

FCC SAR Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT1941-4, XT1941-1
FCC ID : IHDT56XK2
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: Mark Qu / Manager



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Table of Contents

1. Statement of Compliance	4
2. Administration Data	5
3. Guidance Applied.....	5
4. Equipment Under Test (EUT) Information.....	6
4.1 General Information	6
4.2 Specification of Accessory	7
4.3 General LTE SAR Test and Reporting Considerations	8
5. Proximity Sensor Triggering Test.....	10
5.1 Proximity sensor triggering distances(Per KDB616217§6.2)	10
6. RF Exposure Limits.....	13
6.1 Uncontrolled Environment.....	13
6.2 Controlled Environment.....	13
7. Specific Absorption Rate (SAR).....	14
7.1 Introduction	14
7.2 SAR Definition.....	14
8. System Description and Setup	15
8.1 E-Field Probe	16
8.2 Data Acquisition Electronics (DAE)	16
8.3 Phantom.....	17
8.4 Device Holder.....	18
9. Measurement Procedures	19
9.1 Spatial Peak SAR Evaluation	19
9.2 Power Reference Measurement.....	20
9.3 Area Scan	20
9.4 Zoom Scan.....	21
9.5 Volume Scan Procedures.....	21
9.6 Power Drift Monitoring.....	21
10. Test Equipment List.....	22
11. System Verification	23
11.1 Tissue Simulating Liquids	23
11.2 Tissue Verification	24
11.3 System Performance Check Results	25
12. RF Exposure Positions	26
12.1 Ear and handset reference point	26
12.2 Definition of the cheek position	27
12.3 Definition of the tilt position	28
12.4 Body Worn Accessory	29
12.5 Wireless Router.....	29
13. Conducted RF Output Power (Unit: dBm).....	30
14. Antenna Location	60
15. SAR Test Results	61
15.1 Head SAR	63
15.2 Hotspot SAR	66
15.3 Body Worn Accessory SAR.....	70
15.4 Repeated SAR Measurement	72
16. Simultaneous Transmission Analysis	73
16.1 Head Exposure Conditions	74
16.2 Hotspot Exposure Conditions.....	75
16.3 Body-Worn Accessory Exposure Conditions	76
17. Uncertainty Assessment	77
18. References	78
Appendix A. Plots of System Performance Check	
Appendix B. Plots of High SAR Measurement	
Appendix C. DASy Calibration Certificate	
Appendix D. Test Setup Photos	

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA860402-01	Rev. 01	Initial issue of report	Jul. 30, 2018

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Mobility LLC, Mobile Cellular Phone, XT1941-4, XT1941-1**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Hotspot (Separation 5mm)	Body-worn (Separation 5mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.17	0.62	0.62	1.41
		GSM1900	0.12	1.15	0.69	
	WCDMA	Band V	0.13	0.52	0.52	
		Band II	0.25	0.91	0.45	
	LTE	Band 5	0.18	0.69	0.69	
		Band 7	0.15	1.04	0.64	
		Band 41/38	<0.10	0.84	0.40	
DTS	WLAN	2.4GHz WLAN	1.06	0.52	0.52	1.30
NII		5GHz WLAN	0.64	0.52	0.62	1.41
DSS	2.4GHz Band	Bluetooth	0.18	0.10	0.10	1.41
Date of Testing:			2018/6/16 ~ 2018/7/3			
Remark: This device supports LTE B38 and B41. Since the supported frequency span for LTE B38 falls completely within the supports frequency span for LTE B41, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B41.						

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR) 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 1528-2013 and FCC KDB publications.

2. Administration Data

Testing Laboratory	
Test Site	Sporton International (Kunshan) Inc.
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958

Applicant	
Company Name	Motorola Mobility LLC
Address	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility LLC
Address	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

3. Guidance Applied

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 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT1941-4, XT1941-1
FCC ID	IHDT56XK2
IMEI Code	SIM1: 355541090013537 SIM2: 355541090013545
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2537.5 MHz ~ 2652.5 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 ~ 5720MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 Bluetooth BR/EDR/LE NFC:ASK
HW Version	DVT1B
SW Version	fastboot_deen_oem_userdebug_8.1.0_OPK28.26_f325_intcfg-test-keys_oem
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark: - This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation. - This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications. - This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only). - This device does not support DTM operation and supports GRPS/EGRPS mode up to multi-slot class 12. - The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA band II and LTE band 7/38/41 reduced power will be active for WWAN Bands and WLAN 5.2GHz/ 5.3GHz / 5.5GHz. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.) - When hotspot mode is enabled, power reduction will be activated to limit the maximum power of GSM1900, WCDMA band II, LTE band 7/38/41 for WWAN Bands and WLAN5.2GHz for WLAN. - This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power level for hotspot reduced power and P-sensor reduced power for this application. - There are two different types of EUT. They are dual SIM card mobile (XT1941-4) and single SIM card mobile (XT1941-1). It is special to declare. The others are the same including circuit design, PCB board, structure and all components. After pre-scan two types of EUT, we found test result of the sample that dual SIM was the worst, so we chose dual SIM card mobile to perform all tests.	

9. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.

4.2 Specification of Accessory

Specification of Accessory				
AC Adapter 1 (US)	Brand Name	Motorola(Salom)	Model Name	SC-51
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (EU)	Brand Name	Motorola(Salom)	Model Name	SC-52
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (UK)	Brand Name	Motorola(Salom)	Model Name	SC-53
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (IND)	Brand Name	Motorola(Salom)	Model Name	SC-54
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (AU)	Brand Name	Motorola(Salom)	Model Name	SC-55
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (AR)	Brand Name	Motorola(Salom)	Model Name	SC-56
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (BR)	Brand Name	Motorola(Salom)	Model Name	SC-57
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (PRC)	Brand Name	Motorola(Salom)	Model Name	SC-58
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 1 (Chile)	Brand Name	Motorola(Salom)	Model Name	SC-52
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (US)	Brand Name	Motorola(chenyang)	Model Name	SC-51
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (EU)	Brand Name	Motorola(chenyang)	Model Name	SC-52
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (UK)	Brand Name	Motorola(chenyang)	Model Name	SC-53
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (AU)	Brand Name	Motorola(chenyang)	Model Name	SC-55
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (AR)	Brand Name	Motorola(chenyang)	Model Name	SC-56
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
AC Adapter 2 (PRC)	Brand Name	Motorola(chenyang)	Model Name	SC-58
	Power Rating	I/P: 100 - 240 Vac, 0.6A, O/P: 5Vdc 3000mA; 9Vdc 2000mA; 12Vdc 1500mA		
Battery	Brand Name	Motorola	Model Name	JE40
	Power Rating	3.8Vdc, 2820mAh	Type	Li-ion
Earphone	Brand Name	Motorola (New Leader)	Model Name	NLD-EM307E-09SF
	Signal Line	1.2 meter, non-shielded cable, with w/o ferrite core		
USB Cable 1	Brand Name	Motorola(Liqi)	Model Name	LQ-03500079
	Signal Line	1.0 meter, non-shielded cable, with w/o ferrite core		
USB Cable 2	Brand Name	Motorola (Saibao)	Model Name	SLQ-A1111A
	Signal Line	1.0 meter, non-shielded cable, with w/o ferrite core		

4.3 General LTE SAR Test and Reporting Considerations

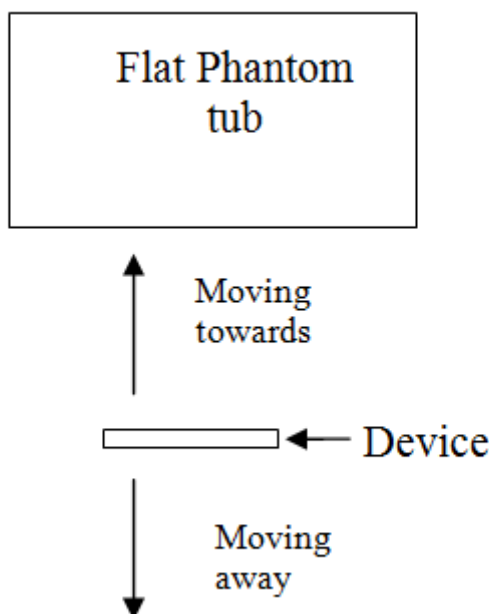
Summarized necessary items addressed in KDB 941225 D05 v02r05								
FCC ID	IHDT56XK2							
Equipment Name	Mobile Cellular Phone							
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2537.5 MHz ~ 2652.5 MHz							
Channel Bandwidth	LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz							
uplink modulations used	QPSK / 16QAM							
LTE Voice / Data requirements	Voice and Data							
LTE MPR permanently built-in by design	Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3							
	Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)
		1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
	256 QAM	≥ 1						≤ 5
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	1. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of LTE band 7/38/41. 2. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected LTE band 7/38/41 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.)							

LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 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
LTE Band 38								
	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	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610
LTE Band 41								
	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	40065	2537.5	40090	2540	40115	2542.5	40140	2545
M	40385	2569.5	40390	2570	40395	2570.5	40400	2571
M	40705	2601.5	40690	2600	40685	2599.5	40670	2598
H	41215	2652.5	41190	2650	41165	2647.5	41140	2645

5. Proximity Sensor Triggering Test

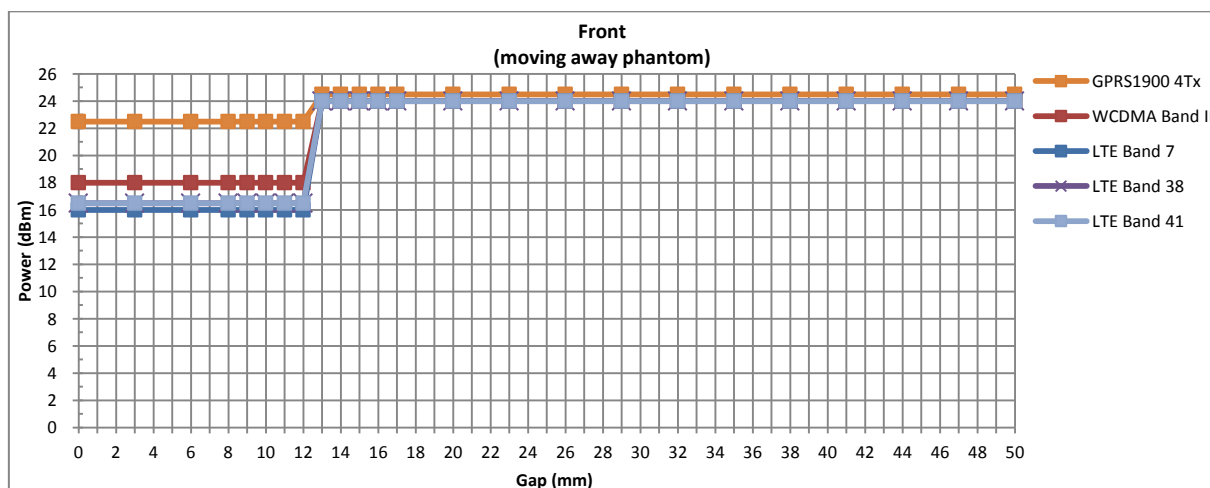
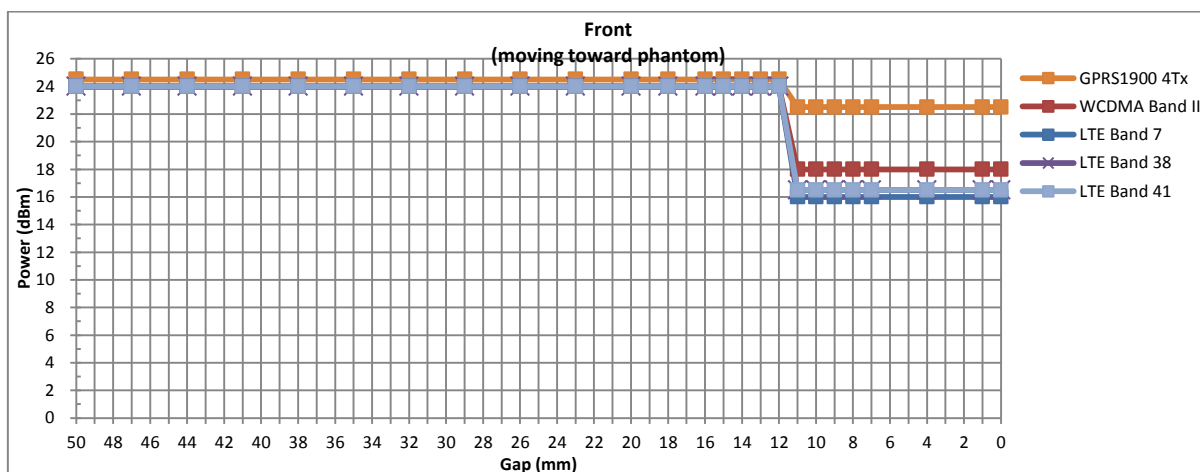
5.1 Proximity sensor triggering distances(Per KDB616217§6.2)

