KDB 865664 D01 SAR Measurement 100MHz to 6GHz
FCC 47 CFR part 2 (2.1093)

SAR EVALUATION REPORT

For

Sony

FCC ID: PY7PM-0802

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Prepared for

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	02 July 2014	Initial Issue	--
1	22 July 2014	Made the following changes: 1. Typo error corrected in section 6.6.1 2. The operating modes for Wi-Fi 5.0 sub bands included in section 6.6.1 3. The table in section 6.7 is updated 4. Typo errors corrected in section 6.6 5. Photo list updated in appendix 4 6. Measurement uncertainty table for Wlan 5.0 GHz Head updated in Section 5 and Appendix 7.	Naseer Mirza
2	01 Aug 2014	Made the following changes: 1. In Section 1, The EUT is a "GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac + NFC & ANT+ " 2. Description sentence removed in section 6.2	Naseer Mirza

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1. ATTESTATION OF TEST RESULTS

Applicant Name:	Sony Mobile Communications Inc			
Application Purpose	☒ Original Grant			
DUT Description	The EUT is a GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac + NFC & ANT+			
Test Device is	An identical prototype			
Device category	Portable			
Exposure Category	General Population/Uncontrolled Exposure (1g SAR limit: 1.6 W/kg)			
Date Tested	16 June 2014 to 19 June 2014			
The highest reported SAR values	RF Exposure Conditions	Equipment Class		
		Licensed	DTS	UNII
	Head	0.634 W/kg	0.388 W/kg	0.596 W/kg
	Body-worn Accessory	0.940 W/kg	0.061 W/kg	0.275 W/kg
	Wireless Router (Hotspot)	1.099 W/kg	0.061 W/kg	0.275 W/kg
	Simultaneous Transmission	1.353 W/kg	1.353 W/kg	1.353 W/kg
Applicable Standards	FCC 47 CFR part 2 (2.1093) KDB publication IEEE Std 1528-2013			
Test Results	Pass			

UL Verification Services Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties are in accordance with the above standard and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample(s), under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by UKAS. This report is written to support regulatory compliance of the applicable standards stated above.

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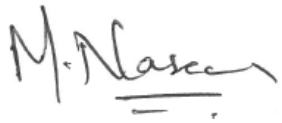
	
Naseer Mirza Project Lead UL Verification Services Ltd.	Sandhya Menon Laboratory Engineer UL Verification Services Ltd.

2. TEST SPECIFICATION, METHODS AND PROCEDURES

2.1. Test Specification

Reference:	KDB 865664 D01 SAR Measurement 100 Mhz to 6 GHz v01r03
Title:	SAR Measurement Requirements for 100 MHz to 6 GHz
Purpose of Test:	Field probes, tissue dielectric properties, SAR scans, measurement accuracy and variability of the measured results are discussed. The field probe and SAR scan requirements are derived from criteria considered in draft standard IEEE P1528-2011.
The Equipment Under Test complied with the Specific Absorption Rate for general population/uncontrolled exposure limit of 1.6 W/kg as specified in FCC 47 CFR part 2 (2.1093) and ANSI C95.1-1992 and has been tested in accordance with the reference documents in section 2.2 of this report.	

2.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

IEEE 1528: 2013
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques,
Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with know precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

FCC KDB Publication:

KDB 248227 D01 SAR measurements for 802.11a b g v01r02

KDB 447498 D01 General RF Exposure Guidance v05r02

KDB 648474 D04 SAR Handsets SAR v01r02

KDB 941225 D01 SAR test for 3G devices v02

KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01

KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01

KDB 941225 D06 Hotspot Mode SAR v01r01

KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03

KDB 865664 D02 RF Exposure Reporting v01r01

2.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at

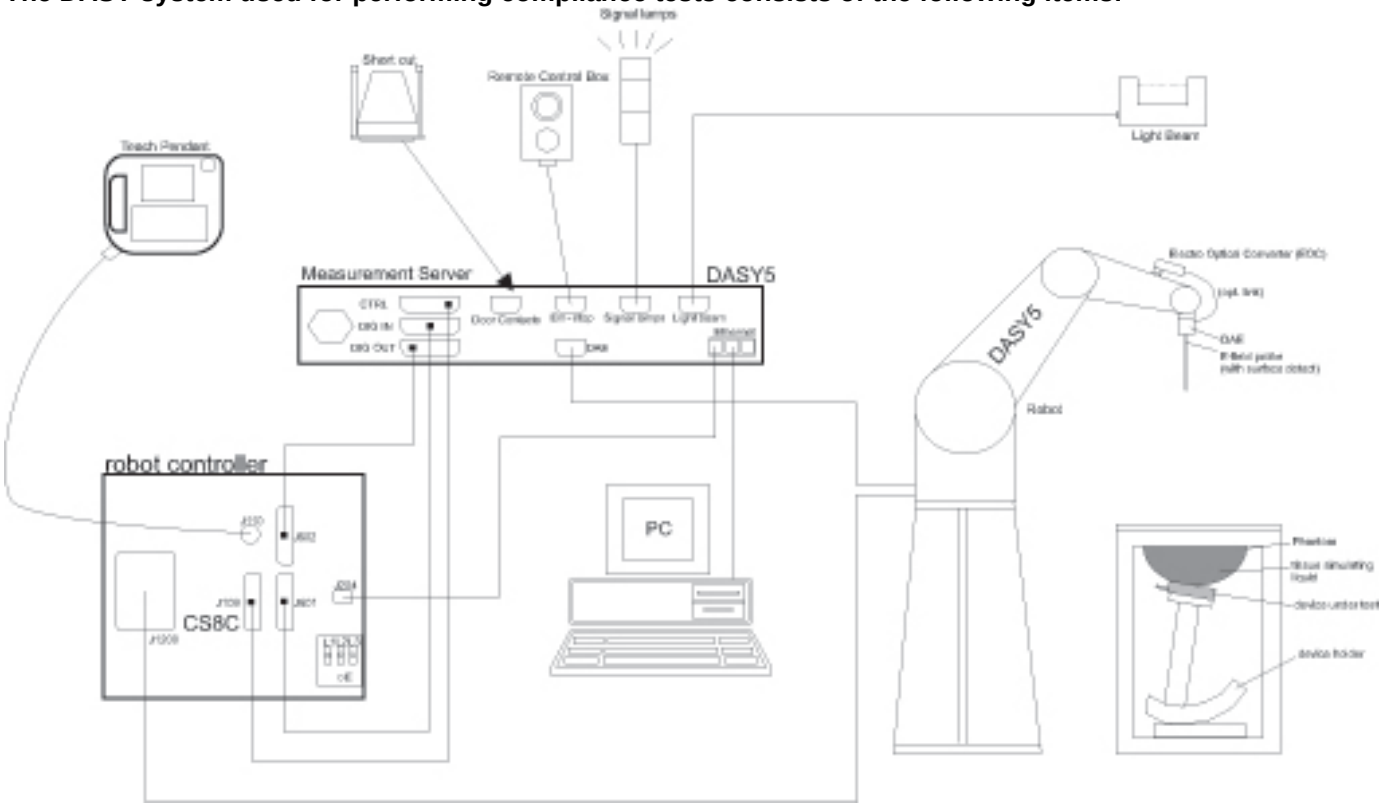
Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG UK	Facility Type
SAR Lab 56	Controlled Environment Chamber
SAR Lab 57	Controlled Environment Chamber
SAR Lab 58	Controlled Environment Chamber
SAR Lab 59	Controlled Environment Chamber
SAR Lab 60	Controlled Environment Chamber
SAR Lab 61	Controlled Environment Chamber

UL Verification Services Ltd, is accredited by UKAS (United Kingdom Accreditation Service), Laboratory UKAS Code 0644.

4. SAR MEASUREMENT SYSTEM & TEST EQUIPMENT

4.1. SAR Measurement System

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (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.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards. Appendix 1 of the report details the equipment used.

5. MEASUREMENT UNCERTAINTY

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Test Name	Confidence Level	Calculated Uncertainty
Uncertainty -GSM 850/ UMTS FDD 5 Head Configuration 1g	95%	±18.77%
Uncertainty -GSM / GPRS / EDGE 850 / UMTS FDD 5 Body Configurations 1g	95%	±18.36%
Uncertainty -PCS 1900 Head Configuration 1g	95%	±18.88%
Uncertainty -GSM / GPRS / EDGE 1900 Body Configuration 1g	95%	±18.26%
Uncertainty -Wi-Fi 2450 MHz Head Configuration 1g	95%	±18.13%
Uncertainty -Wi-Fi 2450 MHz Body Configuration 1g	95%	±18.35%
Uncertainty -Wi-Fi 5GHz Head Configuration 1g	95%	±20.53%
Uncertainty -Wi-Fi 5GHz Body Configuration 1g	95%	±19.90%

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

See Appendix 7 for all uncertainty tables.

6. EQUIPMENT UNDER TEST (EUT)

6.1. Identification of Equipment Under Test (EUT)

Serial Number/ IMEI Number:	**Cellular Radiated Samples:** CB5A1Z2YQE; 004402541515908 – Used to perform GSM 850 Head and PCS 1900 Body SAR measurements. CB5A1Z4RT1; 004402541515957 – Used to perform GSM 850 Body and PCS 1900 Head SAR measurements. CB5A1Z4RS9; 004402541515866 – Used to perform UMTS FDD 5 SAR measurements. **Cellular Conducted Sample:** CB5A1Z4RR1; 004402541515163 – Used to perform Cellular Conducted power measurements. **WLAN Radiated Samples:** CBA5A1Z4RSF; 004402541515858 - used to perform WLAN 2.4GHz SAR measurements only. CB5A1Z*4RT8; 004402541515940* - used to perform WLAN 5GHz Head SAR measurements only. CB5A1Z4RQ5; 004402541515965 - used to perform WLAN 5GHz Body SAR measurement only. **WLAN Conducted Sample:** CB5A1Z4RTJ; 00440254151189- used to perform WLAN Conducted power measurements.
Hardware Version Number:	Cellular Sample: A; WLAN Sample: A
Software Version Number:	Cellular Sample: ATPV:1283-9868 ; WLAN Sample: 0_25_3_16_A
Country of Manufacture:	China
Date of Receipt:	09 June 2014

6.2. Further Description of EUT

The EUT supports GSM 850/1900MHz bands, WCDMA FDD bands 5, bands. It also supports Dual Transfer Mode (DTM ~ Voice+Data) class 11, GPRS service with multi-slots class 33, EGPRS service with multi-slots class 33, HSPA with HSDPA (Category 10) and HSUPA (Category 6) features are also supported. It has MP3, camera, FM radio, USB memory, GPS receiver, NFC, Mobile High-Definition Link (MHL), Bluetooth (EDR and Bluetooth 4.0), WLAN (802.11 a/b/g/n/ac), and Wi-Fi hotspot functions with 'Auto RF Power Back-Off' (PCS1900) mode capabilities."

