FCC SAR Compliance Test Report

Product Name:	Smart Phone
Model:	HUAWEI MLA-L11, MLA-L11, HUAWEI MLA-L01, MLA-L01
Report No.:	SYBH(Z-SAR)044052016-2
FCC ID	QISMLA-LX1

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DATE	2016-07-13	2016-07-13

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※ ※ Notice ※ ※

1. The laboratory has passed the accreditation by China National Accreditation Service for Conformity Assessment (CNAS). The accreditation number is L0310.

2. The laboratory has passed the accreditation by The American Association for Laboratory Accreditation (A2LA). The accreditation number is 2174.01 & 2174.02 & 2174.03

3. The laboratory (Reliability Lab of Huawei Technologies Co., Ltd) is also named “Global Compliance and Testing Center of Huawei Technologies Co., Ltd”, the both names have coexisted since 2009.

4. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.

5. The test report is invalid if there is any evidence of erasure and/or falsification.

6. The test report is only valid for the test samples.

7. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory

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※ ※ Modified History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	2016-07-13	Pan Man

1 General Information

1.1 Statement of Compliance

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

Band	Max Reported SAR(W/kg)			
	1-g Head SAR	1-g Body-worn SAR (15mm) *	1-g Hotspot SAR (10mm)	Product Specific 10-g SAR (0mm)**
GSM850	1.10	0.31	0.81	/
GSM1900	1.23	0.27	1.31	1.71
LTE Band VII	**1.29**	**0.37**	0.90	**3.39**
LTE Band XXXVIII	0.78	0.29	**1.35**	2.67
WiFi 2.4G	0.50	0.24	0.40	/
BT	/	/	/	/
The highest simultaneous SAR value is 1.53 W/kg per KDB690783 D01				

Table 1:Summary of test result

Note:

1)* For body worn operation, this device has been tested and meets 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 operation, this device has been tested and meets the 10-g SAR limits of 4.0 W/kg for general population/ uncontraolled exposure according to ANSI C95.1:1992/IEEE C95.1:1991 and Industry Canada Radio Standards Specification RSS-102.

The device is in compliance with Specific Absorption Rate（SAR）for general population/uncontraolled 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, according to the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

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.

1.3 EUT Description

Device Information：			
Product Name:	Smart Phone		
Model:	HUAWEI MLA-L11, MLA-L11, HUAWEI MLA-L01, MLA-L01		
FCC ID :	QISMLA-LX1		
IMEI:	1#:861348030000815 2#:861348030001771 3#:861348030001078 4#:861348030002084 5#:861348030020904		
Device Type :	Portable device		
Device Phase:	Identical Prototype		
Exposure Category:	Uncontrolled environment / general population		
Hardware Version :	HL1MLAL01M		
Software Version :	MLA-L11C900B055 MLA-L01C900B055		
Antenna Type :	Internal antenna		
Others Accessories	Headset		
Device Operating Configurations:			
Supporting Mode(s)	GSM850/1900,LTE Band VII/XXXVIII, WiFi 2.4G, BT, NFC		
Test Modulation	GSM(GMSK/8PSK), LTE(QPSK/16QAM), WiFi(DSSS/OFDM),BT(GFSK)		
Device Class	B		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	LTE Band VII	2500 -2570	2620 -2690
	LTE Band XXXVIII	2570-2620	2570-2620
	BT	2402-2480	
	WiFi 2.4G	2412-2462	
	NFC	13.56	
GPRS Multislot Class	12		
EGPRS Multislot Class	12		
Power Class:	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control all Max.(LTE Band VII)		
	3, tested with power control all Max.(LTE Band XXXVIII)		

Test Channels (low-mid-high):	128-190-251(GSM850)
	512-661-810(GSM1900)
	20775-21100-21425(LTE Band VII BW=5MHz)
	20800-21100-21400(LTE Band VII BW=10MHz)
	20825-21100-21375(LTE Band VII BW=15MHz)
	20850-21100-21350(LTE Band VII BW=20MHz)
	37775-38000-38225(LTE Band XXXVIII BW=5MHz)
	37800-38000-38200(LTE Band XXXVIII BW=10MHz)
	37825-38000-38175(LTE Band XXXVIII BW=15MHz)
	37850-38000-38150(LTE Band XXXVIII BW=20MHz)
	802.11b/g/n 20M:1-6-11 (WiFi 2.4G)

Table 3:Device information and operating configuration

Note: HUAWEI MLA-L11, MLA-L11 is dual SIM smart phone. SIM1 supports GSM&UMTS&LTE. SIM2 only supports GSM and UMTS(Voice).

1.3.1 General Description

HUAWEI MLA-L11, MLA-L11 is subscriber equipment in the GSM/WCDMA/LTE system. The GSM frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. The UMTS frequency band is B1 and B8. The LTE frequency band is B1 and B3 and B7 and B8 and B20 and B38. But only GSM850 and GSM1900MHz and LTE B7 and B38 bands test data included in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/HSPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS, AGPS, NFC and WIFI etc. Externally it provides one micro SD card interface (it can also used as SIM card interface), earphone port (to provide voice service) and one SIM card interface. HUAWEI MLA-L11, MLA-L11 is dual 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.

The mobile phone MLA-L01 and MLA-L11 are LTE/UMTS mobile phone with Bluetooth.The differences between MLA-L01 and MLA-L11 are showed in the following table. MLA-L01 delete one SIM by software. Other parts of the mobile phone are the same, including the appearance, the antenna, Chipset,Bluetooth mode, Wifi mode, Adapter, Battery, Mainboard and so on:

	MLA-L01	MLA-L11
GSM four bands	B2/B3/B5/B8	B2/B3/B5/B8
WCDMA bands	B1/B8	B1/B8
LTE bands	B1/B3/B7/ B8/B20/B38	B1/B3/B7/ B8/B20/B38
FCC bands	GSM850/1900,LTE B7 /B38	GSM850/1900,LTE B7 /B38
SIM card	One	Two
NFC	the same	the same
External camera	the same	the same
internal camera	the same	the same
FLASH	the same	the same
Mainboard	the same	the same
PCB layout	the same	the same
Appearance	the same	the same
Bluetooth mode	the same	the same
WLAN mode	the same	the same
BT/ WLAN antenna	the same	the same
GSM/ WCDMA /LTE antenna	the same	the same
Adapter	the same	the same
Battery	the same	the same
Chipset	the same	the same
Memory	the same	the same
RF Parameter	The same RF Parameter in the same band	The same RF Parameter in the same band
Dimension	the same	the same
Main Frequency NV	The same NV in the same band	The same NV in the same band except LTE B1 antenna 2

According to the difference description above,full SAR test is performed on HUAWEI MLA-L11, MLA-L11. HUAWEI MLA-L01, MLA-L01 shares the same test data of HUAWEI MLA-L11, MLA-L11.

Battery information:

Name	Manufacture	Serials number	Description
Rechargeable Li-ion	Sunwoda Electronic Co., LTD	NA	Battery Model: HB386483ECW+ Rated capacity: 3270 mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V
Rechargeable Li-ion	SCUD (FUJIAN) Electronics Co., Ltd	NA	Battery Model: HB386483ECW+ Rated capacity: 3270 mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V
Rechargeable Li-ion	(sony) Huizhou Desay Battery Co., Ltd	NA	Battery Model: HB386483ECW+ Rated capacity: 3270 mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V
Rechargeable Li-ion	Harbin Coslight Power Co., Ltd.	NA	Battery Model: HB386483ECW+ Rated capacity: 3270 mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V

1.3.2 Dynamic antenna switching specification

The device has two 2G/3G/4G Tx antennas (Main Antenna and Second Antenna). It can transmit from either Main Antenna or Second Antenna, but they can not transmit simultaneously.

SAR test procedure for dynamic antenna switching is as below (Refer to Section 7 for details):
The Main Antenna and Second Antenna are set to the MAX transmit power level respectively and test the SAR respectively in all applicable RF exposure conditions. Some AT commands are supplied to fix the operation state and choose the antenna so that only one TX antenna is chosen and tested at a time. All independent antennas will be completely covered by the appropriate SAR measurements and all simultaneous transmission possibilities will be fully considered to ensure SAR compliance.

1.3.3 Power reduction specification

This device uses a single fixed level of power reduction through static table look-up for SAR compliance and it is triggered by a single event or operation:
1) A fixed level power reduction is applied for some 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 frequency bands when simultaneously transmitting with the other antennas in certain simultaneous transmission conditions. The standalone SAR compliance still uses the standalone SAR results tested at the maximum output power level without any power reduction.

3) This device uses an infrared proximity sensor to facilitate triggering in typical user interactivity with the device. The proximity sensor locates on the front face of the device. Due to the operating configurations and exposure conditions required by the device, the proximity sensor is used to indicate when the phone is held close to a user's ear exposure condition. It utilizes the proximity sensor to reduce the output power of second antenna and WiFi antenna in held-to-ear scenario.(Refer to Section 6.5 for detail procedures for determining proximity sensor coverage, distance and angle per KDB 616217).

The following tables summerize the key power reduction information.The detailed full power and reduced tune-up specifications and conducted power measurement results are provided in Section 7 of this report.

Band	Power Reduction (dB)	
	second ant + sensor on	second ant + sensor off
GSM850	3.0	0

Table 4:2G&3G&4G second ant only transmit Power Reduction

Band	Power Reduction (dB)	
	second ant +WiFi station + sensor on	second ant +WiFi station + sensor off
GSM 850	3.0	0

Table 5:2G&3G&4G second ant +WiFi ant transmit simultaneously Power Reduction

Band	Power Reduction (dB)	
	Main ant +WiFi hotspot on	Main ant +WiFi hotspot off
LTE B7	3.5	0

Table 6:2G&3G&4G main ant +WiFi ant transmit simultaneously Power Reduction

Band	Power Reduction (dB)	
	second ant/ main ant + WiFi station+ sensor on	second ant/ main ant +Wi-Fi station + sensor off
WiFi 2.4G 802.11b	7	0
WiFi 2.4G 802.11g	5	0
WiFi 2.4G 802.11n	3	0

Table 7: WiFi ant + 2G&3G&4G transmit simultaneously Power Reduction

1.3.4 Downlink LTE CA additional specification

The device supports downlink Release 10 LTE Carrier Aggregation (CA) only. It supports a maximum of 2 carriers in the downlink. Other Release 10 features are not supported, including Uplink Carrier Aggregation, Enhanced SC-FDMA and Uplink MIMO or other antenna diversity configurations etc. All uplink communications are identical to the Release 8 Specifications.

The possible downlink LTE CA combinations supported by this device are as below tables per 3GPP TS 36.101 V12.8.0. The conducted power measurement results of downlink LTE CA are provided in Section 7.1 of this report per 3GPP TS 36.521-1 V12.6.0. According to KDB 941225 D05A, the downlink LTE CA SAR test is not required and PAG requirements can be excluded.

intra-band contiguous CA (per 3GPP TS 36.101 V12.8.0 Table 5.6A.1-1)

E-UTRA CA configuration	Component carriers in order of increasing carrier frequency		Maximum aggregated bandwidth [MHz]	Bandwidth combination set
	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_7C	15	15	40	0
	20	20		
	10	20		
	15	15, 20	40	1
	20	10, 15, 20		

inter-band CA (per 3GPP TS 36.101 V12.8.0 Table 5.6A.1-2)

E-UTRA CA configuration / Bandwidth combination set									
E-UTRA CA Configuration	E-UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth [MHz]	Bandwidth combination set
CA_3A-7A	3			Yes	Yes	Yes	Yes	40	0
	7				Yes	Yes	Yes		
CA_7A-20A	7				Yes	Yes	Yes	30	0
	20			Yes	Yes				
	7				Yes	Yes	Yes	40	1
	20			Yes	Yes	Yes	Yes		

Note:
1) For the inter-band CA combinations, the listed bands above can be used as PCC or SCC.
2) The channel spacing and aggregated channel bandwidth for CA are identical to the associated specification in 3GPP TS 36.101 V12.8.0.
3) The reference test frequencies for CA refers to 3GPP TS 36.508 V12.5.0.

1.4 Test specification(s)

ANSI C95.1:1992	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.(IEEE Std C95.1-1991)
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
RSS-102	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands (Issue 5 of March 2015)
KDB941225 D01	3G SAR Procedures v03r01
KDB941225 D05	SAR for LTE Devices v02r05
KDB941225 D05A	LTE Rel.10 KDB Inquiry Sheet v01
KDB941225 D06	Hotspot SAR v02r01
KDB447498 D01	General RF Exposure Guidance v06
KDB616217 D04	SAR for laptop and tablets v01r02
KDB648474 D04	Handsets SAR v01r03
KDB248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB865664 D01	SAR measurement 100 MHz to 6 GHz v01r04
KDB865664 D02	SAR Reporting v01r02
KDB690783 D01	SAR Listings on Grants v01r03

1.5 Testing laboratory

Test Site	The Reliability Laboratory of Huawei Technologies Co., Ltd.
Test Location	Section G1,Huawei Base Bantian, Longgang District, Shenzhen 518129, P.R. China
Telephone	+86 755 28780808
Fax	+86 755 89652518
State of accreditation	The Test laboratory (area of testing) is accredited according to ISO/IEC 17025. CNAS Registration number: L0310 A2LA TESTING CERT 2174.01 & 2174.02 & 2174.03

1.6 Applicant and Manufacturer

Company Name	HUAWEI TECHNOLOGIES CO., LTD
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

1.7 Application details

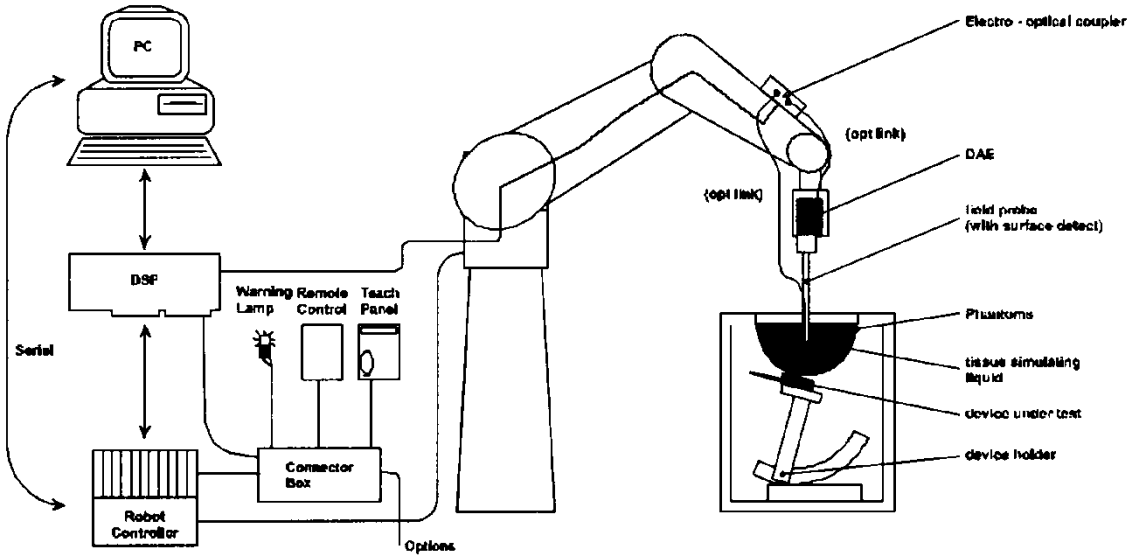
Start Date of test	2016-05-20
End Date of test	2016-06-05

1.8 Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%

2 SAR Measurement System

2.1 SAR Measurement Set-up



The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).

- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7.
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System check dipoles allowing to validate the proper functioning of the system.

2.2 Test environment

The DASY5 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. Above the test system a 1.5 x 1.5 m² array of pyramid absorbers is installed to reduce reflections from the ceiling.
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 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-converte 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.

DAE4

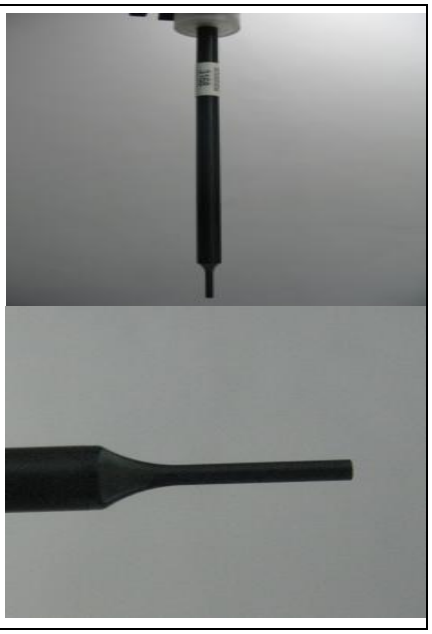
Input Impedance	200MOhm	
The Inputs	symmetrical and floating	
Common mode rejection	above 80 dB	

2.4 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.

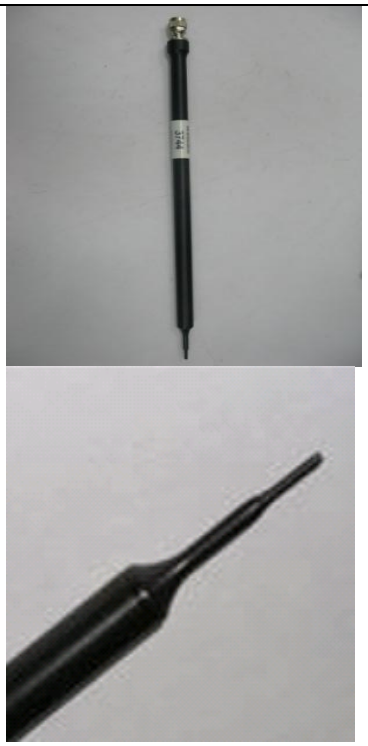
Isotropic E-Field Probe ES3DV3 for Dosimetric Measurements

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
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, e.g., DGBE)
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%

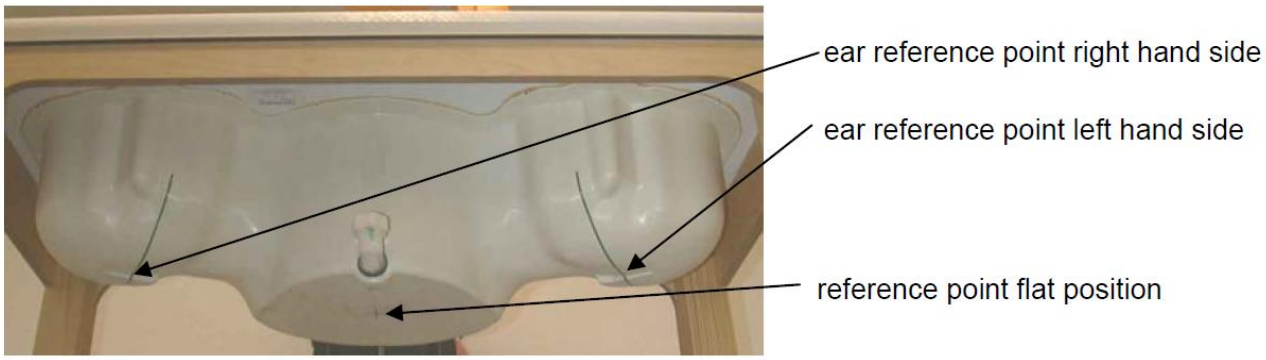


2.5 Phantom description

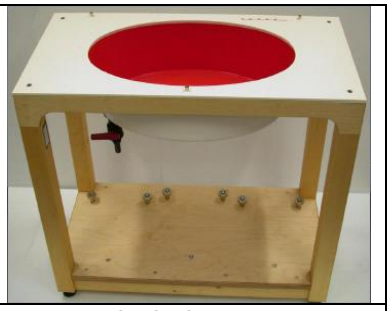
SAM Twin Phantom

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 $2 \leq \varepsilon r \leq 5$ at ≤3 GHz, $3 \leq \varepsilon r \leq 4$ at >3 GHz and and a loss tangent ⩽0.05.

