FCC SAR Test Report

APPLICANT	:	Bullitt Group
EQUIPMENT	:	Rugged Smart Phone
BRAND NAME	:	CAT
MODEL NAME	:	S50
FCC ID	:	ZL5S50
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2003

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA463004	Rev. 01	Initial issue of report	Aug. 19, 2014

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Bullitt Group, Rugged Smart Phone, S50**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary			
		Head (Separation 0mm) 1g SAR (W/kg)	Body-worn (Separation 10mm) 1g SAR (W/kg)	Wireless Router (Separation 10mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
PCE	GSM850	0.37	0.63	0.63	1.47
	GSM1900	0.38	0.56	0.82	
	WCDMA Band V	0.53	0.80	0.80	
	WCDMA Band IV	**0.76**	0.86	1.11	
	WCDMA Band II	0.52	1.08	1.27	
	LTE Band 17	0.52	0.75	0.75	
	LTE Band 5	0.50	0.66	0.66	
	LTE Band 4	0.73	1.00	1.00	
	LTE Band 2	0.56	**1.13**	**1.43**	
	LTE Band 7	0.60	0.76	1.40	
DTS	WLAN 2.4GHz Band	0.36	0.19	0.19	1.43
	WLAN 5.8GHz Band	0.49	0.19		
NII	WLAN 5.2GHz Band	0.19	0.23		1.47
	WLAN 5.3GHz Band	0.27	0.31		
	WLAN 5.5GHz Band	0.60	0.34		
DSS	Bluetooth	0.04	0.01	0.01	1.43
Date of Testing:		07/22/2014 ~ 08/07/2014			

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2003.

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Bullitt Group
Address	No. 4, The Aquarium, King Street,Reading, RG1 2AN United Kingdom

Manufacturer	
Company Name	Compal Electronics, INC.
Address	No. 385, Yangguang St. Neihu District, Taipei City 11491, Taiwan, R.O.C

3. Guidance Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- FCC KDB 865664 D02 SAR Reporting v01r01
- FCC KDB 447498 D01 General RF Exposure Guidance v05r02
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r02
- FCC KDB 248227 D01 SAR meas for 802 11abg v01r02
- FCC KDB 941225 D01 SAR test for 3G devices v02
- FCC KDB 941225 D02 HSPA and 1x Advanced v02r02
- FCC KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- FCC KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01
- FCC KDB 941225 D05 SAR for LTE Devices v02r03
- FCC KDB 941225 D06 Hotspot Mode SAR v01r01

4. Equipment Under Test (EUT)

4.1 General Information

Product Feature & Specification	
Equipment Name	Rugged Smart Phone
Brand Name	CAT
Model Name	S50
FCC ID	ZL5S50
IMEI Code	Sample for GSM /UMTS SAR testing: 355178060001182 Sample for LTE SAR testing: 355178060000689 Sample for WLAN SAR testing: 355178060001323
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	• GSM/GPRS/EGPRS • AMR / RMC 12.2Kbps • HSDPA • HSUPA • DC-HSDPA • LTE: QPSK, 16QAM • WLAN 11b/g/n HT20 • WLAN 11a/n HT20/HT40 • Bluetooth 2.1 + EDR • Bluetooth 3.0 • Bluetooth 4.0 + LE • NFC:ASK
HW Version	DVT1
SW Version	LTE_S0201121.0_S50_0.006.00
GSM / (E)GPRS Dual Transfer mode	Class A – EUT can support Packet Switched and Circuit Switched Network simultaneously.
EUT Stage	Identical Prototype

Remark:

1. This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
2. This device supports GRPS/EGPRS mode up to multi-slot class12 and supports DTM up to multi-slot class11.
3. This device 2.4GHz WLAN supports Hotspot operation, and 2.4GHz WLAN supports WiFi Direct (Group Client / Group Owner), and 5GHz WLAN supports WiFi Direct (Group Client only).

4.2 Maximum Tune-up Limit

Mode		Burst average power(dBm)	
		GSM 850	GSM 1900
GSM (GMSK, 1 Tx slot)		33.50	30.50
GPRS/EDGE (GMSK, 1 Tx slot)		33.50	30.50
GPRS/EDGE (GMSK, 2 Tx slots)		30.50	27.50
GPRS/EDGE (GMSK, 3 Tx slots)		28.50	25.50
GPRS/EDGE (GMSK, 4 Tx slots)		27.50	24.50
EDGE (8PSK, 1 Tx slot)		27.50	26.50
EDGE (8PSK, 2 Tx slots)		27.30	26.30
EDGE (8PSK, 3 Tx slots)		27.10	26.10
EDGE (8PSK, 4 Tx slots)		26.90	25.90
DTM 5	GSM (GMSK, 1 Tx slot)	30.50	27.50
	GPRS (GMSK, 1 Tx slot)	30.50	27.50
DTM 9	GSM (GMSK, 1 Tx slot)	30.50	27.50
	GPRS (GMSK, 1 Tx slot)	30.50	27.50
DTM11	GSM (GMSK, 1 Tx slot)	28.50	25.50
	GPRS (GMSK, 2 Tx slots)	28.50	25.50
DTM 5	GSM (GMSK, 1 Tx slot)	30.50	27.50
	EDGE (8PSK, 1 Tx slot)	27.30	26.30
DTM 9	GSM (GMSK, 1 Tx slot)	30.50	27.50
	EDGE (8PSK, 1 Tx slot)	27.30	26.30
DTM 11	GSM (GMSK, 1 Tx slot)	28.50	25.50
	EDGE (8PSK, 2 Tx slots)	27.10	26.10

Mode	Average power(dBm)		
	WCDMA Band II	WCDMA Band IV	WCDMA Band V
AMR / RMC 12.2Kbps	24.50	24.50	24.50
HSDPA Subtest-1	24.50	24.50	24.50
DC-HSDPA Subtest-1	24.50	24.50	24.50
HSUPA Subtest-5	24.50	24.50	24.50

Mode		Average Power (dBm)
2.4GHz WLAN	802.11b	15.00
	802.11g	11.00
	802.11n-HT20	10.00
5GHz WLAN	802.11a	10.00
	802.11n-HT20	10.00
	802.11n-HT40	10.00
Bluetooth v3.0+EDR	CH 00	6.00
	CH 39	8.00
	CH 78	6.00
Bluetooth v4.0+LE	CH 00	-1.50
	CH 19	0.50
	CH 39	-1.50

LTE Band 17				
Average power(dBm)				
Modulation	BW (MHz)	RB size	(MPR)	power mode
QPSK	10	≤ 12	0	24.50
QPSK	10	> 12	1	23.50
16QAM	10	≤ 12	1	23.50
16QAM	10	> 12	2	22.50
QPSK	5	≤ 8	0	24.50
QPSK	5	> 8	1	23.50
16QAM	5	≤ 8	1	23.50
16QAM	5	> 8	2	22.50

LTE Band 5				
Average power(dBm)				
Modulation	BW (MHz)	RB size	(MPR)	Power mode
QPSK	10	≤ 12	0	24.50
QPSK	10	> 12	1	23.50
16QAM	10	≤ 12	1	23.50
16QAM	10	> 12	2	22.50
QPSK	5	≤ 8	0	24.50
QPSK	5	> 8	1	23.50
16QAM	5	≤ 8	1	23.50
16QAM	5	> 8	2	22.50
QPSK	3	≤ 4	0	24.50
QPSK	3	> 4	1	23.50
16QAM	3	≤ 4	1	23.50
16QAM	3	> 4	2	22.50
QPSK	1.4	≤ 5	0	24.50
QPSK	1.4	> 5	1	23.50
16QAM	1.4	≤ 5	1	23.50
16QAM	1.4	> 5	2	22.50

LTE Band 4				
Average power(dBm)				
Modulation	BW (MHz)	RB size	(MPR)	power mode
QPSK	20	≤ 18	0	24.50
QPSK	20	> 18	1	23.50
16QAM	20	≤ 18	1	23.50
16QAM	20	> 18	2	22.50
QPSK	15	≤ 16	0	24.50
QPSK	15	> 16	1	23.50
16QAM	15	≤ 16	1	23.50
16QAM	15	> 16	2	22.50
QPSK	10	≤ 12	0	24.50
QPSK	10	> 12	1	23.50
16QAM	10	≤ 12	1	23.50
16QAM	10	> 12	2	22.50
QPSK	5	≤ 8	0	24.50
QPSK	5	> 8	1	23.50
16QAM	5	≤ 8	1	23.50
16QAM	5	> 8	2	22.50
QPSK	3	≤ 4	0	24.50
QPSK	3	> 4	1	23.50
16QAM	3	≤ 4	1	23.50
16QAM	3	> 4	2	22.50
QPSK	1.4	≤ 5	0	24.50
QPSK	1.4	> 5	1	23.50
16QAM	1.4	≤ 5	1	23.50
16QAM	1.4	> 5	2	22.50

LTE Band 2				
Average power(dBm)				
Modulation	BW (MHz)	RB size	(MPR)	power mode
QPSK	20	≤ 18	0	24.50
QPSK	20	> 18	1	23.50
16QAM	20	≤ 18	1	23.50
16QAM	20	> 18	2	22.50
QPSK	15	≤ 16	0	24.50
QPSK	15	> 16	1	23.50
16QAM	15	≤ 16	1	23.50
16QAM	15	> 16	2	22.50
QPSK	10	≤ 12	0	24.50
QPSK	10	> 12	1	23.50
16QAM	10	≤ 12	1	23.50
16QAM	10	> 12	2	22.50
QPSK	5	≤ 8	0	24.50
QPSK	5	> 8	1	23.50
16QAM	5	≤ 8	1	23.50
16QAM	5	> 8	2	22.50
QPSK	3	≤ 4	0	24.50
QPSK	3	> 4	1	23.50
16QAM	3	≤ 4	1	23.50
16QAM	3	> 4	2	22.50
QPSK	1.4	≤ 5	0	24.50
QPSK	1.4	> 5	1	23.50
16QAM	1.4	≤ 5	1	23.50
16QAM	1.4	> 5	2	22.50

LTE Band 7				
Average power(dBm)				
Modulation	BW (MHz)	RB size	(MPR)	Power mode
QPSK	20	≤ 18	0	23.00
QPSK	20	> 18	1	22.00
16QAM	20	≤ 18	1	22.00
16QAM	20	> 18	2	21.00
QPSK	15	≤ 16	0	23.00
QPSK	15	> 16	1	22.00
16QAM	15	≤ 16	1	22.00
16QAM	15	> 16	2	21.00
QPSK	10	≤ 12	0	23.00
QPSK	10	> 12	1	22.00
16QAM	10	≤ 12	1	22.00
16QAM	10	> 12	2	21.00
QPSK	5	≤ 8	0	23.00
QPSK	5	> 8	1	22.00
16QAM	5	≤ 8	1	22.00
16QAM	5	> 8	2	21.00

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r03	
FCC ID	ZL5S50
Equipment Name	Rugged Smart Phone
Operating Frequency Range of each LTE transmission band	LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 05: 824.7 MHz ~ 848.3 MHz LTE Band 04: 1710.7 MHz ~ 1754.3 MHz LTE Band 02: 1850.7 MHz ~ 1909.3 MHz LTE Band 07: 2502.5 MHz ~ 2567.5 MHz
Channel Bandwidth	LTE Band 17: 5MHz, 10MHz LTE Band 05: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 04: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 02: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz
LTE version and uplink modulations used	Rel9 and Cat4, QPSK and 16QAM
LTE Voice / Data requirements	Data only
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
Power reduction applied to satisfy SAR compliance	Yes, proximity sensor.

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

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 17

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 4

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745

LTE Band 2

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

LTE Band 7

	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

$$\mathbf{SAR} = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\mathbf{dm}}\right) = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\boldsymbol{\rho}\mathbf{dv}}\right)$$

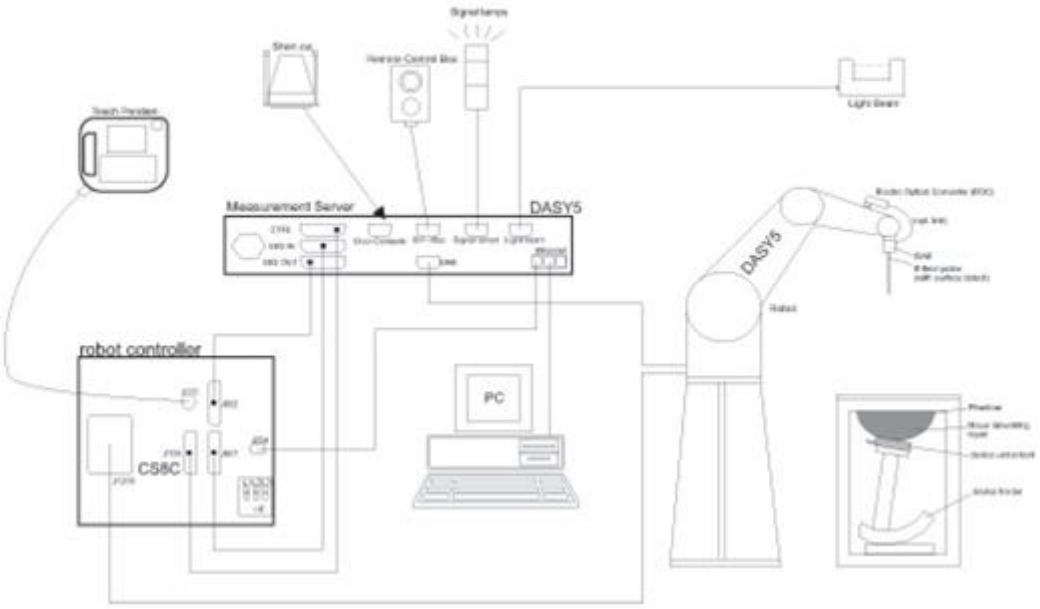
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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 DASY5 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.

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

8.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

8.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r03 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r03 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1012	May. 16, 2014	May. 15, 2015
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 24, 2014	Mar. 23, 2015
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Nov. 27, 2013	Nov. 26, 2014
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 21, 2014	Mar. 20, 2015
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 23, 2013	Aug. 22, 2014
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 23, 2013	Aug. 22, 2014
SPEAG	5GHz System Validation Kit	D5GHzV2	1040	Jun. 20, 2014	Jun. 19, 2015
SPEAG	Data Acquisition Electronics	DAE4	778	Aug. 21, 2013	Aug. 20, 2014
SPEAG	Data Acquisition Electronics	DAE4	1338	Nov. 05, 2013	Nov. 04, 2014
SPEAG	Data Acquisition Electronics	DAE3	577	May. 15, 2014	May. 14, 2015
SPEAG	Data Acquisition Electronics	DAE4	1279	Jan. 30, 2014	Jan. 29, 2015
SPEAG	Data Acquisition Electronics	DAE4	1425	Mar. 03, 2014	Mar. 02, 2015
SPEAG	Data Acquisition Electronics	DAE4	1399	Nov. 07, 2013	Nov. 06, 2014
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 24, 2013	Sep. 23, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3935	Nov. 04, 2013	Nov. 03, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 10, 2013	Sep. 09, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	Nov. 04, 2013	Nov. 03, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3955	Nov. 12, 2013	Nov. 11, 2014
Wisewind	Thermometer	ETP-101	TM560	Oct. 22, 2013	Oct. 21, 2014
Wisewind	Thermometer	ETP-101	TM685	Oct. 22, 2013	Oct. 21, 2014
Wisewind	Thermometer	HTC-1	TM642	Oct. 22, 2013	Oct. 21, 2014
Wisewind	Thermometer	HTC-1	TM281	Oct. 22, 2013	Oct. 21, 2014
H.M.IRIS	Thermometer	TH-08	TM658	Oct. 22, 2013	Oct. 21, 2014
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Feb. 11, 2014	Feb. 10, 2015
Anritsu	Radio Communication Analyzer	MT8820C	6201341950	Dec. 25, 2013	Dec. 24, 2014
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 27, 2014	May. 26, 2015
R&S	BT Base Station	CBT32	100522	Feb. 19, 2014	Feb. 18, 2015
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Agilent	Signal Generator	E4438C	MY49070755	Oct. 08, 2013	Oct. 07, 2014
SPEAG	Dielectric Probe Kit	DAKS-3.5	0004	Mar. 04, 2014	Mar. 03, 2015
Agilent	ENA Network Analyzer	E5071C	MY46316648	Feb. 07, 2014	Feb. 06, 2015
Anritsu	Power Meter	ML2495A	1349001	Dec. 04, 2013	Dec. 03, 2014
Anritsu	Power Sensor	MA2411B	1306099	Dec. 03, 2013	Dec. 02, 2014
R&S	Spectrum Analyzer	FSP30	101067	Nov. 20, 2013	Nov. 19, 2014
Agilent	Dual Directional Coupler	778D	50422	Note 1	
Woken	Attenuator	WK0602-XX	N/A	Note 1	
PE	Attenuator	PE7005-10	N/A	Note 1	
PE	Attenuator	PE7005- 3	N/A	Note 1	
AR	Power Amplifier	5S1G4M2	0328767	Note 1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note 1	
Mini-Circuits	Power Amplifier	ZHL-42W+	13440021344	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