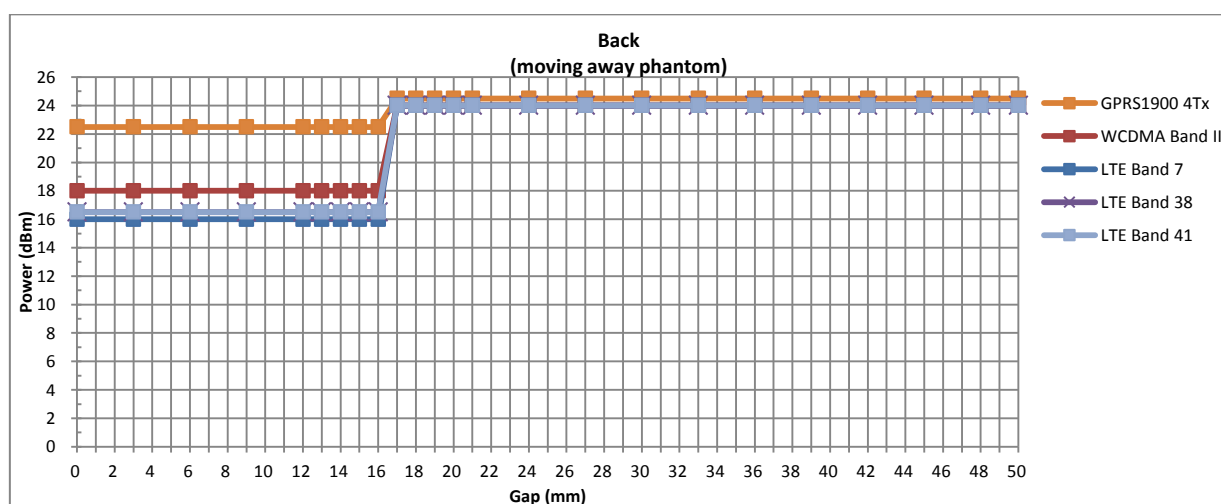
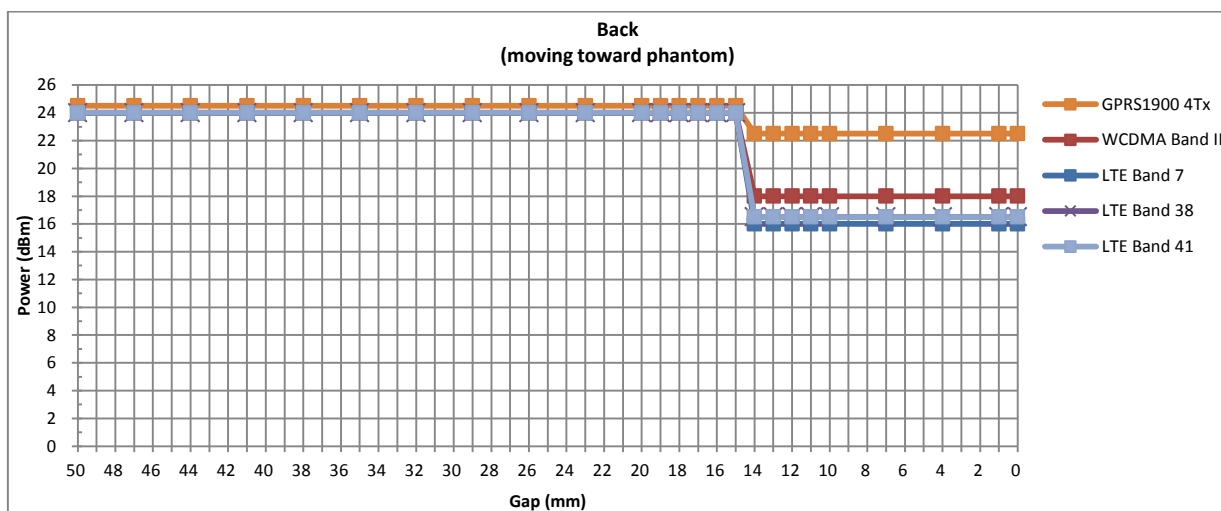
1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (2600MHz) and lowest (850MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body at the front or back of the device.
3. The sensors used to detect the proximity of the user's body (Body-worn condition) at the front or back surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s). When the sensor is active, GSM1900, WCDMA band II and LTE band 7/38/41 reduced power will be active.



Proximity Sensor Triggering Distance (mm)				
Position	Front		Back	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	11	12	14	16

<Sensor Trigger Distance and Measured Power>





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

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:

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

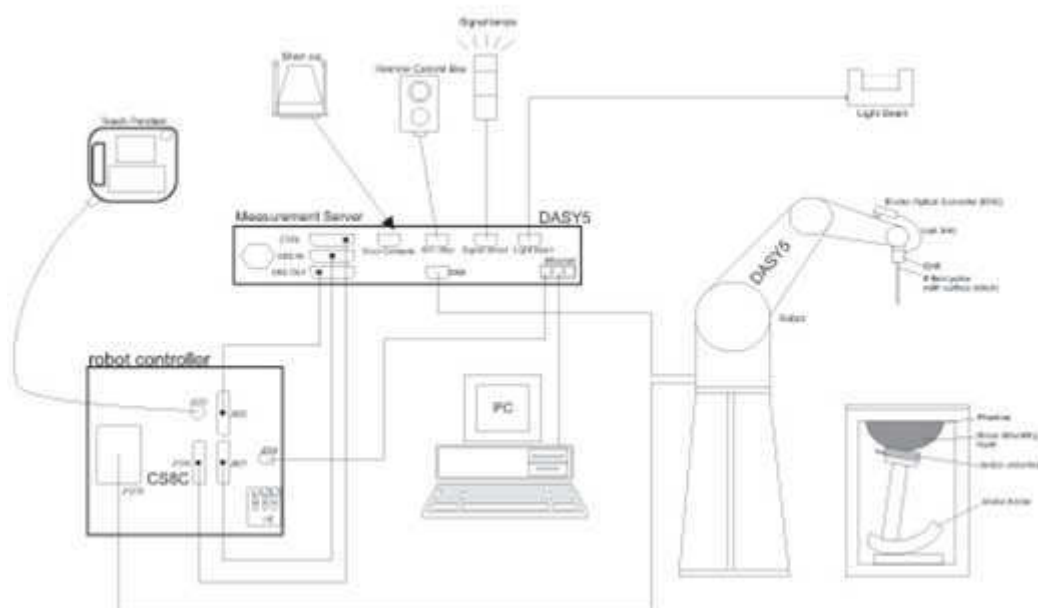
SAR is expressed in units of Watts per kilogram (W/kg)

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

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.

8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ± 0.2 dB (30 MHz – 6 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically <1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

8.2 Data Acquisition Electronics (DAE)

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

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

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 from 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 dB) 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 D01v01r04 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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
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 $\leq$ 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 to 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 whose 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 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> 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 to 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	4d091	2017/12/5	2018/12/4
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	2017/12/6	2018/12/5
SPEAG	2450MHz System Validation Kit	D2450V2	840	2017/12/7	2018/12/6
SPEAG	2600MHz System Validation Kit	D2600V2	1061	2017/12/7	2018/12/6
SPEAG	5000MHz System Validation Kit	D5GHzV2	1006	2017/9/26	2018/9/25
SPEAG	Data Acquisition Electronics	DAE4	1338	2017/12/4	2018/12/3
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	2018/1/31	2019/1/30
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1839	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1842	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201563814	2018/1/18	2019/1/17
Agilent	Wireless Communication Test Set	E5515C	MY52102706	2018/4/17	2019/4/16
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2018/4/17	2019/4/16
SPEAG	DAK Kit	DAK3.5	1146	2017/7/18	2018/7/17
R&S	Signal Generator	SML03	103818	2017/8/17	2018/8/16
Anritsu	Power Meter	ML2495A	1218006	2017/10/6	2018/10/5
Anritsu	Power Sensor	MA2411B	1207363	2017/10/6	2018/10/5
Anritsu	Power Meter	ML2495A	1349001	2017/7/19	2018/7/18
Anritsu	Power Sensor	MA2411B	1306099	2017/8/21	2018/8/20
R&S	CBT BLUETOOTH TESTER	CBT	100783	2017/8/8	2018/8/7
EXA	Spectrum Analyzer	FSV7	101742	2018/1/19	2019/1/18
Testo	Hygrometer	608-H1	1241332096	2017/8/21	2018/8/20
FLUKE	DIGITAC THERMOMETER	51II	97240029	2017/8/3	2018/8/2
ARRA	Power Divider	A3200-2	N/A	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
PASTERNAK	Dual Directional Coupler	PE2214-10	N/A	Note	
MCL	Attenuation1	BW-S10W5+	N/A	Note	
MCL	Attenuation2	BW-S10W5+	N/A	Note	
MCL	Attenuation3	BW-S10W5+	N/A	Note	
AR	Amplifier	5S1G4	333096	Note	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note	

Note: 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 Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.



Fig 11.1 Photo of Liquid Height for Head SAR



Fig 11.2 Photo of Liquid Height for Body SAR

11.2 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 (ϵ_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	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								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
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. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
835	Head	22.6	0.893	41.630	0.90	41.50	-0.78	0.31	±5	2018/6/16
1900	Head	22.6	1.428	41.105	1.40	40.00	2.00	2.76	±5	2018/6/18
2450	Head	22.7	1.846	39.011	1.80	39.20	2.56	-0.48	±5	2018/6/25
2600	Head	22.9	2.021	38.679	1.96	39.00	3.11	-0.82	±5	2018/6/18
5250	Head	22.6	4.565	36.009	4.71	35.90	-3.08	0.30	±5	2018/7/1
5600	Head	22.6	4.968	35.220	5.07	35.50	-2.01	-0.79	±5	2018/7/1
5750	Head	22.7	5.147	34.924	5.22	35.40	-1.40	-1.34	±5	2018/7/3
835	Body	22.8	0.984	56.510	0.97	55.20	1.44	2.37	±5	2018/6/17
1900	Body	22.7	1.537	53.469	1.52	53.30	1.12	0.32	±5	2018/6/16
2450	Body	22.7	2.021	53.033	1.95	52.70	3.64	0.63	±5	2018/6/25
2600	Body	22.7	2.231	52.422	2.16	52.50	3.29	-0.15	±5	2018/6/23
5250	Body	22.6	5.549	47.004	5.36	48.90	3.53	-3.88	±5	2018/6/25
5600	Body	22.6	6.014	46.382	5.77	48.50	4.23	-4.37	±5	2018/6/24
5750	Body	22.7	6.226	46.158	5.94	48.30	4.81	-4.43	±5	2018/6/26

