	18	21.82
				75	0	21.82
	1747.5	20325		1	0	22.86
				1	74	22.71
				40	18	21.88
				75	0	21.72
64QAM	1717.5	20025	15	1	0	23.01
				1	74	23.06
				40	18	21.81
				75	0	21.75
	1732.5	20175		1	0	23.07
				1	74	22.83
				40	18	22.02
				75	0	21.65
	1747.5	20325		1	0	22.94
				1	74	22.88
				40	18	21.80
				75	0	21.77

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	1720	20050	20	1	0	23.49
				1	99	23.51
				50	25	22.68
				100	0	22.70
	1732.5	20175		1	0	23.53
				1	99	23.48
				50	25	22.71
				100	0	22.76
	1745	20300		1	0	23.32
				1	99	23.25
				50	25	22.82
				100	0	22.66
16QAM	1720	20050	1	0	22.76	
			1	99	22.68	
			50	25	21.79	
			100	0	21.78	
	1732.5	20175	1	0	22.87	
			1	99	22.74	
			50	25	21.83	
			100	0	21.87	
	1745	20300	1	0	22.94	
			1	99	22.85	
			50	25	21.91	
			100	0	21.86	
64QAM	1720	20050	1	0	23.07	
			1	99	23.06	
			50	25	21.81	
			100	0	21.79	
	1732.5	20175	1	0	23.16	
			1	99	22.96	
			50	25	22.05	
			100	0	21.78	
	1745	20300	1	0	22.98	
			1	99	22.92	
			50	25	21.89	
			100	0	21.87	

LTE Band 5

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	824.7	20407	1.4	1	0	23.00
				1	5	23.11
				3	2	22.67
				6	0	22.60
	836.5	20525		1	0	23.34
				1	5	23.23
				3	2	22.57
				6	0	22.47
	848.3	20643		1	0	23.31
				1	5	23.26
				3	2	22.53
				6	0	22.32
16QAM	824.7	20407	1.4	1	0	22.97
				1	5	23.05
				3	2	21.67
				6	0	21.60
	836.5	20525		1	0	22.59
				1	5	22.63
				3	2	21.68
				6	0	21.60
	848.3	20643		1	0	22.49
				1	5	22.51
				3	2	21.57
				6	0	21.40
64QAM	824.7	20407	1.4	1	0	22.50
				1	5	22.63
				3	2	21.58
				6	0	21.58
	836.5	20525		1	0	22.80
				1	5	22.81
				3	2	21.74
				6	0	21.64
	848.3	20643		1	0	22.84
				1	5	22.78
				3	2	21.70
				6	0	21.63

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	825.5	20415	3	1	0	23.03
				1	14	23.03
				8	4	22.71
				15	0	22.64
	836.5	20525		1	0	23.21
				1	14	23.26
				8	4	22.64
				15	0	22.51
	847.5	20635		1	0	23.31
				1	14	23.20
				8	4	22.54
				15	0	22.40
16QAM	825.5	20415	3	1	0	22.99
				1	14	23.08
				8	4	21.61
				15	0	21.61
	836.5	20525		1	0	22.66
				1	14	22.57
				8	4	21.69
				15	0	21.68
	847.5	20635		1	0	22.50
				1	14	22.52
				8	4	21.61
				15	0	21.44
64QAM	825.5	20415	3	1	0	22.54
				1	14	22.66
				8	4	21.53
				15	0	21.59
	836.5	20525		1	0	22.85
				1	14	22.79
				8	4	21.72
				15	0	21.68
	847.5	20635		1	0	22.75
				1	14	22.84
				8	4	21.76
				15	0	21.53

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	826.5	20425	5	1	0	23.01
				1	24	23.04
				12	6	22.62
				25	0	22.63
	836.5	20525		1	0	23.30
				1	24	23.20
				12	6	22.62
				25	0	22.51
	846.5	20625		1	0	23.35
				1	24	23.29
				12	6	22.61
				25	0	22.37
16QAM	826.5	20425	5	1	0	23.01
				1	24	23.07
				12	6	21.64
				25	0	21.52
	836.5	20525		1	0	22.65
				1	24	22.52
				12	6	21.75
				25	0	21.57
	846.5	20625		1	0	22.52
				1	24	22.54
				12	6	21.60
				25	0	21.41
64QAM	826.5	20425	5	1	0	22.52
				1	24	22.61
				12	6	21.52
				25	0	21.67
	836.5	20525		1	0	22.87
				1	24	22.78
				12	6	21.72
				25	0	21.53
	846.5	20625		1	0	22.84
				1	24	22.72
				12	6	21.69
				25	0	21.59

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	829	20450	10	1	0	23.13
				1	49	23.11
				24	12	22.75
				50	0	22.65
	836.5	20525		1	0	23.36
				1	49	23.28
				24	12	22.65
				50	0	22.52
	844	20600		1	0	23.35
				1	49	23.33
				24	12	22.63
				50	0	22.47
16QAM	829	20450	10	1	0	23.10
				1	49	23.11
				24	12	21.73
				50	0	21.66
	836.5	20525		1	0	22.66
				1	49	22.63
				24	12	21.78
				50	0	21.70
	844	20600		1	0	22.59
				1	49	22.62
				24	12	21.68
				50	0	21.53
64QAM	829	20450	10	1	0	22.56
				1	49	22.69
				24	12	21.61
				50	0	21.71
	836.5	20525		1	0	22.87
				1	49	22.85
				24	12	21.85
				50	0	21.68
	844	20600		1	0	22.88
				1	49	22.86
				24	12	21.83
				50	0	21.66

LTE Band 7

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	2502.5	20775	5	1	0	23.65
				1	24	23.65
				12	6	23.42
				25	0	23.52
	2535	21100		1	0	23.53
				1	24	23.55
				12	6	23.45
				25	0	23.32
	2567.5	21425		1	0	23.23
				1	24	23.30
				12	6	23.19
				25	0	23.37
16QAM	2502.5	20775	5	1	0	23.44
				1	24	23.49
				12	6	22.71
				25	0	22.72
	2535	21100		1	0	23.61
				1	24	23.53
				12	6	22.51
				25	0	22.65
	2567.5	21425		1	0	23.27
				1	24	23.33
				12	6	22.40
				25	0	22.46
64QAM	2502.5	20775	5	1	0	23.46
				1	24	23.50
				12	6	22.66
				25	0	22.66
	2535	21100		1	0	23.51
				1	24	23.49
				12	6	22.75
				25	0	22.53
	2567.5	21425		1	0	23.14
				1	24	23.17
				12	6	22.54
				25	0	22.39

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	2505	20800	10	1	0	23.68
				1	49	23.56
				24	12	23.48
				50	0	23.51
	2535	21100		1	0	23.58
				1	49	23.46
				24	12	23.33
				50	0	23.35
	2565	21400		1	0	23.33
				1	49	23.27
				24	12	23.16
				50	0	23.41
16QAM	2505	20800	10	1	0	23.55
				1	49	23.44
				24	12	22.71
				50	0	22.69
	2535	21100		1	0	23.63
				1	49	23.63
				24	12	22.62
				50	0	22.64
	2565	21400		1	0	23.31
				1	49	23.21
				24	12	22.46
				50	0	22.42
64QAM	2505	20800	10	1	0	23.52
				1	49	23.45
				24	12	22.68
				50	0	22.66
	2535	21100		1	0	23.61
				1	49	23.54
				24	12	22.68
				50	0	22.58
	2565	21400		1	0	23.10
				1	49	23.09
				24	12	22.51
				50	0	22.41

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	2507.5	20825	15	1	0	23.58
				1	74	23.51
				40	18	23.46
				75	0	23.49
	2535	21100		1	0	23.55
				1	74	23.51
				40	18	23.42
				75	0	23.43
	2562.5	21375		1	0	23.25
				1	74	23.35
				40	18	23.21
				75	0	23.39
16QAM	2507.5	20825	15	1	0	23.50
				1	74	23.45
				40	18	22.75
				75	0	22.71
	2535	21100		1	0	23.51
				1	74	23.60
				40	18	22.61
				75	0	22.71
	2562.5	21375		1	0	23.35
				1	74	23.22
				40	18	22.42
				75	0	22.44
64QAM	2507.5	20825	15	1	0	23.44
				1	74	23.50
				40	18	22.78
				75	0	22.60
	2535	21100		1	0	23.62
				1	74	23.43
				40	18	22.61
				75	0	22.61
	2562.5	21375		1	0	23.03
				1	74	23.15
				40	18	22.44
				75	0	22.48