2.6 Device holder description

The DASY5 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.

2.7 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	3744	2015-07-24	One year
☒	SPEAG	835MHz Dipole	D835V2	4d059	2016-04-20	Three years
☒	SPEAG	1900MHz Dipole	D1900V2	5d091	2015-09-21	Three years
☒	SPEAG	2450MHz Dipole	D2450V2	860	2015-11-25	Three years
☒	SPEAG	2600MHz Dipole	D2600V2	1021	2015-07-24	Three years
☒	SPEAG	Data acquisition electronics	DAE4	1236	2015-11-23	One year
☒	SPEAG	Software	DASY 5	N/A	NCR	NCR
☐	SPEAG	Twin Phantom	SAM1	TP-1475	NCR	NCR
☐	SPEAG	Twin Phantom	SAM2	TP-1474	NCR	NCR
☒	SPEAG	Twin Phantom	SAM3	TP-1597	NCR	NCR
☒	SPEAG	Twin Phantom	SAM4	TP-1620	NCR	NCR
☐	SPEAG	Flat Phantom	ELI 4.0	TP-1038	NCR	NCR
☐	SPEAG	Flat Phantom	ELI 4.0	TP-1111	NCR	NCR
☒	R & S	Universal Radio Communication Tester	CMU 200	111379	2015-12-23	One year
☒	R & S	Universal Radio Communication Tester	CMW 500	126855	2015-07-02	One year
☒	Agilent	Network Analyser	E5071C	MY46213349	2016-01-08	One year
☒	Agilent	Dielectric Probe Kit	85070E	2484	NCR	NCR
☒	Agilent	Signal Generator	N5181A	MY47420989	2015-10-30	One year
☒	MINI-CIRCUITS	Amplifier	ZHL-42W	QA1402001	NCR	NCR
☐	MINI-CIRCUITS	Amplifier	ZVE-8G+	N523101139	NCR	NCR
☒	AR	Directional Coupler	DC7144M1	31190	2016-05-13	One year
☐	Agilent	Dual Directional Coupler	772D	MY52180173	2016-01-06	One year
☒	R & S	Power Meter	NRP	100740	2015-07-02	One year
☒	R & S	Power Meter Sensor	NRP-Z11	106288	2015-07-02	One year
☒	Agilent	Power Meter	E4417A	MY45101339	2016-01-06	One year
☒	Agilent	Power Meter Sensor	E9321A	MY44420359	2016-01-06	One year

Note:
1) Per KDB865664D01 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 Appendix C.
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 equipments are within the valid period when the tests are performed.

3 SAR Measurement Procedure

3.1 Scanning procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.

- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension(≤2GHz)，12 mm in x- and y-dimension(2-4 GHz) and 10mm in x- and y- dimension(4-6GHz). If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.
  Results of this coarse scan are shown in Appendix B.

- A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine grid with maximum scan spatial resolution: Δx_{zoom}, Δy_{zoom}≤ 2GHz - ≤8mm, 2-4GHz - ≤5 mm and 4-6 GHz-≤4mm; Δz_{zoom} ≤3GHz - ≤5 mm, 3-4 GHz- ≤4mm and 4-6GHz-≤2mm where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in Appendix B. Test results relevant for the specified standard (see chapter 1.4.)are shown in table form form in chapter 7.2.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2 mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth. A z-axis scan of the measurement with maximum SAR value is shown in Appendix B.

The following table summarizes the area scan and zoom scan resolutions per FCC KDB 865664D01:

Frequency	Maximun Area Scan resolution (Δx_{area}, Δy_{area})	Maximun Zoom Scan spatial resolution (Δx_{Zoom}, Δy_{Zoom})	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤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

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

DASY5 uses the advanced extrapolation option which is able to compansate boundary effects on E-field probes.

3.3 Data Storage and Evaluation

Data Storage

The DASY5 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 "DAE4". 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 DASY5 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

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

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.

The following materials are used for producing the tissue-equivalent materials.

Ingredients (% of weight)	**Head Tissue**						
Frequency Band (MHz)	750	**835**	1750	**1900**	2300	**2450**	**2600**
Water	39.2	41.45	52.64	55.242	62.82	62.7	55.242
Salt (NaCl)	2.7	1.45	0.36	0.306	0.51	0.5	0.306
Sugar	57.0	56.0	0.0	0.0	0.0	0.0	0.0
HEC	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	47.0	44.542	36.67	36.8	44.452
Ingredients (% of weight)	**Body Tissue**						
Frequency Band (MHz)	750	**835**	1750	**1900**	2300	**2450**	**2600**
Water	50.3	52.4	69.91	69.91	73.32	73.2	64.493
Salt (NaCl)	1.60	1.40	0.13	0.13	0.06	0.04	0.024
Sugar	47.0	45.0	0.0	0.0	0.0	0.0	0.0
HEC	0.0	1.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	29.96	29.96	26.62	26.7	32.252

Table 8: Tissue Dielectric Properties

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16MΩ+ resistivity
HEC: Hydroxyethyl Cellulose; DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

☐**Simulating Head Liquid for 5G(HBBL3500-5800MHz), Manufactured by SPEAG:**

Ingredients	(% by weight)
Water	50-65%
Mineral oil	10-30%
Emulsifiers	8-25%
Sodium salt	0-1.5%

☐**Simulating Body Liquid for 5G(MBBL3500-5800MHz),Manufactured by SPEAG:**

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

Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Deviation (Within +/-5%)		Liquid Temp.	Test Date
		εr	σ (S/m)	εr	σ (S/m)	$\Delta\varepsilon_r$	Δσ		
835H	825	41.60	0.90	42.50	0.887	2.16%	-1.50%	21.8°C	2016/05/26
	835	41.50	0.90	42.41	0.893	2.19%	-0.73%		
	850	41.50	0.92	42.23	0.905	1.76%	-1.68%		
835B	825	55.20	0.97	56.00	0.994	1.45%	2.47%	21.4°C	2016/05/26
	835	55.20	0.97	55.89	1.004	1.25%	3.51%		
	850	55.20	0.99	55.74	1.019	0.98%	2.93%		
1900H	1850	40.00	1.40	39.77	1.354	-0.57%	-3.29%	21.4°C	2016/05/20
	1880	40.00	1.40	39.65	1.385	-0.88%	-1.07%		
	1900	40.00	1.40	39.57	1.406	-1.08%	0.43%		
	1910	40.00	1.40	39.51	1.416	-1.23%	1.14%		
1900B	1850	53.30	1.52	51.54	1.490	-3.30%	-1.97%	21.4°C	2016/05/25
	1880	53.30	1.52	51.43	1.523	-3.51%	0.20%		
	1900	53.30	1.52	51.38	1.546	-3.60%	1.71%		
	1910	53.30	1.52	51.35	1.558	-3.66%	2.50%		
2450H	2410	39.30	1.76	40.36	1.775	2.70%	0.85%	21.4°C	2016/06/03
	2435	39.20	1.79	40.27	1.802	2.73%	0.67%		
	2450	39.20	1.80	40.21	1.818	2.58%	1.00%		
	2460	39.20	1.81	40.15	1.828	2.42%	0.99%		
2450B	2410	52.80	1.91	52.32	1.956	-0.91%	2.41%	21.4°C	2016/06/03
	2435	52.70	1.94	52.24	1.990	-0.87%	2.58%		
	2450	52.70	1.95	52.19	2.008	-0.97%	2.97%		
	2460	52.70	1.96	52.15	2.019	-1.04%	3.01%		
2600H	2510	39.12	1.86	40.40	1.913	3.27%	2.85%	21.4°C	2016/05/26
	2535	39.10	1.89	40.29	1.946	3.04%	2.96%		
	2560	39.00	1.92	40.19	1.978	3.05%	3.18%		
	2600	39.00	1.96	40.03	2.024	2.64%	3.27%		
2600B	2510	52.62	2.03	54.56	2.038	3.69%	0.39%	21.3°C	2016/05/28
	2535	52.59	2.07	54.45	2.071	3.54%	0.05%		
	2560	52.57	2.09	54.37	2.105	3.42%	0.72%		
	2600	52.50	2.16	54.26	2.158	3.35%	-0.09%		
2600B	2510	52.62	2.03	55.16	2.097	4.83%	3.30%	20.5°C	2016/06/01
	2535	52.59	2.07	55.07	2.128	4.72%	2.80%		
	2560	52.57	2.09	54.97	2.162	4.57%	3.44%		
	2600	52.50	2.16	54.83	2.217	4.44%	2.64%		

Table 9:Measured Tissue Parameter

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)KDB 865664 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 P1528 (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).

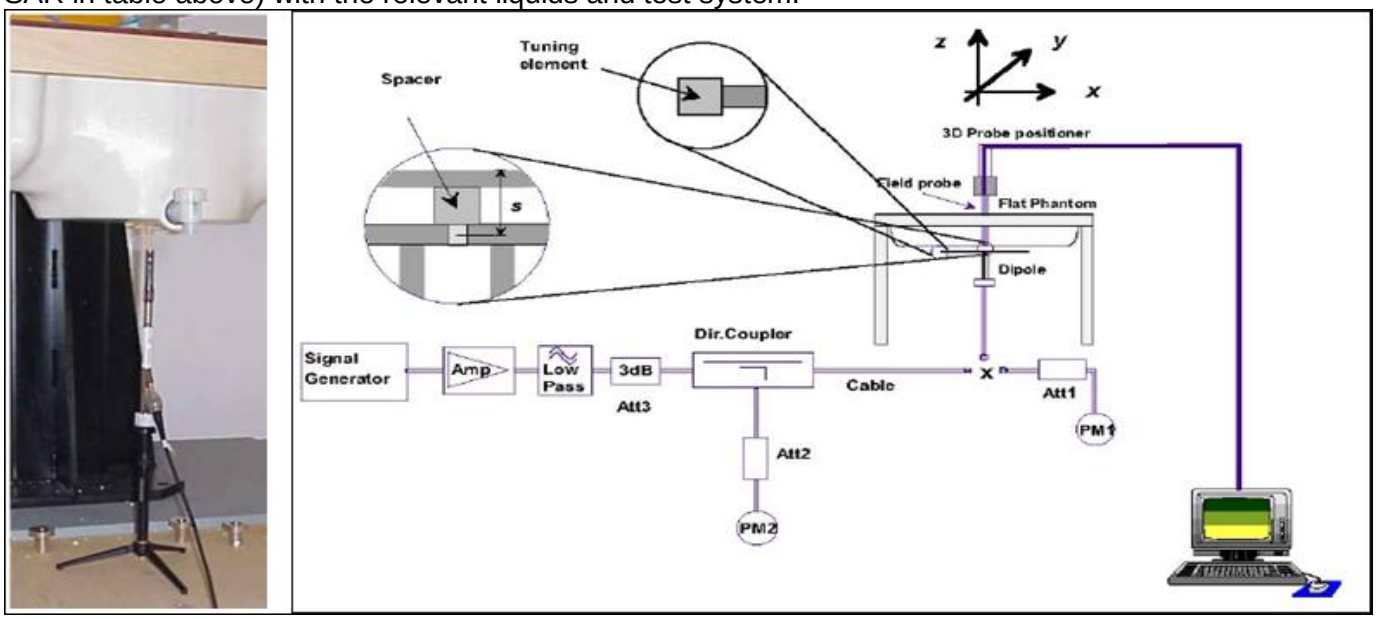
System Check	Target SAR (1W)		Measured SAR (Normalized to 1W)		Deviation (Within +/-10%)		Liquid Temp.	Test Date
	1-g (W/kg)	10-g (W/kg)	1-g (W/kg)	10-g (W/kg)	1-g (W/kg)	10-g (W/kg)		
835MHz Head	9.30	6.05	9.92	6.56	6.67%	8.43%	21.8°C	2016/05/26
1900MHz Head	40.20	21.10	42.00	21.72	4.48%	2.94%	21.4°C	2016/05/20
2450MHz Head	50.80	23.70	52.40	24.04	3.15%	1.43%	21.4°C	2016/06/03
2600MHz Head	57.80	26.30	60.00	26.76	3.81%	1.75%	21.4°C	2016/05/26
835MHz Body	9.41	6.20	9.28	6.08	-1.38%	-1.94%	21.4°C	2016/05/26
1900MHz Body	39.90	21.00	43.20	22.28	8.27%	6.10%	21.4°C	2016/05/25
2450MHz Body	51.90	24.30	51.20	23.40	-1.35%	-3.70%	21.4°C	2016/06/03
2600MHz Body	57.50	25.90	58.40	26.24	1.57%	1.31%	21.3°C	2016/05/28
2600MHz Body	57.50	25.90	62.00	27.72	7.83%	7.03%	20.5°C	2016/06/01

Table 10:System Check Results

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 SMA. It is fed with a power of 250 mW(below 5GHz) or 100mW(above 5GHz). 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 v01r04, 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 Section 7.2.

5.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04,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.

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).

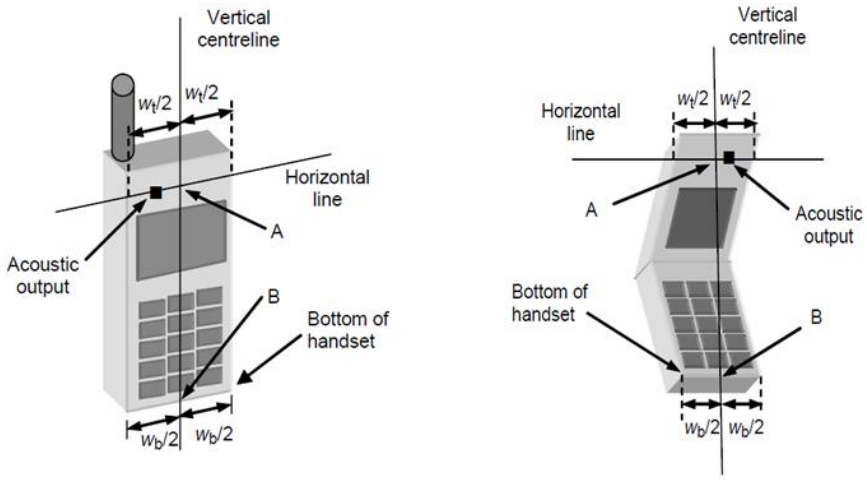


Figure 1 Hand Vertical Center & Horizontal Line Reference Points

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.

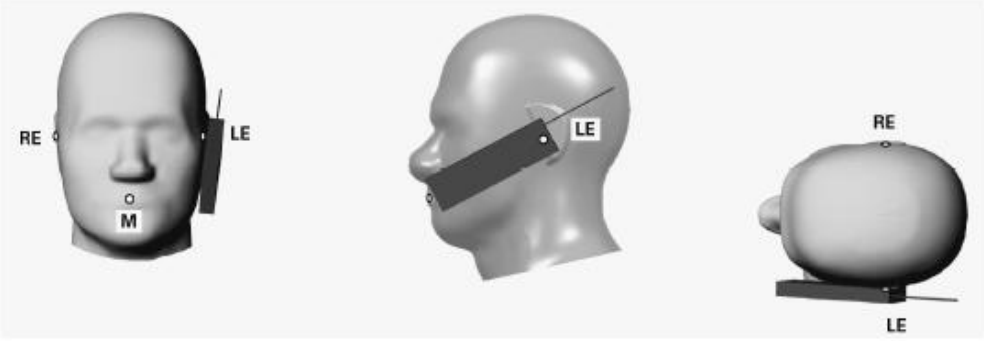


Figure 2 Front, Side and Top View of Cheek Position

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 D04v01, 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 KDB 447498 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.

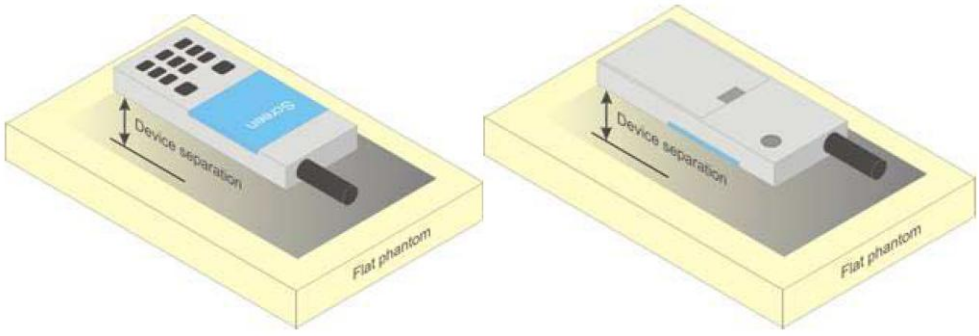


Figure 4 Test position for Body-Worn device

6.1.4 Hotspot Exposure Condition

Per FCC KDB 941225D06, 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 determine simultaneous transmission SAR test exclusion for hotspot mode; otherwise, simultaneous transmission SAR measurement is required.

6.1.5 Product Specific 10-g Exposure Condition

Per FCC KDB 648474D04, 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 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 D01v03, 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 GSM1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5”and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 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.

6.4 LTE Test Configuration

SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02r03. The CMW500 WideBand 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.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (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

3) A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by using Network Signalling 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.