11.3 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 (%)
2018/6/16	835	Head	250	4d091	3954	1338	2.37	9.48	9.48	0.00
2018/6/18	1900	Head	250	5d118	3954	1338	9.78	39.70	39.12	-1.46
2018/6/25	2450	Head	250	840	3954	1338	12.80	52.60	51.20	-2.66
2018/6/18	2600	Head	250	1061	3954	1338	14.30	58.20	57.20	-1.72
2018/7/1	5250	Head	100	1006	3954	1338	7.36	78.30	73.60	-6.00
2018/7/1	5600	Head	100	1006	3954	1338	8.06	85.00	80.60	-5.18
2018/7/3	5750	Head	100	1006	3954	1338	8.04	78.50	80.40	2.42
2018/6/17	835	Body	250	4d091	3954	1338	2.50	9.72	10.00	2.88
2018/6/16	1900	Body	250	5d118	3954	1338	10.10	40.40	40.40	0.00
2018/6/25	2450	Body	250	840	3954	1338	12.60	51.90	50.40	-2.89
2018/6/23	2600	Body	250	1061	3954	1338	14.70	56.40	58.80	4.26
2018/6/25	5250	Body	100	1006	3954	1338	7.97	77.00	79.70	3.51
2018/6/24	5600	Body	100	1006	3954	1338	7.94	80.10	79.40	-0.87
2018/6/26	5750	Body	100	1006	3954	1338	7.94	75.10	79.40	5.73

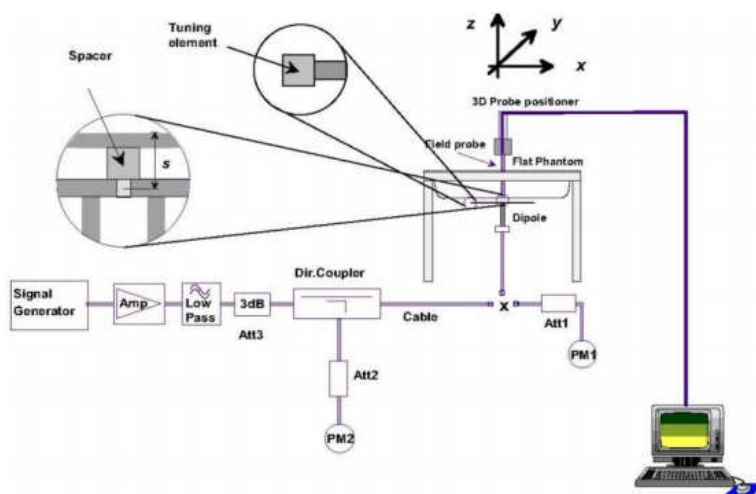


Fig 11.3.1 System Performance Check Setup



Fig 11.3.2 Setup Photo

12. RF Exposure Positions

12.1 Ear and handset reference point

Figure 12.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled "M," the left ear reference point (ERP) is marked "LE," and the right ERP is marked "RE." Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 12.1.2. The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 12.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 12.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

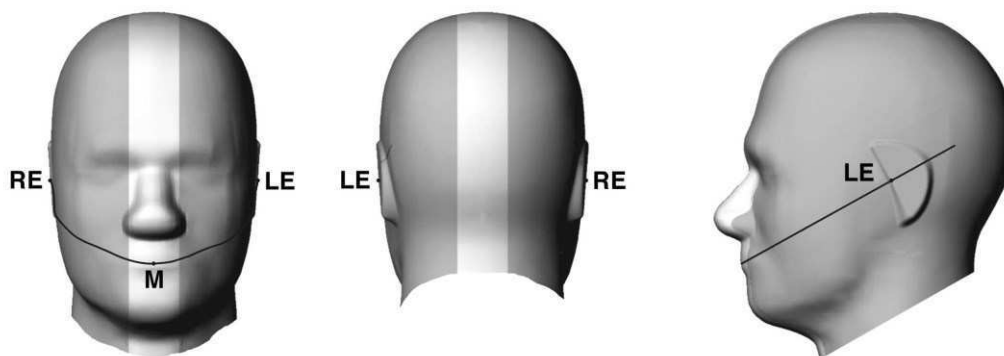


Fig 12.1.1 Front, back, and side views of SAM twin phantom

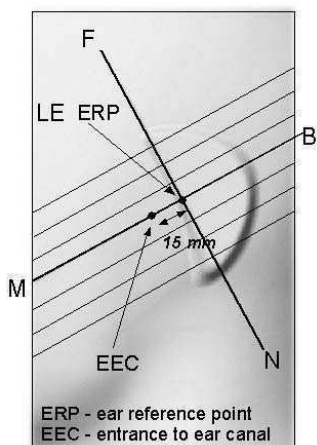


Fig 12.1.2 Close-up side view of phantom showing the ear region.

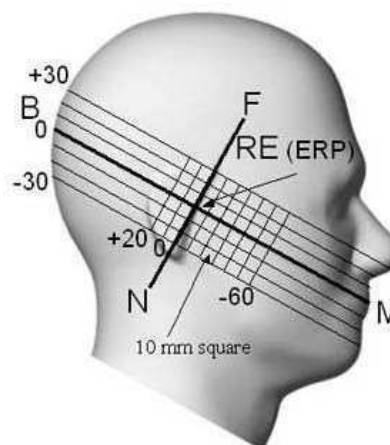


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 12.2.1 and Figure 12.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 12.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 12.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 12.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 12.2.3. The actual rotation angles should be documented in the test report.

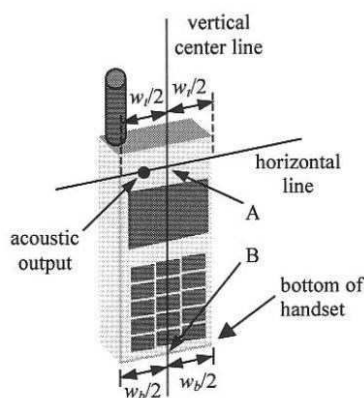


Fig 12.2.1 Handset vertical and horizontal reference lines—"fixed case"

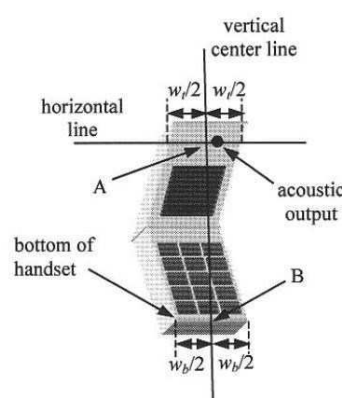


Fig 12.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

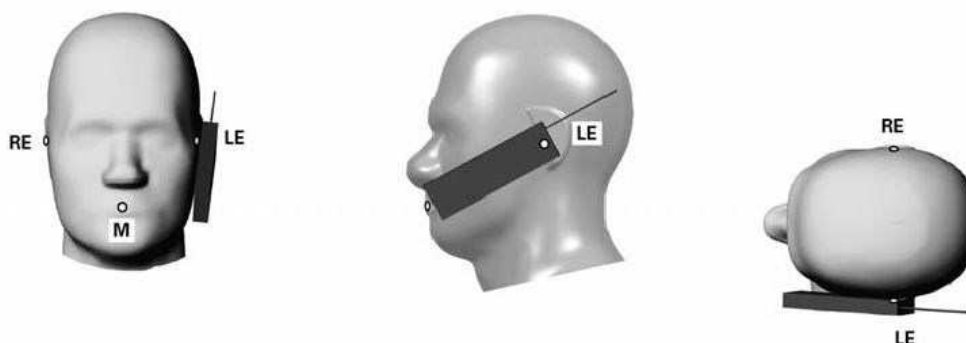


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 12.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point



Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 12.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is $> 1.2 \text{ W/kg}$, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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

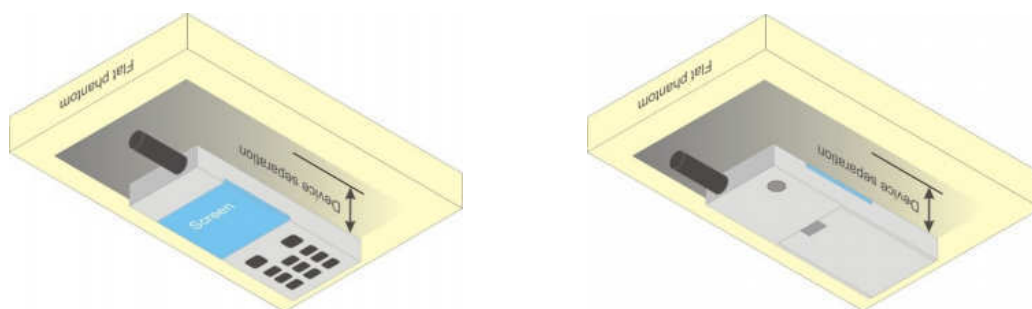


Fig 12.4 Body Worn Position

12.5 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

13. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

General Note:

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode
4. Power reduction which is triggered by hotspot mode/P-Sensor is implemented in GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4 Tx slots for GSM1900, due to its highest frame-average power.

<Full Power Mode>

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
TX Channel	824.2	836.4	848.8		824.2	836.4	848.8	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.40	32.45	32.60	33.50	23.40	23.45	23.60	24.50
GPRS 1 Tx slot	32.39	32.44	32.59	33.50	23.39	23.44	23.59	24.50
GPRS 2 Tx slots	29.36	29.47	29.52	30.50	23.36	23.47	23.52	24.50
GPRS 3 Tx slots	27.56	27.66	27.68	28.75	23.30	23.40	23.42	24.49
GPRS 4 Tx slots	26.30	26.40	26.43	27.50	23.30	23.40	23.43	24.50
EDGE 1 Tx slot	26.30	26.35	26.31	28.00	17.30	17.35	17.31	19.00
EDGE 2 Tx slots	26.27	26.29	26.25	28.00	20.27	20.29	20.25	22.00
EDGE 3 Tx slots	25.19	25.20	25.20	26.25	20.93	20.94	20.94	21.99
EDGE 4 Tx slots	23.81	23.85	23.87	25.00	20.81	20.85	20.87	22.00
GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	1850.2	1880	1909.8		1850.2	1880	1909.8	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.03	29.10	28.93	30.50	20.03	20.10	19.93	21.50
GPRS 1 Tx slot	29.02	29.08	28.92	30.50	20.02	20.08	19.92	21.50
GPRS 2 Tx slots	26.03	26.08	26.15	27.50	20.03	20.08	20.15	21.50
GPRS 3 Tx slots	24.20	24.27	23.93	25.75	19.94	20.01	19.67	21.49
GPRS 4 Tx slots	22.78	22.84	22.62	24.50	19.78	19.84	19.62	21.50
EDGE 1 Tx slot	25.20	25.05	25.12	27.00	16.20	16.05	16.12	18.00
EDGE 2 Tx slots	25.12	25.00	25.00	27.00	19.12	19.00	19.00	21.00
EDGE 3 Tx slots	23.73	23.57	23.44	25.25	19.47	19.31	19.18	20.99
EDGE 4 Tx slots	22.34	22.24	22.07	24.00	19.34	19.24	19.07	21.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<Reduced Power Mode for Hotspot On/P-Sensor On>

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
TX Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	27.13	27.22	27.41	28.50	18.13	18.22	18.41	19.50
GPRS 1 Tx slot	27.14	27.23	27.43	28.50	18.14	18.23	18.43	19.50
GPRS 2 Tx slots	24.16	24.19	24.30	25.50	18.16	18.19	18.30	19.50
GPRS 3 Tx slots	22.36	22.34	22.48	23.75	18.10	18.08	18.22	19.49
GPRS 4 Tx slots	20.85	20.95	20.90	22.50	17.85	17.95	17.90	19.50
EDGE 1 Tx slot	23.50	23.45	23.50	25.00	14.50	14.45	14.50	16.00
EDGE 2 Tx slots	23.42	23.35	23.42	25.00	17.42	17.35	17.42	19.00
EDGE 3 Tx slots	21.54	21.44	21.49	23.25	17.28	17.18	17.23	18.99
EDGE 4 Tx slots	20.02	20.01	20.05	22.00	17.02	17.01	17.05	19.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<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 D01v03r01 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} (Note 1, 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 $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. 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 $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$. Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPCCH, DPDCCH 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 $\beta_c = 11/15$ and $\beta_d = 15/15$.							