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted power (dBm)
QPSK	2510	20850	20	1	0	23.72
				1	99	23.65
				50	25	23.56
				100	0	23.60
	2535	21100		1	0	23.65
				1	99	23.57
				50	25	23.48
				100	0	23.44
	2560	21350		1	0	23.34
				1	99	23.37
				50	25	23.29
				100	0	23.44
16QAM	2510	20850	20	1	0	23.59
				1	99	23.55
				50	25	22.79
				100	0	22.80
	2535	21100		1	0	23.65
				1	99	23.64
				50	25	22.63
				100	0	22.72
	2560	21350		1	0	23.37
				1	99	23.34
				50	25	22.55
				100	0	22.51
64QAM	2510	20850	20	1	0	23.58
				1	99	23.57
				50	25	22.81
				100	0	22.75
	2535	21100		1	0	23.64
				1	99	23.57
				50	25	22.75
				100	0	22.63
	2560	21350		1	0	23.17
				1	99	23.18
				50	25	22.56
				100	0	22.54

LTE Band 12

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	699.7	23017	1.4	1	0	22.96
				1	5	22.96
				3	2	22.28
				6	0	22.23
	707.5	23095		1	0	22.93
				1	5	22.95
				3	2	22.07
				6	0	22.25
	715.3	23173		1	0	22.74
				1	5	22.89
				3	2	22.26
				6	0	22.18
16QAM	699.7	23017	1.4	1	0	22.05
				1	5	22.29
				3	2	21.52
				6	0	21.24
	707.5	23095		1	0	22.14
				1	5	22.19
				3	2	21.16
				6	0	21.23
	715.3	23173		1	0	21.94
				1	5	22.21
				3	2	21.26
				6	0	21.10
64QAM	699.7	23017	1.4	1	0	22.07
				1	5	22.17
				3	2	21.52
				6	0	21.30
	707.5	23095		1	0	22.16
				1	5	22.10
				3	2	21.33
				6	0	21.26
	715.3	23173		1	0	21.88
				1	5	22.08
				3	2	21.34
				6	0	21.15

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	700.5	23025	3	1	0	22.88
				1	14	23.10
				8	4	22.32
				15	0	22.24
	707.5	23095		1	0	22.89
				1	14	22.97
				8	4	22.19
				15	0	22.26
	714.5	23165		1	0	22.79
				1	14	22.86
				8	4	22.25
				15	0	22.22
16QAM	700.5	23025	3	1	0	22.06
				1	14	22.28
				8	4	21.50
				15	0	21.24
	707.5	23095		1	0	22.14
				1	14	22.26
				8	4	21.14
				15	0	21.16
	714.5	23165		1	0	21.88
				1	14	22.14
				8	4	21.32
				15	0	21.08
64QAM	700.5	23025	3	1	0	22.05
				1	14	22.11
				8	4	21.61
				15	0	21.34
	707.5	23095		1	0	22.11
				1	14	22.15
				8	4	21.29
				15	0	21.23
	714.5	23165		1	0	21.88
				1	14	22.12
				8	4	21.35
				15	0	21.18

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	701.5	23035	5	1	0	22.92
				1	24	23.05
				12	6	22.33
				25	0	22.25
	707.5	23095		1	0	22.87
				1	24	22.96
				12	6	22.21
				25	0	22.37
	713.5	23155		1	0	22.80
				1	24	22.92
				12	6	22.22
				25	0	22.19
16QAM	701.5	23035	5	1	0	22.04
				1	24	22.41
				12	6	21.54
				25	0	21.18
	707.5	23095		1	0	22.15
				1	24	22.18
				12	6	21.13
				25	0	21.21
	713.5	23155		1	0	21.83
				1	24	22.16
				12	6	21.34
				25	0	21.15
64QAM	701.5	23035	5	1	0	21.94
				1	24	22.23
				12	6	21.49
				25	0	21.33
	707.5	23095		1	0	22.12
				1	24	22.08
				12	6	21.38
				25	0	21.18
	713.5	23155		1	0	21.86
				1	24	22.19
				12	6	21.38
				25	0	21.11

Modulation	Carrier frequency (MHz)	UL Channel	B W	RB Size	RB Offset	Conducted power (dBm)
QPSK	704	23060	10	1	0	22.96
				1	49	23.11
				24	12	22.34
				50	0	22.36
	707.5	23095		1	0	22.98
				1	49	23.02
				24	12	22.21
				50	0	22.38
	711	23130		1	0	22.85
				1	49	22.93
				24	12	22.27
				50	0	22.24
16QAM	704	23060	10	1	0	22.16
				1	49	22.42
				24	12	21.59
				50	0	21.28
	707.5	23095		1	0	22.27
				1	49	22.32
				24	12	21.25
				50	0	21.28
	711	23130		1	0	21.98
				1	49	22.25
				24	12	21.35
				50	0	21.15
64QAM	704	23060	10	1	0	22.08
				1	49	22.23
				24	12	21.62
				50	0	21.40
	707.5	23095		1	0	22.23
				1	49	22.18
				24	12	21.41
				50	0	21.29
	711	23130		1	0	21.98
				1	49	22.21
				24	12	21.38
				50	0	21.24

6.5 Bluetooth Measurement result

BT

Modulation type	Average Power Output (dBm)		
	2402MHz(Ch0)	2441MHz(Ch39)	2480MHz(Ch78)
GFSK	6.75	7.04	6.10
$\pi/4$ DQPSK	3.21	3.69	2.73
8DPSK	1.72	2.15	1.26

BLE

Modulation type	Average Power Output (dBm)		
	2402MHz (Ch0)	2440MHz (Ch19)	2480MHz (Ch39)
GFSK (LE 1Mbps)	-5.09	-3.92	-5.13

6.6 Wi-Fi Measurement result

WIFI 2.4GHz

Modulation type	Average power output (dBm)		
	2412MHz	2437MHz	2462MHz
11b	18.44	16.79	18.69
11g	16.64	15.46	14.96
11n HT20	15.94	15.01	16.44

6.7 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Method1:

According to the KDB447498 4.3.1 (1)

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f} \text{ (GHz)}] \leq 3.0$ for 1-g SAR, where

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

This is equivalent to $[(\text{max. power of channel, including tune-up tolerance, mW}) / (60 / \sqrt{f} \text{ (GHz)})] \cdot [20 \text{ mm} / (\text{min. test separation distance, mm})] \leq 1.0$ for 1-g SAR; also see Appendix A for approximate exclusion threshold values at selected frequencies and distances.

Method2:

According to the KDB447498 appendix A

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

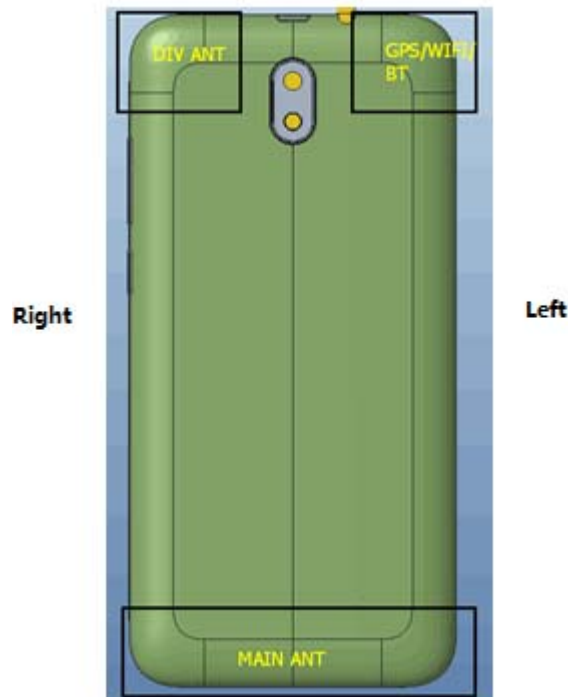
MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Summary of Transmitters

Band/Mode	Max conducted power adjusted for tune-up tolerance(mW)	Position	SAR test exclusion threshold (mW)	Standalone SAR Required
2.4GHz BT/BLE	5.7	Head	10	No
		Body	19	No
2.4GHz Wi-Fi	74.2	Head	10	Yes
		Body	19	Yes

6.8 RF exposure conditions

Refer to the follow picture “Antenna information” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.



Main antenna (Antenna Label:A):
LTE FDD B2/4/5/12 RX&TX ,B7 RX
WCDMA B 2/4/5 RX&TXa
GSM 850/1900 RX&TX
DIV antenna (Antenna Label:B):
LTE FDD 7 RX&TX, B2/4/5/12 RX
WCDMA B2/4/5 RX
WiFi/BT 2.4G 2412MHz~2472MHz & GPS: 1570 MHz~1620 MHz

Note: we defined these position when we face the screen of EUT, the reason why we perform SAR test for these edges is that the structures of antennas is close to our body, and for the other edges do not necessary cause we already consider the worst case.

