FCC SAR Compliance Test Report

Product Name:	Smart Phone
Model:	MGA-LX3
Report No.:	SYBH(Z-SAR)20220105022001
FCC ID:	2ATEYMGA-LX3

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Modified History

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	2022-01-30	Liu Yongsen

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1 General Information

1.1 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing are below Table 1.

Band	Max Reported SAR(W/kg)			
	1-g Head	1-g Body-worn (15mm) *	1-g Hotspot (10mm)	Product Specific 10-g SAR (0mm)**
GSM 850	0.75	0.12	0.27	/
PCS 1900	0.75	0.29	0.33	/
UMTS Band II	0.81	0.36	0.42	/
UMTS Band IV	0.88	**0.73**	**0.64**	**2.54**
UMTS Band V	0.87	0.19	0.42	/
LTE Band 2	0.56	0.35	0.30	/
LTE Band 5	0.83	0.19	0.36	/
LTE Band 7	0.65	0.24	0.29	/
LTE Band 13	0.79	0.23	0.45	/
LTE Band 26	0.44	0.18	0.43	/
LTE Band 38	0.56	0.21	0.59	/
LTE Band 66	**1.02**	0.65	0.47	/
2.4G Wi-Fi	0.15	0.16	0.36	/
BT	0.07	/	/	/
The highest reported SAR for Head, Body Worn, Hotspot, Product Specific 10-g and Simultaneous transmission exposure conditions are 1.02 W/kg, 0.73 W/kg, 0.64 W/kg, 2.54 W/kg and 1.02W/kg per KDB690783 D01.				

Table 1: Summary of test result

Note:

1)* For body worn operation, this device has been tested with FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

2) ** For Product Specific 10-g SAR operation, this device has been tested and meets the 10-g SAR limits of 4.0 W/kg for general population/ uncontrolled exposure according to ANSI C95.1:1992/IEEE C95.1:1991.

3) According to TCB workshop October, 2014 RF Exposure Procedures Update(Overlapping LTE Bands):

a) SAR for LTE Band 4 (Frequency range: 1710-1755 MHz) is covered by LTE Band 66(Frequency range:1710-1780 MHz) due to similar frequency range, smaller maximum tune up limit and same channel bandwidth.

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits according to the FCC rule §2.1093, the ANSI C95.1:1992/IEEE C95.1:1991, the NCRP Report Number 86 for uncontrolled environment, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

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1.2 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain/Body/Arms/Legs)	**1.60 W/kg**	8.00 W/kg
Spatial Average SAR** (Whole Body)	0.08 W/kg	0.40 W/kg
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	**4.00 W/kg**	20.00 W/kg

Table 2: RF exposure limits

The limit applied in this test report is shown in **bold** letters

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation

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1.3 EUT Description

Device type :	Portable device		
Product Name:	Smart Phone		
Models:	MGA-LX3		
SN :	1#:5VEBB21C24200161 2#:5VEBB21C24200162 3#:5VEBB21C24200129 4#:5VEBB21C24200138 5#:5VEBB21C24200092		
Exposure category:	Uncontrolled environment / general population		
Hardware version :	HL1MGASU		
Software version :	6.0.0.28(C900E28R1P1)		
Antenna type :	Internal antenna		
Test device production information	Identical Prototype		
Test modulation	GSM(GMSK/8PSK), UMTS(QPSK), LTE (QPSK/16QAM/64QAM), Wi-Fi(DSSS/OFDM/OFDMA), BT(GFSK/π/4-DQPSK/8-DPSK)		
Device Class :	B		
HSDPA UE Category:	14		
HSUPA UE Category:	6		
DC-HSDPA UE Category	24		
Supporting mode(s) and Operating frequency range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM 850	824-849	869-894
	PCS 1900	1850-1910	1930-1990
	UMTS Band II	1850-1910	1930-1990
	UMTS Band IV	1710-1755	2110-2155
	UMTS Band V	824-849	869-894
	LTE Band 2	1850-1910	1930-1990
	LTE Band 4	1710-1755	2110-2155
	LTE Band 5	824-849	869-894
	LTE Band 7	2500-2570	2620 -2690
	LTE Band 13	777-787	746-756
	LTE Band 26	814-849	859-894
	LTE Band 38	2570-2620	2570-2620
	LTE Band 66	1710-1780	2110-2200
	2.4G Wi-Fi	2400-2483.5	
	BT	2400-2483.5	

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Power class :	4,tested with power level 5(GSM850)
	1,tested with power level 0(PCS1900)
	3, tested with power control “all 1”(UMTS Bands)
	3, tested with power control all Max.(LTE Bands)
Test channels (low-mid-high) :	128-190-251(GSM850)
	512-661-810(PCS1900)
	9262-9400-9538(UMTS Band II)
	1312-1413-1513(UMTS Band IV)
	4132-4182-4233(UMTS Band V)
	18607-18900-19193(LTE Band 2 BW=1.4MHz)
	18615-18900-19185(LTE Band 2 BW=3MHz)
	18625-18900-19175(LTE Band 2 BW=5MHz)
	18650-18900-19150(LTE Band 2 BW=10MHz)
	18675-18900-19125(LTE Band 2 BW=15MHz)
	18700-18900-19100(LTE Band 2 BW=20MHz)
	19957-20175-20393(LTE Band 4 BW=1.4MHz)
	19965-20175-20385(LTE Band 4 BW=3MHz)
	19975-20175-20375(LTE Band 4 BW=5MHz)
	20000-20175-20350(LTE Band 4 BW=10MHz)
	20025-20175-20325(LTE Band 4 BW=15MHz)
	20050-20175-20300(LTE Band 4 BW=20MHz)
	20407-20525-20643(LTE Band 5 BW=1.4MHz)
	20415-20525-20635(LTE Band 5 BW=3MHz)
	20425-20525-20625(LTE Band 5 BW=5MHz)
	20450-20525-20600(LTE Band 5 BW=10MHz)
	20775-21100-21425(LTE Band 7 BW=5MHz)
	20800-21100-21400(LTE Band 7 BW=10MHz)
	20825-21100-21375(LTE Band 7 BW=15MHz)
	20850-21100-21350(LTE Band 7 BW=20MHz)
	23205-23230-23255 (LTE Band 13 BW=5MHz)
	23230 (LTE Band 13 BW=10MHz)
	26697-26865-27033(LTE Band 26 BW=1.4MHz)
	26705-26865-27025(LTE Band 26 BW=3MHz)
	26715-26865-27015(LTE Band 26 BW=5MHz)
	26740-26865-26990(LTE Band 26 BW=10MHz)
	26765-26865-26965(LTE Band 26 BW=15MHz)
	37775-38000-38225(LTE Band 38 BW=5MHz)
	37800-38000-38200(LTE Band 38 BW=10MHz)
	37825-38000-38175(LTE Band 38 BW=15MHz)
	37850-38000-38150(LTE Band 38 BW=20MHz)
	131979-132322-132665(LTE Band 66 BW=1.4MHz)
	131987-132322-132657(LTE Band 66 BW=3MHz)
	131997-132322-132647(LTE Band 66 BW=5MHz)
	132022-132322-132622(LTE Band 66 BW=10MHz)
	132047-132322-132597(LTE Band 66 BW=15MHz)
	132072-132322-132572(LTE Band 66 BW=20MHz)
	802.11b:1-6-11 802.11g:1-2-6-9-10-11

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	802.11n(20M): 1-2-6-9-10-11 802.11n(40M):3-4-6-8-9(2.4G Wi-Fi)
	0-19-39-78(BT)

Table 3: Device information and operating configuration

1.3.1 General Description

MGA-LX3 is subscriber equipment in the GSM/WCDMA/LTE system. The GSM frequency bands include GSM850, GSM900, DCS1800 and PCS1900.The WCDMA frequency band includes band I, band II,band IV , band V, band VIII .The LTE frequency bands include band 1, band 2, band 3, band 4, band 5,band 7, band 8, band 13,band 28,band 38,band 26,band 66. But only GSM850 and GSM1900,WCDMA frequency band II,band IV , band V, LTE frequency band 2, band 4, band5, band 7, band 13, band 38,band 26 and band 66 bands test data included in this report.

The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/WCDMA and GSM protocol processing, voice, video MMS service, GPS, AGPS, Wi-Fi etc. Externally it provides earphone port (to provide voice service), and dual SIM/single SIM card interface. MGA-LX3 is dual/single SIM smart phone. It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

Battery information:

Name	Manufacturer/Trademark	Description
Rechargeable Li-ion	Huawei Device Co., Ltd. (Manufacturer: DESAY)	Battery Model: HB536896EFW Rated capacity: 5900mAH Nominal Voltage: +3.87V Charging Voltage: +4.45V
	Huawei Device Co., Ltd. (Manufacturer: ATL)	
	Huawei Device Co., Ltd. (Manufacturer: DESAY)	Battery Model: HB536896EFW-1 Rated capacity: 5900mAH Nominal Voltage: +3.87V Charging Voltage: +4.45V
	Huawei Device Co., Ltd. (Manufacturer: ATL)	

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1.4 Test specification(s)

IEEE C95.1:1991	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE Std 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01	3G SAR Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 941225 D05A	LTE Rel.10 KDB Inquiry Sheet v01r02
KDB 941225 D06	Hotspot SAR v02r01
KDB 447498 D01	General RF Exposure Guidance v06
KDB 648474 D04	Handsets SAR v01r03
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 865664 D01	SAR measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03

1.5 Testing laboratory

Test Site	Reliability Laboratory of Huawei Technologies Co., Ltd.
Test Location	NO.2 New City Avenue Songshan Lake Sci. & Tech. Industry Park, Dongguan, Guangdong, P.R.C
Telephone	+86 769 23830808
Fax	+86 769 23837628
State of accreditation	The Test laboratory (area of testing) is accredited according to ISO/IEC 17025.

1.6 Applicant and Manufacturer

Company Name	Huawei Device Co., Ltd
Address	No.2 of Xincheng Road, Songshan Lake Zone, Dongguan, Guangdong 523808, People's Republic of China

1.7 Application details

Start Date of test	2022-01-13
End Date of test	2022-01-29

1.8 Ambient Condition

Ambient temperature	18°C – 25°C
Relative Humidity	30% – 70%

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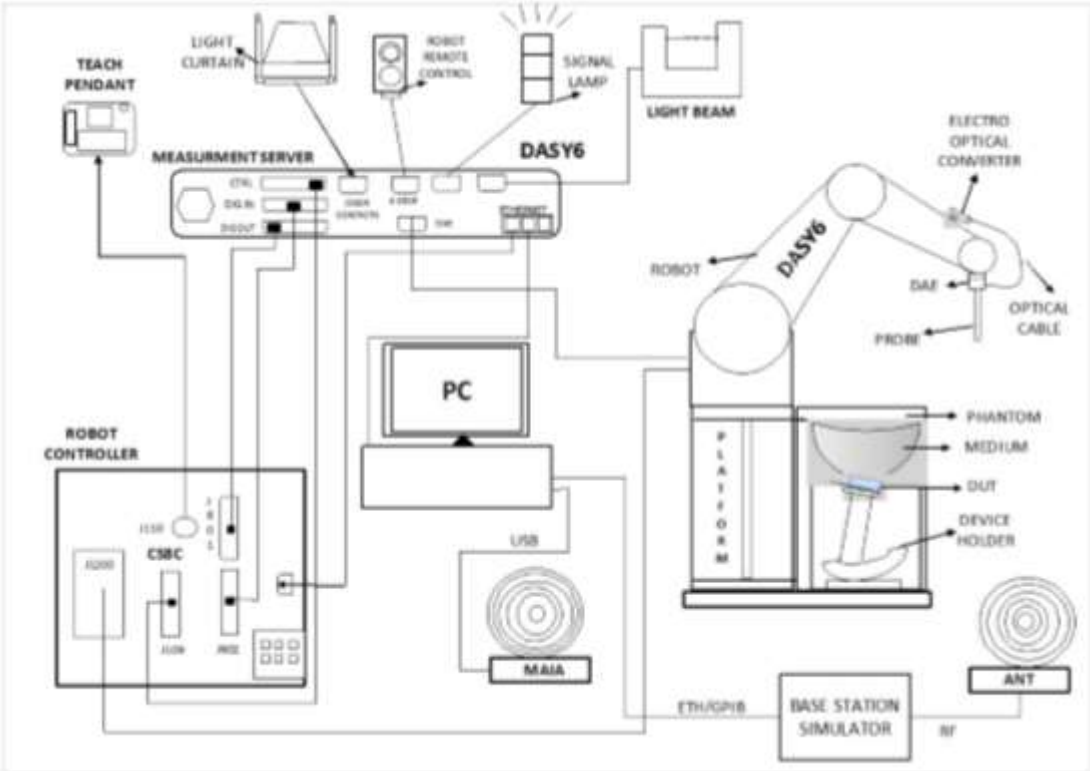
2 SAR Measurement System

2.1 SAR Measurement Set-up

cDASY V6.0 Complaince Dosimetric Assessment System
The DASY6 system combines a sophisticated measurement system with a variety of probes (E-field, H-field, temperature, etc.) and a high-precision 6-axis robot positioner. The combination allows for completely automated measurement scans and evaluations with both field and position information, e.g., volume averages, peak search, and extrapolations. The main purpose is the measurement in the nearfield of radiators of highly non-isotropic fields for which the exact measurement location is critical. Each of the numerous parameters of the many components of the dosimetric measurement system (phantom, medium, positioner, probe, electronics, measurement server, evaluation procedures) influences the measurement result.

The DASY6 system in cDASY6/DASY5 V5.2 SAR Configuration is shown below:



The cDASY6 system for performing compliance tests consist of the following items:

- Robot (6 Axis) & Parts
  - -Controller
  - -Teach Pendant
  - -Signal Lamps
  - -Remote Control
- Phantoms
- Platforms
- Tissue/Head Sim. Liquids
- Dielectric Measurement Kit
- DUT Holder
- Probes & Dipole Kit
- Data Acquisition Electronics (DAE)
- Measurement Server
- Light Beam Unit

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• Computer & Software
• MAIA / ANT

2.2 Test environment

The DASY measurement system is placed at the head end of a room with dimensions:
5 x 2.5 x 3 m³, the SAM phantom is placed in a distance of 75 cm from the side walls and 1.1m from the rear wall.
Picture 1 of the photo documentation shows a complete view of the test environment.
The system allows the measurement of SAR values larger than 0.005 mW/g.

2.3 DASY6 Measurement Chain

The DASY6 dosimetric measurement system signal chain is shown in the figure below:

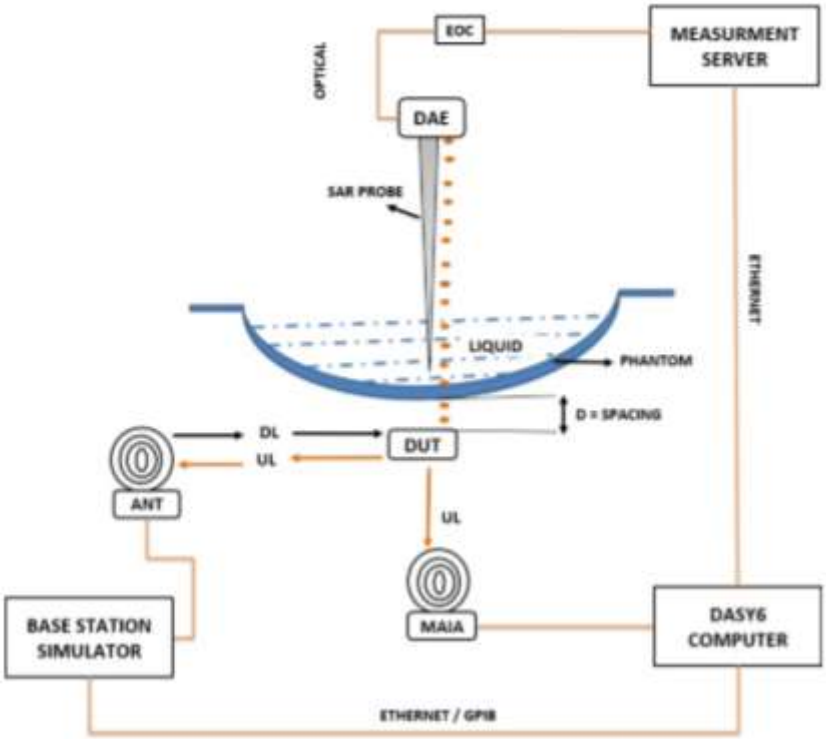

Figure: cDASY6 Dosimetric Measurement System Signal Chain

The base-station simulator is controlled by the computer, to setup a specific test mode call with the device under test (DUT). The test mode call parameters (Freq. Band, Channel, Modulation, etc.) are set within the cDASY6 software.
The DUT is placed in the Device Holder and held at a fixed spacing / orientation with respect to the phantom. The phantom has a fixed geometry and thickness defined by the compliance standards.
The phantom is filled with liquid medium of known permittivity and conductivity.
The uplink signal transmitted by the DUT is measured inside the medium by the probe, which is accurately positioned at a precisely known distance and defined orientation with respect to the phantom surface, normal at the point by the 6-axis robot positioner.
The dipole / loop sensors at the probe tips pick up the signal and generate a voltage, which is measured by the voltmeter inside the data acquisition electronics (DAE). The DAE returns digital values, which are converted to an optical signal and transmitted via the electro-optic converter (EOC) to the measurement server (MS). The data is finally recorded in the DASY6 software.
The Modulation and Interference Analyzer (MAIA) measures the uplink signal and the cDASY6 software calculated signal characteristics such as bandwidth, modulation frequency, etc. and matches these with the known characteristics of the test mode call parameters set up via the base-station simulator. This is important, as the probe has different calibration factors for different types of uplink signals – to obtain an accurate reading, the uplink signal must match the probe calibration factors applied.