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 KDB 941225 D05, 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 38 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

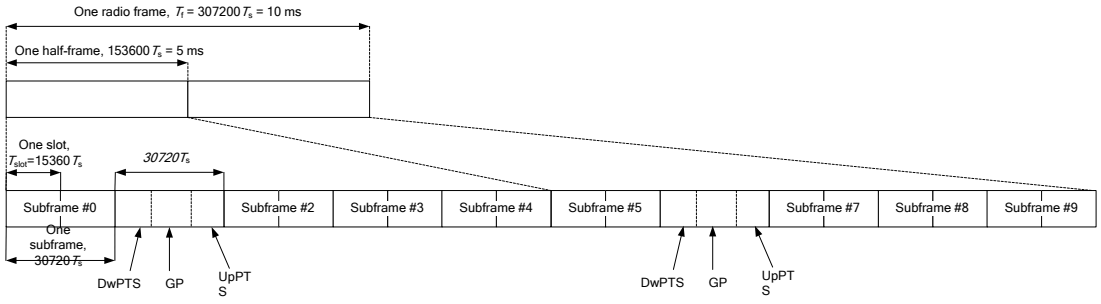


Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

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)

And we can get different Duty cycles under different configurations:

Uplink-downlink configuration	Subframe number			Configuration of special subframe							
				Normal cyclic prefix in downlink				Extended cyclic prefix in downlink			
				Normal cyclic prefix in uplink		Extended cyclic prefix in uplink		Normal cyclic prefix in uplink		Extended cyclic 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.

6.5 WiFi Test Configuration

For WiFi SAR testing, a communication link is set up with the testing software for WiFi mode test. During the test,at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The test procedures in KDB 248227D01 are applied.

6.5.1 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.

6.5.2 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 KDB 248227D01). 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.

6.5.3 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 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.

6.5.4 WiFi 2.4G 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 KDB 248227D01) 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 KDB 248227D01). 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.

C) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

6.6 Proximity sensor Test Configuration

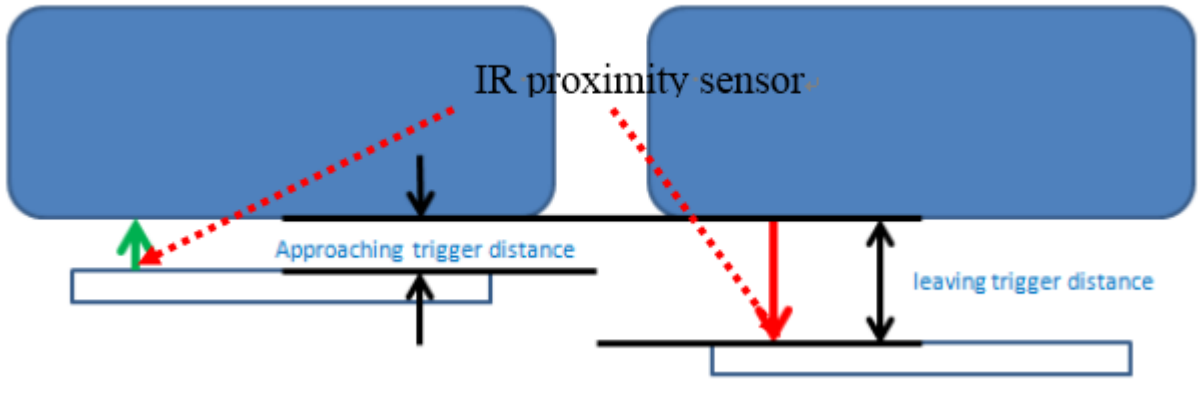
Due to the operating configurations and exposure conditions required by the device, an infrared proximity sensor is used to reduce the output power of Secodn antenna for the following scenarios:
To reduce the output power of Second antenna and WiFi antenna in held-to-ear scenario.
In this section, the following procedure is used to determine the triggering distances, coverage and tilt angle influences per FCC KDB 616217 D04 §6 and FCC guidance.

1) Procedures for determining proximity sensor triggering distances

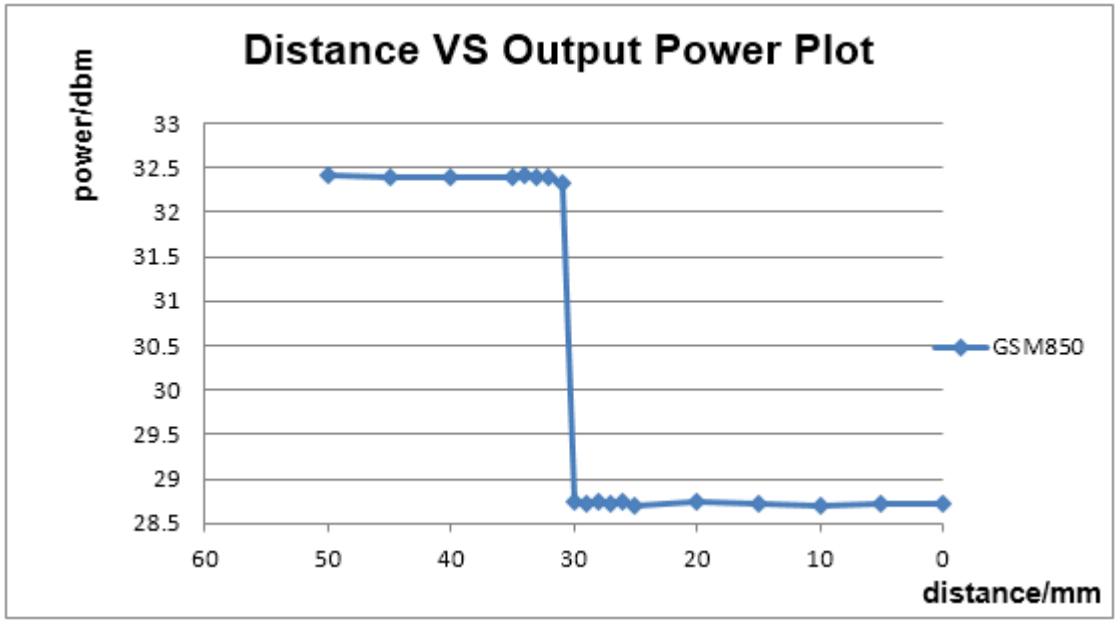
As the IR proximity sensor locates on the front face of the device and detects objects approaching only from the **front side**, so triggering distance only need to be checked for the front side.

FCC KDB 616217 D04v01§6.2, the proximity sensor triggering distance measurement results are as below:

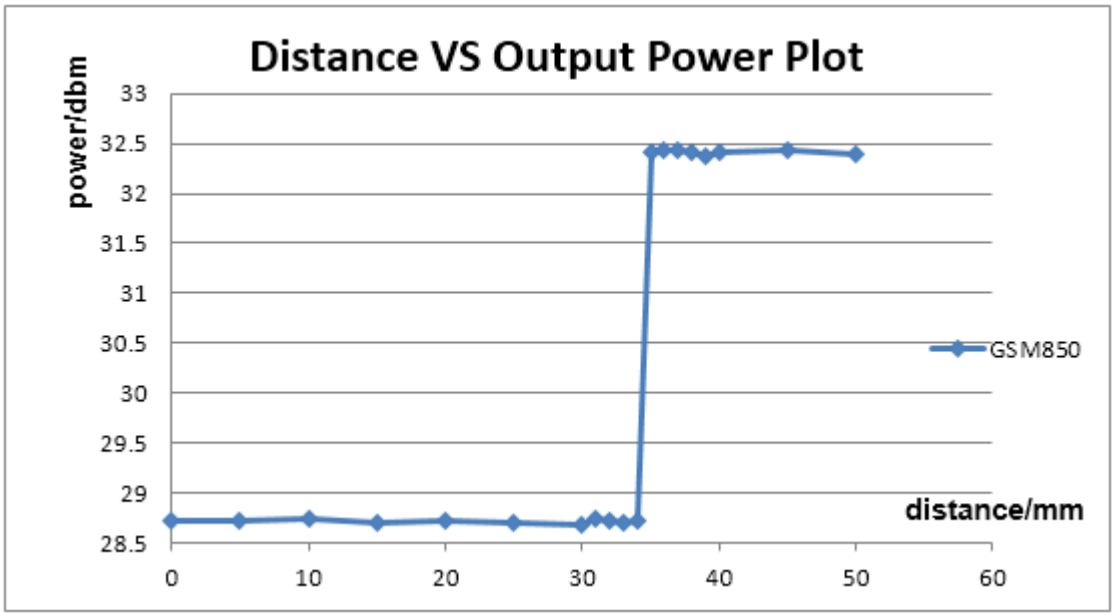
Figure : Proximity sensor triggering distances assessment (Front side only)



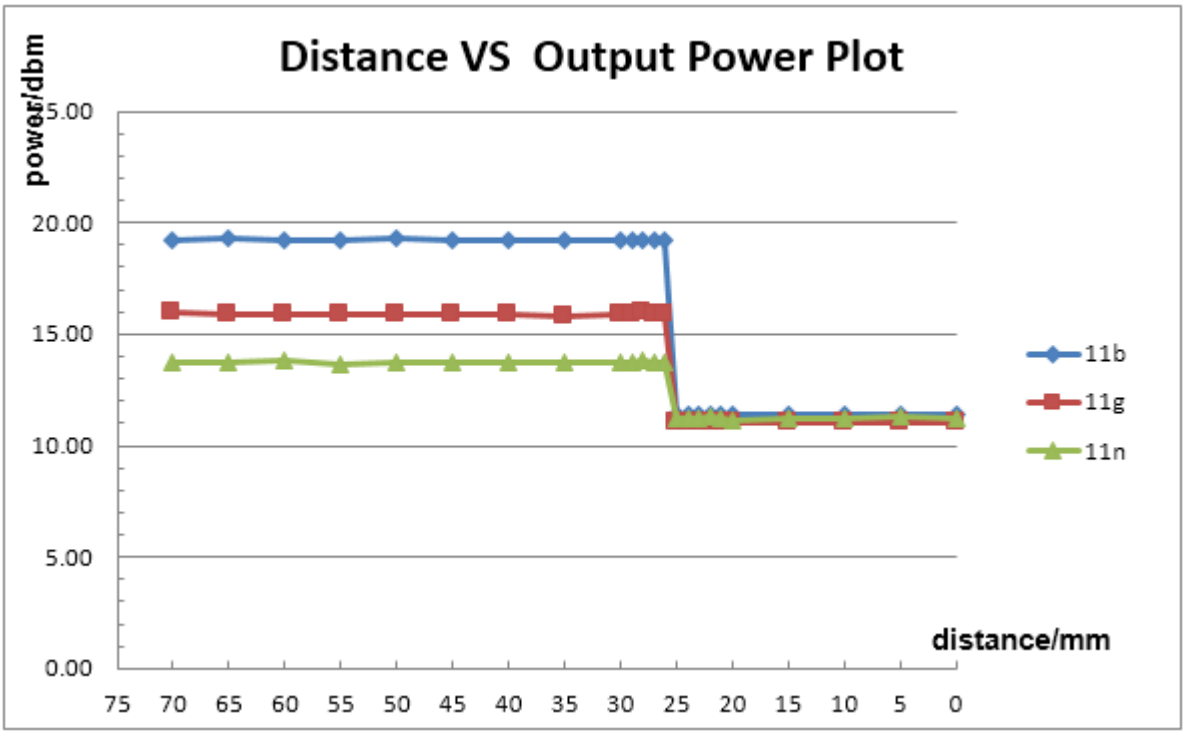
The DUT is moved towards from the flat phantom(Second ant,GSM 850 voice):



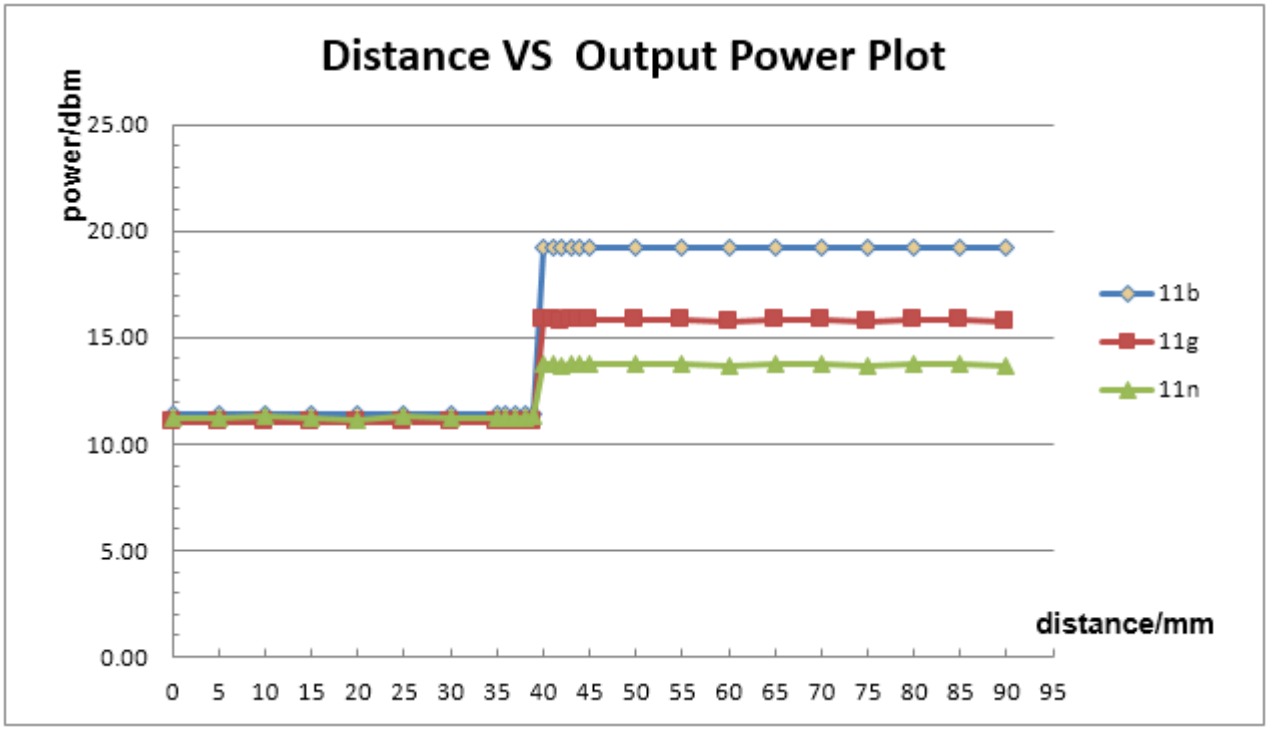
The DUT is moved away from the flat phantom(Second ant,GSM 850 voice):



The DUT is moved towards from the flat phantom (WiFi 2.4G, when WiFi ant and 2G&3G&4G transmit simultaneously) :



The DUT is moved away from the flat phantom(WiFi 2.4G, when WiFi ant and 2G&3G&4G transmit simultaneously) :



Conclusion: It can be ensured that the proximity sensor can be valid triggered in held-to-ear scenario.

2) Procedures for determining antenna and proximity sensor coverage

As the IR proximity sensor locates on the front face of the device and detects objects approaching only from the front side. For front side view, there is no spatial offset between the WiFi antenna/Second antenna and the proximity sensor element, so procedures for determining the proximity sensor coverage per FCC KDB 616217§6.3 does not need to be assessed.

3）Procedures for determining device tilt angle influences to proximity sensor triggering

The following procedure is used to determine the triggering angle. Distance need to be checked when device under voice mode so that sensor is working.

For Head exposure condition, device tilt angle influences to proximity sensor triggering is determined as below per FCC guidance:

Firstly, the DUT was positioned directly touch the Head SAM phantom (Left&Right hand touch cheek position). Rotate the DUT around the ear reference point of the phantom in 5° increments until the DUT is 15° tilted or more away from the touch cheek position at 0°.

Secondly, the DUT is positioned at 15° or more away from the touch cheek position and moved towards the SAM phantom in 5°increments until the DUT directly touch the SAM phantom at 0°(Left & Right hand touch cheek position).

The DUT is moved towards and away from SAM phantom(Second ant GSM 850 or WiFi 2.4G, when WiFi ant and 2G&3G&4G transmit simultaneously):

Angle between phantom to DUT in degree	0°	5°	10°	15°	20°	25°	30°
Condition of Sensor power reduction	on	on	on	on	on	on	on

Conclusion: Based on the validation results above, angle tilt coverage can ensure that the proximity sensor is valid triggered for all required Head test positions(Left/Right Hand Touched cheek and Left/Right Hand tiled 15 °).

4) Summary SAR test Plan for Proximity sensor power reduction scenarios

So Second antenna GSM850 and WiFi 2.4G head SAR is evaluated at reduced power levels according to the real seson on power reduction usage scenarios.

7 SAR Measurement Results

7.1 Conducted power measurements

For the measurements a Rohde & Schwarz Radio Communication Tester CMU 200&CMW500 was used.
SAR drift measured at the same position in liquid before and after each SAR test as below 7.2 chapter.
Note: CMU200 measures GSM peak and average output power for active timeslots.For SAR the timebased average power is relevant. The difference in between depends on the duty cycle of the TDMA signal :

No. of timeslots	1	2	3	4
Duty Cycle	1:8.3	1:4.1	1:2.77	1:2.08
timebased avg. power compared to slotted avg. power	-9.19dB	-6.13dB	-4.42dB	-3.18dB

The signalling modes differ as follows:

mode	coding scheme	modulation
GPRS	CS1 to CS4	GMSK
EDGE	MCS1 to MCS4	GMSK
EDGE	MCS5 to MCS9	8PSK

Apart from modulation change (GMSK/8PSK) coding schemes differ in code rate without influence on the RF signal. Therefore one coding scheme per mode was selected for conducted power measurements.