6.3. Modifications Incorporated in the EUT

There were no modification during the course of testing the device

6.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	Memory Card	Personal Hands-Free Kit (PHF)[2]	Dummy Battery[1]
Brand Name:	None Stated (Generic)	Sony	None Stated
Model Name or Number:	None Stated	MH410c	None Stated
Serial Number:	None Stated	None Stated	None Stated
Cable Length and Type:	Not Applicable	~1.2 m	~0.5m
Country of Manufacture:	China	None Stated	None Stated
Connected to Port	Micro SD Slot	3.5mm Audio jack and custom type	Unique to Manufacturer

Note(s):

1. This Dummy Battery was only used to performing conducted power measurements.
2. Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, "when the reported SAR for 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.''

6.5. Support Equipment

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

Description:	**Brand Name:**	**Model Name or Number:**	**Serial Number:**	**Cable Length and Type:**	**Connected to Port**
Communication Test Set	Agilent	8960 Series 10 (E5515E)	GB46200666	~4.0m Utiflex Cable	RF (Input / Output) Air Link
Communication Test Set	R & S	CMW500	145922	~4.0m Utiflex Cable	RF (Input / Output) Air Link
Communication Test Set	R & S	CMW500	146526	~4.0m Utiflex Cable	RF (Input / Output) Air Link

6.6.Additional Information Related to Testing

Equipment Category	2G GSM / PCS	TDMA 850/ 1900	Voice DTM (Voice + Data) GPRS (Data) EDGE (Data)
	3G UMTS Band	FDD 5	RMC12.2 Kbps HSDPA Cat 10 (Data) HSUPA Cat 6 (Data)
	Wi-Fi Band	(2.4 / 5.0) GHz	Data 802.11a/b/g/n/ac
Type of Unit	Portable Transceiver		
Intended Operating Environment:	Within GSM, UMTS, Wi-Fi and *Bluetooth* Coverage		
Transmitter Maximum Output Power Characteristics:	GSM850	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5.	
	PCS1900	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0.	
	UMTS FDD 5	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
	2.4 GHz Wi-Fi 802.11b/g/n	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
	5.0 GHz Sub band 1 Wi-Fi 802.11a/n/ac	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
	5.0 GHz Sub band 2 Wi-Fi 802.11a/n/ac	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
	5.0 GHz Sub band 3 Wi-Fi 802.11a/n/ac	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
	5.0 GHz Sub band 4 Wi-Fi 802.11a/n/ac	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
	5.0 GHz Wi-Fi 802.11ac (VHT20 / VHT40 / VHT80)	Test Software was used to configure the EUT to transmit at a maximum measured power as per section 7.6	
Transmitter Frequency Range:	GSM850	(824 to 849) MHz	
	PCS1900	(1850 to 1910) MHz	
	UMTS FDD 5	(826 to 847) MHz	
	2.4 GHz Wi-Fi 802.11b/g/n	(2412 to 2462) MHz	
	5.0 GHz Sub band 1 Wi-Fi 802.11a/n/ac	(5180 to 5240) MHz	
	5.0 GHz Sub band 2 Wi-Fi 802.11a/n/ac	(5260 to 5320) MHz	
	5.0 GHz Sub band 3 Wi-Fi 802.11a/n/ac	(5500 to 5700) MHz	
	5.0 GHz Sub band 4 Wi-Fi 802.11a/n/ac	(5745 to 5825) MHz	

Additional Information Related to Testing (Continued)

Transmitter Frequency Allocation of EUT When Under Test:	Bands	Channel Number	Channel Description	Frequency (MHz)
	GSM850	128	Low	824.2
		190	Middle	836.6
		251	High	848.8
	PCS1900	512	Low	1850.2
		661	Middle	1880.0
		810	High	1909.8
	UMTS FDD 5	4132	Low	826.4
		4183	Middle	836.6
		4233	High	846.6

Transmitter Frequency Allocation of EUT When Under Test:	Band: 2.4 / 5.0 GHz Wi-Fi 802.11a/n/ac (HT20 / HT40/HT80)						
	Rule	20 MHz BW Ch.#	Freq. (MHz)	40 MHz BW Ch.#	Freq. (MHz)	80 MHz BW Ch.#	Freq. (MHz)
	15.247	1	2412.0				
		6	2436.0				
		11	2462.0				
	5.2 U-NII-1	36	5180.0	38	5190.0		
		40	5200.0			42	5210.0
		44	5220.0	46	5230.0		
		48	5240.0				
	5.3 U-NII-2A	52	5260.0	54	5270.0		
		56	5280.0			58	5290.0
		60	5300.0	62	5310.0		
		64	5320.0				
	5.6 U-NII-2C	100	5500.0	102	5510.0		
		104	5520.0			106	5530.0
		108	5540.0	110	5550.0		
		112	5560.0				
		116	5580.0	118	5590.0		
		120	5600.0			122	5610.0
		124	5620.0	126	5630.0		
		128	5640.0				
		132	5660.0	134	5670.0		
		136	5680.0				
		140	5700.0				
	5.8 UNII-3	149	5745.0	151	5755.0		
		153	5765.0			155	5775.0
		157	5785.0	159	5795.0		
		161	5805.0				
		165	5825.0				

Additional Information Related to Testing (Continued)

Modulation(s):	GMSK (DTM / GSM / GPRS):	217 Hz
	QPSK(UMTS / HSDPA/HSPA):	0Hz
	DBPSK, BPSK, CCK (Wi-Fi):	0 Hz
Modulation Scheme (Crest Factor):	GMSK (DTM Class 11)	4
	GMSK (DTM Class 9)	2.67
	GMSK (DTM Class 5)	2.67
	GMSK (GPRS/EDGE 4 Uplink)	4
	GMSK (GPRS/EDGE 3 Uplink)	2.67
	GMSK (GPRS/EDGE 2 Uplink)	4
	GMSK (GPRS/EDGE 1 Uplink)	8.3
	DBPSK, BPSK, CCK (Wi-Fi802.11a/b/g/n/ac):	1
	QPSK(UMTS/ FDD / HSDPA):	1
Antenna Type:	Internal integral	
Antenna Length:	As specified in Appendix 9	
Number of Antenna Positions:	WWAN ~ UMTS / GSM	1 fixed
	WLAN / BT	1 fixed
	Felica / NFC	1 fixed
	Sub / GPS	1 fixed
Power Supply Requirement:	4.2 V	
Battery Type(s):	Embedded Li-ion	

6.6.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

- GSM850 Head and Body-Worn – DTM (Voice + Data) allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5. Tested using 2 Uplink time slots with DTM multi class 9 (1 uplink for voice + 1 uplink for GPRS with CS1).
- GSM850 Hotspot Mode –Data allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5. Hotspot was tested using 2 Uplink time slots with CS1 for GPRS.
- PCS1900 Head and Body-Worn – DTM (Voice + Data) allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0. Tested using 3 Uplink time slots with DTM multi class 11 (1 uplink for voice + 2 uplink for GPRS with CS1).
- PCS1900 Hotspot Mode – Data allocated mode with Communication Test Set configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0. Hotspot was tested using 4 Uplink time slots with CS1 for GPRS.

GSM850: Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
0 … 2	39
3	37
4	35
5	**33**
6	31
7	29
8	27
9	25
10	23
11	21
12	19
13	17
14	15
15	13
16	11
17	9
18	7
19 ... 31	5

PCS1900: Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
22 … 29	Reserved
30	33
31	32
0	**30**
1	28
2	26
3	24
4	22
5	20
6	18
7	16
8	14
9	12
10	10
11	8
12	6
13	4
14	2
15	0
16 … 21	Reserved

- UMTS FDD 5 - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to all "1's", to allow the EUT to transmit at a maximum as per KDB 941225 D01.
- UMTS FDD 5 - RMC 12.2kbps + HSUPA with Test loop mode 1 and TPC bits configured to all "1's", Sub-test 5, AG Index set to 21 and E-TFCI set to 81 with Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.
- UMTS FDD 5 - RMC 12.2kbps + HSDPA with Test loop mode 1 and TPC bits configured to all "1's", Sub-test 1 with Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.

Operating Modes (Continued)

- 2.4 GHz Wi-Fi802.11b/g/n Data allocated mode using 'HyperTerminal' software to excise mode ‘b’, ‘g’ and ‘n’, with maximum power of up to 13.1 dBm, 13.0 dBm and 13.0 dBm respectively.
- 5.0 GHz Wi-Fi802.11a/n/ac Sub band 1 - Data allocated mode using 'HyperTerminal' software to excise mode ‘a’ ‘n’ and ‘ac’, with maximum power of up to 16.3 dBm, 16.4 dBm and 16.1 dBm respectively.
- 5.0 GHz Wi-Fi802.11a/n/ac Sub band 2 - Data allocated mode using 'HyperTerminal' software to excise mode ‘a’ ‘n’ and ‘ac’, with maximum power of up to 16.3 dBm, 16.1 dBm and 16.2 dBm respectively.
- 5.0 GHz Wi-Fi802.11a/n/ac Sub band 3 - Data allocated mode using 'HyperTerminal' software to excise mode ‘a’ ‘n’ and ‘ac’, with maximum power of up to 16.5 dBm, 16.6 dBm and 16.5 dBm respectively.
- 5.0 GHz Wi-Fi802.11a/n/ac Sub band 4 - Data allocated mode using 'HyperTerminal' software to excise mode ‘a’ ‘n’ and ‘ac’, with maximum power of up to 16.5 dBm, 16.6 dBm and 16.5 dBm respectively.

6.7.Nominal and Maximum Output power:

Power Back-off NOT Supported

Bands	Speech (Voice Mode)	
	Target (dBm)	Tolerance ± (dB)
GSM850	32.5	-0.9~+0.6

	Tx Slot 1		Tx Slot 2		Tx Slot 3		Tx Slot 4	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
Bands	**GPRS GMSK (CS1)**							
GSM850	32.5	-0.9~+0.6	31.0	-1.5~+0.6	29.0	-1.5~+0.6	28.0	-1.5~+0.6
Bands	**EDGE GMSK (MCS1-4)**							
GSM850	32.5	-0.9~+0.6	31.0	-1.5~+0.6	29.0	-1.5~+0.6	28.0	-1.5~+0.6
Bands	**EDGE 8PSK (MCS5-9)**							
GSM850	27.0	-1.5~+1.0	25.0	-1.5~+1.0	24.0	-1.5~+1.0	22.0	-1.5~+1.0

Bands	DTM (GSM + GPRS [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
GSM850	32.5	-0.9~+0.6	31.0	-1.5~+0.6	31.0	-1.5~+0.6	29.0	-1.5~+0.6	29.0	-1.5~+0.6

Bands	DTM (GSM + EDGE [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
GSM850	32.5	-0.9~+0.6	31.0	-1.5~+0.6	31.0	-1.5~+0.6	29.0	-1.5~+0.6	29.0	-1.5~+0.6

Bands	DTM (GSM + EDGE [8PSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)
GSM850	32.5	-0.9~+0.6	31.0	-1.5~+0.6	25.0	-1.5~+1.0	29.0	-1.5~+0.6	24.0	-1.5~+1.0

Note:

1. As per KDB865664 D02 SAR Reporting v01, 2.1.4(a), the nominal and maximum average source based rated power, declared and supplied by manufacturer are shown in the above tables.
2. These are specified maximum allowed average power for all the wireless modes and frequencies bands supported.