10. System Verification

10.1 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	22.4	0.883	40.800	0.89	41.90	-0.79	-2.63	±5	2014/8/2
750	Body	22.2	0.961	53.900	0.96	55.50	0.10	-2.88	±5	2014/8/2
835	Head	22.2	0.903	41.000	0.90	41.50	0.33	-1.20	±5	2014/8/1
835	Head	22.3	0.911	41.800	0.90	41.50	1.22	0.72	±5	2014/8/2
835	Body	22.5	0.997	55.961	0.97	55.20	2.78	1.38	±5	2014/7/30
1750	Head	22.2	1.390	38.500	1.37	40.10	1.46	-3.99	±5	2014/8/3
1750	Body	22.3	1.530	52.000	1.49	53.40	2.68	-2.62	±5	2014/7/24
1750	Body	22.6	1.514	52.223	1.49	53.40	1.61	-2.20	±5	2014/7/31
1900	Head	22.5	1.430	38.700	1.40	40.00	2.14	-3.25	±5	2014/7/22
1900	Head	22.4	1.430	39.200	1.40	40.00	2.14	-2.00	±5	2014/8/4
1900	Body	22.3	1.550	52.200	1.52	53.30	1.97	-2.06	±5	2014/7/24
1900	Body	22.2	1.508	52.246	1.52	53.30	-0.79	-1.98	±5	2014/8/1
1900	Body	22.4	1.550	52.100	1.52	53.30	1.97	-2.25	±5	2014/8/5
2450	Head	22.3	1.836	39.458	1.80	39.20	2.00	0.66	±5	2014/8/4
2450	Head	22.3	1.850	39.300	1.80	39.20	2.78	0.26	±5	2014/8/7
2450	Body	22.3	2.015	53.957	1.95	52.70	3.33	2.39	±5	2014/8/4
2450	Body	22.5	1.920	53.100	1.95	52.70	-1.54	0.76	±5	2014/8/7
2600	Head	22.3	1.980	38.300	1.96	39.00	1.02	-1.79	±5	2014/8/6
2600	Body	22.3	2.210	51.100	2.16	52.50	2.31	-2.67	±5	2014/8/6
5200	Head	22.5	4.533	37.486	4.66	36.00	-2.73	4.13	±5	2014/8/6
5200	Body	22.4	5.325	47.518	5.30	49.00	0.47	-3.02	±5	2014/8/7
5300	Head	22.5	4.654	37.354	4.76	35.90	-2.23	4.05	±5	2014/8/6
5300	Body	22.4	5.466	47.251	5.42	48.90	0.85	-3.37	±5	2014/8/7
5600	Head	22.5	4.982	36.879	5.07	35.50	-1.74	3.88	±5	2014/8/6
5600	Body	22.4	5.868	46.726	5.77	48.50	1.70	-3.66	±5	2014/8/7
5800	Head	22.5	5.423	34.346	5.27	35.30	2.90	-2.70	±5	2014/8/7
5800	Body	22.4	6.229	46.417	6.00	48.20	3.82	-3.70	±5	2014/8/7

10.2 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2014/8/2	750	Head	250	D750V3-1012	EX3DV4 - SN3955	DAE4 Sn1399	1.94	8.12	7.76	-4.43
2014/8/2	750	Body	250	D750V3-1012	EX3DV4 - SN3955	DAE4 Sn1399	2.10	8.65	8.40	-2.89
2014/8/1	835	Head	250	D835V2-499	EX3DV4 - SN3954	DAE4 Sn1425	2.32	9.13	9.28	1.64
2014/8/2	835	Head	250	D835V2-499	EX3DV4 - SN3931	DAE3 Sn577	2.35	9.13	9.40	2.96
2014/7/30	835	Body	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	2.49	9.46	9.96	5.29
2014/8/3	1750	Head	250	D1750V2-1068	ES3DV3 - SN3270	DAE4 Sn778	8.70	37.30	34.80	-6.70
2014/7/24	1750	Body	250	D1750V2-1068	EX3DV4 - SN3931	DAE3 Sn577	9.95	37.50	39.80	6.13
2014/7/31	1750	Body	250	D1750V2-1068	ES3DV3 - SN3270	DAE4 Sn778	9.49	37.50	37.96	1.23
2014/7/22	1900	Head	250	D1900V2-5d041	EX3DV4 - SN3955	DAE4 Sn1399	10.40	41.00	41.60	1.46
2014/8/4	1900	Head	250	D1900V2-5d041	EX3DV4 - SN3955	DAE4 Sn1399	9.49	41.00	37.96	-7.41
2014/7/24	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3931	DAE3 Sn577	10.30	41.00	41.20	0.49
2014/8/1	1900	Body	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn778	10.10	41.00	40.40	-1.46
2014/8/5	1900	Body	250	D1900V2-5d041	EX3DV4 - SN3955	DAE4 Sn1399	10.60	41.00	42.40	3.41
2014/8/4	2450	Head	250	D2450V2-736	EX3DV4 - SN3935	DAE4 Sn1338	13.80	53.20	55.20	3.76
2014/8/7	2450	Head	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn1279	13.00	53.20	52.00	-2.26
2014/8/4	2450	Body	250	D2450V2-736	EX3DV4 - SN3935	DAE4 Sn1338	12.70	51.30	50.80	-0.97
2014/8/7	2450	Body	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn1279	12.30	51.30	49.20	-4.09
2014/8/6	2600	Head	250	D2600V2-1008	EX3DV4 - SN3955	DAE4 Sn1399	14.20	58.80	56.80	-3.40
2014/8/6	2600	Body	250	D2600V2-1008	EX3DV4 - SN3955	DAE4 Sn1399	13.60	55.20	54.40	-1.45
2014/8/6	5200	Head	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.73	80.80	77.30	-4.33
2014/8/7	5200	Body	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.42	77.80	74.20	-4.63
2014/8/6	5300	Head	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.76	84.00	77.60	-7.62
2014/8/7	5300	Body	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.94	79.10	79.40	0.38
2014/8/6	5600	Head	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.99	84.40	79.90	-5.33
2014/8/7	5600	Body	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	8.53	82.70	85.30	3.14
2014/8/7	5800	Head	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	7.69	80.40	76.90	-4.35
2014/8/7	5800	Body	100	D5GHzV2-1040	EX3DV4 - SN3954	DAE4 Sn1425	8.04	77.30	80.40	4.01

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled "M," the left ear reference point (ERP) is marked "LE," and the right ERP is marked "RE." Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

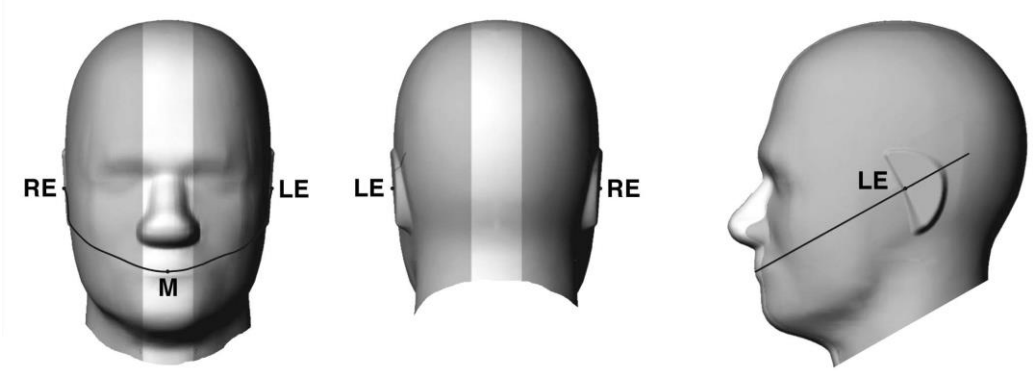


Fig 9.1.1 Front, back, and side views of SAM twin phantom

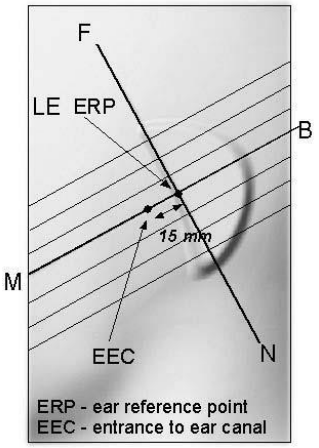


Fig 9.1.2 Close-up side view of phantom showing the ear region.

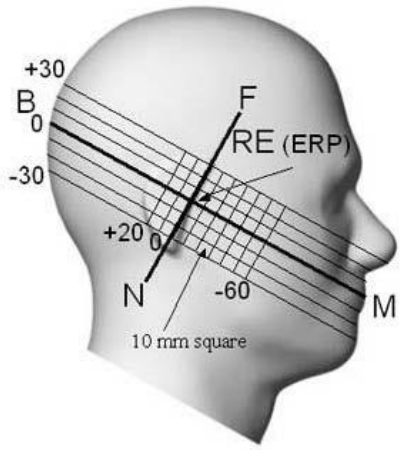


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

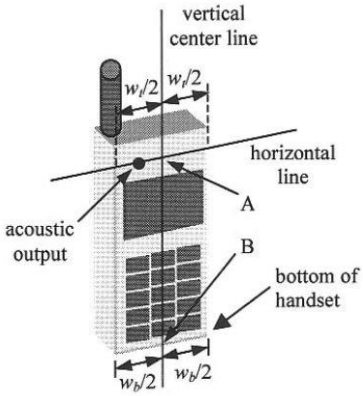


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

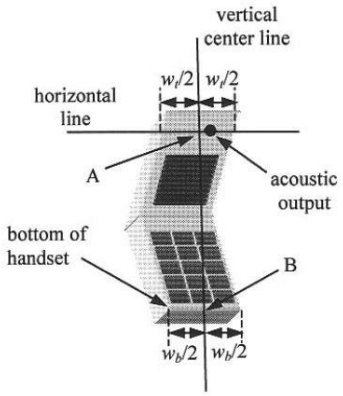


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

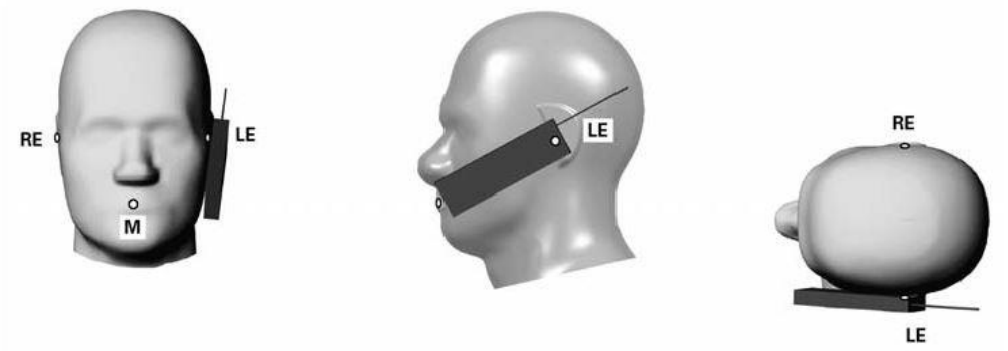


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

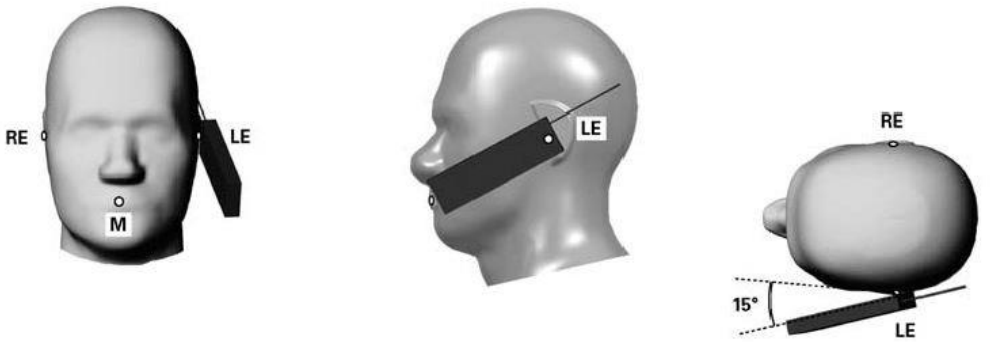


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB 648474 D04v01r02, 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 D01v05r02 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. 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 handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

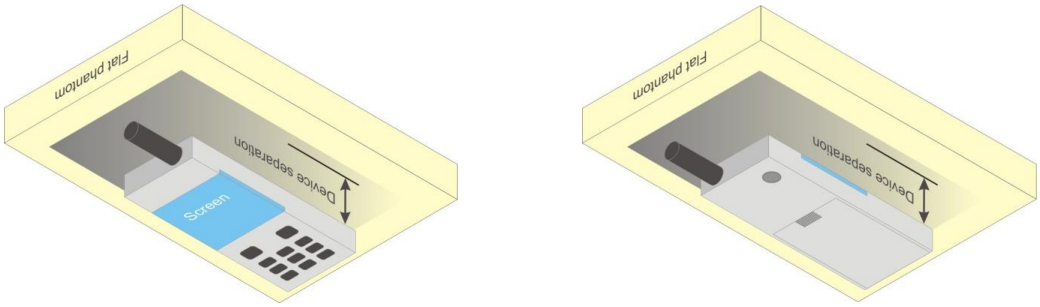


Fig 9.4 Body Worn Position

11.5 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC HDB Publication 941225 D06v01r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v05r02 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. For DTM multi-slot class mode, the device was linked with base station simulator (Agilent E5515C) and transmit maximum power on maximum number of TX slots, i.e. one CS timeslot, and additional PS timeslots (1 for DTM class 5 and 9, 2 for DTM class 11) in one TDMA frame.
2. Agilent E5515C was used to setup the device operated under DTM mode for power measurement and SAR testing. For conducted power, the power of the burst for voice and the power of the bursts for data was reported separately in the table above, and the frame-average power is derived below to determine SAR testing.

   *DTM frame average power (dBm) = 10*log [∑(power of each slot, in mW)/8]*
3. Per KDB 447498 D01v05r02, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. According to October 2013TCB Workshop, For GSM / EGPRS, the number of time slots to test for SAR should correspond to the highest source-based time-averaged maximum output power configuration, Considering the possibility of e.g. 3rd party VoIP operation for head and body-worn SAR testing, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900 band due to its highest frame-average power.
5. For hotspot mode SAR testing, GPRS / EDGE should be evaluated, therefore the EUT was set in GPRS 4 Tx slots for GSM850/GSM1900 band due to its highest frame-average power.
6. Due to the GSM1900 EDGE 4Tx slots average power is high than GPRS 4Tx slots, the GSM1900 EDGE 4Tx slots will be verify worse case found in GPRS mode.