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In case of a new or unknown signal, the MAIA is used to ascertain the best match of probe calibration factors depending on the characteristics of measured signal.
The free-space E-field / H-field measurement setup is also similar. The SAR probe is replaced by the E-an/or H-field probe, while the DUT is typically placed on a plane surface. The data acquisition and signalling processing via the DAE, EOC, and MS by the DASY6 software remains the same.

2.4 Data Acquisition Electronics description

The data acquisition electronics (DAE) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converted and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

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

DAE

Input Impedance	200MOhm	
The Inputs	symmetrical and floating	
Common mode rejection	above 80 Db	

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2.5 Probe description

These probes are specially designed and calibrated for use in liquids with high permittivities. They should not be used in air, since the spherical isotropy in air is poor (±2 dB). The dosimetric probes have special calibrations in various liquids at different frequencies.

Isotropic E-Field Probe ES3DV3 for Dosimetric Measurements

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents)	
Calibration	ISO/IEC 17025 calibration service available.	
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)	
Dynamic range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB	
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	
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones	

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents)	
Calibration	ISO/IEC 17025 calibration service available.	
Frequency	10 MHz to >6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic range	10 µW/g to > 100 mW/g; Linearity: ± 0.2 dB(noise: typically<1µW/g)	
Dimensions	Overall length: 337 mm (Tip:20 mm) Tip diameter:2.5 mm (Body:12 mm) Typical distance from probe tip to dipole centers: 1mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%	

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2.6 Phantom description

SAM Twin Phantom

Shell Thickness	2mm±0.2mm;The ear region:6.0±0.2mm	
Filling Volume	Approximately 25 liters	
Dimensions	Length:1000mm; Width:500mm; Height: adjustable feet	
Measurement Areas	Left hand Right hand Flat phantom	
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible. Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.		

The following figure shows the definition of reference point:

ELI4 Phantom

Shell Thickness	2mm±0.2mm	
Filling Volume	Approximately 30 liters	
Dimensions	Major axis:600mm; Minor axis:400mm;	
Measurement Areas	Flat phantom	
The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.		

The phantom shell material is resistant to all ingredients used in the tissue-equivalent liquid recipes. The shell of the phantom including ear spacers is constructed from low permittivity and low loss material, with a relative permittivity 2≤εr≤5 at ≤3 GHz,3≤ εr≤4 at >3 GHz and a loss tangent ⩽0.05.

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Modular Triple Flat Phantom

Shell Thickness (bottom plate)	2mm±0.2mm	
Filling Volume (Module)	approx. 8.1 liters (filling height: 155 mm)	
Dimensions	Length: 292 mm Width: 178 mm Height: 178 mm Useable area: 280 × 175 mm	
Measurement Areas	Flat phantom	
The Modular Flat Phantom consists of three identical modules that can be installed and removed separately without emptying the liquid. It is used for compliance testing of small wireless devices in body-worn configurations according to IEC 62209-2, etc.		

2.7 Device holder description

The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent σ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.
The device holder permits the device to be positioned with a tolerance of ±1° in the tilt angle.

Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values.
Therefore those devices are normally only tested at the flat part of the SAM.

2.8 Robot System

The DASY6 system uses the high precision industrial robots TX60L, TX90XL, and the RX160L from St¨aubli SA (France). The basic specifications of the three robots are as follows:

Specifications	TX60L	TX90XL	RX160L
Number of Axes	6	6	6
Nominal Load	2 kg	5 kg	14 kg
Maximum Load	5 kg	12 kg	28 kg
Reach	920 mm	1450 mm	2010 mm
Repeatability	0.03 mm	0.035 mm	0.05 mm
Control Unit	CS8c	CS8c	CS8c
Programming Language	VAL3	VAL3	VAL3
Weight	52.2 kg	116 kg	250 kg

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The DASY6 system uses the high-precision industrial robots TX60L, TX90XL, and RX160L from St¨aubli SA (France). The TX robot family – the successor of the well-known RX robot family – continues to offer the features important for DASY6 applications:

• High precision (repeatability 0.02mm)
• High reliability (industrial design)
• Low maintenance costs (virtually maintenance-free as all gears are direct drive, no belt drives)
• Jerk-free straight movements (brushless synchron motors, no stepper motors)
• Low extremely low frequency (ELF) interference (motor control fields are shielded by the closed metallic construction)

The robots are controlled by the St¨aubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is provided on CDs delivered with the robot. Paper manuals are available directly from St¨aubli upon request.

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2.9 Test Equipment List

This table gives a complete overview of the SAR measurement equipment.
Devices used during the test described are marked ☒.

	Manufacturer	Device	Type	Serial number	Date of last calibration	Valid period*
☒	SPEAG	Dosimetric E-Field Probe	EX3DV4	3736	2021-03-03	One year
☒	SPEAG	Dosimetric E-Field Probe	EX3DV4	7505	2021-04-28	One year
☒	SPEAG	750 MHz Dipole	D750V3	1044	2019-08-30	Three years
☒	SPEAG	835 MHz Dipole	D835V2	4d126	2021-08-10	Three years
☒	SPEAG	1750 MHz Dipole	D1750V2	1123	2020-07-28	Three years
☒	SPEAG	1900 MHz Dipole	D1900V2	5d143	2020-07-28	Three years
☒	SPEAG	2450 MHz Dipole	D2450V2	860	2021-11-25	Three years
☒	SPEAG	2600 MHz Dipole	D2600V2	1032	2021-07-21	Three years
☒	SPEAG	Data acquisition electronics	DAE4	852	2021-04-26	One year
☒	SPEAG	Data acquisition electronics	DAE4	1554	2021-04-26	One year
☒	SPEAG	Software	DASY6	N/A	NCR	NCR
☒	SPEAG	Twin Phantom	SAM	1892	NCR	NCR
☒	SPEAG	Twin Phantom	SAM	1940	NCR	NCR
☒	R & S	Universal Radio Communication Tester	CMW 500	116265	2021-07-01	One year
☒	R & S	Universal Radio Communication Tester	CMW 500	160797	2021-07-01	One year
☒	Anritsu	Signal Analyzer	MS2690A	6261767335	2021-03-14	One year
☒	Anritsu	Radio Communication Analyser	MT8821C	6261952999	2021-03-14	One year
☒	Agilent	Network Analyser	E5071C	MY46629448	2021-07-02	One year
☒	SPEAG	Dielectric Probe Kit	DAK3.5	1143	NCR	NCR
☒	Keysight	Signal Generator	SMA100B	105396	2021-05-09	One year
☒	MINI-CIRCUITS	Amplifier	ZHL-42W	QA1402001	NCR	NCR
☒	AR	Directional Coupler	DC7144M1	0423264	2021-07-03	One year
☒	Agilent	Dual Directional Coupler	772D	MY52180295	2021-03-13	One year
☒	R & S	Power Meter	NRP2	105880	2021-03-13	One year
☒	R & S	Power Meter Sensor	NRP8S	103084	2021-03-13	One year
☒	R & S	Power Meter	NRP2	105879	2021-03-13	One year
☒	R & S	Power Meter Sensor	NRP8S	103083	2021-03-13	One year

Table 4: List of Test and Measurement Equipment

Note:

1) Per KDB865664 D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in the appendix.

a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.
d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

3) *All the equipment are within the valid period when the tests are performed.

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3 SAR Measurement Procedure

3.1 Scanning procedure

Fast Area Scan

The Fast Area Scan, available in cDASY6 only, provides psSAR1g/10g assessments in less than <30s for typical test configurations. The post processing algorithm used for regular Area Scans is applied to each measured Fast Area Scans to compute psSAR1g/10g values. Additionally, measured pattern of the given test configuration is compared to the ones measured previously in the project. If a similar pattern shape (matching configuration) is found, a scaling factor defined as difference in amplitude of the two configurations is computed. The Area Scan and Zoom Scan results available for the matching configuration are then scaled to assess the 1g and 10g SAR of the measured configuration. For instance, let's suppose a 1g/10g Zoom Scan measurement is made for a device on GSM 900 MHz band on mid channel. If the same measurement is repeated at the low / high channel, there would be a match of the fingerprints and the software can simply scale the zoom scan SAR value from the mid channel measurement. In this case the zoom scan measurement need not be repeated for the low/high channels.

Area Scan

Area Scans are used to determine the peak location of the measured field before doing a finer measurement around the hotspot. Area Scans measure a two-dimensional volume covering the full device under test area. cDASY6 uses Fast Averaged SAR algorithm to compute the 1g and 10g of simulated tissue from the Area Scan.

For Flat phantom sections both the device under test and the area scan are centered around the phantom device reference point. For Left Head and Right Head phantom sections, Area Scans are anchored to the ERP (Ear Reference Point) and oriented along the Ear Mouth line. The device under test position on this line is given by the speaker position which is always placed at the ERP. The scans extents are defined by the device height and width increased by 15mm on each side.

Zoom Scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1g and 10g of simulated tissue. Zoom scans measure a three-dimensional volume (cube). The bottom face of the cube is centered on the maximum of the preceding Area Scan in the same measurement group. For maxima at border of the phantom, auto extend zoom scan when maxima on boundary feature can be enabled in Application Preferences Scan Settings with Administrator access level.

Power Drift measurement

The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under test within a batch process. In the properties of the Drift job, the user can specify a limit for the drift and have OPENSAR software stop the measurements if this limit is exceeded

The following table summarizes the area scan and zoom scan resolutions:

Frequency	Maximum Area Scan resolution (Δx_{area}, Δy_{area})	Maximum Zoom Scan spatial resolution (Δx_{Zoom}, Δy_{Zoom})	Maximum Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤2GHz	≤15mm	≤8mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
2-3GHz	≤12mm	≤5mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
3-4GHz	≤12mm	≤5mm	≤4mm	≤3mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥28mm
4-5GHz	≤10mm	≤4mm	≤3mm	≤2.5mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥25mm
5-6GHz	≤10mm	≤4mm	≤2mm	≤2mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥22mm

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3.2 Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 5 x 5 x 7 points (with 8mm horizontal resolution) or 7 x 7 x 7 points (with 5mm horizontal resolution) or 8 x 8 x 7 points (with 4mm horizontal resolution). The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

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3.3 Data Storage and Evaluation

Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension "DAE". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf/dcp_i$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be

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evaluated:

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2)/f$

with V_i = compensated signal of channel i (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/ (V/m) ^{2}] for E-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$$

with SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$P_{pwe} = E_{tot}^2 / 3770$ or $P_{pwe} = H_{tot}^2 \cdot 37.7$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2
E_{tot} = total electric field strength in V/m
H_{tot} = total magnetic field strength in A/m

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4 System Verification Procedure

4.1 Tissue Verification

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectic parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ± 5% of the target values.

☒Simulating Head Liquid (HBBL600-6000MHz),Manufactured by SPEAG:

Ingredients	(% by weight)
Water	50-65%
Esters,Emulsifiers,Inhibitors	10-30%
Sodium salt	8-25%

☐Simulating Body Liquid (MBBL600-6000MHz),Manufactured by SPEAG:

Ingredients	(% by weight)
Water	60-80%
Esters,Emulsifiers,Inhibitors	20-40%
Sodium salt	0-1.5%

Note: According to 201904 FCC TCB workshop slides for RF Exposure Procedures, FCC has permitted the use of single head tissue simulating liquid specified in IEC 62209-1 for all SAR tests. So the single head tissue simulating liquid is used for all SAR tests in this test report. The conservative ±5% tolerance is used in tissue dielectric parameters measurments.

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Tissue Type	Target Frequency	Target Tissue		Measured Tissue		Deviation (Within +/-5%)		Liquid Temp.	Test Date
		εr	σ (S/m)	εr	σ (S/m)	$\Delta\varepsilon_r$	Δσ		
750MHz Head	705	42.2	0.89	41.20	0.869	-2.37%	-2.36%	22.5°C	2022/1/13
	710	42.1	0.89	41.20	0.871	-2.14%	-2.13%		
	750	41.9	0.89	40.90	0.882	-2.39%	-0.90%		
750MHz Head	705	42.2	0.89	41.60	0.883	-1.42%	-0.79%	22.3°C	2022/1/28
	710	42.1	0.89	41.60	0.885	-1.19%	-0.56%		
	750	41.9	0.89	41.50	0.899	-0.95%	1.01%		
835MHz Head	825	41.6	0.90	40.70	0.910	-2.16%	1.11%	22.5°C	2022/1/17
	835	41.5	0.90	40.70	0.914	-1.93%	1.56%		
	850	41.5	0.92	40.70	0.922	-1.93%	0.22%		
835MHz Head	825	41.6	0.90	41.20	0.925	-0.96%	2.78%	21.8°C	2022/1/29
	835	41.5	0.90	41.20	0.929	-0.72%	3.22%		
	850	41.5	0.92	41.20	0.936	-0.72%	1.74%		
1750MHz Head	1710	40.1	1.35	39.53	1.340	-1.42%	-0.74%	21.0°C	2022/1/16
	1730	40.1	1.36	39.49	1.353	-1.52%	-0.51%		
	1750	40.1	1.37	39.44	1.369	-1.65%	-0.07%		
	1800	40.0	1.40	39.35	1.395	-1.63%	-0.36%		
1750MHz Head	1710	40.1	1.35	39.64	1.332	-1.15%	-1.33%	21.8°C	2022/1/28
	1730	40.1	1.36	39.59	1.343	-1.27%	-1.25%		
	1750	40.1	1.37	39.54	1.357	-1.40%	-0.95%		
	1800	40.0	1.40	39.45	1.382	-1.37%	-1.29%		
1900MHz Head	1850	40.0	1.40	39.24	1.426	-1.90%	1.86%	21.0°C	2022/1/18
	1880	40.0	1.40	39.20	1.442	-2.00%	3.00%		
	1900	40.0	1.40	39.18	1.456	-2.05%	4.00%		
	1910	40.0	1.40	39.18	1.463	-2.05%	4.50%		
1900MHz Head	1850	40.0	1.40	39.33	1.412	-1.68%	0.86%	21.8°C	2022/1/28
	1880	40.0	1.40	39.30	1.425	-1.75%	1.79%		
	1900	40.0	1.40	39.26	1.438	-1.85%	2.71%		
	1910	40.0	1.40	39.24	1.444	-1.90%	3.14%		
2450MHz Head	2410	39.3	1.76	38.39	1.817	-2.32%	3.24%	21.0°C	2022/1/20
	2435	39.2	1.79	38.38	1.840	-2.09%	2.79%		
	2450	39.2	1.80	38.38	1.851	-2.09%	2.83%		
	2460	39.2	1.81	38.38	1.859	-2.09%	2.71%		
2450MHz Head	2410	39.3	1.76	38.49	1.772	-2.06%	0.68%	21.8°C	2022/1/28
	2435	39.2	1.79	38.49	1.786	-1.81%	-0.22%		
	2450	39.2	1.80	38.46	1.795	-1.89%	-0.28%		
	2460	39.2	1.81	38.43	1.804	-1.96%	-0.33%		
2600MHz Head	2510	39.1	1.87	38.26	1.898	-2.15%	1.50%	21°.0C	2022/1/19
	2535	39.1	1.89	38.06	1.919	-2.66%	1.53%		
	2560	39.1	1.92	38.19	1.936	-2.33%	0.83%		
	2600	39.0	1.96	38.14	1.975	-2.21%	0.77%		
	2610	39.0	1.97	38.15	1.984	-2.18%	0.71%		
	2645	39.0	2.01	38.03	2.010	-2.49%	0.00%		

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2600MHz Head	2510	39.1	1.87	38.37	1.841	-1.87%	-1.55%	22.3°C	2022/1/29
	2535	39.1	1.89	38.33	1.858	-1.97%	-1.69%		
	2560	39.1	1.92	38.25	1.882	-2.17%	-1.98%		
	2600	39.0	1.96	38.22	1.907	-2.00%	-2.70%		
	2610	39.0	1.97	38.21	1.915	-2.03%	-2.79%		
	2645	39.0	2.01	38.10	1.947	-2.31%	-3.13%		

Table 5: Dielectric Performance of Head Tissue Simulating Liquid

Note:

1) The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.
2) KDB865664 was ensured to be applied for probe calibration frequencies greater than or equal to 50MHz of the EUT frequencies.
3) The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies. The SAR test plots may slightly differ from the table above since the DASY rounds to three significant digits.

4.2 System Check

The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE 1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests (Graphic Plot(s) see Appendix A).