Power Back-off Supported & Disabled

Bands	Speech (Voice Mode)	
	Target (dBm)	Tolerance ± (dB)
PCS1900	30.0	-0.7~+0.7

Bands	Tx Slot 1		Tx Slot 2		Tx Slot 3		Tx Slot 4	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
	GPRS GMSK (CS1)							
PCS1900	30.0	-0.7~+0.7	28.0	-1.5~+0.6	27.0	-1.5~+0.6	26.0	-1.5~+0.6
Bands	EDGE GMSK (MCS1-4)							
PCS1900	30.0	-0.7~+0.7	28.0	-1.5~+0.6	27.0	-1.5~+0.6	26.0	-1.5~+0.6
Bands	EDGE 8PSK (MCS5-9)							
PCS1900	24.5	-1.5~+1.5	22.5	-1.5~+1.5	21.5	-1.5~+1.5	20.5	-1.5~+1.5

Bands	DTM (GSM + GPRS [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
PCS1900	30.0	-0.7~+0.7	28.0	-1.5~+0.6	28.0	-1.5~+0.6	27.0	-1.5~+0.6	27.0	-1.5~+0.6
Bands	DTM (GSM + EDGE [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
PCS1900	30.0	-0.7~+0.7	28.0	-1.5~+0.6	28.0	-1.5~+0.6	27.0	-1.5~+0.6	27.0	-1.5~+0.6
Bands	DTM (GSM + EDGE [8PSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)
PCS1900	30.0	-0.7~+0.7	28.0	-1.5~+0.6	24.0	-1.5~+1.0	27.0	-1.5~+0.6	23.0	-1.5~+1.0

Power Back-off Supported & Enabled

Bands	Speech (Voice Mode)	
	Target (dBm)	Tolerance ± (dB)
PCS1900	25.0	-1.5~+1.5

Bands	Tx Slot 1		Tx Slot 2		Tx Slot 3		Tx Slot 4	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
	GPRS GMSK (CS1)							
PCS1900	25.0	-1.5~+1.5	23.0	-1.5~+1.5	22.0	-1.5~+1.5	21.0	-1.5~+1.5
Bands	EDGE GMSK (MCS1-4)							
PCS1900	25.0	-1.5~+1.5	23.0	-1.5~+1.5	22.0	-1.5~+1.5	21.0	-1.5~+1.5
Bands	EDGE 8PSK (MCS5-9)							
PCS1900	24.5	-1.5~+1.5	22.5	-1.5~+1.5	21.5	-1.5~+1.5	20.5	-1.5~+1.5

Bands	DTM (GSM + GPRS [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
PCS1900	25.0	-1.5~+1.5	23.0	-1.5~+1.5	23.0	-1.5~+1.5	22.0	-1.5~+1.5	22.0	-1.5~+1.5
Bands	DTM (GSM + EDGE [GMSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_GMSK	Tol ± (dB)
PCS1900	25.0	-1.5~+1.5	23.0	-1.5~+1.5	23.0	-1.5~+1.5	22.0	-1.5~+1.5	22.0	-1.5~+1.5
Bands	DTM (GSM + EDGE [8PSK])									
	Tx Slot 1		Tx Slot 2				Tx Slot 3			
	CS_GMSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)	CS_GMSK	Tol ± (dB)	PS_8PSK	Tol ± (dB)
PCS1900	25.0	-1.5~+1.5	23.0	-1.5~+1.5	22.5	-1.5~+1.5	22.0	-1.5~+1.5	21.5	-1.5~+1.5

Nominal and Maximum Output power (Continued):

Power Back-off NOT Supported

Band	CS		HS	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
UMTS FDD 5	24.0	-0.7~+0.5	24.0	-0.7~+0.5

Power Back-off NOT Supported

	WLAN Modes					
	2.4 GHz 802.11b		2.4 GHz 802.11g		2.4 GHz 802.11n	
	1 Mbps	11 Mbps	6 Mbps	54 Mbps	6.5 Mbps	65 Mbps
Max Power {Target + Upper Tolerance} (dBm)	13.5	13.5	13.4	13.4	13.4	13.4

Power Back-off NOT Supported

5.0 GHz 802.11a	5.2 GHz		5.3 GHz		5.5 GHz		5.8 GHz	
	6 Mbps	54 Mbps	6 Mbps	54 Mbps	6 Mbps	54 Mbps	6 Mbps	54 Mbps
Max Power {Target + Upper Tolerance} (dBm)	16.3	16.3	16.3	16.3	16.5	16.5	16.5	16.5
5.0 GHz 802.11n HT-20 / 11ac VHT-20	**5.2 GHz**		**5.3 GHz**		**5.5 GHz**		**5.8 GHz**	
	6.5 Mbps	65 Mbps	6.5 Mbps	65 Mbps	6.5 Mbps	65 Mbps	6.5 Mbps	65 Mbps
Max Power {Target + Upper Tolerance} (dBm)	16.3	13.3	16.3	13.3	16.6	13.7	16.6	13.7
5.0 GHz 802.11n HT-40 / 11ac VHT-40	**5.2 GHz**		**5.3 GHz**		**5.5 GHz**		**5.8 GHz**	
	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps
Max Power {Target + Upper Tolerance} (dBm)	14.3	12.3	14.3	12.3	14.7	12.7	14.7	12.7
5.0 GHz 802.11ac VHT-80	**5.2 GHz**		**5.3 GHz**		**5.5 GHz**		**5.8 GHz**	
	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps	13.5 Mbps	135 Mbps
Max Power {Target + Upper Tolerance} (dBm)	14.2	12.2	14.2	12.2	14.5	12.6	14.5	12.6

Band	Max Power {Target (dBm) + Upper Tolerance (dBm)}		
	BR	EDR	BLE
Bluetooth	10.0	7.9	2.4

Note:

1. As per KDB865664 D02 SAR Reporting v01, 2.1.4(a), the nominal and maximum average source based rated power, declared and supplied by manufacturer are shown in the above tables.
2. These are specified maximum allowed average power for all the wireless modes and frequencies bands supported.

6.8. Simultaneous Transmission Conditions

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the *reported* standalone SAR of each applicable simultaneous transmitting antenna.

	Simultaneous transmission conditions				
	WWAN		WLAN		WPAN
#	GSM Voice / Data / DTM	UMTS Voice / Data	Wi-Fi 802.11b/g/n	Wi-Fi 802.11a/n/ac	*Bluetooth*
1	X		X		
2		X	X		
3	X			X	
4		X		X	
5	X				X
6		X			X
7				X	X
8	X			X	X
9		X		X	X

Note:

Based on the customer declaration, the following are the possible combination of the Simultaneous Transmission possibilities in the EUT:

1. WWAN + WLAN 2.4 GHz
2. WWAN + WLAN 5.0 GHz
3. WWAN + WPAN
4. WPAN + WLAN 5.0 GHz
5. WWAN + WLAN 5.0 GHz + WPAN

7. RF EXPOSURE CONDITIONS (TEST CONFIGURATIONS)

Refer to Appendix 8 “Antenna Locations and Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

7.1. Configuration and Peripherals

The EUT was tested in the following configuration(s) unless otherwise stated:

- Standalone fully charged battery powered.
- Head, Hotspot mode and Body-worn configurations were evaluated.
- The applied FCC body-worn Personal Hotspot orientations where the corresponding edge(s) closest to the user with the most conservative exposure condition were all evaluated at 10 mm from the body. For configuration that did overlap and power back-off not supported with Personal hotspot, SAR evaluation results for 10mm was used for Body worn.
- GSM, DTM, GPRS and EDGE power measurement were all measured as per FCC publication 941225 D03 and D04. Although power reduction was allowed SAR test was performed on using GMSK (GPRS and /or DTM). Test reduction was applied to EDGE using GMSK and 8PSK modulation scheme.

Head Configuration

a) The EUT was placed in a normal operating position with the centre of the ear-piece aligned with the ear canal on the phantom.

b) With the ear-piece touching the phantom the centre line of the EUT was aligned with an imaginary plane (X and Y axis) consisting of three lines connecting both ears and the mouth.

c) For the cheek position the EUT was gradually moved towards the cheek until any point of the mouth-piece or keypad touched the cheek.

d) For the tilted position the EUT was positioned as for the cheek position, and then the horizontal angle was increased by fifteen degrees (the phone keypad was moved away from the cheek by fifteen degrees).

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test.

g) The location of the maximum spatial SAR distribution (peak) was determined relative to the EUT and its antenna.

h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

Body Configuration

a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the ‘SAM’ or ‘Eli’ phantom.

b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.

c) For the touch-safe position the EUT was gradually moved towards the flat section of the ‘SAM’ phantom until any point of the EUT touched the phantom.

d) For position(s) greater then 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.

e) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

f) The device was keyed to operate continuously in the transmit mode for the duration of the test.

g) The location of the maximum spatial SAR distribution (peak) was determined relative to the EUT and its antenna.

h) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

7.2. Configuration Consideration

Technology Antenna	Configuration	Antenna-to-User Separation	Position	Antenna-to-Edge Separation	Evaluation Considered
WWAN	Head	0mm	Touch Left	<25mm	Yes
			Tilt Left	<25mm	Yes
			Touch Right	<25mm	Yes
			Tilt Right	<25mm	Yes
	Hotspot	10mm	Front	<25mm	Yes
			Back	<25mm	Yes
			Top Edge	>25mm	No
			Bottom Edge	<25mm	Yes
			Right Edge	<25mm	Yes
			Left Edge	<25mm	Yes
	Body	15mm	Front	<25mm	Yes
			Back	<25mm	Yes
WLAN	Head	0mm	Touch Left	<25mm	Yes
			Tilt Left	<25mm	Yes
			Touch Right	<25mm	Yes
			Tilt Right	<25mm	Yes
	Hotspot	10mm	Front	<25mm	Yes
			Back	<25mm	Yes
			Top Edge	<25mm	Yes
			Bottom Edge	>25mm	No
			Right Edge	>25mm	No
			Left Edge	<25mm	Yes
	Body	15mm	Front	<25mm	Yes
			Back	<25mm	Yes

Note:

1. The Antenna to Edge distances is included in the Appendix 9 of the report.
2. Test exemption is as per FCC KDB publication 447498 D01v05 for mobile handsets.
3. Bluetooth standalone SAR is excluded as the output power meets the exclusion threshold:

1) The 1-g 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*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[16] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[17]
- The result is rounded to one decimal place for comparison

" Taken from FCC KDB publication 447498 D01v05r02

7.3. SAR Test Exclusion Consideration

Frequency Band	Configuration(s)		
	Head	Hotspot Mode	Body-worn
GSM850	No	No	No
PCS1900	No	No	No
UMTS FDD 5	No	No	No
WLAN 2.4 GHz	No	No	No
WLAN 5.0 GHz	No	No	No
Bluetooth	N/A	Yes	Yes

Note:

1. As per KDB 447498 D01 General RF Exposure Guidance v05r02, The Frequency Bands with Rated Power including Upper tolerance, which qualify for **Standalone SAR Test Exclusion,** are as per the above table.