Band GSM850		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel		128	189	251		128	189	251	
Frequency (MHz)		824.2	836.4	848.8		824.2	836.4	848.8	
GSM (GMSK, 1 Tx slot)		33.22	33.18	33.45	33.50	24.22	24.18	24.45	24.50
GPRS (GMSK, 1 Tx slot)		33.28	33.25	33.48	33.50	24.28	24.25	24.48	24.50
GPRS (GMSK, 2 Tx slots)		29.09	29.07	29.16	30.50	23.09	23.07	23.16	24.50
GPRS (GMSK, 3 Tx slots)		28.46	28.44	28.49	28.50	24.20	24.18	24.23	24.24
GPRS (GMSK, 4 Tx slots)		25.85	25.76	26.00	27.50	22.85	22.76	23.00	24.50
EDGE (8PSK, 1 Tx slot)		26.66	26.57	26.77	27.50	17.66	17.57	17.77	18.50
EDGE (8PSK, 2 Tx slots)		26.55	26.45	26.68	27.30	20.55	20.45	20.68	21.30
EDGE (8PSK, 3 Tx slots)		25.95	25.85	25.80	27.10	21.69	21.59	21.54	22.84
EDGE (8PSK, 4 Tx slots)		25.73	25.68	25.69	26.90	22.73	22.68	22.69	23.90
DTM 5 (2Tx slots)	GSM (GMSK, 1 Tx slot)	28.93	28.91	29.07	30.50	22.88	22.84	23.02	24.48
	GPRS (GMSK, 1 Tx slot)	28.88	28.82	29.01	30.50				
DTM 9 (2Tx slots)	GSM (GMSK, 1 Tx slot)	28.90	28.88	28.94	30.50	22.85	22.83	22.89	24.48
	GPRS (GMSK, 1 Tx slot)	28.84	28.82	28.89	30.50				
DTM 11 (3Tx slots)	GSM (GMSK, 1 Tx slot)	28.49	28.48	28.50	28.50	24.20	24.19	24.23	24.24
	GPRS (GMSK, 2 Tx slots)	28.45	28.44	28.48	28.50				
DTM 5 (2Tx slots)	GSM (GMSK, 1 Tx slot)	28.81	28.76	28.93	30.50	21.68	21.63	21.80	23.17
	EDGE (8PSK, 1 Tx slot)	26.22	26.15	26.34	27.30				
DTM 9 (2Tx slots)	GSM (GMSK, 1 Tx slot)	28.92	28.86	28.96	30.50	21.75	21.68	21.81	23.17
	EDGE (8PSK, 1 Tx slot)	26.19	26.11	26.29	27.30				
DTM 11 (3Tx slots)	GSM (GMSK, 1 Tx slot)	28.36	28.26	28.47	28.50	22.54	22.46	22.64	23.36
	EDGE (8PSK, 2 Tx slots)	25.74	25.68	25.84	27.10				

Band GSM1900		Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel		512	661	810		512	661	810	
Frequency (MHz)		1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM (GMSK, 1 Tx slot)		30.44	30.47	30.48	30.50	21.44	21.47	21.48	21.50
GPRS (GMSK, 1 Tx slot)		30.45	30.48	30.49	30.50	21.45	21.48	21.49	21.50
GPRS (GMSK, 2 Tx slots)		26.33	26.36	26.47	27.50	20.33	20.36	20.47	21.50
GPRS (GMSK, 3 Tx slots)		24.60	24.64	24.70	25.50	20.34	20.38	20.44	21.24
GPRS (GMSK, 4 Tx slots)		23.55	23.56	23.65	24.50	20.55	20.56	20.65	21.50
EDGE (8PSK, 1 Tx slot)		25.73	25.76	25.88	26.50	16.73	16.76	16.88	17.50
EDGE (8PSK, 2 Tx slots)		25.35	25.36	25.49	26.30	19.35	19.36	19.49	20.30
EDGE (8PSK, 3 Tx slots)		24.92	24.97	25.15	26.10	20.66	20.71	20.89	21.84
EDGE (8PSK, 4 Tx slots)		24.46	24.47	24.48	25.90	21.46	21.47	21.48	22.90
DTM 5 (2Tx slots)	GSM (GMSK, 1 Tx slot)	25.91	25.97	26.01	27.50	19.88	19.93	19.97	21.48
	GPRS (GMSK, 1 Tx slot)	25.90	25.94	25.98	27.50				
DTM 9 (2Tx slots)	GSM (GMSK, 1 Tx slot)	25.89	25.92	25.96	27.50	19.85	19.88	19.93	21.48
	GPRS (GMSK, 1 Tx slot)	25.86	25.89	25.95	27.50				
DTM 11 (3Tx slots)	GSM (GMSK, 1 Tx slot)	24.09	24.14	24.20	25.50	19.82	19.87	19.92	21.24
	GPRS (GMSK, 2 Tx slots)	24.07	24.12	24.17	25.50				
DTM 5 (2Tx slots)	GSM (GMSK, 1 Tx slot)	25.92	25.96	26.01	27.50	19.72	19.76	19.85	20.92
	EDGE (8PSK, 1 Tx slot)	25.56	25.60	25.72	26.30				
DTM 9 (2Tx slots)	GSM (GMSK, 1 Tx slot)	25.89	25.93	25.97	27.50	19.69	19.73	19.81	20.92
	EDGE (8PSK, 1 Tx slot)	25.52	25.56	25.68	26.30				
DTM 11 (3Tx slots)	GSM (GMSK, 1 Tx slot)	24.08	24.14	24.19	25.50	20.57	20.61	20.66	21.65
	EDGE (8PSK, 2 Tx slots)	25.16	25.19	25.25	26.10				

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	**CM** (dB) *(Note 3)*	**MPR** (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_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 β_c = 14/15 and β_d = 15/15.
Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

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

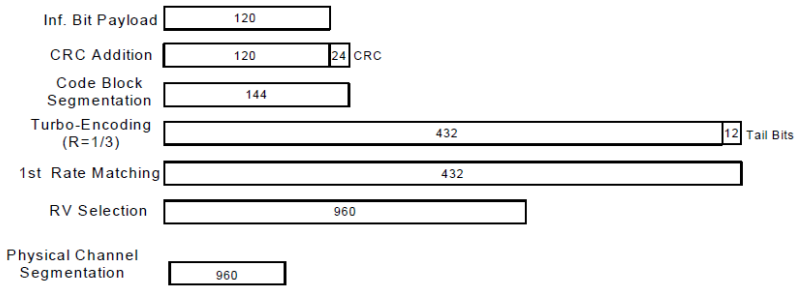


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. SAR testing in AMR configuration is not required when the maximum average output of each RF channel for AMR 12.2Kbps is less than 0.25dB higher than that measured in RMC 12.2Kbps
2. Per KDB 941225 D02v02r02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/DC-HSDPA output power is < 0.25dB higher than RMC, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.

Band			WCDMA V			WCDMA II			WCDMA IV		
TX Channel			4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)			826.4	836.4	846.4	1852.4	1880	1907.6	1712.4	1732.6	1752.6
MPR(dB)	3GPP Rel 99	AMR 12.2Kbps	23.98	23.82	23.94	24.41	24.45	24.38	24.11	24.45	24.42
		RMC 12.2Kbps	24.01	23.87	23.98	24.43	24.47	24.48	24.24	24.46	24.49
0	3GPP Rel 6	HSDPA Subtest-1	22.98	22.84	22.89	23.40	23.47	23.66	23.19	23.47	23.48
0	3GPP Rel 6	HSDPA Subtest-2	22.99	22.81	22.91	23.36	23.41	23.63	23.31	23.33	23.52
0.5	3GPP Rel 6	HSDPA Subtest-3	22.55	22.41	22.54	22.96	23.01	23.07	22.82	23.00	23.06
0.5	3GPP Rel 6	HSDPA Subtest-4	22.55	22.51	22.53	22.99	23.02	23.12	22.85	23.01	23.05
0	3GPP Rel 8	DC-HSDPA Subtest-1	22.95	22.83	22.87	23.40	23.45	23.64	23.16	23.46	23.46
0	3GPP Rel 8	DC-HSDPA Subtest-2	22.96	22.80	22.89	23.34	23.40	23.61	23.28	23.32	23.50
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	22.56	22.40	22.52	22.94	23.00	23.05	22.79	22.99	23.04
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	22.51	22.46	22.50	22.98	23.00	23.10	22.82	23.00	23.03
0	3GPP Rel 6	HSUPA Subtest-1	22.56	22.51	22.52	22.66	22.69	22.86	22.89	23.05	23.27
2	3GPP Rel 6	HSUPA Subtest-2	21.56	21.18	21.38	22.19	22.21	22.25	21.78	21.96	22.22
1	3GPP Rel 6	HSUPA Subtest-3	21.97	21.61	21.74	21.75	21.77	21.85	21.76	21.92	21.99
2	3GPP Rel 6	HSUPA Subtest-4	21.61	21.43	21.49	22.11	22.27	22.32	22.04	22.18	22.23
0	3GPP Rel 6	HSUPA Subtest-5	22.6	22.50	22.56	23.08	23.16	23.20	23.00	23.10	23.20

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r03, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r03, 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.
4. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r03, 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 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.
6. Per KDB 941225 D05v02r03, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r03, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, smaller bandwidth SAR testing is not required.

<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				23780	23790	23800		
Frequency (MHz)				709	710	711		
10	QPSK	1	0	22.81	22.82	22.80	24.5	0
10	QPSK	1	24	22.73	22.75	22.73		
10	QPSK	1	49	22.80	22.81	22.78		
10	QPSK	25	0	21.80	21.85	21.78	23.5	1
10	QPSK	25	12	21.78	21.82	21.78		
10	QPSK	25	24	21.82	21.83	21.80		
10	QPSK	50	0	21.85	21.86	21.84		
10	16QAM	1	0	21.84	21.83	21.79	23.5	1
10	16QAM	1	24	21.72	21.74	21.71		
10	16QAM	1	49	21.83	21.82	21.76		
10	16QAM	25	0	20.82	20.81	20.82	22.5	2
10	16QAM	25	12	20.86	20.81	20.86		
10	16QAM	25	24	20.87	20.85	20.86		
10	16QAM	50	0	20.93	20.85	20.83		
Channel				23755	23790	23825	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				706.5	710	713.5		
5	QPSK	1	0	22.80	22.75	22.71	24.5	0
5	QPSK	1	12	22.70	22.71	22.66		
5	QPSK	1	24	22.77	22.74	22.69		
5	QPSK	12	0	21.70	21.73	21.76	23.5	1
5	QPSK	12	6	21.77	21.72	21.73		
5	QPSK	12	11	21.74	21.81	21.76		
5	QPSK	25	0	21.85	21.74	21.80		
5	16QAM	1	0	21.82	21.81	21.72	23.5	1
5	16QAM	1	12	21.68	21.67	21.62		
5	16QAM	1	24	21.74	21.80	21.71		
5	16QAM	12	0	20.78	20.75	20.76	22.5	2
5	16QAM	12	6	20.77	20.73	20.83		
5	16QAM	12	11	20.81	20.85	20.80		
5	16QAM	25	0	20.86	20.83	20.81		

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.92	22.92	23.08	24.5	0
10	QPSK	1	24	22.92	22.87	23.01		
10	QPSK	1	49	22.98	23.01	23.03		
10	QPSK	25	0	22.33	22.41	22.48	23.5	1
10	QPSK	25	12	22.46	22.41	22.43		
10	QPSK	25	24	22.41	22.40	22.40		
10	QPSK	50	0	22.57	22.47	22.61		
10	16QAM	1	0	22.43	22.50	22.61	23.5	1
10	16QAM	1	24	22.55	22.44	22.43		
10	16QAM	1	49	22.52	22.60	22.56		
10	16QAM	25	0	21.39	21.44	21.44	22.5	2
10	16QAM	25	12	21.52	21.44	21.51		
10	16QAM	25	24	21.48	21.44	21.55		
10	16QAM	50	0	21.55	21.49	21.57		
Channel				20425	20525	20625	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.89	22.92	23.02	24.5	0
5	QPSK	1	12	22.83	22.87	23.01		
5	QPSK	1	24	23.00	22.94	23.00		
5	QPSK	12	0	22.51	22.48	22.61	23.5	1
5	QPSK	12	6	22.49	22.47	22.59		
5	QPSK	12	11	22.48	22.48	22.61		
5	QPSK	25	0	22.41	22.50	22.52		
5	16QAM	1	0	22.46	22.43	22.56	23.5	1
5	16QAM	1	12	22.47	22.46	22.53		
5	16QAM	1	24	22.52	22.45	22.51		
5	16QAM	12	0	21.53	21.59	21.70	22.5	2
5	16QAM	12	6	21.56	21.60	21.66		
5	16QAM	12	11	21.57	21.58	21.68		
5	16QAM	25	0	21.48	21.55	21.67		
Channel				20415	20525	20635	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.80	22.77	22.91	24.5	0
3	QPSK	1	7	22.77	22.75	22.87		
3	QPSK	1	14	22.90	22.79	22.85		
3	QPSK	8	0	22.43	22.31	22.44	23.5	1
3	QPSK	8	4	22.42	22.35	22.39		
3	QPSK	8	7	22.42	22.33	22.42		
3	QPSK	15	0	22.29	22.37	22.43		
3	16QAM	1	0	22.39	22.41	22.52	23.5	1
3	16QAM	1	7	22.32	22.31	22.47		
3	16QAM	1	14	22.34	22.35	22.49		
3	16QAM	8	0	21.34	21.36	21.50	22.5	2
3	16QAM	8	4	21.36	21.42	21.57		
3	16QAM	8	7	21.28	21.38	21.52		
3	16QAM	15	0	21.16	21.27	21.57		

Channel				20407	20525	20643	Tune up Limit (dBm)	Target MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.95	22.99	23.00	24.5	0
1.4	QPSK	1	2	22.93	22.97	22.89		
1.4	QPSK	1	5	22.95	22.99	22.95		
1.4	QPSK	3	0	22.91	22.93	22.94		
1.4	QPSK	3	1	22.92	22.99	22.95		
1.4	QPSK	3	2	22.90	22.94	22.96		
1.4	QPSK	6	0	22.48	22.49	22.47	23.5	1
1.4	16QAM	1	0	22.56	22.54	22.54	23.5	1
1.4	16QAM	1	2	22.54	22.53	22.51		
1.4	16QAM	1	5	22.50	22.51	22.47		
1.4	16QAM	3	0	22.50	22.53	22.49		
1.4	16QAM	3	1	22.49	22.48	22.47		
1.4	16QAM	3	2	22.46	22.49	22.46		
1.4	16QAM	6	0	21.34	21.37	21.41	22.5	2

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.95	23.69	23.53	24.5	0
20	QPSK	1	49	23.94	23.62	23.40		
20	QPSK	1	99	23.89	23.52	23.35		
20	QPSK	50	0	22.94	22.70	22.55	23.5	1
20	QPSK	50	24	22.93	22.63	22.46		
20	QPSK	50	49	22.71	22.53	22.41		
20	QPSK	100	0	22.81	22.65	22.44		
20	16QAM	1	0	22.72	22.50	22.38	23.5	1
20	16QAM	1	49	22.71	22.49	22.33		
20	16QAM	1	99	22.52	22.36	22.26		
20	16QAM	50	0	21.71	21.51	21.46	22.5	2
20	16QAM	50	24	21.68	21.51	21.43		
20	16QAM	50	49	21.61	21.49	21.39		
20	16QAM	100	0	21.79	21.59	21.52		
Channel				20025	20175	20325	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.90	23.69	23.43	24.5	0
15	QPSK	1	37	23.89	23.62	23.36		
15	QPSK	1	74	23.80	23.48	23.33		
15	QPSK	36	0	22.93	22.63	22.47	23.5	1
15	QPSK	36	18	22.84	22.63	22.37		
15	QPSK	36	37	22.62	22.44	22.32		
15	QPSK	75	0	22.81	22.56	22.44		
15	16QAM	1	0	22.64	22.45	22.29	23.5	1
15	16QAM	1	37	22.62	22.43	22.25		
15	16QAM	1	74	22.51	22.33	22.23		
15	16QAM	36	0	21.66	21.51	21.42	22.5	2
15	16QAM	36	18	21.63	21.44	21.40		
15	16QAM	36	37	21.55	21.43	21.29		
15	16QAM	75	0	21.71	21.57	21.44		
Channel				20000	20175	20350	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.92	23.62	23.51	24.5	0
10	QPSK	1	24	23.91	23.61	23.33		
10	QPSK	1	49	23.86	23.48	23.28		
10	QPSK	25	0	22.94	22.62	22.48	23.5	1
10	QPSK	25	12	22.87	22.53	22.43		
10	QPSK	25	24	22.70	22.53	22.36		
10	QPSK	50	0	22.77	22.61	22.38		
10	16QAM	1	0	22.72	22.49	22.33	23.5	1
10	16QAM	1	24	22.70	22.48	22.29		
10	16QAM	1	49	22.50	22.36	22.16		
10	16QAM	25	0	21.62	21.50	21.46	22.5	2
10	16QAM	25	12	21.64	21.45	21.43		
10	16QAM	25	24	21.56	21.42	21.33		
10	16QAM	50	0	21.77	21.53	21.42		

Channel				19975	20175	20375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.93	23.59	23.48	24.5	0
5	QPSK	1	12	23.85	23.57	23.40		
5	QPSK	1	24	23.84	23.43	23.32		
5	QPSK	12	0	22.85	22.60	22.54	23.5	1
5	QPSK	12	6	22.85	22.57	22.44		
5	QPSK	12	11	22.70	22.44	22.37		
5	QPSK	25	0	22.78	22.56	22.35		
5	16QAM	1	0	22.71	22.48	22.30	23.5	1
5	16QAM	1	12	22.62	22.45	22.29		
5	16QAM	1	24	22.44	22.35	22.25		
5	16QAM	12	0	21.69	21.45	21.39	22.5	2
5	16QAM	12	6	21.58	21.49	21.40		
5	16QAM	12	11	21.61	21.42	21.34		
5	16QAM	25	0	21.75	21.52	21.52		
Channel				19965	20175	20385	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.89	23.69	23.44	24.5	0
3	QPSK	1	7	23.85	23.60	23.38		
3	QPSK	1	14	23.84	23.42	23.26		
3	QPSK	8	0	22.87	22.70	22.48	23.5	1
3	QPSK	8	4	22.93	22.61	22.37		
3	QPSK	8	7	22.69	22.43	22.38		
3	QPSK	15	0	22.79	22.55	22.38		
3	16QAM	1	0	22.69	22.48	22.38	23.5	1
3	16QAM	1	7	22.62	22.48	22.26		
3	16QAM	1	14	22.45	22.32	22.25		
3	16QAM	8	0	21.65	21.44	21.40	22.5	2
3	16QAM	8	4	21.66	21.42	21.42		
3	16QAM	8	7	21.53	21.47	21.31		
3	16QAM	15	0	21.69	21.59	21.45		
Channel				19957	20175	20393	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.60	23.63	23.52	24.5	0
1.4	QPSK	1	2	23.59	23.52	23.39		
1.4	QPSK	1	5	23.58	23.50	23.27		
1.4	QPSK	3	0	22.95	22.96	22.88		
1.4	QPSK	3	1	22.94	22.95	22.87		
1.4	QPSK	3	2	22.92	22.94	22.86		
1.4	QPSK	6	0	22.81	22.64	22.38	23.5	1
1.4	16QAM	1	0	22.66	22.43	22.36	23.5	1
1.4	16QAM	1	2	22.61	22.41	22.27		
1.4	16QAM	1	5	22.48	22.29	22.26		
1.4	16QAM	3	0	21.96	21.96	21.88		
1.4	16QAM	3	1	21.95	21.95	21.87		
1.4	16QAM	3	2	21.94	21.93	21.86		
1.4	16QAM	6	0	21.76	21.51	21.51	22.5	2