7.1.1 Conducted power measurements of GSM850(Second Antenna)

Full Power:

GSM850		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	128CH	190CH	251CH		Tune-up	128CH	190CH	251CH
GSM (CS)		33.00	32.40	32.56	32.35	-9.19	23.81	23.21	23.37	23.16
GPRS/ EDGE (GMSK)	1 Tx Slot	33.00	32.47	32.64	32.41	-9.19	23.81	23.28	23.45	23.22
	2 Tx Slots	30.50	29.84	30.02	30.02	-6.13	**24.37**	**23.71**	**23.89**	**23.89**
	3 Tx Slots	27.50	27.07	27.15	27.16	-4.42	23.08	22.65	22.73	22.74
	4 Tx Slots	26.50	25.76	25.87	25.83	-3.18	23.32	22.58	22.69	22.65
EDGE (8PSK)	1 Tx Slot	27.00	25.93	25.95	25.98	-9.19	17.81	16.74	16.76	16.79
	2 Tx Slots	27.00	25.81	25.92	25.85	-6.13	20.87	19.68	19.79	19.72
	3 Tx Slots	26.00	24.20	24.26	24.17	-4.42	21.58	19.78	19.84	19.75
	4 Tx Slots	24.00	22.88	22.85	22.87	-3.18	20.82	19.70	19.67	19.69

Table 11:Conducted power measurement results of GSM850

Second antenna(Voice), Sensor on / Second antenna(Voice) + WiFi Station ,Sensor on：

GSM850	Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
	Tune-up	128CH	190CH	251CH		Tune-up	128CH	190CH	251CH
GSM (CS)	30.00	28.69	28.73	28.61	-9.19	20.81	19.50	19.54	19.42

Table 12:Conducted power measurement results of GSM850

Note:

1) The conducted power of GSM850 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3) Per KDB941225 D01v03, 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 applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.2 Conducted power measurements of GSM1900(Second Antenna)

Full Power:

GSM1900		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	512CH	661CH	810CH		Tune-up	512CH	661CH	810CH
GSM (CS)		30.00	28.86	28.81	28.82	-9.19	20.81	19.67	19.62	19.63
GPRS/ EDGE (GMSK)	1 Tx Slot	30.00	29.03	29.01	28.93	-9.19	20.81	19.84	19.82	19.74
	2 Tx Slots	28.00	27.17	27.02	27.13	-6.13	21.87	21.04	20.89	21.00
	3 Tx Slots	26.00	24.48	24.43	24.44	-4.42	21.58	20.06	20.01	20.02
	4 Tx Slots	24.00	23.41	23.31	23.36	-3.18	20.82	20.23	20.13	20.18
EDGE (8PSK)	1 Tx Slot	26.00	24.94	24.77	24.81	-9.19	16.81	15.75	15.58	15.62
	2 Tx Slots	26.00	24.71	24.66	24.71	-6.13	19.87	18.58	18.53	18.58
	3 Tx Slots	24.00	23.11	23.04	23.14	-4.42	19.58	18.69	18.62	18.72
	4 Tx Slots	23.00	21.95	21.83	21.93	-3.18	19.82	18.77	18.65	18.75

Table 13:Conducted power measurement results of GSM1900

Note:

1) The conducted power of GSM1900 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3) Per KDB941225 D01v03, 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 applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.3 Conducted power measurements of LTE Band VII(Second Antenna)

Full Power:

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20775CH	21100CH	21425CH
5MHz	QPSK	1	0	19.00	18.14	18.10	18.61
		1	13	19.00	18.02	18.39	18.78
		1	24	19.00	17.97	17.95	18.59
		12	0	18.00	16.91	17.17	17.44
		12	6	18.00	17.03	17.26	17.47
		12	13	18.00	16.95	17.23	17.55
		25	0	18.00	16.98	17.16	17.48
	16QAM	1	0	18.00	16.47	16.70	16.91
		1	13	18.00	16.48	16.70	17.04
		1	24	18.00	16.28	16.39	16.82
		12	0	17.00	15.75	16.02	16.43
		12	6	17.00	15.75	16.06	16.46
		12	13	17.00	15.62	15.90	16.32
		25	0	17.00	15.91	16.37	16.61
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20800CH	21100CH	21400CH
10MHz	QPSK	1	0	19.00	18.05	18.31	18.53
		1	25	19.00	18.21	18.41	18.47
		1	49	19.00	18.06	18.32	18.62
		25	0	18.00	17.07	17.17	17.45
		25	13	18.00	16.98	17.24	17.46
		25	25	18.00	16.99	17.11	17.47
		50	0	18.00	16.97	17.26	17.51
	16QAM	1	0	18.00	16.93	16.91	17.10
		1	25	18.00	16.95	17.23	17.35
		1	49	18.00	16.62	16.96	17.51
		25	0	17.00	16.04	16.05	16.46
		25	13	17.00	15.84	16.17	16.48
		25	25	17.00	15.85	16.17	16.49
		50	0	17.00	15.87	16.21	16.51

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20825CH	21100CH	21375CH
15MHz	QPSK	1	0	19.00	18.19	18.25	18.52
		1	38	19.00	18.14	18.32	18.55
		1	74	19.00	18.03	18.51	18.71
		36	0	18.00	16.94	17.14	17.34
		36	18	18.00	16.93	17.23	17.31
		36	39	18.00	16.97	17.09	17.44
		75	0	18.00	16.96	17.23	17.37
	16QAM	1	0	18.00	16.96	16.99	17.16
		1	38	18.00	17.26	17.63	17.81
		1	74	18.00	16.87	17.07	17.43
		36	0	17.00	15.77	16.12	16.25
		36	18	17.00	15.78	16.28	16.37
		36	39	17.00	15.84	16.09	16.45
		75	0	17.00	15.92	16.15	16.38
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20850CH	21100CH	21350CH
20MHz	QPSK	1	0	19.00	17.70	17.78	17.95
		1	50	19.00	**18.04**	17.87	**18.31**
		1	99	19.00	17.67	**17.93**	18.16
		50	0	18.00	16.91	**17.16**	17.35
		50	25	18.00	16.97	17.15	17.33
		50	50	18.00	**17.02**	17.10	**17.40**
		100	0	18.00	16.93	17.24	**17.32**
	16QAM	1	0	18.00	16.63	16.59	16.70
		1	50	18.00	17.13	17.56	17.07
		1	99	18.00	16.54	16.67	17.01
		50	0	17.00	15.92	16.06	16.48
		50	25	17.00	16.07	16.38	16.47
		50	50	17.00	16.08	16.34	16.55
		100	0	17.00	15.85	16.15	16.32

Table 14: Conducted power measurement results of LTE Band VII

7.1.4 Conducted power measurements of LTE Band XXXVIII(Second Antenna)

Full Power:

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37775CH	38000CH	38225CH
5MHz	QPSK	1	0	19.60	19.00	19.01	19.19
		1	13	19.60	19.20	19.16	19.27
		1	24	19.60	19.00	18.97	19.04
		12	0	18.60	18.14	18.19	18.35
		12	6	18.60	18.25	18.19	18.29
		12	13	18.60	18.22	18.19	18.28
		25	0	18.60	18.07	18.20	18.24
	16QAM	1	0	19.60	17.67	17.68	18.02
		1	13	19.60	18.01	18.04	17.82
		1	24	19.60	17.65	17.68	17.62
		12	0	17.60	16.86	17.03	17.12
		12	6	17.60	16.99	17.04	17.37
		12	13	17.60	16.86	17.04	17.14
		25	0	17.60	17.08	17.31	17.35
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37800CH	38000CH	38200CH
10MHz	QPSK	1	0	19.60	19.13	19.04	19.18
		1	25	19.60	19.24	19.36	19.45
		1	49	19.60	18.99	19.21	19.21
		25	0	18.60	18.27	18.27	18.35
		25	13	18.60	18.15	18.25	18.35
		25	25	18.60	18.05	18.20	18.29
		50	0	18.60	18.10	18.21	18.33
	16QAM	1	0	19.60	18.48	18.80	18.60
		1	25	19.60	18.54	18.98	19.08
		1	49	19.60	18.40	18.67	18.58
		25	0	17.60	17.22	17.17	17.38
		25	13	17.60	17.12	17.22	17.41
		25	25	17.60	17.11	17.17	17.31
		50	0	17.60	16.99	17.17	17.41

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37825CH	38000CH	38175CH
15MHz	QPSK	1	0	19.60	19.03	19.13	19.23
		1	38	19.60	18.92	19.09	19.18
		1	74	19.60	19.01	19.11	19.02
		36	0	18.60	18.13	18.32	18.28
		36	18	18.60	18.10	18.28	18.36
		36	39	18.60	18.23	18.32	18.32
		75	0	18.60	18.09	18.24	18.29
	16QAM	1	0	19.60	18.53	18.79	18.64
		1	38	19.60	18.42	18.62	18.69
		1	74	19.60	18.77	18.98	18.67
		36	0	17.60	16.96	17.13	17.07
		36	18	17.60	16.94	17.12	17.31
		36	39	17.60	16.83	17.01	17.25
		75	0	17.60	17.08	17.23	17.27
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37850CH	38000CH	38150CH
20MHz	QPSK	1	0	19.60	19.16	19.20	19.35
		1	50	19.60	**19.21**	19.34	**19.42**
		1	99	19.60	19.13	**19.56**	19.24
		50	0	18.60	18.12	**18.29**	18.34
		50	25	18.60	18.17	18.23	18.30
		50	50	18.60	**18.21**	18.28	**18.36**
		100	0	18.60	18.10	18.28	18.34
	16QAM	1	0	19.60	17.66	17.95	17.95
		1	50	19.60	18.20	18.42	18.40
		1	99	19.60	17.76	18.12	17.98
		50	0	17.60	17.01	17.24	17.32
		50	25	17.60	17.06	17.19	17.26
		50	50	17.60	17.09	17.23	17.34
		100	0	17.60	16.96	17.13	17.24

Table 15: Conducted power measurement results of LTE Band XXXVIII

7.1.5 Conducted power measurements of GSM850 (Main Antenna)

Full Power:

GSM850		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	128CH	190CH	251CH		Tune-up	128CH	190CH	251CH
GSM (CS)		33.00	32.63	32.83	32.61	-9.19	23.81	23.44	23.64	23.42
GPRS/ EDGE (GMSK)	1 Tx Slot	33.00	32.67	32.85	32.64	-9.19	23.81	23.48	23.66	23.45
	2 Tx Slots	30.50	30.01	30.21	30.24	-6.13	24.37	23.88	24.08	24.11
	3 Tx Slots	27.50	27.11	27.30	27.35	-4.42	23.08	22.69	22.88	22.93
	4 Tx Slots	26.50	25.84	26.03	26.01	-3.18	23.32	22.66	22.85	22.83
EDGE (8PSK)	1 Tx Slot	27.00	26.03	26.02	26.06	-9.19	17.81	16.84	16.83	16.87
	2 Tx Slots	27.00	25.84	25.92	25.91	-6.13	20.87	19.71	19.79	19.78
	3 Tx Slots	26.00	24.16	24.27	24.29	-4.42	21.58	19.74	19.85	19.87
	4 Tx Slots	24.00	22.93	23.03	23.00	-3.18	20.82	19.75	19.85	19.82

Table 16:Conducted power measurement results of GSM850

Note:

1) The conducted power of GSM850 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3) Per KDB941225 D01v03, 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 applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.6 Conducted power measurements of GSM1900 (Main Antenna)

Full Power:

GSM1900		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	512CH	661CH	810CH		Tune-up	512CH	661CH	810CH
GSM (CS)		30.00	28.81	28.93	28.79	-9.19	20.81	19.62	19.74	19.60
GPRS/ EDGE (GMSK)	1 Tx Slot	30.00	29.01	28.91	28.92	-9.19	20.81	19.82	19.72	19.73
	2 Tx Slots	28.00	27.18	27.03	27.07	-6.13	**21.87**	**21.05**	**20.90**	**20.94**
	3 Tx Slots	26.00	24.71	24.53	24.54	-4.42	21.58	20.29	20.11	20.12
	4 Tx Slots	24.00	23.62	23.56	23.47	-3.18	20.82	20.44	20.38	20.29
EDGE (8PSK)	1 Tx Slot	26.00	24.83	24.81	24.84	-9.19	16.81	15.64	15.62	15.65
	2 Tx Slots	26.00	24.79	24.61	24.73	-6.13	19.87	18.66	18.48	18.60
	3 Tx Slots	24.00	23.12	23.04	23.10	-4.42	19.58	18.70	18.62	18.68
	4 Tx Slots	23.00	21.96	21.92	21.95	-3.18	19.82	18.78	18.74	18.77

Table 17: Conducted power measurement results of GSM1900

Note:

1) The conducted power of GSM1900 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3) Per KDB941225 D01v03, 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 applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.7 Conducted power measurements of LTE Band VII (Main Antenna)

Full Power：

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20775CH	21100CH	21425CH
5MHz	QPSK	1	0	24.00	23.23	23.27	23.48
		1	13	24.00	23.18	23.58	23.95
		1	24	24.00	23.14	23.18	23.84
		12	0	23.00	22.21	22.36	22.81
		12	6	23.00	22.30	22.42	22.86
		12	13	23.00	22.58	22.39	22.89
		25	0	23.00	22.25	22.41	22.90
	16QAM	1	0	23.50	22.46	22.48	22.79
		1	13	23.50	22.32	22.51	22.99
		1	24	23.50	22.30	22.33	22.94
		12	0	22.50	21.48	21.20	21.97
		12	6	22.50	21.36	21.32	21.91
		12	13	22.50	21.21	21.23	21.88
		25	0	22.50	21.55	21.58	21.80
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20800CH	21100CH	21400CH
10MHz	QPSK	1	0	24.00	23.84	23.69	23.81
		1	25	24.00	23.72	23.71	23.80
		1	49	24.00	23.31	23.55	23.95
		25	0	23.00	22.50	22.37	22.80
		25	13	23.00	22.43	22.58	22.86
		25	25	23.00	22.66	22.69	22.91
		50	0	23.00	22.37	22.58	22.96
	16QAM	1	0	23.50	22.59	22.38	22.73
		1	25	23.50	22.68	22.58	22.97
		1	49	23.50	22.95	22.43	23.37
		25	0	22.50	21.64	21.60	22.19
		25	13	22.50	21.66	21.54	22.16
		25	25	22.50	21.28	21.61	21.97
		50	0	22.50	21.38	21.61	22.03

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20825CH	21100CH	21375CH
15MHz	QPSK	1	0	24.00	23.84	23.47	23.86
		1	38	24.00	23.51	23.89	23.88
		1	74	24.00	23.30	23.77	23.88
		36	0	23.00	22.41	22.78	22.73
		36	18	23.00	22.32	22.53	22.47
		36	39	23.00	22.54	22.70	22.77
		75	0	23.00	22.40	22.81	22.76
	16QAM	1	0	23.50	22.62	22.28	23.18
		1	38	23.50	22.25	23.19	23.17
		1	74	23.50	22.32	22.96	23.21
		36	0	22.50	21.46	21.54	21.64
		36	18	22.50	21.32	21.54	21.77
		36	39	22.50	21.20	21.56	21.92
		75	0	22.50	21.34	21.58	21.89
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20850CH	21100CH	21350CH
20MHz	QPSK	1	0	24.00	23.09	23.36	23.39
		1	50	24.00	**23.40**	23.44	**23.96**
		1	99	24.00	22.77	**23.49**	23.95
		50	0	23.00	22.14	**22.62**	**22.92**
		50	25	23.00	**22.37**	22.52	22.64
		50	50	23.00	22.32	22.61	22.86
		100	0	23.00	22.50	22.64	**22.90**
	16QAM	1	0	23.50	22.49	22.79	22.49
		1	50	23.50	22.53	22.61	22.63
		1	99	23.50	21.83	22.12	22.72
		50	0	22.50	21.21	21.53	21.80
		50	25	22.50	21.44	21.49	21.61
		50	50	22.50	21.26	21.59	21.78
		100	0	22.50	21.56	21.71	21.73

Table 18: Conducted power measurement results of LTE Band VII

Main antenna + WiFi Hotspot on:

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20775CH	21100CH	21425CH
5MHz	QPSK	1	0	20.50	19.53	19.80	19.97
		1	13	20.50	19.66	20.07	20.45
		1	24	20.50	19.40	19.64	20.16
		12	0	19.50	18.38	18.55	19.04
		12	6	19.50	18.42	18.70	19.10
		12	13	19.50	18.40	18.74	19.08
		25	0	19.50	18.42	18.78	18.98
	16QAM	1	0	19.50	18.04	18.22	18.48
		1	13	19.50	17.99	18.31	18.59
		1	24	19.50	17.75	18.06	18.35
		12	0	18.50	17.25	17.51	17.95
		12	6	18.50	17.46	17.71	18.00
		12	13	18.50	17.21	17.46	17.85
		25	0	18.50	17.46	17.68	18.05
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20800CH	21100CH	21400CH
10MHz	QPSK	1	0	20.50	19.61	19.94	20.07
		1	25	20.50	19.75	20.07	20.29
		1	49	20.50	19.54	19.96	20.39
		25	0	19.50	18.54	18.64	18.99
		25	13	19.50	18.52	18.74	19.01
		25	25	19.50	18.40	18.70	19.06
		50	0	19.50	18.46	18.83	19.08
	16QAM	1	0	19.50	18.43	18.52	18.65
		1	25	19.50	18.34	18.72	18.93
		1	49	19.50	18.18	18.54	19.03
		25	0	18.50	17.66	17.68	17.95
		25	13	18.50	17.49	17.79	17.97
		25	25	18.50	17.42	17.63	18.03
		50	0	18.50	17.34	17.75	18.02

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20825CH	21100CH	21375CH
15MHz	QPSK	1	0	20.50	19.43	19.77	20.00
		1	38	20.50	19.68	20.05	20.39
		1	74	20.50	19.45	19.87	20.42
		36	0	19.50	18.45	18.61	18.94
		36	18	19.50	18.42	18.76	18.96
		36	39	19.50	18.46	18.69	19.03
		75	0	19.50	18.48	18.71	18.93
	16QAM	1	0	19.50	18.16	18.61	18.81
		1	38	19.50	18.94	19.22	19.46
		1	74	19.50	18.28	18.59	19.06
		36	0	18.50	17.41	17.63	17.77
		36	18	18.50	17.44	17.61	17.90
		36	39	18.50	17.36	17.50	17.98
		75	0	18.50	17.38	17.85	17.81
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					20850CH	21100CH	21350CH
20MHz	QPSK	1	0	20.50	19.27	19.53	19.57
		1	50	20.50	**19.56**	**19.89**	20.05
		1	99	20.50	18.95	19.38	**20.07**
		50	0	19.50	18.42	**18.75**	**19.03**
		50	25	19.50	18.42	18.74	18.93
		50	50	19.50	**18.45**	18.71	19.01
		100	0	19.50	18.36	18.83	18.99
	16QAM	1	0	19.50	17.85	18.17	18.38
		1	50	19.50	18.64	19.01	18.74
		1	99	19.50	18.00	18.31	18.53
		50	0	18.50	17.50	17.80	17.93
		50	25	18.50	17.53	17.85	17.82
		50	50	18.50	17.50	17.70	17.78
		100	0	18.50	17.42	17.78	17.84

Table 19: Conducted power measurement results of LTE Band VII

7.1.8 Conducted power measurements of LTE Band XXXVIII (Main Antenna)

Full Power:

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37775CH	38000CH	38225CH
5MHz	QPSK	1	0	24.00	22.73	22.84	23.07
		1	13	24.00	23.07	22.83	23.22
		1	24	24.00	22.98	22.79	22.93
		12	0	23.00	21.83	22.10	22.21
		12	6	23.00	22.02	22.13	22.24
		12	13	23.00	22.01	22.11	22.12
		25	0	23.00	21.91	22.02	22.14
	16QAM	1	0	23.00	21.60	21.51	21.51
		1	13	23.00	21.82	21.88	21.55
		1	24	23.00	21.38	21.44	21.49
		12	0	22.00	20.73	20.90	20.92
		12	6	22.00	20.84	21.04	21.07
		12	13	22.00	20.91	20.79	21.05
		25	0	22.00	21.08	21.19	21.04
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37800CH	38000CH	38200CH
10MHz	QPSK	1	0	24.00	23.09	23.20	23.11
		1	25	24.00	23.18	23.31	23.37
		1	49	24.00	22.90	23.18	23.10
		25	0	23.00	22.05	22.13	22.25
		25	13	23.00	21.95	22.18	22.22
		25	25	23.00	21.96	22.12	22.17
		50	0	23.00	21.87	22.12	22.27
	16QAM	1	0	23.00	22.65	22.33	22.45
		1	25	23.00	22.43	22.99	22.80
		1	49	23.00	22.48	22.52	22.60
		25	0	22.00	21.14	21.21	21.34
		25	13	22.00	21.15	21.17	21.30
		25	25	22.00	21.05	21.11	21.18
		50	0	22.00	20.74	21.02	21.27

Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37825CH	38000CH	38175CH
15MHz	QPSK	1	0	24.00	23.00	22.89	23.12
		1	38	24.00	22.99	23.04	23.17
		1	74	24.00	22.88	23.05	22.98
		36	0	23.00	21.96	22.17	22.19
		36	18	23.00	21.89	22.08	22.20
		36	39	23.00	22.01	22.05	22.21
		75	0	23.00	21.87	22.07	22.21
	16QAM	1	0	23.00	22.55	22.38	22.54
		1	38	23.00	22.21	22.46	22.63
		1	74	23.00	22.50	22.96	22.95
		36	0	22.00	20.93	21.04	21.08
		36	18	22.00	20.86	21.07	21.16
		36	39	22.00	20.98	21.03	20.91
		75	0	22.00	21.00	20.99	21.13
Bandwidth	Modulation	RB size	RB offset	Tune-up	Channel	Channel	Channel
					37850CH	38000CH	38150CH
20MHz	QPSK	1	0	24.00	22.98	**23.39**	23.59
		1	50	24.00	**23.00**	23.34	**23.64**
		1	99	24.00	22.96	23.09	23.05
		50	0	23.00	21.94	**22.19**	**22.22**
		50	25	23.00	22.05	22.06	22.09
		50	50	23.00	**22.11**	22.16	22.21
		100	0	23.00	22.03	22.08	22.26
	16QAM	1	0	23.00	21.48	21.55	21.70
		1	50	23.00	21.63	22.14	22.07
		1	99	23.00	21.77	21.78	21.68
		50	0	22.00	20.90	21.17	21.18
		50	25	22.00	20.99	21.05	21.09
		50	50	22.00	21.09	21.11	21.11
		100	0	22.00	21.02	20.99	21.14

Table 20: Conducted power measurement results of LTE Band XXXVIII

7.1.9 Conducted power measurements of Downlink LTE CA

In this section, the following conducted power measurement results of downlink LTE carrier aggregation are provided to quantify downlink only carrier aggregation SAR test exclusion per KDB 941225 D05
Uplink maximum output power is measured with downlink carrier aggregation active, using the channel with highest measured maximum output power when downlink carrier aggregation is inactive, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

Power test equipment: a R&S Radio Communication Tester CMW500 was used.