   The 1-g 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*)] * [$\sqrt{f_{(GHz)}}$] ≤ 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

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

   Applying the above formula for *Bluetooth* Hotspot Mode we get:
   - For 2450MHz, [(10)/10]*[√2.45] =1.6 ≤ 3.0

   Applying the above formula for *Bluetooth* Body-worn we get:
   - For 2450MHz, [(10)/15]*[√2.45] =1.1 ≤ 3.0

   Hence, no testing was performed on *Bluetooth* mode.

2. The details for the ***Maximum Rated Power*** and tolerance(s) can be found in section 6.7.

7.4. Conducted Output Power Measurements

7.4.1. RF Output Average Power Measurement: 2G

7.4.2. GSM850
Power Back-off NOT Supported

Voice Mode GSM (GMSK)

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)	Frame Power (dB*m*)
128	824.2	32.0	23.0
190	836.6	32.0	23.0
251	848.8	32.0	23.0

GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)				Frame Power (dB*m*)			
		1Uplink	2Uplink	3Uplink	4Uplink	1Uplink	2Uplink	3Uplink	4Uplink
128	824.2	32.0	30.9	28.8	27.7	23.0	24.9	24.5	24.7
190	836.6	32.0	30.9	28.8	27.7	23.0	24.9	24.5	24.7
251	848.8	32.0	30.9	28.8	27.8	23.0	24.9	24.5	24.8
EDGE (GMSK) – Coding Scheme: MCS4									
128	824.2	32.0	30.9	28.8	27.7	23.0	24.9	24.5	24.7
190	836.6	32.0	30.9	28.8	27.7	23.0	24.9	24.5	24.7
251	848.8	32.0	30.9	28.8	27.8	23.0	24.9	24.5	24.8
EDGE (8PSK) – Coding Scheme: MCS9									
128	824.2	27.4	25.3	24.4	22.4	18.4	**19.3**	20.1	19.4
190	836.6	27.4	25.2	24.4	22.4	18.4	**19.2**	20.1	19.4
251	848.8	27.4	25.3	24.4	22.4	18.4	**19.3**	20.1	19.4

GSM850
Power Back-off NOT Supported (Continued)

DTM - Voice Mode GSM (GMSK) + GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)						Frame Power (dBm)					
		Class 5		Class 9		Class 11		Class 5		Class 9		Class 11	
		GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink
128	824.2	30.9	30.8	30.9	30.8	28.9	28.7	24.9	24.8	24.9	24.8	24.6	24.4
190	836.6	30.9	30.8	30.9	30.9	28.9	28.7	24.9	24.8	24.9	24.9	24.6	24.4
251	848.8	30.9	30.9	31.0	30.9	28.9	28.7	24.9	24.9	25.0	24.9	24.6	24.4
DTM - Voice Mode GSM (GMSK) + EDGE (GMSK) – Coding Scheme: MCS4													
128	824.2	30.9	30.8	30.9	30.8	28.9	28.7	24.9	24.8	24.9	24.8	24.6	24.4
190	836.6	30.9	30.8	30.9	30.9	28.9	28.7	24.9	24.8	24.9	24.9	24.6	24.4
251	848.8	30.9	30.9	31.0	30.9	28.9	28.7	24.9	24.9	25.0	24.9	24.6	24.4
DTM - Voice Mode GSM (GMSK) + EDGE (8PSK) – Coding Scheme: MCS9													
128	824.2	30.9	25.2	31.0	25.2	28.8	24.3	24.9	19.2	25.0	19.2	24.5	20.0
190	836.6	30.9	25.3	31.0	25.2	28.8	24.3	24.9	19.3	25.0	19.2	24.5	20.0
251	848.8	31.0	25.3	31.0	25.2	28.7	24.3	25.0	19.3	25.0	19.2	24.4	20.0

Note:

Scale factor for uplink time slot:

1. 1 Uplink: time slot ratio = 8:1 => 10*log(8/1) = **9.03 dB**
2. 2 Uplink: time slot ratio = 8:2 => 10*log(8/2) = **6.02 dB**
3. 3 Uplink: time slot ratio = 8:3 => 10*log(8/3) = **4.26 dB**
4. 4 Uplink: time slot ratio = 8:4 => 10*log(8/4) = **3.01 dB**

Conclusions:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- For Head SAR Testing, GSM and DTM should be evaluated; therefore the EUT was set in **DTM Multi-slot class 9** due its highest Frame Average Power (dBm)
- For Hotspot Mode SAR Testing, GPRS and DTM should be evaluated; therefore the EUT was set in **GPRS 2 Tx slots** due its highest Frame Average Power (dBm)
- For Body worn SAR Testing, GSM and DTM should be evaluated, therefore the EUT was set in **DTM Multi-slot class 9** due its highest Frame Average Power (dBm)

7.4.3.PCS1900
Power back-off Supported & Disabled

Voice Mode GSM (GMSK)

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)	Frame Power (dB*m*)
512	1850.2	29.9	20.9
661	1880.0	30.0	21.0
810	1909.8	30.1	21.1

GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)				Frame Power (dB*m*)			
		1Uplink	2Uplink	3Uplink	4Uplink	1Uplink	2Uplink	3Uplink	4Uplink
512	1850.2	29.9	27.8	26.6	25.6	20.9	21.8	22.3	22.6
661	1880.0	30.1	27.8	26.6	25.5	21.1	21.8	22.3	22.5
810	1909.8	30.1	27.8	26.5	25.5	21.1	21.8	22.2	22.5

EDGE (GMSK) – Coding Scheme: MCS4

975	880.2	29.9	27.8	26.6	25.6	20.9	21.8	22.3	22.6
37	897.4	30.1	27.8	26.6	25.5	21.1	21.8	22.3	22.5
124	914.8	30.1	27.8	26.5	25.5	21.1	21.8	22.2	22.5

EDGE (8PSK) – Coding Scheme: MCS9

512	1850.2	26.3	24.5	23.4	22.6	17.3	18.5	19.1	19.6
661	1880.0	26.3	24.5	23.4	22.6	17.3	18.5	19.1	19.6
810	1909.8	26.4	24.5	23.4	22.7	17.4	18.5	19.1	19.6

DTM - Voice Mode GSM (GMSK) + GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)						Frame Power (dBm)					
		Class 5		Class 9		Class 11		Class 5		Class 9		Class 11	
		GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink
512	1850.2	27.8	27.8	27.8	27.8	26.7	26.6	21.8	21.8	21.8	21.8	22.4	22.3
661	1880.0	27.9	27.8	27.8	27.8	26.6	26.6	21.9	21.8	21.8	21.8	22.3	22.3
810	1909.8	27.9	27.8	27.8	27.7	26.6	26.5	21.9	21.8	21.8	21.7	22.3	22.2

DTM - Voice Mode GSM (GMSK) + EDGE (GMSK) – Coding Scheme: MCS4

512	1850.2	27.8	27.8	27.8	27.8	26.7	26.6	21.8	21.8	21.8	21.8	22.4	22.3
661	1880.0	27.9	27.8	27.8	27.8	26.6	26.6	21.9	21.8	21.8	21.8	22.3	22.3
810	1909.8	27.9	27.8	27.8	27.7	26.6	26.5	21.9	21.8	21.8	21.7	22.3	22.2

DTM - Voice Mode GSM (GMSK) + EDGE (8PSK) – Coding Scheme: MCS9

512	1850.2	27.8	24.4	27.8	24.3	26.6	23.3	21.8	18.4	21.8	18.3	22.3	19.0
661	1880.0	27.8	24.4	27.8	24.3	26.6	23.2	21.8	18.4	21.8	18.3	22.3	18.9
810	1909.8	27.8	24.4	27.8	24.4	26.5	23.3	21.8	18.4	21.8	18.4	22.2	19.0

7.4.4.PCS1900
Power back-off Supported & Enabled

Voice Mode GSM (GMSK)

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)	Frame Power (dB*m*)
512	1850.2	25.8	16.8
661	1880.0	25.8	16.8
810	1909.8	25.9	16.9

GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)				Frame Power (dB*m*)			
		1Uplink	2Uplink	3Uplink	4Uplink	1Uplink	2Uplink	3Uplink	4Uplink
512	1850.2	25.9	23.3	22.1	21.5	16.9	17.3	17.8	18.5
661	1880.0	25.9	23.3	22.2	21.5	16.9	17.3	17.9	18.5
810	1909.8	25.9	23.3	22.2	21.5	16.9	17.3	17.9	18.5
EDGE (GMSK) – Coding Scheme: MCS4									
975	880.2	25.9	23.3	22.1	21.5	16.9	17.3	17.8	18.5
37	897.4	25.9	23.3	22.2	21.5	16.9	17.3	17.9	18.5
124	914.8	25.9	23.3	22.2	21.5	16.9	17.3	17.9	18.5
EDGE (8PSK) – Coding Scheme: MCS9									
512	1850.2	25.1	22.8	21.4	20.3	16.1	16.8	17.1	17.3
661	1880.0	25.1	22.7	21.3	20.4	16.1	16.7	17.0	17.4
810	1909.8	25.1	22.8	21.3	20.4	16.1	16.8	17.0	17.4

DTM - Voice Mode GSM (GMSK) + GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)						Frame Power (dBm)					
		Class 5		Class 9		Class 11		Class 5		Class 9		Class 11	
		GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 1 Uplink	GSM 1 Uplink	GPRS 2 Uplink
512	1850.2	23.3	23.3	23.3	23.3	22.2	22.2	17.3	17.3	17.3	17.3	17.9	17.9
661	1880.0	23.3	23.3	23.3	23.2	22.2	22.1	17.3	17.3	17.3	17.2	17.9	17.8
810	1909.8	23.3	23.3	23.3	23.3	22.2	22.1	17.3	17.3	17.3	17.3	17.9	17.8
DTM - Voice Mode GSM (GMSK) + EDGE (GMSK) – Coding Scheme: MCS4													
512	1850.2	23.3	23.3	23.3	23.3	22.2	22.2	17.3	17.3	17.3	17.3	17.9	17.9
661	1880.0	23.3	23.3	23.3	23.2	22.2	22.1	17.3	17.3	17.3	17.2	17.9	17.8
810	1909.8	23.3	23.3	23.3	23.3	22.2	22.1	17.3	17.3	17.3	17.3	17.9	17.8
DTM - Voice Mode GSM (GMSK) + EDGE (8PSK) – Coding Scheme: MCS9													
512	1850.2	23.5	22.7	23.3	22.5	22.1	21.3	17.5	16.7	17.3	16.5	17.8	17.0
661	1880.0	23.5	22.7	23.3	22.5	22.2	21.3	17.5	16.7	17.3	16.5	17.9	17.0
810	1909.8	23.5	22.8	23.4	22.5	22.2	21.3	17.5	16.8	17.4	16.5	17.9	17.0

Note:

Scale factor for uplink time slot:

1. 1 Uplink: time slot ratio = 8:1 => 10*log(8/1) = **9.03 dB**
2. 2 Uplink: time slot ratio = 8:2 => 10*log(8/2) = **6.02 dB**
3. 3 Uplink: time slot ratio = 8:3 => 10*log(8/3) = **4.26 dB**
4. 4 Uplink: time slot ratio = 8:4 => 10*log(8/4) = **3.01 dB**

Conclusions:

The worst-case configuration and mode for SAR testing is determined to be as follows:

- For Head SAR Testing, GSM and DTM should be evaluated; therefore the EUT was set in DTM Multi-slot class 11 due its highest Frame Average Power (dBm) with Power Back-of Disabled.
- For Hotspot Mode SAR Testing, GPRS and DTM should be evaluated; therefore the EUT was set in GPRS 4 Tx slots due its highest Frame Average Power (dBm) with Power Back-of Enabled.
- For Body worn SAR Testing, GSM and DTM should be evaluated, therefore the EUT was set in DTM Multi-slot class 11 due its highest Frame Average Power (dBm) with Power Back-of Disabled.