Remark (Dipole SN)	System Check	Target SAR (Normalized to 1W)		Measured SAR (Normalized to 1W)		Deviation (Within +/-10%)		Test Date
		1-g (mW/g)	10-g (mW/g)	1-g (mW/g)	10-g (mW/g)	Δ1-g	Δ10-g	
1044	750MHz	8.64	5.66	8.72	5.76	0.93%	1.77%	2022/1/13
1044	750MHz	8.64	5.66	9.12	6.08	5.56%	7.42%	2022/1/28
4d126	835MHz	9.80	6.36	9.96	6.56	1.63%	3.14%	2022/1/17
4d126	835MHz	9.80	6.36	10.24	6.76	4.49%	6.29%	2022/1/29
1123	1750MHz	36.20	19.00	34.60	18.24	-4.42%	-4.00%	2022/1/16
1123	1750MHz	36.20	19.00	35.68	18.84	-1.44%	-0.84%	2022/1/28
5d143	1900MHz	39.40	20.60	39.40	20.20	0.00%	-1.94%	2022/1/18
5d143	1900MHz	39.40	20.60	41.20	21.16	4.57%	2.72%	2022/1/28
860	2450MHz	53.50	25.10	51.20	23.48	-4.30%	-6.45%	2022/1/20
860	2450MHz	53.50	25.10	52.00	23.96	-2.80%	-4.54%	2022/1/28
1032	2600MHz	57.30	25.50	53.20	23.76	-7.16%	-6.82%	2022/1/19
1032	2600MHz	57.30	25.50	55.20	24.56	-3.66%	-3.69%	2022/1/29

Table 6: System Check Results

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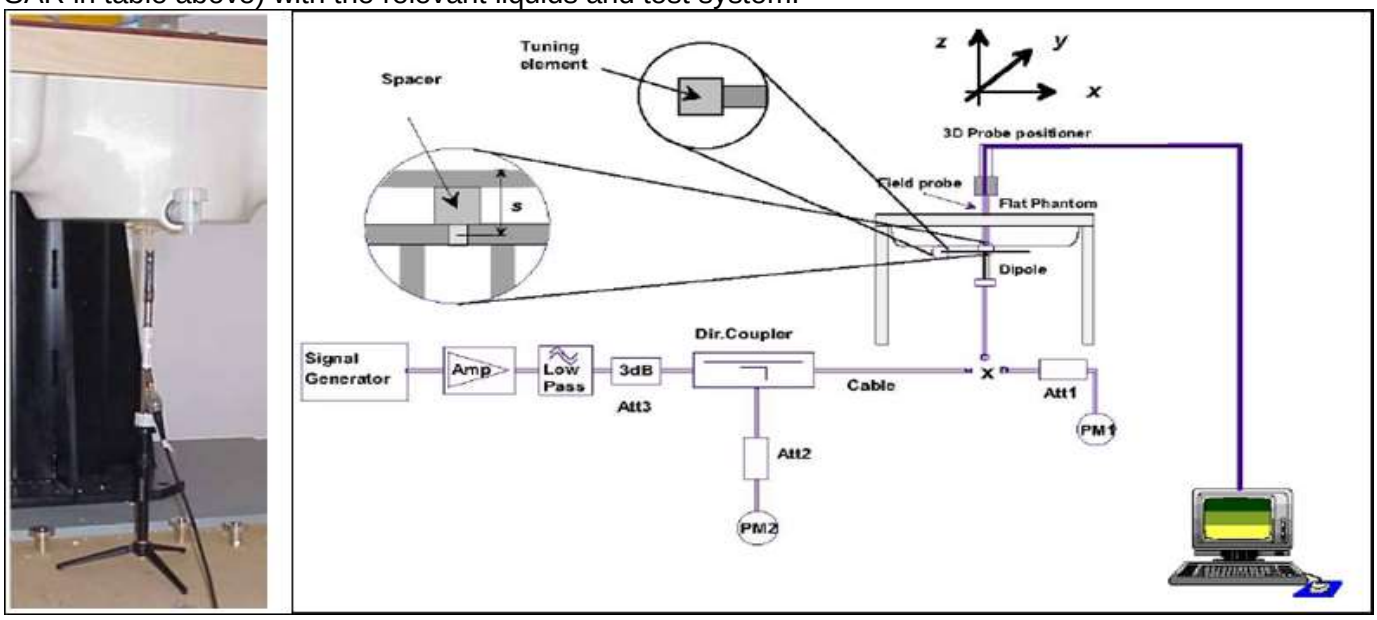
4.3 System check Procedure

The system check is performed by using a system check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SAM. It is fed with a power of 250 mW (below 3GHz) or 100mW (3-6GHz). To adjust this power, a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system check to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot). System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



5 SAR measurement variability and uncertainty

5.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, 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. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The detailed repeated measurement results are shown in the following section.

5.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

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6 SAR Test Configuration

6.1 Test Positions Configuration

6.1.1 General considerations

Per IEEE 1528-2013,two imaginary lines on the handset were established: the vertical centerline and the horizontal line (See Figure 1).

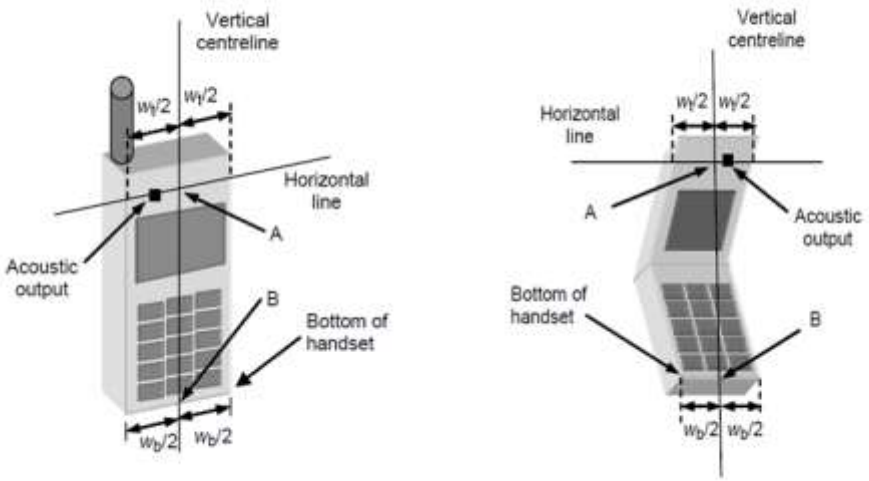

Figure 1 Hand Vertical Center & Horizontal Line Reference Points

6.1.2 Head Exposure Condition

Per IEEE 1528-2013, Head SAR measurements were made in the “cheek” position (See Figure 2) and the “tilt” position (See Figure 3). The device should be tested in both positions on left and right sides of the SAM phantom.

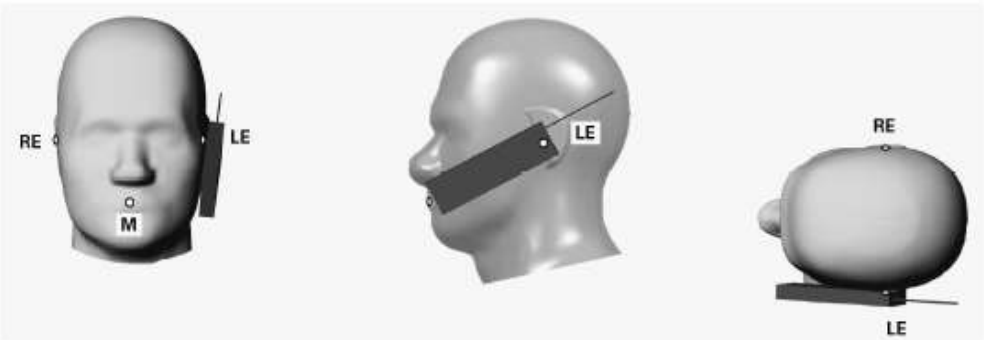

Figure 2 Front, Side and Top View of Cheek Position

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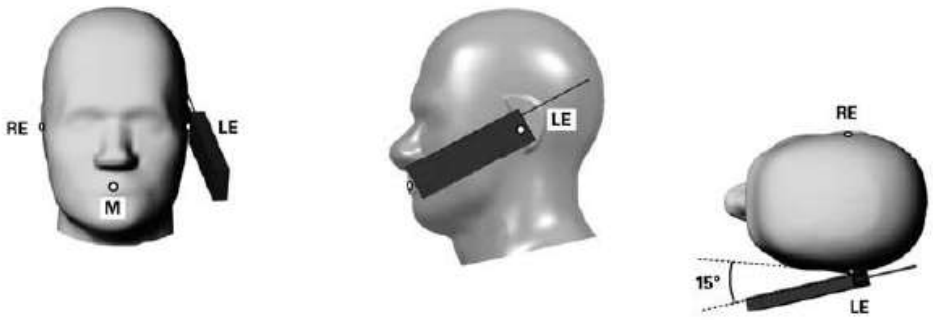

Figure 3 Front, Side and Top View of Tilt 15° Position

Note:

M Mouth reference point

LE Left ear reference point (ERP)

RE Right ear reference point(ERP)

6.1.3 Body-worn Exposure Condition

Body-worn operating configurations are tested with the holder attached to the device and positioned against a flat phantom with test separation distance of 15mm in a normal use configuration (See Figure 4). Per FCC KDB648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB447498 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

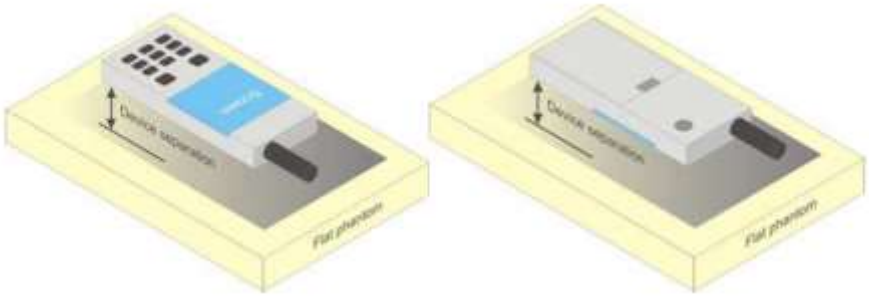

Figure 4 Test position for Body-Worn device

6.1.4 Hotspot Exposure Condition

Per FCC KDB941225 D06, the SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9 cm x 5 cm, a test separation distance of 10 mm is required for hotspot mode SAR measurements. A test separation distance of 5 mm or less is required for smaller devices. 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. The SAR results are used to

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determine simultaneous transmission SAR test exclusion for hotspot mode; otherwise, simultaneous transmission SAR measurement is required.

6.1.5 Product Specific 10-g SAR Exposure Condition

Per FCC KDB648474 D04, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as “Phablet”.
The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for Product Specific 10-g SAR SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

6.2 3G SAR Test Reduction Procedure

Per KDB941225 D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

6.3 GSM Test Configuration

SAR tests for GSM850 and PCS1900, a communication link is set up with a base station by air link. The power lever is set to “5”and “0” in SAR of GSM850 and PCS1900 using a Radio Communication Tester. The tests in the band of GSM850 and PCS1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8 PSK.

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6.4 UMTS Test Configuration

1) Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1’s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are requied in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2) WCDMA

a. Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode.

b. Body SAR Measurements

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode

3) HSDPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements’’ procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

Per KDB941225 D01, the 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures for the highest reported SAR body exposure configuration in 12.2 kbps RMC.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the below table, β_{hs} for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of the β_c /β_d ratio causes a power reduction at sub-tests 2 - 4.

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Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2 : CM=1 for β_c/β_d= 12/15, β_{hs}/β_c = 24/15. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 3 : 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 signalled gain factors for the reference TFC (TF1,TF1) to β_c = 11/15 and β_d = 15/15

Table 7: Sub-tests for UMTS Release 5 HSDPA

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI's
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 8: settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 9: HSDPA UE category

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4) HSUPA

SAR for body exposure configurations is measured according to the "Body SAR Measurements" procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

Per KDB941225 D01, the 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures for the highest reported body exposure SAR configuration in 12.2 kbps RMC.

Due to inner loop power control requirements in HSDPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Device' sections of 3G device.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	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	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	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	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2: 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

Note 3 : 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$

Note 4 : 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 10: Subtests for UMTS Release 6 HSUPA

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UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?
NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM. (TS25.306-7.3.0).						

Table 11: HSUPA UE category

5) DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a Second serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

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

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

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The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK

Parameter	Value
Nominal average inf. bit rate	60 kbit/s
Inter-TTI Distance	1 TTI's
Number of HARQ Processes	6 Processes
Information Bit Payload	120 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	960 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	3200 SMLs
Coding Rate	0.15
Number of Physical Channel Codes	1

Table 12: settings of required H-Set 12 QPSK acc. to 3GPP 34.121

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 above.
2. Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

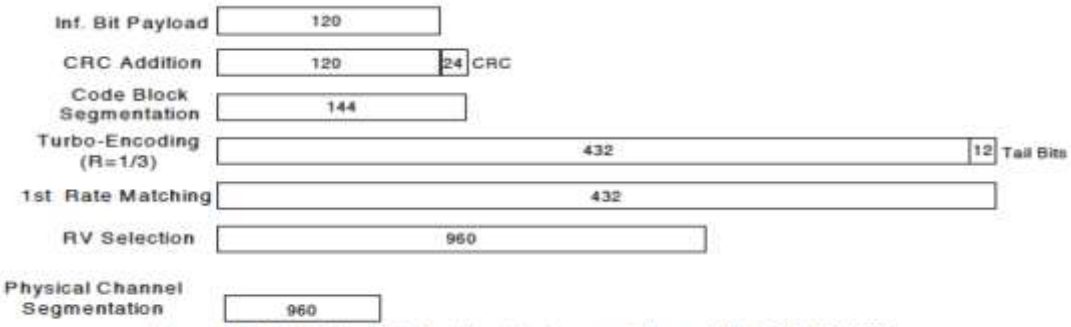

Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 3: 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Up commands are set continuously to set the UE to Max power.

Note:

1. The Dual Carriers transmission only applies to HSDPA physical channels
2. The Dual Carriers belong to the same Node and are on adjacent carriers.
3. The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation
4. The Dual Carriers operate in the same frequency band.
5. The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.
6. The device doesn't support carrier aggregation for it just can operate in Release 8.

6.5 LTE Test Configuration

SAR for LTE band exposure configurations is measured according to the procedures of KDB941225 D05 SAR for LTE Devices. The Radio Communication Tester was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR test were performed with the same number of RB and RB offsets transmitting on all TTI frames (Maximum TTI)

1) Spectrum Plots for RB configurations

A properly configured base station simulator was used for LTE output power measurements and SAR testing. Therefore, spectrum plots for RB configurations were not required to be included in this report.

2) MPR

When MPR is implemented permanently within the UE, regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

3) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by using Network Signaling Value of “NS_01”on the base station simulator.

4) LTE procedures for SAR testing

A) Largest channel bandwidth standalone SAR test requirements

i) QPSK with 1 RB allocation

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

ii) QPSK with 50% RB allocation

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

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iii) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in i) and ii) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

iv) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

B) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

5) TDD LTE test configuration

According to KDB941225 D05 SAR for LTE Devices, for Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

TDD LTE Band 41 supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Figure 4.2-1: Frame structure type 2

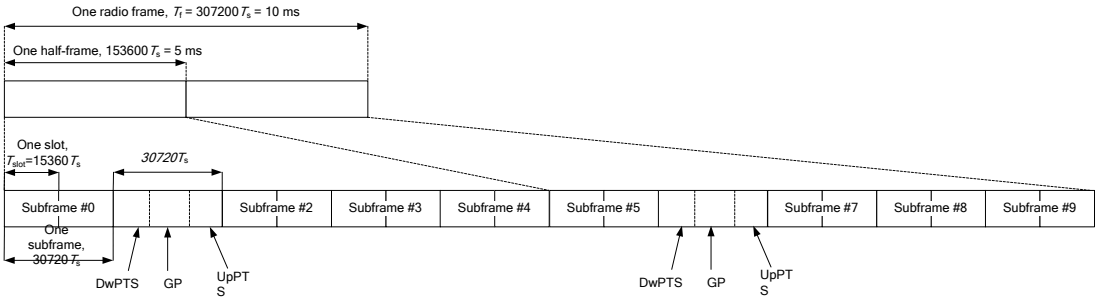

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

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	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Table 4.2-2: Uplink-downlink configurations

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

According to Figure 4.2-1, one radio frame is configured by 10 subframes, which consist of Uplink-subframe, Downlink-subframe and Special subframe. For TDD-LTE, the Duty Cycle should be calculated on Uplink-subframes and Special subframes, due to Special subframe containing both Uplink transmissions. So for one radio frame, Duty Cycle can be calculated with formula as below. The count of Uplink subframes are according to Table 4.2-2:

Duty cycle = (30720Ts*Ups+Uplink Component*Specials)/ (307200Ts)

About the uplink component of Special subframes, we can figure out by Table 4.2-1:

Uplink Component=UpPTS

In conclusion, for the TDD LTE Band, Duty Cycle can be calculated with formula as below .all these sets are ok when we test, or we can set as below.