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} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.

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

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

Note 4: 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 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

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: $\beta_c/\beta_d=2/15$
 - b). Subtest 2: $\beta_c/\beta_d=12/15$
 - c). Subtest 3: $\beta_c/\beta_d=15/8$
 - d). Subtest 4: $\beta_c/\beta_d=15/4$
 - 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	Processes	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.		

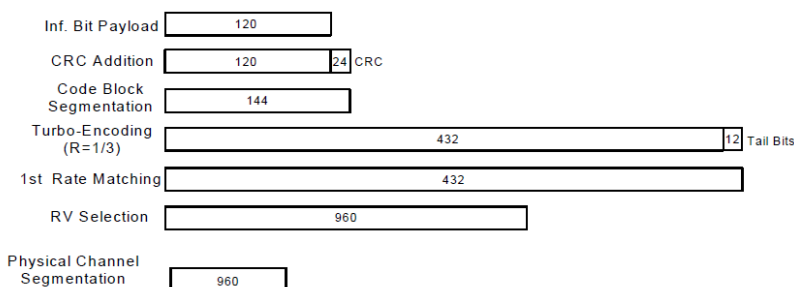


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>
General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is $\leq \frac{1}{4}$ 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, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

<Full Power Mode>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.30	23.35	23.45	24.00	23.62	23.48	23.40	24.00
3GPP Rel 99	RMC 12.2Kbps	23.31	23.38	23.46	24.00	23.63	23.50	23.41	24.00
3GPP Rel 6	HSDPA Subtest-1	21.87	21.86	21.95	23.00	22.38	22.33	22.24	23.00
3GPP Rel 6	HSDPA Subtest-2	21.80	21.94	22.07	23.00	22.44	22.37	22.33	23.00
3GPP Rel 6	HSDPA Subtest-3	21.38	21.46	21.61	22.50	22.03	21.89	21.86	22.50
3GPP Rel 6	HSDPA Subtest-4	21.35	21.46	21.61	22.50	22.01	21.90	21.87	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.85	21.89	21.92	23.00	22.17	22.31	22.21	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.82	21.88	22.10	23.00	22.35	22.35	22.27	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.28	21.39	21.58	22.50	22.01	21.81	21.78	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.36	21.45	21.54	22.50	22.05	21.89	21.81	22.50
3GPP Rel 6	HSUPA Subtest-1	21.81	21.95	21.89	23.00	22.57	22.27	22.28	23.00
3GPP Rel 6	HSUPA Subtest-2	19.94	20.03	19.98	21.00	20.55	20.31	20.31	21.00
3GPP Rel 6	HSUPA Subtest-3	20.92	20.99	21.04	22.00	21.47	21.28	21.30	22.00
3GPP Rel 6	HSUPA Subtest-4	19.92	20.02	20.10	21.00	20.54	20.29	20.30	21.00
3GPP Rel 6	HSUPA Subtest-5	21.90	22.00	22.00	23.00	22.50	22.20	22.20	23.00

<Reduced Power Mode for Hotspot On/P-Sensor On>

Band		WCDMA Band II			Tune-up Limit (dBm)
TX Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	17.24	17.30	17.37	18.00
3GPP Rel 99	RMC 12.2Kbps	17.25	17.31	17.39	18.00
3GPP Rel 6	HSDPA Subtest-1	16.19	16.04	16.22	17.00
3GPP Rel 6	HSDPA Subtest-2	16.24	16.08	16.23	17.00
3GPP Rel 6	HSDPA Subtest-3	15.72	15.58	15.74	16.50
3GPP Rel 6	HSDPA Subtest-4	15.70	15.57	15.74	16.50
3GPP Rel 8	DC-HSDPA Subtest-1	16.18	16.08	16.21	17.00
3GPP Rel 8	DC-HSDPA Subtest-2	16.25	16.05	16.18	17.00
3GPP Rel 8	DC-HSDPA Subtest-3	15.68	15.51	15.74	16.50
3GPP Rel 8	DC-HSDPA Subtest-4	15.65	15.48	15.63	16.50
3GPP Rel 6	HSUPA Subtest-1	16.98	16.92	16.89	17.00
3GPP Rel 6	HSUPA Subtest-2	14.89	14.81	14.80	15.00
3GPP Rel 6	HSUPA Subtest-3	15.62	15.69	15.59	16.00
3GPP Rel 6	HSUPA Subtest-4	14.34	14.33	14.29	15.00
3GPP Rel 6	HSUPA Subtest-5	16.20	16.10	16.20	17.00

<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 D05v02r05, 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 D05v02r05, 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 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, 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 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ 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 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B5 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 38 SAR test was covered by Band 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

<Full Power Mode>

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	22.73	22.96	22.79	24	0
10	QPSK	1	25	23.03	22.88	22.89		
10	QPSK	1	49	23.23	22.96	22.80		
10	QPSK	25	0	22.00	22.07	22.01	23	1
10	QPSK	25	12	22.15	22.08	21.98		
10	QPSK	25	25	22.02	22.08	22.08		
10	QPSK	50	0	22.08	22.05	22.08	23	1
10	16QAM	1	0	22.19	21.92	21.92		
10	16QAM	1	25	22.09	21.72	21.80		
10	16QAM	1	49	22.20	22.51	21.92	22	2
10	16QAM	25	0	20.91	21.07	21.00		
10	16QAM	25	12	21.01	21.08	21.05		
10	16QAM	25	25	20.92	20.91	21.06	22	2
10	16QAM	50	0	21.00	21.05	20.95		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.85	22.89	22.70	24	0
5	QPSK	1	12	23.03	22.97	23.04		
5	QPSK	1	24	22.93	22.68	22.84		
5	QPSK	12	0	22.08	21.88	22.07	23	1
5	QPSK	12	7	22.04	22.10	22.10		
5	QPSK	12	13	22.15	22.06	22.02		
5	QPSK	25	0	22.11	22.11	21.99	23	1
5	16QAM	1	0	21.82	21.69	21.65		
5	16QAM	1	12	22.40	21.80	22.14		
5	16QAM	1	24	22.06	21.89	21.66	22	2
5	16QAM	12	0	21.28	20.80	21.16		
5	16QAM	12	7	21.15	20.88	21.19		
5	16QAM	12	13	21.08	20.90	21.02	22	2
5	16QAM	25	0	21.35	21.03	21.21		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.84	22.87	22.94	24	0
3	QPSK	1	8	23.17	22.98	23.22		
3	QPSK	1	14	22.94	22.89	23.15		
3	QPSK	8	0	22.17	22.05	22.00	23	1
3	QPSK	8	4	22.12	22.09	22.02		
3	QPSK	8	7	22.10	22.08	22.02		
3	QPSK	15	0	22.13	22.11	22.05		
3	16QAM	1	0	21.82	22.29	21.73	23	1
3	16QAM	1	8	21.84	21.39	21.67		
3	16QAM	1	14	21.85	21.98	21.86		
3	16QAM	8	0	21.24	20.81	21.25	22	2
3	16QAM	8	4	21.19	20.88	21.06		
3	16QAM	8	7	20.80	20.83	21.07		
3	16QAM	15	0	20.99	20.79	21.25		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.94	23.06	22.93	24	0
1.4	QPSK	1	3	22.78	23.04	23.00		
1.4	QPSK	1	5	23.14	22.81	22.78		
1.4	QPSK	3	0	23.20	23.20	23.04		
1.4	QPSK	3	1	23.18	23.21	23.06		
1.4	QPSK	3	3	23.16	23.03	23.14		
1.4	QPSK	6	0	22.11	22.02	21.91	23	1
1.4	16QAM	1	0	21.89	21.85	22.45	23	1
1.4	16QAM	1	3	21.89	21.93	22.48		
1.4	16QAM	1	5	21.89	21.67	22.43		
1.4	16QAM	3	0	22.02	21.75	21.92		
1.4	16QAM	3	1	22.04	21.79	21.91		
1.4	16QAM	3	3	22.08	22.15	21.94		
1.4	16QAM	6	0	20.88	20.92	20.79	22	2

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.78	23.08	23.18	24	0
20	QPSK	1	49	22.96	23.07	23.60		
20	QPSK	1	99	22.83	22.96	23.35		
20	QPSK	50	0	21.99	21.97	22.59	23	1
20	QPSK	50	24	22.01	22.17	22.61		
20	QPSK	50	50	21.98	22.22	22.60		
20	QPSK	100	0	21.98	22.21	22.58		
20	16QAM	1	0	21.63	21.89	22.22	23	1
20	16QAM	1	49	21.67	21.97	22.27		
20	16QAM	1	99	21.56	22.02	22.27		
20	16QAM	50	0	21.05	20.98	21.55	22	2
20	16QAM	50	24	21.03	21.20	21.64		
20	16QAM	50	50	20.90	21.17	21.40		
20	16QAM	100	0	20.96	21.12	21.43		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.00	23.25	23.59	24	0
15	QPSK	1	37	23.10	23.34	23.50		
15	QPSK	1	74	23.07	23.05	23.53		
15	QPSK	36	0	22.04	22.12	22.69	23	1
15	QPSK	36	20	21.93	22.25	22.61		
15	QPSK	36	39	21.94	22.27	22.60		
15	QPSK	75	0	22.02	22.22	22.62		
15	16QAM	1	0	21.86	22.07	22.48	23	1
15	16QAM	1	37	21.64	22.02	22.33		
15	16QAM	1	74	21.93	22.03	22.39		
15	16QAM	36	0	20.97	20.98	21.60	22	2
15	16QAM	36	20	20.90	21.04	21.55		
15	16QAM	36	39	20.81	21.20	21.41		
15	16QAM	75	0	21.10	21.15	21.48		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	23.07	22.85	23.48	24	0
10	QPSK	1	25	22.80	23.07	23.57		
10	QPSK	1	49	22.95	23.09	23.50		
10	QPSK	25	0	21.98	22.29	22.96	23	1
10	QPSK	25	12	22.03	22.24	22.62		
10	QPSK	25	25	21.98	22.24	22.97		
10	QPSK	50	0	22.03	22.09	22.76		
10	16QAM	1	0	21.75	22.04	22.54	23	1
10	16QAM	1	25	21.80	22.03	22.37		
10	16QAM	1	49	21.76	21.97	22.46		
10	16QAM	25	0	20.92	21.00	21.78	22	2
10	16QAM	25	12	20.97	21.22	21.57		
10	16QAM	25	25	20.90	21.21	21.51		
10	16QAM	50	0	20.98	21.02	21.63		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	23.03	22.74	23.32	24	0
5	QPSK	1	12	23.05	23.35	23.56		
5	QPSK	1	24	22.64	23.21	23.24		
5	QPSK	12	0	22.02	22.30	22.61	23	1
5	QPSK	12	7	22.00	22.27	22.62		
5	QPSK	12	13	22.02	22.22	22.49		
5	QPSK	25	0	21.99	22.11	22.74		
5	16QAM	1	0	21.70	21.93	22.26	23	1
5	16QAM	1	12	21.75	21.97	22.22		
5	16QAM	1	24	21.72	21.97	22.27		
5	16QAM	12	0	20.94	21.07	21.32	22	2
5	16QAM	12	7	21.00	21.20	21.34		
5	16QAM	12	13	20.90	21.00	21.38		
5	16QAM	25	0	21.11	21.08	21.33		