7.5. RF Output Average Power Measurement: 3G

7.5.1. WCDMA Band 5 on RMC / HSDPA / HSUPA modes
Power Back-off NOT Supported

Modes		HSDPA				HSUPA					WCDMA
Sets		1	2	3	4	1	2	3	4	5	Voice / RMC 12.2kbps
Band	Channel	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]
850 (Band 5)	4132 4357	23.9	23.9	23.9	23.9	23.9	22.7	23.7	22.6	23.9	24.4
	4183 4408	24.0	24.0	24.1	24.1	23.8	22.5	23.6	22.4	24.0	24.5
	4233 4458	24.0	24.0	24.1	24.1	23.2	22.4	23.0	22.3	24.0	24.5
ßc		2	12	15	15	11	6	15	2	15	
ßd		15	15	8	4	15	15	9	15	15	
ΔACK, ΔNACK, ΔCQI		8	8	8	8	8	8	8	8	8	
AGV		-	-	-	-	20	12	15	17	21	

The module power levels were measured in both HSPA and 3G RMC 12.2kbps modes and compared to ensure the correct mode of operation had been established.

The following tables taken from FCC 3G SAR procedures (KDB 941225 D01 SAR test for 3G devices v02) below were applied using an wireless communications test set which supports 3G / HSDPA release 5 / HSUPA release 6.

Sub-test Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	SM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

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

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Sub-test Setup for Release 6 HSUPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	B_{oc}	B_{od}	B_{od} *(SF)*	B_{od} *(codes)*	CM (2) (dB)	Power Back-Off (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	31/15	B_{al1}: 47/15 B_{al2}: 47/15	4	1	2.0	1.0	15	92
4	2/15	15/15	64	2/15	2/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	24/15	24/15	134/15	4	1	1.0	0.0	21	81

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

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH AND E-DPCCH for the Power Back-Off is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

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

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

7.6.RF Output Average Power Measurement: Wi-Fi

7.6.1.Wi-Fi 802.11b/g/n (2.4 GHz)
Power Back-off NOT supported

		Avg Power (dBm)	
Channel Number	**Frequency (MHZ)**	**(1Mbps)**	**Operating Mode**
1	2412.0	12.9	**802.11b**
6	2437.0	13.0	
11	2462.0	13.1	
Channel Number	**Frequency (MHZ)**	**(6Mbps)**	**Operating Mode**
1	2412.0	12.9	**802.11g**
6	2437.0	13.0	
11	2462.0	12.8	
Channel Number	**Frequency (MHZ)**	**(6.5Mbps)**	**Operating Mode**
1	2412.0	13.0	**802.11n HT20**
6	2437.0	13.0	
11	2462.0	12.7	

7.6.2.Wi-Fi802.11a/n/ac (5.0 GHz) –Sub Band 1 (5.2 GHz UNII)
Power Back-off NOT Supported

		Avg Power (dBm)	
Channel Number	**Frequency (MHZ)**	**6 Mbps**	**Operating Mode**
36	5180.0	16.2	**802.11a**
40	5200.0	16.0	
44	5220.0	16.0	
48	5240.0	16.3	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
36	5180.0	16.3	**802.11n, HT20**
40	5200.0	16.1	
44	5220.0	16.1	
48	5240.0	16.1	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
36	5180.0	16.0	**802.11ac, VHT20**
40	5200.0	15.9	
44	5220.0	16.1	
48	5240.0	16.1	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
38	5190.0	14.3	**802.11n, HT40**
46	5230.0	14.0	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
38	5190.0	14.3	**802.11ac, VHT40**
46	5230.0	14.2	
Channel Number	**Frequency (MHZ)**	**29.3 Mbps**	**Operating Mode**
42	5210.0	14.2	**802.11ac, VHT80**

7.6.3.Wi-Fi802.11a/n/ac (5.0 GHz) –Sub Band 2 (5.3 GHz UNII) Power Back-off NOT Supported

		Avg Power (dBm)	
Channel Number	**Frequency (MHZ)**	**6 Mbps**	**Operating Mode**
52	5260.0	16.3	**802.11a**
56	5280.0	15.9	
60	5300.0	15.9	
64	5320.0	15.9	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
52	5260.0	16.0	**802.11n, HT20**
56	5280.0	16.0	
60	5300.0	16.0	
64	5320.0	16.1	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
52	5260.0	16.2	**802.11ac, VHT20**
56	5280.0	16.2	
60	5300.0	16.2	
64	5320.0	16.1	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
54	5270.0	14.1	**802.11n, HT40**
62	5310.0	14.2	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
54	5270.0	14.3	**802.11ac, VHT40**
62	5310.0	14.2	
Channel Number	**Frequency (MHZ)**	**29.3 Mbps**	**Operating Mode**
58	5290.0	14.2	**802.11ac, VHT80**

7.6.4.Wi-Fi802.11a/n/ac (5.0 GHz) –Sub Band 3 (5.5 GHz UNII)
Power Back-off NOT Supported

		Avg Power (dBm)	
Channel Number	**Frequency (MHZ)**	**6 Mbps**	**Operating Mode**
100	5500.0	16.4	**802.11a**
104	5520.0	16.4	
108	5540.0	16.5	
112	5560.0	16.5	
116	5580.0	16.4	
132	5660.0	16.3	
136	5680.0	16.3	
140	5700.0	16.3	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
100	5500.0	16.6	**802.11n, HT20**
104	5520.0	16.6	
108	5540.0	16.5	
112	5560.0	16.5	
116	5580.0	16.5	
132	5660.0	16.5	
136	5680.0	16.0	
140	5700.0	16.3	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
100	5500.0	16.4	**802.11ac, VHT20**
104	5520.0	16.5	
108	5540.0	16.5	
112	5560.0	16.5	
116	5580.0	16.4	
132	5660.0	16.4	
136	5680.0	16.4	
140	5700.0	16.3	

Wi-Fi802.11a/n/ac (5.0 GHz) –Sub Band 3 (5.5 GHz UNII)
Power Back-off NOT Supported (Continued)

Channel Number	Frequency (MHZ)	13.5 Mbps	Operating Mode
102	5510.0	14.2	**802.11n, HT40**
110	5550.0	14.6	
134	5670.0	14.5	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
102	5510.0	14.2	**802.11ac, VHT40**
110	5550.0	14.6	
134	5670.0	14.6	
Channel Number	**Frequency (MHZ)**	**29.3 Mbps**	**Operating Mode**
106	5530.0	14.5	**802.11ac, VHT80**

7.6.5.Wi-Fi802.11a/n/ac (5.0 GHz) –Sub Band 4 (5.8 GHz UNII)
Power Back-off NOT Supported

		Avg Power (dBm)	
Channel Number	**Frequency (MHZ)**	**6 Mbps**	**Operating Mode**
149	5745.0	16.1	**802.11a**
153	5765.0	16.4	
157	5785.0	16.4	
161	5805.0	16.5	
165	5825.0	16.2	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
149	5745.0	16.1	**802.11n, HT20**
153	5765.0	16.6	
157	5785.0	16.6	
161	5805.0	16.5	
165	5825.0	16.4	
Channel Number	**Frequency (MHZ)**	**6.5 Mbps**	**Operating Mode**
149	5745.0	16.3	**802.11ac, VHT20**
153	5765.0	16.2	
157	5785.0	16.2	
161	5805.0	16.5	
165	5825.0	16.4	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
151	5755.0	14.3	**802.11n, HT40**
159	5795.0	14.3	
Channel Number	**Frequency (MHZ)**	**13.5 Mbps**	**Operating Mode**
151	5755.0	14.4	**802.11ac, VHT40**
159	5795.0	14.5	
Channel Number	**Frequency (MHZ)**	**29.3 Mbps**	**Operating Mode**
155	5775.0	14.2	**802.11ac, VHT80**

8. SYSTEM CHECK AND DIELECTRIC PARAMETERS

See Appendix 5 and Appendix 6 for tables and measurements.

9. MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

9.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

9.2. Specific Absorption Rate - Test Results

For All SAR measurement in this report the 1g-SAR limit tested to is 1.6 W/Kg

9.2.1. GSM 850 - Head - Power Back-off NOT Supported

Max Reported SAR = 0.634 (W/kg):

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (DTM Class 9)	0	Touch Left	190	836.6	N/A	N/A	31.6	30.9	0.448	0.539	1, 2	1
GMSK (DTM Class 9)	0	Tilt Left	190	836.6	N/A	N/A	31.6	30.9	0.257	0.309	1, 2	2
GMSK (DTM Class 9)	0	Touch Right	190	836.6	N/A	N/A	31.6	30.9	0.527	0.634	1, 2	3
GMSK (DTM Class 9)	0	Tilt Right	190	836.6	N/A	N/A	31.6	30.9	0.269	0.323	1, 2	4

Note(s):

1. DTM Multi-slot Class 9 - Tested using 2 Uplink time slots (with 1 time slots set as CS1 for GPRS and 1 time slot set for voice).
2. 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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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

9.2.2. GSM 850 Hotspot Mode - Power Back-off NOT Supported

Max Reported SAR = 0.721 (W/kg):

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (Data 2 Slot)	10	Front	190	836.6	N/A	N/A	31.6	30.9	0.492	0.578	1	5
GMSK (Data 2 Slot)	10	Back	190	836.6	N/A	N/A	31.6	30.9	0.614	0.721	1	6
GMSK (Data 2 Slot)	10	Left Hand	190	836.6	N/A	N/A	31.6	30.9	0.325	0.382	1	7
GMSK (Data 2 Slot)	10	Right Hand	190	836.6	N/A	N/A	31.6	30.9	0.612	0.719	1	8
GMSK (Data 2 Slot)	10	Bottom	190	836.6	N/A	N/A	31.6	30.9	0.259	0.304	1	9

Note(s):

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

*KDB 941225 D03 - SAR is not required for EDGE and DTM technology when the maximum average output power is lower than that measured on the corresponding GPRS channels.