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	23.78	23.92	23.90	24.5	0
20	QPSK	1	49	23.76	23.91	23.78		
20	QPSK	1	99	23.74	23.87	23.62		
20	QPSK	50	0	22.75	22.96	22.93	23.5	1
20	QPSK	50	24	22.79	22.92	22.88		
20	QPSK	50	49	22.73	22.86	22.75		
20	QPSK	100	0	22.72	22.92	22.82		
20	16QAM	1	0	22.76	22.85	22.83	23.5	1
20	16QAM	1	49	22.75	22.83	22.77		
20	16QAM	1	99	22.68	22.80	22.54		
20	16QAM	50	0	21.82	21.88	21.85	22.5	2
20	16QAM	50	24	21.88	21.94	21.85		
20	16QAM	50	49	21.81	21.89	21.74		
20	16QAM	100	0	21.81	22.01	21.86		
Channel				18675	18900	19125	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.74	23.91	23.83	24.5	0
15	QPSK	1	37	23.71	23.90	23.70		
15	QPSK	1	74	23.73	23.78	23.61		
15	QPSK	36	0	22.72	22.77	22.86	23.5	1
15	QPSK	36	18	22.75	22.89	22.82		
15	QPSK	36	37	22.72	22.77	22.69		
15	QPSK	75	0	22.70	22.85	22.76		
15	16QAM	1	0	22.72	22.79	22.81	23.5	1
15	16QAM	1	37	22.66	22.74	22.67		
15	16QAM	1	74	22.67	22.74	22.47		
15	16QAM	36	0	21.79	21.83	21.78	22.5	2
15	16QAM	36	18	21.86	21.87	21.83		
15	16QAM	36	37	21.75	21.84	21.65		
15	16QAM	75	0	21.77	21.97	21.85		
Channel				18650	18900	19150	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.74	23.82	23.87	24.5	0
10	QPSK	1	24	23.71	23.81	23.78		
10	QPSK	1	49	23.73	23.81	23.52		
10	QPSK	25	0	22.68	22.82	22.87	23.5	1
10	QPSK	25	12	22.71	22.92	22.81		
10	QPSK	25	24	22.71	22.86	22.70		
10	QPSK	50	0	22.69	22.90	22.80		
10	16QAM	1	0	22.71	22.82	22.78	23.5	1
10	16QAM	1	24	22.68	22.80	22.77		
10	16QAM	1	49	22.59	22.78	22.45		
10	16QAM	25	0	21.81	21.83	21.80	22.5	2
10	16QAM	25	12	21.80	21.85	21.80		
10	16QAM	25	24	21.73	21.83	21.72		
10	16QAM	50	0	21.78	21.94	21.83		

Channel				18625	18900	19175	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	23.73	23.87	23.86	24.5	0
5	QPSK	1	12	23.72	23.86	23.77		
5	QPSK	1	24	23.72	23.85	23.52		
5	QPSK	12	0	22.74	22.84	22.87	23.5	1
5	QPSK	12	6	22.76	22.90	22.82		
5	QPSK	12	11	22.73	22.84	22.74		
5	QPSK	25	0	22.66	22.82	22.81		
5	16QAM	1	0	22.71	22.83	22.75	23.5	1
5	16QAM	1	12	22.67	22.76	22.72		
5	16QAM	1	24	22.64	22.71	22.52		
5	16QAM	12	0	21.82	21.86	21.78	22.5	2
5	16QAM	12	6	21.79	21.91	21.82		
5	16QAM	12	11	21.78	21.85	21.73		
5	16QAM	25	0	21.73	21.96	21.82		
Channel				18615	18900	19185	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	23.72	23.84	23.89	24.5	0
3	QPSK	1	7	23.71	23.83	23.77		
3	QPSK	1	14	23.70	23.84	23.62		
3	QPSK	8	0	22.70	22.84	22.86	23.5	1
3	QPSK	8	4	22.70	22.84	22.87		
3	QPSK	8	7	22.69	22.82	22.69		
3	QPSK	15	0	22.67	22.82	22.77		
3	16QAM	1	0	22.75	22.85	22.81	23.5	1
3	16QAM	1	7	22.72	22.76	22.69		
3	16QAM	1	14	22.63	22.79	22.45		
3	16QAM	8	0	21.78	21.78	21.76	22.5	2
3	16QAM	8	4	21.88	21.89	21.78		
3	16QAM	8	7	21.75	21.83	21.67		
3	16QAM	15	0	21.72	21.96	21.82		
Channel				18607	18900	19193	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	23.60	23.65	23.66	24.5	0
1.4	QPSK	1	2	23.58	23.61	23.65		
1.4	QPSK	1	5	23.58	23.60	23.53		
1.4	QPSK	3	0	22.93	22.96	22.96		
1.4	QPSK	3	1	22.93	22.95	22.97		
1.4	QPSK	3	2	22.92	22.95	22.96		
1.4	QPSK	6	0	22.64	22.92	22.74	23.5	1
1.4	16QAM	1	0	22.67	22.65	22.63	23.5	1
1.4	16QAM	1	2	22.60	22.60	22.60		
1.4	16QAM	1	5	22.62	22.58	22.52		
1.4	16QAM	3	0	21.92	21.96	21.96		
1.4	16QAM	3	1	21.90	21.95	21.99		
1.4	16QAM	3	2	21.91	21.97	21.96		
1.4	16QAM	6	0	21.79	21.95	21.78	22.5	2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune up Limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.02	22.16	21.81	23.0	0
20	QPSK	1	49	21.77	21.99	21.70		
20	QPSK	1	99	21.87	21.93	21.66		
20	QPSK	50	0	20.75	21.11	20.62	22.0	1
20	QPSK	50	24	20.77	21.03	20.67		
20	QPSK	50	49	20.75	21.02	20.63		
20	QPSK	100	0	20.82	20.91	20.54		
20	16QAM	1	0	20.42	21.18	21.00	22.0	1
20	16QAM	1	49	20.69	21.15	20.99		
20	16QAM	1	99	20.99	20.93	20.99		
20	16QAM	50	0	19.85	19.99	19.77	21.0	2
20	16QAM	50	24	19.75	20.11	19.79		
20	16QAM	50	49	19.86	19.73	19.76		
20	16QAM	100	0	19.79	19.90	20.14		
Channel				20825	21100	21375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.00	21.48	21.86	23.0	0
15	QPSK	1	37	21.66	21.68	21.71		
15	QPSK	1	74	21.77	21.50	21.85		
15	QPSK	36	0	20.74	21.14	20.57	22.0	1
15	QPSK	36	18	20.67	21.04	20.74		
15	QPSK	36	37	20.81	21.32	20.75		
15	QPSK	75	0	20.73	20.88	20.55		
15	16QAM	1	0	20.40	21.08	20.46	22.0	1
15	16QAM	1	37	20.97	20.77	20.38		
15	16QAM	1	74	20.83	20.57	20.45		
15	16QAM	36	0	19.81	19.69	20.16	21.0	2
15	16QAM	36	18	19.82	20.08	19.69		
15	16QAM	36	37	19.84	19.87	19.70		
15	16QAM	75	0	19.78	19.92	19.62		
Channel				20800	21100	21400	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.07	21.77	21.57	23.0	0
10	QPSK	1	24	21.37	21.73	21.52		
10	QPSK	1	49	21.50	21.30	21.56		
10	QPSK	25	0	20.85	20.77	20.26	22.0	1
10	QPSK	25	12	21.02	21.08	20.51		
10	QPSK	25	24	20.73	20.85	20.49		
10	QPSK	50	0	20.74	20.89	20.83		
10	16QAM	1	0	21.34	21.43	20.95	22.0	1
10	16QAM	1	24	20.92	21.17	20.86		
10	16QAM	1	49	20.83	21.30	20.90		
10	16QAM	25	0	19.91	19.77	19.68	21.0	2
10	16QAM	25	12	19.90	19.60	19.62		
10	16QAM	25	24	19.73	19.97	19.86		
10	16QAM	50	0	19.88	20.01	19.80		

Channel				20775	21100	21425	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	21.45	21.65	21.86	23.0	0
5	QPSK	1	12	21.56	21.65	21.50		
5	QPSK	1	24	21.52	21.62	21.42		
5	QPSK	12	0	20.55	20.94	20.53	22.0	1
5	QPSK	12	6	20.68	20.91	20.51		
5	QPSK	12	11	20.48	21.14	20.48		
5	QPSK	25	0	20.52	20.75	20.47		
5	16QAM	1	0	20.78	20.82	20.62	22.0	1
5	16QAM	1	12	20.69	20.76	20.49		
5	16QAM	1	24	20.68	20.33	20.81		
5	16QAM	12	0	19.50	20.43	19.64	21.0	2
5	16QAM	12	6	19.72	19.97	19.54		
5	16QAM	12	11	19.59	20.19	19.59		
5	16QAM	25	0	19.55	19.76	19.62		

<WLAN Conducted Power>

General Note:

1. For IEEE802.11b/g SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were selected for SAR evaluation. 802.11g were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11b mode.
2. For IEEE802.11n, SAR testing can be conducted on channel with the highest output power when taking into consideration tune-up tolerance for same test configuration that was identified during SAR evaluations for IEEE802.11b/g (as applicable) provided bandwidth and test position are the same.
3. For IEEE802.11n with multiple channel BW configurations, highest channel BW configuration with highest output power limit shall be tested.
4. Testing of lower BW configurations is not required when the maximum average output of the default test channels in each lower BW configuration is less than 1/4dB higher than the default test channel in the highest BW configuration.

<2.4GHz WLAN>

WLAN 2.4GHz 802.11b Average Power (dBm)					
Power vs. Channel			Power vs. Data Rate		
Channel	Frequency (MHz)	Data Rate 1Mbps	2Mbps	5.5Mbps	11Mbps
CH 1	2412	14.90	14.92	14.84	14.86
CH 6	2437	14.94			
CH 11	2462	14.86			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 1	2412	10.82	10.90	10.83	10.89	10.87	10.84	10.70	10.77
CH 6	2437	10.92							
CH 11	2462	10.87							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 1	2412	9.98	9.97	9.94	9.97	9.93	9.95	9.83	9.78
CH 6	2437	9.96							
CH 11	2462	9.94							

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The duty factor was used theoretical 83.3% perform Bluetooth SAR testing.

Mode	Channel	Frequency (MHz)	Bluetooth Average power (dBm)		
			1Mbps	2Mbps	3Mbps
v3.0+EDR	CH 00	2402	5.91	4.65	4.64
	CH 39	2441	7.55	6.27	6.32
	CH 78	2480	5.40	4.11	4.13

Mode	Channel	Frequency (MHz)	Bluetooth Average power (dBm)
			GFSK
v4.0-LE	CH 00	2402	-1.56
	CH 19	2440	0.09
	CH 39	2480	-1.88

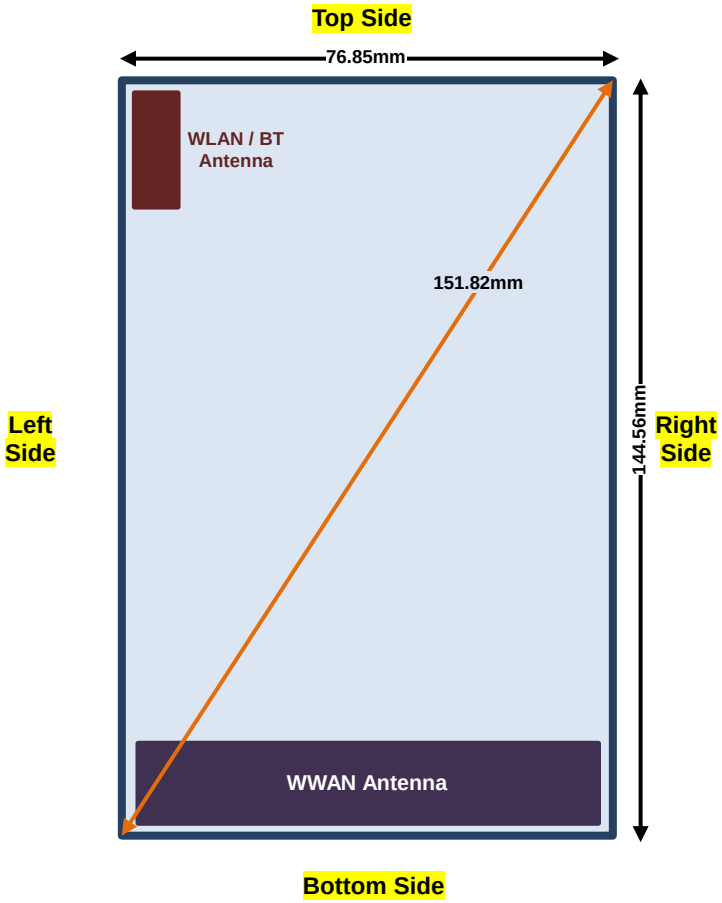
<5GHz WLAN>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps							
CH 36	5180	9.81	9.68	9.63	9.85	9.68	9.62	9.52	9.56
CH 40	5200	9.73							
CH 44	5220	9.73							
CH 48	5240	9.50							
CH 52	5260	9.67	9.71	9.69	9.66	9.73	9.61	9.60	9.68
CH 56	5280	9.55							
CH 60	5300	9.76							
CH 64	5320	9.64							
CH 100	5500	9.20	9.15	9.26	9.19	9.28	9.14	9.12	9.27
CH 104	5520	9.17							
CH 108	5540	9.13							
CH 112	5560	9.08							
CH 116	5580	9.31							
CH 132	5660	9.58							
CH 136	5680	9.29							
CH 140	5700	9.07							
CH 149	5745	9.98	9.91	9.94	9.95	9.96	9.92	9.93	9.81
CH 153	5765	9.94							
CH 157	5785	9.95							
CH 161	5805	9.96							
CH 165	5825	9.93							

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 36	5180	9.88	9.80	9.82	9.78	9.80	9.78	9.81	9.67
CH 40	5200	9.74							
CH 44	5220	9.80							
CH 48	5240	9.76							
CH 52	5260	9.83	9.89	9.90	9.92	9.84	9.71	9.83	9.80
CH 56	5280	9.81							
CH 60	5300	9.93							
CH 64	5320	9.69							
CH 100	5500	9.53	9.58	9.55	9.45	9.47	9.49	9.56	9.53
CH 104	5520	9.57							
CH 108	5540	9.46							
CH 112	5560	9.64							
CH 116	5580	9.60							
CH 132	5660	9.53							
CH 136	5680	9.47							
CH 140	5700	9.47							
CH 149	5745	9.97	9.90	9.93	9.94	9.94	9.92	9.86	9.81
CH 153	5765	9.84							
CH 157	5785	9.89							
CH 161	5805	9.95							
CH 165	5825	9.88							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	9.76	9.87	9.88	9.87	9.87	9.70	9.74	9.83
CH 46	5230	9.94							
CH 54	5270	9.91	9.69	9.81	9.81	9.82	9.76	9.83	9.85
CH 62	5310	9.72							
CH 102	5510	8.37	9.39	9.48	9.38	9.47	9.31	9.37	9.46
CH 110	5550	9.48							
CH 134	5670	9.52							
CH 151	5755	9.91	9.90	9.95	9.88	9.96	9.94	9.94	9.85
CH 159	5795	9.98							

13. Antenna Location



Front View

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	> 25mm	> 25mm	> 25mm
Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN	Yes	Yes	Yes	No	No	Yes

General Note:

1. Referring to KDB 941225 D06 v01r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v05r02, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v05r02, for each exposure position, 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
3. According to October 2013TCB Workshop, For GSM / EGPRS, the number of time slots to test for SAR should correspond to the highest source-based time-averaged maximum output power configuration, Considering the possibility of e.g. 3rd party VoIP operation for head and body-worn SAR testing, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900 band due to its highest frame-average power.
4. For hotspot mode SAR testing, GPRS / EDGE should be evaluated, therefore the EUT was set in GPRS 4 Tx slots for GSM850/GSM1900 band due to its highest frame-average power.
5. Due to the GSM1900 EDGE 4Tx slots average power is high than GPRS 4Tx slots, the GSM1900 EDGE 4Tx slots will be verify worse case found in GPRS mode.
6. Per KDB 941225 D02v02r02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/DC-HSDPA output power is < 0.25dB higher than RMC, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded..
7. Per KDB 941225 D05v02r03, 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.
8. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
9. Per KDB 941225 D05v02r03, 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 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.
10. Per KDB 941225 D05v02r03, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, 16QAM SAR testing is not required.
11. Per KDB 941225 D05v02r03, Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, smaller bandwidth SAR testing is not required.
12. Per KDB 648474 D04v01r02, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
13. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Right Cheek	251	848.8	26.00	27.50	1.413	0.034	0.240	0.339
01	GSM850	GPRS (4 Tx slots)	Right Cheek	128	824.2	25.85	27.50	1.462	0.014	0.255	**0.373**
	GSM850	GPRS (4 Tx slots)	Right Cheek	189	836.4	25.76	27.50	1.493	0.065	0.240	0.358
	GSM850	GPRS (4 Tx slots)	Right Tilted	251	848.8	26.00	27.50	1.413	-0.104	0.149	0.210
	GSM850	GPRS (4 Tx slots)	Left Cheek	251	848.8	26.00	27.50	1.413	-0.012	0.214	0.302
	GSM850	GPRS (4 Tx slots)	Left Tilted	251	848.8	26.00	27.50	1.413	0.044	0.148	0.209
	GSM1900	GPRS (4 Tx slots)	Right Cheek	810	1909.8	23.65	24.50	1.216	-0.069	0.146	0.178
	GSM1900	EDGE (4 Tx slots)	Right Cheek	810	1909.8	24.48	25.90	1.387	0	0.180	0.250
02	GSM1900	EDGE (4 Tx slots)	Right Cheek	512	1850.2	24.46	25.90	1.393	-0.085	0.272	**0.379**
	GSM1900	EDGE (4 Tx slots)	Right Cheek	661	1880	24.47	25.90	1.390	-0.051	0.239	0.332
	GSM1900	GPRS (4 Tx slots)	Right Tilted	810	1909.8	23.65	24.50	1.216	0.051	0.038	0.046
	GSM1900	GPRS (4 Tx slots)	Left Cheek	810	1909.8	23.65	24.50	1.216	-0.025	0.107	0.130
	GSM1900	GPRS (4 Tx slots)	Left Tilted	810	1909.8	23.65	24.50	1.216	0.141	0.045	0.055

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA V	RMC 12.2Kbps	Right Cheek	4132	826.4	24.01	24.50	1.119	-0.082	0.444	0.497
	WCDMA V	RMC 12.2Kbps	Right Cheek	4182	836.4	23.87	24.50	1.156	-0.106	0.422	0.488
03	WCDMA V	RMC 12.2Kbps	Right Cheek	4233	846.6	23.98	24.50	1.127	-0.079	0.469	**0.529**
	WCDMA V	RMC 12.2Kbps	Right Tilted	4132	826.4	24.01	24.50	1.119	-0.065	0.315	0.353
	WCDMA V	RMC 12.2Kbps	Left Cheek	4132	826.4	24.01	24.50	1.119	0.022	0.414	0.463
	WCDMA V	RMC 12.2Kbps	Left Tilted	4132	826.4	24.01	24.50	1.119	-0.076	0.293	0.328
	WCDMA IV	RMC 12.2Kbps	Right Cheek	1513	1752.6	24.49	24.50	1.002	-0.147	0.670	0.672
04	WCDMA IV	RMC 12.2Kbps	Right Cheek	1312	1712.4	24.24	24.50	1.062	0.072	0.712	**0.756**
	WCDMA IV	RMC 12.2Kbps	Right Cheek	1413	1732.6	24.46	24.50	1.009	-0.086	0.579	0.584
	WCDMA IV	RMC 12.2Kbps	Right Tilted	1513	1752.6	24.49	24.50	1.002	-0.002	0.262	0.263
	WCDMA IV	RMC 12.2Kbps	Left Cheek	1513	1752.6	24.49	24.50	1.002	0.001	0.419	0.420
	WCDMA IV	RMC 12.2Kbps	Left Tilted	1513	1752.6	24.49	24.50	1.002	0.047	0.308	0.309
	WCDMA II	RMC 12.2Kbps	Right Cheek	9538	1907.6	24.48	24.50	1.005	-0.05	0.484	0.486
05	WCDMA II	RMC 12.2Kbps	Right Cheek	9262	1852.4	24.43	24.50	1.016	0.018	0.513	**0.521**
	WCDMA II	RMC 12.2Kbps	Right Cheek	9400	1880	24.47	24.50	1.007	-0.096	0.489	0.492
	WCDMA II	RMC 12.2Kbps	Right Tilted	9538	1907.6	24.48	24.50	1.005	-0.03	0.151	0.152
	WCDMA II	RMC 12.2Kbps	Left Cheek	9538	1907.6	24.48	24.50	1.005	-0.073	0.381	0.383
	WCDMA II	RMC 12.2Kbps	Left Tilted	9538	1907.6	24.48	24.50	1.005	0.021	0.106	0.106

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
06	LTE Band 17	10M	QPSK	1RB	0offset	Right Cheek	23790	710	22.82	24.50	1.472	-0.008	0.356	**0.524**
	LTE Band 17	10M	QPSK	25RB	0offset	Right Cheek	23790	710	21.85	23.50	1.462	-0.167	0.291	0.425
	LTE Band 17	10M	QPSK	1RB	0offset	Right Tilted	23790	710	22.82	24.50	1.472	0.01	0.245	0.361
	LTE Band 17	10M	QPSK	25RB	0offset	Right Tilted	23790	710	21.85	23.50	1.462	0.013	0.190	0.278
	LTE Band 17	10M	QPSK	1RB	0offset	Left Cheek	23790	710	22.82	24.50	1.472	0.04	0.356	0.524
	LTE Band 17	10M	QPSK	25RB	0offset	Left Cheek	23790	710	21.85	23.50	1.462	0.091	0.293	0.428
	LTE Band 17	10M	QPSK	1RB	0offset	Left Tilted	23790	710	22.82	24.50	1.472	0.002	0.288	0.424
	LTE Band 17	10M	QPSK	25RB	0offset	Left Tilted	23790	710	21.85	23.50	1.462	-0.002	0.226	0.330
	LTE Band 5	10M	QPSK	1RB	0offset	Right Cheek	20600	844	23.08	24.50	1.387	-0.157	0.331	0.459
	LTE Band 5	10M	QPSK	1RB	0offset	Right Cheek	20525	836.5	22.92	24.50	1.439	-0.104	0.319	0.459
07	LTE Band 5	10M	QPSK	1RB	0offset	Right Cheek	20450	829	22.92	24.50	1.439	-0.088	0.348	**0.501**
	LTE Band 5	10M	QPSK	25RB	0offset	Right Cheek	20600	844	22.48	23.50	1.265	-0.055	0.293	0.371
	LTE Band 5	10M	QPSK	1RB	0offset	Right Tilted	20600	844	23.08	24.50	1.387	0.029	0.171	0.237
	LTE Band 5	10M	QPSK	25RB	0offset	Right Titled	20600	844	22.48	23.50	1.265	0.009	0.150	0.190
	LTE Band 5	10M	QPSK	1RB	0offset	Left Cheek	20600	844	23.08	24.50	1.387	-0.021	0.293	0.406
	LTE Band 5	10M	QPSK	25RB	0offset	Left Cheek	20600	844	22.48	23.50	1.265	0.038	0.259	0.328
	LTE Band 5	10M	QPSK	1RB	0offset	Left Tilted	20600	844	23.08	24.50	1.387	0.03	0.156	0.216
	LTE Band 5	10M	QPSK	25RB	0offset	Left Tilted	20600	844	22.48	23.50	1.265	-0.007	0.142	0.180
	LTE Band 4	20M	QPSK	1RB	0offset	Right Cheek	20050	1720	23.95	24.50	1.135	0.022	0.557	0.632
	LTE Band 4	20M	QPSK	1RB	0offset	Right Cheek	20175	1732.5	23.69	24.50	1.205	-0.005	0.488	0.588
08	LTE Band 4	20M	QPSK	1RB	0offset	Right Cheek	20300	1745	23.53	24.50	1.250	0.045	0.582	**0.728**
	LTE Band 4	20M	QPSK	50RB	0offset	Right Cheek	20050	1720	22.94	23.50	1.138	0.006	0.485	0.552
	LTE Band 4	20M	QPSK	1RB	0offset	Right Tilted	20050	1720	23.95	24.50	1.135	0.012	0.200	0.227
	LTE Band 4	20M	QPSK	50RB	0offset	Right Tilted	20050	1720	22.94	23.50	1.138	-0.141	0.166	0.189
	LTE Band 4	20M	QPSK	1RB	0offset	Left Cheek	20050	1720	23.95	24.50	1.135	0.02	0.371	0.421
	LTE Band 4	20M	QPSK	50RB	0offset	Left Cheek	20050	1720	22.94	23.50	1.138	-0.023	0.313	0.356
	LTE Band 4	20M	QPSK	1RB	0offset	Left Tilted	20050	1720	23.95	24.50	1.135	0.077	0.253	0.287
	LTE Band 4	20M	QPSK	50RB	0offset	Left Tilted	20050	1720	22.94	23.50	1.138	0.033	0.220	0.250
	LTE Band 2	20M	QPSK	1RB	0offset	Right Cheek	18900	1880	23.92	24.50	1.143	0.015	0.439	0.502
09	LTE Band 2	20M	QPSK	1RB	0offset	Right Cheek	18700	1860	23.78	24.50	1.180	0.037	0.476	**0.562**
	LTE Band 2	20M	QPSK	1RB	0offset	Right Cheek	19100	1900	23.90	24.50	1.148	0.037	0.427	0.490
	LTE Band 2	20M	QPSK	50RB	0offset	Right Cheek	18900	1880	22.96	23.50	1.132	-0.022	0.420	0.476
	LTE Band 2	20M	QPSK	1RB	0offset	Right Tilted	18900	1880	23.92	24.50	1.143	0.016	0.135	0.154
	LTE Band 2	20M	QPSK	50RB	0offset	Right Tilted	18900	1880	22.96	23.50	1.132	0.077	0.109	0.123
	LTE Band 2	20M	QPSK	1RB	0offset	Left Cheek	18900	1880	23.92	24.50	1.143	0.039	0.437	0.499
	LTE Band 2	20M	QPSK	50RB	0offset	Left Cheek	18900	1880	22.96	23.50	1.132	0.063	0.350	0.396
	LTE Band 2	20M	QPSK	1RB	0offset	Left Tilted	18900	1880	23.92	24.50	1.143	0.04	0.176	0.201
	LTE Band 2	20M	QPSK	50RB	0offset	Left Tilted	18900	1880	22.96	23.50	1.132	0.046	0.143	0.162
	LTE Band 7	20M	QPSK	1RB	0offset	Right Cheek	21100	2535	22.16	23.00	1.213	0.015	0.232	0.282
	LTE Band 7	20M	QPSK	50RB	0offset	Right Cheek	21100	2535	21.11	22.00	1.227	-0.021	0.195	0.239
	LTE Band 7	20M	QPSK	1RB	0offset	Right Tilted	21100	2535	22.16	23.00	1.213	-0.15	0.136	0.165
	LTE Band 7	20M	QPSK	50RB	0offset	Right Tilted	21100	2535	21.11	22.00	1.227	-0.129	0.103	0.126
	LTE Band 7	20M	QPSK	1RB	0offset	Left Cheek	21100	2535	22.16	23.00	1.213	0.012	0.405	0.491
	LTE Band 7	20M	QPSK	1RB	0offset	Left Cheek	20850	2510	22.02	23.00	1.253	-0.014	0.425	0.533
10	LTE Band 7	20M	QPSK	1RB	0offset	Left Cheek	21350	2560	21.81	23.00	1.315	0.048	0.457	**0.601**
	LTE Band 7	20M	QPSK	50RB	0offset	Left Cheek	21100	2535	21.11	22.00	1.227	0.034	0.390	0.479
	LTE Band 7	20M	QPSK	1RB	0offset	Left Tilted	21100	2535	22.16	23.00	1.213	0.121	0.063	0.076
	LTE Band 7	20M	QPSK	50RB	0offset	Left Tilted	21100	2535	21.11	22.00	1.227	-0.135	0.054	0.066

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
11	Bluetooth	1Mbps	Right Cheek	39	2441	7.55	8.00	1.109	-0.023	0.032	**0.035**
	Bluetooth	1Mbps	Right Cheek	0	2402	5.91	6.00	1.021	-0.02	0.025	0.026
	Bluetooth	1Mbps	Right Cheek	78	2480	5.40	6.00	1.148	0.037	0.021	0.024
	Bluetooth	1Mbps	Right Tilted	39	2441	7.55	8.00	1.109	0.017	0.023	0.026
	Bluetooth	1Mbps	Left Cheek	39	2441	7.55	8.00	1.109	0.074	0.018	0.020
	Bluetooth	1Mbps	Left Tilted	39	2441	7.55	8.00	1.109	0.046	0.014	0.016

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	6	2437	14.94	15.00	1.013	97.63	1.024	-0.13	0.326	0.338
	WLAN2.4GHz	802.11n-HT20 MCS0	Right Cheek	1	2412	9.98	10.00	1.004	86.49	1.156	-0.14	0.094	0.109
12	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	1	2412	14.90	15.00	1.022	97.63	1.024	0.05	0.342	**0.358**
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	11	2462	14.86	15.00	1.032	97.63	1.024	0.14	0.325	0.343
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	6	2437	14.94	15.00	1.013	97.63	1.024	-0.05	0.256	0.266
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	6	2437	14.94	15.00	1.013	97.63	1.024	-0.01	0.197	0.204
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	6	2437	14.94	15.00	1.013	97.63	1.024	0.05	0.175	0.182
13	WLAN5GHz	802.11a 6Mbps	Right Cheek	149	5745	9.98	10.00	1.004	87.26	1.146	0.18	0.426	**0.490**
	WLAN5GHz	802.11n-HT40 MCS0	Right Cheek	159	5795	9.98	10.00	1.005	76.43	1.308	0.13	0.336	0.442
	WLAN5GHz	802.11a 6Mbps	Right Cheek	157	5785	9.95	10.00	1.011	87.26	1.146	0.16	0.384	0.445
	WLAN5GHz	802.11a 6Mbps	Right Cheek	161	5805	9.96	10.00	1.009	87.26	1.146	0.11	0.344	0.398
	WLAN5GHz	802.11a 6Mbps	Right Tilted	149	5745	9.98	10.00	1.004	87.26	1.146	0.16	0.346	0.398
	WLAN5GHz	802.11a 6Mbps	Left Cheek	149	5745	9.98	10.00	1.004	87.26	1.146	0.04	0.389	0.448
	WLAN5GHz	802.11a 6Mbps	Left Tilted	149	5745	9.98	10.00	1.004	87.26	1.146	0.02	0.359	0.413
	WLAN5GHz	802.11a 6Mbps	Right Cheek	36	5180	9.81	10.00	1.044	87.26	1.146	-0.14	0.152	0.182
	WLAN5GHz	802.11n-HT40 MCS0	Right Cheek	46	5230	9.94	10.00	1.015	76.43	1.308	0.17	0.131	0.174
14	WLAN5GHz	802.11a 6Mbps	Right Cheek	44	5220	9.73	10.00	1.064	87.26	1.146	-0.13	0.159	**0.194**
	WLAN5GHz	802.11a 6Mbps	Right Tilted	36	5180	9.81	10.00	1.044	87.26	1.146	-0.11	0.129	0.154
	WLAN5GHz	802.11a 6Mbps	Left Cheek	36	5180	9.81	10.00	1.044	87.26	1.146	0.03	0.108	0.129
	WLAN5GHz	802.11a 6Mbps	Left Tilted	36	5180	9.81	10.00	1.044	87.26	1.146	-0.03	0.109	0.130
15	WLAN5GHz	802.11a 6Mbps	Right Cheek	60	5300	9.76	10.00	1.056	87.26	1.146	0.16	0.219	**0.265**
	WLAN5GHz	802.11n-HT40 MCS0	Right Cheek	54	5270	9.91	10.00	1.022	76.43	1.308	0.11	0.136	0.182
	WLAN5GHz	802.11a 6Mbps	Right Cheek	52	5260	9.67	10.00	1.078	87.26	1.146	-0.02	0.179	0.221
	WLAN5GHz	802.11a 6Mbps	Right Tilted	60	5300	9.76	10.00	1.056	87.26	1.146	-0.18	0.180	0.218
	WLAN5GHz	802.11a 6Mbps	Left Cheek	60	5300	9.76	10.00	1.056	87.26	1.146	-0.01	0.153	0.185
	WLAN5GHz	802.11a 6Mbps	Left Tilted	60	5300	9.76	10.00	1.056	87.26	1.146	-0.04	0.148	0.179
	WLAN5GHz	802.11a 6Mbps	Right Cheek	132	5660	9.58	10.00	1.102	87.26	1.146	0.11	0.239	0.302
	WLAN5GHz	802.11a 6Mbps	Right Tilted	132	5660	9.58	10.00	1.102	87.26	1.146	0.12	0.217	0.274
	WLAN5GHz	802.11a 6Mbps	Left Cheek	132	5660	9.58	10.00	1.102	87.26	1.146	0.01	0.269	0.340
16	WLAN5GHz	802.11n-HT40 MCS0	Left Cheek	134	5670	9.52	10.00	1.118	76.43	1.308	-0.13	0.413	**0.604**
	WLAN5GHz	802.11n-HT40 MCS0	Left Cheek	110	5550	9.48	10.00	1.128	76.43	1.308	-0.03	0.174	0.257
	WLAN5GHz	802.11n-HT40 MCS0	Left Cheek	102	5510	8.37	10.00	1.456	76.43	1.308	-0.01	0.225	0.429
	WLAN5GHz	802.11a 6Mbps	Left Tilted	132	5660	9.58	10.00	1.102	87.26	1.146	-0.05	0.258	0.326