<Reduced Power Mode for Hotspot On/P-Sensor On>

<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	16	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	15.37	15.09	15.08		
20	QPSK	1	49	15.50	15.15	15.52	16	0
20	QPSK	1	99	15.32	15.22	15.42		
20	QPSK	50	0	15.31	15.05	15.21		
20	QPSK	50	24	15.21	15.08	15.36	16	0
20	QPSK	50	50	15.25	15.10	15.33		
20	QPSK	100	0	15.32	15.13	15.33		
20	16QAM	1	0	15.19	15.02	15.02	16	0
20	16QAM	1	49	14.91	14.87	14.97		
20	16QAM	1	99	15.02	15.03	15.14		
20	16QAM	50	0	15.27	15.07	15.28	16	0
20	16QAM	50	24	15.26	15.10	15.21		
20	16QAM	50	50	15.25	15.04	15.46		
20	16QAM	100	0	15.21	15.14	15.30	16	0
Channel				20825	21100	21375		
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	15.23	15.25	15.24	16	0
15	QPSK	1	37	15.17	15.23	15.53		
15	QPSK	1	74	15.08	15.27	15.38		
15	QPSK	36	0	15.37	15.10	15.28	16	0
15	QPSK	36	20	15.26	15.14	15.23		
15	QPSK	36	39	15.31	15.18	15.39		
15	QPSK	75	0	15.28	15.09	15.20	16	0
15	16QAM	1	0	15.15	15.38	15.06		
15	16QAM	1	37	14.94	14.90	15.20		
15	16QAM	1	74	15.05	14.98	15.09	16	0
15	16QAM	36	0	15.34	15.04	15.35		
15	16QAM	36	20	15.22	15.06	15.37		
15	16QAM	36	39	15.21	15.21	15.34	16	0
15	16QAM	75	0	15.28	15.11	15.27		

Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	15.09	15.02	14.93	16	0
10	QPSK	1	25	15.19	15.26	15.13		
10	QPSK	1	49	14.94	14.96	15.00		
10	QPSK	25	0	15.38	15.13	15.26	16	0
10	QPSK	25	12	15.24	15.11	15.34		
10	QPSK	25	25	15.27	15.07	15.32		
10	QPSK	50	0	15.22	15.11	15.37		
10	16QAM	1	0	15.08	15.01	15.08	16	0
10	16QAM	1	25	15.01	14.85	15.19		
10	16QAM	1	49	15.35	14.97	15.13		
10	16QAM	25	0	15.36	15.09	15.23	16	0
10	16QAM	25	12	15.39	15.14	15.32		
10	16QAM	25	25	15.16	15.10	15.41		
10	16QAM	50	0	15.11	15.14	15.40		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	15.20	14.84	14.96	16	0
5	QPSK	1	12	15.32	15.17	15.17		
5	QPSK	1	24	15.03	14.92	14.95		
5	QPSK	12	0	15.29	15.07	15.34	16	0
5	QPSK	12	7	15.31	15.12	15.40		
5	QPSK	12	13	15.23	15.04	15.33		
5	QPSK	25	0	15.27	15.04	15.26		
5	16QAM	1	0	15.12	14.93	15.02	16	0
5	16QAM	1	12	14.86	14.78	15.05		
5	16QAM	1	24	14.88	14.80	14.93		
5	16QAM	12	0	15.14	14.97	15.17	16	0
5	16QAM	12	7	15.20	14.97	15.12		
5	16QAM	12	13	15.11	15.05	15.18		
5	16QAM	25	0	15.46	15.06	15.10		

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- “special subframe S” contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

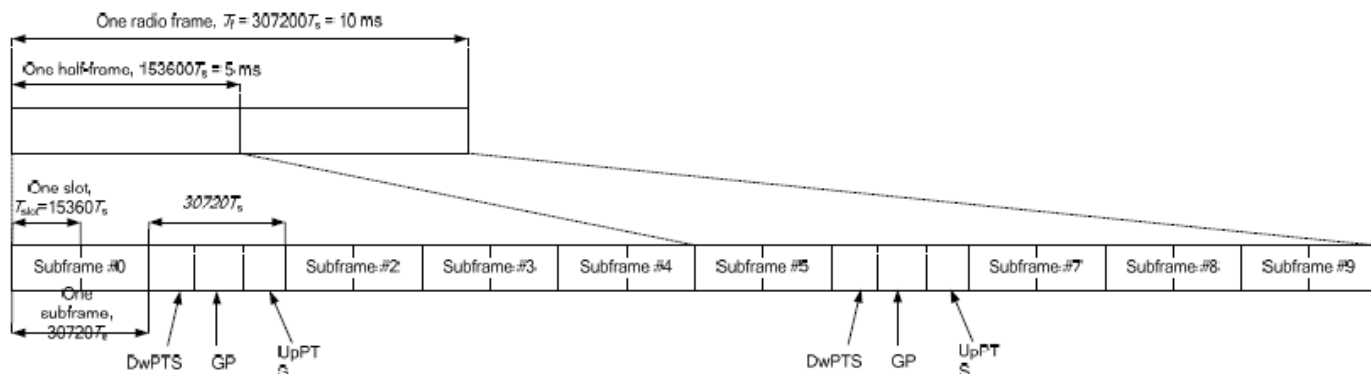


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$			$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$	-	-
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$			-		

Special subframe (30720·T _s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T _s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

- Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is:
 $(3+0.167)/5 = 63.3\%$
- for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is:
 $(3+0.143)/5 = 62.9\%$
- For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.



<Full Power Mode>

<LTE Band 38>

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				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	22.69	23.06	22.89	24	0
20	QPSK	1	49	22.22	22.20	22.54		
20	QPSK	1	99	22.50	22.53	22.35		
20	QPSK	50	0	22.38	22.12	22.26	23	1
20	QPSK	50	24	22.07	22.18	22.25		
20	QPSK	50	50	22.09	22.18	22.27		
20	QPSK	100	0	22.06	22.12	22.27		
20	16QAM	1	0	21.65	21.76	21.94	23	1
20	16QAM	1	49	21.89	22.03	21.91		
20	16QAM	1	99	21.70	21.80	21.97		
20	16QAM	50	0	21.17	21.04	21.14	22	2
20	16QAM	50	24	21.14	21.05	21.31		
20	16QAM	50	50	21.04	21.07	21.19		
20	16QAM	100	0	21.10	21.12	21.21		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	23.03	23.02	23.04	24	0
15	QPSK	1	37	23.01	23.03	23.05		
15	QPSK	1	74	23.03	23.04	23.00		
15	QPSK	36	0	22.16	22.15	22.28	23	1
15	QPSK	36	20	22.13	22.22	22.30		
15	QPSK	36	39	22.12	22.21	22.32		
15	QPSK	75	0	22.18	22.18	22.30		
15	16QAM	1	0	21.78	21.89	21.86	23	1
15	16QAM	1	37	21.77	21.87	21.95		
15	16QAM	1	74	21.84	21.89	21.87		
15	16QAM	36	0	21.12	21.23	21.12	22	2
15	16QAM	36	20	21.20	21.20	21.35		
15	16QAM	36	39	21.06	21.27	21.35		
15	16QAM	75	0	21.20	21.13	21.28		

Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	23.00	22.57	22.95	24	0
10	QPSK	1	25	22.66	22.69	22.64		
10	QPSK	1	49	22.13	22.13	22.19		
10	QPSK	25	0	22.11	22.12	22.29	23	1
10	QPSK	25	12	22.09	22.16	22.28		
10	QPSK	25	25	22.15	22.17	22.28		
10	QPSK	50	0	22.11	22.18	22.29		
10	16QAM	1	0	21.81	21.84	21.88	23	1
10	16QAM	1	25	22.05	22.05	22.13		
10	16QAM	1	49	21.75	22.08	21.92		
10	16QAM	25	0	21.09	21.17	21.43	22	2
10	16QAM	25	12	21.05	21.44	21.40		
10	16QAM	25	25	21.07	21.16	21.44		
10	16QAM	50	0	21.14	21.25	21.17		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	22.73	22.35	23.00	24	0
5	QPSK	1	12	22.59	22.30	22.64		
5	QPSK	1	24	22.23	22.18	22.25		
5	QPSK	12	0	22.18	22.20	22.22	23	1
5	QPSK	12	7	22.14	22.23	22.26		
5	QPSK	12	13	22.21	22.16	22.29		
5	QPSK	25	0	22.02	22.06	22.20		
5	16QAM	1	0	21.59	21.67	21.83	23	1
5	16QAM	1	12	21.88	21.88	21.92		
5	16QAM	1	24	21.68	21.76	21.80		
5	16QAM	12	0	21.01	21.00	21.30	22	2
5	16QAM	12	7	21.27	21.12	21.38		
5	16QAM	12	13	21.04	21.24	21.33		
5	16QAM	25	0	21.12	21.42	21.38		

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40140	40400	40670	41140		
Frequency (MHz)				2545	2571	2598	2645		
20	QPSK	1	0	22.70	22.98	23.27	23.43	24	0
20	QPSK	1	49	23.12	23.12	23.44	23.35		
20	QPSK	1	99	22.86	22.98	23.37	23.29		
20	QPSK	50	0	21.94	22.11	22.47	22.38	23	1
20	QPSK	50	24	22.02	22.11	22.37	22.33		
20	QPSK	50	50	22.08	22.12	22.45	22.23		
20	QPSK	100	0	22.06	22.14	22.43	22.36		
20	16QAM	1	0	22.12	21.89	22.08	22.28	23	1
20	16QAM	1	49	21.81	21.98	22.24	22.17		
20	16QAM	1	99	21.84	21.88	22.19	21.82		
20	16QAM	50	0	20.87	21.00	21.48	21.37	22	2
20	16QAM	50	24	21.23	20.99	21.40	21.36		
20	16QAM	50	50	21.05	20.97	21.47	21.29		
20	16QAM	100	0	20.98	21.07	21.36	21.33		
Channel				40115	40395	40685	41165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2542.5	2570.5	2599.5	2647.5		
15	QPSK	1	0	22.82	23.17	23.43	23.36	24	0
15	QPSK	1	37	22.89	23.35	23.28	23.41		
15	QPSK	1	74	22.74	23.30	23.35	22.90		
15	QPSK	36	0	21.92	22.29	22.30	22.27	23	1
15	QPSK	36	20	21.91	22.18	22.36	22.07		
15	QPSK	36	39	21.95	22.19	22.39	22.13		
15	QPSK	75	0	21.91	22.22	22.31	22.17		
15	16QAM	1	0	21.72	22.08	22.28	22.16	23	1
15	16QAM	1	37	21.60	22.26	22.21	22.12		
15	16QAM	1	74	21.57	22.09	22.14	22.10		
15	16QAM	36	0	20.86	21.14	21.28	21.15	22	2
15	16QAM	36	20	20.97	21.09	21.43	21.01		
15	16QAM	36	39	21.16	21.16	21.52	21.06		
15	16QAM	75	0	21.34	21.22	21.24	21.18		

Channel				40090	40390	40690	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2540	2570	2600	2650		
10	QPSK	1	0	22.85	23.38	23.23	23.30	24	0
10	QPSK	1	25	22.92	23.42	23.20	23.35		
10	QPSK	1	49	22.91	23.18	23.18	23.08		
10	QPSK	25	0	21.88	22.34	22.30	22.05	23	1
10	QPSK	25	12	21.93	22.31	22.36	22.06		
10	QPSK	25	25	21.91	22.22	22.10	22.06		
10	QPSK	50	0	21.89	22.20	22.31	22.07		
10	16QAM	1	0	21.70	22.13	22.00	22.04	23	1
10	16QAM	1	25	21.67	22.07	22.10	21.94		
10	16QAM	1	49	21.80	21.79	22.14	21.98		
10	16QAM	25	0	21.12	21.15	21.15	21.33	22	2
10	16QAM	25	12	21.17	21.51	21.43	21.32		
10	16QAM	25	25	21.16	21.12	21.52	21.35		
10	16QAM	50	0	21.06	21.21	21.24	21.20		
Channel				40065	40385	40705	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2537.5	2569.5	2601.5	2652.5		
5	QPSK	1	0	22.69	22.58	22.60	22.50	24	0
5	QPSK	1	12	22.88	22.66	22.76	22.69		
5	QPSK	1	24	22.71	22.88	22.75	22.78		
5	QPSK	12	0	22.03	22.31	22.25	22.36	23	1
5	QPSK	12	7	21.75	22.00	22.01	22.21		
5	QPSK	12	13	21.77	21.98	21.80	21.89		
5	QPSK	25	0	22.08	22.00	22.03	22.06		
5	16QAM	1	0	22.00	22.21	22.04	22.12	23	1
5	16QAM	1	12	22.05	22.07	22.00	22.16		
5	16QAM	1	24	22.01	22.36	22.45	22.49		
5	16QAM	12	0	20.58	20.64	20.45	20.69	22	2
5	16QAM	12	7	20.82	20.90	20.96	20.88		
5	16QAM	12	13	20.77	21.00	20.98	20.99		
5	16QAM	25	0	20.95	20.98	20.78	20.89		