Duty cycle = [(30720Ts*Ups) + UpPTS *Specials]/ (307200Ts)

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And we can get different Duty cycles under different configurations:

Uplink-Downlink configuration	Subframe number			Configuration of special subframe							
				Normal cyclice prefix in downlink				Extended cyclice prefix in downlink			
				Normal cyclice prefix in uplink		Extended cyclice prefix in uplink		Normal cyclice prefix in uplink		Extended cyclice prefix in uplink	
	D	S	U	configuration 0~4	configuration 5~9	configuration 0~4	configuration 5~9	configuration 0~3	configuration 4~7	configuration 0~3	configuration 4~7
0	2	2	6	61.43%	62.85%	61.67%	**63.33%**	61.43%	62.85%	61.67%	**63.33%**
1	4	2	4	41.43%	42.85%	41.67%	43.33%	41.43%	42.85%	41.67%	43.33%
2	6	2	2	21.43%	22.85%	21.67%	23.33%	21.43%	22.85%	21.67%	23.33%
3	6	1	3	30.71%	31.43%	30.83%	31.67%	30.71%	31.43%	30.83%	31.67%
4	7	1	2	20.71%	21.43%	20.83%	21.67%	20.71%	21.43%	20.83%	21.67%
5	8	1	1	10.71%	11.43%	10.83%	11.67%	10.71%	11.43%	10.83%	11.67%
6	3	2	5	51.43%	52.85%	51.67%	53.33%	51.43%	52.85%	51.67%	53.33%

For TDD LTE, SAR should be tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7 for Frame structure type 2.

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6.6 Wi-Fi Test Configuration

For Wi-Fi SAR testing, a communication link is set up with the testing software for Wi-Fi mode test. During the test,at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Per KDB248227 D01, a minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

6.6.1 Initial Test Position Procedure

For exposure condition with multiple test position, such as handsets operating next to the ear, devices with hotspot mode or UMPC mini-tablet , procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. The test position with the highest extrapolated(peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4W/kg, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8W/kg or all test position are measured. For all positions/configurations tested using the initial test position and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

6.6.2 Initial Test Configuration Procedure

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required (see section 5.3.2 of KDB248227 D01). SAR test reduction of subsequent highest output test channels is based on the *reported* SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

6.6.3 Sub Test Configuration Procedure

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units.

When the highest reported SAR for the initial test configuration, according to the initial test position or

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fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ⩽ 1.2 W/kg, SAR is not required for that subsequent test configuration.

6.6.4 2.4G Wi-Fi SAR Test Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

A) 802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the *reported* SAR of the highest measured maximum output power channel (section 3.1 of of KDB248227 D01) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the *reported* SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any *reported* SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

B) 2.4GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3 of of KDB248227 D01). SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.

2) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

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6.6.5 OFDM Transmission Mode SAR Test Channel Selection Requirements

For 2.4 GHz bands, When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth,lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations(for example 802.11g and 802.11n, with the same channel bandwidth, modulation, and data rate, etc), the lower order 802.11 mode (i.e., 802.11g is chosen over 802.11n) is used for SAR measurement. When the maximum output power are the same for multiple test channel, either according to the default or additional power measurement requirement, SAR is measured using the channel closest to the middle of the frequency band or aggregted band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

6.7 BT Test Configuration

For BT SAR testing, there is set to the DUT continuous transmitting with maximum output power using the WideBand Radio Communication Tester CMW500. Per TCB Worksop Notes, the BT SAR was scaled to the 100% transmission DutyCycle to determine compliance. Refer to the following section for the time-domain plot and calculation for the duty cylce of the device.

6.8 Power Reduction Specification

This device uses the following power reduction features to reduce the transmit power and ensure SAR compliance. These power reduction features are implemented using a single fixed level of reduction through static table look-up for some wireless operating modes or frequency bands and triggered by a single event or operation. The published RF exposure KDB procedures are applicable to the specific implementation and applied for testing. So PAG is not required for these features.

1) A fixed level power reduction is applied for some antennas and frequency bands when hotspot mode becomes active. When the hotspot is disabled, the power value will be recovered.
2) A fixed level power reduction is applied for some antennas and frequency bands when two or more wireless modes transmit simultaneously.
3) This device uses the receiver to indicate whether the user is making a voice call in head scenario or not. The selection between head and body power levels is based on the receiver detection mechanism. A fixed level power reduction is applied for some antennas and frequency bands when the audio receiver is on.

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6.8.1 Power Reduction Specification of 2G&3G&4G Main antenna

The following tables summarize the key power reduction information of 2G/3G/4G Main antenna triggered by specific use conditions. The detailed full power and reduced conducted power measurement results are provided in the report appendixs:

Band	2G/3G/4G Main Antenna Max Power (dBm)					
	Main Antenna only		WiFi station on		Hotstpot on	
	Receiver OFF	Receiver ON	Receiver OFF	Receiver ON	Receiver OFF	Receiver ON
GSM 850	33.50	33.50	33.50	33.50	33.50	33.50
PCS 1900	30.50	28.00	30.50	28.00	28.00	25.50
UMTS Band II	23.50	20.50	21.00	18.00	20.50	17.50
UMTS Band IV	23.50	18.50	21.00	16.00	20.50	15.50
UMTS Band V	25.50	24.50	25.50	24.50	24.50	23.50
LTE Band 2	23.50	19.00	21.00	16.50	19.00	14.50
LTE Band 4	23.00	18.00	20.50	15.50	19.00	14.00
LTE Band 5	25.00	24.00	25.00	24.00	24.00	23.00
LTE Band 7	22.20	17.70	19.70	15.20	17.20	12.70
LTE Band 13	25.00	25.00	25.00	25.00	25.00	25.00
LTE Band 26	25.00	23.00	25.00	23.00	25.00	23.00
LTE Band 38	24.50	20.00	21.50	17.00	23.00	18.50
LTE Band 66	23.00	19.50	20.50	17.00	19.00	15.50

Note: For Head SAR test of 2G/3G/4G Antenna, standalone Head SAR should be evaluated with audio receiver on. The audio receiver only works in voice mode when the user is making a call in head scenario, lacking of the third-party VoIP server and the unstandardized VOIP operating characteristic, therefore, a test script tool is used to trigger the receiver on during the test. The test script is only used to trigger audio receiver on and simulate voice and VOIP usage scene. It can be ensured that the unmodified settings in production units, including maximum output power, amplifier gain and other RF performance or tuning parameters, are used for SAR measurement.

6.8.2 Power Reduction Specification of Wi-Fi antennas

The following tables summarize the key power reduction information of Wi-Fi antennas.

Wi-Fi Antenna Power Validation (dBm)			
Band	Mode	Wi-Fi Antenna only	
		Receiver ON	Receiver OFF
2.4G Wi-Fi	802.11b	11.50	19.00
	802.11g	11.50	19.00
	802.11n 20M	11.50	18.50
	802.11n 40M	11.50	17.50

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7 SAR Measurement Results

7.1 Conducted power measurements

The conducted power measurement results are provided in the report Appendixs C.

7.2 SAR measurement Results

General Notes:

1) Per KDB 447498 D01, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.

2) Per KDB 447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

● ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.

● ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.

● ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

3) Per KDB 865664 D01,for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg; if the deviation among the repeated measurement is ≤20%, and the measured SAR <1.45W/kg, only one repeated measurement is required.

4) Per KDB 941225 D06, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

5) Per KDB 648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤1.2 W/kg, no additional SAR evaluations using a headset are required.

6) Per KDB 865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing (Refer to appendix B for details).

7) Per KDB 648474 D04, Body-worn accessories that do not contain metallic or conductive components is tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics.

8) The 2G/3G/4G bands support two SIM card slots. Full SAR test is performed with SIM card slot 1. The highest reported SAR configuration for each Tx antenna and applicable exposure condition should be repeated with SIM card slot 2.

GSM Notes:

1) Per KDB941225 D01, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the

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applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.
2) Per KDB 648474 D04, the device does not support DTM function. Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

UMTS Notes:
1) Per KDB 941225 D01, When the maximum output power and tune-up tolerance specified for production units in a Second mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of Second to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the Second mode.

LTE Notes:
1) The general test procedures used for SAR testing can be found in Section.

Wi-Fi Notes:
Per KDB 248227D01:
1) When reported SAR for the initial test position is ⩽ 0.4W/kg, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ⩽ 0.8W/kg or all test position are measured. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ⩽ 1.2 W/kg or all required channels are tested..
2) When the DSSS reported SAR of the highest measured maximum output power channel for the exposure configuration is ⩽ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
3) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ⩽ 1.2 W/kg, SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations
4) The highest SAR measured for the initial test position or initial test configuration should be used to determine SAR test exclusion according to the sum of 1-g SAR and SAR peak to location ratio provisions in KDB 447498. In addition, a test lab may also choose to perform standalone SAR measurements for test positions and 802.11 configurations that are not required by the initial test position or initial test configuration procedures and apply the results to determine simultaneous transmission SAR test exclusion, according to sum of 1-g and SAR peak to location ratio requirements to reduce the number of simultaneous transmission SAR measurements.

BT Notes:
BT was configured to transimit manximum averaged power level and max duty cycle for each operation mode to be tested. If the actual duty cycle is <100%, the SAR test results should be scaled to 100% duty cycle to ensure SAR compliance.

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7.2.1 SAR measurement Results of GSM 850

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	190/836.6	GSM	0.253	0.167	32.48	33.50	0.320	Battery 1#	/
Main	Left tilt	/	190/836.6	GSM	0.227	0.142	32.48	33.50	0.287	Battery 1#	/
Main	Right cheek	/	190/836.6	GSM	0.343	0.209	32.48	33.50	0.434	Battery 1#	/
Main	Right tilt	/	190/836.6	GSM	0.352	0.188	32.48	33.50	0.445	Battery 1#	/
Main	Right tilt	/	190/836.6	GSM	0.297	0.174	32.48	33.50	0.376	Battery 2#	/
Main	Right tilt	/	190/836.6	GSM	**0.593**	0.320	32.48	33.50	**0.750**	Battery 3#	Plot
Main	Right tilt	/	190/836.6	GSM	0.374	0.216	32.48	33.50	0.473	Battery 4#	/
Main	Right tilt	/	190/836.6	GSM	0.299	0.172	32.48	33.50	0.378	With SIM2	/

Table 13: Head SAR test results of GSM 850

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	190/836.6	GSM	0.067	0.048	32.48	33.50	0.085	Battery 1#	/
Main	Back side	15mm	190/836.6	GSM	**0.093**	0.071	32.48	33.50	**0.118**	Battery 1#	Plot
Main	Back side	15mm	190/836.6	GSM	0.092	0.062	32.48	33.50	0.116	Battery 2#	/
Main	Back side	15mm	190/836.6	GSM	0.091	0.069	32.48	33.50	0.115	Battery 3#	/
Main	Back side	15mm	190/836.6	GSM	0.090	0.063	32.48	33.50	0.114	Battery 4#	/
Main	Back side	15mm	190/836.6	GSM	0.091	0.063	32.48	33.50	0.115	With SIM2	/

Table 14: Body Worn SAR test results of GSM 850

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	190/836.6	GPRS 2TS	0.117	0.071	29.50	30.50	0.147	Battery 1#	/
Main	Back side	10mm	190/836.6	GPRS 2TS	**0.217**	0.129	29.50	30.50	**0.273**	Battery 1#	Plot
Main	Left side	10mm	190/836.6	GPRS 2TS	0.101	0.064	29.50	30.50	0.127	Battery 1#	/
Main	Top side	10mm	190/836.6	GPRS 2TS	0.110	0.066	29.50	30.50	0.138	Battery 1#	/
Main	Back side	10mm	190/836.6	GPRS 2TS	0.202	0.121	29.50	30.50	0.254	Battery 2#	/
Main	Back side	10mm	190/836.6	GPRS 2TS	0.212	0.127	29.50	30.50	0.267	Battery 3#	/
Main	Back side	10mm	190/836.6	GPRS 2TS	0.204	0.126	29.50	30.50	0.257	Battery 4#	/
Main	Back side	10mm	190/836.6	GPRS 2TS	0.200	0.120	29.50	30.50	0.252	With SIM2	/

Table 15: Hotspot SAR test results of GSM 850

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	190/836.6	GPRS 2TS	0.117	0.071	29.50	30.5	0.147	Yes
Main	Back side	10mm	190/836.6	GPRS 2TS	**0.217**	0.129	29.50	30.5	0.273	Yes
Main	Left side	10mm	190/836.6	GPRS 2TS	0.101	0.064	29.50	30.5	0.127	Yes
Main	Top side	10mm	190/836.6	GPRS 2TS	0.110	0.066	29.50	30.5	0.138	Yes
Main	Back side	10mm	190/836.6	GPRS 2TS	0.202	0.121	29.50	30.5	0.254	Yes
Main	Back side	10mm	190/836.6	GPRS 2TS	0.212	0.127	29.50	30.5	0.267	Yes
Main	Back side	10mm	190/836.6	GPRS 2TS	0.204	0.126	29.50	30.5	0.257	Yes
Main	Back side	10mm	190/836.6	GPRS 2TS	0.200	0.120	29.50	30.5	0.252	Yes

Table 16: Product Specific 10-g SAR test reduction evaluation of GSM 850

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.2 SAR measurement Results of PCS 1900

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	661/1880	GSM	0.296	0.183	27.17	28.00	0.358	Battery 1#	/
Main	Left tilt	/	661/1880	GSM	0.431	0.249	27.17	28.00	0.522	Battery 1#	/
Main	Right cheek	/	661/1880	GSM	**0.621**	0.335	27.17	28.00	**0.752**	Battery 1#	Plot
Main	Right tilt	/	661/1880	GSM	0.482	0.259	27.17	28.00	0.584	Battery 1#	/
Main	Right cheek	/	661/1880	GSM	0.537	0.296	27.17	28.00	0.650	Battery 2#	/
Main	Right cheek	/	661/1880	GSM	0.482	0.267	27.17	28.00	0.584	Battery 3#	/
Main	Right cheek	/	661/1880	GSM	0.494	0.274	27.17	28.00	0.598	Battery 4#	/
Main	Right cheek	/	661/1880	GSM	0.541	0.300	27.17	28.00	0.655	With SIM2	/

Table 17: Head SAR test results of PCS 1900

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	661/1880	GSM	0.141	0.088	29.69	30.50	0.170	Battery 1#	/
Main	Back side	15mm	661/1880	GSM	**0.244**	0.140	29.69	30.50	**0.294**	Battery 1#	Plot
Main	Back side	15mm	661/1880	GSM	0.234	0.135	29.69	30.50	0.282	Battery 2#	/
Main	Back side	15mm	661/1880	GSM	0.179	0.103	29.69	30.50	0.216	Battery 3#	/
Main	Back side	15mm	661/1880	GSM	0.187	0.109	29.69	30.50	0.225	Battery 4#	/
Main	Back side	15mm	661/1880	GSM	0.231	0.132	29.69	30.50	0.278	With SIM2	/

Table 18: Body Worn SAR test results of PCS 1900

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	661/1880	GPRS 2TS	0.137	0.079	26.74	27.50	0.163	Battery 1#	/
Main	Back side	10mm	661/1880	GPRS 2TS	0.227	0.124	26.74	27.50	0.270	Battery 1#	/
Main	Left side	10mm	661/1880	GPRS 2TS	0.055	0.031	26.74	27.50	0.066	Battery 1#	/
Main	Top side	10mm	661/1880	GPRS 2TS	**0.278**	0.148	26.74	27.50	**0.331**	Battery 1#	Plot
Main	Top side	10mm	661/1880	GPRS 2TS	0.273	0.140	26.74	27.50	0.325	Battery 2#	/
Main	Top side	10mm	661/1880	GPRS 2TS	0.271	0.144	26.74	27.50	0.323	Battery 3#	/
Main	Top side	10mm	661/1880	GPRS 2TS	0.277	0.147	26.74	27.50	0.330	Battery 4#	/
Main	Top side	10mm	661/1880	GPRS 2TS	0.274	0.146	26.74	27.50	0.326	With SIM2	/

Table 19: Hotspot SAR test results of PCS 1900

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	661/1880	GPRS 2TS	0.137	0.079	26.74	27.5	0.163	Yes
Main	Back side	10mm	661/1880	GPRS 2TS	0.227	0.124	26.74	27.5	0.270	Yes
Main	Left side	10mm	661/1880	GPRS 2TS	0.055	0.031	26.74	27.5	0.066	Yes
Main	Top side	10mm	661/1880	GPRS 2TS	**0.278**	0.148	26.74	27.5	0.331	Yes
Main	Top side	10mm	661/1880	GPRS 2TS	0.273	0.140	26.74	27.5	0.325	Yes
Main	Top side	10mm	661/1880	GPRS 2TS	0.271	0.144	26.74	27.5	0.323	Yes
Main	Top side	10mm	661/1880	GPRS 2TS	0.277	0.147	26.74	27.5	0.330	Yes
Main	Top side	10mm	661/1880	GPRS 2TS	0.274	0.146	26.74	27.5	0.326	Yes