14.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Front	1cm	251	848.8	26.00	27.50	1.413	-0.08	0.325	0.459
	GSM850	GPRS (4 Tx slots)	Back	1cm	251	848.8	26.00	27.50	1.413	-0.07	0.378	0.534
17	GSM850	GPRS (4 Tx slots)	Back	1cm	128	824.2	25.85	27.50	1.462	0.1	0.429	**0.627**
	GSM850	GPRS (4 Tx slots)	Back	1cm	189	836.4	25.76	27.50	1.493	0.06	0.387	0.578
	GSM850	GPRS (4 Tx slots)	Left Side	1cm	251	848.8	26.00	27.50	1.413	0.03	0.193	0.273
	GSM850	GPRS (4 Tx slots)	Right Side	1cm	251	848.8	26.00	27.50	1.413	0.06	0.285	0.403
	GSM850	GPRS (4 Tx slots)	Bottom Side	1cm	251	848.8	26.00	27.50	1.413	0.05	0.072	0.102
	GSM1900	GPRS (4 Tx slots)	Front	1cm	810	1909.8	23.65	24.50	1.216	-0.152	0.255	0.310
	GSM1900	GPRS (4 Tx slots)	Back	1cm	810	1909.8	23.65	24.50	1.216	-0.085	0.378	0.460
	GSM1900	GPRS (4 Tx slots)	Left Side	1cm	810	1909.8	23.65	24.50	1.216	-0.086	0.068	0.083
	GSM1900	GPRS (4 Tx slots)	Right Side	1cm	810	1909.8	23.65	24.50	1.216	-0.026	0.058	0.071
	GSM1900	GPRS (4 Tx slots)	Bottom Side	1cm	810	1909.8	23.65	24.50	1.216	-0.098	0.380	0.462
	GSM1900	EDGE (4 Tx slots)	Bottom Side	1cm	810	1909.8	24.48	25.90	1.387	-0.14	0.531	0.736
	GSM1900	EDGE (4 Tx slots)	Bottom Side	1cm	512	1850.2	24.46	25.90	1.393	-0.162	0.554	0.772
18	GSM1900	EDGE (4 Tx slots)	Bottom Side	1cm	661	1880	24.47	25.90	1.390	-0.093	0.592	**0.823**

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA V	RMC 12.2Kbps	Front	1cm	4132	826.4	24.01	24.50	1.119	0	0.659	0.738
	WCDMA V	RMC 12.2Kbps	Back	1cm	4357	826.4	24.01	24.50	1.119	0.09	0.715	0.800
19	WCDMA V	RMC 12.2Kbps	Back	1cm	4182	836.4	23.87	24.50	1.156	-0.03	0.695	**0.803**
	WCDMA V	RMC 12.2Kbps	Back	1cm	4233	846.6	23.98	24.50	1.127	-0.03	0.704	0.794
	WCDMA V	RMC 12.2Kbps	Left Side	1cm	4357	826.4	24.01	24.50	1.119	0.02	0.242	0.271
	WCDMA V	RMC 12.2Kbps	Right Side	1cm	4357	826.4	24.01	24.50	1.119	0.01	0.355	0.397
	WCDMA V	RMC 12.2Kbps	Bottom Side	1cm	4357	826.4	24.01	24.50	1.119	-0.01	0.102	0.114
	WCDMA IV	RMC 12.2Kbps	Front	1cm	1513	1752.6	24.49	24.50	1.002	-0.084	0.792	0.794
	WCDMA IV	RMC 12.2Kbps	Back	1cm	1513	1752.6	24.49	24.50	1.002	-0.142	0.862	0.864
	WCDMA IV	RMC 12.2Kbps	Back	1cm	1312	1712.4	24.24	24.50	1.062	-0.061	0.691	0.734
	WCDMA IV	RMC 12.2Kbps	Back	1cm	1413	1732.6	24.46	24.50	1.009	-0.146	0.564	0.569
	WCDMA IV	RMC 12.2Kbps	Left Side	1cm	1513	1752.6	24.49	24.50	1.002	-0.156	0.138	0.138
	WCDMA IV	RMC 12.2Kbps	Right Side	1cm	1513	1752.6	24.49	24.50	1.002	-0.133	0.201	0.201
20	WCDMA IV	RMC 12.2Kbps	Bottom Side	1cm	1513	1752.6	24.49	24.50	1.002	-0.12	1.110	**1.113**
	WCDMA IV	RMC 12.2Kbps	Bottom Side	1cm	1312	1712.4	24.24	24.50	1.062	0.022	1.020	1.083
	WCDMA IV	RMC 12.2Kbps	Bottom Side	1cm	1413	1732.6	24.46	24.50	1.009	-0.145	0.857	0.865
	WCDMA II	RMC 12.2Kbps	Front	1cm	9538	1907.6	24.48	24.50	1.005	-0.158	0.549	0.552
	WCDMA II	RMC 12.2Kbps	Back	1cm	9538	1907.6	24.48	24.50	1.005	-0.075	0.750	0.753
	WCDMA II	RMC 12.2Kbps	Left Side	1cm	9538	1907.6	24.48	24.50	1.005	-0.067	0.127	0.128
	WCDMA II	RMC 12.2Kbps	Right Side	1cm	9538	1907.6	24.48	24.50	1.005	-0.094	0.125	0.126
	WCDMA II	RMC 12.2Kbps	Bottom Side	1cm	9538	1907.6	24.48	24.50	1.005	-0.104	1.010	1.015
	WCDMA II	RMC 12.2Kbps	Bottom Side	1cm	9262	1852.4	24.43	24.50	1.016	-0.064	1.230	1.250
21	WCDMA II	RMC 12.2Kbps	Bottom Side	1cm	9400	1880	24.47	24.50	1.007	-0.083	1.260	**1.269**

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 17	10M	QPSK	1RB	0offset	Front	1cm	23790	710	22.82	24.50	1.472	-0.056	0.423	0.623
	LTE Band 17	10M	QPSK	25RB	0offset	Front	1cm	23790	710	21.85	23.50	1.462	-0.03	0.328	0.480
22	LTE Band 17	10M	QPSK	1RB	0offset	Back	1cm	23790	710	22.82	24.50	1.472	-0.034	0.510	**0.751**
	LTE Band 17	10M	QPSK	25RB	0offset	Back	1cm	23790	710	21.85	23.50	1.462	-0.008	0.390	0.570
	LTE Band 17	10M	QPSK	1RB	0offset	Left Side	1cm	23790	710	22.82	24.50	1.472	0.079	0.233	0.343
	LTE Band 17	10M	QPSK	25RB	0offset	Left Side	1cm	23790	710	21.85	23.50	1.462	-0.029	0.183	0.268
	LTE Band 17	10M	QPSK	1RB	0offset	Right Side	1cm	23790	710	22.82	24.50	1.472	-0.064	0.256	0.377
	LTE Band 17	10M	QPSK	25RB	0offset	Right Side	1cm	23790	710	21.85	23.50	1.462	-0.015	0.199	0.291
	LTE Band 17	10M	QPSK	1RB	0offset	Bottom Side	1cm	23790	710	22.82	24.50	1.472	-0.047	0.054	0.080
	LTE Band 17	10M	QPSK	25RB	0offset	Bottom Side	1cm	23790	710	21.85	23.50	1.462	-0.14	0.042	0.061
	LTE Band 5	10M	QPSK	1RB	0offset	Front	1cm	20600	844	23.08	24.50	1.387	0.15	0.413	0.573
	LTE Band 5	10M	QPSK	25RB	0offset	Front	1cm	20600	844	22.48	23.50	1.265	0.01	0.367	0.464
23	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20600	844	23.08	24.50	1.387	-0.03	0.474	**0.657**
	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20450	829	22.92	24.50	1.439	0.12	0.404	0.581
	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20525	836.5	22.92	24.50	1.439	0.01	0.447	0.643
	LTE Band 5	10M	QPSK	25RB	0offset	Back	1cm	20600	844	22.48	23.50	1.265	0.08	0.431	0.545
	LTE Band 5	10M	QPSK	1RB	0offset	Left Side	1cm	20600	844	23.08	24.50	1.387	0.03	0.212	0.294
	LTE Band 5	10M	QPSK	25RB	0offset	Left Side	1cm	20600	844	22.48	23.50	1.265	0.01	0.194	0.245
	LTE Band 5	10M	QPSK	1RB	0offset	Right Side	1cm	20600	844	23.08	24.50	1.387	0.04	0.202	0.280
	LTE Band 5	10M	QPSK	25RB	0offset	Right Side	1cm	20600	844	22.48	23.50	1.265	0.02	0.195	0.247
	LTE Band 5	10M	QPSK	1RB	0offset	Bottom Side	1cm	20600	844	23.08	24.50	1.387	-0.02	0.099	0.137
	LTE Band 5	10M	QPSK	25RB	0offset	Bottom Side	1cm	20600	844	22.48	23.50	1.265	-0.08	0.087	0.110
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20050	1720	23.95	24.50	1.135	0.11	0.772	0.876
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20175	1732.5	23.69	24.50	1.205	-0.03	0.704	0.848
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20300	1745	23.53	24.50	1.250	0	0.789	0.986
	LTE Band 4	20M	QPSK	50RB	0offset	Front	1cm	20050	1720	22.94	23.50	1.138	0.04	0.657	0.747
	LTE Band 4	20M	QPSK	100RB	0offset	Front	1cm	20050	1720	22.81	23.50	1.172	0.06	0.695	0.815
	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20050	1720	23.95	24.50	1.135	0.06	0.816	0.926
	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20175	1732.5	23.69	24.50	1.205	-0.04	0.720	0.868
24	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20300	1745	23.53	24.50	1.250	-0.01	0.801	**1.001**
	LTE Band 4	20M	QPSK	50RB	0offset	Back	1cm	20050	1720	22.94	23.50	1.138	-0.17	0.697	0.793
	LTE Band 4	20M	QPSK	100RB	0offset	Back	1cm	20050	1720	22.81	23.50	1.172	-0.04	0.719	0.843
	LTE Band 4	20M	QPSK	1RB	0offset	Left Side	1cm	20050	1720	23.95	24.50	1.135	-0.05	0.110	0.125
	LTE Band 4	20M	QPSK	50RB	0offset	Left Side	1cm	20050	1720	22.94	23.50	1.138	0.04	0.098	0.111
	LTE Band 4	20M	QPSK	1RB	0offset	Right Side	1cm	20050	1720	23.95	24.50	1.135	0.04	0.148	0.168
	LTE Band 4	20M	QPSK	50RB	0offset	Right Side	1cm	20050	1720	22.94	23.50	1.138	0.02	0.127	0.144
	LTE Band 4	20M	QPSK	1RB	0offset	Bottom Side	1cm	20050	1720	23.95	24.50	1.135	-0.02	0.657	0.746
	LTE Band 4	20M	QPSK	50RB	0offset	Bottom Side	1cm	20050	1720	22.94	23.50	1.138	0.01	0.572	0.651

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	18900	1880	23.92	24.50	1.143	0	0.767	0.877
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	18700	1860	23.78	24.50	1.180	0.02	0.807	0.953
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	19100	1900	23.90	24.50	1.148	0.01	0.697	0.800
	LTE Band 2	20M	QPSK	50RB	0offset	Front	1cm	18900	1880	22.96	23.50	1.132	0.01	0.607	0.687
	LTE Band 2	20M	QPSK	100RB	0offset	Front	1cm	18900	1880	22.92	23.50	1.143	-0.01	0.579	0.662
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	18900	1880	23.92	24.50	1.143	-0.03	0.917	1.048
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	18700	1860	23.78	24.50	1.180	-0.01	0.934	1.102
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	19100	1900	23.90	24.50	1.148	0	0.856	0.983
	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	18900	1880	22.96	23.50	1.132	-0.081	0.994	1.126
	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	18700	1860	22.75	23.50	1.189	-0.046	0.915	1.087
	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	19100	1900	22.93	23.50	1.140	-0.088	0.905	1.032
	LTE Band 2	20M	QPSK	100RB	0offset	Back	1cm	18900	1880	22.92	23.50	1.143	-0.069	0.907	1.037
	LTE Band 2	20M	QPSK	1RB	0offset	Left Side	1cm	18900	1880	23.92	24.50	1.143	-0.064	0.209	0.239
	LTE Band 2	20M	QPSK	50RB	0offset	Left Side	1cm	18900	1880	22.96	23.50	1.132	-0.044	0.168	0.190
	LTE Band 2	20M	QPSK	1RB	0offset	Right Side	1cm	18900	1880	23.92	24.50	1.143	-0.062	0.190	0.217
	LTE Band 2	20M	QPSK	50RB	0offset	Right Side	1cm	18900	1880	22.96	23.50	1.132	-0.082	0.156	0.177
	LTE Band 2	20M	QPSK	1RB	0offset	Bottom Side	1cm	18900	1880	23.92	24.50	1.143	-0.08	1.240	1.417
25	LTE Band 2	20M	QPSK	1RB	0offset	Bottom Side	1cm	18700	1860	23.78	24.50	1.180	-0.109	1.210	**1.428**
	LTE Band 2	20M	QPSK	1RB	0offset	Bottom Side	1cm	19100	1900	23.90	24.50	1.148	-0.064	1.170	1.343
	LTE Band 2	20M	QPSK	50RB	0offset	Bottom Side	1cm	18900	1880	22.96	23.50	1.132	-0.054	0.955	1.081
	LTE Band 2	20M	QPSK	50RB	0offset	Bottom Side	1cm	18700	1880	22.75	23.50	1.189	-0.054	0.935	1.111
	LTE Band 2	20M	QPSK	50RB	0offset	Bottom Side	1cm	19100	1880	22.93	23.50	1.140	-0.054	0.925	1.055
	LTE Band 2	20M	QPSK	100RB	0offset	Bottom Side	1cm	18900	1880	22.92	23.50	1.143	-0.088	0.967	1.105
	LTE Band 7	20M	QPSK	1RB	0offset	Front	1cm	21100	2535	22.16	23.00	1.213	-0.032	0.547	0.664
	LTE Band 7	20M	QPSK	50RB	0offset	Front	1cm	21100	2535	21.11	22.00	1.227	-0.111	0.453	0.556
	LTE Band 7	20M	QPSK	1RB	0offset	Back	1cm	21100	2535	22.16	23.00	1.213	-0.025	0.596	0.723
	LTE Band 7	20M	QPSK	50RB	0offset	Back	1cm	21100	2535	21.11	22.00	1.227	0.011	0.488	0.599
	LTE Band 7	20M	QPSK	1RB	0offset	Left Side	1cm	21100	2535	22.16	23.00	1.213	0.018	0.097	0.118
	LTE Band 7	20M	QPSK	50RB	0offset	Left Side	1cm	21100	2535	21.11	22.00	1.227	-0.047	0.082	0.101
	LTE Band 7	20M	QPSK	1RB	0offset	Right Side	1cm	21100	2535	22.16	23.00	1.213	0.022	0.081	0.098
	LTE Band 7	20M	QPSK	50RB	0offset	Right Side	1cm	21100	2535	21.11	22.00	1.227	-0.07	0.074	0.091
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Side	1cm	21100	2535	22.16	23.00	1.213	-0.108	0.983	1.193
26	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Side	1cm	20850	2510	22.02	23.00	1.253	-0.108	1.120	**1.404**
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Side	1cm	21350	2560	21.81	23.00	1.315	-0.085	0.797	1.048
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Side	1cm	21100	2535	21.11	22.00	1.227	-0.1	0.799	0.981
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Side	1cm	20850	2535	20.75	22.00	1.334	-0.1	0.785	1.047
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Side	1cm	21350	2535	20.62	22.00	1.374	-0.1	0.773	1.062
	LTE Band 7	20M	QPSK	100RB	0offset	Bottom Side	1cm	21100	2535	20.91	22.00	1.285	-0.109	0.726	0.933