Initial Conditions						
Test Environment as specified in TS 36.508[7] subclause 4.1			NC[, TL/VL, TL/VH, TH/VL, TH/VH]			
Test Frequencies as specified in TS36.508 [7] subclause 4.3.1 for different CA bandwidth classes.			A: Mid range for PCC and SCC			
Test CC Combination setting (N_{RB_agg}) as specified in subclause 5.4.2A.1 for the CA Configuration			Lowest N_{RB_agg} Highest N_{RB_agg}			
Test Parameters for CA Configurations						
CA Configuration / N_{RB_agg}		DL Allocation	CC MOD	UL Allocation		
PCC N_{RB}	SCCs N_{RB}	PCC & SCC RB allocation		N_{RB_alloc}	PCC RB allocations (L_{CRB} @ RB_{start})	
6	25	N/A for this test	QPSK	5	P_5@0	-
15	25		QPSK	4	P_4@0	-
25	50		QPSK	8	P_8@0	-
50	75		QPSK	12	P_12@0	-
75	100		QPSK	16	P_16@0	-
100	75		QPSK	18	P_18@0	-
Note 1: CA Configuration Test CC Combination settings are checked separately for each CA Configuration, which applicable aggregated channel bandwidths are specified in Table 5.4.2A.1-1						

Table 21: Conducted power measurement setup of LTE CA per 3GPP TS 36.521-1 V12.6.0

A) The conducted power measurement results of downlink LTE CA Conduted Power are as below(Main antenna):

DL LTE CA Class	PCC								SCC			Power	
	PCC Band	PCC Bandwidt	PCC UL RB size	PCC UL RB offset	PCC DL RB size	PCC DL RB offset	PCC UL Channel	PCC DL Channel	SCC Band	SCC Bandwidth	SCC DL Channel	Rel 8 LTE Tx	Rel 10 DL LTE CA
CA_7C	7	20	1	50	100	0	21350	3350	7	20	3152	23.96	23.87
CA_3A-7A	7	10	1	49	50	0	21400	3400	3	10	1900	23.95	23.91
CA_7A-20A	7	10	1	49	50	0	21400	3400	20	10	6400	23.95	23.97

Note: Testing is not required in bands or modes not intended/allowed for US operation.

B) The conducted power measurement results of downlink LTE CA Conduted Power are as below (Second antenna):

DL LTE CA Class	PCC								SCC			Power	
	PCC Band	PCC Bandwidt	PCC UL RB size	PCC UL RB offset	PCC DL RB size	PCC DL RB offset	PCC UL Channel	PCC DL Channel	SCC Band	SCC Bandwidth	SCC DL Channel	Rel 8 LTE Tx	Rel 10 DL LTE CA
CA_7C	7	15	1	74	75	0	21375	3375	7	15	3225	18.71	18.80
CA_3A-7A	7	10	1	49	50	0	21400	3400	3	10	1900	18.62	18.72
CA_7A-20A	7	10	1	49	50	0	21400	3400	20	10	6400	18.62	18.75

Note: Testing is not required in bands or modes not intended/allowed for US operation.

7.1.10 Conducted power measurements of WiFi 2.4G

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)	Power Setting Level
802.11b	1	2412	1	19.50	18.95	Yes	18
	6	2437		19.50	19.02	Yes	
	11	2462		19.50	19.28	Yes	
802.11g	1	2412	6	17.50	Not Required	No	16
	6	2437		17.50	Not Required	No	
	11	2462		17.50	Not Required	No	
802.11n-20M	1	2412	6.5	15.50	Not Required	No	14
	6	2437		15.50	Not Required	No	
	11	2462		15.50	Not Required	No	

Table 22: Conducted power measurement results of WiFi 2.4G

Note: 1) The Average conducted power of WiFi is measured with RMS detector.

After Simultaneous Transmission Power Reduction

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)	Power Setting Level
802.11b	1	2412	1	12.50	11.67	Yes	11
	6	2437		12.50	11.45	Yes	
	11	2462		12.50	11.98	Yes	
802.11g	1	2412	6	12.50	11.01	No	11
	6	2437		12.50	10.98	No	
	11	2462		12.50	11.26	No	
802.11n-20M	1	2412	6.5	12.50	11.56	No	11
	6	2437		12.50	10.93	No	
	11	2462		12.50	11.12	No	

Table 23: Conducted power measurement results of WiFi 2.4G

Note: 1) The Average conducted power of WiFi is measured with RMS detector.

7.1.11 Conducted power measurements of BT

The output power of BT antenna is as following:

BT 2450	Tune-up	Average Conducted Power (dBm)		
		0CH	39CH	78CH
DH5	11.00	10.58	10.88	**10.94**
2DH5	11.00	7.91	7.97	8.20
3DH5	11.00	5.23	4.84	5.14

BT 2450	Tune-up	Average Conducted Power (dBm)		
		0CH	19CH	39CH
BLE	11.00	2.22	2.94	1.88

Table 24: Conducted power measurement results of BT.

Note: The conducted power of BT is measured with RMS detector.

7.2 SAR measurement Results

General Notes:

1) Per KDB447498 D01, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.

2) Per KDB447498 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 KDB865664 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 KDB941225 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 KDB648474 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 KDB865664 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 the blue SAR test results in the tables of Section 7.3 and appendix B for detailed SAR plots).

7) Addtional SAR tests in simultaneous transmission fixed power reduction scenario are also tested in some frequency bands and test positions, which are only used to ensure simultaneous transmission SAR test exclusion. The standalone SAR compliance still uses the SAR results tested at the maximum output power level.

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 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 KDB648474 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.

LTE Notes:

1) The LTE test configurations are determined according to KDB941225 D05 SAR for LTE Devices v02r03.The general test procedures used for SAR testing can be found in Section 6.5.

2) A-MPR was disabled for all SAR test by setting NS_01 on the base station simulator.SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames(maximum TTI)

3) According to KDB 941225 D05 SAR for LTE Devices v02r03, for Time-Division Duplex (TDD) systems, SAR is tested using a fixed periodic duty factor according to the highest transmission duty factor (63.33%) implemented for the device and supported by the defined 3GPP LTE TDD configurations.

WiFi Notes:

Per KDB248227D01:

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) 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.

3) For Head SAR compliance: Head SAR for Wi-Fi antenna is evaluated at reduced power levels according to the real usage scenarios.

7.2.1 SAR measurement Result of GSM850 (Second Antenna)

Test Position of Head	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Left touch	190/836.6	GSM	0.493	0.269	0.10	28.73	30.00	0.660	/
Left tilt	190/836.6	GSM	0.432	0.271	0.00	28.73	30.00	0.579	/
Right touch	190/836.6	GSM	0.763	0.391	0.16	28.73	30.00	1.022	/
Right touch	128/824.2	GSM	0.745	0.382	0.17	28.69	30.00	1.007	/
Right touch	251/848.8	GSM	0.673	0.344	0.01	28.61	30.00	0.927	/
Right tilt	190/836.6	GSM	0.659	0.312	0.02	28.73	30.00	0.883	/
Right tilt	128/824.2	GSM	0.636	0.306	-0.01	28.69	30.00	0.860	/
Right tilt	251/848.8	GSM	0.583	0.282	0.03	28.61	30.00	0.803	/
Tested at the worst position with SIM2									
Right touch	190/836.6	GSM	**0.820**	0.415	0.09	28.73	30.00	**1.099**	Yes
Right touch-Repeated	190/836.6	GSM	0.756	0.387	0.17	28.73	30.00	1.013	/
Tested at the worst position with Battery 2#									
Right touch	190/836.6	GSM	0.784	0.404	0.16	28.73	30.00	1.050	/
Tested at the worst position with Battery 3#									
Right touch	190/836.6	GSM	0.811	0.412	0.18	28.73	30.00	1.086	/
Tested at the worst position with Battery 4#									
Right touch	190/836.6	GSM	0.709	0.354	0.15	28.73	30.00	0.950	/

Table 25: Head SAR test results of GSM850

Test Position of Body-Worn with 15mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	190/836.6	GSM	0.282	0.167	0.09	32.56	33.00	0.312	/
Back Side	190/836.6	GSM	0.280	0.202	-0.08	32.56	33.00	0.310	/
Tested at the worst position with SIM2									
Front Side	190/836.6	GSM	0.243	0.145	0.02	32.56	33.00	0.269	/
Tested at the worst position with Battery 2#									
Front Side	190/836.6	GSM	**0.284**	0.204	0.06	32.56	33.00	**0.314**	Yes
Tested at the worst position with Battery 3#									
Front Side	190/836.6	GSM	0.170	0.100	0.15	32.56	33.00	0.188	/
Tested at the worst position with Battery 4#									
Front Side	190/836.6	GSM	0.275	0.199	-0.08	32.56	33.00	0.304	/

Table 26: Body-Worn SAR test results of GSM850

Test Position of Hotspot with 10mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	190/836.6	GPRS 2TS	0.596	0.333	-0.03	30.02	30.50	0.666	/
Back Side	190/836.6	GPRS 2TS	0.691	0.384	-0.06	30.02	30.50	0.772	/
Left Side	190/836.6	GPRS 2TS	0.442	0.295	0.07	30.02	30.50	0.494	/
Top Side	190/836.6	GPRS 2TS	0.527	0.256	0.04	30.02	30.50	0.589	/
Tested at the worst position with SIM2									
Back Side	190/836.6	GPRS 2TS	0.622	0.347	-0.10	30.02	30.50	0.695	/
Tested at the worst position with Battery 2#									
Back Side	190/836.6	GPRS 2TS	**0.725**	0.402	-0.01	30.02	30.50	**0.810**	Yes
Back Side	128/824.2	GPRS 2TS	0.619	0.399	-0.01	29.84	30.50	0.721	/
Back Side	251/848.8	GPRS 2TS	0.668	0.371	0.02	30.02	30.50	0.746	/
Tested at the worst position with Battery 3#									
Back Side	190/836.6	GPRS 2TS	0.610	0.341	0.03	30.02	30.50	0.681	/
Tested at the worst position with Battery 4#									
Back Side	190/836.6	GPRS 2TS	0.658	0.365	0.02	30.02	30.50	0.735	/

Table 27: Hotspot SAR test results of GSM850

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

7.2.1 SAR measurement Result of GSM1900 (Second Antenna)

Test Position of Head	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Left touch	661/1880	GSM	0.286	0.157	-0.18	28.81	30.00	0.376	/
Left tilt	661/1880	GSM	0.338	0.175	0.02	28.81	30.00	0.445	/
Right touch	661/1880	GSM	0.765	0.424	-0.07	28.81	30.00	1.006	/
Right touch	512/1850.2	GSM	0.724	0.400	0.01	28.86	30.00	0.941	/
Right touch	810/1909.8	GSM	0.883	0.485	0.03	28.82	30.00	1.159	/
Right touch-Repeated	810/1909.8	GSM	**0.938**	0.511	0.13	28.82	30.00	**1.231**	Yes
Right tilt	661/1880	GSM	0.663	0.347	0.06	28.81	30.00	0.872	/
Right tilt	512/1850.2	GSM	0.643	0.337	0.06	28.86	30.00	0.836	/
Right tilt	810/1909.8	GSM	0.685	0.359	0.06	28.82	30.00	0.899	/
Tested at the worst position with SIM2									
Right touch	810/1909.8	GSM	0.838	0.465	0.00	28.82	30.00	1.100	/
Tested at the worst position with Battery 2#									
Right touch	810/1909.8	GSM	0.711	0.393	0.03	28.82	30.00	0.933	/
Tested at the worst position with Battery 3#									
Right touch	810/1909.8	GSM	0.692	0.389	0.16	28.82	30.00	0.908	/
Tested at the worst position with Battery 4#									
Right touch	810/1909.8	GSM	0.871	0.476	-0.03	28.82	30.00	1.143	/

Table 28: Head SAR test results of GSM1900

Test Position of Body-Worn with 15mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GSM	0.072	0.040	0.08	28.81	30.00	0.095	/
Back Side	661/1880	GSM	0.052	0.030	0.12	28.81	30.00	0.069	/
Tested at the worst position with SIM2									
Front Side	661/1880	GSM	**0.075**	0.042	0.10	28.81	30.00	**0.099**	Yes
Tested at the worst position with Battery 2#									
Front Side	661/1880	GSM	0.072	0.040	0.07	28.81	30.00	0.095	/
Tested at the worst position with Battery 3#									
Front Side	661/1880	GSM	0.070	0.038	0.19	28.81	30.00	0.091	/
Tested at the worst position with Battery 4#									
Front Side	661/1880	GSM	0.067	0.037	0.19	28.81	30.00	0.089	/

Table 29: Body-Worn SAR test results of GSM1900

Test Position of Hotspot with 10mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GPRS 2TS	0.209	0.110	0.13	27.02	28.00	0.262	/
Back Side	661/1880	GPRS 2TS	0.156	0.084	0.06	27.02	28.00	0.195	/
Left Side	661/1880	GPRS 2TS	0.202	0.113	0.01	27.02	28.00	0.253	/
Top Side	661/1880	GPRS 2TS	**0.277**	0.143	0.18	27.02	28.00	**0.347**	Yes
Tested at the worst position with SIM2									
Top Side	661/1880	GPRS 2TS	0.249	0.124	0.15	27.02	28.00	0.312	/
Tested at the worst position with Battery 2#									
Top Side	661/1880	GPRS 2TS	0.270	0.193	0.17	27.02	28.00	0.338	/
Tested at the worst position with Battery 3#									
Top Side	661/1880	GPRS 2TS	0.240	0.125	-0.08	27.02	28.00	0.301	/
Tested at the worst position with Battery 4#									
Top Side	661/1880	GPRS 2TS	0.256	0.127	0.15	27.02	28.00	0.321	/

Table 30: Hotspot SAR test results of GSM850

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

7.2.2 SAR measurement Result of LTE Band VII (Second Antenna)

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Left touch	21350/2560	20M QPSK 1RB#50	0.375	0.190	-0.12	18.31	19.00	0.440	/
Left tilt	21350/2560	20M QPSK 1RB#50	0.328	0.170	0.11	18.31	19.00	0.384	/
Right touch	21350/2560	20M QPSK 1RB#50	**1.040**	0.465	0.12	18.31	19.00	1.219	Yes
Right touch-Repeated	21350/2560	20M QPSK 1RB#50	1.010	0.450	-0.12	18.31	19.00	1.184	/
Right touch	20850/2510	20M QPSK 1RB#50	0.726	0.355	0.07	18.04	19.00	0.906	/
Right touch	21100/2535	20M QPSK 1RB#99	1.010	0.459	-0.08	17.93	19.00	**1.292**	/
Right tilt	21350/2560	20M QPSK 1RB#50	0.858	0.366	-0.10	18.31	19.00	1.006	/
Right tilt	20850/2510	20M QPSK 1RB#50	0.670	0.305	-0.08	18.04	19.00	0.836	/
Right tilt	21100/2535	20M QPSK 1RB#99	0.750	0.332	-0.15	17.93	19.00	0.960	/
50%RB									
Left touch	21350/2560	20M QPSK 50%RB#50	0.279	0.145	0.03	17.40	18.00	0.320	/
Left tilt	21350/2560	20M QPSK 50%RB#50	0.242	0.125	0.16	17.40	18.00	0.278	/
Right touch	21350/2560	20M QPSK 50%RB#50	0.760	0.340	-0.05	17.40	18.00	0.873	/
Right touch	20850/2510	20M QPSK 50%RB#50	0.596	0.292	0.01	17.02	18.00	0.747	/
Right touch	21100/2535	20M QPSK 50%RB#0	0.677	0.322	0.18	17.16	18.00	0.821	/
Right tilt	21350/2560	20M QPSK 50%RB#50	0.681	0.286	0.00	17.40	18.00	0.782	/
100%RB									
Right touch	21350/2560	20M QPSK 100%RB#0	0.775	0.342	0.10	17.32	18.00	0.906	/
Right tilt	21350/2560	20M QPSK 100%RB#0	0.628	0.267	0.02	17.32	18.00	0.734	/
Tested at the worst position with Battery 2#									
Right touch	21100/2535	20M QPSK 1RB#99	0.990	0.439	-0.12	17.93	19.00	1.267	/
Tested at the worst position with Battery 3#									
Right touch	21100/2535	20M QPSK 1RB#99	0.928	0.443	0.09	17.93	19.00	1.187	/
Tested at the worst position with Battery 4#									
Right touch	21100/2535	20M QPSK 1RB#99	0.985	0.444	-0.08	17.93	19.00	1.260	/