Table 20: Product Specific 10-g SAR test reduction evaluation of PCS 1900

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.3 SAR measurement Results of UMTS Band II

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	9400/1880	RMC	0.286	0.176	19.33	20.50	0.374	Battery 1#	/
Main	Left tilt	/	9400/1880	RMC	0.448	0.257	19.33	20.50	0.587	Battery 1#	/
Main	Right cheek	/	9400/1880	RMC	0.379	0.224	19.33	20.50	0.496	Battery 1#	/
Main	Right tilt	/	9400/1880	RMC	**0.621**	0.313	19.33	20.50	**0.813**	Battery 1#	Plot
Main	Right tilt	/	9262/1852.4	RMC	0.518	0.280	19.17	20.50	0.704	Battery 1#	
Main	Right tilt	/	9538/1907.6	RMC	0.526	0.280	19.27	20.50	0.698	Battery 1#	
Main	Right tilt	/	9400/1880	RMC	0.515	0.275	19.33	20.50	0.674	Battery 2#	/
Main	Right tilt	/	9400/1880	RMC	0.485	0.260	19.33	20.50	0.635	Battery 3#	/
Main	Right tilt	/	9400/1880	RMC	0.555	0.297	19.33	20.50	0.727	Battery 4#	/
Main	Right tilt	/	9400/1880	RMC	0.523	0.278	19.33	20.50	0.685	With SIM2	/

Table 21: Head SAR test results of UMTS Band II

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	9400/1880	RMC	0.149	0.093	22.31	23.50	0.196	Battery 1#	/
Main	Back side	15mm	9400/1880	RMC	**0.271**	0.154	22.31	23.50	**0.356**	Battery 1#	Plot
Main	Back side	15mm	9400/1880	RMC	0.242	0.139	22.31	23.50	0.318	Battery 2#	/
Main	Back side	15mm	9400/1880	RMC	0.225	0.132	22.31	23.50	0.296	Battery 3#	/
Main	Back side	15mm	9400/1880	RMC	0.232	0.136	22.31	23.50	0.305	Battery 4#	/
Main	Back side	15mm	9400/1880	RMC	0.240	0.139	22.31	23.50	0.316	With SIM2	/

Table 22: Body Worn SAR test results of UMTS Band II

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	9400/1880	RMC	0.132	0.077	19.33	20.50	0.173	Battery 1#	/
Main	Back side	10mm	9400/1880	RMC	0.232	0.127	19.33	20.50	0.304	Battery 1#	/
Main	Left side	10mm	9400/1880	RMC	0.052	0.030	19.33	20.50	0.068	Battery 1#	/
Main	Top side	10mm	9400/1880	RMC	**0.324**	0.173	19.33	20.50	**0.424**	Battery 1#	Plot
Main	Top side	10mm	9400/1880	RMC	0.296	0.160	19.33	20.50	0.388	Battery 2#	/
Main	Top side	10mm	9400/1880	RMC	0.305	0.162	19.33	20.50	0.399	Battery 3#	/
Main	Top side	10mm	9400/1880	RMC	0.310	0.165	19.33	20.50	0.406	Battery 4#	/
Main	Top side	10mm	9400/1880	RMC	0.294	0.160	19.33	20.50	0.385	With SIM2	/

Table 23: Hotspot SAR test results of UMTS Band II

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	9400/1880	RMC	0.132	0.077	19.33	23.5	0.345	Yes
Main	Back side	10mm	9400/1880	RMC	0.232	0.127	19.33	23.5	0.606	Yes
Main	Left side	10mm	9400/1880	RMC	0.052	0.030	19.33	23.5	0.136	Yes
Main	Top side	10mm	9400/1880	RMC	**0.324**	0.173	19.33	23.5	0.846	Yes
Main	Top side	10mm	9400/1880	RMC	0.296	0.160	19.33	23.5	0.773	Yes
Main	Top side	10mm	9400/1880	RMC	0.305	0.162	19.33	23.5	0.797	Yes
Main	Top side	10mm	9400/1880	RMC	0.310	0.165	19.33	23.5	0.810	Yes
Main	Top side	10mm	9400/1880	RMC	0.294	0.160	19.33	23.5	0.768	Yes

Table 24: Product Specific 10-g SAR test reduction evaluation of UMTS Band II

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.4 SAR measurement Results of UMTS Band IV

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	1413/1732.6	RMC	0.290	0.178	17.18	18.50	0.393	Battery 1#	/
Main	Left tilt	/	1413/1732.6	RMC	0.446	0.257	17.18	18.50	0.604	Battery 1#	/
Main	Right cheek	/	1413/1732.6	RMC	0.420	0.236	17.18	18.50	0.569	Battery 1#	/
Main	Right tilt	/	1413/1732.6	RMC	**0.648**	0.325	17.18	18.50	**0.878**	Battery 1#	Plot
Main	Right tilt	/	1312/1712.4	RMC	0.564	0.303	17.07	18.50	0.784	Battery 1#	/
Main	Right tilt	/	1513/1752.6	RMC	0.537	0.285	17.10	18.50	0.741	Battery 1#	/
Main	Right tilt	/	1413/1732.6	RMC	0.480	0.260	17.18	18.50	0.650	Battery 2#	/
Main	Right tilt	/	1413/1732.6	RMC	0.579	0.301	17.18	18.50	0.785	Battery 3#	/
Main	Right tilt	/	1413/1732.6	RMC	0.578	0.307	17.18	18.50	0.783	Battery 4#	/
Main	Right tilt	/	1413/1732.6	RMC	0.512	0.280	17.18	18.50	0.694	With SIM2	/

Table 25: Head SAR test results of UMTS Band IV

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	1413/1732.6	RMC	0.219	0.131	22.21	23.50	0.295	Battery 1#	/
Main	Back side	15mm	1413/1732.6	RMC	**0.540**	0.307	22.21	23.50	**0.727**	Battery 1#	Plot
Main	Back side	15mm	1413/1732.6	RMC	0.450	0.255	22.21	23.50	0.606	Battery 2#	/
Main	Back side	15mm	1413/1732.6	RMC	0.481	0.275	22.21	23.50	0.647	Battery 3#	/
Main	Back side	15mm	1413/1732.6	RMC	0.452	0.259	22.21	23.50	0.608	Battery 4#	/
Main	Back side	15mm	1413/1732.6	RMC	0.452	0.256	22.21	23.50	0.608	With SIM2	/
Main	Back side	15mm	1413/1732.6	RMC	0.396	0.226	22.21	23.50	0.533	With Plastic Cover	/

Table 26: Body Worn SAR test results of UMTS Band IV

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	1413/1732.6	RMC	0.218	0.121	19.27	20.50	0.289	Battery 1#	/
Main	Back side	10mm	1413/1732.6	RMC	**0.485**	0.257	19.27	20.50	**0.644**	Battery 1#	Plot
Main	Left side	10mm	1413/1732.6	RMC	0.118	0.065	19.27	20.50	0.157	Battery 1#	/
Main	Top side	10mm	1413/1732.6	RMC	0.484	0.252	19.27	20.50	0.642	Battery 1#	/
Main	Back side	10mm	1413/1732.6	RMC	0.455	0.242	19.27	20.50	0.604	Battery 2#	/
Main	Back side	10mm	1413/1732.6	RMC	0.472	0.252	19.27	20.50	0.627	Battery 3#	/
Main	Back side	10mm	1413/1732.6	RMC	0.449	0.241	19.27	20.50	0.596	Battery 4#	/
Main	Back side	10mm	1413/1732.6	RMC	0.462	0.244	19.27	20.50	0.613	With SIM2	/
Main	Back side	10mm	1413/1732.6	RMC	0.374	0.204	19.27	20.50	0.496	With Plastic Cover	/

Table 27: Hotspot SAR test results of UMTS Band IV

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	1413/1732.6	RMC	0.218	0.121	19.27	23.5	0.577	Yes
Main	Back side	10mm	1413/1732.6	RMC	**0.485**	0.257	19.27	23.5	1.285	No
Main	Left side	10mm	1413/1732.6	RMC	0.118	0.065	19.27	23.5	0.313	Yes
Main	Top side	10mm	1413/1732.6	RMC	0.484	0.252	19.27	23.5	1.282	No
Main	Back side	10mm	1413/1732.6	RMC	0.455	0.242	19.27	23.5	1.205	No
Main	Back side	10mm	1413/1732.6	RMC	0.472	0.252	19.27	23.5	1.250	No
Main	Back side	10mm	1413/1732.6	RMC	0.449	0.241	19.27	23.5	1.189	Yes
Main	Back side	10mm	1413/1732.6	RMC	0.462	0.244	19.27	23.5	1.224	No
Main	Back side	10mm	1413/1732.6	RMC	0.374	0.204	19.27	23.5	0.991	Yes

Table 28: Product Specific 10-g SAR test reduction evaluation of UMTS Band IV

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 10-g SAR (W/kg)	Accessory Information	Note
Main	Back side	0mm	1413/1732.6	RMC	4.080	1.880	22.21	23.50	2.530	Battery 1#	/
Main	Back side	0mm	1312/1712.4	RMC	4.050	1.820	22.05	23.50	2.541	Battery 1#	/
Main	Back side	0mm	1513/1752.6	RMC	4.040	1.750	22.15	23.50	2.388	Battery 1#	/
Main	Top side	0mm	1413/1732.6	RMC	4.610	**1.890**	22.21	23.50	**2.544**	Battery 1#	Plot
Main	Top side	0mm	1312/1712.4	RMC	4.430	1.810	22.05	23.50	2.527	Battery 1#	/
Main	Top side	0mm	1513/1752.6	RMC	4.410	1.840	22.15	23.50	2.511	Battery 1#	/
Main	Top side	0mm	1413/1732.6	RMC	4.160	1.880	22.21	23.50	2.530	Battery 2#	/
Main	Top side	0mm	1413/1732.6	RMC	4.470	1.870	22.21	23.50	2.517	Battery 3#	/
Main	Top side	0mm	1413/1732.6	RMC	4.770	1.860	22.21	23.50	2.503	Battery 4#	/
Main	Top side	0mm	1413/1732.6	RMC	4.320	1.790	22.21	23.50	2.409	With SIM2	/
Main	Top side	0mm	1413/1732.6	RMC	3.880	1.670	22.21	23.50	2.248	With Plastic Cover	/

Table 29: Product Specific 10-g SAR test results of UMTS Band IV

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7.2.5 SAR measurement Results of UMTS Band V

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	4182/836.4	RMC	0.349	0.233	23.12	24.50	0.480	Battery 1#	/
Main	Left tilt	/	4182/836.4	RMC	0.310	0.195	23.12	24.50	0.426	Battery 1#	/
Main	Right cheek	/	4182/836.4	RMC	**0.630**	0.362	23.12	24.50	**0.866**	Battery 1#	Plot
Main	Right cheek	/	4132/826.4	RMC	0.589	0.371	23.18	24.50	0.798	Battery 1#	/
Main	Right cheek	/	4233/846.6	RMC	0.584	0.371	23.07	24.50	0.812	Battery 1#	/
Main	Right tilt	/	4182/836.4	RMC	0.488	0.259	23.12	24.50	0.671	Battery 1#	/
Main	Right cheek	/	4182/836.4	RMC	0.503	0.333	23.12	24.50	0.691	Battery 2#	/
Main	Right cheek	/	4182/836.4	RMC	0.498	0.312	23.12	24.50	0.684	Battery 3#	/
Main	Right cheek	/	4182/836.4	RMC	0.555	0.350	23.12	24.50	0.763	Battery 4#	/
Main	Right cheek	/	4182/836.4	RMC	0.521	0.334	23.12	24.50	0.716	With SIM2	/

Table 30: Head SAR test results of UMTS Band V

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	4182/836.4	RMC	0.105	0.076	24.12	25.50	0.144	Battery 1#	/
Main	Back side	15mm	4182/836.4	RMC	**0.141**	0.107	24.12	25.50	**0.194**	Battery 1#	Plot
Main	Back side	15mm	4182/836.4	RMC	0.139	0.104	24.12	25.50	0.191	Battery 2#	/
Main	Back side	15mm	4182/836.4	RMC	0.140	0.103	24.12	25.50	0.192	Battery 3#	/
Main	Back side	15mm	4182/836.4	RMC	0.134	0.100	24.12	25.50	0.184	Battery 4#	/
Main	Back side	15mm	4182/836.4	RMC	0.135	0.103	24.12	25.50	0.185	With SIM2	/

Table 31: Body Worn SAR test results of UMTS Band V

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	4182/836.4	RMC	0.171	0.105	23.12	24.50	0.235	Battery 1#	/
Main	Back side	10mm	4182/836.4	RMC	**0.307**	0.185	23.12	24.50	**0.422**	Battery 1#	Plot
Main	Left side	10mm	4182/836.4	RMC	0.155	0.102	23.12	24.50	0.213	Battery 1#	/
Main	Top side	10mm	4182/836.4	RMC	0.181	0.107	23.12	24.50	0.249	Battery 1#	/
Main	Back side	10mm	4182/836.4	RMC	0.270	0.163	23.12	24.50	0.371	Battery 2#	/
Main	Back side	10mm	4182/836.4	RMC	0.257	0.159	23.12	24.50	0.353	Battery 3#	/
Main	Back side	10mm	4182/836.4	RMC	0.247	0.152	23.12	24.50	0.339	Battery 4#	/
Main	Back side	10mm	4182/836.4	RMC	0.273	0.164	23.12	24.50	0.375	With SIM2	/

Table 32: Hotspot SAR test results of UMTS Band V

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	4182/836.4	RMC	0.171	0.105	23.12	25.5	0.296	Yes
Main	Back side	10mm	4182/836.4	RMC	**0.307**	0.185	23.12	25.5	0.531	Yes
Main	Left side	10mm	4182/836.4	RMC	0.155	0.102	23.12	25.5	0.268	Yes
Main	Top side	10mm	4182/836.4	RMC	0.181	0.107	23.12	25.5	0.313	Yes
Main	Back side	10mm	4182/836.4	RMC	0.270	0.163	23.12	25.5	0.467	Yes
Main	Back side	10mm	4182/836.4	RMC	0.257	0.159	23.12	25.5	0.445	Yes
Main	Back side	10mm	4182/836.4	RMC	0.247	0.152	23.12	25.5	0.427	Yes
Main	Back side	10mm	4182/836.4	RMC	0.273	0.164	23.12	25.5	0.472	Yes

Table 33: Product Specific 10-g SAR test reduction evaluation of UMTS Band V

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.6 SAR measurement Results of LTE Band 2

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	18900/1880	20M QPSK 1RB@0	0.226	0.140	18.22	19.00	0.270	Battery 1#	/
Main	Left tilt	/	18900/1880	20M QPSK 1RB@0	0.345	0.199	18.22	19.00	0.413	Battery 1#	/
Main	Right cheek	/	18900/1880	20M QPSK 1RB@0	0.296	0.176	18.22	19.00	0.354	Battery 1#	/
Main	Right tilt	/	18900/1880	20M QPSK 1RB@0	0.402	0.215	18.22	19.00	0.481	Battery 1#	/
Main	Left cheek	/	18700/1860	20M QPSK 50%RB@25	0.220	0.137	18.34	19.00	0.256	Battery 1#	/
Main	Left tilt	/	18700/1860	20M QPSK 50%RB@25	0.356	0.206	18.34	19.00	0.414	Battery 1#	/
Main	Right cheek	/	18700/1860	20M QPSK 50%RB@25	0.302	0.180	18.34	19.00	0.352	Battery 1#	/
Main	Right tilt	/	18700/1860	20M QPSK 50%RB@25	**0.477**	0.239	18.34	19.00	**0.555**	Battery 1#	Plot
Main	Right tilt	/	18700/1860	20M QPSK 50%RB@25	0.386	0.209	18.34	19.00	0.449	Battery 2#	/
Main	Right tilt	/	18700/1860	20M QPSK 50%RB@25	0.390	0.212	18.34	19.00	0.454	Battery 3#	/
Main	Right tilt	/	18700/1860	20M QPSK 50%RB@25	0.458	0.244	18.34	19.00	0.533	Battery 4#	/
Main	Right tilt	/	18700/1860	20M QPSK 50%RB@25	0.384	0.208	18.34	19.00	0.447	With SIM2	/

Table 34: Head SAR test results of LTE Band 2

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	18900/1880	20M QPSK 1RB@0	0.165	0.102	22.70	23.50	0.198	Battery 1#	/
Main	Back side	15mm	18900/1880	20M QPSK 1RB@0	**0.292**	0.165	22.70	23.50	**0.351**	Battery 1#	Plot
Main	Front side	15mm	18900/1880	20M QPSK 50%RB@50	0.172	0.105	22.82	23.50	0.201	Battery 1#	/
Main	Back side	15mm	18900/1880	20M QPSK 50%RB@50	0.267	0.156	22.82	23.50	0.312	Battery 1#	/
Main	Back side	15mm	18900/1880	20M QPSK 1RB@0	0.263	0.153	22.70	23.50	0.316	Battery 2#	/
Main	Back side	15mm	18900/1880	20M QPSK 1RB@0	0.247	0.145	22.70	23.50	0.297	Battery 3#	/
Main	Back side	15mm	18900/1880	20M QPSK 1RB@0	0.260	0.153	22.70	23.50	0.313	Battery 4#	/
Main	Back side	15mm	18900/1880	20M QPSK 1RB@0	0.261	0.154	22.70	23.50	0.314	With SIM2	/