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	1cm	39	2441	7.55	8.00	1.109	0.017	0.007	0.008
27	Bluetooth	1Mbps	Back	1cm	39	2441	7.55	8.00	1.109	0.067	0.010	**0.011**
	Bluetooth	1Mbps	Back	1cm	0	2402	5.91	6.00	1.021	-0.112	0.007	0.007
	Bluetooth	1Mbps	Back	1cm	78	2480	5.40	6.00	1.148	0.045	0.006	0.007
	Bluetooth	1Mbps	Left Side	1cm	39	2441	7.55	8.00	1.109	0.091	0.007	0.007
	Bluetooth	1Mbps	Top Side	1cm	39	2441	7.55	8.00	1.109	-0.015	0.002	0.002

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.07	0.124	0.129
	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.13	0.128	0.133
	WLAN2.4GHz	802.11n-HT20 MCS0	Back	1cm	1	2412	9.98	10.00	1.004	86.49	1.156	-0.1	0.027	0.031
28	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	1	2412	14.90	15.00	1.022	97.63	1.024	-0.16	0.181	**0.189**
	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	11	2462	14.86	15.00	1.032	97.63	1.024	-0.02	0.114	0.120
	WLAN2.4GHz	802.11b 1Mbps	Left Side	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.02	0.097	0.101
	WLAN2.4GHz	802.11b 1Mbps	Top Side	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.12	0.046	0.048

14.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS (4 Tx slots)	Front	1cm	251	848.8	26.00	27.50	1.413	-0.08	0.325	0.459
	GSM850	GPRS (4 Tx slots)	Back	1cm	251	848.8	26.00	27.50	1.413	-0.07	0.378	0.534
29	GSM850	GPRS (4 Tx slots)	Back	1cm	128	824.2	25.85	27.50	1.462	0.1	0.429	**0.627**
	GSM850	GPRS (4 Tx slots)	Back	1cm	189	836.4	25.76	27.50	1.493	0.06	0.387	0.578
	GSM1900	GPRS (4 Tx slots)	Front	1cm	810	1909.8	23.65	24.50	1.216	-0.152	0.255	0.310
	GSM1900	GPRS (4 Tx slots)	Back	1cm	810	1909.8	23.65	24.50	1.216	-0.085	0.378	0.460
	GSM1900	GPRS (4 Tx slots)	Back	1cm	512	1850.2	23.55	24.50	1.245	-0.092	0.442	0.550
30	GSM1900	GPRS (4 Tx slots)	Back	1cm	661	1880	23.56	24.50	1.242	-0.098	0.447	**0.555**

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA V	RMC 12.2Kbps	Front	1cm	4357	826.4	24.01	24.50	1.119	0	0.659	0.738
	WCDMA V	RMC 12.2Kbps	Back	1cm	4357	826.4	24.01	24.50	1.119	0.09	0.715	0.800
31	WCDMA V	RMC 12.2Kbps	Back	1cm	4182	836.4	23.87	24.50	1.156	-0.03	0.695	**0.803**
	WCDMA V	RMC 12.2Kbps	Back	1cm	4233	846.6	23.98	24.50	1.127	-0.03	0.704	0.794
	WCDMA IV	RMC 12.2Kbps	Front	1cm	1513	1752.6	24.49	24.50	1.002	-0.084	0.792	0.794
32	WCDMA IV	RMC 12.2Kbps	Back	1cm	1513	1752.6	24.49	24.50	1.002	-0.142	0.862	**0.864**
	WCDMA IV	RMC 12.2Kbps	Back	1cm	1312	1712.4	24.24	24.50	1.062	-0.061	0.691	0.734
	WCDMA IV	RMC 12.2Kbps	Back	1cm	1413	1732.6	24.46	24.50	1.009	-0.146	0.564	0.569
	WCDMA II	RMC 12.2Kbps	Front	1cm	9538	1907.6	24.48	24.50	1.005	-0.158	0.549	0.552
	WCDMA II	RMC 12.2Kbps	Back	1cm	9538	1907.6	24.48	24.50	1.005	-0.075	0.750	0.753
33	WCDMA II	RMC 12.2Kbps	Back	1cm	9262	1852.4	24.43	24.50	1.016	-0.058	1.060	**1.077**
	WCDMA II	RMC 12.2Kbps	Back	1cm	9400	1880	24.47	24.50	1.007	-0.145	1.040	1.047

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 17	10M	QPSK	1RB	0offset	Front	1cm	23790	710	22.82	24.50	1.472	-0.056	0.423	0.623
	LTE Band 17	10M	QPSK	25RB	0offset	Front	1cm	23790	710	21.85	23.50	1.462	-0.03	0.328	0.480
34	LTE Band 17	10M	QPSK	1RB	0offset	Back	1cm	23790	710	22.82	24.50	1.472	-0.034	0.510	**0.751**
	LTE Band 17	10M	QPSK	25RB	0offset	Back	1cm	23790	710	21.85	23.50	1.462	-0.008	0.390	0.570
	LTE Band 5	10M	QPSK	1RB	0offset	Front	1cm	20600	844	23.08	24.50	1.387	0.15	0.413	0.573
	LTE Band 5	10M	QPSK	25RB	0offset	Front	1cm	20600	844	22.48	23.50	1.265	0.01	0.367	0.464
35	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20600	844	23.08	24.50	1.387	-0.03	0.474	**0.657**
	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20450	829	22.92	24.50	1.439	0.12	0.404	0.581
	LTE Band 5	10M	QPSK	1RB	0offset	Back	1cm	20525	836.5	22.92	24.50	1.439	0.01	0.447	0.643
	LTE Band 5	10M	QPSK	25RB	0offset	Back	1cm	20600	844	22.48	23.50	1.265	0.08	0.431	0.545
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20050	1720	23.95	24.50	1.135	0.11	0.772	0.876
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20175	1732.5	23.69	24.50	1.205	-0.03	0.704	0.848
	LTE Band 4	20M	QPSK	1RB	0offset	Front	1cm	20300	1745	23.53	24.50	1.250	0	0.789	0.986
	LTE Band 4	20M	QPSK	50RB	0offset	Front	1cm	20050	1720	22.94	23.50	1.138	0.04	0.657	0.747
	LTE Band 4	20M	QPSK	100RB	0offset	Front	1cm	20050	1720	22.81	23.50	1.172	0.06	0.695	0.815
	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20050	1720	23.95	24.50	1.135	0.06	0.816	0.926
	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20175	1732.5	23.69	24.50	1.205	-0.04	0.720	0.868
36	LTE Band 4	20M	QPSK	1RB	0offset	Back	1cm	20300	1745	23.53	24.50	1.250	-0.01	0.801	**1.001**
	LTE Band 4	20M	QPSK	50RB	0offset	Back	1cm	20050	1720	22.94	23.50	1.138	-0.17	0.697	0.793
	LTE Band 4	20M	QPSK	100RB	0offset	Back	1cm	20050	1720	22.81	23.50	1.172	-0.04	0.719	0.843
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	18900	1880	23.92	24.50	1.143	0	0.767	0.877
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	18700	1860	23.78	24.50	1.180	0.02	0.807	0.953
	LTE Band 2	20M	QPSK	1RB	0offset	Front	1cm	19100	1900	23.90	24.50	1.148	0.01	0.697	0.800
	LTE Band 2	20M	QPSK	50RB	0offset	Front	1cm	18900	1880	22.96	23.50	1.132	0.01	0.607	0.687
	LTE Band 2	20M	QPSK	100RB	0offset	Front	1cm	18900	1880	22.92	23.50	1.143	-0.01	0.579	0.662
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	18900	1880	23.92	24.50	1.143	-0.03	0.917	1.048
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	18700	1860	23.78	24.50	1.180	-0.01	0.934	1.102
	LTE Band 2	20M	QPSK	1RB	0offset	Back	1cm	19100	1900	23.90	24.50	1.148	0	0.856	0.983
37	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	18900	1880	22.96	23.50	1.132	-0.081	0.994	**1.126**
	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	18700	1860	22.75	23.50	1.189	-0.046	0.915	1.087
	LTE Band 2	20M	QPSK	50RB	0offset	Back	1cm	19100	1900	22.93	23.50	1.140	-0.088	0.905	1.032
	LTE Band 2	20M	QPSK	100RB	0offset	Back	1cm	18900	1880	22.92	23.50	1.143	-0.069	0.907	1.037
	LTE Band 7	20M	QPSK	1RB	0offset	Front	1cm	21100	2535	22.16	23.00	1.213	-0.032	0.547	0.664
	LTE Band 7	20M	QPSK	50RB	0offset	Front	1cm	21100	2535	21.11	22.00	1.227	-0.111	0.453	0.556
	LTE Band 7	20M	QPSK	1RB	0offset	Back	1cm	21100	2535	22.16	23.00	1.213	-0.025	0.596	0.723
38	LTE Band 7	20M	QPSK	1RB	0offset	Back	1cm	20850	2535	22.02	23.00	1.253	-0.025	0.609	**0.763**
	LTE Band 7	20M	QPSK	1RB	0offset	Back	1cm	21350	2535	21.81	23.00	1.315	-0.025	0.524	0.689
	LTE Band 7	20M	QPSK	50RB	0offset	Back	1cm	21100	2535	21.11	22.00	1.227	0.011	0.488	0.599

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	1cm	39	2441	7.55	8.00	1.109	0.017	0.007	0.008
39	Bluetooth	1Mbps	Back	1cm	39	2441	7.55	8.00	1.109	0.067	0.010	**0.011**
	Bluetooth	1Mbps	Back	1cm	0	2402	5.91	6.00	1.021	-0.112	0.007	0.007
	Bluetooth	1Mbps	Back	1cm	78	2480	5.40	6.00	1.148	0.045	0.006	0.007

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.07	0.124	0.129
	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	6	2437	14.94	15.00	1.013	97.63	1.024	-0.13	0.128	0.133
40	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	1	2412	14.90	15.00	1.022	97.63	1.024	-0.16	0.181	**0.189**
	WLAN2.4GHz	802.11b 1Mbps	Back	1cm	11	2462	14.86	15.00	1.032	97.63	1.024	-0.02	0.114	0.120
	WLAN5GHz	802.11a 6Mbps	Front	1cm	149	5745	9.98	10.00	1.004	87.26	1.146	-0.07	0.096	0.110
41	WLAN5GHz	802.11a 6Mbps	Back	1cm	149	5745	9.98	10.00	1.004	87.26	1.146	0.06	0.162	**0.186**
	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	159	5795	9.98	10.00	1.005	76.43	1.308	0.14	0.132	0.174
	WLAN5GHz	802.11a 6Mbps	Back	1cm	157	5785	9.95	10.00	1.011	87.26	1.146	0.12	0.140	0.162
	WLAN5GHz	802.11a 6Mbps	Back	1cm	161	5805	9.96	10.00	1.009	87.26	1.146	0.05	0.145	0.168
	WLAN5GHz	802.11a 6Mbps	Front	1cm	36	5180	9.81	10.00	1.044	87.26	1.146	-0.12	0.077	0.092
	WLAN5GHz	802.11a 6Mbps	Back	1cm	36	5180	9.81	10.00	1.044	87.26	1.146	-0.01	0.173	0.207
	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	46	5230	9.94	10.00	1.015	76.43	1.308	-0.08	0.159	0.211
42	WLAN5GHz	802.11a 6Mbps	Back	1cm	44	5220	9.73	10.00	1.064	87.26	1.146	-0.1	0.186	**0.227**
	WLAN5GHz	802.11a 6Mbps	Front	1cm	60	5300	9.76	10.00	1.056	87.26	1.146	0.14	0.079	0.096
43	WLAN5GHz	802.11a 6Mbps	Back	1cm	60	5300	9.76	10.00	1.056	87.26	1.146	-0.15	0.255	**0.309**
	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	54	5270	9.91	10.00	1.022	76.43	1.308	-0.06	0.176	0.235
	WLAN5GHz	802.11a 6Mbps	Back	1cm	52	5260	9.67	10.00	1.078	87.26	1.146	-0.14	0.198	0.245
	WLAN5GHz	802.11a 6Mbps	Front	1cm	132	5660	9.58	10.00	1.102	87.26	1.146	-0.11	0.088	0.111
	WLAN5GHz	802.11a 6Mbps	Back	1cm	132	5660	9.58	10.00	1.102	87.26	1.146	0.14	0.161	0.203
44	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	134	5670	9.52	10.00	1.118	76.43	1.308	0.1	0.234	**0.342**
	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	110	5550	9.48	10.00	1.128	76.43	1.308	-0.01	0.157	0.232
	WLAN5GHz	802.11n-HT40 MCS0	Back	1cm	102	5510	8.37	10.00	1.456	76.43	1.308	-0.02	0.140	0.267

14.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Bottom Side	1cm	1513	1752.6	24.49	24.50	1.002	-0.12	1.110	-	1.113
2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Bottom Side	1cm	1513	1752.6	24.49	24.50	1.002	-0.18	1.030	1.08	1.032
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	1cm	9400	1880	24.47	24.50	1.007	-0.083	1.260	-	1.269
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	1cm	9400	1880	24.47	24.50	1.007	-0.054	1.220	1.03	1.228
1st	LTE Band 7	20M	QPSK	1RB	0offset	-	Bottom Side	1cm	20850	2510	22.02	23.00	1.253	-0.108	1.120	-	1.404
2nd	LTE Band 7	20M	QPSK	1RB	0offset	-	Bottom Side	1cm	20850	2510	22.02	23.00	1.253	-0.093	1.080	1.03	1.353

General Note:

1. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg
2. Per KDB 865664 D01v01r03, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM(Voice) + WLAN2.4GHz(data)	Yes	Yes		
2.	WCDMA(Voice) + WLAN2.4GHz(data)	Yes	Yes		
3.	GSM(Voice) + Bluetooth(data)	Yes	Yes		
4.	WCDMA((Voice) + Bluetooth(data)	Yes	Yes		
5.	GSM(Voice) + WLAN5GHz(data)	Yes	Yes		
6.	WCDMA((Voice) + WLAN5GHz(data)	Yes	Yes		
7.	GPRS/EDGE(Data) + WLAN2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
8.	WCDMA(Data) + WLAN2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
9.	LTE(Data) + WLAN2.4GHz(data)	Yes	Yes	Yes	2.4GHz Hotspot
10.	GPRS/EDGE(Data) + Bluetooth(data)	Yes	Yes	Yes	Bluetooth Tethering
11.	WCDMA(Data) + Bluetooth(data)	Yes	Yes	Yes	Bluetooth Tethering
12.	LTE(Data) + Bluetooth(data)	Yes	Yes	Yes	Bluetooth Tethering
13.	GPRS/EDGE(data) + WLAN5GHz(data)	Yes	Yes	Yes	WiFi Direct
14.	WCDMA(data) + WLAN5GHz(data)	Yes	Yes	Yes	WiFi Direct
15.	LTE(data) + WLAN5GHz(data)	Yes	Yes	Yes	WiFi Direct

General Note:

1. This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
2. This device 2.4GHz WLAN supports Hotspot operation only, and 2.4GHz WLAN supports WiFi Direct (Group Client / Group Owner), and 5GHz WLAN supports WiFi Direct (Group Client only).
3. The worst case WLAN reported SAR for each configuration was used for SAR summation, regardless of whether the WLAN channel has WiFi Direct and Hotspot capability. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
4. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
5. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
6. The Scaled SAR summation is calculated based on the same configuration and test position.
7. Per KDB 447498 D01v05r02, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
   v) The SPLSR calculated results please refer to section 16.2.
8. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05r02 based on the formula below.
   i) (*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.
   ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.
   iv) Bluetooth estimated SAR is conservatively determined by 5mm separation, for all applicable exposure positions.