Table 31: Head SAR test results of LTE Band VII

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	21350/2560	20M QPSK 1RB#50	0.086	0.049	0.19	18.31	19.00	0.101	/
Back Side	21350/2560	20M QPSK 1RB#50	0.075	0.042	0.00	18.31	19.00	0.088	/
50%RB									
Front Side	21350/2560	20M QPSK 50%RB#50	0.065	0.036	0.11	17.40	18.00	0.075	/
Back Side	21350/2560	20M QPSK 50%RB#50	0.055	0.031	0.16	17.40	18.00	0.063	/
Tested at the worst position with Battery 2#									
Front Side	21350/2560	20M QPSK 1RB#50	0.084	0.048	0.13	18.31	19.00	0.098	/
Tested at the worst position with Battery 3#									
Front Side	21350/2560	20M QPSK 1RB#50	**0.088**	0.050	0.13	18.31	19.00	**0.103**	Yes
Tested at the worst position with Battery 4#									
Front Side	21350/2560	20M QPSK 1RB#50	0.084	0.047	0.11	18.31	19.00	0.098	/

Table 32: Body-Worn SAR test results of LTE Band VII

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	21350/2560	20M QPSK 1RB#50	0.157	0.088	0.14	18.31	19.00	0.184	/
Back Side	21350/2560	20M QPSK 1RB#50	0.147	0.078	0.15	18.31	19.00	0.172	/
Left Side	21350/2560	20M QPSK 1RB#50	0.152	0.077	-0.17	18.31	19.00	0.178	/
Top Side	21350/2560	20M QPSK 1RB#50	0.096	0.045	0.15	18.31	19.00	0.113	/
50%RB									
Front Side	21350/2560	20M QPSK 50%RB#50	0.122	0.066	0.14	17.40	18.00	0.140	/
Back Side	21350/2560	20M QPSK 50%RB#50	0.109	0.057	0.16	17.40	18.00	0.125	/
Left Side	21350/2560	20M QPSK 50%RB#50	0.118	0.059	-0.14	17.40	18.00	0.135	/
Top Side	21350/2560	20M QPSK 50%RB#50	0.076	0.036	0.16	17.40	18.00	0.087	/

Tested at the worst position with Battery 2#									
Front Side	21350/2560	20M QPSK 1RB#50	0.144	0.082	0.12	18.31	19.00	0.169	/
Tested at the worst position with Battery 3#									
Front Side	21350/2560	20M QPSK 1RB#50	0.151	0.084	0.11	18.31	19.00	0.177	/
Tested at the worst position with Battery 4#									
Front Side	21350/2560	20M QPSK 1RB#50	**0.176**	0.099	0.15	18.31	19.00	**0.206**	Yes

Table 33: Hotspot SAR test results of LTE Band VII

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

7.2.3 SAR measurement Result of LTE Band XXXVIII (Second Antenna)

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Left touch	38000/2595	20M QPSK 1RB#99	0.287	0.143	0.08	19.56	19.60	0.290	/
Left tilt	38000/2595	20M QPSK 1RB#99	0.283	0.136	0.11	19.56	19.60	0.286	/
Right touch	38000/2595	20M QPSK 1RB#99	0.713	0.308	0.14	19.56	19.60	0.720	/
Right tilt	38000/2595	20M QPSK 1RB#99	0.340	0.147	0.00	19.56	19.60	0.343	/
Right touch	37850/2580	20M QPSK 1RB#50	**0.714**	0.312	-0.06	19.21	19.60	**0.781**	Yes
Right touch	38150/2610	20M QPSK 1RB#50	0.703	0.304	0.19	19.42	19.60	0.733	/
50%RB									
Left touch	38150/2610	20M QPSK 50%RB#50	0.247	0.124	0.14	18.36	18.60	0.261	/
Left tilt	38150/2610	20M QPSK 50%RB#50	0.230	0.110	0.02	18.36	18.60	0.243	/
Right touch	38150/2610	20M QPSK 50%RB#50	0.659	0.292	0.10	18.36	18.60	0.696	/
Right tilt	38150/2610	20M QPSK 50%RB#50	0.411	0.179	-0.01	18.36	18.60	0.434	/
Tested at the worst position with Battery 2#									
Right touch	37850/2580	20M QPSK 1RB#50	0.648	0.272	0.12	19.21	19.60	0.709	/
Tested at the worst position with Battery 3#									
Right touch	37850/2580	20M QPSK 1RB#50	0.644	0.294	-0.02	19.21	19.60	0.705	/
Tested at the worst position with Battery 4#									
Right touch	37850/2580	20M QPSK 1RB#50	0.703	0.304	0.14	19.21	19.60	0.769	/

Table 34: Head SAR test results of LTE Band XXXVIII

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	38000/2595	20M QPSK 1RB#99	0.149	0.084	-0.01	19.56	19.60	0.150	/
Back Side	38000/2595	20M QPSK 1RB#99	0.132	0.074	-0.03	19.56	19.60	0.133	/
50%RB									
Front Side	38150/2610	20M QPSK 50%RB#50	0.136	0.076	0.17	18.36	18.60	0.144	/
Back Side	38150/2610	20M QPSK 50%RB#50	0.110	0.061	0.04	18.36	18.60	0.116	/
Tested at the worst position with Battery 2#									
Front Side	38000/2595	20M QPSK 1RB#99	**0.163**	0.089	0.19	19.56	19.60	**0.165**	Yes
Tested at the worst position with Battery 3#									
Front Side	38000/2595	20M QPSK 1RB#99	0.140	0.079	0.13	19.56	19.60	0.141	/
Tested at the worst position with Battery 4#									
Front Side	38000/2595	20M QPSK 1RB#99	0.146	0.083	-0.01	19.56	19.60	0.147	/

Table 35: Body-Worn SAR test results of LTE Band XXXVIII

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	38000/2595	20M QPSK 1RB#99	0.266	0.146	0.15	19.56	19.60	0.268	/
Back Side	38000/2595	20M QPSK 1RB#99	0.234	0.129	0.14	19.56	19.60	0.236	/
Left Side	38000/2595	20M QPSK 1RB#99	0.280	0.140	-0.14	19.56	19.60	0.283	/
Top Side	38000/2595	20M QPSK 1RB#99	0.127	0.061	0.17	19.56	19.60	0.128	/
50%RB									
Front Side	38150/2610	20M QPSK 50%RB#50	0.246	0.134	0.16	18.36	18.60	0.260	/
Back Side	38150/2610	20M QPSK 50%RB#50	0.198	0.109	0.16	18.36	18.60	0.209	/
Left Side	38150/2610	20M QPSK 50%RB#50	0.238	0.117	-0.13	18.36	18.60	0.252	/
Top Side	38150/2610	20M QPSK 50%RB#50	0.110	0.054	0.11	18.36	18.60	0.116	/

Tested at the worst position with Battery 2#									
Left Side	38000/2595	20M QPSK 1RB#99	0.173	0.088	-0.10	19.56	19.60	0.175	/
Tested at the worst position with Battery 3#									
Left Side	38000/2595	20M QPSK 1RB#99	**0.317**	0.157	-0.14	19.56	19.60	**0.320**	Yes
Tested at the worst position with Battery 4#									
Left Side	38000/2595	20M QPSK 1RB#99	0.284	0.142	-0.14	19.56	19.60	0.287	/

Table 36: Hotspot SAR test results of LTE Band XXXVIII

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

7.2.4 SAR measurement Result of GSM850 (Main Antenna)

Test Position of Head	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Left touch	190/836.6	GSM	0.112	0.075	0.12	32.83	33.00	0.116	/
Left tilt	190/836.6	GSM	0.053	0.037	0.15	32.83	33.00	0.055	/
Right touch	190/836.6	GSM	0.143	0.111	-0.01	32.83	33.00	0.149	/
Right tilt	190/836.6	GSM	0.061	0.042	0.06	32.83	33.00	0.063	/
Right touch	128/824.2	GSM	0.137	0.107	0.12	32.63	33.00	0.149	/
Right touch	251/848.8	GSM	0.145	0.112	0.13	32.61	33.00	0.159	/
Tested at the worst position with SIM2									
Right touch	251/848.8	GSM	0.136	0.094	0.13	32.61	33.00	0.149	/
Tested at the worst position with Battery 2#									
Right touch	251/848.8	GSM	0.147	0.113	0.11	32.61	33.00	0.161	/
Tested at the worst position with Battery 3#									
Right touch	251/848.8	GSM	**0.272**	0.212	-0.04	32.61	33.00	**0.298**	Yes
Tested at the worst position with Battery 4#									
Right touch	251/848.8	GSM	0.140	0.110	0.12	32.61	33.00	0.153	/

Table 37: Head SAR test results of GSM850

Test Position of Body-Worn with 15mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	190/836.6	GSM	0.129	0.091	0.03	32.83	33.00	0.134	/
Back Side	190/836.6	GSM	**0.167**	0.126	0.03	32.83	33.00	**0.174**	Yes
Tested at the worst position with SIM2									
Back Side	190/836.6	GSM	0.159	0.112	0.03	32.83	33.00	0.165	/
Tested at the worst position with Battery 2#									
Back Side	190/836.6	GSM	0.160	0.113	-0.01	32.83	33.00	0.166	/
Tested at the worst position with Battery 3#									
Back Side	190/836.6	GSM	0.149	0.106	0.01	32.83	33.00	0.155	/
Tested at the worst position with Battery 4#									
Back Side	190/836.6	GSM	0.151	0.108	0.01	32.83	33.00	0.157	/

Table 38: Body-Worn SAR test results of GSM850

Test Position of Hotspot with 10mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	190/836.6	GPRS 2TS	0.440	0.249	0.15	30.21	30.50	0.470	/
Back Side	190/836.6	GPRS 2TS	0.486	0.291	-0.05	30.21	30.50	0.520	/
Left Side	190/836.6	GPRS 2TS	0.261	0.174	-0.10	30.21	30.50	0.279	/
Right Side	190/836.6	GPRS 2TS	0.456	0.305	-0.16	30.21	30.50	0.487	/
Bottom Side	190/836.6	GPRS 2TS	0.252	0.124	-0.16	30.21	30.50	0.269	/
Tested at the worst position with SIM2									
Back Side	190/836.6	GPRS 2TS	0.478	0.320	0.01	30.21	30.50	0.511	/
Tested at the worst position with Battery 2#									
Back Side	190/836.6	GPRS 2TS	0.436	0.264	0.02	30.21	30.50	0.466	/
Tested at the worst position with Battery 3#									
Back Side	190/836.6	GPRS 2TS	**0.519**	0.306	0.08	30.21	30.50	**0.555**	Yes
Tested at the worst position with Battery 4#									
Back Side	190/836.6	GPRS 2TS	0.478	0.287	-0.05	30.21	30.50	0.511	/

Table 39: Hotspot SAR test results of GSM850

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

7.2.5 SAR measurement Result of GSM1900 (Main Antenna)

Test Position of Head	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Left touch	661/1880	GSM	0.041	0.027	0.11	28.93	30.00	0.052	/
Left tilt	661/1880	GSM	0.022	0.011	-0.18	28.93	30.00	0.029	/
Right touch	661/1880	GSM	0.030	0.019	0.11	28.93	30.00	0.039	/
Right tilt	661/1880	GSM	0.029	0.016	0.19	28.93	30.00	0.037	/
Left touch	512/1850.2	GSM	**0.046**	0.029	0.11	28.81	30.00	**0.060**	Yes
Left touch	810/1909.8	GSM	0.035	0.021	0.11	28.79	30.00	0.047	/
Tested at the worst position with SIM2									
Left touch	512/1850.2	GSM	0.044	0.026	0.11	28.81	30.00	0.058	/
Tested at the worst position with Battery 2#									
Left touch	512/1850.2	GSM	0.043	0.025	0.10	28.81	30.00	0.056	/
Tested at the worst position with Battery 3#									
Left touch	512/1850.2	GSM	0.044	0.026	0.00	28.81	30.00	0.057	/
Tested at the worst position with Battery 4#									
Left touch	512/1850.2	GSM	0.043	0.026	0.18	28.81	30.00	0.057	/

Table 40: Head SAR test results of GSM1900

Test Position of Body-Worn with 15mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GSM	0.165	0.096	0.19	28.93	30.00	0.211	/
Back Side	661/1880	GSM	0.203	0.118	0.19	28.93	30.00	0.260	/
Tested at the worst position with SIM2									
Back Side	661/1880	GSM	0.182	0.107	0.19	28.93	30.00	0.233	/
Tested at the worst position with Battery 2#									
Back Side	661/1880	GSM	**0.207**	0.121	0.13	28.93	30.00	**0.265**	Yes
Tested at the worst position with Battery 3#									
Back Side	661/1880	GSM	0.204	0.119	0.18	28.93	30.00	0.261	/
Tested at the worst position with Battery 4#									
Back Side	661/1880	GSM	0.170	0.099	0.19	28.93	30.00	0.217	/

Table 41: Body-Worn SAR test results of GSM1900

Test Position of Hotspot with 10mm	Test channel /Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GPRS 2TS	0.382	0.212	0.10	27.03	28.00	0.478	/
Back Side	661/1880	GPRS 2TS	0.479	0.265	0.16	27.03	28.00	0.599	/
Left Side	661/1880	GPRS 2TS	0.074	0.039	0.04	27.03	28.00	0.092	/
Right Side	661/1880	GPRS 2TS	0.046	0.025	0.10	27.03	28.00	0.057	/
Bottom Side	661/1880	GPRS 2TS	**1.050**	0.563	0.02	27.03	28.00	**1.313**	Yes
Bottom Side-Repeated	661/1880	GPRS 2TS	1.000	0.538	0.03	27.03	28.00	1.250	/
Bottom Side	512/1850.2	GPRS 2TS	1.040	0.563	0.02	27.18	28.00	1.256	/
Bottom Side	810/1909.8	GPRS 2TS	0.924	0.491	0.04	27.07	28.00	1.145	/
Tested at the worst position with SIM2									
Bottom Side	661/1880	GPRS 2TS	1.040	0.554	0.06	27.03	28.00	1.300	/
Tested at the worst position with Battery 2#									
Bottom Side	661/1880	GPRS 2TS	0.995	0.531	0.07	27.03	28.00	1.244	/
Tested at the worst position with Battery 3#									
Bottom Side	661/1880	GPRS 2TS	1.050	0.562	-0.04	27.03	28.00	1.313	/
Tested at the worst position with Battery 4#									
Bottom Side	661/1880	GPRS 2TS	1.030	0.555	0.03	27.03	28.00	1.288	/

Table 42: Hotspot SAR test results of GSM1900

Per KDB648474D04, 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:

Test Position of Hotspot with 10mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Product Specific 10-g SAR Exclusion
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GPRS 2TS	0.382	0.212	0.10	27.03	28.00	0.478	Yes
Back Side	661/1880	GPRS 2TS	0.479	0.265	0.16	27.03	28.00	0.599	Yes
Left Side	661/1880	GPRS 2TS	0.074	0.039	0.04	27.03	28.00	0.092	Yes
Right Side	661/1880	GPRS 2TS	0.046	0.025	0.10	27.03	28.00	0.057	Yes
Bottom Side	661/1880	GPRS 2TS	1.050	0.563	0.02	27.03	28.00	1.313	No
Bottom Side-Repeated	661/1880	GPRS 2TS	1.000	0.538	0.03	27.03	28.00	1.250	No
Bottom Side	512/1850.2	GPRS 2TS	1.040	0.563	0.02	27.18	28.00	1.256	No
Bottom Side	810/1909.8	GPRS 2TS	0.924	0.491	0.04	27.07	28.00	1.145	No
Tested at the worst position with SIM2									
Bottom Side	661/1880	GPRS 2TS	1.040	0.554	0.06	27.03	28.00	1.300	No
Tested at the worst position with Battery 2#									
Bottom Side	661/1880	GPRS 2TS	0.995	0.531	0.07	27.03	28.00	1.244	No
Tested at the worst position with Battery 3#									
Bottom Side	661/1880	GPRS 2TS	1.050	0.562	-0.04	27.03	28.00	1.313	No
Tested at the worst position with Battery 4#									
Bottom Side	661/1880	GPRS 2TS	1.030	0.555	0.03	27.03	28.00	1.288	No

Table 43: 10-g Product Specific y SAR test reduction evaluation of GSM1900

Note : According to the table above , only **Bottom Side** 10-g Product Specific SAR test are required for this frequency band:

Test Position of Product Specific 10-g with 0mm	Test channel /Freq.	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled 10-g SAR (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
Bottom Side	661/1880	GPRS 2TS	2.890	1.240	-0.18	27.03	28.00	1.550	/
Tested at the worst position with SIM2									
Bottom Side	661/1880	GPRS 2TS	2.980	1.270	-0.11	27.03	28.00	1.588	/
Tested at the worst position with Battery 2#									
Bottom Side	661/1880	GPRS 2TS	3.190	**1.370**	-0.13	27.03	28.00	**1.713**	Yes
Tested at the worst position with Battery 3#									
Bottom Side	661/1880	GPRS 2TS	2.750	1.180	-0.07	27.03	28.00	1.475	/
Tested at the worst position with Battery 4#									
Bottom Side	661/1880	GPRS 2TS	2.830	1.210	-0.03	27.03	28.00	1.513	/

Table 44: Product Specific 10-g SAR results of GSM1900

7.2.6 SAR measurement Result of LTE Band VII (Main Antenna)

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Left touch	21350/2560	20M QPSK 1RB#50	0.034	0.018	-0.14	23.96	24.00	0.035	/
Left tilt	21350/2560	20M QPSK 1RB#50	0.007	0.003	0.11	23.96	24.00	0.007	/
Right touch	21350/2560	20M QPSK 1RB#50	**0.042**	0.022	0.00	23.96	24.00	**0.042**	Yes
Right tilt	21350/2560	20M QPSK 1RB#50	0.024	0.010	-0.19	23.96	24.00	0.024	/
Right touch	20850/2510	20M QPSK 1RB#50	0.032	0.017	0.00	23.40	24.00	0.036	/
Right touch	21100/2535	20M QPSK 1RB#99	0.037	0.020	0.00	23.49	24.00	0.042	/
50%RB									
Left touch	21350/2560	20M QPSK 50%RB#0	0.040	0.020	0.19	22.92	23.00	0.041	/
Left tilt	21350/2560	20M QPSK 50%RB#0	0.006	0.001	0.15	22.92	23.00	0.006	/
Right touch	21350/2560	20M QPSK 50%RB#0	0.037	0.019	0.00	22.92	23.00	0.037	/
Right tilt	21350/2560	20M QPSK 50%RB#0	0.020	0.008	0.19	22.92	23.00	0.021	/
Tested at the worst position with Battery 2#									
Right touch	21350/2560	20M QPSK 1RB#50	0.033	0.017	0.00	23.96	24.00	0.033	/
Tested at the worst position with Battery 3#									
Right touch	21350/2560	20M QPSK 1RB#50	0.038	0.020	0.00	23.96	24.00	0.038	/
Tested at the worst position with Battery 4#									
Right touch	21350/2560	20M QPSK 1RB#50	0.037	0.020	0.00	23.96	24.00	0.037	/