6.8.1 Head Exposure Conditions For WWAN

Test Configurations	SAR Required	Note
Left Touch	Yes	/
Left Tilt (15°)	Yes	/
Right Touch	Yes	/
Right Tilt (15°)	Yes	/

For WLAN

Test Configurations	SAR Required	Note
Left Touch	Yes	/
Left Tilt (15°)	Yes	/
Right Touch	Yes	/
Right Tilt (15°)	Yes	/

For BT/BLE

Test Configurations	Estimated SAR	Note
Left Touch	Yes	Excluded from SAR test
Left Tilt (15°)	Yes	
Right Touch	Yes	
Right Tilt (15°)	Yes	

6.8.2 Body Exposure conditions

For WWAN

Test Configurations	SAR Required	Note
Back	Yes	/
Front	Yes	/

For WLAN

Test Configurations	SAR Required	Note
Back	Yes	/
Front	Yes	/

For BT/BLE

Test Configurations	Estimated SAR	Note
Back	Yes	Excluded from SAR test
Front	Yes	

6.8.3 Hotspot Exposure conditions

For WWAN

Test Configurations	SAR Required	Antenna-to-edge(s) distances
Back	Yes*	<25mm
Front	Yes*	<25mm
Top	No	>25mm
Bottom	Yes	<25mm
Left	Yes	<25mm
Right	Yes	<25mm

For WLAN

Test Configurations	SAR Required	Antenna-to-edge(s) distances
Back	Yes*	<25mm
Front	Yes*	<25mm
Top	Yes	<25mm
Bottom	No	>25mm
Left	Yes	<25mm
Right	Yes	<25mm

For BT/BLE

Test Configurations	SAR evaluation	Note
Back	No	There is no hotspot mode for BT/BLE
Front		
Top		
Bottom		
Left		
Right		

Note*: For hotspot mode, it's not necessary test Rear and Front position cause we already test the these position without hotspot mode in Body Exposure conditions, Normally if the hotspot mode opened, the technology "power reduction" used for mobile, so we consider the worst condition, and remain the data of body worn as hotspots mode.

6.9 System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser.

For the measurement of the following parameters the SPEAG DAKS-3.5 dielectric parameter probe is used, representing the open-ended coaxial probe measurement procedure.

Date Tested	Freq. (MHz)	Liquid parameters	measured	Target	Delta (%)	Tolerance (%)
2020.04.21	750	ϵ_r	41.374	41.90	-1.26	± 10
		σ [S/m]	0.917	0.89	3.03	± 10
2020.04.22	835	ϵ_r	40.352	41.50	-2.77	± 10
		σ [S/m]	0.924	0.90	2.67	± 10
2019.04.23	1800	ϵ_r	40.647	40.00	1.62	± 10
		σ [S/m]	1.413	1.40	0.93	± 10
2020.04.24	2000	ϵ_r	39.857	40.00	-0.36	± 10
		σ [S/m]	1.434	1.40	2.43	± 10
2020.04.26	2450	ϵ_r	38.367	39.20	-2.13	± 10
		σ [S/m]	1.851	1.80	2.83	± 10
2020.04.27	2600	ϵ_r	39.653	39.00	1.67	± 10
		σ [S/m]	1.948	1.96	-0.61	± 10

Note: For DASY system, the conservative tolerance 5% could expand to 10% when the frequency under 3GHz.

A system check measurement was made following once the determination of the dielectric parameters of the simulant, using the dipole validation kit. The system checking results (dielectric parameters and SAR values) are given in the table below.

Date Tested	System dipole	T.S. Liquid	SAR measured (normalized to 1W)		Target (Ref. Value)	Delta (%)	Tolerance (%)
2020.04.21	D750V3	Head	1g	8.56	8.26	3.63	± 10
2020.04.22	D835V2	Head	1g	9.72	9.37	3.74	± 10
2020.04.23	D1800V2	Head	1g	38.08	38.9	-2.11	± 10
2020.04.24	D2000V2	Head	1g	39.44	40.3	-2.13	± 10
2020.04.26	D2450V2	Head	1g	54.4	52.4	3.82	± 10
2020.04.27	D2600V2	Head	1g	58.0	56.6	2.47	± 10

6.10 SAR TEST RESULT

In order to determine the largest value of the peak spatial-average SAR of a handset, all device positions, configurations, and operational modes should be tested for each frequency band according to Steps 1 to 3 below.

Step 1: The tests should be performed at the channel that is closest to the center of the transmit frequency band.

a) All device positions (cheek and tilt, for both left and right sides of the SAM phantom),
b) All configurations for each device position in a), e.g., antenna extended and retracted, and
c) All operational modes for each device position in item a) and configuration in item b) in each frequency band, e.g., analog and digital, If more than three frequencies need to be tested (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing the highest peak spatial-average SAR determined in Step 1 for each frequency, perform all tests at all other test frequency channels, e.g., lowest and highest frequencies. In addition, for all other conditions (device position, configuration, and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies should be tested as well.

Step 3: Examine all data to determine the largest value of the peak.

Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.

Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.

Duty Factor = 1 / Duty Cycle(%)

For cellular network:

Reported SAR (W/kg) = Measured SAR (W/kg) * Scaling Factor

For WLAN

Reported SAR (W/kg) = Measured SAR (W/kg) * Scaling Factor * Duty factor

2. Per KDB 447498 D01v06, for each exposure position, if the highest output channel reported SAR ≤ 0.8 W/kg, other channels SAR testing are not necessary.

3. The distance between the EUT and the phantom bottom is 10mm.

Mode		Duty cycle	Duty factor	Note
Licensed Frequency	GSM Band	Depends on UP slots	NA	According to the theory, we configured duty cycle with relevant value on the communication tester, so correction factor do not need such as "duty factor"
	WCDMA Band	100%		
	FDD-LTE Band	100%		
	TDD-LTE Band	63.3%		
Unlicensed Frequency	WIFI 2.4GHz 802.11b	99.6%	1.01	SRTC perform SAR test with non-signaling mode, and duty factor shall be considered because of the uncertainty of data traffic.

The measured and reported Head/body SAR values for the test device are tabulated below:

Mode: GSM 850

fL(MHz)=824.2MHz

fM(MHz)=836.5MHz

fH(MHz)= 848.8MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
GPRS 2TX	Head	Left touch	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.190	0.213
			H	31.04	31.50	1.11	---	---
		Left tilt	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.096	0.108
			H	31.04	31.50	1.11	---	---
		Right touch	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.163	0.183
			H	31.04	31.50	1.11	---	---
		Right tilt	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.103	0.115
			H	31.04	31.50	1.11	---	---
	Body worn & Hotspot	Back	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.283	0.317
			H	31.04	31.50	1.11	---	---
		Front	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.221	0.248
			H	31.04	31.50	1.11	---	---
	Hotspot	Bottom	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.129	0.144
			H	31.04	31.50	1.11	---	---
		Left	L	31.07	31.50	1.10	---	---
			M	30.99	31.50	1.12	0.158	0.177
			H	31.04	31.50	1.11	---	---
Right		L	31.07	31.50	1.10	---	---	
		M	30.99	31.50	1.12	0.125	0.140	
		H	31.04	31.50	1.11	---	---	

Mode: GSM1900

fL (MHz)=1850.2MHz

fM (MHz)=1880.0MHz

fH (MHz)=1909.8MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
GPRS 2TX	Head	Left touch	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.046	0.051
			H	27.86	28.50	1.16	---	---
		Left tilt	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.018	0.020
			H	27.86	28.50	1.16	---	---
		Right touch	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.026	0.029
			H	27.86	28.50	1.16	---	---
		Right tilt	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.018	0.020
			H	27.86	28.50	1.16	---	---
	Body worn & Hotspot	Back	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.329	0.365
			H	27.86	28.50	1.16	---	---
		Front	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.292	0.324
			H	27.86	28.50	1.16	---	---
	Hotspot	Bottom	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.414	0.460
			H	27.86	28.50	1.16	---	---
		Left	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.086	0.095
			H	27.86	28.50	1.16	---	---
		Right	L	28.24	28.50	1.06	---	---
			M	28.03	28.50	1.11	0.102	0.113
			H	27.86	28.50	1.16	---	---

Mode: WCDMA BAND II

fL (MHz)= 1852.4MHz fM (MHz)= 1880.0MHz fH (MHz)= 1907.6MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
Rel.99	Head	Left touch	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.067	0.070
			H	22.43	23.00	1.14	---	---
		Left tilt	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.030	0.032
			H	22.43	23.00	1.14	---	---
		Right touch	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.038	0.040
			H	22.43	23.00	1.14	---	---
		Right tilt	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.026	0.027
			H	22.43	23.00	1.14	---	---
	Body worn & Hotspot	Back	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.365	0.383
			H	22.43	23.00	1.14	---	---
		Front	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.236	0.248
			H	22.43	23.00	1.14	---	---
	Hotspot	Bottom	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.211	0.222
			H	22.43	23.00	1.14	---	---
		Left	L	22.62	23.00	1.09	---	---
			M	22.78	23.00	1.05	0.010	0.011
			H	22.43	23.00	1.14	---	---
Right		L	22.62	23.00	1.09	---	---	
		M	22.78	23.00	1.05	0.010	0.011	
		H	22.43	23.00	1.14	---	---	

