FCC SAR Test Report

APPLICANT	:	Hewlett Packard
EQUIPMENT	:	12" Tablet
BRAND NAME	:	hp
MODEL NAME	:	HSTNH-C412DC
FCC ID	:	B94HHC412DC
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

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA4O1415	Rev. 01	Initial issue of report	Dec. 15, 2014

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Hewlett Packard, 12'' Tablet, HSTNH-C412DC**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	
		Body 1g SAR (W/kg)	Simultaneous Transmission 1g SAR (W/kg)
PCB	GSM850	0.90	1.59
	GSM1900	1.10	
	WCDMA Band V	0.86	
	WCDMA Band II	1.33	
	LTE Band 7	0.96	
DTS	WLAN 2.4GHz Band	1.19	1.59
NII	WLAN 5.2GHz Band	1.33	1.35
	WLAN 5.3GHz Band	**1.35**	
	WLAN 5.5GHz Band	1.24	
	WLAN 5.8GHz Band	1.14	
Date of Testing:		11/12/2014 ~ 11/17/2014	

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	Hewlett Packard
Address	1501 Page Mill Road,MS 1419 Palo Alto,CA 94304-1126

Manufacturer	
Company Name	1. Compal Electronics Inc. 2. Compal Electronics Technology (KunShan) Co. Ltd.
Address	1. No. 581 Ruiguang Rd. Neihu District Taipei City114, Taiwan 2. No.25 Third Ave., A Zone, KunShan Comprehensive Free Trade Zone, KunShan Jiangsu, China

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 248227 D01 SAR meas for 802 11abg v01r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r01
- FCC KDB 941225 D01 3G SAR Procedures v03
- FCC KDB 941225 D05 SAR for LTE Devices v02r03

4. Equipment Under Test (EUT)

4.1 General Information

Product Feature & Specification	
Equipment Name	12" Tablet
Brand Name	hp
Model Name	HSTNH-C412DC
FCC ID	B94HHC412DC
S/N	480627585
Integrated WWAN Module	Brand Name: Huawei Model Name: ME906E
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 II: 1852.4 MHz ~ 1907.6 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	• GPRS/EGPRS • RMC 12.2Kbps • HSDPA • HSUPA • DC-HSDPA • LTE: QPSK, 16QAM • 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 • Bluetooth v3.0+EDR，Bluetooth v4.0-LE • NFC:ASK
HW Version	GA-419
SW Version	0.00.21
EUT Stage	Identical Prototype
Remark: 1. This device WLAN supports Tx diversity, and the WLAN and Bluetooth cannot transmit simultaneously.	

Accessory				
Battery 1	Brand Name	hp	Model Name	HSTNH-C412D-SD
	Power Rating	3.8 Vdc, 9750 mAh	Type	Li-ion,

4.2 Maximum Tune-up Limit

Band	average power (dBm)			
	GSM 850		GSM 1900	
Output Power Status	Full Power mode	Reduced Power mode	Full Power mode	Reduced Power mode
GPRS/EDGE (GMSK, 1 Tx slot)	33.50	29.00	30.50	26.00
GPRS/EDGE (GMSK, 2 Tx slots)	31.00	26.00	27.50	23.00
GPRS/EDGE (GMSK, 3 Tx slots)	29.50	24.00	26.50	22.00
GPRS/EDGE (GMSK, 4 Tx slots)	28.00	23.00	24.50	20.00
EDGE (8PSK, 1 Tx slot)	28.00	28.00	28.00	26.00
EDGE (8PSK, 2 Tx slots)	26.00	26.00	25.00	23.00
EDGE (8PSK, 3 Tx slots)	25.00	24.00	23.50	22.00
EDGE (8PSK, 4 Tx slots)	23.00	23.00	22.00	20.00

Mode	WCDMA Band V		WCDMA Band II	
Output Power Status	Full Power mode	Reduced Power mode	Full Power mode	Reduced Power mode
RMC 12.2K	24.00	19.00	24.00	16.00
HSDPA Subtest-1	24.00	19.00	24.00	16.00
DC-HSDPA Subtest-1	24.00	19.00	24.00	16.00
HSUPA Subtest-5	24.00	19.00	24.00	16.00

LTE Band 7						
average power(dBm)						
Modulation	BW (MHz)	RB size	Full Power mode (MPR)	Full power mode	Reduced Power mode (MPR)	Reduced power mode
QPSK	20	≤ 18	0	24.00	0	13.00
QPSK	20	> 18	1	23.00	0	13.00
16QAM	20	≤ 18	1	23.00	0	13.00
16QAM	20	> 18	2	22.00	0	13.00
QPSK	15	≤ 16	0	24.00	0	13.00
QPSK	15	> 16	1	23.00	0	13.00
16QAM	15	≤ 16	1	23.00	0	13.00
16QAM	15	> 16	2	22.00	0	13.00
QPSK	10	≤ 12	0	24.00	0	13.00
QPSK	10	> 12	1	23.00	0	13.00
16QAM	10	≤ 12	1	23.00	0	13.00
16QAM	10	> 12	2	22.00	0	13.00
QPSK	5	≤ 8	0	24.00	0	13.00
QPSK	5	> 8	1	23.00	0	13.00
16QAM	5	≤ 8	1	23.00	0	13.00
16QAM	5	> 8	2	22.00	0	13.00

Mode		Average Power (dBm)
2.4GHz	802.11b	15.0
	802.11g	13.0
	802.11n-HT20	12.0
	802.11n-HT40	12.0
5GHz	802.11a	12.0
	802.11n-HT20	12.0
	802.11n-HT40	12.0
	802.11n-VHT20	12.0
	802.11n-VHT40	12.0
	802.11n-VHT80	12.0
Bluetooth v3.0+EDR		-1.0
Bluetooth v4.0+LE		-1.0

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r03	
FCC ID	B94HHC412DC
Equipment Name	12" Tablet
Operating Frequency Range of each LTE transmission band	LTE Band 7: 2502.5 MHz ~ 2567.5 MHz
Channel Bandwidth	LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	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 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. Proximity Sensor Triggering Test

Proximity sensor power reduction

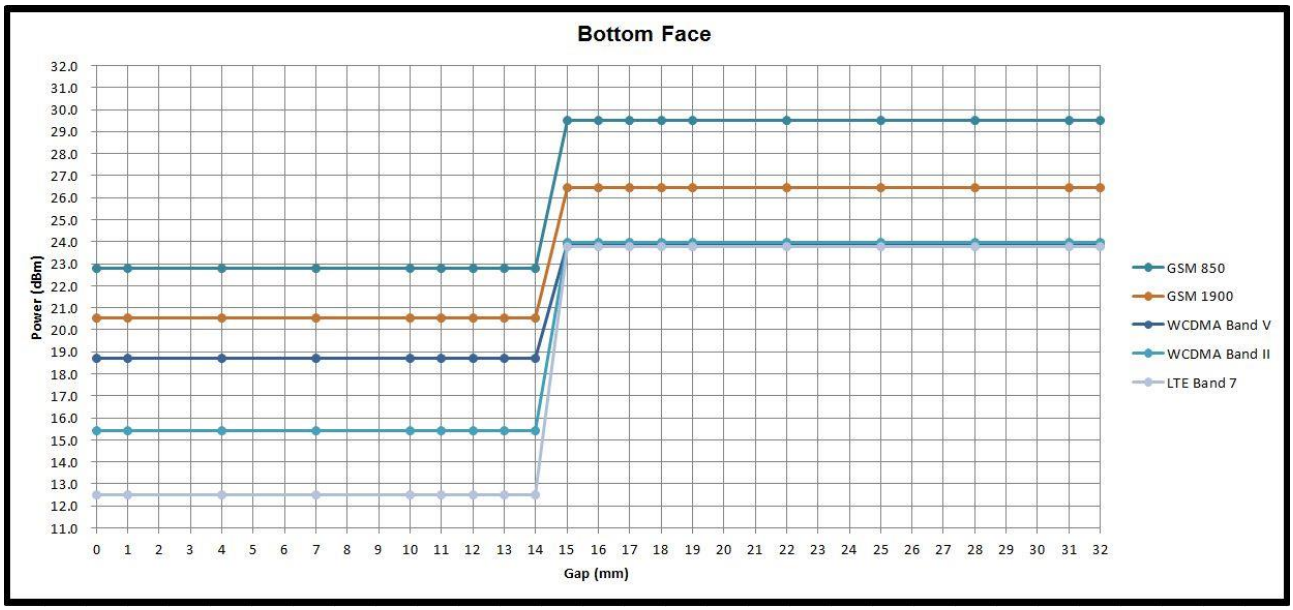
Exposure Position / wireless mode	Bottom Face(1)	Edge 1	Edge 2	Edge 3	Edge 4
GSM850 GPRS (GMSK 1 Tx slot) - CS1	4.5 dB	0.0 dB	0 dB	0 dB	0 dB
GSM850 GPRS (GMSK 2 Tx slot) - CS1	5.0 dB				
GSM850 GPRS (GMSK 3 Tx slot) - CS1	5.5 dB				
GSM850 GPRS (GMSK 4 Tx slot) - CS1	5.0 dB				
GSM850 EDGE (8PSK 1 Tx slot) - MCS5	0.0 dB				
GSM850 EDGE (8PSK 2 Tx slot) - MCS5	0.0 dB				
GSM850 EDGE (8PSK 3 Tx slot) - MCS5	1.0 dB				
GSM850 EDGE (8PSK 4 Tx slot) - MCS5	0.0 dB				
GSM1900 GPRS (GMSK 1 Tx slot) - CS1	4.5 dB				
GSM1900 GPRS (GMSK 2 Tx slot) - CS1	4.5 dB				
GSM1900 GPRS (GMSK 3 Tx slot) - CS1	4.5 dB				
GSM1900 GPRS (GMSK 4 Tx slot) - CS1	4.5 dB				
GSM1900 EDGE (8PSK 1 Tx slot) - MCS5	2.0 dB				
GSM1900 EDGE (8PSK 2 Tx slot) - MCS5	2.0 dB				
GSM1900 EDGE (8PSK 3 Tx slot) - MCS5	1.5 dB				
GSM1900 EDGE (8PSK 4 Tx slot) - MCS5	2.0 dB				
WCDMA Band V	5.0 dB				
WCDMA Band II	8.0 dB				
LTE Band 7	11.0 dB				

Remark:

1. (1): Reduced maximum limit applied by activation of proximity sensor.
2. Power reduction is not applicable for WLAN and Bluetooth.
3. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5 and compliant results are shown and described in exhibit “P-Sensor operational description
4. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:
   - Bottom Face: 12 mm

Power Measurement during Sensor Trigger distance testing

Band/Mode	Ch #	Measured power reduction (dBm)		Reduction Levels
		w/o power back-off	w/ power back-off	(dB)
GSM850	251	29.49	22.80	6.69
GSM1900	661	26.46	20.53	5.93
WCDMA Band V	4132	23.90	18.70	5.20
WCDMA Band II	9400	23.97	15.43	8.54
LTE Band 7	20850	23.76	12.51	11.25



6. RF Exposure Limits

6.1 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.