Table 45: Head SAR test results of LTE Band VII

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	21350/2560	20M QPSK 1RB#50	0.341	0.190	0.15	23.96	24.00	0.344	/
Back Side	21350/2560	20M QPSK 1RB#50	0.327	0.180	0.15	23.96	24.00	0.330	/
50%RB									
Front Side	21350/2560	20M QPSK 50%RB#0	0.272	0.149	0.04	22.92	23.00	0.277	/
Back Side	21350/2560	20M QPSK 50%RB#0	0.265	0.145	0.18	22.92	23.00	0.270	/
Tested at the worst position with Battery 2#									
Front Side	21350/2560	20M QPSK 1RB#50	0.312	0.169	0.18	23.96	24.00	0.315	/
Tested at the worst position with Battery 3#									
Front Side	21350/2560	20M QPSK 1RB#50	0.284	0.154	0.19	23.96	24.00	0.287	/
Tested at the worst position with Battery 4#									
Front Side	21350/2560	20M QPSK 1RB#50	**0.365**	0.205	0.14	23.96	24.00	**0.368**	Yes

Table 46: Body-Worn SAR test results of LTE Band VII

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	21350/2560	20M QPSK 1RB#99	0.348	0.178	0.15	20.07	20.50	0.384	/
Back Side	21350/2560	20M QPSK 1RB#99	0.491	0.222	0.08	20.07	20.50	0.542	/
Left Side	21350/2560	20M QPSK 1RB#99	0.217	0.099	0.10	20.07	20.50	0.240	/
Right Side	21350/2560	20M QPSK 1RB#99	0.058	0.035	-0.11	20.07	20.50	0.064	/
Bottom Side	21350/2560	20M QPSK 1RB#99	**0.814**	0.399	0.01	20.07	20.50	**0.899**	Yes
Bottom Side-Repeated	21350/2560	20M QPSK 1RB#99	0.768	0.373	-0.13	20.07	20.50	0.848	/
Bottom Side	20850/2510	20M QPSK 1RB#50	0.698	0.343	-0.12	19.56	20.50	0.867	/
Bottom Side	21100/2535	20M QPSK 1RB#50	0.756	0.366	0.01	19.89	20.50	0.870	/
50%RB									
Front Side	21350/2560	20M QPSK 50%RB#0	0.267	0.138	0.12	19.03	19.50	0.298	/
Back Side	21350/2560	20M QPSK 50%RB#0	0.384	0.200	0.19	19.03	19.50	0.428	/
Left Side	21350/2560	20M QPSK 50%RB#0	0.161	0.074	-0.17	19.03	19.50	0.179	/
Right Side	21350/2560	20M QPSK 50%RB#0	0.044	0.026	-0.14	19.03	19.50	0.049	/
Bottom Side	21350/2560	20M QPSK 50%RB#0	0.624	0.305	0.07	19.03	19.50	0.695	/
100%RB									
Bottom Side	21350/2560	20M QPSK 100%RB#0	0.620	0.304	0.02	18.99	19.50	0.697	/
Tested at the worst position with Battery 2#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.641	0.307	0.12	20.07	20.50	0.708	/
Tested at the worst position with Battery 3#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.736	0.353	0.06	20.07	20.50	0.813	/
Tested at the worst position with Battery 4#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.778	0.380	0.08	20.07	20.50	0.859	/

Table 47: Hotspot SAR test results of LTE Band VII

Per KDB648474D04, 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:

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	10-g Product Specific SAR Exclusion
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	21350/2560	20M QPSK 1RB#99	0.348	0.178	0.15	20.07	24.00	0.860	Yes
Back Side	21350/2560	20M QPSK 1RB#99	0.491	0.222	0.08	20.07	24.00	1.214	NO
Left Side	21350/2560	20M QPSK 1RB#99	0.217	0.099	0.10	20.07	24.00	0.536	Yes
Right Side	21350/2560	20M QPSK 1RB#99	0.058	0.035	-0.11	20.07	24.00	0.143	Yes
Bottom Side	21350/2560	20M QPSK 1RB#99	0.814	0.399	0.01	20.07	24.00	2.012	NO
Bottom Side Repeated	21350/2560	20M QPSK 1RB#99	0.768	0.373	-0.13	20.07	24.00	1.898	NO
Bottom Side	20850/2510	20M QPSK 1RB#50	0.698	0.343	-0.12	19.56	24.00	1.940	NO
Bottom Side	21100/2535	20M QPSK 1RB#50	0.756	0.366	0.01	19.89	24.00	1.948	NO
50%RB									
Front Side	21350/2560	20M QPSK 50%RB#0	0.267	0.138	0.12	19.03	23.00	0.666	Yes
Back Side	21350/2560	20M QPSK 50%RB#0	0.384	0.200	0.19	19.03	23.00	0.958	Yes
Left Side	21350/2560	20M QPSK 50%RB#0	0.161	0.074	-0.17	19.03	23.00	0.402	Yes
Right Side	21350/2560	20M QPSK 50%RB#0	0.044	0.026	-0.14	19.03	23.00	0.109	Yes
Bottom Side	21350/2560	20M QPSK 50%RB#0	0.624	0.305	0.07	19.03	23.00	1.557	NO
100%RB									
Bottom Side	21350/2560	20M QPSK 100%RB#0	0.620	0.304	0.02	18.99	23.00	1.561	NO
Tested at the worst position with Battery 2#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.641	0.307	0.12	20.07	24.00	1.584	NO
Tested at the worst position with Battery 3#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.736	0.353	0.06	20.07	24.00	1.819	NO
Tested at the worst position with Battery 4#									
Bottom Side	21350/2560	20M QPSK 1RB#99	0.778	0.380	0.08	20.07	24.00	1.923	NO

Table 48: 10-g Product Specific SAR test reduction evaluation of LTE Band VII

According to the table above , only **Back Side** and **Bottom Side** Product Specific 10-g SAR test are required for this frequency band:

Test Position of Product Specific 10-g SAR with 0mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled $SAR_{10\text{-}g}$ (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Back Side	21350/2560	20M QPSK 1RB#50	7.940	2.900	0.16	23.96	24.00	2.927	/
Back Side	20850/2510	20M QPSK 1RB#50	7.090	2.640	0.12	23.40	24.00	3.031	/
Back Side	21100/2535	20M QPSK 1RB#99	7.090	2.600	-0.11	23.49	24.00	2.924	/
Bottom Side	21350/2560	20M QPSK 1RB#50	4.410	1.440	-0.02	23.96	24.00	1.453	/
50%RB									
Back Side	21350/2560	20M QPSK 50%RB#0	5.320	2.160	0.18	22.92	23.00	2.200	/
Back Side	20850/2510	20M QPSK 50%RB#25	4.800	1.960	0.19	22.37	23.00	2.266	/
Back Side	21100/2535	20M QPSK 50%RB#0	4.940	2.010	0.15	22.62	23.00	2.194	/
Bottom Side	21350/2560	20M QPSK 50%RB#0	2.580	1.010	0.12	22.92	23.00	1.029	/
100%RB									
Back Side	21350/2560	20M QPSK 100%RB#0	4.710	1.820	0.13	22.90	23.00	1.862	/
Tested at the worst position with Battery 2#									
Back Side	20850/2510	20M QPSK 1RB#50	7.230	2.680	-0.14	23.40	24.00	3.077	/
Tested at the worst position with Battery 3#									
Back Side	20850/2510	20M QPSK 1RB#50	8.150	**2.950**	0.11	23.40	24.00	**3.387**	Yes
Back Side-Repeated	20850/2510	20M QPSK 1RB#50	7.560	2.760	0.16	23.40	24.00	3.169	/
Tested at the worst position with Battery 4#									
Back Side	20850/2510	20M QPSK 1RB#50	7.070	2.620	-0.17	23.40	24.00	3.008	/

Table 49: Product Specific 10-g SAR results of LTE Band VII

7.2.7 SAR measurement Result of LTE Band XXXVIII (Main Antenna)

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Left touch	38150/2610	20M QPSK 1RB#50	0.048	0.025	0.16	23.64	24.00	0.052	/
Left tilt	38150/2610	20M QPSK 1RB#50	0.014	0.007	0.10	23.64	24.00	0.015	/
Right touch	38150/2610	20M QPSK 1RB#50	0.063	0.034	0.00	23.64	24.00	0.068	/
Right tilt	38150/2610	20M QPSK 1RB#50	0.020	0.011	0.10	23.64	24.00	0.021	/
Right touch	37850/2580	20M QPSK 1RB#50	**0.064**	0.033	0.00	23.00	24.00	**0.081**	Yes
Right touch	38000/2595	20M QPSK 1RB#0	0.055	0.029	0.11	23.39	24.00	0.063	/
50%RB									
Left touch	38150/2610	20M QPSK 50%RB#0	0.035	0.019	0.00	22.22	23.00	0.042	/
Left tilt	38150/2610	20M QPSK 50%RB#0	0.009	0.004	0.15	22.22	23.00	0.011	/
Right touch	38150/2610	20M QPSK 50%RB#0	0.055	0.028	0.00	22.22	23.00	0.066	/
Right tilt	38150/2610	20M QPSK 50%RB#0	0.016	0.008	0.16	22.22	23.00	0.019	/
Tested at the worst position with Battery 2#									
Right touch	37850/2580	20M QPSK 1RB#50	0.057	0.030	0.00	23.00	24.00	0.072	/
Tested at the worst position with Battery 3#									
Right touch	37850/2580	20M QPSK 1RB#50	0.050	0.026	-0.10	23.00	24.00	0.063	/
Tested at the worst position with Battery 4#									
Right touch	37850/2580	20M QPSK 1RB#50	0.054	0.028	0.00	23.00	24.00	0.068	/

Table 50: Head SAR test results of LTE Band XXXVIII

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	38150/2610	20M QPSK 1RB#50	**0.265**	0.144	-0.16	23.64	24.00	**0.288**	Yes
Back Side	38150/2610	20M QPSK 1RB#50	0.254	0.138	0.06	23.64	24.00	0.276	/
50%RB									
Front Side	38150/2610	20M QPSK 50%RB#0	0.203	0.110	0.16	22.22	23.00	0.243	/
Back Side	38150/2610	20M QPSK 50%RB#0	0.196	0.106	0.14	22.22	23.00	0.235	/
Tested at the worst position with Battery 2#									
Front Side	38150/2610	20M QPSK 1RB#50	0.132	0.071	0.16	23.64	24.00	0.143	/
Tested at the worst position with Battery 3#									
Front Side	38150/2610	20M QPSK 1RB#50	0.191	0.103	0.13	23.64	24.00	0.208	/
Tested at the worst position with Battery 4#									
Front Side	38150/2610	20M QPSK 1RB#50	0.201	0.109	0.16	23.64	24.00	0.218	/

Table 51: Body-Worn SAR test results of LTE Band XXXVIII

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	38150/2610	20M QPSK 1RB#50	0.380	0.205	0.07	23.64	24.00	0.413	/
Back Side	38150/2610	20M QPSK 1RB#50	0.475	0.219	0.18	23.64	24.00	0.516	/
Left Side	38150/2610	20M QPSK 1RB#50	0.245	0.120	-0.12	23.64	24.00	0.266	/
Right Side	38150/2610	20M QPSK 1RB#50	0.062	0.037	0.15	23.64	24.00	0.068	/
Bottom Side	38150/2610	20M QPSK 1RB#50	1.010	0.494	0.01	23.64	24.00	1.097	/
Bottom Side	37850/2580	20M QPSK 1RB#50	**1.070**	0.526	-0.09	23.00	24.00	**1.347**	Yes
Bottom Side-Repeated	37850/2580	20M QPSK 1RB#50	1.060	0.520	0.15	23.00	24.00	1.334	/
Bottom Side	38000/2595	20M QPSK 1RB#0	0.968	0.472	0.18	23.39	24.00	1.114	/
50%RB									
Front Side	38150/2610	20M QPSK 50%RB#0	0.319	0.172	0.11	22.22	23.00	0.382	/
Back Side	38150/2610	20M QPSK 50%RB#0	0.369	0.191	0.13	22.22	23.00	0.442	/
Left Side	38150/2610	20M QPSK 50%RB#0	0.199	0.098	0.19	22.22	23.00	0.238	/
Right Side	38150/2610	20M QPSK 50%RB#0	0.061	0.036	0.11	22.22	23.00	0.072	/
Bottom Side	38150/2610	20M QPSK 50%RB#0	0.848	0.414	0.00	22.22	23.00	1.015	/
Bottom Side	37850/2580	20M QPSK 50%RB#50	0.818	0.400	-0.02	22.11	23.00	1.004	/
Bottom Side	38000/2595	20M QPSK 50%RB#0	0.828	0.405	0.04	22.19	23.00	0.998	/
100%RB									
Bottom Side	38150/2610	20M QPSK 100%RB#0	0.870	0.423	0.01	22.26	23.00	1.032	/
Tested at the worst position with Battery 2#									
Bottom Side	37850/2580	20M QPSK 1RB#50	0.799	0.391	0.15	23.00	24.00	1.006	/
Tested at the worst position with Battery 3#									
Bottom Side	37850/2580	20M QPSK 1RB#50	0.823	0.402	0.18	23.00	24.00	1.036	/
Tested at the worst position with Battery 4#									
Bottom Side	37850/2580	20M QPSK 1RB#50	1.040	0.512	-0.10	23.00	24.00	1.309	/

Table 52: Hotspot SAR test results of LTE Band XXXVIII

Per KDB648474D04, when hotspot mode applies, 10-g Product Specific 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:

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conduct Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	10-g Product Specific SAR Exclusion
			1-g	10-g					
Test data with battery 1#									
1RB									
Front Side	38150/2610	20M QPSK 1RB#50	0.380	0.205	0.07	23.64	24.00	0.413	Yes
Back Side	38150/2610	20M QPSK 1RB#50	0.475	0.219	0.18	23.64	24.00	0.516	Yes
Left Side	38150/2610	20M QPSK 1RB#50	0.245	0.120	-0.12	23.64	24.00	0.266	Yes
Right Side	38150/2610	20M QPSK 1RB#50	0.062	0.037	0.15	23.64	24.00	0.068	Yes
Bottom Side	38150/2610	20M QPSK 1RB#50	1.010	0.494	0.01	23.64	24.00	1.097	Yes
Bottom Side	37850/2580	20M QPSK 1RB#50	1.070	0.526	-0.09	23.00	24.00	1.347	No
Bottom Side-Repeated	37850/2580	20M QPSK 1RB#50	1.060	0.520	0.15	23.00	24.00	1.334	No
Bottom Side	38000/2595	20M QPSK 1RB#0	0.968	0.472	0.18	23.39	24.00	1.114	Yes
50%RB									
Front Side	38150/2610	20M QPSK 50%RB#0	0.319	0.172	0.11	22.22	23.00	0.382	Yes
Back Side	38150/2610	20M QPSK 50%RB#0	0.369	0.191	0.13	22.22	23.00	0.442	Yes
Left Side	38150/2610	20M QPSK 50%RB#0	0.199	0.098	0.19	22.22	23.00	0.238	Yes
Right Side	38150/2610	20M QPSK 50%RB#0	0.061	0.036	0.11	22.22	23.00	0.072	Yes
Bottom Side	38150/2610	20M QPSK 50%RB#0	0.848	0.414	0.00	22.22	23.00	1.015	Yes
Bottom Side	37850/2580	20M QPSK 50%RB#50	0.818	0.400	-0.02	22.11	23.00	1.004	Yes
Bottom Side	38000/2595	20M QPSK 50%RB#0	0.828	0.405	0.04	22.19	23.00	0.998	Yes
100%RB									
Bottom Side	38150/2610	20M QPSK 100%RB#0	0.870	0.423	0.01	22.26	23.00	1.032	Yes
Tested at the worst position with Battery 2#									
Bottom Side	37850/2580	20M QPSK 1RB#50	0.799	0.391	0.15	23.00	24.00	1.006	Yes

Tested at the worst position with Battery 3#									
Bottom Side	37850/2580	20M QPSK 1RB#50	0.823	0.402	0.18	23.00	24.00	1.036	Yes
Tested at the worst position with Battery 4#									
Bottom Side	37850/2580	20M QPSK 1RB#50	1.040	0.512	-0.10	23.00	24.00	1.309	No

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

According to the table above , only **Bottom Side** Product Specific 10-g SAR test is required for this frequency band:

Test Position of Product Specific 10-g SAR with 0mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled $SAR_{10\text{-}g}$ (W/kg)	SAR Plot
			1-g	10-g					
Test data with battery 1#									
1RB									
Bottom Side	38150/2610	20M QPSK 1RB#50	6.490	**2.130**	0.15	23.64	24.00	2.314	Yes
Bottom Side-Repeated	38150/2610	20M QPSK 1RB#50	6.220	2.040	0.14	23.64	24.00	2.216	/
Bottom Side	37850/2580	20M QPSK 1RB#50	6.440	2.120	0.18	23.00	24.00	**2.669**	/
Bottom Side	38000/2595	20M QPSK 1RB#0	6.140	2.010	0.14	23.39	24.00	2.313	/
50%RB									
Bottom Side	38150/2610	20M QPSK 50%RB#0	5.260	1.700	0.12	22.22	23.00	2.034	/
Bottom Side	37850/2580	20M QPSK 50%RB#50	3.580	1.350	0.04	22.11	23.00	1.657	/
Bottom Side	38000/2595	20M QPSK 50%RB#0	3.530	1.340	0.12	22.19	23.00	1.615	/
100%RB									
Bottom Side	38150/2610	20M QPSK 100%RB#0	3.690	1.390	0.13	22.26	23.00	1.648	/
Tested at the worst position with Battery 2#									
Bottom Side	37850/2580	20M QPSK 1RB#50	5.850	1.920	0.12	23.00	24.00	2.417	/
Tested at the worst position with Battery 3#									
Bottom Side	37850/2580	20M QPSK 1RB#50	5.190	1.680	0.18	23.00	24.00	2.115	/
Tested at the worst position with Battery 4#									
Bottom Side	37850/2580	20M QPSK 1RB#50	5.990	1.960	0.15	23.00	24.00	2.467	/

Table 54: Product Specific 10-g SAR results of LTE Band XXXVIII

7.2.8 SAR measurement Result of WiFi 2.4G

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g Area Scan	1-g Zoom Scan					
Test data with battery 1#									
Left touch	11/2462	802.11 b	0.447	0.381	-0.100	11.98	12.50	0.429	/
Left tilt	11/2462	802.11 b	0.374	0.150	0.020	11.98	12.50	0.169	/
Right touch	11/2462	802.11 b	0.233	0.206	-0.180	11.98	12.50	0.232	/
Right tilt	11/2462	802.11 b	0.125	0.116	-0.110	11.98	12.50	0.131	/
Left touch	1/2412	802.11 b	0.360	/	0.090	11.67	12.50	/	/
Left touch	6/2437	802.11 b	0.424	**0.384**	0.120	11.45	12.50	0.489	Yes
Tested at the worst position with Battery 2#									
Left touch	6/2437	802.11 b	0.410	0.351	0.120	11.45	12.50	0.447	/
Tested at the worst position with Battery 3#									
Left touch	6/2437	802.11 b	0.398	0.357	-0.050	11.45	12.50	0.455	/
Tested at the worst position with Battery 4#									
Left touch	6/2437	802.11 b	0.430	0.332	0.000	11.45	12.50	0.423	/

Table 55: Head SAR test results of WiFi 2450MHz

According to KDB248227 D01,The reported SAR must be scaled to 100% transmission duty factor to determine compliance at maximum tune-up tolerance limit.The scaled reported SAR is presented as below.