Mode: WCDMA BAND IV

fL (MHz)=1712.4MHz fM (MHz)=1732.4MHz fH (MHz)= 1752.6MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
Rel.99	Head	Left touch	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.094	0.095
			H	22.61	23.00	1.09	---	---
		Left tilt	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.073	0.074
			H	22.61	23.00	1.09	---	---
		Right touch	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.077	0.078
			H	22.61	23.00	1.09	---	---
		Right tilt	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.072	0.073
			H	22.61	23.00	1.09	---	---
	Body worn & Hotspot	Back	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.638	0.644
			H	22.61	23.00	1.09	---	---
		Front	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.563	0.569
			H	22.61	23.00	1.09	---	---
	Hotspot	Bottom	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.501	0.506
			H	22.61	23.00	1.09	---	---
		Left	L	22.82	23.00	1.04	---	---
			M	22.96	23.00	1.01	0.010	0.010
			H	22.61	23.00	1.09	---	---
Right		L	22.82	23.00	1.04	---	---	
		M	22.96	23.00	1.01	0.010	0.010	
		H	22.61	23.00	1.09	---	---	

Mode: WCDMA BAND V

fL (MHz)=826.4MHz

fM (MHz)=836.4MHz

fH (MHz)= 846.6MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
Rel.99	Head	Left touch	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.182	0.189
			H	22.39	23.00	1.15	---	---
		Left tilt	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.106	0.110
			H	22.39	23.00	1.15	---	---
		Right touch	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.162	0.168
			H	22.39	23.00	1.15	---	---
		Right tilt	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.106	0.110
			H	22.39	23.00	1.15	---	---
	Body worn & Hotspot	Back	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.056	0.058
			H	22.39	23.00	1.15	---	---
		Front	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.218	0.227
			H	22.39	23.00	1.15	---	---
	Hotspot	Bottom	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.010	0.010
			H	22.39	23.00	1.15	---	---
		Left	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.217	0.226
			H	22.39	23.00	1.15	---	---
		Right	L	22.56	23.00	1.11	---	---
			M	22.85	23.00	1.04	0.010	0.010
			H	22.39	23.00	1.15	---	---

Mode: LTE Band 2

fL (MHz)= 1860MHz

fM (MHz)= 1880MHz

fH (MHz)= 1900MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=20MHz QPSK 1%RB	Head	Left touch	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.063	0.068
			H	23.66	24.00	1.08	---	---
		Left tilt	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.033	0.036
			H	23.66	24.00	1.08	---	---
		Right touch	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.052	0.056
			H	23.66	24.00	1.08	---	---
		Right tilt	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.034	0.037
			H	23.66	24.00	1.08	---	---
	Body worn & Hotspot	Back	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.529	0.571
			H	23.66	24.00	1.08	---	---
		Front	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.306	0.330
			H	23.66	24.00	1.08	---	---
	Hotspot	Bottom	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.659	0.712
			H	23.66	24.00	1.08	---	---
		Left	L	23.87	24.00	1.03	---	---
			M	23.67	24.00	1.08	0.045	0.049
			H	23.66	24.00	1.08	---	---
Right		L	23.87	24.00	1.03	---	---	
		M	23.67	24.00	1.08	0.053	0.057	
		H	23.66	24.00	1.08	---	---	

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=20MHz QPSK 50%RB	Head	Left touch	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.058	0.067
			H	22.12	23.50	1.37	---	---
		Left tilt	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.029	0.033
			H	22.12	23.50	1.37	---	---
		Right touch	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.043	0.049
			H	22.12	23.50	1.37	---	---
		Right tilt	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.025	0.029
			H	22.12	23.50	1.37	---	---
	Body worn & Hotspot	Back	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.441	0.507
			H	22.12	23.50	1.37	---	---
		Front	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.223	0.256
			H	22.12	23.50	1.37	---	---
	Hotspot	Bottom	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.545	0.627
			H	22.12	23.50	1.37	---	---
		Left	L	23.08	23.50	1.10	---	---
			M	22.91	23.50	1.15	0.051	0.059
			H	22.12	23.50	1.37	---	---
Right		L	23.08	23.50	1.10	---	---	
		M	22.91	23.50	1.15	0.054	0.062	
		H	22.12	23.50	1.37	---	---	

Mode: LTE Band 4 fL (MHz)=1720MHz fM (MHz)= 1732.5MHz fH (MHz)= 1745MHz
Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=20MHz QPSK 1%RB	Head	Left touch	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.100	0.111
			H	23.32	24.00	1.17	---	---
		Left tilt	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.091	0.101
			H	23.32	24.00	1.17	---	---
		Right touch	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.080	0.089
			H	23.32	24.00	1.17	---	---
		Right tilt	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.075	0.083
			H	23.32	24.00	1.17	---	---
	Body worn & Hotspot	Back	L1	23.51	24.00	1.12	0.632	0.708
			M1	23.53	24.00	1.11	0.757	0.840
			H1	23.32	24.00	1.17	0.724	0.847
			L2	23.51	24.00	1.12	0.627	0.702
			M2	23.53	24.00	1.11	0.747	0.832
			H2	23.32	24.00	1.17	0.716	0.837
		Front	L1	23.51	24.00	1.12	0.665	0.745
			M1	23.53	24.00	1.11	0.799	0.887
			H1	23.32	24.00	1.17	0.763	0.893
			L2	23.51	24.00	1.12	0.649	0.727
			M2	23.53	24.00	1.11	0.784	0.874
			H2	23.32	24.00	1.17	0.758	0.886
	Hotspot	Bottom	L1	23.51	24.00	1.12	0.772	0.865
			M1	23.53	24.00	1.11	0.928	1.030
			H1	23.32	24.00	1.17	0.883	1.033
			L2	23.51	24.00	1.12	0.766	0.857
			M2	23.53	24.00	1.11	0.925	1.028
			H2	23.32	24.00	1.17	0.876	1.024
		Left	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.095	0.105
			H	23.32	24.00	1.17	---	---
		Right	L	23.51	24.00	1.12	---	---
			M	23.53	24.00	1.11	0.106	0.118
			H	23.32	24.00	1.17	---	---

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=20MHz QPSK 50%RB	Head	Left touch	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.092	0.098
			H	22.82	23.00	1.04	---	---
		Left tilt	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.074	0.079
			H	22.82	23.00	1.04	---	---
		Right touch	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.070	0.075
			H	22.82	23.00	1.04	---	---
		Right tilt	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.066	0.071
			H	22.82	23.00	1.04	---	---
	Body worn & Hotspot	Back	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.742	0.794
			H	22.82	23.00	1.04	---	---
		Front	L1	22.68	23.00	1.08	0.661	0.714
			M1	22.71	23.00	1.07	0.795	0.851
			H1	22.82	23.00	1.04	0.756	0.786
			L2	22.68	23.00	1.08	0.657	0.707
			M2	22.71	23.00	1.07	0.783	0.837
			H2	22.82	23.00	1.04	0.762	0.794
	Hotspot	Bottom	L1	22.68	23.00	1.08	0.698	0.754
			M1	22.71	23.00	1.07	0.839	0.898
			H1	22.82	23.00	1.04	0.798	0.830
			L2	22.68	23.00	1.08	0.687	0.740
			M2	22.71	23.00	1.07	0.825	0.882
			H2	22.82	23.00	1.04	0.794	0.828
		Left	L	22.68	23.00	1.08	---	---
			M	22.71	23.00	1.07	0.077	0.082
			H	22.82	23.00	1.04	---	---
Right		L	22.68	23.00	1.08	---	---	
		M	22.71	23.00	1.07	0.091	0.097	
		H	22.82	23.00	1.04	---	---	

Mode: LTE Band 5

fL (MHz)=829 MHz fM (MHz)=836.5MHz fH (MHz)= 844MHz

Limit of SAR (W/kg) : <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=10MHz QPSK 1%RB	Head	Left touch	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.186	0.192
			H	23.35	23.50	1.04	---	---
		Left tilt	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.117	0.121
			H	23.35	23.50	1.04	---	---
		Right touch	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.177	0.182
			H	23.35	23.50	1.04	---	---
		Right tilt	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.114	0.117
			H	23.35	23.50	1.04	---	---
	Body worn & Hotspot	Back	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.341	0.351
			H	23.35	23.50	1.04	---	---
		Front	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.254	0.262
			H	23.35	23.50	1.04	---	---
	Hotspot	Bottom	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.155	0.160
			H	23.35	23.50	1.04	---	---
		Left	L	23.13	23.50	1.09	---	---
			M	23.36	23.50	1.03	0.192	0.198
			H	23.35	23.50	1.04	---	---
Right		L	23.13	23.50	1.09	---	---	
		M	23.36	23.50	1.03	0.153	0.158	
		H	23.35	23.50	1.04	---	---	