6.2 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.

7. Specific Absorption Rate (SAR)

7.1 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.

7.2 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:

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

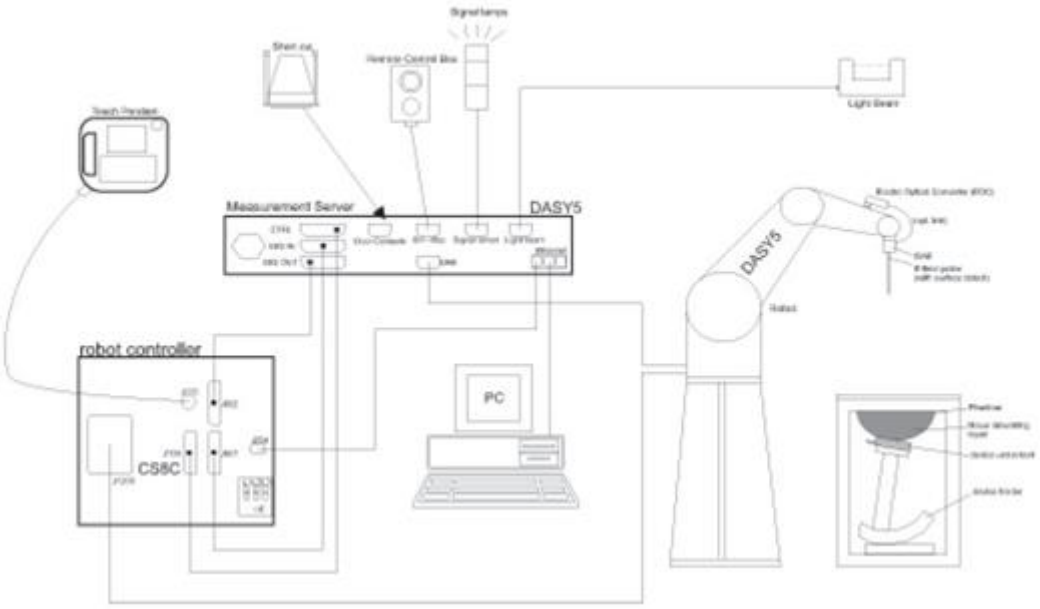
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. 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.

9. 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

9.1 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

9.2 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.

9.3 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.	

9.4 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.

9.5 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.

9.6 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.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d092	Jun. 23, 2014	Jun. 22, 2015
SPEAG	1900MHz System Validation Kit	D1900V2	5d018	Jun. 18, 2014	Jun. 17, 2015
SPEAG	2450MHz System Validation Kit	D2450V2	924	Nov. 13, 2013	Nov. 12, 2014
SPEAG	2600MHz System Validation Kit	D2600V2	1058	Jun. 23, 2014	Jun. 22, 2015
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Sep. 25, 2014	Sep. 24, 2015
SPEAG	Data Acquisition Electronics	DAE4	913	Dec. 17, 2013	Dec. 16, 2014
SPEAG	Data Acquisition Electronics	DAE4	1388	Sep. 24, 2014	Sep. 23, 2015
SPEAG	Data Acquisition Electronics	DAE4	1279	Jul. 23, 2014	Jul. 22, 2015
SPEAG	Data Acquisition Electronics	DAE3	495	May. 19, 2014	May. 18, 2015
SPEAG	Dosimetric E-Field Probe	ES3DV3	3296	Apr. 30, 2014	Apr. 29, 2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3697	Sep. 29, 2014	Sep. 28, 2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3753	Mar. 26, 2014	Mar. 25, 2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	May. 22, 2014	May. 21, 2015
Wisewind	Thermometer	ETP-101	TM560	Oct. 21, 2014	Oct. 20, 2015
Wisewind	Thermometer	ETP-101	TM685	Oct. 21, 2014	Oct. 20, 2015
Wisewind	Thermometer	HTC-1	TM642	Oct. 21, 2014	Oct. 20, 2015
Wisewind	Thermometer	HTC-1	TM281	Oct. 21, 2014	Oct. 20, 2015
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Feb. 11, 2014	Feb. 10, 2015
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 27, 2014	May. 26, 2015
Agilent	Signal Generator	N5181A	MY50145381	Jan. 04, 2014	Jan. 03, 2015
R&S	Signal Generator	SMU200A	102502	Jul. 07, 2014	Jul. 06, 2015
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	1036004	Aug. 09, 2014	Aug. 08, 2015
Anritsu	Power Sensor	MA2411B	1027253	Aug. 11, 2014	Aug. 10, 2015
R&S	Spectrum Analyzer	FSP 30	101329	Jun. 14, 2014	Jun. 13, 2015
Agilent	Dual Directional Coupler	778D	50422	Note1	
Woken	Attenuator 1	WK0602-XX	N/A	Note1	
PE	Attenuator 2	PE7005-10	N/A	Note1	
PE	Attenuator 3	PE7005- 3	N/A	Note1	
AR	Power Amplifier	5S1G4M2	0328767	Note1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note1	
Mini-Circuits	Power Amplifier	ZHL-42W+	13440021344	Note1	

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.

11. System Verification

11.1 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
835	MSL	22.3	0.965	55.164	0.97	55.20	-0.52	-0.07	±5	2014/11/14
1900	MSL	22.2	1.532	52.328	1.52	53.30	0.79	-1.82	±5	2014/11/13
2450	MSL	22.2	2.037	52.548	1.95	52.70	4.46	-0.29	±5	2014/11/12
2600	MSL	22.5	2.201	52.823	2.16	52.50	1.90	0.62	±5	2014/11/13
5200	MSL	22.5	5.325	48.639	5.30	49.00	0.47	-0.74	±5	2014/11/15
5300	MSL	22.5	5.473	48.500	5.42	48.90	0.98	-0.82	±5	2014/11/15
5600	MSL	22.3	5.671	46.999	5.77	48.50	-1.72	-3.09	±5	2014/11/16
5800	MSL	22.4	6.179	46.434	6.00	48.20	2.98	-3.66	±5	2014/11/17

11.2 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 (%)
2014/11/14	835	MSL	250	D835V2-4d092	EX3DV4 - SN3925	DAE3 Sn495	2.45	9.47	9.80	3.48
2014/11/13	1900	MSL	250	D1900V2-5d018	ES3DV3 - SN3296	DAE4 Sn913	9.60	39.80	38.40	-3.52
2014/11/12	2450	MSL	250	D2450V2-924	ES3DV3 - SN3296	DAE4 Sn913	12.40	50.20	49.60	-1.20
2014/11/13	2600	MSL	250	D2600V2_1058	EX3DV4 - SN3925	DAE3 Sn495	14.30	56.80	57.20	0.70
2014/11/15	5200	MSL	100	D5GHzV2-1006	EX3DV4 - SN3697	DAE4 Sn1388	8.27	77.50	82.70	6.71
2014/11/15	5300	MSL	100	D5GHzV2-1006	EX3DV4 - SN3753	DAE4 Sn1279	8.33	80.00	83.30	4.13
2014/11/16	5600	MSL	100	D5GHzV2-1006	EX3DV4 - SN3753	DAE4 Sn1279	8.24	85.20	82.40	-3.29
2014/11/17	5800	MSL	100	D5GHzV2-1006	EX3DV4 - SN3753	DAE4 Sn1279	7.45	78.40	74.50	-4.97

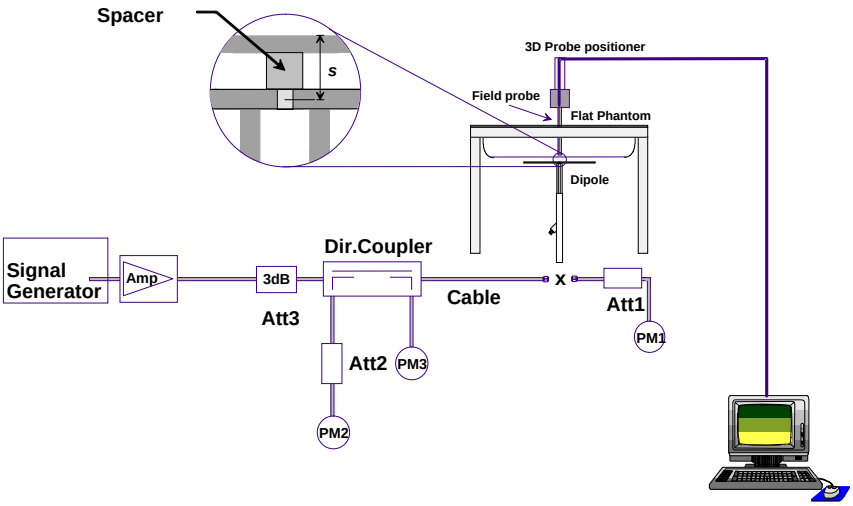


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

12. RF Exposure Positions

12.1 SAR Testing for Tablet

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v05r02 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

13. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v05r02, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03, for Body SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance, for modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested, therefore, the GMS850 GPRS 4Tx slots and GSM1900 GPRS 3Tx slots modes was selected when EUT operating without power back-off, the GPRS 3Tx slots were selected when EUT operating with power back-off, according to the highest source-based time-averaged output power.

Full Power mode (Proximity Sensor Inactive)

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	
GPRS (GMSK, 1 Tx slot)	32.79	33.21	33.15	33.50	23.79	24.21	24.15	24.50
GPRS (GMSK, 2 Tx slots)	30.33	30.63	30.86	31.00	24.33	24.63	24.86	25.00
GPRS (GMSK, 3 Tx slots)	29.41	29.35	29.49	29.50	25.15	25.09	25.23	25.24
GPRS (GMSK, 4 Tx slots)	27.01	27.17	27.37	28.00	24.01	24.17	24.37	25.00
EDGE (8PSK, 1 Tx slot)	26.86	27.03	27.39	28.00	17.86	18.03	18.39	19.00
EDGE (8PSK, 2 Tx slots)	24.85	24.91	25.21	26.00	18.85	18.91	19.21	20.00
EDGE (8PSK, 3 Tx slots)	23.83	23.95	24.26	25.00	19.57	19.69	20.00	20.74
EDGE (8PSK, 4 Tx slots)	21.92	22.10	22.49	23.00	18.92	19.10	19.49	20.00

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	
GPRS (GMSK, 1 Tx slot)	29.41	29.85	29.70	30.50	20.41	20.85	20.70	21.50
GPRS (GMSK, 2 Tx slots)	27.17	27.50	27.49	27.50	21.17	21.50	21.49	21.50
GPRS (GMSK, 3 Tx slots)	26.23	26.46	26.41	26.50	21.97	22.20	22.15	22.24
GPRS (GMSK, 4 Tx slots)	24.13	24.48	24.40	24.50	21.13	21.48	21.40	21.50
EDGE (8PSK, 1 Tx slot)	26.96	26.98	26.89	28.00	17.96	17.98	17.89	19.00
EDGE (8PSK, 2 Tx slots)	23.74	24.02	23.92	25.00	17.74	18.02	17.92	19.00
EDGE (8PSK, 3 Tx slots)	22.76	23.00	22.88	23.50	18.50	18.74	18.62	19.24
EDGE (8PSK, 4 Tx slots)	20.69	21.05	21.00	22.00	17.69	18.05	18.00	19.00