9.2.3. GSM 850 - Body-Worn - Power Back-off NOT Supported

Max Reported SAR = 0.785 (W/kg)

					For LTE Only		Power (dBm)		1g: SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (DTM)	15	Front	190	836.6	N/A	N/A	31.6	30.9	0.560	0.658	1, 2	10
GMSK (DTM)	15	Back	190	836.6	N/A	N/A	31.6	30.9	0.668	0.785	1, 2	11

Note(s):

1. DTM Multi-slot Class 9 - Tested using 2 Uplink time slots (with 1 time slots set as CS1 for GPRS and 1 time slot set for voice).
2. 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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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*With headset attached.

* Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, “when the reported SAR for 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.’’

9.2.4. PCS 1900 - Head - Power Back-off Supported & Disabled

Reported SAR = 0.329 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (DTM Class 11)	0	Touch Left	661	1880.0	N/A	N/A	27.6	26.6	0.261	0.329	1, 2	12
GMSK (DTM Class 11)	0	Tilt Left	661	1880.0	N/A	N/A	27.6	26.6	0.080	0.101	1, 2	13
GMSK (DTM Class 11)	0	Touch Right	661	1880.0	N/A	N/A	27.6	26.6	0.131	0.165	1, 2	14
GMSK (DTM Class 11)	0	Tilt Right	661	1880.0	N/A	N/A	27.6	26.6	0.051	0.064	1, 2	15

Note(s):

1. DTM Multi-slot Class 11 - Tested using 3 Uplink time slots (with 2 time slots set as CS1 for GPRS and 1 time slot set for voice).
2. 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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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

9.2.5. PCS 1900 - Hotspot Mode - Power Back-off Supported & Enabled

Max Reported SAR = 1.099 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (Data 4 Slot)	10	Front	661	1880.0	N/A	N/A	22.5	21.5	0.546	0.687	1	16
GMSK (Data 4 Slot)	10	Back	661	1880.0	N/A	N/A	22.5	21.5	0.491	0.618	1	17
GMSK (Data 4 Slot)	10	Left Hand	661	1880.0	N/A	N/A	22.5	21.5	0.100	0.126	1	18
GMSK (Data 4 Slot)	10	Right Hand	661	1880.0	N/A	N/A	22.5	21.5	0.038	0.047	1	19
GMSK (Data 4 Slot)	10	Bottom	661	1880.0	N/A	N/A	22.5	21.5	0.793	0.998	-	20
GMSK (Data 4 Slot)	10	Bottom	512	1850.2	N/A	N/A	22.5	21.5	0.639	0.804	-	21
GMSK (Data 4 Slot)	10	Bottom	810	1909.8	N/A	N/A	22.5	21.5	0.873	1.099	2	22

Note(s):

1. 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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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
2. As per 865664 D01, the highest SAR measured > 0.8 W/kg has been re-measured and included in the report in section 10.4 under ***SAR Measurement Variability and Measurement Uncertainty Analysis Results*** Table.

*KDB 941225 D03 - SAR is not required for EDGE technology when the maximum average output power is lower than that measured on the corresponding GPRS channels.

9.2.6. PCS 1900 - Body-Worn - Power Back-off Supported & Disabled

Reported SAR = 0.940 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK (DTM Class 11)	15	Front	661	1880.0	N/A	N/A	27.6	26.6	0.660	0.831	1	23
GMSK (DTM Class 11)	15	Front	512	1850.2	N/A	N/A	27.6	26.6	0.517	0.651	1	24
GMSK (DTM Class 11)	15	Front	810	1909.8	N/A	N/A	27.6	26.5	0.658	0.848	1	25
GMSK (DTM Class 11)	15	Back	661	1880.0	N/A	N/A	27.6	26.6	0.705	0.888	1	26
GMSK (DTM Class 11)	15	Back	512	1850.2	N/A	N/A	27.6	26.6	0.575	0.724	1	27
GMSK (DTM Class 11)	15	Back	810	1909.8	N/A	N/A	27.6	26.5	0.730	0.940	1	28

Note(s):

1. DTM Multi-slot Class 11 - Tested using 3 Uplink time slots (with 2 time slots set as CS1 for GPRS and 1 time slot set for voice).

* Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, “when the reported SAR for 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.”

9.2.7. UMTS FDD 5 - Head - Power Back-off NOT Supported

Max Reported SAR = 0.495 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
QPSK	0	Touch Left	4183	836.6	N/A	N/A	24.5	24.5	0.371	0.371	1, 2	29
QPSK	0	Tilt Left	4183	836.6	N/A	N/A	24.5	24.5	0.227	0.227	1, 2	30
QPSK	0	Touch Right	4183	836.6	N/A	N/A	24.5	24.5	0.495	0.495	1, 2	31
QPSK	0	Tilt Right	4183	836.6	N/A	N/A	24.5	24.5	0.254	0.254	1, 2	32

Note(s):

1. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"
2. 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:

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

9.2.8. UMTS FDD 5 - Hotspot Mode - Power Back-off NOT Supported

Max Reported SAR = 0.552 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
QPSK	10	Front	4183	836.6	N/A	N/A	24.5	24.5	0.552	0.552	1, 2	33
QPSK	10	Back	4183	836.6	N/A	N/A	24.5	24.5	0.508	0.508	1, 2	34
QPSK	10	Left Hand Side	4183	836.6	N/A	N/A	24.5	24.5	0.391	0.391	1, 2	35
QPSK	10	Right Hand Side	4183	836.6	N/A	N/A	24.5	24.5	0.460	0.460	1, 2	36
QPSK	10	Bottom	4183	836.6	N/A	N/A	24.5	24.5	0.144	0.144	1, 2	37

Note(s):

1. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"
2. 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:

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

*KDB 941225 D02 - SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding RMC channels and 1g SAR level reported in 'RMC 12.2kbps' is <75% SAR limit.

9.2.9. UMTS FDD 5 - Body-Worn - Power Back-off NOT Supported

Max Reported SAR = 0.552 (W/kg)

For body-worn configuration indicated below the test position overlap with hotspot and the power back –off was not supported meaning hotspot mode was most conservative and results re-used for body-worn configuration.

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
QPSK	10	Front	4183	836.6	N/A	N/A	24.5	24.5	0.552	0.552	1, 2	33
QPSK	10	Back	4183	836.6	N/A	N/A	24.5	24.5	0.508	0.508	1, 2	34

Note(s):

1. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"
2. 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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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

*KDB 941225 D02 - SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding RMC channels and 1g SAR level reported in 'RMC 12.2kbps' is <75% SAR limit.

* Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, "when the reported SAR for 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."

9.2.10. Wi-Fi 2.4 GHz - Head – Power Back-off NOT Supported

Max Reported SAR = 0.388 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
DBPSK (802.11b 1Mbps)	0	Touch Left	6	2437	N/A	N/A	13.5	13.0	0.120	0.135	1	38
DBPSK (802.11b 1Mbps)	0	Tilt Left	6	2437	N/A	N/A	13.5	13.0	0.082	0.092	1	39
DBPSK (802.11b 1Mbps)	0	Touch Right	6	2437	N/A	N/A	13.5	13.0	0.346	0.388	1	40
DBPSK (802.11b 1Mbps)	0	Tilt Right	6	2437	N/A	N/A	13.5	13.0	0.102	0.114	1	41

Note(s):

1. 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:

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

*KDB 248227 - SAR is not required for 802.11g/n channels when the maximum average output power is equal to that measured on the corresponding 802.11b channels.

9.2.11. Wi-Fi 2.4 GHz - Hotspot Mode - Power Back-off NOT Supported

Max Reported SAR = 0.061 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	
DBPSK (802.11b 1Mbps)	10	Front	6	2437	N/A	N/A	13.5	13.0	0.054	0.061	1	42
DBPSK (802.11b 1Mbps)	10	Back	6	2437	N/A	N/A	13.5	13.0	0.028	0.031	1	43
DBPSK (802.11b 1Mbps)	10	Left Hand Side	6	2437	N/A	N/A	13.5	13.0	0.008	0.009	1	44
DBPSK (802.11b 1Mbps)	10	Top	6	2437	N/A	N/A	13.5	13.0	0.004	0.005	1	45

Note(s):

1. 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:

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

*KDB 248227 - SAR is not required for 802.11g/n channels when the maximum average output power is equal to that measured on the corresponding 802.11b channels.

9.2.12. Wi-Fi 2.4 GHz - Body-Worn - Power Back-off NOT Supported

Max Reported SAR = 0.061(W/kg)

For body-worn configuration indicated below the test position overlap with hotspot and the power back –off was not supported meaning hotspot mode was most conservative and results re-used for body-worn configuration.

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
DBPSK (802.11b 1Mbps)	15	Front	6	2437	N/A	N/A	13.5	13.0	0.054	0.061	1	42
DBPSK (802.11b 1Mbps)	15	Back	6	2437	N/A	N/A	13.5	13.0	0.028	0.031	1	43

Note(s):

1. 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:

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

*KDB 248227 - SAR is not required for 802.11g/n channels when the maximum average output power is equal to that measured on the corresponding 802.11b channels.

* Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, “when the reported SAR for 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.”

9.2.13. Wi-Fi 5.0 GHz - Head - Power Back-off NOT Supported

Max Reported SAR = 0.596 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Ch No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
BPSK (802.11a HT20 6Mbps)												
WiFi 5.0 GHz Sub Band 1	0	Touch Left	48	5240	N/A	N/A	16.3	16.3	0.187	0.187	1	46
WiFi 5.0 GHz Sub Band 1	0	Tilt Left	48	5240	N/A	N/A	16.3	16.3	0.144	0.144	1	47
WiFi 5.0 GHz Sub Band 1	0	Touch Right	48	5240	N/A	N/A	16.3	16.3	0.596	0.596	1	48
WiFi 5.0 GHz Sub Band 1	0	Tilt Right	48	5240	N/A	N/A	16.3	16.3	0.358	0.358	1	49
WiFi 5.0 GHz Sub Band 2	0	Touch Right	52	5260	N/A	N/A	16.3	16.3	0.251	0.251	1	50
WiFi 5.0 GHz Sub Band 3	0	Touch Right	108	5540	N/A	N/A	16.5	16.5	0.325	0.325	1	51
WiFi 5.0 GHz Sub Band 4	0	Touch Right	161	5805	N/A	N/A	16.5	16.5	0.273	0.273	1	52
BPSK (802.11ac VHT40 13.5Mbps)												
WiFi 5.0 GHz Sub Band 1	0	Touch Right	38	5190	N/A	N/A	14.3	14.3	0.355	0.355	1	53
WiFi 5.0 GHz Sub Band 2	0	Touch Right	54	5270	N/A	N/A	14.3	14.3	0.403	0.403	1	54
WiFi 5.0 GHz Sub Band 3	0	Touch Right	134	5670	N/A	N/A	14.7	14.6	0.152	0.156	1	55
WiFi 5.0 GHz Sub Band 4	0	Touch Right	159	5795	N/A	N/A	14.7	14.5	0.116	0.121	1	56
BPSK (802.11ac VHT80 29.3Mbps)												
WiFi 5.0 GHz Sub Band 1	0	Touch Right	42	5210	N/A	N/A	14.2	14.2	0.134	0.134	1	57
WiFi 5.0 GHz Sub Band 2	0	Touch Right	58	5290	N/A	N/A	14.2	14.2	0.188	0.188	1	58
WiFi 5.0 GHz Sub Band 3	0	Touch Right	106	5530	N/A	N/A	14.5	14.5	0.108	0.108	1	59
WiFi 5.0 GHz Sub Band 4	0	Touch Right	155	5775	N/A	N/A	14.5	14.2	0.136	0.146	1	60

Note(s):

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

*KDB 248227 - SAR is not required for 802.11n HT20 / 802.11ac VHT20 channels as the maximum average output power is less than ¼ dB higher than 802.11a.