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=10MHz QPSK 50%RB	Head	Left touch	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.163	0.176
			H	22.63	23.00	1.09	---	---
		Left tilt	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.100	0.108
			H	22.63	23.00	1.09	---	---
		Right touch	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.160	0.173
			H	22.63	23.00	1.09	---	---
		Right tilt	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.101	0.109
			H	22.63	23.00	1.09	---	---
	Body worn & Hotspot	Back	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.285	0.308
			H	22.63	23.00	1.09	---	---
		Front	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.208	0.225
			H	22.63	23.00	1.09	---	---
	Hotspot	Bottom	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.114	0.123
			H	22.63	23.00	1.09	---	---
		Left	L	22.75	23.00	1.06	---	---
			M	22.65	23.00	1.08	0.165	0.178
			H	22.63	23.00	1.09	---	---
Right		L	22.75	23.00	1.06	---	---	
		M	22.65	23.00	1.08	0.126	0.136	
		H	22.63	23.00	1.09	---	---	

Mode: LTE Band 7

fL (MHz)=2510 MHz

fM (MHz)=2535MHz

fH (MHz)= 2560MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average	
Mode	Exposure condition	Position	CH						
BW=20MHz QPSK 1%RB	Head	Left touch	L	23.72	24.00	1.07	---	---	
			M	23.65	24.00	1.08	0.007	0.008	
			H	23.37	24.00	1.16	---	---	
		Left tilt	L	23.72	24.00	1.07	---	---	
			M	23.65	24.00	1.08	0.007	0.008	
			H	23.37	24.00	1.16	---	---	
		Right touch	L	23.72	24.00	1.07	---	---	
			M	23.65	24.00	1.08	0.009	0.010	
			H	23.37	24.00	1.16	---	---	
		Right tilt	L	23.72	24.00	1.07	---	---	
			M	23.65	24.00	1.08	0.009	0.010	
			H	23.37	24.00	1.16	---	---	
	Body worn & Hotspot	Back	L1	23.72	24.00	1.07	0.641	0.686	
			M1	23.65	24.00	1.08	0.764	0.825	
			H1	23.37	24.00	1.16	0.676	0.784	
			L2	23.72	24.00	1.07	0.637	0.679	
			M2	23.65	24.00	1.08	0.759	0.823	
			H2	23.37	24.00	1.16	0.658	0.761	
		Front	L	23.72	24.00	1.07	---	---	
			M	23.65	24.00	1.08	0.361	0.390	
			H	23.37	24.00	1.16	---	---	
	Hotspot	Bottom	L1	23.72	24.00	1.07	0.835	0.893	
			M1	23.65	24.00	1.08	0.995	1.075	
			H1	23.37	24.00	1.16	0.881	1.022	
			L2	23.72	24.00	1.07	0.823	0.878	
			M2	23.65	24.00	1.08	0.987	1.070	
			H2	23.37	24.00	1.16	0.879	1.016	
		Left	M ^{Note1}	23.65	24.00	1.08	0.993	1.072	
			L	L	23.72	24.00	1.07	---	---
				M	23.65	24.00	1.08	0.002	0.002
				H	23.37	24.00	1.16	---	---
			Right	L	23.72	24.00	1.07	---	---
				M	23.65	24.00	1.08	0.002	0.002
	H	23.37		24.00	1.16	---	---		

Note1: Secondary supply worst case test result.

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=20MHz QPSK 50%RB	Head	Left touch	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.006	0.007
			H	23.29	24.00	1.18	---	---
		Left tilt	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.006	0.007
			H	23.29	24.00	1.18	---	---
		Right touch	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.010	0.011
			H	23.29	24.00	1.18	---	---
		Right tilt	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.007	0.008
			H	23.29	24.00	1.18	---	---
	Body worn & Hotspot	Back	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.584	0.660
			H	23.29	24.00	1.18	---	---
		Front	L	23.56	24.00	1.11	---	---
			M	23.48	24.00	1.13	0.283	0.320
			H	23.29	24.00	1.18	---	---
	Hotspot	Bottom	L1	23.56	24.00	1.11	0.685	0.760
			M1	23.48	24.00	1.13	0.823	0.930
			H1	23.29	24.00	1.18	0.783	0.924
			L2	23.56	24.00	1.11	0.674	0.746
			M2	23.48	24.00	1.13	0.817	0.921
			H2	23.29	24.00	1.18	0.776	0.914
Left		L	23.56	24.00	1.11	---	---	
		M	23.48	24.00	1.13	0.023	0.026	
		H	23.29	24.00	1.18	---	---	
Right		L	23.56	24.00	1.11	---	---	
		M	23.48	24.00	1.13	0.023	0.026	
		H	23.29	24.00	1.18	---	---	

Mode: LTE Band 12

fL (MHz)=704 MHz fM (MHz)=707.5MHz fH (MHz)= 711MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=10MHz QPSK 1%RB	Head	Left touch	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.096	0.108
			H	22.93	23.50	1.14	---	---
		Left tilt	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.060	0.067
			H	22.93	23.50	1.14	---	---
		Right touch	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.093	0.104
			H	22.93	23.50	1.14	---	---
		Right tilt	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.059	0.066
			H	22.93	23.50	1.14	---	---
	Body worn & Hotspot	Back	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.226	0.253
			H	22.93	23.50	1.14	---	---
		Front	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.164	0.184
			H	22.93	23.50	1.14	---	---
	Hotspot	Bottom	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.061	0.068
			H	22.93	23.50	1.14	---	---
		Left	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.139	0.156
			H	22.93	23.50	1.14	---	---
		Right	L	23.11	23.50	1.09	---	---
			M	23.02	23.50	1.12	0.135	0.151
			H	22.93	23.50	1.14	---	---

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average
Mode	Exposure condition	Position	CH					
BW=10MHz QPSK 50%RB	Head	Left touch	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.086	0.092
			H	22.27	22.50	1.05	---	---
		Left tilt	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.055	0.059
			H	22.27	22.50	1.05	---	---
		Right touch	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.085	0.091
			H	22.27	22.50	1.05	---	---
		Right tilt	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.052	0.056
			H	22.27	22.50	1.05	---	---
	Body worn & Hotspot	Back	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.203	0.217
			H	22.27	22.50	1.05	---	---
		Front	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.138	0.148
			H	22.27	22.50	1.05	---	---
	Hotspot	Bottom	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.059	0.063
			H	22.27	22.50	1.05	---	---
		Left	L	22.34	22.50	1.04	---	---
			M	22.21	22.50	1.07	0.122	0.131
			H	22.27	22.50	1.05	---	---
Right		L	22.34	22.50	1.04	---	---	
		M	22.21	22.50	1.07	0.121	0.129	
		H	22.27	22.50	1.05	---	---	

Mode: BT

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Estimated SAR					
MAX power		Head distance	Body-worn distance	Head SAR	Body-worn SAR
dBm	mw	mm	mm	w/kg	w/kg
7.5	5.63	5	10	0.232	0.116

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f_{\text{GHz}}/x}] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$;
where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.

Mode: Wi-Fi 2.4GHz

fL (MHz)=2412MHz fM (MHz)=2437MHz fH (MHz)= 2462MHz

Limit of SAR (W/kg): <1.6W/kg (1g Average)

Test case				Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg) 1g Average	Reported Results (W/kg) 1g Average	
Mode	Exposure condition	Position	CH						
802.11b 1Mbps	Head	Left touch	L	18.44	18.70	1.06	---	---	
			M	16.79	18.70	1.55	0.329	0.510	
			H	18.69	18.70	1.00	---	---	
		Left tilt	L	18.44	18.70	1.06	---	---	
			M	16.79	18.70	1.55	0.263	0.408	
			H	18.69	18.70	1.00	---	---	
		Right touch	L1	18.44	18.70	1.06	1.040	1.102	
			M1	16.79	18.70	1.55	0.716	1.110	
			H1	18.69	18.70	1.00	0.887	0.887	
			L2	18.44	18.70	1.06	1.010	1.072	
			M2	16.79	18.70	1.55	0.713	1.107	
			H2	18.69	18.70	1.00	0.874	0.876	
			M ^{Note1}	16.79	18.70	1.55	0.623	0.966	
		Right tilt	L	18.44	18.70	1.06	---	---	
			M	16.79	18.70	1.55	0.547	0.848	
			H	18.69	18.70	1.00	---	---	
		Body worn & Hotspot	Back	L	18.44	18.70	1.06	---	---
				M	16.79	18.70	1.55	0.267	0.414
				H	18.69	18.70	1.00	---	---
			Front	L	18.44	18.70	1.06	---	---
				M	16.79	18.70	1.55	0.263	0.408
				H	18.69	18.70	1.00	---	---
		Hotspot	Top	L	18.44	18.70	1.06	---	---
				M	16.79	18.70	1.55	0.135	0.209
	H			18.69	18.70	1.00	---	---	
	Left		L	18.44	18.70	1.06	---	---	
			M	16.79	18.70	1.55	0.268	0.415	
			H	18.69	18.70	1.00	---	---	
	Right		L	18.44	18.70	1.06	---	---	
			M	16.79	18.70	1.55	0.039	0.060	
H			18.69	18.70	1.00	---	---		

Note1: Secondary supply worst case test result.

6.11 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

- 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 ($\sim 10\%$ 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 .