Test Position of Head	Test channel / Freq.(MHz)	Test Mode	Scaled SAR_{1-g} (W/kg)	Actual duty factor	Maximum duty factor	Scaled Reported SAR_{1-g} (W/kg)
Test data with battery 1#						
Left touch	11/2462	802.11 b	0.429	97.6%	100%	0.440
Left tilt	11/2462	802.11 b	0.169	97.6%	100%	0.173
Right touch	11/2462	802.11 b	0.232	97.6%	100%	0.238
Right tilt	11/2462	802.11 b	0.131	97.6%	100%	0.134
Left touch	1/2412	802.11 b	/	97.6%	100%	/
Left touch	6/2437	802.11 b	0.489	97.6%	100%	**0.501**
Tested at the worst position with battery 2#						
Left touch	6/2437	802.11 b	0.447	97.6%	100%	0.458
Tested at the worst position with Battery 3#						
Left touch	6/2437	802.11 b	0.455	97.6%	100%	0.466
Tested at the worst position with Battery 4#						
Left touch	6/2437	802.11 b	0.423	97.6%	100%	0.433

Mode	Tune-up（dBm）	Tune-up（mW）	Hightest Reported SAR(W/kg)	Adjusted SAR (W/kg)	SAR test
802.11b	12.50	17.78	0.501	/	Yes
802.11g	12.50	17.78	/	0.501	No
802.11n 20M	12.50	17.78	/	0.501	No

Note: Per KDB248227D01, for Head SAR test of WiFi 2.4G,

1) SAR is measured for 2.4 GHz 802.11b DSSS using the initial test position procedure.

2) As the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is < 1.2 W/kg, so SAR for 802.11g/n is not required.

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g Area Scan	1-g Zoom Scan					
Test data with battery 1#									
Front Side	11/2462	802.11 b	0.216	0.219	0.040	19.28	19.50	0.230	/
Back Side	11/2462	802.11 b	0.222	**0.223**	0.160	19.28	19.50	0.235	Yes
Tested at the worst position with Battery 2#									
Back Side	11/2462	802.11 b	0.207	0.212	0.100	19.28	19.50	0.223	/
Tested at the worst position with Battery 3#									
Back Side	11/2462	802.11 b	0.154	0.178	0.020	19.28	19.50	0.187	/
Tested at the worst position with Battery 4#									
Back Side	11/2462	802.11 b	0.165	0.186	0.190	19.28	19.50	0.196	/

Table 56: Body-Worn SAR test results of WiFi 2450MHz

According to KDB248227 D01,The reported SAR must be scaled to 100% transmission duty factor to determine compliance at maximum tune-up tolerance limit.The scaled reported SAR is presented as below.

Test Position of Body-Worn with 15mm	Test channel / Freq.(MHz)	Test Mode	Scaled SAR_{1-g} (W/kg)	Actual duty factor	Maximum duty factor	Scaled Reported SAR_{1-g} (W/kg)
Test data with battery 1#						
Front Side	11/2462	802.11 b	0.230	97.6%	100%	0.236
Back Side	11/2462	802.11 b	0.235	97.6%	100%	**0.241**
Tested at the worst position with battery 2#						
Back Side	11/2462	802.11 b	0.223	97.6%	100%	0.228
Tested at the worst position with Battery 3#						
Back Side	11/2462	802.11 b	0.187	97.6%	100%	0.192
Tested at the worst position with Battery 4#						
Back Side	11/2462	802.11 b	0.196	97.6%	100%	0.201

Mode	Tune-up（dBm）	Tune-up（mW）	Hightest Reported SAR(W/kg)	Adjusted SAR (W/kg)	SAR test
802.11b	19.50	89.13	0.241	/	Yes
802.11g	17.50	56.23	/	0.152	No
802.11n 20M	15.50	35.48	/	0.096	No

Note: Per KDB248227D01, for Head SAR test of WiFi 2.4G,

1) SAR is measured for 2.4 GHz 802.11b DSSS using the initial test position procedure.

2) As the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is < 1.2 W/kg, so SAR for 802.11g/n is not required.

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	SAR Plot
			1-g Area Scan	1-g Zoom Scan					
Test data with battery 1#									
Front Side	11/2462	802.11 b	0.300	0.305	-0.080	19.28	19.50	0.321	/
Back Side	11/2462	802.11 b	0.352	**0.369**	0.140	19.28	19.50	0.388	Yes
Left Side	11/2462	802.11 b	0.039	/	0.150	19.28	19.50	/	/
Right Side	11/2462	802.11 b	0.364	0.362	0.100	19.28	19.50	0.381	/
Top Side	11/2462	802.11 b	0.267	0.116	0.180	19.28	19.50	0.122	/
Tested at the worst position with Battery 2#									
Back Side	11/2462	802.11 b	0.322	0.327	0.110	19.28	19.50	0.344	/
Tested at the worst position with Battery 3#									
Back Side	11/2462	802.11 b	0.345	0.351	0.150	19.28	19.50	0.369	/
Tested at the worst position with Battery 4#									
Back Side	11/2462	802.11 b	0.322	0.338	0.140	19.28	19.50	0.356	/

Table 57: Hotspot SAR test results of WiFi 2450MHz

According to KDB248227 D01,The reported SAR must be scaled to 100% transmission duty factor to determine compliance at maximum tune-up tolerance limit.The scaled reported SAR is presented as below.

Test Position of Hotspot with 10mm	Test channel / Freq.(MHz)	Test Mode	Scaled SAR_{1-g} (W/kg)	Actual duty factor	Maximum duty factor	Scaled Reported SAR_{1-g} (W/kg)
Test data with battery 1#						
Front Side	11/2462	802.11 b	0.321	97.6%	100%	0.329
Back Side	11/2462	802.11 b	0.388	97.6%	100%	**0.398**
Left Side	11/2462	802.11 b	/	97.6%	100%	/
Right Side	11/2462	802.11 b	0.381	97.6%	100%	0.390
Top Side	11/2462	802.11 b	0.122	97.6%	100%	0.125
Tested at the worst position with battery 2#						
Back Side	11/2462	802.11 b	0.344	97.6%	100%	0.352
Tested at the worst position with Battery 3#						
Back Side	11/2462	802.11 b	0.369	97.6%	100%	0.378

Tested at the worst position with Battery 4#						
Back Side	11/2462	802.11 b	0.356	97.6%	100%	0.365

Note: Per KDB 648474 D04, Product Specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2 W/kg.

Mode	Tune-up（dBm）	Tune-up（mW）	Hightest Reported SAR(W/kg)	Adjusted SAR (W/kg)	SAR test
802.11b	19.50	89.13	0.398	/	Yes
802.11g	17.50	56.23	/	0.251	No
802.11n 20M	15.50	35.48	/	0.158	No

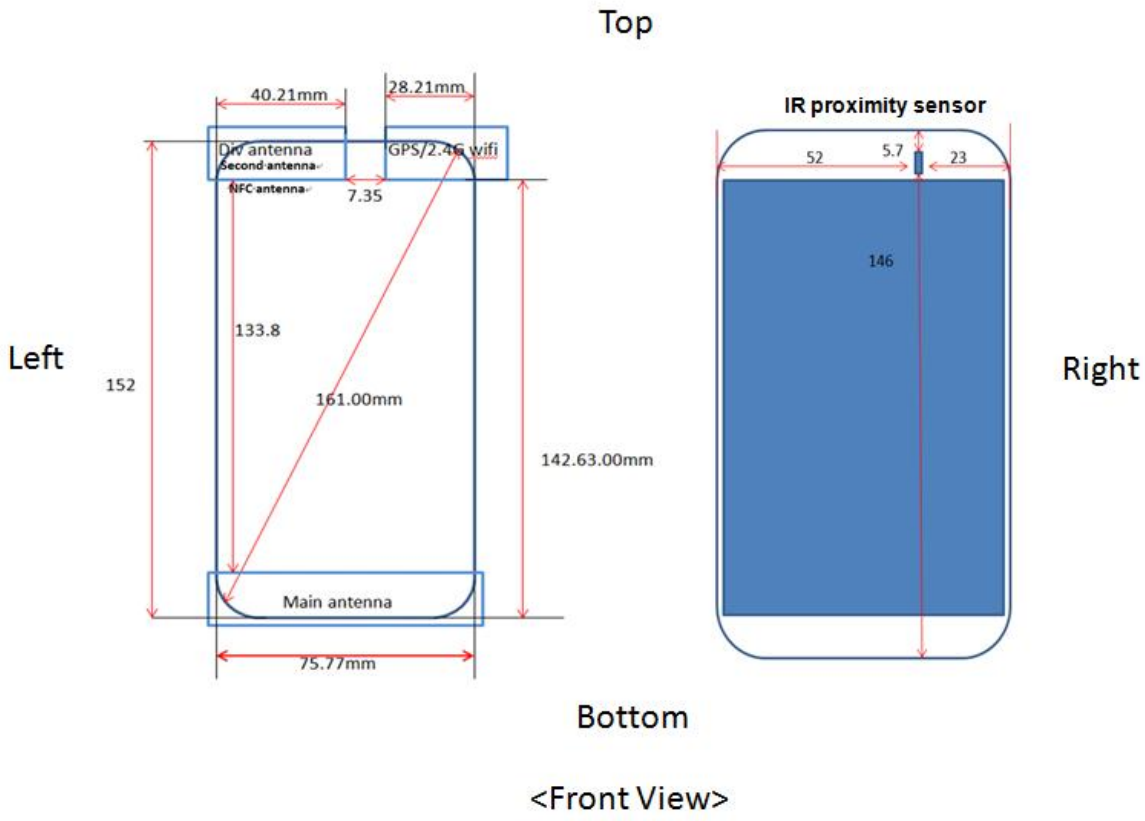
Note: Per KDB248227D01, for Head SAR test of WiFi 2.4G,

1) SAR is measured for 2.4 GHz 802.11b DSSS using the initial test position procedure.

2) As the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM 802.11g/n to DSSS specified maximum output power and the adjusted SAR is < 1.2 W/kg, so SAR for 802.11g/n is not required.

7.3 Multiple Transmitter Evaluation

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498D01 General RF Exposure Guidance v06
The location of the antennas inside the device is shown as below picture:



Note:
1) Per KDB 648474 D04, because the diagonal distance of this device is > 160mm, it is considered a “Phablet” device.
2) The device has two 2G/3G/4G Tx antennas (Main Antenna and Second Antenna). It can transmit from either Main Antenna or Second Antenna, but they can not transmit simultaneously.
3) The device supports NFC function. Per KDB 648474 D04, Phones with built-in NFC functions do not require separate SAR testing and can generally be tested according to the SAR measurement procedures normally required for the phone. Influences of the hardware introduced by the built-in NFC functions are inherently considered through testing of the other transmitters that require SAR.

Mode	Exposure Condition	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
Main antenna	Hotspot/ Product Specific	Yes	Yes	Yes	Yes	No	Yes
Second antenna	Hotspot/ Product Specific	Yes	Yes	Yes	No	Yes	No
WiFi 2.4G Antenna	Hotspot/ Product Specific	Yes	Yes	Yes	Yes	Yes	No

Table 58: Sides for Hotspot SAR testing

Note:
1) Per KDB 941225 D06 and KDB 648474 D04, particular DUT edges were not required to be evaluated for Hotspot and/or Product Specific SAR if the antenna-to-edge distance is greater than 2.5cm.
2) Per KDB 648474 D04, when hotspot mode applies, 10-g Product Specific SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg;

7.3.1 Stand-alone SAR test exclusion

Per FCC KDB 447498D01v05, 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 extremity 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	2.480	1.32	3.00	Yes
BT	10-g Product Specific	11.00	12.59	5	2.480	3.97	7.50	Yes

Table 59: Standalone SAR test exclusion for BT

Note:

1)* - maximum possible output power declared by manufacturer

2) Held to ear configurations are not applicable to Bluetooth for this device.

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

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	0.176
BT	Product Specific10-g	11.00	12.59	5	2.480	18.75	0.211

Table 60: Estimated SAR calculation for BT

Note:

1) * - maximum possible output power declared by manufacturer

2) Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.

7.3.2 Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

No.	Configuration	Head	Body-worn (15mm)	Hotspot (10mm)	Product Specific 10-g(0mm)
1	GSM(Voice) + BT	No	Yes	No	Yes
2	GSM(DATA) + BT	No	No	No	Yes
3	GSM(Voice)+ WiFi 2.4G	Yes	Yes	No	Yes
4	GSM(DATA) + WiFi 2.4G	No	No	Yes	Yes
5	LTE + BT	No	Yes	No	Yes
6	LTE + WLAN 2.4G	Yes	Yes	Yes	Yes

Table 61: Simultaneous Transmission Possibilities

Note:

1) 2G&3G&4G can't transmit simutanously.It can transmit from either 2G&3G&4G Main antenna or 2G&3G&4G Second antenna, but Main antenna and Second antenna can't transmit simutanously,

3) WiFi 2.4G and BT can't transmit simutanously.

4) The device supports VoLTE function.

5) The device does not support GSM DTM function. Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

6) Held to ear configurations are not applicable to Bluetooth for this device.

7) The device does not support WiFi VOIP function

7.3.3 SAR Summation Scenario

Test Position		Second antenna SAR_{Max}				WiFi/BT antenna SAR_{Max}		Σ1-g or Product Specific 10-g SAR	SPLSR	Volume scan
		GSM850	GSM1900	LTE Band VII	LTE Band XXXVIII	WiFi 2.4G	BT			
Head	Left touch	0.660	0.376	0.440	0.290	0.501	/	1.161	N/A	N/A
	Left tilt	0.579	0.445	0.384	0.286	0.173	/	0.752	N/A	N/A
	Right touch	1.099	1.231	1.292	0.781	0.238	/	**1.530**	N/A	N/A
	Right tilt	0.883	0.899	1.006	0.434	0.134	/	1.140	N/A	N/A
Body 15mm	Front side	0.314	0.099	0.103	0.165	0.236	0.176	0.550	N/A	N/A
	Back side	0.310	0.069	0.088	0.133	0.241	0.176	0.551	N/A	N/A
Hotspot 10mm	Front side	0.666	0.262	0.206	0.268	0.329	/	0.995	N/A	N/A
	Back side	0.810	0.195	0.172	0.236	0.398	/	1.208	N/A	N/A
	Left side	0.494	0.253	0.178	0.320	0.398	/	0.892	N/A	N/A
	Right side	/	/	/	/	0.390	/	0.390	N/A	N/A
	Top side	0.589	0.347	0.113	0.128	0.125	/	0.714	N/A	N/A
	Bottom side	/	/	/	/	/	/	0.000	N/A	N/A
Product Specific 10-g SAR 0mm	Front side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Back side	/	/	/	/	/	0.211	**0.211**	N/A	N/A
	Left side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Right side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Top side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Bottom side	/	/	/	/	/	/	0.000	N/A	N/A

Table 62: SAR Simultaneous Tx Combination of Second Antenna and 2.4G WiFi/BT.

Test Position		Main antenna SAR_{Max}				WiFi/BT antenna SAR_{Max}		Σ1-g or Product Specific 10-g SAR	SPLSR	Volume scan
		GSM850	GSM1900	LTE Band VII	LTE Band XXXVIII	WiFi 2.4G	BT			
Head	Left touch	0.116	0.060	0.041	0.052	0.501	/	0.617	N/A	N/A
	Left tilt	0.055	0.029	0.007	0.015	0.173	/	0.228	N/A	N/A
	Right touch	0.298	0.039	0.042	0.081	0.238	/	0.536	N/A	N/A
	Right tilt	0.063	0.037	0.024	0.021	0.134	/	0.197	N/A	N/A
Body-worn 15mm	Front side	0.134	0.211	0.368	0.288	0.236	0.176	0.604	N/A	N/A
	Back side	0.174	0.265	0.330	0.276	0.241	0.176	0.571	N/A	N/A
Hotspot 10mm	Front side	0.470	0.478	0.384	0.413	0.329	/	0.807	N/A	N/A
	Back side	0.555	0.599	0.542	0.516	0.398	/	0.997	N/A	N/A
	Left side	0.279	0.092	0.240	0.266	0.398	/	0.677	N/A	N/A
	Right side	0.487	0.057	0.064	0.062	0.390	/	0.877	N/A	N/A
	Top side	/	/	/	/	0.125	/	0.125	N/A	N/A
	Bottom side	0.269	1.313	0.899	1.347	/	/	**1.347**	N/A	N/A
Product Specific 10-g SAR 0mm	Front side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Back side	/	/	3.387	/	/	0.211	**3.598**	N/A	N/A
	Left side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Right side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Top side	/	/	/	/	/	0.211	0.211	N/A	N/A
	Bottom side	/	1.713	1.453	2.669	/	/	2.669	N/A	N/A

Table 63: SAR Simultaneous Tx Combination of Main Antenna and 2.4G WiFi/BT.

Note: Per KDB 648474 D04, simultaneous transmission SAR consideration for Product Specific 10-g SAR requires consideration only when standalone 10-g SAR is required.

7.3.4 Simultaneous Transmission Conlcusion

The above numeral summed SAR results and/or SPLSR analysis 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 D01v06

Appendix A. System Check Plots
(Pls See Appendix No.: SYBH(Z-SAR)044052016-2A, total: 10 pages)

Appendix B. SAR Measurement Plots
(Pls See Appendix No.: SYBH(Z-SAR)044052016-2B, total: 33 pages)

Appendix C. Calibration Certificate
(Pls See Appendix No.: SYBH(Z-SAR)044052016-2C, total: 50 pages)

Appendix D. Photo documentation
(Pls See Appendix No.: SYBH(Z-SAR)044052016-2D, total: 7 pages)

End