*KDB 248227 - SAR is not required for 802.11n HT40 channels as the maximum average output power is less than ¼ dB higher than 802.11ac VHT40.

9.2.14. Wi-Fi 5.0 GHz Hotspot Mode - Power Back-off NOT Supported

Max Reported SAR = 0.275 (W/kg)

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Ch No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
BPSK (802.11a HT20 6Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Front	48	5240	N/A	N/A	16.3	16.3	0.000	0.000	1, 2	61
WiFi 5.0 GHz Sub Band 1	10	Back	48	5240	N/A	N/A	16.3	16.3	0.200	0.200	1	62
WiFi 5.0 GHz Sub Band 1	10	Left Hand	48	5240	N/A	N/A	16.3	16.3	0.048	0.048	1	63
WiFi 5.0 GHz Sub Band 1	10	Top	48	5240	N/A	N/A	16.3	16.3	0.000	0.000	1, 2	-
WiFi 5.0 GHz Sub Band 2	10	Back	52	5260	N/A	N/A	16.3	16.3	0.275	0.275	1	64
WiFi 5.0 GHz Sub Band 3	10	Back	108	5540	N/A	N/A	16.5	16.5	0.098	0.098	1	65
WiFi 5.0 GHz Sub Band 4	10	Back	161	5805	N/A	N/A	16.5	16.5	0.095	0.095	1	66
BPSK (802.11ac VHT40 13.5Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Back	38	5190	N/A	N/A	14.3	14.3	0.157	0.157	1	67
WiFi 5.0 GHz Sub Band 2	10	Back	54	5270	N/A	N/A	14.3	14.3	0.163	0.163	1	68
WiFi 5.0 GHz Sub Band 3	10	Back	134	5670	N/A	N/A	14.7	14.6	0.061	0.063	1	69
WiFi 5.0 GHz Sub Band 4	10	Back	159	5795	N/A	N/A	14.7	14.5	0.051	0.053	1	70
BPSK (802.11ac VHT80 29.3Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Back	42	5210	N/A	N/A	14.2	14.2	0.225	0.225	1	71
WiFi 5.0 GHz Sub Band 2	10	Back	58	5290	N/A	N/A	14.2	14.2	0.250	0.250	1	72
WiFi 5.0 GHz Sub Band 3	10	Back	106	5530	N/A	N/A	14.5	14.5	0.049	0.049	1	73
WiFi 5.0 GHz Sub Band 4	10	Back	155	5775	N/A	N/A	14.5	14.2	0.052	0.056	1	74

Note(s):

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

2. The results measured are below Noise floor.

*KDB 248227 - SAR is not required for 802.11n HT20 / 802.11ac VHT20 channels as the maximum average output power is less than ¼ dB higher than 802.11a.

*KDB 248227 - SAR is not required for 802.11n HT40 channels as the maximum average output power is less than ¼ dB higher than 802.11ac VHT40.

9.2.15. Wi-Fi 5.0 GHz - Body-Worn - Power Back-off NOT Supported

Max Reported SAR = 0.275 (W/kg)

For body-worn configuration indicated below the test position overlap with hotspot and the power back –off was not supported meaning hotspot mode was most conservative and results re-used for body-worn configuration.

					For LTE Only		Power (dBm)		1g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Ch No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
BPSK (802.11a HT20 6Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Front	48	5240	N/A	N/A	16.3	16.3	0.000	0.000	1, 2	61
WiFi 5.0 GHz Sub Band 1	10	Back	48	5240	N/A	N/A	16.3	16.3	0.200	0.200	1	62
WiFi 5.0 GHz Sub Band 2	10	Back	52	5260	N/A	N/A	16.3	16.3	0.275	0.275	1	64
WiFi 5.0 GHz Sub Band 3	10	Back	108	5540	N/A	N/A	16.5	16.5	0.098	0.098	1	65
WiFi 5.0 GHz Sub Band 4	10	Back	161	5805	N/A	N/A	16.5	16.5	0.095	0.095	1	66
BPSK (802.11ac VHT40 13.5Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Back	38	5190	N/A	N/A	14.3	14.3	0.157	0.157	1	67
WiFi 5.0 GHz Sub Band 2	10	Back	54	5270	N/A	N/A	14.3	14.3	0.163	0.163	1	68
WiFi 5.0 GHz Sub Band 3	10	Back	134	5670	N/A	N/A	14.7	14.6	0.061	0.063	1	69
WiFi 5.0 GHz Sub Band 4	10	Back	159	5795	N/A	N/A	14.7	14.5	0.051	0.053	1	70
BPSK (802.11ac VHT80 29.3Mbps)												
WiFi 5.0 GHz Sub Band 1	10	Back	42	5210	N/A	N/A	14.2	14.2	0.225	0.225	1	71
WiFi 5.0 GHz Sub Band 2	10	Back	58	5290	N/A	N/A	14.2	14.2	0.250	0.250	1	72
WiFi 5.0 GHz Sub Band 3	10	Back	106	5530	N/A	N/A	14.5	14.5	0.049	0.049	1	73
WiFi 5.0 GHz Sub Band 4	10	Back	155	5775	N/A	N/A	14.5	14.2	0.052	0.056	1	74

Note(s):

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

2. The results measured are below Noise floor.

*KDB 248227 - SAR is not required for 802.11n HT20 / 802.11ac VHT20 channels as the maximum average output power is less than ¼ dB higher than 802.11a.

*KDB 248227 - SAR is not required for 802.11n HT40 channels as the maximum average output power is less than ¼ dB higher than 802.11ac VHT40.

* Body worn configurations were not evaluated with PHF attached, as per KDB 648474 Section 2.3, “when the reported SAR for 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.”

9.3. Bluetooth

9.3.1. Estimated SAR

1. As per FCC KDB 447498 D01, Bluetooth maximum source based time average power was below the allowed threshold for both 10 and 15mm separation distances.
   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)]·[$\sqrt{f_{(GHz)}}/x$] W/kg for test separation distances* ≤ 50 mm;
     where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

For the estimated SAR level calculation, the Maximum Target power + Upper tolerance for *Bluetooth* = 10.0 dBm (~ 10mW) is considered.

- **10mm Bluetooth estimated SAR level:**

  Estimated *Bluetooth* SAR = (10mW/10mm)*(√2.4 / 7.5) = 0.207 W/kg

- **15mm Bluetooth estimated SAR level:**

  Estimated *Bluetooth* SAR = (10mW/15mm)*(√2.4 / 7.5) = 0.138 W/kg

Worst case separation distance of 10mm was considered for the body-worn testing listed in the table

Estimated SAR Result for Body-worn Accessory Conditions:

Test Configuration	Max. tune-up tolerance limit (mW)	Min. test separation distance (mm)	Frequency (GHz)	Estimated 1-g SAR (W/kg)
Rear/Front	10	10	2.4	0.207
Rear/Front	10	15	2.4	0.138

9.4. SAR measurement variability and measurement uncertainty analysis:

Exposure Configuration	Technology Band	Measured 1g -SAR (W/Kg)	Equipment Class	Max Meas. Source base Avg Power [dBm]	Ratio of Largest to Smallest SAR Measured
HOTSPOT (Separation Distance 10mm)	PCS1900	0.873	PCE	21.5	1.10
	PCS1900	0.795			

Note(s):

1. The following step below were followed as per KDB publication 865664 D01:

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.

9.5. Simultaneous Transmission SAR Analysis

According to the worst case configuration Simultaneous transmission analysis of worst cases is shown in the tables below.

Overall Worst Case:

1. WWAN + WLAN 2.4GHz
2. WWAN + WLAN 5.0GHz
3. WWAN + WPAN
4. WPAN + WLAN 5.0 GHz
5. WWAN + WLAN 5.0GHz + WPAN

Simultaneous Transmission SAR Analysis (Continued)

Head 1g – Worst cases measurements WWAN + WLAN 2.4GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 2	Wi-Fi 2.4 GHz	
Touch Left	0.539			0.135	0.674
Tilt Left	0.309			0.092	0.401
Touch Right	0.634			0.388	1.022
Tilt Right	0.323			0.114	0.437
Touch Left		0.329		0.135	0.464
Tilt Left		0.101		0.092	0.193
Touch Right		0.165		0.388	0.553
Tilt Right		0.064		0.114	0.178
Touch Left			0.371	0.135	0.506
Tilt Left			0.227	0.092	0.319
Touch Right			0.495	0.388	0.883
Tilt Right			0.254	0.114	0.368

Hotspot Mode 1g – Worst cases measurements WWAN + WLAN 2.4GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 2.4 GHz	
Front	0.578			0.061	0.639
Back	0.721			0.031	0.752
Left Hand Side	0.382			0.009	0.391
Right Hand Side	0.719				0.719
Bottom	0.304				0.304
Top				0.005	0.005
Front		0.687		0.061	0.748
Back		0.618		0.031	0.649
Left Hand Side		0.126		0.009	0.135
Right Hand Side		0.047			0.047
Bottom		1.099			1.099
Top				0.005	0.005
Front			0.552	0.061	0.613
Back			0.508	0.031	0.539
Left Hand Side			0.391	0.009	0.400
Right Hand Side			0.460		0.460
Bottom			0.144		0.144
Top				0.005	0.005

Body-worn 1g – Worst cases measurements WWAN + WLAN 2.4GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 2.4 GHz	
Front	0.658			0.061	0.719
Back	0.785			0.031	0.816
Front		0.848		0.061	0.909
Back		0.940		0.031	0.971
Front			0.552	0.061	0.613
Back			0.508	0.031	0.539

Conclusion:

1. The sum of reported SAR does not exceed 1.6 W/kg in any of the above cases and hence, the SAR to peak location separation ratio distance was not calculated.