The Highest Reported/Estimated SAR configuration in Each Frequency Band

Frequency band	Air interface	Head SAR(w/kg)	Body-worn SAR(w/kg)	Hotspot SAR(w/kg)
Below 1GHz	GSM850 WCDMA BANDV LTE BAND5 LTE BAND12	<0.8	<0.8	<0.8
1GHz-2GHz	GSM1900 WCDMA BANDII WCDMA BANDIV LTE BAND2 LTE BAND4	<0.8	>0.8	>0.8
2GHz-3GHz	BT WIFI 2.4GHZ LTE BAND7	>0.8	>0.8	>0.8

6.12 Simultaneous Transmission SAR Analysis

Antenna numbers of Simultaneous Transmission	Antennas of Simultaneous Transmission	Simultaneous Transmission Modes
2	MAIN ANT+ WLAN/BT ANT	Celluar2/3/4G+WIFI 2.4GHz Celluar2/3/4G+BT

Head exposure

Position of worst case	Licensed band	Unlicensed band	Simultaneous SAR(w/kg)
Right Cheek	GSM850	WIFI 2.4G	1.293

Body-worn exposure

Position of worst case	Licensed band	Unlicensed band	Simultaneous SAR(w/kg)
Front	LTE Band 4	WIFI 2.4G	1.301

Hotspot exposure

Position of worst case	Licensed band	Unlicensed band	Simultaneous SAR(w/kg)
Bottom	LTE Band 7	WIFI 2.4G	1.075

According to the above tables, all the exposure condition of SAR values < 1.6W/kg.

7 MEASUREMENT UNCERTAINTY

(0.3 - 3 GHz range)								
Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.0 %	N	1	1	1	±6.0 %	±6.0 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.4 %	R	$\sqrt{3}$	1	1	±0.2 %	±0.2 %	∞
Probe Positioning	±2.9 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Max. SAR Eval.	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^p	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.1 %	R	$\sqrt{3}$	1	1	±3.5 %	±3.5 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±11.2 %	±11.1 %	361
Expanded STD Uncertainty						±22.3 %	±22.2 %	

(3 - 6 GHz range)

Error Description	Uncert. value	Prob. Dist.	Div.	(c_1) 1g	(c_2) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(v_i) v_{eff}
Measurement System								
Probe Calibration	±6.55 %	N	1	1	1	±6.55 %	±6.55 %	∞
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	0.7	0.7	±1.9 %	±1.9 %	∞
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0.7	0.7	±3.9 %	±3.9 %	∞
Boundary Effects	±2.0 %	R	$\sqrt{3}$	1	1	±1.2 %	±1.2 %	∞
Linearity	±4.7 %	R	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	1	±0.6 %	±0.6 %	∞
Modulation Response ^m	±2.4 %	R	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	±0.3 %	N	1	1	1	±0.3 %	±0.3 %	∞
Response Time	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Integration Time	±2.6 %	R	$\sqrt{3}$	1	1	±1.5 %	±1.5 %	∞
RF Ambient Noise	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
RF Ambient Reflections	±3.0 %	R	$\sqrt{3}$	1	1	±1.7 %	±1.7 %	∞
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	1	±0.5 %	±0.5 %	∞
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	1	±3.9 %	±3.9 %	∞
Max. SAR Eval.	±4.0 %	R	$\sqrt{3}$	1	1	±2.3 %	±2.3 %	∞
Test Sample Related								
Device Positioning	±2.9 %	N	1	1	1	±2.9 %	±2.9 %	145
Device Holder	±3.6 %	N	1	1	1	±3.6 %	±3.6 %	5
Power Drift	±5.0 %	R	$\sqrt{3}$	1	1	±2.9 %	±2.9 %	∞
Power Scaling ^P	±0 %	R	$\sqrt{3}$	1	1	±0.0 %	±0.0 %	∞
Phantom and Setup								
Phantom Uncertainty	±6.6 %	R	$\sqrt{3}$	1	1	±3.8 %	±3.8 %	∞
SAR correction	±1.9 %	R	$\sqrt{3}$	1	0.84	±1.1 %	±0.9 %	∞
Liquid Conductivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
Liquid Permittivity (mea.) ^{DAK}	±2.5 %	R	$\sqrt{3}$	0.26	0.26	±0.3 %	±0.4 %	∞
Temp. unc. - Conductivity ^{BB}	±3.4 %	R	$\sqrt{3}$	0.78	0.71	±1.5 %	±1.4 %	∞
Temp. unc. - Permittivity ^{BB}	±0.4 %	R	$\sqrt{3}$	0.23	0.26	±0.1 %	±0.1 %	∞
Combined Std. Uncertainty						±12.3 %	±12.2 %	748
Expanded STD Uncertainty						±24.6 %	±24.5 %	

8 TEST EQUIPMENTS

The measurements were performed using an automated near-field scanning system, DASY5, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the ‘advanced extrapolation’ algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
DAE	DAE4	546	2019.08.28	2020.08.27
Dosimetric E-field Probe	ES3DV3	3127	2019.08.27	2020.08.26
Dipole Validation Kit	D750V3	4d023	2017.09.13	2020.09.12
Dipole Validation Kit	D835V2	4d023	2017.09.13	2020.09.12
Dipole Validation Kit	D1800V2	2d084	2017.09.15	2020.09.14
Dipole Validation Kit	D2000V2	1009	2018.02.01	2021.01.31
Dipole Validation Kit	D2450V2	738	2017.09.18	2020.09.17
Dipole Validation Kit	D2600V2	1166	2019.11.08	2022.11.08

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration date	Calibration Due data
Signal Generator	E4428C	MY45280865	2019.08.20	2020.08.19
Signal Generator	SML 03	103514	2019.08.20	2020.08.19
Power meter	E4417A	MY45101182	2019.08.20	2020.08.19
Power Sensor	E4412A	MY41502214	2019.08.20	2020.08.19
Power Sensor	E4412A	MY41502130	2019.08.20	2020.08.19
Power meter	E4417A	MY45101004	2019.08.20	2020.08.19
Power Sensor	E9300B	MY41496001	2019.08.20	2020.08.19
Power Sensor	E9300B	MY41496003	2019.08.20	2020.08.19
Communication Tester	E5515C	MY48367401	2019.08.20	2020.08.19
Communication Tester	CMU500	114666	2019.08.20	2020.08.19
Communication Tester	MT8820C	6201300660	2019.08.20	2020.08.19
Communication Tester	MT8821C	6201547819	2019.08.20	2020.08.19
Vector Network Analyzer	VNA R140	0011213	2019.09.18	2020.09.17
Dielectric Parameter Probe	DAKS-3.5	1042	2019.09.17	2020.09.16

Detailed information of Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Dynamic Range	5 μ W/g to > 100 W/kg; Linearity: ± 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

Detailed information of Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Optical Surface Detection	± 0.3 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Dynamic Range	10 μ W/g to > 100 W/kg Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

According to KDB 865664 D01 section 3.2.2, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the **SAR target, impedance and return loss** of a dipole have remain stable according to the following requirements.

- 1) The test laboratory must ensure that the required supporting information and documentation are included in the SAR report to qualify for the three-year extended calibration interval; otherwise, the IEEE Std 1528-2013 recommended annual calibration applies.
- 2) Immediate re-calibration is required for the following conditions.
 - a) After a dipole is damaged and properly repaired to meet required specifications.
 - b) When the measured SAR deviates from the calibrated SAR value by more than 10% due to changes in physical, mechanical, electrical or other relevant dipole conditions; i.e., the error is not introduced by incorrect measurement procedures or other issues relating to the SAR measurement system.
 - c) When the most recent return-loss result, measured at least annually, deviates by more than 20% from the previous measurement (i.e. value in dB \times 0.2) or not meeting the required 20 dB minimum return-loss requirement.
 - d) When the most recent measurement of the real or imaginary parts of the impedance, measured at least annually, deviates by more than 5 Ω from the previous measurement.