Reduced Power Mode (Proximity Sensor active)

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	
GPRS (GMSK, 1 Tx slot)	28.60	28.88	28.99	29.00	19.60	19.88	19.99	20.00
GPRS (GMSK, 2 Tx slots)	25.59	25.77	26.00	26.00	19.59	19.77	20.00	20.00
GPRS (GMSK, 3 Tx slots)	23.44	23.49	23.84	24.00	19.18	19.23	19.58	19.74
GPRS (GMSK, 4 Tx slots)	22.14	22.71	22.80	23.00	19.14	19.71	19.80	20.00
EDGE (8PSK, 1 Tx slot)	27.03	27.14	27.44	28.00	18.03	18.14	18.44	19.00
EDGE (8PSK, 2 Tx slots)	24.98	25.08	25.34	26.00	18.98	19.08	19.34	20.00
EDGE (8PSK, 3 Tx slots)	23.74	23.81	23.99	24.00	19.48	19.55	19.73	19.74
EDGE (8PSK, 4 Tx slots)	21.87	22.12	22.50	23.00	18.87	19.12	19.50	20.00

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	
GPRS (GMSK, 1 Tx slot)	25.00	25.43	25.18	26.00	16.00	16.43	16.18	17.00
GPRS (GMSK, 2 Tx slots)	22.06	22.42	22.23	23.00	16.06	16.42	16.23	17.00
GPRS (GMSK, 3 Tx slots)	20.16	20.53	20.43	22.00	15.90	16.27	16.17	17.74
GPRS (GMSK, 4 Tx slots)	19.06	19.65	19.44	20.00	16.06	16.65	16.44	17.00
EDGE (8PSK, 1 Tx slot)	25.65	25.94	25.84	26.00	16.65	16.94	16.84	17.00
EDGE (8PSK, 2 Tx slots)	22.69	22.97	22.88	23.00	16.69	16.97	16.88	17.00
EDGE (8PSK, 3 Tx slots)	20.40	20.73	20.69	22.00	16.14	16.47	16.43	17.74
EDGE (8PSK, 4 Tx slots)	19.54	19.71	19.69	20.00	16.54	16.71	16.69	17.00

<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.		

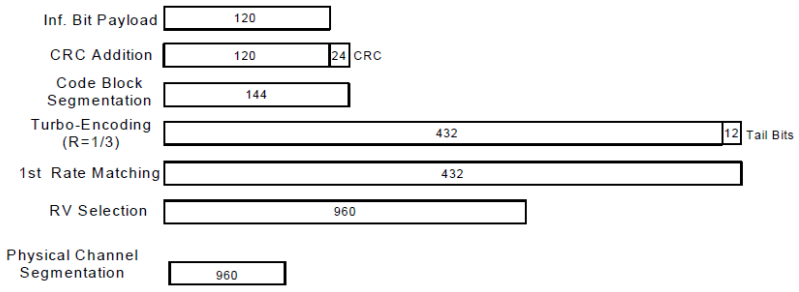


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03, SAR for Body exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Full Power mode (Proximity Sensor Inactive)

Band			WCDMA V			WCDMA II		
TX Channel			4132	4182	4233	9262	9400	9538
Frequency (MHz)			826.4	836.4	846.6	1852.4	1880	1907.6
MPR (dB)	3GPP Rel 99	RMC 12.2Kbps	23.90	23.76	23.71	23.92	23.97	23.71
0	3GPP Rel 6	HSDPA Subtest-1	22.95	22.86	22.78	22.97	23.11	22.67
0	3GPP Rel 6	HSDPA Subtest-2	22.94	22.86	22.77	22.96	23.09	22.65
0.5	3GPP Rel 6	HSDPA Subtest-3	22.47	22.39	22.31	22.42	22.53	22.22
0.5	3GPP Rel 6	HSDPA Subtest-4	22.46	22.39	22.30	22.41	22.53	22.21
0	3GPP Rel 8	DC-HSDPA Subtest-1	22.94	22.85	22.76	22.96	23.10	22.66
0	3GPP Rel 8	DC-HSDPA Subtest-2	22.93	22.84	22.76	22.95	23.09	22.65
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	22.45	22.39	22.30	22.41	22.52	22.21
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	22.45	22.38	22.29	22.39	22.52	22.20
0	3GPP Rel 6	HSUPA Subtest-1	22.78	22.81	22.53	22.91	22.70	22.45
2	3GPP Rel 6	HSUPA Subtest-2	21.70	21.73	21.45	22.20	21.98	21.63
1	3GPP Rel 6	HSUPA Subtest-3	21.77	21.81	21.54	22.16	21.96	21.61
2	3GPP Rel 6	HSUPA Subtest-4	21.96	22.01	21.73	22.64	22.60	22.22
0	3GPP Rel 6	HSUPA Subtest-5	23.01	22.93	22.84	22.98	23.03	22.67

Reduced Power Mode (Proximity Sensor active)

Band			WCDMA V			WCDMA II		
TX Channel			4132	4182	4233	9262	9400	9538
Frequency (MHz)			826.4	836.4	846.6	1852.4	1880	1907.6
MPR (dB)	3GPP Rel 99	RMC 12.2Kbps	18.70	18.56	18.41	15.42	15.43	15.33
0	3GPP Rel 6	HSDPA Subtest-1	17.75	17.66	17.58	14.43	14.57	14.03
0	3GPP Rel 6	HSDPA Subtest-2	17.74	17.66	17.57	14.42	14.55	14.01
0.5	3GPP Rel 6	HSDPA Subtest-3	17.27	17.19	17.11	13.88	13.99	13.58
0.5	3GPP Rel 6	HSDPA Subtest-4	17.26	17.19	17.10	13.87	13.99	13.57
0	3GPP Rel 8	DC-HSDPA Subtest-1	17.74	17.65	17.56	14.42	14.56	14.02
0	3GPP Rel 8	DC-HSDPA Subtest-2	17.73	17.64	17.56	14.41	14.55	14.01
0.5	3GPP Rel 8	DC-HSDPA Subtest-3	17.25	17.19	17.10	13.87	13.98	13.57
0.5	3GPP Rel 8	DC-HSDPA Subtest-4	17.25	17.18	17.09	13.85	13.98	13.56
0	3GPP Rel 6	HSUPA Subtest-1	17.58	17.61	17.33	14.37	14.16	14.01
2	3GPP Rel 6	HSUPA Subtest-2	16.50	16.53	16.25	13.66	13.44	13.19
1	3GPP Rel 6	HSUPA Subtest-3	16.57	16.61	16.34	13.62	13.42	13.07
2	3GPP Rel 6	HSUPA Subtest-4	16.76	16.81	16.53	14.10	14.06	13.48
0	3GPP Rel 6	HSUPA Subtest-5	17.81	17.73	17.64	14.44	14.49	14.03

<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.

Maximum Average RF Power (Proximity Sensor Inactive)

<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	23.76	23.43	23.32	24	0
20	QPSK	1	49	23.68	23.34	23.23		
20	QPSK	1	99	23.64	23.24	23.21		
20	QPSK	50	0	22.42	21.97	21.93	23	1
20	QPSK	50	24	22.39	21.98	22.00		
20	QPSK	50	49	22.41	22.05	22.01		
20	QPSK	100	0	22.21	22.03	22.02		
20	16QAM	1	0	22.73	22.47	22.29	23	1
20	16QAM	1	49	22.71	22.35	22.25		
20	16QAM	1	99	22.64	22.24	22.28		
20	16QAM	50	0	21.27	20.97	20.85	22	2
20	16QAM	50	24	21.29	20.96	20.92		
20	16QAM	50	49	21.39	21.08	20.99		
20	16QAM	100	0	21.38	21.01	20.96		
Channel				20825	21100	21375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.72	23.47	23.22	24	0
15	QPSK	1	37	23.69	23.27	23.20		
15	QPSK	1	74	23.63	23.17	23.21		
15	QPSK	36	0	22.51	22.07	22.04	23	1
15	QPSK	36	18	22.49	22.08	22.00		
15	QPSK	36	37	22.47	22.22	22.07		
15	QPSK	75	0	22.44	22.03	22.02		
15	16QAM	1	0	22.70	22.46	22.24	23	1
15	16QAM	1	37	22.66	22.28	22.22		
15	16QAM	1	74	22.57	22.12	22.20		
15	16QAM	36	0	21.24	21.00	20.83	22	2
15	16QAM	36	18	21.38	21.02	20.93		
15	16QAM	36	37	21.40	21.15	21.07		
15	16QAM	75	0	21.32	21.04	20.90		
Channel				20800	21100	21400	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	23.71	23.37	23.21	24	0
10	QPSK	1	24	23.49	23.25	23.08		
10	QPSK	1	49	23.64	23.16	23.14		
10	QPSK	25	0	22.51	22.10	22.01	23	1
10	QPSK	25	12	22.45	22.11	22.02		
10	QPSK	25	24	22.45	22.05	21.97		
10	QPSK	50	0	22.35	21.96	21.91		
10	16QAM	1	0	22.72	22.40	22.28	23	1
10	16QAM	1	24	22.59	22.29	22.10		
10	16QAM	1	49	22.53	22.22	22.11		
10	16QAM	25	0	21.33	21.01	20.89	22	2
10	16QAM	25	12	21.41	21.04	21.03		
10	16QAM	25	24	21.41	21.02	20.99		
10	16QAM	50	0	21.30	20.92	20.92		

Channel				20775	21100	21425	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	23.72	23.29	23.27	24	0
5	QPSK	1	12	23.71	23.23	23.23		
5	QPSK	1	24	23.26	23.25	23.12		
5	QPSK	12	0	22.58	22.26	22.17	23	1
5	QPSK	12	6	22.63	22.21	22.15		
5	QPSK	12	11	22.47	22.19	22.14		
5	QPSK	25	0	22.39	22.05	21.99		
5	16QAM	1	0	22.72	22.29	22.24	23	1
5	16QAM	1	12	22.66	22.26	22.18		
5	16QAM	1	24	22.58	22.28	22.15		
5	16QAM	12	0	21.68	21.25	21.26	22	2
5	16QAM	12	6	21.64	21.27	21.18		
5	16QAM	12	11	21.68	21.25	21.18		
5	16QAM	25	0	21.47	21.03	21.03		

Reduced Average RF Power (Proximity Sensor active)