Simultaneous Transmission SAR Analysis (Continued)

Head 1g – Worst cases measurements WWAN + WLAN 5.0GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 2	Wi-Fi 5.0 GHz	
Touch Left	0.539			0.187	0.726
Tilt Left	0.309			0.144	0.453
Touch Right	0.634			0.596	1.230
Tilt Right	0.323			0.358	0.681
Touch Left		0.329		0.187	0.516
Tilt Left		0.101		0.144	0.245
Touch Right		0.165		0.596	0.761
Tilt Right		0.064		0.358	0.422
Touch Left			0.371	0.187	0.558
Tilt Left			0.227	0.144	0.371
Touch Right			0.495	0.596	1.091
Tilt Right			0.254	0.358	0.612

Hotspot Mode 1g – Worst cases measurements WWAN + WLAN 5.0GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 5.0 GHz	
Front	0.578			0.000	0.578
Back	0.721			0.275	0.996
Left Hand Side	0.382			0.048	0.430
Right Hand Side	0.719				0.719
Bottom	0.304				0.304
Top				0.000	0.000
Front		0.687		0.000	0.687
Back		0.618		0.275	0.893
Left Hand Side		0.126		0.048	0.174
Right Hand Side		0.047			0.047
Bottom		1.099			1.099
Top				0.000	0.000
Front			0.552	0.000	0.552
Back			0.508	0.275	0.783
Left Hand Side			0.391	0.048	0.439
Right Hand Side			0.460		0.460
Bottom			0.144		0.144
Top				0.000	0.000

Body-worn 1g – Worst cases measurements WWAN + WLAN 5.0GHz

	Reported SAR 1g (W/Kg)				
	WWAN			WLAN	Sum of WWAN & WLAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 802.11b/g/n	
Front	0.658			0.000	0.658
Back	0.785			0.275	1.060
Front		0.848		0.000	0.848
Back		0.940		0.275	1.215
Front			0.552	0.000	0.552
Back			0.508	0.275	0.783

Conclusion:

1. The sum of reported SAR does not exceed 1.6 W/kg in any of the above cases and hence, the SAR to peak location separation ratio distance was not calculated.

Simultaneous Transmission SAR Analysis (Continued)

Hotspot Mode 1g – Worst cases measurements WWAN + WPAN

	Reported SAR 1g (W/Kg)				
	WWAN			WPAN	Sum of WWAN & WPAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Bluetooth	
Front	0.578			0.207	0.785
Back	0.721			0.207	0.928
Left Hand Side	0.382			0.207	0.589
Right Hand Side	0.719				0.719
Bottom	0.304				0.304
Top				0.207	0.207
Front		0.687		0.207	0.894
Back		0.618		0.207	0.825
Left Hand Side		0.126		0.207	0.333
Right Hand Side		0.047			0.047
Bottom		1.099			1.099
Top				0.207	0.207
Front			0.552	0.207	0.759
Back			0.508	0.207	0.715
Left Hand Side			0.391	0.207	0.598
Right Hand Side			0.460		0.460
Bottom			0.144		0.144
Top				0.207	0.207

Body-worn 1g – Worst cases measurements WWAN + WPAN

	Reported SAR 1g (W/Kg)				
	WWAN			WPAN	Sum of WWAN & WPAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Bluetooth	
Front	0.658			0.138	0.796
Back	0.785			0.138	0.923
Front		0.848		0.138	0.986
Back		0.940		0.138	1.078
Front			0.552	0.138	0.690
Back			0.508	0.138	0.646

Conclusion:

1. The sum of reported SAR does not exceed 1.6 W/kg in any of the above cases and hence, the SAR to peak location separation ratio distance was not calculated.

Simultaneous Transmission SAR Analysis (Continued)

Hotspot Mode 1g – Worst cases measurements WLAN 5.0GHz + WPAN

	Reported SAR 1g (W/Kg)		
	WLAN	WPAN	Sum of WLAN & WPAN
EUT Position	Wi-Fi 5.0 GHz	*Bluetooth*	
Front	0.000	0.207	0.207
Back	0.275	0.207	0.482
Left Hand Side	0.048	0.207	0.255
Right Hand Side			
Bottom			
Top	0.000	0.207	0.207

Body-Worn 1g – Worst cases measurements WLAN 5.0GHz + WPAN

	Reported SAR 1g (W/Kg)		
	WLAN	WPAN	Sum of WLAN & WPAN
EUT Position	Wi-Fi 5.0 GHz	*Bluetooth*	
Front	0.000	0.138	0.138
Back	0.275	0.138	0.413

Conclusion:

1. The sum of reported SAR does not exceed 1.6 W/kg in any of the above cases and hence, the SAR to peak location separation ratio distance was not calculated.

Simultaneous Transmission SAR Analysis (Continued)

Hotspot Mode 1g – Worst cases measurements WWAN + WLAN 5.0GHz + WPAN

	Reported SAR 1g (W/Kg)					
	WWAN			WLAN	WPAN	Sum of WWAN, WLAN & WPAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 5.0 GHz	*Bluetooth*	
Front	0.578			0.000	0.207	0.785
Back	0.721			0.275	0.207	1.203
Left Hand Side	0.382			0.048	0.207	0.637
Right Hand Side	0.719					0.719
Bottom	0.304					0.304
Top				0.000	0.207	0.207
Front		0.687		0.000	0.207	0.894
Back		0.618		0.275	0.207	1.100
Left Hand Side		0.126		0.048	0.207	0.381
Right Hand Side		0.047				0.047
Bottom		1.099				1.099
Top				0.000	0.207	0.207
Front			0.552	0.000	0.207	0.759
Back			0.508	0.275	0.207	0.990
Left Hand Side			0.391	0.048	0.207	0.646
Right Hand Side			0.460			0.460
Bottom			0.144			0.144
Top				0.000	0.207	0.207

Body-Worn 1g – Worst cases measurements WWAN + WLAN 5.0GHz + WPAN

	Reported SAR 1g (W/Kg)					
	WWAN			WLAN	WPAN	Sum of WWAN, WLAN & WPAN
EUT Position	GSM850	PCS1900	UMTS FDD 5	Wi-Fi 5.0 GHz	*Bluetooth*	
Front	0.658			0.000	0.138	0.796
Back	0.785			0.275	0.138	1.198
Front		0.848		0.000	0.138	0.986
Back		0.940		0.275	0.138	1.353
Front			0.552	0.000	0.138	0.690
Back			0.508	0.275	0.138	0.921

Conclusion:

1. The sum of reported SAR does not exceed 1.6 W/kg in any of the above cases and hence, the SAR to peak location separation ratio distance was not calculated.

APPENDIX 1. TEST EQUIPMENT USED

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A2077	Probe	Schmid & Partner Engineering AG	EX3 DV4	3814	24 Sep 2013	12
A1186	Probe	Schmid & Partner Engineering AG	ET3 DV3	1529	22 May 2014	12
A2243	Probe	Schmid & Partner Engineering AG	ES3 DV3	3304	02 Sept 2013	12
A2436	Probe	Schmid & Partner Engineering AG	ES3 DV3	3335	08 Jan 2014	12
A2545	Probe	Schmid & Partner Engineering AG	EX3 DV4	3995	09 May 2014	12
A2201	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	035	20 Jan 2014	12
A2200	1900 MHz Dipole Kit	Schmid & Partner Engineering AG	D1900V2	537	22 Jan 2014	12
A2202	2440 MHz Dipole Kit	Schmid & Partner Engineering AG	D2440V2	701	14 Jan 2014	12
A1377	5.0 GHz Dipole Kit	Schmid & Partner Engineering AG	D5GHzV2	1016	26 Mar 2014	12
A2111	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	432	28 Aug 2013	12
A2110	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	431	18 Nov 2013	12
A1234	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	450	12 Nov 2013	12
A2546	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE4	1435	12 May 2014	12
A2547	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE4	1438	12 May 2014	12
M1023	Dual Channel Power Meter	R & S	NRVD	863715/030	01 May 2014	12
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	04 Oct 2013	12
M1634	Power Sensor	R & S	NRV-Z1	860462/016	02 May 2014	12
M1855	Power Sensor	R & S	NRP-Z51	103246	06 May 2014	12
M1839	Signal Generator	R&S	SME06	837633/001	15 Apr 2014	12
M1838	Signal Generator	R&S	SME06	831377/005	14 Apr 2014	12
M1270	Digital Thermometer	RS	N/A	N/A	Internal Checked 06 May 2014	12
M1755	DAK Fluid Probe	Schmid & Partner Engineering AG	SM DAK 040 CA	1089	Calibrated before use	-
A1238	SAM Phantom	Schmid & Partner Engineering AG	SAM b (Site 56)	001	Calibrated before use	-
A2125	SAM Phantom	Schmid & Partner Engineering AG	SAM b (Site 57)	TP-1031	Calibrated before use	-
A2124	SAM Phantom	Schmid & Partner Engineering AG	SAM a (Site 57)	TP-1030	Calibrated before use	-
A2438	SAM Phantom	Schmid & Partner Engineering AG	SAM a	1805	Calibrated before use	-
A2551	SAM Phantom	Schmid & Partner Engineering AG	SAM a	1832	Calibrated before use	-
A2552	SAM Phantom	Schmid & Partner Engineering AG	SAM a	1836	Calibrated before use	-

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A2437	Eli Phantom	Schmid & Partner Engineering AG	Eli5	1235	Calibrated before use	-
A2252	2mm Oval Phantom	Schmid & Partner Engineering AG	Eli5	1177	Calibrated before use	-
A2549	2mm Oval Phantom	Schmid & Partner Engineering AG	Eli5	00T01 DA	Calibrated before use	-
A2550	2mm Oval Phantom	Schmid & Partner Engineering AG	Eli5	00T01 DA	Calibrated before use	-
G0528	Robot Power Supply	Schmid & Partner Engineering AG	DASY4	None	Calibrated before use	-
GO591	Robot Power Supply	Schmid & Partner Engineering AG	DASY4	None	Calibrated before use	-
G0592	Robot Power Supply	Schmid & Partner Engineering AG	DASY52	None	Calibrated before use	-
G0610	Robot Power Supply	Schmid & Partner Engineering AG	DASY52	None	Calibrated before use	-
G0611	Robot Power Supply	Schmid & Partner Engineering AG	DASY52	None	Calibrated before use	-
G0612	Robot Power Supply	Schmid & Partner Engineering AG	DASY52	None	Calibrated before use	-
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-
M1047	Robot Arm	Staubli	RX908 L	F00/SD8 9A1/A/01	Calibrated before use	-
M1653	Robot Arm	Staubli	RX908 L	F01/5J8 6A1/C/01	Calibrated before use	-
M1680	Robot Arm	Staubli	TX60 L	F12/5MZ7 A1/A/01	Calibrated before use	-
M1875	Robot Arm	Staubli	TX60 L	F13/5SC6F1/A/01	Calibrated before use	-
M1876	Robot Arm	Staubli	TX60 L	F14/5T5ZA1/A/01	Calibrated before use	-
M1877	Robot Arm	Staubli	TX60 L	F14/5UA6A1/A/01	Calibrated before use	-
S0566	SAR Lab	UL	Site 56	N/A	Calibrated before use	-
S0567	SAR Lab	UL	Site 57	N/A	Calibrated before use	-
S0568	SAR Lab	UL	Site 58	N/A	Calibrated before use	-
S0569	SAR Lab	UL	Site 59	N/A	Calibrated before use	-
S0570	SAR Lab	UL	Site 60	N/A	Calibrated before use	-
S0571	SAR Lab	UL	Site 61	N/A	Calibrated before use	-
A1328	Handset Positioner	Schmid & Partner Engineering AG	Modification	SD 000 H01 DA	-	-
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A2263	Digital Camera	Samsung	PL211	9453C90B 607487L	-	-

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A215	20dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147A F030003030	41752-1	Calibrated as part of system	-