Dipole 750

SAR target

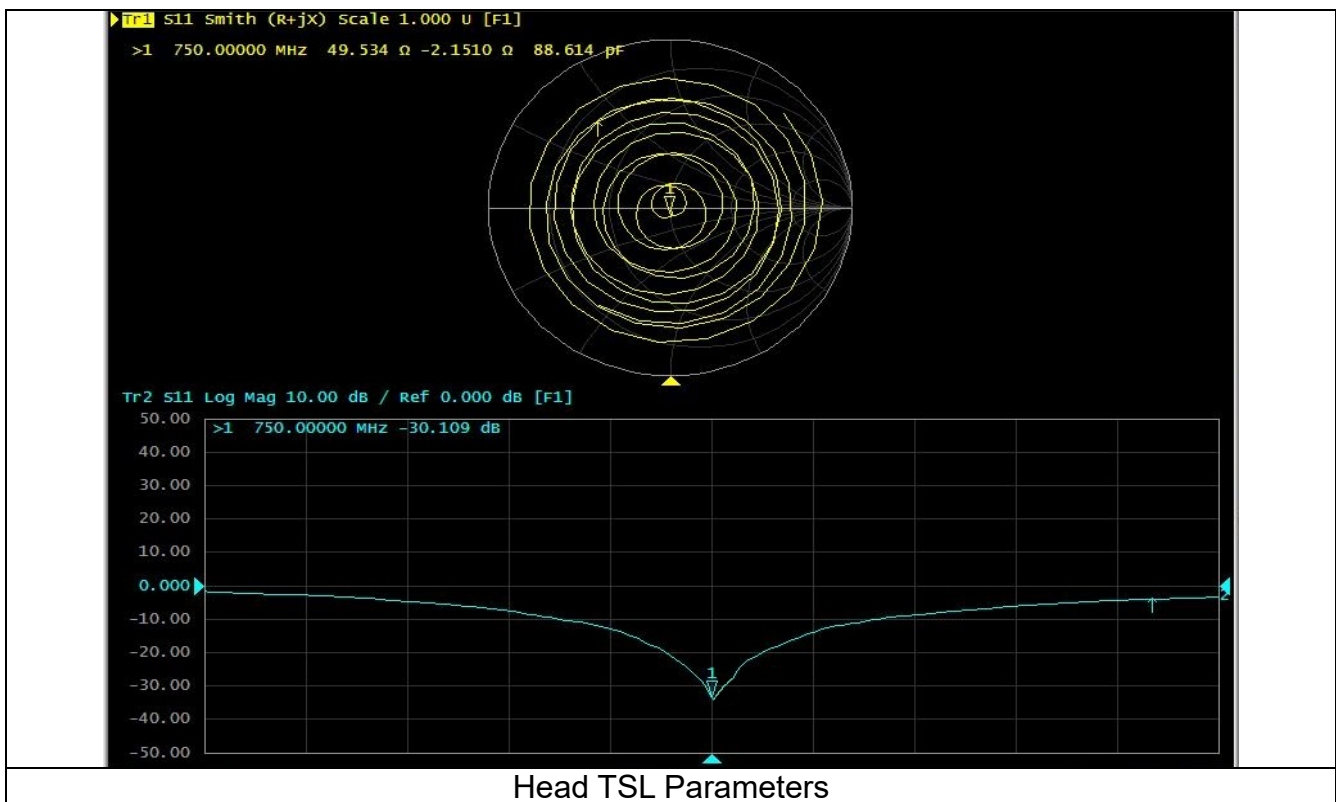
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

Head TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	53.9Ω+0.24jΩ	49.5Ω-2.15jΩ	<5Ω
Return loss	-28.4dB	-29.8dB	<20%



Dipole 835

SAR target

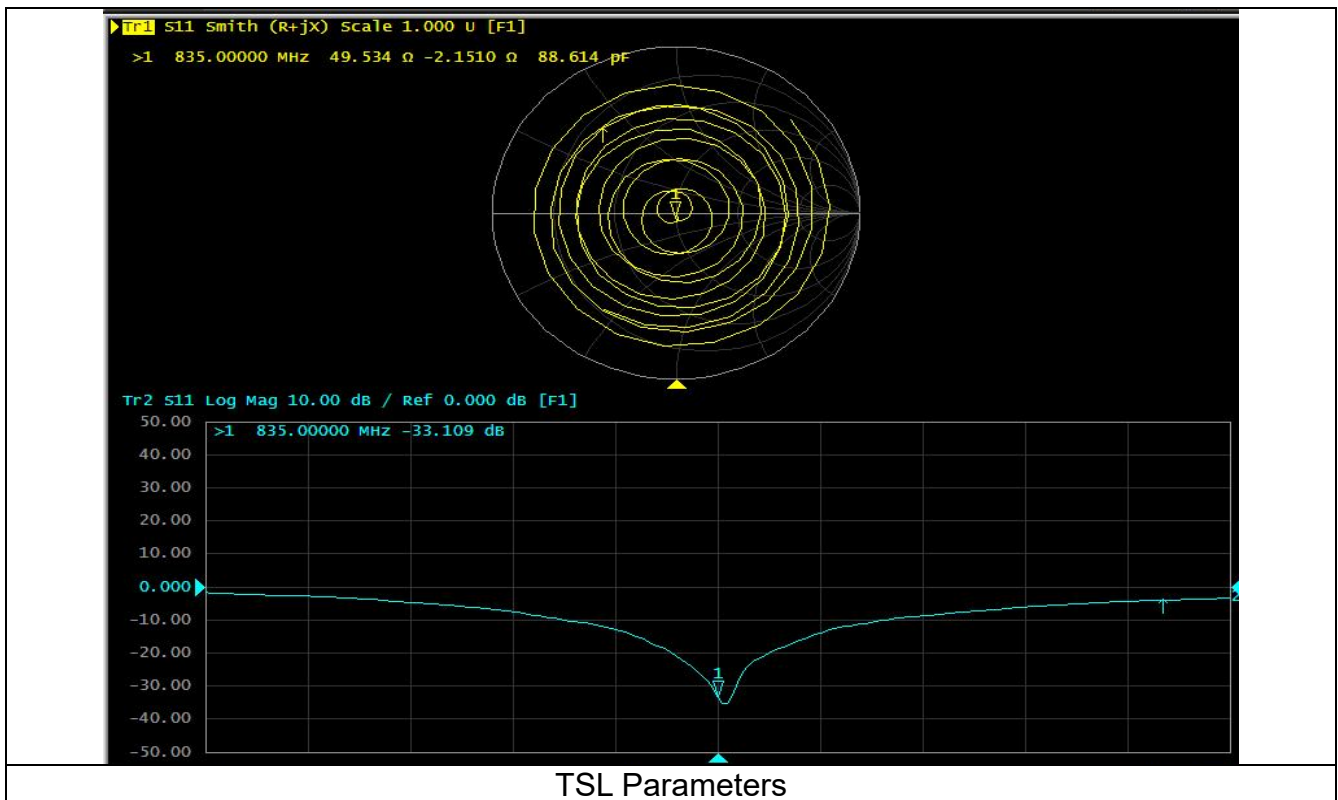
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	51.0 Ω -2.79j Ω	49.5 Ω -2.15j Ω	<5 Ω
Return loss	-30.7 dB	-33.1 dB	<20%



TSL Parameters

Dipole1800

SAR target

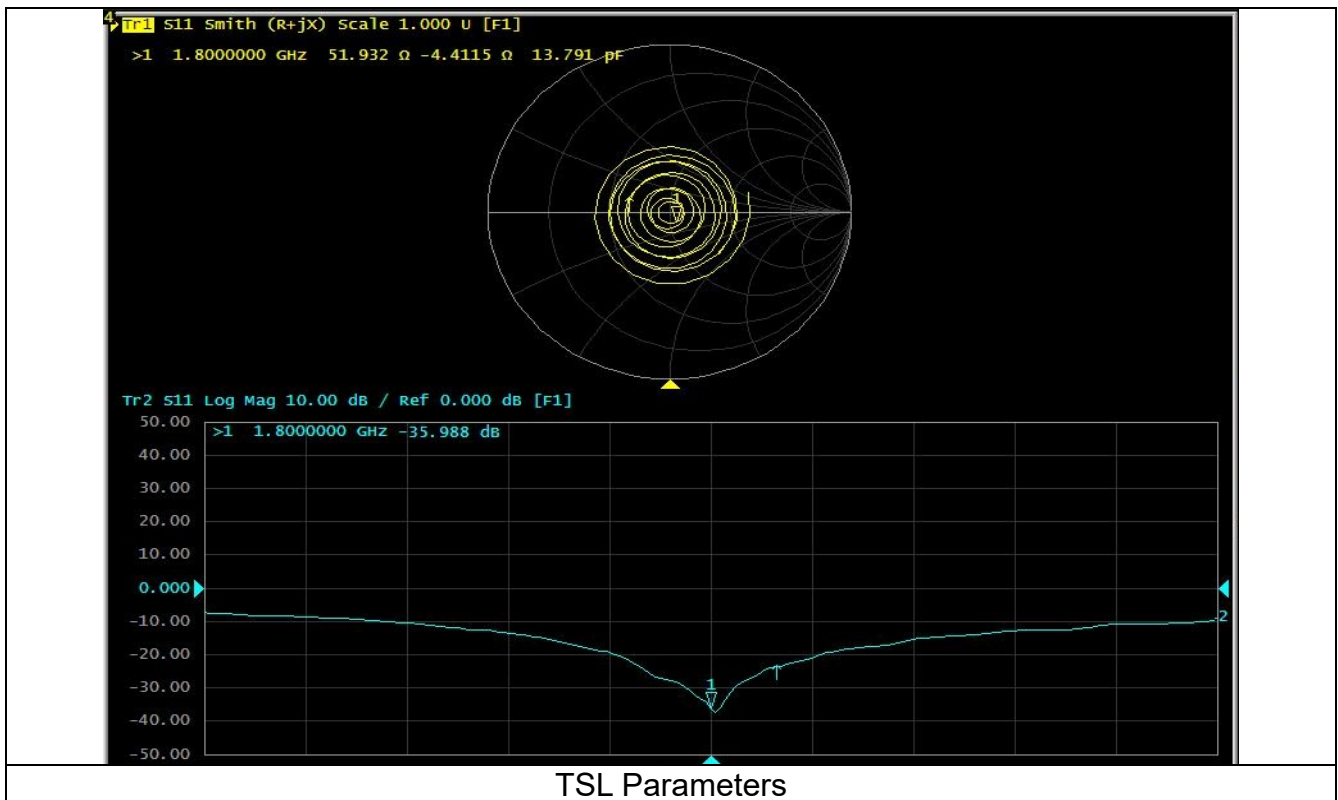
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	49.3 Ω -1.55j Ω	51.9 Ω -4.41j Ω	<5 Ω
Return loss	-35.4 dB	-36.0dB	<20%