15.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2		3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
			WWAN	2.4GHz / 5.8GHz WLAN		2.4GHz Bluetooth		
			SAR (W/kg)	Band	SAR (W/kg)	SAR (W/kg)		
GSM	GSM850	Right Cheek	0.373	5.8GHz WLAN	0.490	0.035	**0.86**	**0.41**
		Right Tilted	0.210	5.8GHz WLAN	0.398	0.026	**0.61**	**0.24**
		Left Cheek	0.302	5.8GHz WLAN	0.448	0.020	**0.75**	**0.32**
		Left Tilted	0.209	5.8GHz WLAN	0.413	0.016	**0.62**	**0.23**
	GSM1900	Right Cheek	0.379	5.8GHz WLAN	0.490	0.035	**0.87**	**0.41**
		Right Tilted	0.046	5.8GHz WLAN	0.398	0.026	**0.44**	**0.07**
		Left Cheek	0.130	5.8GHz WLAN	0.448	0.020	**0.58**	**0.15**
		Left Tilted	0.055	5.8GHz WLAN	0.413	0.016	**0.47**	**0.07**
WCMDA	Band V	Right Cheek	0.529	5.8GHz WLAN	0.490	0.035	**1.02**	**0.56**
		Right Tilted	0.353	5.8GHz WLAN	0.398	0.026	**0.75**	**0.38**
		Left Cheek	0.463	5.8GHz WLAN	0.448	0.020	**0.91**	**0.48**
		Left Tilted	0.328	5.8GHz WLAN	0.413	0.016	**0.74**	**0.34**
	Band IV	Right Cheek	0.756	5.8GHz WLAN	0.490	0.035	**1.25**	**0.79**
		Right Tilted	0.263	5.8GHz WLAN	0.398	0.026	**0.66**	**0.29**
		Left Cheek	0.420	5.8GHz WLAN	0.448	0.020	**0.87**	**0.44**
		Left Tilted	0.309	5.8GHz WLAN	0.413	0.016	**0.72**	**0.33**
	Band II	Right Cheek	0.521	5.8GHz WLAN	0.490	0.035	**1.01**	**0.56**
		Right Tilted	0.152	5.8GHz WLAN	0.398	0.026	**0.55**	**0.18**
		Left Cheek	0.383	5.8GHz WLAN	0.448	0.020	**0.83**	**0.40**
		Left Tilted	0.106	5.8GHz WLAN	0.413	0.016	**0.52**	**0.12**
LTE	Band 17	Right Cheek	0.524	5.8GHz WLAN	0.490	0.035	**1.01**	**0.56**
		Right Tilted	0.361	5.8GHz WLAN	0.398	0.026	**0.76**	**0.39**
		Left Cheek	0.524	5.8GHz WLAN	0.448	0.020	**0.97**	**0.54**
		Left Tilted	0.424	5.8GHz WLAN	0.413	0.016	**0.84**	**0.44**
	Band 5	Right Cheek	0.501	5.8GHz WLAN	0.490	0.035	**0.99**	**0.54**
		Right Tilted	0.237	5.8GHz WLAN	0.398	0.026	**0.64**	**0.26**
		Left Cheek	0.406	5.8GHz WLAN	0.448	0.020	**0.85**	**0.43**
		Left Tilted	0.216	5.8GHz WLAN	0.413	0.016	**0.63**	**0.23**
	Band 4	Right Cheek	0.728	5.8GHz WLAN	0.490	0.035	**1.22**	**0.76**
		Right Tilted	0.227	5.8GHz WLAN	0.398	0.026	**0.63**	**0.25**
		Left Cheek	0.421	5.8GHz WLAN	0.448	0.020	**0.87**	**0.44**
		Left Tilted	0.287	5.8GHz WLAN	0.413	0.016	**0.70**	**0.30**
	Band 2	Right Cheek	0.562	5.8GHz WLAN	0.490	0.035	**1.05**	**0.60**
		Right Tilted	0.154	5.8GHz WLAN	0.398	0.026	**0.55**	**0.18**
		Left Cheek	0.499	5.8GHz WLAN	0.448	0.020	**0.95**	**0.52**
		Left Tilted	0.201	5.8GHz WLAN	0.413	0.016	**0.61**	**0.22**
	Band 7	Right Cheek	0.282	5.8GHz WLAN	0.490	0.035	**0.77**	**0.32**
		Right Tilted	0.165	5.8GHz WLAN	0.398	0.026	**0.56**	**0.19**
		Left Cheek	0.601	5.8GHz WLAN	0.448	0.020	**1.05**	**0.62**
		Left Tilted	0.076	5.8GHz WLAN	0.413	0.016	**0.49**	**0.09**

WWAN Band		Exposure Position	1	2		1+2 Summed SAR (W/kg)
			WWAN	5.2GHz / 5.3GHz / 5.5GHz WLAN		
			SAR (W/kg)	Band	SAR (W/kg)	
GSM	GSM850	Right Cheek	0.373	5.5GHz WLAN	0.302	**0.68**
		Right Tilted	0.210	5.5GHz WLAN	0.274	**0.48**
		Left Cheek	0.302	5.5GHz WLAN	0.604	**0.91**
		Left Tilted	0.209	5.5GHz WLAN	0.326	**0.54**
	GSM1900	Right Cheek	0.379	5.5GHz WLAN	0.302	**0.68**
		Right Tilted	0.046	5.5GHz WLAN	0.274	**0.32**
		Left Cheek	0.130	5.5GHz WLAN	0.604	**0.73**
		Left Tilted	0.055	5.5GHz WLAN	0.326	**0.38**
WCMDA	Band V	Right Cheek	0.529	5.5GHz WLAN	0.302	**0.83**
		Right Tilted	0.353	5.5GHz WLAN	0.274	**0.63**
		Left Cheek	0.463	5.5GHz WLAN	0.604	**1.07**
		Left Tilted	0.328	5.5GHz WLAN	0.326	**0.65**
	Band IV	Right Cheek	0.756	5.5GHz WLAN	0.302	**1.06**
		Right Tilted	0.263	5.5GHz WLAN	0.274	**0.54**
		Left Cheek	0.420	5.5GHz WLAN	0.604	**1.02**
		Left Tilted	0.309	5.5GHz WLAN	0.326	**0.64**
	Band II	Right Cheek	0.521	5.5GHz WLAN	0.302	**0.82**
		Right Tilted	0.152	5.5GHz WLAN	0.274	**0.43**
		Left Cheek	0.383	5.5GHz WLAN	0.604	**0.99**
		Left Tilted	0.106	5.5GHz WLAN	0.326	**0.43**
LTE	Band 17	Right Cheek	0.524	5.5GHz WLAN	0.302	**0.83**
		Right Tilted	0.361	5.5GHz WLAN	0.274	**0.64**
		Left Cheek	0.524	5.5GHz WLAN	0.604	**1.13**
		Left Tilted	0.424	5.5GHz WLAN	0.326	**0.75**
	Band 5	Right Cheek	0.501	5.5GHz WLAN	0.302	**0.80**
		Right Tilted	0.237	5.5GHz WLAN	0.274	**0.51**
		Left Cheek	0.406	5.5GHz WLAN	0.604	**1.01**
		Left Tilted	0.216	5.5GHz WLAN	0.326	**0.54**
	Band 4	Right Cheek	0.728	5.5GHz WLAN	0.302	**1.03**
		Right Tilted	0.227	5.5GHz WLAN	0.274	**0.50**
		Left Cheek	0.421	5.5GHz WLAN	0.604	**1.03**
		Left Tilted	0.287	5.5GHz WLAN	0.326	**0.61**
	Band 2	Right Cheek	0.562	5.5GHz WLAN	0.302	**0.86**
		Right Tilted	0.154	5.5GHz WLAN	0.274	**0.43**
		Left Cheek	0.499	5.5GHz WLAN	0.604	**1.10**
		Left Tilted	0.201	5.5GHz WLAN	0.326	**0.53**
	Band 7	Right Cheek	0.282	5.5GHz WLAN	0.302	**0.58**
		Right Tilted	0.165	5.5GHz WLAN	0.274	**0.44**
		Left Cheek	0.601	5.5GHz WLAN	0.604	**1.21**
		Left Tilted	0.076	5.5GHz WLAN	0.326	**0.40**

15.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2		3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
			WWAN	2.4GHz WLAN		2.4GHz Bluetooth		
			SAR (W/kg)	Band	SAR (W/kg)	SAR (W/kg)		
GSM	GSM850	Front	0.459	2.4GHz WLAN	0.129	0.008	**0.59**	**0.47**
		Back	0.627	2.4GHz WLAN	0.189	0.011	**0.82**	**0.64**
		Left side	0.273	2.4GHz WLAN	0.101	0.007	**0.37**	**0.28**
		Right side	0.403				**0.40**	**0.40**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.102				**0.10**	**0.10**
	GSM1900	Front	0.31	2.4GHz WLAN	0.129	0.008	**0.44**	**0.32**
		Back	0.46	2.4GHz WLAN	0.189	0.011	**0.65**	**0.47**
		Left side	0.083	2.4GHz WLAN	0.101	0.007	**0.18**	**0.09**
		Right side	0.071				**0.07**	**0.07**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.823				**0.82**	**0.82**
WCMDA	Band V	Front	0.738	2.4GHz WLAN	0.129	0.008	**0.87**	**0.75**
		Back	0.803	2.4GHz WLAN	0.189	0.011	**0.99**	**0.81**
		Left side	0.271	2.4GHz WLAN	0.101	0.007	**0.37**	**0.28**
		Right side	0.397				**0.40**	**0.40**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.114				**0.11**	**0.11**
	Band IV	Front	0.794	2.4GHz WLAN	0.129	0.008	**0.92**	**0.80**
		Back	0.864	2.4GHz WLAN	0.189	0.011	**1.05**	**0.88**
		Left side	0.138	2.4GHz WLAN	0.101	0.007	**0.24**	**0.15**
		Right side	0.201				**0.20**	**0.20**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	1.113				**1.11**	**1.11**
	Band II	Front	0.552	2.4GHz WLAN	0.129	0.008	**0.68**	**0.56**
		Back	0.753	2.4GHz WLAN	0.189	0.011	**0.94**	**0.76**
		Left side	0.128	2.4GHz WLAN	0.101	0.007	**0.23**	**0.14**
		Right side	0.126				**0.13**	**0.13**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	1.269				**1.27**	**1.27**

WWAN Band		Exposure Position	1	2		3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
			WWAN	2.4GHz WLAN		2.4GHz Bluetooth		
			SAR (W/kg)	Band	SAR (W/kg)	SAR (W/kg)		
LTE	Band 17	Front	0.623	2.4GHz WLAN	0.129	0.008	**0.75**	**0.63**
		Back	0.751	2.4GHz WLAN	0.189	0.011	**0.94**	**0.76**
		Left side	0.343	2.4GHz WLAN	0.101	0.007	**0.44**	**0.35**
		Right side	0.377				**0.38**	**0.38**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.08				**0.08**	**0.08**
	Band 5	Front	0.573	2.4GHz WLAN	0.129	0.008	**0.70**	**0.58**
		Back	0.657	2.4GHz WLAN	0.189	0.011	**0.85**	**0.67**
		Left side	0.294	2.4GHz WLAN	0.101	0.007	**0.40**	**0.30**
		Right side	0.28				**0.28**	**0.28**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.137				**0.14**	**0.14**
	Band 4	Front	0.986	2.4GHz WLAN	0.129	0.008	**1.12**	**0.99**
		Back	1.001	2.4GHz WLAN	0.189	0.011	**1.19**	**1.01**
		Left side	0.125	2.4GHz WLAN	0.101	0.007	**0.23**	**0.13**
		Right side	0.168				**0.17**	**0.17**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	0.746				**0.75**	**0.75**
	Band 2	Front	0.953	2.4GHz WLAN	0.129	0.008	**1.08**	**0.96**
		Back	1.126	2.4GHz WLAN	0.189	0.011	**1.32**	**1.14**
		Left side	0.239	2.4GHz WLAN	0.101	0.007	**0.34**	**0.25**
		Right side	0.217				**0.22**	**0.22**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	1.428				**1.43**	**1.43**
	Band 7	Front	0.664	2.4GHz WLAN	0.129	0.008	**0.79**	**0.67**
		Back	0.723	2.4GHz WLAN	0.189	0.011	**0.91**	**0.73**
		Left side	0.118	2.4GHz WLAN	0.101	0.007	**0.22**	**0.13**
		Right side	0.098				**0.10**	**0.10**
		Top side		2.4GHz WLAN	0.048	0.002	**0.05**	**0.00**
		Bottom side	1.404				**1.40**	**1.40**

15.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2		3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
			WWAN	2.4GHz / 5.8GHz WLAN		2.4GHz Bluetooth		
			SAR (W/kg)	Band	SAR (W/kg)	SAR (W/kg)		
GSM	GSM850	Front	0.459	2.4GHz WLAN	0.129	0.008	**0.59**	**0.47**
		Back	0.627	2.4GHz WLAN	0.189	0.011	**0.82**	**0.64**
	GSM1900	Front	0.310	2.4GHz WLAN	0.129	0.008	**0.44**	**0.32**
		Back	0.555	2.4GHz WLAN	0.189	0.011	**0.74**	**0.57**
WCMDA	Band V	Front	0.738	2.4GHz WLAN	0.129	0.008	**0.87**	**0.75**
		Back	0.803	2.4GHz WLAN	0.189	0.011	**0.99**	**0.81**
	Band IV	Front	0.794	2.4GHz WLAN	0.129	0.008	**0.92**	**0.80**
		Back	0.864	2.4GHz WLAN	0.189	0.011	**1.05**	**0.88**
	Band II	Front	0.552	2.4GHz WLAN	0.129	0.008	**0.68**	**0.56**
		Back	1.077	2.4GHz WLAN	0.189	0.011	**1.27**	**1.09**
LTE	Band 17	Front	0.623	2.4GHz WLAN	0.129	0.008	**0.75**	**0.63**
		Back	0.751	2.4GHz WLAN	0.189	0.011	**0.94**	**0.76**
	Band 5	Front	0.573	2.4GHz WLAN	0.129	0.008	**0.70**	**0.58**
		Back	0.657	2.4GHz WLAN	0.189	0.011	**0.85**	**0.67**
	Band 4	Front	0.986	2.4GHz WLAN	0.129	0.008	**1.12**	**0.99**
		Back	1.001	2.4GHz WLAN	0.189	0.011	**1.19**	**1.01**
	Band 2	Front	0.953	2.4GHz WLAN	0.129	0.008	**1.08**	**0.96**
		Back	1.126	2.4GHz WLAN	0.189	0.011	**1.32**	**1.14**
	Band 7	Front	0.664	2.4GHz WLAN	0.129	0.008	**0.79**	**0.67**
		Back	0.763	2.4GHz WLAN	0.189	0.011	**0.95**	**0.77**

WWAN Band		Exposure Position	1	2		1+2 Summed SAR (W/kg)
			WWAN	5.2GHz / 5.3GHz / 5.5GHz WLAN		
			SAR (W/kg)	Band	SAR (W/kg)	
GSM	GSM850	Front	0.459	5.5GHz WLAN	0.111	**0.57**
		Back	0.627	5.5GHz WLAN	0.342	**0.97**
	GSM1900	Front	0.310	5.5GHz WLAN	0.111	**0.42**
		Back	0.555	5.5GHz WLAN	0.342	**0.90**
WCMDA	Band V	Front	0.738	5.5GHz WLAN	0.111	**0.85**
		Back	0.803	5.5GHz WLAN	0.342	**1.15**
	Band IV	Front	0.794	5.5GHz WLAN	0.111	**0.91**
		Back	0.864	5.5GHz WLAN	0.342	**1.21**
	Band II	Front	0.552	5.5GHz WLAN	0.111	**0.66**
		Back	1.077	5.5GHz WLAN	0.342	**1.42**
LTE	Band 17	Front	0.623	5.5GHz WLAN	0.111	**0.73**
		Back	0.751	5.5GHz WLAN	0.342	**1.09**
	Band 5	Front	0.573	5.5GHz WLAN	0.111	**0.68**
		Back	0.657	5.5GHz WLAN	0.342	**1.00**
	Band 4	Front	0.986	5.5GHz WLAN	0.111	**1.10**
		Back	1.001	5.5GHz WLAN	0.342	**1.34**
	Band 2	Front	0.953	5.5GHz WLAN	0.111	**1.06**
		Back	1.126	5.5GHz WLAN	0.342	**1.47**
	Band 7	Front	0.664	5.5GHz WLAN	0.111	**0.78**
		Back	0.763	5.5GHz WLAN	0.342	**1.11**

Test Engineer： Ken Li, Kurt Liu, Tommy Chen, and Lawrence Chen

16. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[a]	1/k[b]	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 16.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

Table 16.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 25.6 %**	**± 25.2 %**

Table 16.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

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[15] FCC KDB 865664 D01 v01r03, "SAR Measurement Requirements for 100 MHz to 6 GHz", Feb 2014.

[16] FCC KDB 865664 D02 v01r01, “RF Exposure Compliance Reporting and Documentation Considerations” May 2013.