<Reduced Power Mode for Hotspot On/P-Sensor On>

<LTE Band 38>

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				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	15.60	15.71	15.92	16.5	0
20	QPSK	1	49	15.74	15.91	15.93		
20	QPSK	1	99	15.68	15.76	15.68		
20	QPSK	50	0	16.00	15.79	15.82	16.5	0
20	QPSK	50	24	15.84	15.80	15.84		
20	QPSK	50	50	15.84	15.78	15.80		
20	QPSK	100	0	15.82	15.77	15.85	16.5	0
20	16QAM	1	0	15.10	15.30	15.46		
20	16QAM	1	49	15.69	15.60	15.49		
20	16QAM	1	99	15.20	15.43	15.44	16.5	0
20	16QAM	50	0	15.79	15.85	15.88		
20	16QAM	50	24	15.83	15.78	15.88		
20	16QAM	50	50	15.82	15.83	15.84	16.5	0
20	16QAM	100	0	15.76	15.74	15.80		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	15.54	15.59	15.90	16.5	0
15	QPSK	1	37	15.79	15.98	16.15		
15	QPSK	1	74	15.82	15.85	15.82		
15	QPSK	36	0	15.96	15.84	15.79	16.5	0
15	QPSK	36	20	15.80	15.83	15.81		
15	QPSK	36	39	15.76	15.76	15.79		
15	QPSK	75	0	15.75	15.91	15.88	16.5	0
15	16QAM	1	0	15.37	15.23	15.74		
15	16QAM	1	37	15.53	15.93	15.73		
15	16QAM	1	74	15.33	15.50	15.32	16.5	0
15	16QAM	36	0	15.66	15.75	15.69		
15	16QAM	36	20	15.82	15.85	15.85		
15	16QAM	36	39	15.80	15.66	15.79	16.5	0
15	16QAM	75	0	15.72	15.86	15.93		

Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	15.56	15.89	15.83	16.5	0
10	QPSK	1	25	15.67	15.99	15.84		
10	QPSK	1	49	15.75	15.91	15.84		
10	QPSK	25	0	15.83	16.14	15.83	16.5	0
10	QPSK	25	12	15.92	16.03	15.88		
10	QPSK	25	25	15.93	16.04	15.85		
10	QPSK	50	0	15.92	16.03	15.81	16.5	0
10	16QAM	1	0	15.45	15.54	15.66		
10	16QAM	1	25	15.73	16.02	15.60		
10	16QAM	1	49	15.43	15.49	15.49	16.5	0
10	16QAM	25	0	15.85	16.12	16.03		
10	16QAM	25	12	15.69	16.02	16.08		
10	16QAM	25	25	15.98	16.01	15.93	16.5	0
10	16QAM	50	0	15.58	15.71	15.92		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	15.50	15.76	15.72	16.5	0
5	QPSK	1	12	15.65	15.77	16.05		
5	QPSK	1	24	15.49	15.58	15.60		
5	QPSK	12	0	15.55	16.13	15.89	16.5	0
5	QPSK	12	7	15.59	16.06	16.04		
5	QPSK	12	13	15.58	16.00	15.83		
5	QPSK	25	0	15.60	15.98	15.80	16.5	0
5	16QAM	1	0	15.11	15.93	15.73		
5	16QAM	1	12	15.70	15.88	15.86		
5	16QAM	1	24	15.22	15.61	15.28	16.5	0
5	16QAM	12	0	15.53	16.06	15.71		
5	16QAM	12	7	15.61	16.00	15.78		
5	16QAM	12	13	15.59	15.84	15.77	16.5	0
5	16QAM	25	0	15.76	16.06	16.18		

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40140	40400	40670	41140	16.5	0
Frequency (MHz)				2545	2571	2598	2645		
20	QPSK	1	0	15.20	15.40	15.86	15.80	16.5	0
20	QPSK	1	49	15.24	15.89	15.98	15.88		
20	QPSK	1	99	15.41	15.72	15.65	15.55		
20	QPSK	50	0	15.36	15.53	15.95	15.81	16.5	0
20	QPSK	50	24	15.40	15.60	15.83	15.77		
20	QPSK	50	50	15.38	15.52	15.73	15.60		
20	QPSK	100	0	15.38	15.63	15.83	15.78	16.5	0
20	16QAM	1	0	14.82	15.34	15.18	15.58		
20	16QAM	1	49	15.49	15.35	15.36	15.35		
20	16QAM	1	99	15.06	15.23	15.07	15.06	16.5	0
20	16QAM	50	0	15.34	15.43	15.65	15.76		
20	16QAM	50	24	15.43	15.59	15.66	15.78		
20	16QAM	50	50	15.43	15.62	15.68	15.59	16.5	0
20	16QAM	100	0	15.34	15.70	15.58	15.82		
Channel				40115	40395	40685	41165	16.5	0
Frequency (MHz)				2542.5	2570.5	2599.5	2647.5		
15	QPSK	1	0	15.74	15.43	15.82	15.69	16.5	0
15	QPSK	1	37	15.62	15.39	15.87	15.43		
15	QPSK	1	74	15.56	15.53	15.83	15.66		
15	QPSK	36	0	15.43	15.69	15.67	15.63	16.5	0
15	QPSK	36	20	15.23	15.46	15.59	15.62		
15	QPSK	36	39	15.36	15.69	15.61	15.43		
15	QPSK	75	0	15.43	15.61	15.56	15.78	16.5	0
15	16QAM	1	0	15.32	15.69	15.57	15.70		
15	16QAM	1	37	15.39	15.78	15.71	15.61		
15	16QAM	1	74	15.36	15.36	15.46	15.60	16.5	0
15	16QAM	36	0	15.15	15.46	15.44	15.64		
15	16QAM	36	20	15.23	15.62	15.64	15.46		
15	16QAM	36	39	15.36	15.26	15.59	15.43	16.5	0
15	16QAM	75	0	15.43	15.36	15.69	15.36		



Channel				40090	40390	40690	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2540	2570	2600	2650		
10	QPSK	1	0	15.45	15.43	15.55	15.43	16.5	0
10	QPSK	1	25	15.50	15.56	15.64	15.46		
10	QPSK	1	49	15.43	15.29	15.56	15.56		
10	QPSK	25	0	15.49	15.68	15.83	15.76	16.5	0
10	QPSK	25	12	15.12	15.78	15.82	15.56		
10	QPSK	25	25	15.03	15.25	15.80	15.46		
10	QPSK	50	0	15.39	15.65	15.64	15.32	16.5	0
10	16QAM	1	0	15.45	15.66	15.22	15.12		
10	16QAM	1	25	15.07	15.75	15.47	15.25		
10	16QAM	1	49	15.01	15.67	15.22	15.13	16.5	0
10	16QAM	25	0	15.27	15.13	15.60	15.36		
10	16QAM	25	12	15.26	15.23	15.63	15.34		
10	16QAM	25	25	15.19	15.63	15.61	15.46	16.5	0
10	16QAM	50	0	15.65	15.61	15.59	15.13		
Channel				40065	40385	40705	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2537.5	2569.5	2601.5	2652.5		
5	QPSK	1	0	15.59	15.46	15.71	15.75	16.5	0
5	QPSK	1	12	15.40	15.50	15.92	15.74		
5	QPSK	1	24	15.71	15.71	15.70	15.59		
5	QPSK	12	0	15.65	15.76	15.77	15.78	16.5	0
5	QPSK	12	7	15.37	15.56	15.62	15.43		
5	QPSK	12	13	15.34	15.49	15.60	15.42		
5	QPSK	25	0	15.56	15.79	15.60	15.43	16.5	0
5	16QAM	1	0	15.59	15.80	15.43	15.78		
5	16QAM	1	12	15.03	15.01	15.62	15.29		
5	16QAM	1	24	15.29	15.67	15.66	15.31	16.5	0
5	16QAM	12	0	15.37	15.60	15.70	15.56		
5	16QAM	12	7	15.36	15.75	15.87	15.34		
5	16QAM	12	13	15.47	15.67	15.88	15.76	16.5	0
5	16QAM	25	0	15.30	15.61	15.63	15.75		

<WLAN Conducted Power>
General Note:

1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<Full Power Mode>
<2.4GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	17.29	18.50	97.59
		6	2437	18.46	18.50	
		11	2462	17.96	18.50	
	802.11g 6Mbps	1	2412	12.48	14.00	87.04
		6	2437	14.25	14.50	
		11	2462	11.62	13.50	
	802.11n-HT20 MCS0	1	2412	11.89	13.50	86.27
		6	2437	12.48	14.00	
		11	2462	9.72	11.50	

<5GHz WLAN>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	14.38	16.00	87.04
		40	5200	14.88	16.00	
		44	5220	14.75	16.00	
		48	5240	13.37	15.00	
	802.11n-HT20 MCS0	36	5180	14.37	15.50	86.70
		40	5200	14.55	15.50	
		44	5220	14.30	15.50	
		48	5240	12.98	14.50	
	802.11n-HT40 MCS0	38	5190	10.72	12.00	85.79
		46	5230	14.91	15.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	13.36	15.00	87.04
		56	5280	13.51	15.00	
		60	5300	13.26	15.00	
		64	5320	13.54	15.00	
	802.11n-HT20 MCS0	52	5260	12.96	14.50	86.70
		56	5280	12.94	14.50	
		60	5300	12.75	14.50	
		64	5320	12.98	14.50	
	802.11n-HT40 MCS0	54	5270	12.84	14.50	85.79
		62	5310	10.08	12.00	

5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	100	5500	13.96	15.00	87.04
		116	5580	14.67	15.00	
		124	5620	13.78	15.00	
		132	5660	13.09	15.00	
		140	5700	13.11	15.00	
		144	5720	12.86	14.50	
	802.11n-HT20 MCS0	100	5500	13.47	14.50	86.70
		116	5580	14.29	14.50	
		124	5620	13.28	14.50	
		132	5660	12.65	14.50	
		140	5700	12.66	14.50	
		144	5720	12.36	14.00	
	802.11n-HT40 MCS0	102	5510	9.72	11.00	85.79
		110	5550	13.13	14.50	
		126	5630	14.31	14.50	
		134	5670	14.33	14.50	
		142	5710	14.39	14.50	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	149	5745	11.98	13.50	87.04
		157	5785	11.68	13.50	
		165	5825	11.91	13.50	
	802.11n-HT20 MCS0	149	5745	11.43	13.00	86.70
		157	5785	11.05	13.00	
		165	5825	11.58	13.00	
	802.11n-HT40 MCS0	151	5755	11.52	13.00	85.79
		159	5795	8.09	10.00	

<Reduced Power Mode>

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	36	5180	13.26	13.50	87.04
		40	5200	13.08	13.50	
		44	5220	13.02	13.50	
		48	5240	13.33	13.50	
	802.11n-HT20 MCS0	36	5180	13.04	13.50	86.70
		40	5200	13.14	13.50	
		44	5220	13.08	13.50	
		48	5240	13.27	13.50	
	802.11n-HT40 MCS0	38	5190	10.72	12.00	85.79
		46	5230	12.92	13.00	