<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	12.41	12.51	12.40	13	0
20	QPSK	1	49	12.11	12.14	12.30		
20	QPSK	1	99	12.15	12.15	12.16		
20	QPSK	50	0	12.14	12.24	12.18	13	0
20	QPSK	50	24	12.10	12.16	12.15		
20	QPSK	50	49	12.07	12.21	12.09		
20	QPSK	100	0	12.04	12.07	12.03		
20	16QAM	1	0	12.48	12.42	12.32	13	0
20	16QAM	1	49	12.30	12.40	12.23		
20	16QAM	1	99	12.19	12.32	12.14		
20	16QAM	50	0	12.31	12.17	12.19	13	0
20	16QAM	50	24	12.14	12.05	12.26		
20	16QAM	50	49	12.08	12.27	12.24		
20	16QAM	100	0	12.11	12.00	12.22		
Channel				20825	21100	21375	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	12.43	12.40	12.45	13	0
15	QPSK	1	37	12.13	12.11	12.30		
15	QPSK	1	74	12.18	12.24	11.92		
15	QPSK	36	0	12.29	12.03	12.35	13	0
15	QPSK	36	18	12.06	12.13	12.42		
15	QPSK	36	37	12.08	12.39	12.35		
15	QPSK	75	0	12.10	12.19	12.19		
15	16QAM	1	0	12.35	12.39	12.33	13	0
15	16QAM	1	37	12.29	12.37	12.23		
15	16QAM	1	74	12.27	12.27	12.16		
15	16QAM	36	0	12.11	11.90	12.13	13	0
15	16QAM	36	18	12.12	12.01	12.26		
15	16QAM	36	37	12.04	12.25	12.19		
15	16QAM	75	0	12.18	12.02	12.26		
Channel				20800	21100	21400	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	12.33	12.30	12.45	13	0
10	QPSK	1	24	12.20	12.10	12.23		
10	QPSK	1	49	12.07	12.14	12.09		
10	QPSK	25	0	12.19	12.12	12.43	13	0
10	QPSK	25	12	12.30	12.18	12.29		
10	QPSK	25	24	12.23	12.28	12.22		
10	QPSK	50	0	12.31	12.24	12.35		
10	16QAM	1	0	12.20	12.29	12.30	13	0
10	16QAM	1	24	12.15	12.18	12.24		
10	16QAM	1	49	12.16	12.26	12.21		
10	16QAM	25	0	12.18	11.95	12.29	13	0
10	16QAM	25	12	12.05	12.06	12.10		
10	16QAM	25	24	12.12	12.13	12.02		
10	16QAM	50	0	12.14	12.09	12.16		

Channel				20775	21100	21425	Tune up Limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	12.45	12.35	12.50	13	0
5	QPSK	1	12	12.38	12.17	12.33		
5	QPSK	1	24	12.29	12.22	12.13		
5	QPSK	12	0	12.44	12.27	12.45	13	0
5	QPSK	12	6	12.41	12.31	12.46		
5	QPSK	12	11	12.18	12.29	12.37		
5	QPSK	25	0	12.07	12.25	12.41		
5	16QAM	1	0	12.32	12.30	12.49	13	0
5	16QAM	1	12	12.26	12.29	12.43		
5	16QAM	1	24	12.31	12.15	12.31		
5	16QAM	12	0	12.23	12.12	12.27	13	0
5	16QAM	12	6	12.28	12.20	12.29		
5	16QAM	12	11	12.25	12.15	12.20		
5	16QAM	25	0	12.23	12.13	12.22		

<WLAN Conducted Power>

General Note:

1. For IEEE802.11a/b/g SAR testing, highest average RF output power channel for the lowest data rate for 802.11a/b 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/ac, 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 IEEE802.11a/b/g (as applicable) provided bandwidth and test position are the same.
3. For IEEE802.11n/ac 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	2Mbps	5.5Mbps	11Mbps
		1Mbps			
CH 1	2412	14.78	14.73	14.79	14.70
CH 6	2437	14.82			
CH 11	2462	14.81			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps							
CH 1	2412	12.72	12.69	12.76	12.75	12.73	12.74	12.76	12.71
CH 6	2437	12.77							
CH 11	2462	12.76							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0							
CH 1	2412	11.74	11.72	11.85	11.86	11.82	11.84	11.80	11.84
CH 6	2437	11.87							
CH 11	2462	11.80							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0							
CH 3	2422	11.99	11.93	11.98	11.93	11.96	11.96	11.95	11.95
CH 6	2437	11.97							
CH 9	2452	11.96							

<5GHz WLAN>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	11.87	11.78	11.91	11.94	11.93	11.94	11.92	11.93
CH 40	5200	11.99							
CH 44	5220	11.80							
CH 48	5240	11.65							
CH 52	5260	11.55	11.96	11.95	11.91	11.93	11.93	11.96	11.94
CH 56	5280	11.96							
CH 60	5300	11.80							
CH 64	5320	11.97							
CH 100	5500	11.98	11.95	11.91	11.98	11.96	11.79	11.78	11.77
CH 104	5520	11.94							
CH 108	5540	11.79							
CH 112	5560	11.85							
CH 116	5580	11.61							
CH 120	5600	11.86							
CH 124	5620	11.78							
CH 128	5640	11.62							
CH 132	5660	11.97							
CH 136	5680	11.99							
CH 140	5700	11.80							
CH 144	5720	11.85							
CH 149	5745	11.68	11.81	11.80	11.79	11.80	11.82	11.79	11.81
CH 153	5765	11.82							
CH 157	5785	11.83							
CH 161	5805	11.81							
CH 165	5825	11.78							

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	11.97	11.95	11.93	11.91	11.95	11.96	11.92	11.95
CH 40	5200	11.93							
CH 44	5220	11.68							
CH 48	5240	11.56							
CH 52	5260	11.83	11.88	11.81	11.82	11.88	11.75	11.75	11.62
CH 56	5280	11.88							
CH 60	5300	11.54							
CH 64	5320	11.89							
CH 100	5500	11.60	11.96	11.93	11.95	11.96	11.83	11.90	11.90
CH 104	5520	11.98							
CH 108	5540	11.89							
CH 112	5560	11.86							
CH 116	5580	11.72							
CH 120	5600	11.98							
CH 124	5620	11.94							
CH 128	5640	11.65							
CH 132	5660	11.73							
CH 136	5680	11.65							
CH 140	5700	11.98							
CH 144	5720	11.97							
CH 149	5745	11.70	11.98	11.97	11.91	11.98	11.96	11.93	11.92
CH 153	5765	11.75							
CH 157	5785	11.73							
CH 161	5805	11.78							
CH 165	5825	11.99							

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	11.92	11.86	11.73	11.87	11.74	11.81	11.71	11.86
CH 46	5230	11.83							
CH 54	5270	11.77	11.88	11.90	11.93	11.96	11.94	11.95	11.96
CH 62	5310	11.97							
CH 102	5510	11.63	11.84	11.84	11.83	11.86	11.83	11.85	11.85
CH 110	5550	11.53							
CH 126	5630	11.52							
CH 134	5670	11.87							
CH 142	5710	11.58							
CH 151	5755	11.91	11.94	11.90	11.93	11.94	11.88	11.87	11.94
CH 159	5795	11.96							

WLAN 5GHz 802.11ac-VHT20 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 36	5180	11.91	11.85	11.78	11.80	11.88	11.69	11.64	11.74	11.75
CH 40	5200	11.64								
CH 44	5220	11.88								
CH 48	5240	11.89								
CH 52	5260	11.87	11.90	11.94	11.89	11.92	11.93	11.95	11.94	11.92
CH 56	5280	11.98								
CH 60	5300	11.88								
CH 64	5320	11.94								
CH 100	5500	11.85	11.88	11.87	11.84	11.80	11.83	11.78	11.81	11.87
CH 104	5520	11.74								
CH 108	5540	11.88								
CH 112	5560	11.96								
CH 116	5580	11.73								
CH 120	5600	11.90								
CH 124	5620	11.59								
CH 128	5640	11.73								
CH 132	5660	11.78								
CH 136	5680	11.61								
CH 140	5700	11.71								
CH 144	5720	11.96								
CH 149	5745	11.72	11.83	11.78	11.82	11.01	10.92	10.99	11.00	11.02
CH 153	5765	11.58								
CH 157	5785	11.85								
CH 161	5805	11.84								
CH 165	5825	11.56								

WLAN 5GHz 802.11ac-VHT40 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 38	5190	11.98	11.80	11.79	11.68	11.80	11.69	11.75	11.72	11.86	11.87
CH 46	5230	11.77									
CH 54	5270	11.72	11.73	11.75	11.65	11.71	11.76	11.72	11.74	11.73	11.72
CH 62	5310	11.78									
CH 102	5510	11.91	11.72	11.71	11.77	11.79	11.76	11.79	11.78	11.75	11.77
CH 110	5550	11.71									
CH 126	5630	11.63									
CH 134	5670	11.61									
CH 142	5710	11.86									
CH 151	5755	11.75	11.79	11.81	11.75	11.72	11.70	11.73	11.76	11.73	11.73
CH 159	5795	11.86									

WLAN 5GHz 802.11ac-VHT80 Average Power (dBm)											
Power vs. Channel			Power vs. MCS Index								
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 42	5210	11.75	11.71	11.69	11.74	11.72	11.54	11.58	11.55	11.62	11.53
CH 58	5290	11.78	11.75	11.51	11.75	11.71	11.70	11.74	11.72	11.68	11.73
CH 106	5530	11.75	11.73	11.71	11.82	11.81	11.83	11.81	11.72	11.84	11.83
CH 122	5610	11.54									
CH 138	5690	11.86									
CH 155	5775	11.66	11.59	11.51	11.65	11.60	11.62	11.64	11.64	11.64	11.61

14. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)	
	Bluetooth v3.0+EDR	Bluetooth v4.0+LE
2.4GHz Bluetooth	-1.0	-1.0

Note:

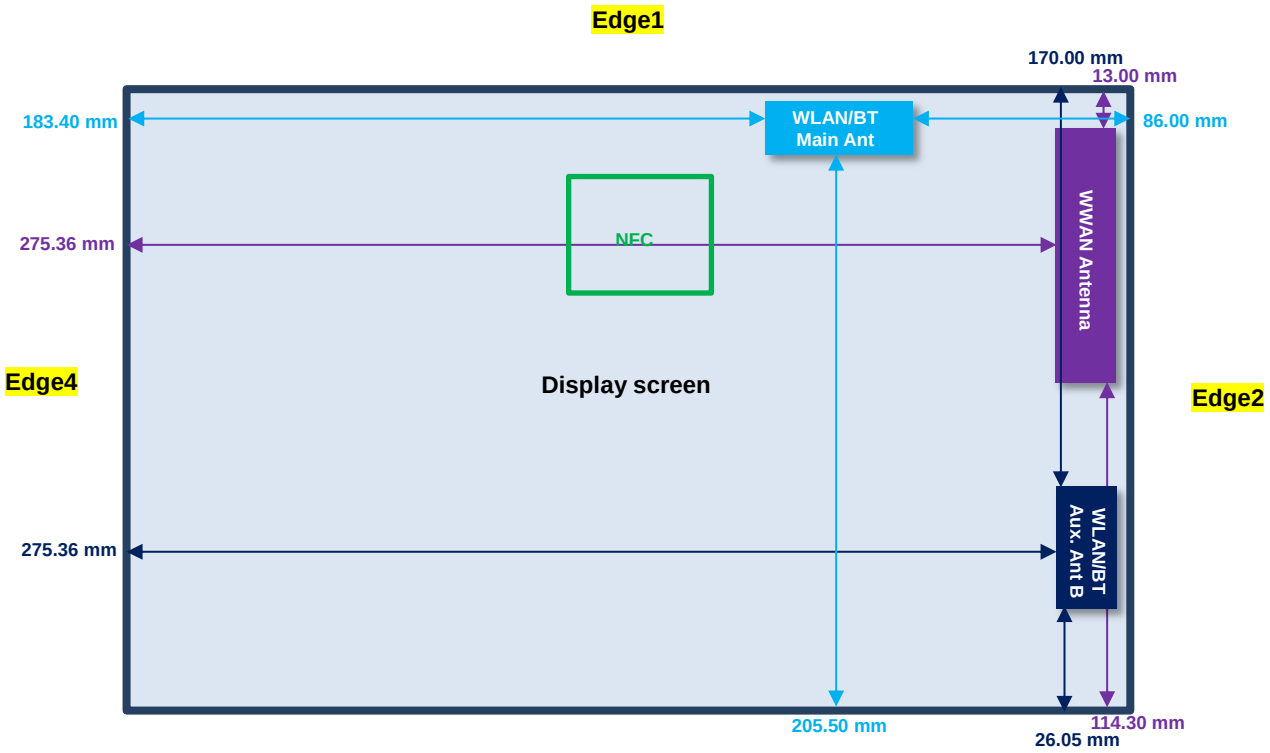
1. Per KDB 447498 D01v05r02, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
-1.0	< 5	2.48	0.31

Note:

Per KDB 447498 D01v05r02, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 0.31 which is <= 3, SAR testing is not required.

15. Antenna Location



Front View

<SAR test exclusion table>

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v05r02, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v05r02, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v05r02, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v05r02, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	GPRS 850 Class 11	GPRS 1900 Class 11	WCDMA Band V	WCDMA Band II	LTE Band 7	802.11b Main Ant	802.11b Aux Ant	802.11a Main Ant	802.11a Aux Ant
	Calculated Frequency	848MHz	1909MHz	846MHz	1907MHz	2570MHz	2462MHz	2462MHz	5825MHz	5825MHz
	Maximum power (dBm)	25.24	22.24	24	24	24	15	15	12	12
	Maximum rated power(mW)	334	167	251	251	251	32	32	16	16
Bottom Face	Separation distance(mm)	5.0					5.0	5.0	5.0	5.0
	exclusion threshold	62	46	46	69	80	10	10	8	8
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	13.00					5.0	170.0	5.0	170.0
	exclusion threshold	24	18	18	27	31	10	1296	8	1262
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Edge 2	Separation distance(mm)	5.0					86.0	5.0	86.0	5.0
	exclusion threshold	62	46	46	69	80	456	10	422	8
	Testing required?	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Edge 3	Separation distance(mm)	114.3					205.5	26.5	205.5	26.5
	exclusion threshold	526	752	526	752	737	1651	2	1617	1
	Testing required?	No	No	No	No	No	No	No	No	No
Edge 4	Separation distance(mm)	275.36					183.4	275.36	183.4	275.36
	exclusion threshold	1437	2362	1434	2362	2347	1430	2349	1396	2316
	Testing required?	No	No	No	No	No	No	No	No	No

16. 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. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in normal mode was performed; 1.2cm for bottom face.
4. Per KDB 941225 D01v03, for Body SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance, for modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested, therefore, the GMS850 GPRS 4Tx slots and GSM1900 GPRS 3Tx slots modes was selected when EUT operating without power back-off, the GPRS 3Tx slots were selected when EUT operating with power back-off, according to the highest source-based time-averaged output power.
5. Per KDB 941225 D01v03, SAR for Body exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
6. Per KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.
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. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

16.1 Body SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Power Reduction	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)	Bottom Face	0cm	ON	251	848.8	22.80	23.00	1.047	0.05	0.813	0.851
	GSM850	GPRS (4 Tx slots)	Bottom Face	0cm	ON	128	824.2	22.14	23.00	1.219	0.08	0.648	0.790
	GSM850	GPRS (4 Tx slots)	Bottom Face	0cm	ON	189	836.4	22.71	23.00	1.069	0.01	0.793	0.848
	GSM850	GPRS (3 Tx slots)	Bottom Face	1.2cm	OFF	251	848.8	29.49	29.50	1.002	-0.1	0.463	0.464
1	GSM850	GPRS (3 Tx slots)	Edge 1	0cm	OFF	251	848.8	29.49	29.50	1.002	-0.01	0.894	**0.896**
	GSM850	GPRS (3 Tx slots)	Edge 1	0cm	OFF	128	824.2	29.41	29.50	1.021	-0.16	0.871	0.889
	GSM850	GPRS (3 Tx slots)	Edge 1	0cm	OFF	189	836.4	29.35	29.50	1.035	-0.06	0.863	0.893
	GSM850	GPRS (3 Tx slots)	Edge 2	0cm	OFF	251	848.8	29.49	29.50	1.002	-0.07	0.285	0.286
2	GSM1900	GPRS (3 Tx slots)	Bottom Face	0cm	ON	661	1880	20.53	22.00	1.403	-0.03	0.785	**1.101**
	GSM1900	GPRS (3 Tx slots)	Bottom Face	0cm	ON	512	1850.2	20.16	22.00	1.528	-0.07	0.661	1.010
	GSM1900	GPRS (3 Tx slots)	Bottom Face	0cm	ON	810	1909.8	20.43	22.00	1.435	-0.02	0.755	1.084
	GSM1900	GPRS (3 Tx slots)	Bottom Face	1.2cm	OFF	661	1880	26.46	26.50	1.009	0.02	0.568	0.573
	GSM1900	GPRS (3 Tx slots)	Edge 1	0cm	OFF	661	1880	26.46	26.50	1.009	-0.07	0.038	0.038
	GSM1900	GPRS (3 Tx slots)	Edge 2	0cm	OFF	661	1880	26.46	26.50	1.009	-0.12	0.498	0.503

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Power Reduction	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	Bottom Face	0cm	ON	4132	826.4	18.70	19.00	1.072	0.06	0.777	0.833
	WCDMA V	RMC 12.2Kbps	Bottom Face	0cm	ON	4182	836.4	18.56	19.00	1.107	0.01	0.735	0.813
	WCDMA V	RMC 12.2Kbps	Bottom Face	0cm	ON	4233	846.6	18.41	19.00	1.146	0	0.702	0.804
	WCDMA V	RMC 12.2Kbps	Bottom Face	1.2cm	OFF	4132	826.4	23.90	24.00	1.023	-0.16	0.289	0.296
3	WCDMA V	RMC 12.2Kbps	Edge 1	0cm	OFF	4132	826.4	23.90	24.00	1.023	-0.02	0.836	**0.855**
	WCDMA V	RMC 12.2Kbps	Edge 1	0cm	OFF	4182	836.4	23.76	24.00	1.057	-0.03	0.608	0.643
	WCDMA V	RMC 12.2Kbps	Edge 1	0cm	OFF	4233	846.6	23.71	24.00	1.069	-0.04	0.615	0.657
	WCDMA V	RMC 12.2Kbps	Edge 2	0cm	OFF	4132	826.4	23.90	24.00	1.023	-0.09	0.314	0.321
	WCDMA II	RMC 12.2Kbps	Bottom Face	0cm	ON	9400	1880	15.43	16.00	1.140	-0.03	0.742	0.846
	WCDMA II	RMC 12.2Kbps	Bottom Face	0cm	ON	9262	1852.4	15.42	16.00	1.143	-0.02	0.594	0.679
	WCDMA II	RMC 12.2Kbps	Bottom Face	0cm	ON	9538	1907.6	15.33	16.00	1.167	-0.02	0.616	0.719
	WCDMA II	RMC 12.2Kbps	Bottom Face	1.2cm	OFF	9400	1880	23.97	24.00	1.007	-0.07	1.070	1.077
	WCDMA II	RMC 12.2Kbps	Bottom Face	1.2cm	OFF	9262	1852.4	23.92	24.00	1.019	-0.02	1.230	1.253
	WCDMA II	RMC 12.2Kbps	Bottom Face	1.2cm	OFF	9538	1907.6	23.71	24.00	1.069	0.04	0.984	1.052
	WCDMA II	RMC 12.2Kbps	Edge 1	0cm	OFF	9400	1880	23.97	24.00	1.007	-0.03	0.117	0.118
	WCDMA II	RMC 12.2Kbps	Edge 2	0cm	OFF	9400	1880	23.97	24.00	1.007	-0.12	1.190	1.198
4	WCDMA II	RMC 12.2Kbps	Edge 2	0cm	OFF	9262	1852.4	23.92	24.00	1.019	-0.04	1.310	**1.334**
	WCDMA II	RMC 12.2Kbps	Edge 2	0cm	OFF	9538	1907.6	23.71	24.00	1.069	-0.17	1.240	1.326

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (cm)	Power Reduction	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)
5	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	0cm	ON	21100	2535	12.51	13.00	1.119	0.07	0.854	**0.956**
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	0cm	ON	20850	2510	12.41	13.00	1.146	-0.09	0.618	0.708
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	0cm	ON	21350	2560	12.40	13.00	1.148	-0.03	0.783	0.899
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Face	0cm	ON	21100	2535	12.24	13.00	1.191	-0.04	0.730	0.870
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Face	0cm	ON	20850	2510	12.14	13.00	1.219	-0.02	0.528	0.644
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Face	0cm	ON	21350	2560	12.18	13.00	1.208	-0.02	0.762	0.920
	LTE Band 7	20M	QPSK	100RB	0offset	Bottom Face	0cm	ON	21100	2535	12.07	13.00	1.239	-0.01	0.638	0.790
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	1.2cm	OFF	20850	2510	23.76	24.00	1.057	0.08	0.783	0.827
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	1.2cm	OFF	21100	2535	23.43	24.00	1.140	-0.01	0.712	0.812
	LTE Band 7	20M	QPSK	1RB	0offset	Bottom Face	1.2cm	OFF	21350	2560	23.32	24.00	1.169	-0.04	0.796	0.931
	LTE Band 7	20M	QPSK	50RB	0offset	Bottom Face	1.2cm	OFF	20850	2510	22.42	23.00	1.143	0.11	0.608	0.695
	LTE Band 7	20M	QPSK	100RB	0offset	Bottom Face	1.2cm	OFF	20850	2510	22.21	23.00	1.199	-0.03	0.595	0.714
	LTE Band 7	20M	QPSK	1RB	0offset	Edge 1	0cm	OFF	20850	2510	23.76	24.00	1.057	-0.09	0.717	0.758
	LTE Band 7	20M	QPSK	50RB	0offset	Edge 1	0cm	OFF	20850	2510	22.42	23.00	1.143	0	0.516	0.590
	LTE Band 7	20M	QPSK	1RB	0offset	Edge 2	0cm	OFF	20850	2510	23.76	24.00	1.057	-0.03	0.904	0.955
	LTE Band 7	20M	QPSK	1RB	0offset	Edge 2	0cm	OFF	21100	2535	23.43	24.00	1.140	-0.11	0.734	0.837
	LTE Band 7	20M	QPSK	1RB	0offset	Edge 2	0cm	OFF	21350	2560	23.32	24.00	1.169	-0.05	0.759	0.888
	LTE Band 7	20M	QPSK	50RB	0offset	Edge 2	0cm	OFF	20850	2510	22.42	23.00	1.143	-0.09	0.639	0.730
	LTE Band 7	20M	QPSK	100RB	0offset	Edge 2	0cm	OFF	20850	2510	22.21	23.00	1.199	-0.06	0.613	0.735