Dipole2000

SAR target

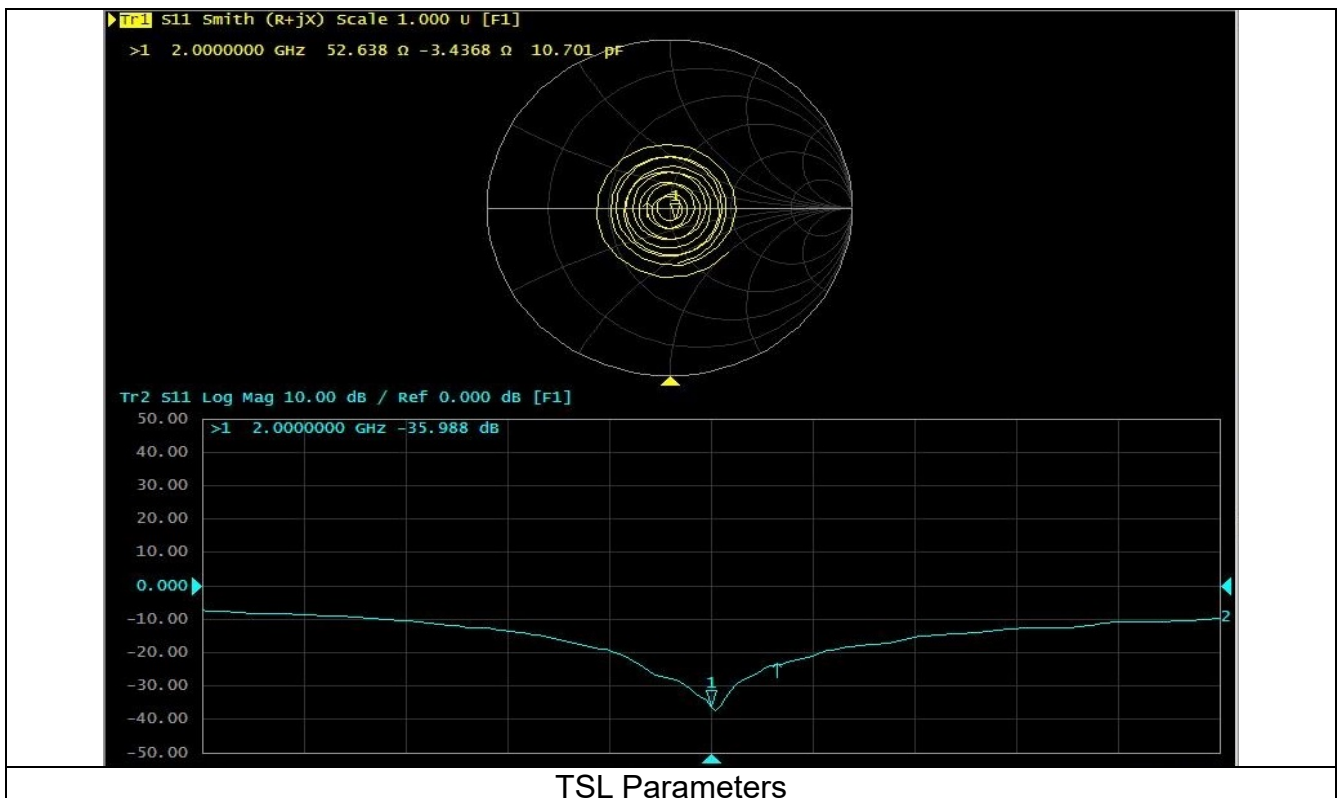
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance, deviates within 5Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	$49.8\Omega-2.08j\Omega$	$52.6\Omega-3.44j\Omega$	$<5\Omega$
Return loss	-33.6dB	-36.0dB	$<20\%$



Dipole2450

SAR target

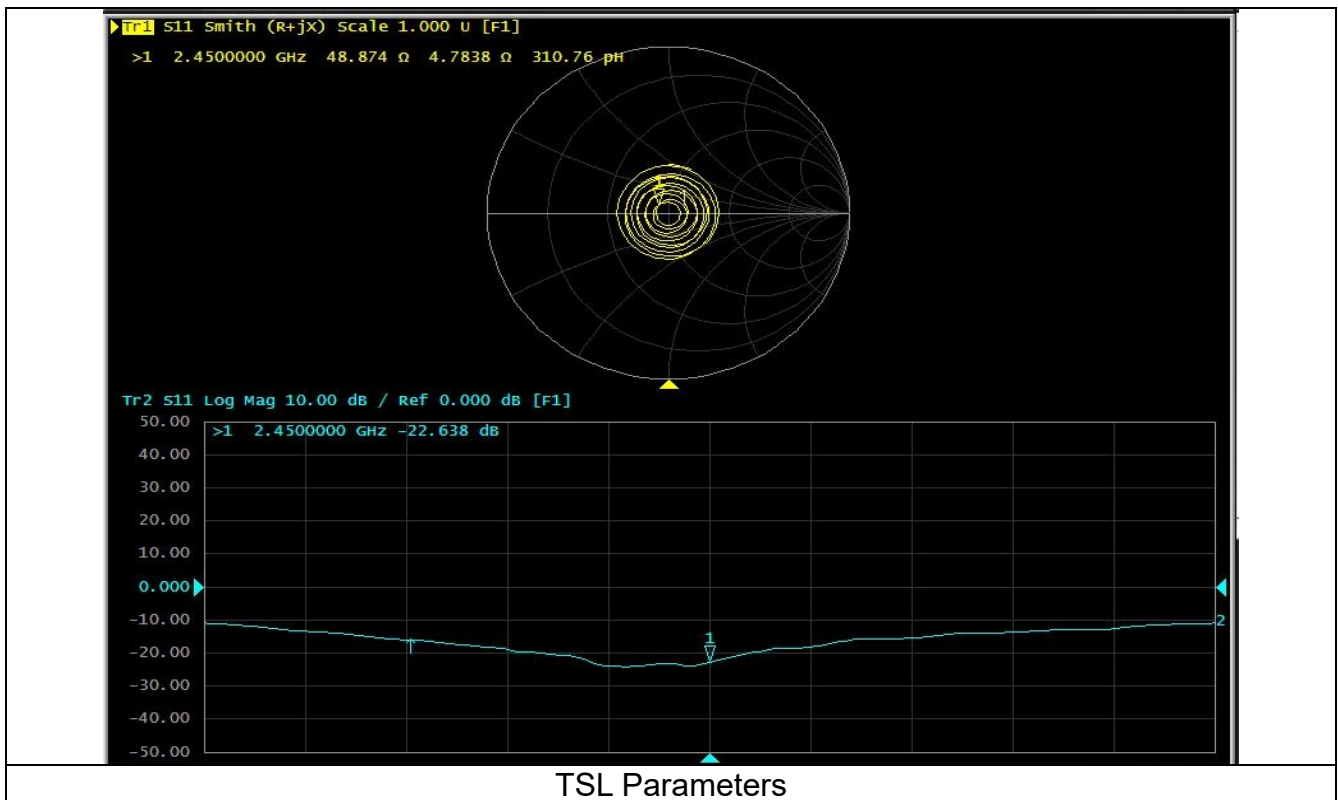
Refers to system check, measured SAR (1g and 10g) deviates from the Target SAR value of calibration report within 10%.

Impedance and Return loss measured by Network analyzer

The most recent measurement of the real or imaginary parts of the impedance deviates within 5 Ω from the previous measurement. (Data from the last calibration report)

The most recent return-loss result deviates within 20% from the previous measurement. (Data from the last calibration report)

TSL Parameters			
Parameters	Target (Ref. Value)	Measured data	Deviation
Impedance	51.3Ω+5.92jΩ	48.9Ω+4.78jΩ	<5Ω
Return loss	-24.5 dB	-22.6dB	<20%



TSL Parameters

ANNEX A – TEST PLOTS

Please refer to the attachment.

ANNEX B – RELEVANT PAGES FROM CALIBRATION REPORTS

Please refer to the attachment.