Table 35: Body Worn SAR test results of LTE Band 2

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Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	18900/1880	20M QPSK 1RB@0	0.103	0.060	18.22	19.00	0.123	Battery 1#	/
Main	Back side	10mm	18900/1880	20M QPSK 1RB@0	0.182	0.100	18.22	19.00	0.218	Battery 1#	/
Main	Left side	10mm	18900/1880	20M QPSK 1RB@0	0.049	0.027	18.22	19.00	0.059	Battery 1#	/
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	**0.251**	0.135	18.22	19.00	**0.300**	Battery 1#	Plot
Main	Front side	10mm	18700/1860	20M QPSK 50%RB@25	0.100	0.059	18.34	19.00	0.116	Battery 1#	/
Main	Back side	10mm	18700/1860	20M QPSK 50%RB@25	0.174	0.096	18.34	19.00	0.203	Battery 1#	/
Main	Left side	10mm	18700/1860	20M QPSK 50%RB@25	0.043	0.025	18.34	19.00	0.050	Battery 1#	/
Main	Top side	10mm	18700/1860	20M QPSK 50%RB@25	0.238	0.128	18.34	19.00	0.277	Battery 1#	/
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.234	0.129	18.22	19.00	0.280	Battery 2#	/
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.241	0.129	18.22	19.00	0.288	Battery 3#	/
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.250	0.130	18.22	19.00	0.299	Battery 4#	/
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.233	0.128	18.22	19.00	0.279	With SIM2	/

Table 36: Hotspot SAR test results of LTE Band 2

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	18900/1880	20M QPSK 1RB@0	0.103	0.060	18.22	23.5	0.347	Yes
Main	Back side	10mm	18900/1880	20M QPSK 1RB@0	0.182	0.100	18.22	23.5	0.614	Yes
Main	Left side	10mm	18900/1880	20M QPSK 1RB@0	0.049	0.027	18.22	23.5	0.165	Yes
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	**0.251**	0.135	18.22	23.5	0.847	Yes
Main	Front side	10mm	18700/1860	20M QPSK 50%RB@25	0.100	0.059	18.34	23.5	0.328	Yes
Main	Back side	10mm	18700/1860	20M QPSK 50%RB@25	0.174	0.096	18.34	23.5	0.571	Yes
Main	Left side	10mm	18700/1860	20M QPSK 50%RB@25	0.043	0.025	18.34	23.5	0.141	Yes
Main	Top side	10mm	18700/1860	20M QPSK 50%RB@25	0.238	0.128	18.34	23.5	0.781	Yes
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.234	0.129	18.22	23.5	0.789	Yes
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.241	0.129	18.22	23.5	0.813	Yes
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.250	0.130	18.22	23.5	0.843	Yes
Main	Top side	10mm	18900/1880	20M QPSK 1RB@0	0.233	0.128	18.22	23.5	0.786	Yes

Table 37: Product Specific 10-g SAR test reduction evaluation of LTE Band 2

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.7 SAR measurement Results of LTE Band 5

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	20525/836.5	10M QPSK 1RB@0	0.349	0.234	23.27	24.00	0.413	Battery 1#	/
Main	Left tilt	/	20525/836.5	10M QPSK 1RB@0	0.325	0.203	23.27	24.00	0.384	Battery 1#	/
Main	Right cheek	/	20525/836.5	10M QPSK 1RB@0	0.501	0.314	23.27	24.00	0.593	Battery 1#	/
Main	Right tilt	/	20525/836.5	10M QPSK 1RB@0	0.522	0.276	23.27	24.00	0.618	Battery 1#	/
Main	Left cheek	/	20450/829	10M QPSK 50%RB@25	0.340	0.229	23.22	24.00	0.407	Battery 1#	/
Main	Left tilt	/	20450/829	10M QPSK 50%RB@25	0.312	0.195	23.22	24.00	0.373	Battery 1#	/
Main	Right cheek	/	20450/829	10M QPSK 50%RB@25	**0.693**	0.397	23.22	24.00	**0.829**	Battery 1#	Plot
Main	Right cheek	/	20525/836.5	10M QPSK 50%RB@0	0.599	0.377	23.13	24.00	0.732	Battery 1#	/
Main	Right cheek	/	20600/844	10M QPSK 50%RB@0	0.613	0.387	23.19	24.00	0.739	Battery 1#	/
Main	Right cheek	/	20600/844	10M QPSK 100%RB@0	0.588	0.371	23.17	24.00	0.712	Battery 1#	/
Main	Right tilt	/	20450/829	10M QPSK 50%RB@25	0.517	0.274	23.22	24.00	0.619	Battery 1#	/
Main	Right cheek	/	20450/829	10M QPSK 50%RB@25	0.563	0.355	23.22	24.00	0.674	Battery 2#	/
Main	Right cheek	/	20450/829	10M QPSK 50%RB@25	0.495	0.309	23.22	24.00	0.592	Battery 3#	/
Main	Right cheek	/	20450/829	10M QPSK 50%RB@25	0.535	0.343	23.22	24.00	0.640	Battery 4#	/
Main	Right cheek	/	20450/829	10M QPSK 50%RB@25	0.584	0.366	23.22	24.00	0.699	With SIM2	/

Table 38: Head SAR test results of LTE Band 5

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	20525/836.5	10M QPSK 1RB@0	0.117	0.085	24.20	25.00	0.141	Battery 1#	/
Main	Back side	15mm	20525/836.5	10M QPSK 1RB@0	**0.155**	0.118	24.20	25.00	**0.186**	Battery 1#	Plot
Main	Front side	15mm	20450/829	10M QPSK 50%RB@13	0.104	0.075	23.23	24.00	0.124	Battery 1#	/
Main	Back side	15mm	20450/829	10M QPSK 50%RB@13	0.139	0.100	23.23	24.00	0.166	Battery 1#	/
Main	Back side	15mm	20525/836.5	10M QPSK 1RB@0	0.153	0.117	24.20	25.00	0.184	Battery 2#	/
Main	Back side	15mm	20525/836.5	10M QPSK 1RB@0	0.152	0.099	24.20	25.00	0.183	Battery 3#	/
Main	Back side	15mm	20525/836.5	10M QPSK 1RB@0	0.150	0.097	24.20	25.00	0.180	Battery 4#	/
Main	Back side	15mm	20525/836.5	10M QPSK 1RB@0	0.152	0.115	24.20	25.00	0.183	With SIM2	/

Table 39: Body Worn SAR test results of LTE Band 5

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Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	20525/836.5	10M QPSK 1RB@0	0.177	0.109	23.27	24.00	0.209	Battery 1#	/
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	**0.300**	0.181	23.27	24.00	**0.355**	Battery 1#	Plot
Main	Left side	10mm	20525/836.5	10M QPSK 1RB@0	0.175	0.115	23.27	24.00	0.207	Battery 1#	/
Main	Top side	10mm	20525/836.5	10M QPSK 1RB@0	0.190	0.112	23.27	24.00	0.225	Battery 1#	/
Main	Front side	10mm	20450/829	10M QPSK 50%RB@25	0.152	0.094	23.22	24.00	0.182	Battery 1#	/
Main	Back side	10mm	20450/829	10M QPSK 50%RB@25	0.281	0.165	23.22	24.00	0.336	Battery 1#	/
Main	Left side	10mm	20450/829	10M QPSK 50%RB@25	0.129	0.086	23.22	24.00	0.154	Battery 1#	/
Main	Top side	10mm	20450/829	10M QPSK 50%RB@25	0.137	0.080	23.22	24.00	0.164	Battery 1#	/
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.278	0.169	23.27	24.00	0.329	Battery 2#	/
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.248	0.154	23.27	24.00	0.293	Battery 3#	/
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.242	0.150	23.27	24.00	0.286	Battery 4#	/
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.277	0.169	23.27	24.00	0.328	With SIM2	/

Table 40: Hotspot SAR test results of LTE Band 5

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	20525/836.5	10M QPSK 1RB@0	0.177	0.109	23.27	25	0.264	Yes
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	**0.300**	0.181	23.27	25	0.447	Yes
Main	Left side	10mm	20525/836.5	10M QPSK 1RB@0	0.175	0.115	23.27	25	0.261	Yes
Main	Top side	10mm	20525/836.5	10M QPSK 1RB@0	0.190	0.112	23.27	25	0.283	Yes
Main	Front side	10mm	20450/829	10M QPSK 50%RB@25	0.152	0.094	23.22	24	0.182	Yes
Main	Back side	10mm	20450/829	10M QPSK 50%RB@25	0.281	0.165	23.22	24	0.336	Yes
Main	Left side	10mm	20450/829	10M QPSK 50%RB@25	0.129	0.086	23.22	24	0.154	Yes
Main	Top side	10mm	20450/829	10M QPSK 50%RB@25	0.137	0.080	23.22	24	0.164	Yes
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.278	0.169	23.27	25	0.414	Yes
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.248	0.154	23.27	25	0.369	Yes
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.242	0.150	23.27	25	0.360	Yes
Main	Back side	10mm	20525/836.5	10M QPSK 1RB@0	0.277	0.169	23.27	25	0.413	Yes

Table 41: Product Specific 10-g SAR test reduction evaluation of LTE Band 5

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.8 SAR measurement Results of LTE Band 7

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	21350/2560	20M QPSK 1RB@0	0.260	0.133	16.67	17.70	0.330	Battery 1#	/
Main	Left tilt	/	21350/2560	20M QPSK 1RB@0	0.383	0.185	16.67	17.70	0.486	Battery 1#	/
Main	Right cheek	/	21350/2560	20M QPSK 1RB@0	0.287	0.141	16.67	17.70	0.364	Battery 1#	/
Main	Right tilt	/	21350/2560	20M QPSK 1RB@0	**0.513**	0.224	16.67	17.70	**0.650**	Battery 1#	Plot
Main	Left cheek	/	21100/2535	20M QPSK 50%RB@25	0.245	0.126	16.78	17.70	0.303	Battery 1#	/
Main	Left tilt	/	21100/2535	20M QPSK 50%RB@25	0.376	0.182	16.78	17.70	0.465	Battery 1#	/
Main	Right cheek	/	21100/2535	20M QPSK 50%RB@25	0.283	0.142	16.78	17.70	0.350	Battery 1#	/
Main	Right tilt	/	21100/2535	20M QPSK 50%RB@25	0.408	0.198	16.78	17.70	0.504	Battery 1#	/
Main	Right tilt	/	21350/2560	20M QPSK 1RB@0	0.373	0.178	16.67	17.70	0.473	Battery 2#	/
Main	Right tilt	/	21350/2560	20M QPSK 1RB@0	0.498	0.236	16.67	17.70	0.631	Battery 3#	/
Main	Right tilt	/	21350/2560	20M QPSK 1RB@0	0.486	0.219	16.67	17.70	0.616	Battery 4#	/
Main	Right tilt	/	21350/2560	20M QPSK 1RB@0	0.378	0.181	16.67	17.70	0.479	With SIM2	/

Table 42: Head SAR test results of LTE Band 7

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	21100/2535	20M QPSK 1RB@99	0.126	0.067	21.07	22.20	0.163	Battery 1#	/
Main	Back side	15mm	21100/2535	20M QPSK 1RB@99	**0.186**	0.097	21.07	22.20	**0.241**	Battery 1#	Plot
Main	Front side	15mm	21100/2535	20M QPSK 50%RB@25	0.123	0.066	21.22	22.20	0.154	Battery 1#	/
Main	Back side	15mm	21100/2535	20M QPSK 50%RB@25	0.172	0.091	21.22	22.20	0.216	Battery 1#	/
Main	Back side	15mm	21100/2535	20M QPSK 1RB@99	0.168	0.089	21.07	22.20	0.218	Battery 2#	/
Main	Back side	15mm	21100/2535	20M QPSK 1RB@99	0.168	0.086	21.07	22.20	0.218	Battery 3#	/
Main	Back side	15mm	21100/2535	20M QPSK 1RB@99	0.177	0.097	21.07	22.20	0.230	Battery 4#	/
Main	Back side	15mm	21100/2535	20M QPSK 1RB@99	0.171	0.090	21.07	22.20	0.222	With SIM2	/

Table 43: Body Worn SAR test results of LTE Band 7

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Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	21350/2560	20M QPSK 1RB@0	0.033	0.009	16.17	17.20	0.042	Battery 1#	/
Main	Back side	10mm	21350/2560	20M QPSK 1RB@0	0.119	0.059	16.17	17.20	0.151	Battery 1#	/
Main	Left side	10mm	21350/2560	20M QPSK 1RB@0	0.036	0.010	16.17	17.20	0.046	Battery 1#	/
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	**0.232**	0.108	16.17	17.20	**0.294**	Battery 1#	Plot
Main	Front side	10mm	21100/2535	20M QPSK 50%RB@25	0.031	0.007	16.09	17.20	0.040	Battery 1#	/
Main	Back side	10mm	21100/2535	20M QPSK 50%RB@25	0.122	0.060	16.09	17.20	0.158	Battery 1#	/
Main	Left side	10mm	21100/2535	20M QPSK 50%RB@25	0.029	0.007	16.09	17.20	0.037	Battery 1#	/
Main	Top side	10mm	21100/2535	20M QPSK 50%RB@25	0.186	0.090	16.09	17.20	0.240	Battery 1#	/
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.199	0.098	16.17	17.20	0.252	Battery 2#	/
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.225	0.115	16.17	17.20	0.285	Battery 3#	/
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.213	0.099	16.17	17.20	0.270	Battery 4#	/
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.192	0.095	16.17	17.20	0.243	With SIM2	/

Table 44: Hotspot SAR test results of LTE Band 7

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	21350/2560	20M QPSK 1RB@0	0.033	0.009	16.17	22.2	0.132	Yes
Main	Back side	10mm	21350/2560	20M QPSK 1RB@0	0.119	0.059	16.17	22.2	0.477	Yes
Main	Left side	10mm	21350/2560	20M QPSK 1RB@0	0.036	0.010	16.17	22.2	0.144	Yes
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	**0.232**	0.108	16.17	22.2	0.930	Yes
Main	Front side	10mm	21100/2535	20M QPSK 50%RB@25	0.031	0.007	16.09	22.2	0.127	Yes
Main	Back side	10mm	21100/2535	20M QPSK 50%RB@25	0.122	0.060	16.09	22.2	0.498	Yes
Main	Left side	10mm	21100/2535	20M QPSK 50%RB@25	0.029	0.007	16.09	22.2	0.118	Yes
Main	Top side	10mm	21100/2535	20M QPSK 50%RB@25	0.186	0.090	16.09	22.2	0.759	Yes
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.199	0.098	16.17	22.2	0.798	Yes
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.225	0.115	16.17	22.2	0.902	Yes
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.213	0.099	16.17	22.2	0.854	Yes
Main	Top side	10mm	21350/2560	20M QPSK 1RB@0	0.192	0.095	16.17	22.2	0.770	Yes

Table 45: Product Specific 10-g SAR test reduction evaluation of LTE Band 7

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.9 SAR measurement Results of LTE Band 13

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	23230/782	10M QPSK 1RB@49	0.403	0.272	24.03	25.00	0.504	Battery 1#	/
Main	Left tilt	/	23230/782	10M QPSK 1RB@49	0.362	0.223	24.03	25.00	0.453	Battery 1#	/
Main	Right cheek	/	23230/782	10M QPSK 1RB@49	0.595	0.372	24.03	25.00	0.744	Battery 1#	/
Main	Right tilt	/	23230/782	10M QPSK 1RB@49	**0.635**	0.332	24.03	25.00	**0.794**	Battery 1#	Plot
Main	Left cheek	/	23230/782	10M QPSK 50%RB@13	0.308	0.208	23.15	24.00	0.375	Battery 1#	/
Main	Left tilt	/	23230/782	10M QPSK 50%RB@13	0.285	0.176	23.15	24.00	0.347	Battery 1#	/
Main	Right cheek	/	23230/782	10M QPSK 50%RB@13	0.459	0.287	23.15	24.00	0.558	Battery 1#	/
Main	Right tilt	/	23230/782	10M QPSK 50%RB@13	0.466	0.241	23.15	24.00	0.567	Battery 1#	/
Main	Right tilt	/	23230/782	10M QPSK 1RB@49	0.520	0.288	24.03	25.00	0.650	Battery 2#	/
Main	Right tilt	/	23230/782	10M QPSK 1RB@49	0.620	0.312	24.03	25.00	0.775	Battery 3#	/
Main	Right tilt	/	23230/782	10M QPSK 1RB@49	0.599	0.315	24.03	25.00	0.749	Battery 4#	/
Main	Right tilt	/	23230/782	10M QPSK 1RB@49	0.514	0.286	24.03	25.00	0.643	With SIM2	/