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	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	Bottom Face	0cm	Main	6	2437	14.82	15.00	1.041	97.63	1.024	-0.02	0.693	0.739
	WLAN2.4GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	3	2422	11.99	12.00	1.002	76.19	1.313	0.01	0.400	0.526
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0cm	Main	6	2437	14.82	15.00	1.041	97.63	1.024	-0.07	0.094	0.100
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	6	2437	14.82	15.00	1.041	97.63	1.024	-0.17	1.090	1.162
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	1	2412	14.78	15.00	1.051	97.63	1.024	0.17	1.070	1.152
6	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	11	2462	14.81	15.00	1.044	97.63	1.024	-0.18	1.110	**1.186**
	WLAN2.4GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	3	2422	11.99	12.00	1.002	76.19	1.313	-0.01	0.472	0.621
	WLAN2.4GHz	802.11b 1Mbps	Edge 2	0cm	Aux	6	2437	14.82	15.00	1.041	97.63	1.024	0.04	0.039	0.042
7	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	40	5200	11.99	12.00	1.002	87.34	1.145	0.05	1.160	**1.331**
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	44	5220	11.8	12.00	1.047	87.34	1.145	-0.1	0.940	1.127
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	38	5190	11.92	12.00	1.018	76.19	1.313	-0.15	0.824	1.102
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	46	5230	11.83	12.00	1.040	76.19	1.313	-0.17	0.851	1.162
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	42	5210	11.75	12.00	1.059	54.67	1.829	-0.17	0.502	0.972
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	40	5200	11.99	12.00	1.002	87.34	1.145	0.04	0.179	0.205
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	40	5200	11.99	12.00	1.002	87.34	1.145	0.05	0.774	0.888
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	44	5220	11.8	12.00	1.047	87.34	1.145	-0.19	0.615	0.737
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	38	5190	11.92	12.00	1.018	76.19	1.313	-0.03	0.569	0.761
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	42	5210	11.75	12.00	1.059	54.67	1.829	-0.1	0.344	0.666
	WLAN5GHz	802.11a 6Mbps	Edge 2	0cm	Aux	40	5200	11.99	12.00	1.002	87.34	1.145	0.05	0.040	0.046

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	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)
8	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	64	5320	11.97	12.00	1.007	87.34	1.145	-0.17	1.170	**1.349**
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	56	5280	11.96	12.00	1.009	87.34	1.145	-0.19	1.160	1.340
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	62	5310	11.97	12.00	1.007	76.19	1.313	-0.12	0.925	1.223
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	54	5270	11.77	12.00	1.054	76.19	1.313	-0.1	0.917	1.269
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	58	5290	11.78	12.00	1.051	54.67	1.829	0.09	0.620	1.192
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	64	5320	11.97	12.00	1.007	87.34	1.145	0.173	0.186	0.214
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	64	5320	11.97	12.00	1.007	87.34	1.145	0.132	0.606	0.699
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	62	5310	11.97	12.00	1.007	76.19	1.313	0.03	0.410	0.542
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	58	5290	11.78	12.00	1.051	54.67	1.829	0.127	0.392	0.754
	WLAN5GHz	802.11a 6Mbps	Edge 2	0cm	Aux	64	5320	11.97	12.00	1.007	87.34	1.145	0.01	0.109	0.126
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	136	5680	11.99	12.00	1.002	87.34	1.145	-0.127	1.000	1.148
9	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	100	5500	11.98	12.00	1.005	87.34	1.145	-0.13	1.080	**1.242**
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	112	5560	11.85	12.00	1.035	87.34	1.145	-0.141	1.020	1.209
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	120	5600	11.86	12.00	1.033	87.34	1.145	-0.122	1.030	1.218
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	134	5670	11.87	12.00	1.030	76.19	1.313	-0.08	0.912	1.234
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	102	5510	11.63	12.00	1.089	76.19	1.313	-0.11	0.779	1.114
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	110	5550	11.53	12.00	1.114	76.19	1.313	-0.13	0.769	1.125
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	126	5630	11.52	12.00	1.117	76.19	1.313	-0.09	0.817	1.198
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	142	5710	11.58	12.00	1.102	76.19	1.313	-0.17	0.718	1.038
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	138	5690	11.86	12.00	1.033	54.67	1.829	-0.11	0.653	1.233
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	106	5530	11.75	12.00	1.059	54.67	1.829	-0.11	0.615	1.191
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	122	5610	11.54	12.00	1.111	54.67	1.829	-0.15	0.610	1.240
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	136	5680	11.99	12.00	1.002	87.34	1.145	-0.16	0.189	0.217
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	136	5680	11.99	12.00	1.002	87.34	1.145	0.14	0.659	0.756
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	100	5500	11.98	12.00	1.005	87.34	1.145	0.14	0.579	0.666
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	112	5560	11.85	12.00	1.035	87.34	1.145	0.08	0.634	0.751
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	120	5600	11.86	12.00	1.033	87.34	1.145	0.02	0.717	0.848
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	134	5670	11.87	12.00	1.030	76.19	1.313	0.07	0.603	0.816
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	102	5510	11.63	12.00	1.089	76.19	1.313	0.05	0.453	0.648
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	110	5550	11.53	12.00	1.114	76.19	1.313	0.01	0.487	0.712
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	126	5630	11.52	12.00	1.117	76.19	1.313	0.04	0.546	0.801
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	142	5710	11.58	12.00	1.102	76.19	1.313	0.06	0.574	0.830
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	138	5690	11.86	12.00	1.033	54.67	1.829	-0.04	0.376	0.710
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	106	5530	11.75	12.00	1.059	54.67	1.829	-0.06	0.349	0.676
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	122	5610	11.54	12.00	1.111	54.67	1.829	0.07	0.415	0.843
	WLAN5GHz	802.11a 6Mbps	Edge 2	0cm	Aux	136	5680	11.99	12.00	1.002	87.34	1.145	-0.09	0.118	0.135
10	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	157	5785	11.83	12.00	1.040	87.34	1.145	-0.09	0.958	**1.141**
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	153	5765	11.82	12.00	1.042	87.34	1.145	-0.08	0.903	1.078
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	161	5805	11.81	12.00	1.045	87.34	1.145	-0.1	0.895	1.071
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	159	5795	11.96	12.00	1.009	76.19	1.313	-0.07	0.723	0.958
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Main	151	5755	11.91	12.00	1.021	76.19	1.313	-0.15	0.621	0.832
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Main	155	5775	11.66	12.00	1.081	54.67	1.829	-0.05	0.480	0.949
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	157	5785	11.83	12.00	1.040	87.34	1.145	0.07	0.192	0.229
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	157	5785	11.83	12.00	1.040	87.34	1.145	-0.16	0.456	0.543
	WLAN5GHz	802.11n-HT40 MCS0	Bottom Face	0cm	Aux	159	5795	11.96	12.00	1.009	76.19	1.313	0.06	0.380	0.503
	WLAN5GHz	802.11ac-VHT80 MCS0	Bottom Face	0cm	Aux	155	5775	11.66	12.00	1.081	54.67	1.829	0.09	0.266	0.526
	WLAN5GHz	802.11a 6Mbps	Edge 2	0cm	Aux	157	5785	11.83	12.00	1.040	87.34	1.145	0.1	0.046	0.055

16.2 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (cm)	Power Reduction	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	GSM850	-	-	-	-	GPRS (3 Tx slots)	Edge 1	0cm	OFF	251	848.8	29.49	29.50	1.002	-0.01	0.894	-	0.896
2nd	GSM850	-	-	-	-	GPRS (3 Tx slots)	Edge 1	0cm	OFF	251	848.8	29.49	29.50	1.002	-0.11	0.878	1.02	0.880
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Edge 2	0cm	OFF	9262	1852.4	23.92	24.00	1.019	-0.04	1.310	-	1.334
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Edge 2	0cm	OFF	9262	1852.4	23.92	24.00	1.019	-0.1	1.300	1.01	1.324
1st	LTE Band 7	20M	QPSK	1RB	0offset	-	Edge 2	0cm	OFF	20850	2510	23.76	24.00	1.057	-0.03	0.904	-	0.955
2nd	LTE Band 7	20M	QPSK	1RB	0offset	-	Edge 2	0cm	OFF	20850	2510	23.76	24.00	1.057	-0.09	0.901	1.00	0.952

No.	Band	Mode	Test Position	Gap (cm)	Antenna	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)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	11	2462	14.81	15.00	1.044	97.63	1.024	-0.18	1.110	-	1.186
2nd	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	11	2462	14.81	15.00	1.044	97.63	1.024	-0.14	1.100	1.01	1.176
1st	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	40	5200	11.99	12.00	1.002	87.34	1.145	0.05	1.160	-	1.331
2nd	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	40	5200	11.99	12.00	1.002	87.34	1.145	-0.05	1.090	1.06	1.251
1st	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	64	5320	11.97	12.00	1.007	87.34	1.145	-0.17	1.170	-	1.349
2nd	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	64	5320	11.97	12.00	1.007	87.34	1.145	-0.126	1.020	1.15	1.176
1st	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	100	5500	11.98	12.00	1.005	87.34	1.145	-0.13	1.080	-	1.242
2nd	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	100	5500	11.98	12.00	1.005	87.34	1.145	-0.13	0.985	1.10	1.133
1st	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	157	5785	11.83	12.00	1.040	87.34	1.145	-0.09	0.958	-	1.141
2nd	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	157	5785	11.83	12.00	1.040	87.34	1.145	-0.03	0.912	1.05	1.086

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.

17. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Tablet	Note
		Body	
1.	GPRS/EDGE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
2.	WCDMA(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
3.	CDMA(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
4.	LTE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
5.	GPRS/EDGE(Data) + Bluetooth(data)	Yes	
6.	WCDMA(Data) + Bluetooth(data)	Yes	
7.	LTE(Data) + Bluetooth(data)	Yes	
8.	GPRS/EDGE(data) + WLAN5GHz(data)	No	
9.	WCDMA(data) + WLAN5GHz(data)	No	
10.	LTE(data) + WLAN5GHz(data)	No	

General Note:

1. For simultaneous transmission analysis for exposure position of bottom face 1.5cm, WLAN SAR tested at 0mm separation is worse and the test data is used for conservative SAR summation.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. 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.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. 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 17.2.
6. 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*)]·[$\sqrt{}$f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   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.

Bluetooth Max Power	Exposure Position	All Positions
-1.0 dBm	Estimated SAR (W/kg)	0.042 W/kg

17.1 Body Exposure Conditions

WWAN Band		Exposure Position	1 WWAN SAR (W/kg)	2 2.4GHz WLAN Main Antenna SAR (W/kg)	1+2 Summed SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Bottom Face at 1.2 cm	0.464	0.739	**1.20**		
		Bottom Face at 0cm	0.851	0.739	**1.59**		
		Edge1 at 0cm	0.896	0.100	**1.00**		
		Edge2 at 0cm	0.286		**0.29**		
	GSM1900	Bottom Face at 1.2 cm	0.573	0.739	**1.31**		
		Bottom Face at 0cm	1.101	0.739	**1.84**	0.02	Case 1
		Edge1 at 0cm	0.038	0.100	**0.14**		
		Edge2 at 0cm	0.503		**0.50**		
WCDMA	Band V	Bottom Face at 1.2 cm	0.296	0.739	**1.04**		
		Bottom Face at 0cm	0.833	0.739	**1.57**		
		Edge1 at 0cm	0.855	0.100	**0.96**		
		Edge2 at 0cm	0.321		**0.32**		
	Band II	Bottom Face at 1.2 cm	1.253	0.739	**1.99**	0.03	Case 2
		Bottom Face at 0cm	0.846	0.739	**1.59**		
		Edge1 at 0cm	0.118	0.100	**0.22**		
		Edge2 at 0cm	1.334		**1.33**		
LTE	Band 7	Bottom Face at 1.2 cm	0.931	0.739	**1.67**	0.02	Case 3
		Bottom Face at 0cm	0.956	0.739	**1.70**	0.02	Case 4
		Edge1 at 0cm	0.758	0.100	**0.86**		
		Edge2 at 0cm	0.955		**0.96**		

WWAN Band		Exposure Position	1 WWAN SAR (W/kg)	3 2.4GHz WLAN Aux Antenna SAR (W/kg)	1+3 Summed SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Bottom Face at 1.2 cm	0.464	1.186	**1.65**	0.02	Case 5
		Bottom Face at 0cm	0.851	1.186	**2.04**	0.02	Case 6
		Edge1 at 0cm	0.896		**0.90**		
		Edge2 at 0cm	0.286	0.042	**0.33**		
	GSM1900	Bottom Face at 1.2 cm	0.573	1.186	**1.76**	0.02	Case 7
		Bottom Face at 0cm	1.101	1.186	**2.29**	0.02	Case 8
		Edge1 at 0cm	0.038		**0.04**		
		Edge2 at 0cm	0.503	0.042	**0.55**		
WCDMA	Band V	Bottom Face at 1.2 cm	0.296	1.186	**1.48**		
		Bottom Face at 0cm	0.833	1.186	**2.02**	0.02	Case 9
		Edge1 at 0cm	0.855		**0.86**		
		Edge2 at 0cm	0.321	0.042	**0.36**		
	Band II	Bottom Face at 1.2 cm	1.253	1.186	**2.44**	0.03	Case 10
		Bottom Face at 0cm	0.846	1.186	**2.03**	0.02	Case 11
		Edge1 at 0cm	0.118		**0.12**		
		Edge2 at 0cm	1.334	0.042	**1.38**		
LTE	Band 7	Bottom Face at 1.2 cm	0.931	1.186	**2.12**	0.02	Case 12
		Bottom Face at 0cm	0.956	1.186	**2.14**	0.02	Case 13
		Edge1 at 0cm	0.758		**0.76**		
		Edge2 at 0cm	0.955	0.042	**1.00**		

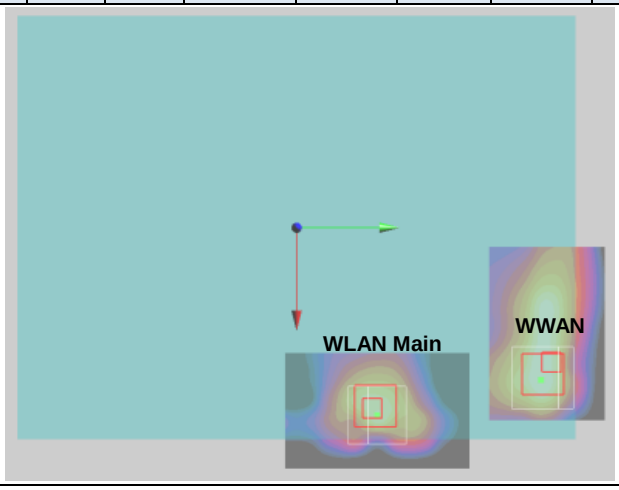
WWAN Band		Exposure Position	1	4	1+4 Summed SAR (W/kg)	SPLSR	Case No
			WWAN	2.4GHz Bluetooth			
			SAR (W/kg)	Estimated SAR (W/kg)			
GSM	GSM850	Bottom Face at 1.2 cm	0.464	0.042	**0.51**		
		Bottom Face at 0cm	0.851	0.042	**0.89**		
		Edge1 at 0cm	0.896	0.042	**0.94**		
		Edge2 at 0cm	0.286	0.042	**0.33**		
	GSM1900	Bottom Face at 1.2 cm	0.573	0.042	**0.62**		
		Bottom Face at 0cm	1.101	0.042	**1.14**		
		Edge1 at 0cm	0.038	0.042	**0.08**		
		Edge2 at 0cm	0.503	0.042	**0.55**		
WCDMA	Band V	Bottom Face at 1.2 cm	0.296	0.042	**0.34**		
		Bottom Face at 0cm	0.833	0.042	**0.88**		
		Edge1 at 0cm	0.855	0.042	**0.90**		
		Edge2 at 0cm	0.321	0.042	**0.36**		
	Band II	Bottom Face at 1.2 cm	1.253	0.042	**1.30**		
		Bottom Face at 0cm	0.846	0.042	**0.89**		
		Edge1 at 0cm	0.118	0.042	**0.16**		
		Edge2 at 0cm	1.334	0.042	**1.38**		
LTE	Band 7	Bottom Face at 1.2 cm	0.931	0.042	**0.97**		
		Bottom Face at 0cm	0.956	0.042	**1.00**		
		Edge1 at 0cm	0.758	0.042	**0.80**		
		Edge2 at 0cm	0.955	0.042	**1.00**		

17.2 SPLSR Evaluation and Analysis

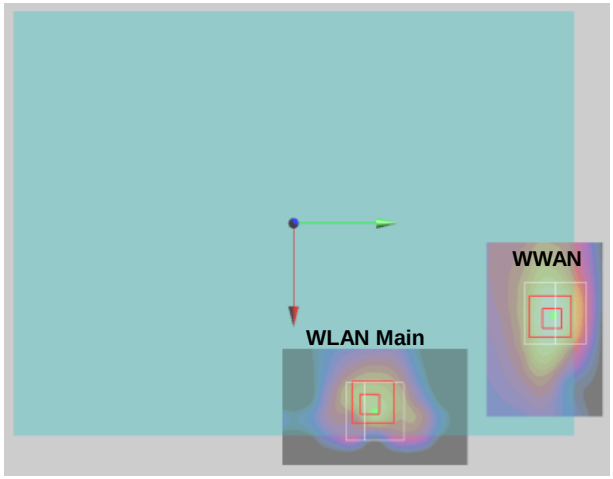
General Note:

1. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

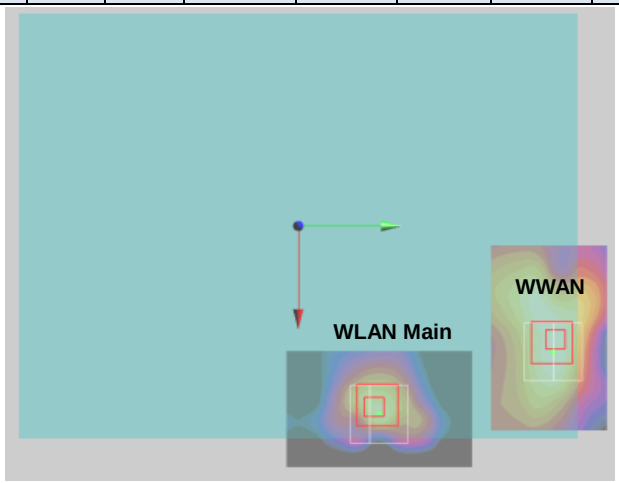
Case 1	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Bottom Face	1.101	0	0.07	0.136	-0.176	101.5	1.84	0.02	Not required
	2.4GHz_Main		0.739	0	0.0924	0.037	-0.177				



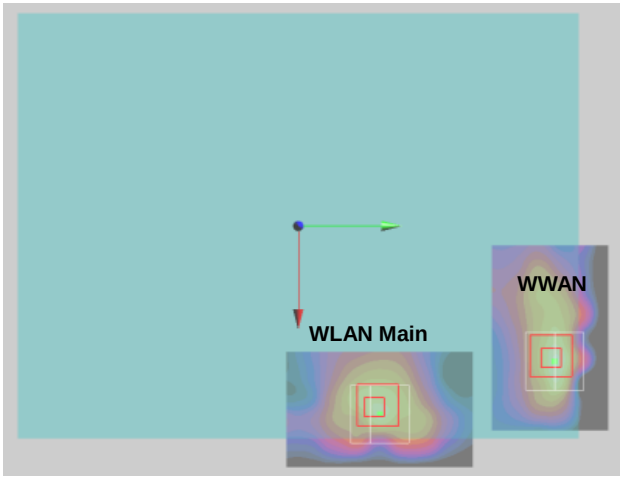
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 2	WCDMA II	Bottom Face	1.253	1.2	0.0465	0.136	-0.177	109.1	1.99	0.03	Not required
	2.4GHz_Main		0.739	0	0.0924	0.037	-0.177				



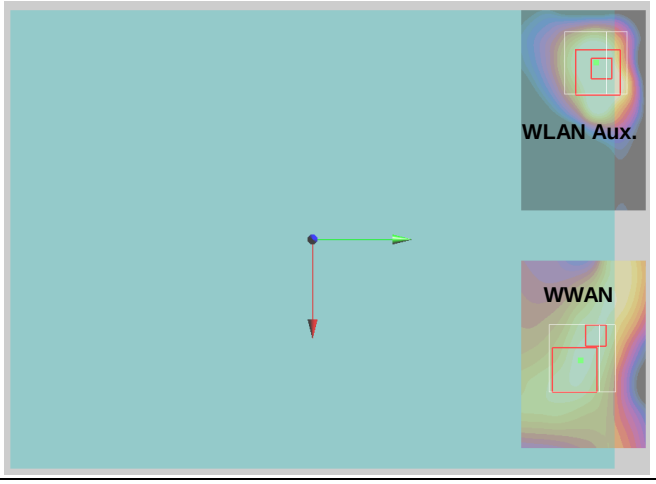
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 3	LTE Band 7	Bottom Face	0.931	1.2	0.0702	0.132	-0.178	97.6	1.67	0.02	Not required
	2.4GHz_Main		0.739	0	0.0924	0.037	-0.177				