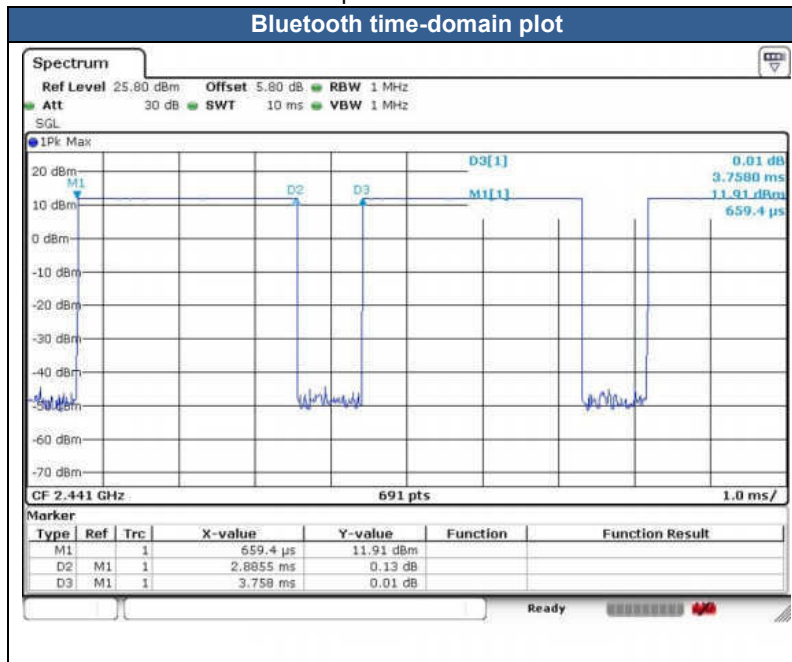
5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	52	5260	13.36	13.50	87.04
		56	5280	13.45	13.50	
		60	5300	13.26	13.50	
		64	5320	13.47	13.50	
	802.11n-HT20 MCS0	52	5260	12.96	13.50	86.70
		56	5280	12.94	13.50	
		60	5300	12.75	13.50	
		64	5320	12.98	13.50	
	802.11n-HT40 MCS0	54	5270	12.84	13.00	85.79
		62	5310	10.08	12.00	

5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	100	5500	13.33	13.50	87.04
		116	5580	13.35	13.50	
		124	5620	13.31	13.50	
		132	5660	13.09	13.50	
		140	5700	13.11	13.50	
		144	5720	12.86	13.50	
	802.11n-HT20 MCS0	100	5500	13.07	13.50	86.70
		116	5580	13.22	13.50	
		124	5620	13.22	13.50	
		132	5660	12.65	13.50	
		140	5700	12.66	13.50	
		144	5720	12.36	13.50	
	802.11n-HT40 MCS0	102	5510	9.72	11.00	85.79
		110	5550	12.58	13.00	
		126	5630	12.60	13.00	
		134	5670	12.79	13.00	
		142	5710	12.84	13.00	

<2.4GHz Bluetooth>

General Note:

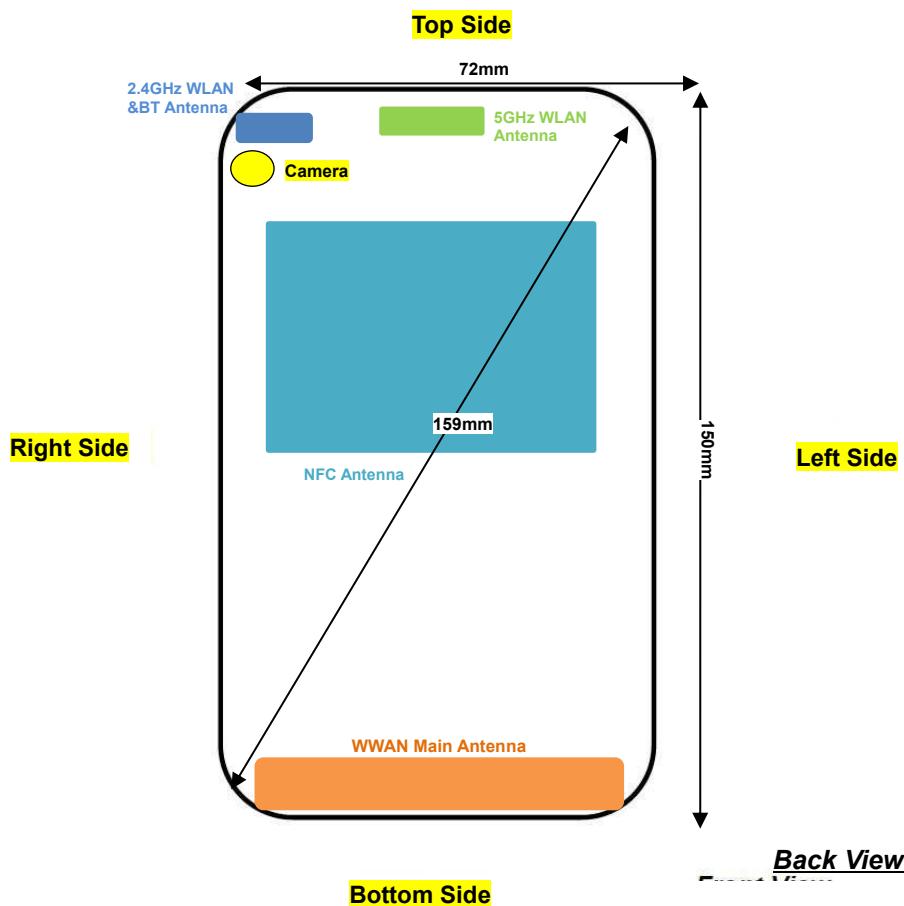
1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.78% as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation



Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-up limit (dBm)
			1Mbps	
BR/EDR	CH 00	2402	11.16	12.50
	CH 39	2441	11.80	
	CH 78	2480	10.03	

Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-up limit (dBm)
			GFSK	
LE	CH 00	2402	1.59	2.50
	CH 19	2440	2.39	
	CH 39	2480	1.07	

14. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN 2.4GHz	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm
WLAN 5GHz	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	>25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN 2.4GHz	Yes	Yes	Yes	No	Yes	No
WLAN 5GHz	Yes	Yes	Yes	No	No	No

General Note:

Referring to KDB 941225 D06 v02r01, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

15. SAR Test Results

General Note:

- Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - 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.
 - 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)"
 - For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
- Per KDB 447498 D01v06, 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
- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8W/kg.
- Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
- The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA band II and LTE band 7/38/41 reduced power will be active for WWAN Bands and WLAN 5.2GHz/ 5.3GHz / 5.5GHz. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.)
- When hotspot mode is enabled, power reduction will be activated to limit the maximum power of GSM1900, WCDMA band II, LTE band 7/38/41 for WWAN Bands and WLAN5.2GHz for WLAN.
- This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power level for hotspot reduced power and P-sensor reduced power for this application.

GSM Note:

- Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 is considered as the primary mode.
- Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
- Power reduction which is triggered by hotspot mode/P-sensor is implemented in GSM900 band, SAR testing EUT was set in reduced power mode and GPRS 4 Tx slots for GSM850 and GSM1900, due to its highest frame-average power.

UMTS Note:

- Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
- Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. 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, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, 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.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, 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.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ 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 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B5 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE band 38 SAR test was covered by Band 41; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is $\leq$ the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is required when the U-NII-2A band maximum tune up power is less than U-NII-1, So for head SAR, chose U-NII-1to perform SAR testing.
4. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
5. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
6. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

15.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Power Mode	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)
01	GSM 850	GPRS 4 Tx slots	Right Cheek	Full	251	848.8	26.43	27.50	1.279	0.08	0.134	0.171
	GSM 850	GPRS 4 Tx slots	Right Tilted	Full	251	848.8	26.43	27.50	1.279	0.02	0.076	0.097
	GSM 850	GPRS 4 Tx slots	Left Cheek	Full	251	848.8	26.43	27.50	1.279	0.07	0.085	0.109
	GSM 850	GPRS 4 Tx slots	Left Tilted	Full	251	848.8	26.43	27.50	1.279	0.02	0.061	0.078
	GSM 1900	GPRS 4 Tx slots	Right Cheek	Full	661	1880	22.84	24.50	1.466	0.02	0.049	0.072
	GSM 1900	GPRS 4 Tx slots	Right Tilted	Full	661	1880	22.84	24.50	1.466	0.15	0.026	0.038
02	GSM 1900	GPRS 4 Tx slots	Left Cheek	Full	661	1880	22.84	24.50	1.466	0.05	0.084	0.123
	GSM 1900	GPRS 4 Tx slots	Left Tilted	Full	661	1880	22.84	24.50	1.466	-0.08	0.037	0.054

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Power Mode	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)
03	WCDMA Band V	RMC 12.2Kbps	Right Cheek	Full	4132	826.4	23.63	24.00	1.089	-0.04	0.119	0.130
	WCDMA Band V	RMC 12.2Kbps	Right Tilted	Full	4132	826.4	23.63	24.00	1.089	-0.03	0.068	0.074
	WCDMA Band V	RMC 12.2Kbps	Left Cheek	Full	4132	826.4	23.63	24.00	1.089	0.06	0.091	0.099
	WCDMA Band V	RMC 12.2Kbps	Left Tilted	Full	4132	826.4	23.63	24.00	1.089	0.09	0.070	0.076
	WCDMA Band II	RMC 12.2Kbps	Right Cheek	Full	9538	1907.6	23.46	24.00	1.132	0.04	0.122	0.138
	WCDMA Band II	RMC 12.2Kbps	Right Tilted	Full	9538	1907.6	23.46	24.00	1.132	0.15	0.068	0.077
04	WCDMA Band II	RMC 12.2Kbps	Left Cheek	Full	9538	1907.6	23.46	24.00	1.132	0.07	0.217	0.246
	WCDMA Band II	RMC 12.2Kbps	Left Tilted	Full	9538	1907.6	23.46	24.00	1.132	0.02	0.091	0.103

**<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	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)
05	LTE Band 5	10M	QPSK	1	49	Right Cheek	Full	20525	836.5	22.96	24.00	1.271	0.07	0.138	0.175
	LTE Band 5	10M	QPSK	25	12	Right Cheek	Full	20525	836.5	22.08	23.00	1.236	0.08	0.066	0.082
	LTE Band 5	10M	QPSK	1	49	Right Tilted	Full	20525	836.5	22.96	24.00	1.271	0.06	0.071	0.090
	LTE Band 5	10M	QPSK	25	12	Right Tilted	Full	20525	836.5	22.08	23.00	1.236	0.08	0.034	0.042
	LTE Band 5	10M	QPSK	1	49	Left Cheek	Full	20525	836.5	22.96	24.00	1.271	0.07	0.101	0.128
	LTE Band 5	10M	QPSK	25	12	Left Cheek	Full	20525	836.5	22.08	23.00	1.236	0.03	0.049	0.061
	LTE Band 5	10M	QPSK	1	49	Left Tilted	Full	20525	836.5	22.96	24.00	1.271	0	0.074	0.094
	LTE Band 5	10M	QPSK	25	12	Left Tilted	Full	20525	836.5	22.08	23.00	1.236	0.08	0.036	0.044
06	LTE Band 7	20M	QPSK	1	49	Right Cheek	Full	21350	2560	23.60	24.00	1.096	0.13	0.133	0.146
	LTE Band 7	20M	QPSK	50	24	Right Cheek	Full	21350	2560	22.61	23.00	1.094	0.07	0.074	0.081
	LTE Band 7	20M	QPSK	1	49	Right Tilted	Full	21350	2560	23.60	24.00	1.096	0.07	0.101	0.111
	LTE Band 7	20M	QPSK	50	24	Right Tilted	Full	21350	2560	22.61	23.00	1.094	0.05	0.053	0.058
	LTE Band 7	20M	QPSK	1	49	Left Cheek	Full	21350	2560	23.60	24.00	1.096	0.02	0.110	0.121
	LTE Band 7	20M	QPSK	50	24	Left Cheek	Full	21350	2560	22.61	23.00	1.094	0.03	0.056	0.061
	LTE Band 7	20M	QPSK	1	49	Left Tilted	Full	21350	2560	23.60	24.00	1.096	0.02	0.031	0.034
	LTE Band 7	20M	QPSK	50	24	Left Tilted	Full	21350	2560	22.61	23.00	1.094	0.04	0.015	0.016