Table 46: Head SAR test results of LTE Band 13

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	23230/782	10M QPSK 1RB@49	0.145	0.105	24.03	25.00	0.181	Battery 1#	/
Main	Back side	15mm	23230/782	10M QPSK 1RB@49	**0.186**	0.119	24.03	25.00	**0.233**	Battery 1#	Plot
Main	Front side	15mm	23230/782	10M QPSK 50%RB@13	0.115	0.083	23.15	24.00	0.140	Battery 1#	/
Main	Back side	15mm	23230/782	10M QPSK 50%RB@13	0.154	0.112	23.15	24.00	0.187	Battery 1#	/
Main	Back side	15mm	23230/782	10M QPSK 1RB@49	0.184	0.117	24.03	25.00	0.230	Battery 2#	/
Main	Back side	15mm	23230/782	10M QPSK 1RB@49	0.175	0.108	24.03	25.00	0.219	Battery 3#	/
Main	Back side	15mm	23230/782	10M QPSK 1RB@49	0.164	0.102	24.03	25.00	0.205	Battery 4#	/
Main	Back side	15mm	23230/782	10M QPSK 1RB@49	0.185	0.118	24.03	25.00	0.231	With SIM2	/

Table 47: Body Worn SAR test results of LTE Band 13

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	23230/782	10M QPSK 1RB@49	0.156	0.100	24.03	25.00	0.195	Battery 1#	/
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	**0.356**	0.217	24.03	25.00	**0.445**	Battery 1#	Plot
Main	Left side	10mm	23230/782	10M QPSK 1RB@49	0.189	0.127	24.03	25.00	0.236	Battery 1#	/
Main	Top side	10mm	23230/782	10M QPSK 1RB@49	0.146	0.085	24.03	25.00	0.183	Battery 1#	/
Main	Front side	10mm	23230/782	10M QPSK 50%RB@13	0.122	0.078	23.15	24.00	0.148	Battery 1#	/
Main	Back side	10mm	23230/782	10M QPSK 50%RB@13	0.215	0.134	23.15	24.00	0.261	Battery 1#	/
Main	Left side	10mm	23230/782	10M QPSK 50%RB@13	0.153	0.103	23.15	24.00	0.186	Battery 1#	/
Main	Top side	10mm	23230/782	10M QPSK 50%RB@13	0.113	0.066	23.15	24.00	0.137	Battery 1#	/
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.299	0.188	24.03	25.00	0.374	Battery 2#	/

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Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.344	0.214	24.03	25.00	0.430	Battery 3#	/
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.335	0.208	24.03	25.00	0.419	Battery 4#	/
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.296	0.186	24.03	25.00	0.370	With SIM2	/

Table 48: Hotspot SAR test results of LTE Band 13

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	23230/782	10M QPSK 1RB@49	0.156	0.100	24.03	25	0.195	Yes
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	**0.356**	0.217	24.03	25	0.445	Yes
Main	Left side	10mm	23230/782	10M QPSK 1RB@49	0.189	0.127	24.03	25	0.236	Yes
Main	Top side	10mm	23230/782	10M QPSK 1RB@49	0.146	0.085	24.03	25	0.183	Yes
Main	Front side	10mm	23230/782	10M QPSK 50%RB@13	0.122	0.078	23.15	24	0.148	Yes
Main	Back side	10mm	23230/782	10M QPSK 50%RB@13	0.215	0.134	23.15	24	0.261	Yes
Main	Left side	10mm	23230/782	10M QPSK 50%RB@13	0.153	0.103	23.15	24	0.186	Yes
Main	Top side	10mm	23230/782	10M QPSK 50%RB@13	0.113	0.066	23.15	24	0.137	Yes
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.299	0.188	24.03	25	0.374	Yes
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.344	0.214	24.03	25	0.430	Yes
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.335	0.208	24.03	25	0.419	Yes
Main	Back side	10mm	23230/782	10M QPSK 1RB@49	0.296	0.186	24.03	25	0.370	Yes

Table 49: Product Specific 10-g SAR test reduction evaluation of LTE Band 13

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.10 SAR measurement Results of LTE Band 26

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	26865/831.5	15M QPSK 1RB@0	0.266	0.179	22.40	23.00	0.305	Battery 1#	/
Main	Left tilt	/	26865/831.5	15M QPSK 1RB@0	0.253	0.158	22.40	23.00	0.290	Battery 1#	/
Main	Right cheek	/	26865/831.5	15M QPSK 1RB@0	0.370	0.201	22.40	23.00	0.425	Battery 1#	/
Main	Right tilt	/	26865/831.5	15M QPSK 1RB@0	0.372	0.203	22.40	23.00	0.427	Battery 1#	/
Main	Left cheek	/	26775/822.5	15M QPSK 50%RB@18	0.276	0.185	22.37	23.00	0.319	Battery 1#	/
Main	Left tilt	/	26775/822.5	15M QPSK 50%RB@18	0.256	0.160	22.37	23.00	0.296	Battery 1#	/
Main	Right cheek	/	26775/822.5	15M QPSK 50%RB@18	0.368	0.201	22.37	23.00	0.425	Battery 1#	/
Main	Right tilt	/	26775/822.5	15M QPSK 50%RB@18	**0.379**	0.205	22.37	23.00	**0.438**	Battery 1#	Plot
Main	Right tilt	/	26775/822.5	15M QPSK 50%RB@18	0.369	0.208	22.37	23.00	0.427	Battery 2#	/
Main	Right tilt	/	26775/822.5	15M QPSK 50%RB@18	0.365	0.196	22.37	23.00	0.422	Battery 3#	/
Main	Right tilt	/	26775/822.5	15M QPSK 50%RB@18	0.341	0.194	22.37	23.00	0.394	Battery 4#	/
Main	Right tilt	/	26775/822.5	15M QPSK 50%RB@18	0.360	0.205	22.37	23.00	0.416	With SIM2	/

Table 50: Head SAR test results of LTE Band 26

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	26865/831.5	15M QPSK 1RB@0	0.122	0.089	24.45	25.00	0.138	Battery 1#	/
Main	Back side	15mm	26865/831.5	15M QPSK 1RB@0	**0.156**	0.119	24.45	25.00	**0.177**	Battery 1#	Plot
Main	Front side	15mm	26775/822.5	15M QPSK 50%RB@0	0.106	0.076	23.29	24.00	0.125	Battery 1#	/
Main	Back side	15mm	26775/822.5	15M QPSK 50%RB@0	0.143	0.104	23.29	24.00	0.168	Battery 1#	/
Main	Back side	15mm	26865/831.5	15M QPSK 1RB@0	0.153	0.114	24.45	25.00	0.174	Battery 2#	/
Main	Back side	15mm	26865/831.5	15M QPSK 1RB@0	0.147	0.106	24.45	25.00	0.167	Battery 3#	/
Main	Back side	15mm	26865/831.5	15M QPSK 1RB@0	0.143	0.094	24.45	25.00	0.162	Battery 4#	/
Main	Back side	15mm	26865/831.5	15M QPSK 1RB@0	0.145	0.104	24.45	25.00	0.165	With SIM2	/

Table 51: Body Worn SAR test results of LTE Band 26

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Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	26865/831.5	15M QPSK 1RB@0	0.169	0.106	24.45	25.00	0.192	Battery 1#	/
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.269	0.164	24.45	25.00	0.305	Battery 1#	/
Main	Left side	10mm	26865/831.5	15M QPSK 1RB@0	0.148	0.098	24.45	25.00	0.168	Battery 1#	/
Main	Top side	10mm	26865/831.5	15M QPSK 1RB@0	0.174	0.104	24.45	25.00	0.197	Battery 1#	/
Main	Front side	10mm	26775/822.5	15M QPSK 50%RB@0	0.140	0.088	23.29	24.00	0.165	Battery 1#	/
Main	Back side	10mm	26775/822.5	15M QPSK 50%RB@0	0.258	0.154	23.29	24.00	0.304	Battery 1#	/
Main	Left side	10mm	26775/822.5	15M QPSK 50%RB@0	0.144	0.095	23.29	24.00	0.170	Battery 1#	/
Main	Top side	10mm	26775/822.5	15M QPSK 50%RB@0	0.134	0.078	23.29	24.00	0.158	Battery 1#	/
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	**0.378**	0.230	24.45	25.00	**0.429**	Battery 2#	Plot
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.290	0.181	24.45	25.00	0.329	Battery 3#	/
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.289	0.179	24.45	25.00	0.328	Battery 4#	/
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.328	0.198	24.45	25.00	0.372	With SIM2	/

Table 52: Hotspot SAR test results of LTE Band 26

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	26865/831.5	15M QPSK 1RB@0	0.169	0.106	24.45	25	0.192	Yes
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.269	0.164	24.45	25	0.305	Yes
Main	Left side	10mm	26865/831.5	15M QPSK 1RB@0	0.148	0.098	24.45	25	0.168	Yes
Main	Top side	10mm	26865/831.5	15M QPSK 1RB@0	0.174	0.104	24.45	25	0.197	Yes
Main	Front side	10mm	26775/822.5	15M QPSK 50%RB@0	0.140	0.088	23.29	24	0.165	Yes
Main	Back side	10mm	26775/822.5	15M QPSK 50%RB@0	0.258	0.154	23.29	24	0.304	Yes
Main	Left side	10mm	26775/822.5	15M QPSK 50%RB@0	0.144	0.095	23.29	24	0.170	Yes
Main	Top side	10mm	26775/822.5	15M QPSK 50%RB@0	0.134	0.078	23.29	24	0.158	Yes
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	**0.378**	0.230	24.45	25	0.429	Yes
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.290	0.181	24.45	25	0.329	Yes
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.289	0.179	24.45	25	0.328	Yes
Main	Back side	10mm	26865/831.5	15M QPSK 1RB@0	0.328	0.198	24.45	25	0.372	Yes

Table 53: Product Specific 10-g SAR test reduction evaluation of LTE Band 26

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.11 SAR measurement Results of LTE Band 38

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	38000/2595	20M QPSK 1RB@0	0.313	0.155	19.13	20.00	0.382	Battery 1#	/
Main	Left tilt	/	38000/2595	20M QPSK 1RB@0	0.392	0.173	19.13	20.00	0.479	Battery 1#	/
Main	Right cheek	/	38000/2595	20M QPSK 1RB@0	0.330	0.158	19.13	20.00	0.403	Battery 1#	/
Main	Right tilt	/	38000/2595	20M QPSK 1RB@0	0.395	0.170	19.13	20.00	0.483	Battery 1#	/
Main	Left cheek	/	37850/2580	20M QPSK 50%RB@0	0.327	0.157	19.15	20.00	0.398	Battery 1#	/
Main	Left tilt	/	37850/2580	20M QPSK 50%RB@0	0.387	0.178	19.15	20.00	0.471	Battery 1#	/
Main	Right cheek	/	37850/2580	20M QPSK 50%RB@0	0.310	0.154	19.15	20.00	0.377	Battery 1#	/
Main	Right tilt	/	37850/2580	20M QPSK 50%RB@0	0.386	0.181	19.15	20.00	0.469	Battery 1#	/
Main	Right tilt	/	38000/2595	20M QPSK 1RB@0	0.394	0.176	19.13	20.00	0.481	Battery 2#	/
Main	Right tilt	/	38000/2595	20M QPSK 1RB@0	**0.458**	0.194	19.13	20.00	**0.560**	Battery 3#	Plot
Main	Right tilt	/	38000/2595	20M QPSK 1RB@0	0.305	0.145	19.13	20.00	0.373	Battery 4#	/
Main	Right tilt	/	38000/2595	20M QPSK 1RB@0	0.384	0.173	19.13	20.00	0.469	With SIM2	/

Table 54: Head SAR test results of LTE Band 38

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	38000/2595	20M QPSK 1RB@0	0.151	0.079	23.54	24.50	0.188	Battery 1#	/
Main	Back side	15mm	38000/2595	20M QPSK 1RB@0	**0.165**	0.086	23.54	24.50	**0.206**	Battery 1#	Plot
Main	Front side	15mm	37850/2580	20M QPSK 50%RB@0	0.129	0.069	23.16	24.00	0.157	Battery 1#	/
Main	Back side	15mm	37850/2580	20M QPSK 50%RB@0	0.163	0.084	23.16	24.00	0.198	Battery 1#	/
Main	Back side	15mm	38000/2595	20M QPSK 1RB@0	0.164	0.092	23.54	24.50	0.205	Battery 2#	/
Main	Back side	15mm	38000/2595	20M QPSK 1RB@0	0.163	0.082	23.54	24.50	0.203	Battery 3#	/
Main	Back side	15mm	38000/2595	20M QPSK 1RB@0	0.160	0.081	23.54	24.50	0.200	Battery 4#	/
Main	Back side	15mm	38000/2595	20M QPSK 1RB@0	0.162	0.085	23.54	24.50	0.202	With SIM2	/

Table 55: Body Worn SAR test results of LTE Band 38

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Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	38000/2595	20M QPSK 1RB@0	0.161	0.079	22.02	23.00	0.202	Battery 1#	/
Main	Back side	10mm	38000/2595	20M QPSK 1RB@0	0.199	0.099	22.02	23.00	0.249	Battery 1#	/
Main	Left side	10mm	38000/2595	20M QPSK 1RB@0	0.041	0.021	22.02	23.00	0.051	Battery 1#	/
Main	Top side	10mm	38000/2595	20M QPSK 1RB@0	0.330	0.160	22.02	23.00	0.414	Battery 1#	/
Main	Front side	10mm	38000/2595	20M QPSK 50%RB@0	0.174	0.084	22.08	23.00	0.215	Battery 1#	/
Main	Back side	10mm	38000/2595	20M QPSK 50%RB@0	0.213	0.104	22.08	23.00	0.263	Battery 1#	/
Main	Left side	10mm	38000/2595	20M QPSK 50%RB@0	0.047	0.024	22.08	23.00	0.058	Battery 1#	/
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.398	0.185	22.08	23.00	0.492	Battery 1#	/
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.394	0.178	22.08	23.00	0.487	Battery 2#	/
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	**0.480**	0.217	22.08	23.00	**0.593**	Battery 3#	Plot
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.460	0.216	22.08	23.00	0.569	Battery 4#	/
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.392	0.189	22.08	23.00	0.484	With SIM2	/

Table 56: Hotspot SAR test results of LTE Band 38

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Main	Front side	10mm	38000/2595	20M QPSK 1RB@0	0.161	0.079	22.02	24.5	0.285	Yes
Main	Back side	10mm	38000/2595	20M QPSK 1RB@0	0.199	0.099	22.02	24.5	0.352	Yes
Main	Left side	10mm	38000/2595	20M QPSK 1RB@0	0.041	0.021	22.02	24.5	0.073	Yes
Main	Top side	10mm	38000/2595	20M QPSK 1RB@0	0.330	0.160	22.02	24.5	0.584	Yes
Main	Front side	10mm	38000/2595	20M QPSK 50%RB@0	0.174	0.084	22.08	24	0.271	Yes
Main	Back side	10mm	38000/2595	20M QPSK 50%RB@0	0.213	0.104	22.08	24	0.331	Yes
Main	Left side	10mm	38000/2595	20M QPSK 50%RB@0	0.047	0.024	22.08	24	0.073	Yes
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.398	0.185	22.08	24	0.619	Yes
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.394	0.178	22.08	24	0.613	Yes
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	**0.480**	0.217	22.08	24	0.747	Yes
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.460	0.216	22.08	24	0.716	Yes
Main	Top side	10mm	38000/2595	20M QPSK 50%RB@0	0.392	0.189	22.08	24	0.610	Yes

Table 57: Product Specific 10-g SAR test reduction evaluation of LTE Band 38

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.12 SAR measurement Results of LTE Band 66

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Left cheek	/	132322/1745	20M QPSK 1RB@0	0.402	0.248	18.68	19.50	0.486	Battery 1#	/
Main	Left tilt	/	132322/1745	20M QPSK 1RB@0	0.617	0.357	18.68	19.50	0.745	Battery 1#	/
Main	Right cheek	/	132322/1745	20M QPSK 1RB@0	0.578	0.327	18.68	19.50	0.698	Battery 1#	/
Main	Right tilt	/	132322/1745	20M QPSK 1RB@0	0.813	0.434	18.68	19.50	0.982	Battery 1#	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	**0.820**	0.421	18.56	19.50	**1.018**	Battery 1#	Plot
Main	Right tilt	/	132572/1770	20M QPSK 1RB@0	0.759	0.406	18.65	19.50	0.923	Battery 1#	/
Main	Left cheek	/	132322/1745	20M QPSK 50%RB@25	0.396	0.244	18.81	19.50	0.464	Battery 1#	/
Main	Left tilt	/	132322/1745	20M QPSK 50%RB@25	0.618	0.358	18.81	19.50	0.724	Battery 1#	/
Main	Right cheek	/	132322/1745	20M QPSK 50%RB@25	0.571	0.325	18.81	19.50	0.669	Battery 1#	/
Main	Right tilt	/	132322/1745	20M QPSK 50%RB@25	0.795	0.410	18.81	19.50	0.932	Battery 1#	/
Main	Right tilt	/	132072/1720	20M QPSK 50%RB@0	0.819	0.444	18.60	19.50	1.008	Battery 1#	/
Main	Right tilt	/	132572/1770	20M QPSK 50%RB@0	0.748	0.401	18.78	19.50	0.883	Battery 1#	/
Main	Right tilt	/	132322/1745	20M QPSK 100%RB@0	0.805	0.432	18.79	19.50	0.948	Battery 1#	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.744	0.395	18.56	19.50	0.924	Battery 2#	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.806	0.418	18.56	19.50	1.001	Battery 3#	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.782	0.402	18.56	19.50	0.971	Battery 4#	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.752	0.400	18.56	19.50	0.934	With SIM2	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.622	0.333	18.56	19.50	0.772	With Plastic Cover	/
Main	Right tilt	/	132072/1720	20M QPSK 1RB@99	0.815	0.429	18.56	19.50	1.012	Battery 1#	Repeated SAR