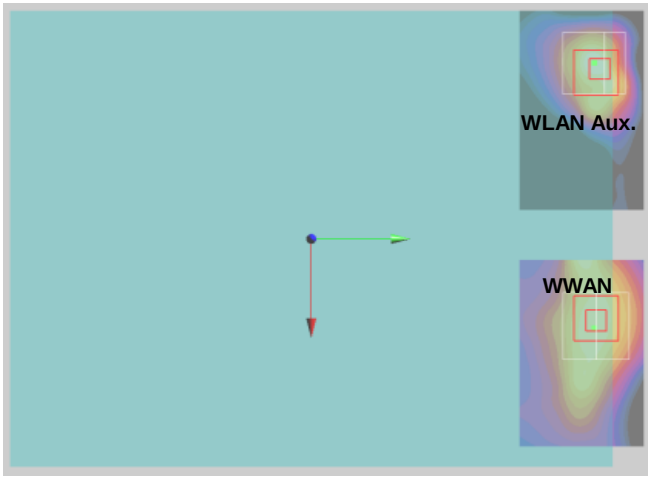
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 4	LTE Band 7	Bottom Face	0.956	0	0.07	0.132	-0.177	97.6	1.70	0.02	Not required
	2.4GHz_Main		0.739	0	0.0924	0.037	-0.177				



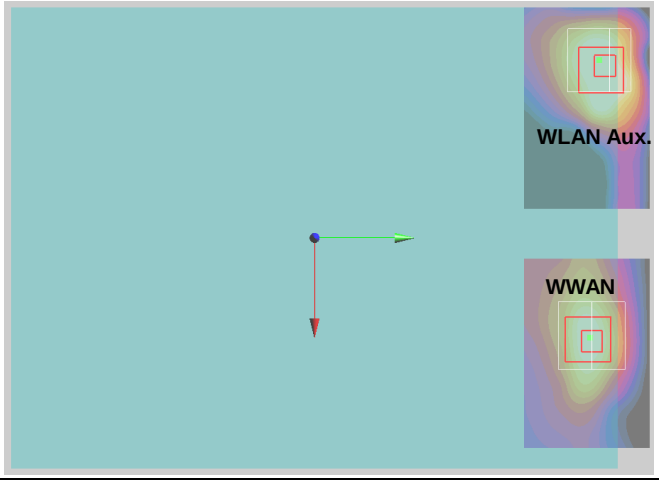
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 5	GSM850	Bottom Face	0.464	1.2	0.041	0.138	-0.178	125.9	1.65	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



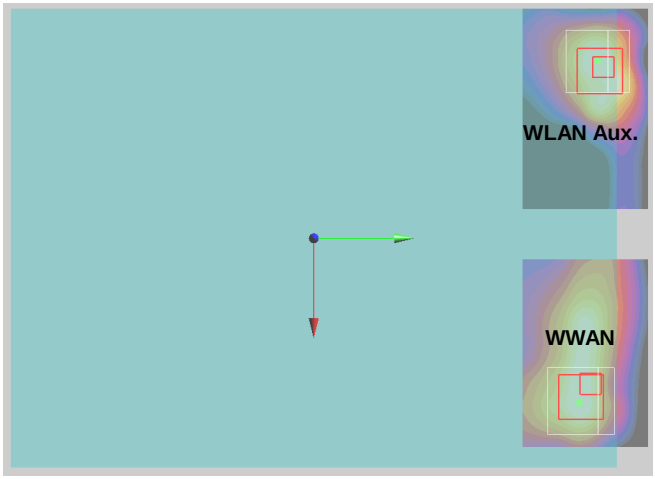
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 6	GSM850	Bottom Face	0.851	0	0.042	0.137	-0.178	126.9	2.04	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



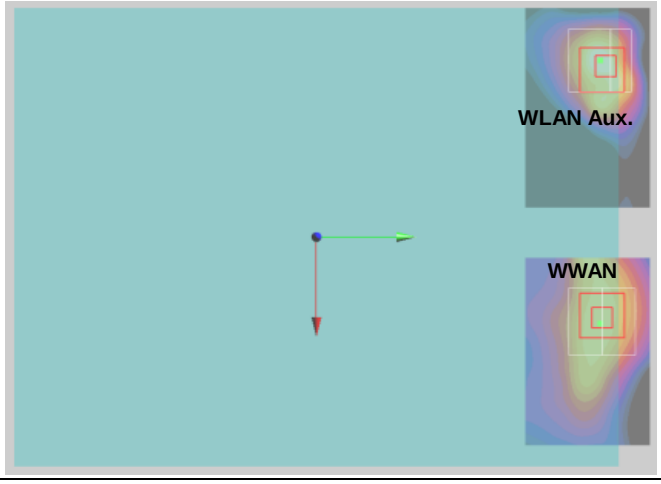
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 7	GSM1900	Bottom Face	0.573	1.2	0.0465	0.133	-0.177	131.5	1.76	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



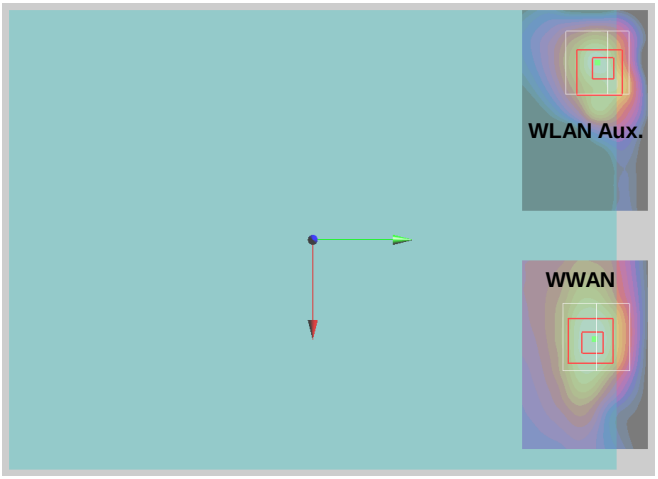
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 8	GSM1900	Bottom Face	1.101	0	0.07	0.136	-0.176	154.9	2.29	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



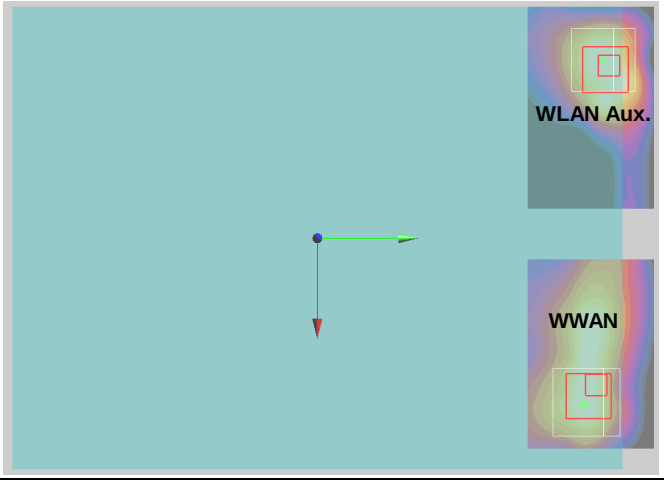
	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 9	WCDMA V	Bottom Face	0.833	0	0.0405	0.137	-0.177	125.4	2.02	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



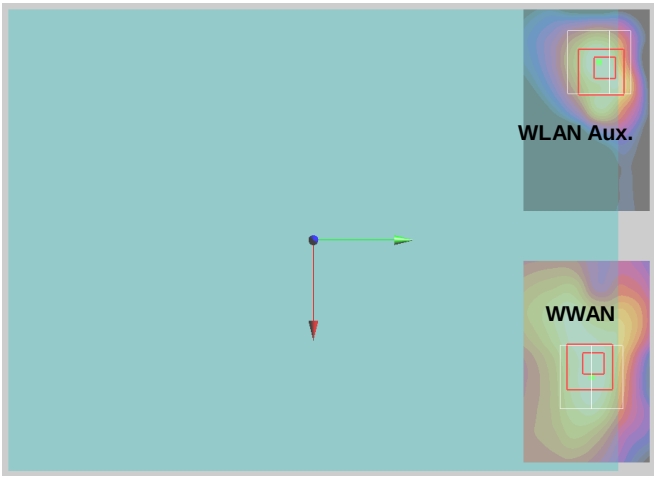
Case 10	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II	Bottom Face	1.253	1.2	0.0465	0.136	-0.177	131.4	2.44	0.03	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



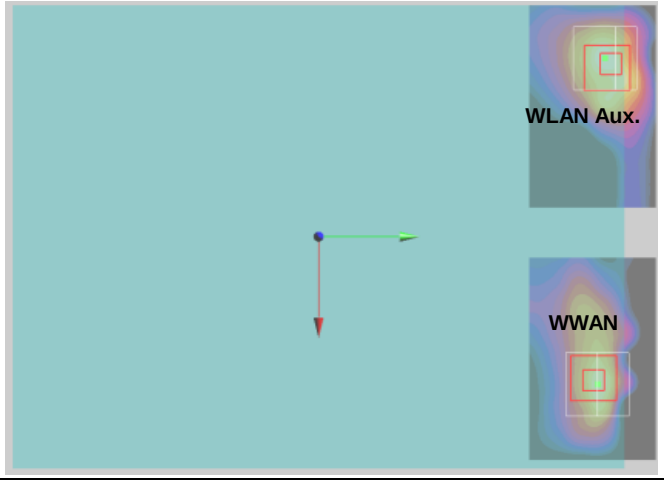
Case 11	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II	Bottom Face	0.846	0	0.07	0.136	-0.176	154.9	2.03	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



Case 12	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7	Bottom Face	0.931	1.2	0.0702	0.132	-0.178	155.3	2.12	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



Case 13	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7	Bottom Face	0.956	0	0.07	0.132	-0.177	155.1	2.14	0.02	Not required
	2.4GHz_Aux		1.186	0	-0.0848	0.141	-0.176				



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18. 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 18.1. 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 18.2. 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 18.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz

19. References

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

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[6] FCC KDB 447498 D01 v05r02, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Feb 2014

[7] FCC KDB 941225 D01 v03, “3G SAR MEAUREMENT PROCEDURES”, Oct 2014

[8] FCC KDB 941225 D05 v02r03, “SAR Evaluation Considerations for LTE Devices”, Dec 2013

[9] FCC KDB 616217 D04 v01r01, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, May 2013

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

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