Table 58: Head SAR test results of LTE Band 66

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	15mm	132322/1745	20M QPSK 1RB@0	0.226	0.134	22.15	23.00	0.275	Battery 1#	/
Main	Back side	15mm	132322/1745	20M QPSK 1RB@0	**0.530**	0.299	22.15	23.00	**0.645**	Battery 1#	Plot
Main	Front side	15mm	132322/1745	20M QPSK 50%RB@25	0.215	0.129	22.24	23.00	0.256	Battery 1#	/

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Main	Back side	15mm	132322/1745	20M QPSK 50%RB@25	0.444	0.255	22.24	23.00	0.529	Battery 1#	/
Main	Back side	15mm	132322/1745	20M QPSK 1RB@0	0.429	0.246	22.15	23.00	0.522	Battery 2#	/
Main	Back side	15mm	132322/1745	20M QPSK 1RB@0	0.463	0.265	22.15	23.00	0.563	Battery 3#	/
Main	Back side	15mm	132322/1745	20M QPSK 1RB@0	0.439	0.251	22.15	23.00	0.534	Battery 4#	/
Main	Back side	15mm	132322/1745	20M QPSK 1RB@0	0.442	0.252	22.15	23.00	0.538	With SIM2	/

Table 59: Body Worn SAR test results of LTE Band 66

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Main	Front side	10mm	132322/1745	20M QPSK 1RB@0	0.153	0.087	18.15	19.00	0.186	Battery 1#	/
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	**0.384**	0.203	18.15	19.00	**0.467**	Battery 1#	Plot
Main	Left side	10mm	132322/1745	20M QPSK 1RB@0	0.074	0.041	18.15	19.00	0.090	Battery 1#	/
Main	Top side	10mm	132322/1745	20M QPSK 1RB@0	0.302	0.163	18.15	19.00	0.367	Battery 1#	/
Main	Front side	10mm	132322/1745	20M QPSK 50%RB@50	0.147	0.083	18.20	19.00	0.177	Battery 1#	/
Main	Back side	10mm	132322/1745	20M QPSK 50%RB@50	0.314	0.172	18.20	19.00	0.378	Battery 1#	/
Main	Left side	10mm	132322/1745	20M QPSK 50%RB@50	0.070	0.039	18.20	19.00	0.084	Battery 1#	/
Main	Top side	10mm	132322/1745	20M QPSK 50%RB@50	0.317	0.171	18.20	19.00	0.381	Battery 1#	/
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.362	0.194	18.15	19.00	0.440	Battery 2#	/
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.367	0.196	18.15	19.00	0.446	Battery 3#	/
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.351	0.188	18.15	19.00	0.427	Battery 4#	/
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.354	0.191	18.15	19.00	0.431	With SIM2	/

Table 60: Hotspot SAR test results of LTE Band 66

Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Conducted Power (dBm)
Main	Front side	10mm	132322/1745	20M QPSK 1RB@0	0.153	0.087	18.15
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	**0.384**	0.203	18.15
Main	Left side	10mm	132322/1745	20M QPSK 1RB@0	0.074	0.041	18.15
Main	Top side	10mm	132322/1745	20M QPSK 1RB@0	0.302	0.163	18.15
Main	Front side	10mm	132322/1745	20M QPSK 50%RB@50	0.147	0.083	18.20
Main	Back side	10mm	132322/1745	20M QPSK 50%RB@50	0.314	0.172	18.20
Main	Left side	10mm	132322/1745	20M QPSK 50%RB@50	0.070	0.039	18.20
Main	Top side	10mm	132322/1745	20M QPSK 50%RB@50	0.317	0.171	18.20
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.362	0.194	18.15
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.367	0.196	18.15
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.351	0.188	18.15
Main	Back side	10mm	132322/1745	20M QPSK 1RB@0	0.354	0.191	18.15

Table 61: Product Specific 10-g SAR test reduction evaluation of LTE Band 66

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

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7.2.13 SAR measurement Results of 2.4G Wi-Fi

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Duty Cycle	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Core0	Left cheek	/	6/2437	802.11b	**0.093**	0.043	99%	10.56	11.50	**0.111**	Battery 1#	Plot
Core0	Left tilt	/	6/2437	802.11b	0.069	0.035	99%	10.56	11.50	0.082	Battery 1#	/
Core0	Right cheek	/	6/2437	802.11b	0.041	0.024	99%	10.56	11.50	0.049	Battery 1#	/
Core0	Right tilt	/	6/2437	802.11b	0.001	0.001	99%	10.56	11.50	0.001	Battery 1#	/
Core0	Left cheek	/	6/2437	802.11n(40M)	0.077	0.039	95%	9.81	11.50	0.095	Battery 1#	/
Core0	Left tilt	/	6/2437	802.11n(40M)	0.044	0.023	95%	9.81	11.50	0.055	Battery 1#	/
Core0	Right cheek	/	6/2437	802.11n(40M)	0.001	0.001	95%	9.81	11.50	0.001	Battery 1#	/
Core0	Right tilt	/	6/2437	802.11n(40M)	0.001	0.001	95%	9.81	11.50	0.001	Battery 1#	/
Core0	Left cheek	/	6/2437	802.11b	0.092	0.058	99%	10.56	11.50	0.093	Battery 2#	/
Core0	Left cheek	/	6/2437	802.11b	0.084	0.043	99%	10.56	11.50	0.085	Battery 3#	/
Core0	Left cheek	/	6/2437	802.11b	0.087	0.045	99%	10.56	11.50	0.088	Battery 4#	/

Table 62: Head SAR test results of 2.4G Wi-Fi

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Duty Cycle	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Core0	Front side	15mm	6/2437	802.11b	0.088	0.047	99%	18.29	19.00	0.089	Battery 1#	/
Core0	Back side	15mm	6/2437	802.11b	**0.135**	0.069	99%	18.29	19.00	**0.161**	Battery 1#	Plot
Core0	Back side	15mm	6/2437	802.11b	0.094	0.049	99%	18.29	19.00	0.112	Battery 2#	/
Core0	Back side	15mm	6/2437	802.11b	0.116	0.061	99%	18.29	19.00	0.138	Battery 3#	/
Core0	Back side	15mm	6/2437	802.11b	0.117	0.062	99%	18.29	19.00	0.139	Battery 4#	/

Table 63: Body Worn SAR test results of 2.4G Wi-Fi

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Duty Cycle	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Core0	Front side	10mm	6/2437	802.11b	0.156	0.081	99%	18.29	19.00	0.186	Battery 1#	/
Core0	Back side	10mm	6/2437	802.11b	**0.306**	0.145	99%	18.29	19.00	**0.364**	Battery 1#	Plot
Core0	Right side	10mm	6/2437	802.11b	0.201	0.094	99%	18.29	19.00	0.239	Battery 1#	/
Core0	Back side	10mm	6/2437	802.11b	0.211	0.106	99%	18.29	19.00	0.251	Battery 2#	/
Core0	Back side	10mm	6/2437	802.11b	0.207	0.102	99%	18.29	19.00	0.246	Battery 3#	/
Core0	Back side	10mm	6/2437	802.11b	0.193	0.096	99%	18.29	19.00	0.230	Battery 4#	/

Table 64: Hotspot SAR test results of 2.4G Wi-Fi

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Per KDB648474 D04, when hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold:

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Duty Cycle	Conducted Power (dBm)	Max Power Without Reduction	Scaled-up 1-g SAR (W/kg)	Product Specific 10-g SAR Exclusion
Core0	Front side	10mm	6/2437	802.11b	0.156	0.081	99%	18.29	19	0.184	Yes
Core0	Back side	10mm	6/2437	802.11b	**0.306**	0.145	99%	18.29	19	0.360	Yes
Core0	Right side	10mm	6/2437	802.11b	0.201	0.094	99%	18.29	19	0.237	Yes
Core0	Back side	10mm	6/2437	802.11b	0.211	0.106	99%	18.29	19	0.248	Yes
Core0	Back side	10mm	6/2437	802.11b	0.207	0.102	99%	18.29	19	0.244	Yes
Core0	Back side	10mm	6/2437	802.11b	0.193	0.096	99%	18.29	19	0.227	Yes

Table 65: Product Specific 10-g SAR test reduction evaluation of 2.4G Wi-Fi

Note: According to the table above, Product Specific 10-g SAR test is not required for this frequency band.

7.2.14 SAR measurement Results of BT

Antenna	Test Position	Dist.	Test Channel/Freq.(MHz)	Test Mode	Measured 1-g SAR (W/kg)	Measured 10-g SAR (W/kg)	Duty Cycle	Conducted Power (dBm)	Tune-up Power (dBm)	Reported 1-g SAR (W/kg)	Accessory Information	Note
Ant1	Left cheek	/	39/2441	DH5	**0.044**	0.018	77%	9.85	11.00	**0.074**	Battery 1#	Plot
Ant1	Left tilt	/	39/2441	DH5	0.001	0.001	77%	9.85	11.00	0.001	Battery 1#	/
Ant1	Right cheek	/	39/2441	DH5	0.001	0.001	77%	9.85	11.00	0.001	Battery 1#	/
Ant1	Right tilt	/	39/2441	DH5	0.001	0.001	77%	9.85	11.00	0.001	Battery 1#	/
Ant1	Left cheek	/	39/2441	DH5	0.041	0.016	77%	9.85	11.00	0.069	Battery 2#	/
Ant1	Left cheek	/	39/2441	DH5	0.040	0.020	77%	9.85	11.00	0.068	Battery 3#	/
Ant1	Left cheek	/	39/2441	DH5	0.042	0.021	77%	9.85	11.00	0.071	Battery 4#	/

Table 66: Head SAR test results of BT

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7.3 Multiple Transmitter Evaluation

The detailed location of the Tx antennas inside the device refers to Appendix.

The list information of following tables which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498 D01 General RF Exposure Guidance.

Antenna	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
Ant0: Second an-LB	YES	YES	YES	NO	NO	YES
Ant1: Second ant-MHB	YES	YES	NO	YES	NO	YES
Ant2: Main ant-LMHB	YES	YES	YES	NO	YES	NO
Ant4: 2.4G Wi-Fi Core0, BT Ant1	YES	YES	NO	YES	NO	NO

Table 67: Sides for Hotspot/ Product specific 10g SAR testing

Note:

1) Per KDB 648474 D04, because the diagonal distance of this device is ≥160mm,so it is a phablet.

2) Per KDB 941225 D06 and KDB 648474 D04, particular DUT edges were not required to be evaluated for Hotspot SAR if the antenna-to-edge distance is greater than 2.5cm.

3) Ant0 and Ant1 only support receiving signal.

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7.3.1 Stand-alone SAR test exclusion

Per FCC KDB 447498 D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-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

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Mode	Position	P_{max} (dBm) *	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
BT	Body-worn	11.00	12.59	15	2.441	1.31	3.00	Yes
BT	Hotspot	11.00	12.59	10	2.441	1.97	3.00	Yes

Table 68: Standalone SAR test exclusion for BT

Note:

1)* - maximum possible output power declared by manufacturer

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm,where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Per KDB 447498 D01, the approximate SAR values were estimated at selected frequencies, test separation distances and power levels for determining simultaneous transmission SAR test exclusion when standalone SAR is not required.

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/kg)*
BT	Body-worn	11.00	12.59	15	2.480	7.50	0.175
BT	Hotspot	11.00	12.59	10	2.441	7.50	0.262

Table 69: Estimated SAR calculation for BT

Note:

1) * - maximum possible output power declared by manufacturer

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7.3.2 Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities are as below:

NO.	Simultaneous TX Combination	Head	Body
1	GSM/UMTS/LTE + BT	Yes	Yes
2	GSM/UMTS/LTE + 2.4G Wi-Fi	Yes	Yes

Table 70: Simultaneous Transmission Possibilities

Note:

1) 2.4G Wi-Fi can’t transmit simultaneously with Bluetooth.
2) The device does not support DTM function.
3) VoLTE or pre-installed VOIP applications are considered.
4) The device supports Vo-Wi-Fi function.

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7.3.3 SAR Summation Scenario

The Max ΣSAR is calculated as below table. The color grounding SAR test data in the following summed SAR tables represent that the additional SAR test results in simultaneous transmission fixed power reduction scenario are used to ensure simultaneous transmission SAR test exclusion. For the other SAR test data in the summed SAR tables, the more conservative stand-alone SAR test results are used.

Band	Head				Body-worn		Hotspot						Product Specific 10-g					
	Left cheek	Left tilt	Right cheek	Right tilt	Front side	Back side	Front side	Back side	Left side	Right side	Top side	Bottom side	Front side	Back side	Left side	Right side	Top side	Botto m side
GSM850	0.320	0.287	0.434	0.750	0.085	0.118	0.147	0.273	0.127	/	0.138	/	/	/	/	/	/	/
PCS 1900	0.358	0.522	0.752	0.584	0.170	0.294	0.163	0.270	0.066	/	0.331	/	/	/	/	/	/	/
UMTS B2	0.374	0.587	0.496	0.813	0.196	0.356	0.173	0.304	0.068	/	0.424	/	/	/	/	/	/	/
UMTS B4	0.393	0.604	0.569	0.878	0.295	0.727	0.289	0.644	0.157	/	0.644	/	/	/	/	/	2.544	/
UMTS B5	0.480	0.426	0.866	0.671	0.144	0.194	0.235	0.422	0.213	/	0.249	/	/	/	/	/	/	/
LTE B2	0.270	0.414	0.354	0.555	0.201	0.351	0.123	0.218	0.059	/	0.300	/	/	/	/	/	/	/
LTE B5	0.413	0.384	0.829	0.619	0.141	0.188	0.209	0.355	0.207	/	0.225	/	/	/	/	/	/	/
LTE B7	0.330	0.486	0.364	0.650	0.163	0.241	0.042	0.158	0.046	/	0.294	/	/	/	/	/	/	/
LTE B13	0.504	0.453	0.744	0.794	0.181	0.233	0.195	0.445	0.236	/	0.183	/	/	/	/	/	/	/
LTE B26	0.319	0.296	0.425	0.438	0.138	0.177	0.192	0.429	0.170	/	0.197	/	/	/	/	/	/	/
LTE B38	0.398	0.479	0.403	0.560	0.188	0.206	0.215	0.263	0.058	/	0.593	/	/	/	/	/	/	/
LTE B66	0.486	0.745	0.698	1.018	0.275	0.645	0.186	0.467	0.090	/	0.381	/	/	/	/	/	/	/
Max SAR	0.504	0.745	0.866	1.018	0.295	0.727	0.289	0.644	0.236	/	0.644	/	/	/	/	/	2.544	/

Table 71: Maximum SAR of 2/3/4G Main antenna

Band/Ant	Case	Head				Body-worn		Hotspot						Product Specific 10-g					
		Left cheek	Left tilt	Right cheek	Right tilt	Front side	Back side	Front side	Back side	Left side	Right side	Top side	Bottom side	Front side	Back side	Left side	Right side	Top side	Bottom side
Wi-Fi&BT	1	0.151	0.082	0.049	0.001	0.175	0.175	0.262	0.364	/	0.262	/	/	/	/	/	/	/	/
2/3/4G	2	0.504	0.745	0.866	1.018	0.295	0.727	0.289	0.644	0.236	/	0.644	/	/	/	/	/	2.544	/
Simultaneous Transmission SAR	1+2	0.655	0.827	0.915	**1.019**	0.470	0.902	0.551	1.008	0.236	0.262	0.644	/	/	/	/	/	2.544	/

Table 72: Maximum SAR of 2/3/4G Simultaneous Transmission with Wi-Fi/BT.

Note:

1) The SAR test data of some frequency bands in the summed SAR tables, the more conservative SAR test results at the maximum output power level without any simultaneous transmission power reduction are used.

7.3.4 Simultaneous Transmission Conclusion

The above numeral summed SAR results is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore simultaneous transmission SAR with Volume Scans is not required per KDB 447498 D01.

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Appendix A. System Check Plots
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-A, total: 17 pages)

Appendix B. SAR Measurement Plots
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-B, total: 42 pages)

Appendix C. Conducted Power Test Results
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-C, total: 103 pages)

Appendix D. Conducted power test results for certain power reduction mechanisms validation
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-D, total: 1 page)

Appendix E. Calibration Certificate
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-E, total: 96 pages)

Appendix F. Photo Documentation
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-F, total: 8 pages)

Appendix G. Antenna Location
(Please See Appendix No.: SYBH(Z-SAR)20220105022001-G, total: 1 page)

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