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	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)
	LTE Band 41	20M	QPSK	1	49	Right Cheek	Full	40670	2598	23.44	24.00	1.138	62.9	1.006	0.03	0.039	0.045
	LTE Band 41	20M	QPSK	50	0	Right Cheek	Full	40670	2598	22.47	23.00	1.130	62.9	1.006	0.04	0.021	0.024
	LTE Band 41	20M	QPSK	1	49	Right Tilted	Full	40670	2598	23.44	24.00	1.138	62.9	1.006	0.06	0.025	0.029
	LTE Band 41	20M	QPSK	50	0	Right Tilted	Full	40670	2598	22.47	23.00	1.130	62.9	1.006	0.08	0.014	0.016
07	LTE Band 41	20M	QPSK	1	49	Left Cheek	Full	40670	2598	23.44	24.00	1.138	62.9	1.006	0.02	0.064	0.073
	LTE Band 41	20M	QPSK	50	0	Left Cheek	Full	40670	2598	22.47	23.00	1.130	62.9	1.006	0.03	0.035	0.040
	LTE Band 41	20M	QPSK	1	49	Left Tilted	Full	40670	2598	23.44	24.00	1.138	62.9	1.006	0.05	0.025	0.029
	LTE Band 41	20M	QPSK	50	0	Left Tilted	Full	40670	2598	22.47	23.00	1.130	62.9	1.006	0.08	0.012	0.014

<WLAN2.4GHz SAR >

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	6	2437	18.46	18.50	1.009	97.59	1.025	0.484	-0.08	0.325	0.336
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	6	2437	18.46	18.50	1.009	97.59	1.025	0.469			
08	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	6	2437	18.46	18.50	1.009	97.59	1.025	1.554	0.04	1.020	1.055
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	6	2437	18.46	18.50	1.009	97.59	1.025	1.431	0.06	0.870	0.900
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	11	2462	17.96	18.50	1.132	97.59	1.025		-0.14	0.852	0.989
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	11	2462	17.96	18.50	1.132	97.59	1.025		-0.09	0.657	0.763

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Right Cheek	39	2441	11.80	12.50	1.175	76.78	1.085	-0.06	0.043	0.055
	Bluetooth	1Mbps	Right Tilted	39	2441	11.80	12.50	1.175	76.78	1.085	-0.04	0.042	0.054
09	Bluetooth	1Mbps	Left Cheek	39	2441	11.80	12.50	1.175	76.78	1.085	-0.05	0.144	0.184
	Bluetooth	1Mbps	Left Tilted	39	2441	11.80	12.50	1.175	76.78	1.085	-0.06	0.128	0.163

<WLAN5GHz SAR>

Plot No.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.2GHz	802.11a 6Mbps	Right Cheek	Full	40	5200	14.88	16.00	1.294	87.04	1.149	1.193	-0.01	0.397	0.590
10	WLAN5.2GHz	802.11a 6Mbps	Right Tilted	Full	40	5200	14.88	16.00	1.294	87.04	1.149	1.128	-0.02	0.432	0.642
	WLAN5.2GHz	802.11a 6Mbps	Left Cheek	Full	40	5200	14.88	16.00	1.294	87.04	1.149	0.655			
	WLAN5.2GHz	802.11a 6Mbps	Left Tilted	Full	40	5200	14.88	16.00	1.294	87.04	1.149	0.699			
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	Full	116	5580	14.67	15.00	1.079	87.04	1.149	0.890			
11	WLAN5.5GHz	802.11a 6Mbps	Right Tilted	Full	116	5580	14.67	15.00	1.079	87.04	1.149	0.967	-0.02	0.318	0.394
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	Full	116	5580	14.67	15.00	1.079	87.04	1.149	0.511			
	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	Full	116	5580	14.67	15.00	1.079	87.04	1.149	0.548			
	WLAN 5.8GHz	802.11a 6Mbps	Right Cheek	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.325			
12	WLAN 5.8GHz	802.11a 6Mbps	Right Tilted	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.457	0.06	0.126	0.205
	WLAN 5.8GHz	802.11a 6Mbps	Left Cheek	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.220			
	WLAN 5.8GHz	802.11a 6Mbps	Left Tilted	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.222			

**15.2 Hotspot SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS 4 Tx slots	Front	5	Full	251	848.8	26.43	27.50	1.279	0.05	0.471	0.603
13	GSM850	GPRS 4 Tx slots	Back	5	Full	251	848.8	26.43	27.50	1.279	-0.02	0.481	0.615
	GSM850	GPRS 4 Tx slots	Left Side	5	Full	251	848.8	26.43	27.50	1.279	0.01	0.111	0.142
	GSM850	GPRS 4 Tx slots	Right Side	5	Full	251	848.8	26.43	27.50	1.279	-0.13	0.242	0.310
	GSM850	GPRS 4 Tx slots	Bottom Side	5	Full	251	848.8	26.43	27.50	1.279	0.01	0.343	0.439
	GSM1900	GPRS 4 Tx slots	Front	5	Reduced	661	1880	20.95	22.50	1.429	0.03	0.415	0.593
	GSM1900	GPRS 4 Tx slots	Back	5	Reduced	661	1880	20.95	22.50	1.429	-0.05	0.484	0.692
	GSM1900	GPRS 4 Tx slots	Left Side	5	Reduced	661	1880	20.95	22.50	1.429	-0.06	0.100	0.143
	GSM1900	GPRS 4 Tx slots	Right Side	5	Reduced	661	1880	20.95	22.50	1.429	0.09	0.039	0.056
	GSM1900	GPRS 4 Tx slots	Bottom Side	5	Reduced	661	1880	20.95	22.50	1.429	0.16	0.762	1.089
14	GSM1900	GPRS 4 Tx slots	Bottom Side	5	Reduced	512	1850.2	20.85	22.50	1.462	0.08	0.787	1.151
	GSM1900	GPRS 4 Tx slots	Bottom Side	5	Reduced	810	1909.8	20.90	22.50	1.445	0.13	0.659	0.953

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	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 Band V	RMC 12.2Kbps	Front	5	Full	4132	826.4	23.63	24.00	1.089	0.06	0.457	0.498
15	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4132	826.4	23.63	24.00	1.089	-0.14	0.477	0.519
	WCDMA Band V	RMC 12.2Kbps	Left Side	5	Full	4132	826.4	23.63	24.00	1.089	-0.13	0.142	0.155
	WCDMA Band V	RMC 12.2Kbps	Right Side	5	Full	4132	826.4	23.63	24.00	1.089	-0.11	0.252	0.274
	WCDMA Band V	RMC 12.2Kbps	Bottom Side	5	Full	4132	826.4	23.63	24.00	1.089	0.1	0.330	0.359
	WCDMA Band II	RMC 12.2Kbps	Front	5	Reduced	9538	1907.6	17.39	18.00	1.151	0.01	0.349	0.402
	WCDMA Band II	RMC 12.2Kbps	Back	5	Reduced	9538	1907.6	17.39	18.00	1.151	-0.16	0.394	0.453
	WCDMA Band II	RMC 12.2Kbps	Left Side	5	Reduced	9538	1907.6	17.39	18.00	1.151	-0.04	0.068	0.078
	WCDMA Band II	RMC 12.2Kbps	Right Side	5	Reduced	9538	1907.6	17.39	18.00	1.151	0.08	0.032	0.037
16	WCDMA Band II	RMC 12.2Kbps	Bottom Side	5	Reduced	9538	1907.6	17.39	18.00	1.151	0.02	0.788	0.907
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	5	Reduced	9262	1852.4	17.25	18.00	1.189	0.09	0.761	0.904
	WCDMA Band II	RMC 12.2Kbps	Bottom Side	5	Reduced	9400	1880	17.31	18.00	1.172	0.04	0.768	0.900



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	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)
17	LTE Band 5	10M	QPSK	1	49	Front	5	Full	20525	836.5	22.96	24.00	1.271	0.07	0.501	0.637
	LTE Band 5	10M	QPSK	25	12	Front	5	Full	20525	836.5	22.08	23.00	1.236	-0.04	0.259	0.320
	LTE Band 5	10M	QPSK	1	49	Back	5	Full	20525	836.5	22.96	24.00	1.271	0.05	0.544	0.691
	LTE Band 5	10M	QPSK	25	12	Back	5	Full	20525	836.5	22.08	23.00	1.236	0.01	0.249	0.308
	LTE Band 5	10M	QPSK	1	49	Left Side	5	Full	20525	836.5	22.96	24.00	1.271	0.07	0.132	0.168
	LTE Band 5	10M	QPSK	25	12	Left Side	5	Full	20525	836.5	22.08	23.00	1.236	-0.07	0.072	0.089
	LTE Band 5	10M	QPSK	1	49	Right Side	5	Full	20525	836.5	22.96	24.00	1.271	0.01	0.304	0.386
	LTE Band 5	10M	QPSK	25	12	Right Side	5	Full	20525	836.5	22.08	23.00	1.236	0.02	0.142	0.176
	LTE Band 5	10M	QPSK	1	49	Bottom Side	5	Full	20525	836.5	22.96	24.00	1.271	0.07	0.414	0.526
	LTE Band 5	10M	QPSK	25	12	Bottom Side	5	Full	20525	836.5	22.08	23.00	1.236	0.08	0.199	0.246
18	LTE Band 7	20M	QPSK	1	49	Front	5	Reduced	21350	2560	15.52	16.00	1.117	-0.19	0.408	0.456
	LTE Band 7	20M	QPSK	50	24	Front	5	Reduced	21350	2560	15.36	16.00	1.159	-0.14	0.416	0.482
	LTE Band 7	20M	QPSK	1	49	Back	5	Reduced	21350	2560	15.52	16.00	1.117	-0.07	0.560	0.625
	LTE Band 7	20M	QPSK	50	24	Back	5	Reduced	21350	2560	15.36	16.00	1.159	-0.06	0.556	0.644
	LTE Band 7	20M	QPSK	1	49	Left Side	5	Reduced	21350	2560	15.52	16.00	1.117	-0.06	0.246	0.275
	LTE Band 7	20M	QPSK	50	24	Left Side	5	Reduced	21350	2560	15.36	16.00	1.159	-0.01	0.250	0.290
	LTE Band 7	20M	QPSK	1	49	Right Side	5	Reduced	21350	2560	15.52	16.00	1.117	0.06	0.021	0.023
	LTE Band 7	20M	QPSK	50	24	Right Side	5	Reduced	21350	2560	15.36	16.00	1.159	0.08	0.021	0.024
	LTE Band 7	20M	QPSK	1	49	Bottom Side	5	Reduced	21350	2560	15.52	16.00	1.117	0.07	0.844	0.943
	LTE Band 7	20M	QPSK	1	49	Bottom Side	5	Reduced	20850	2510	15.50	16.00	1.122	0.02	0.738	0.828
	LTE Band 7	20M	QPSK	1	49	Bottom Side	5	Reduced	21100	2535	15.15	16.00	1.216	0.04	0.789	0.960
	LTE Band 7	20M	QPSK	50	24	Bottom Side	5	Reduced	21350	2560	15.36	16.00	1.159	0.09	0.860	0.997
	LTE Band 7	20M	QPSK	50	24	Bottom Side	5	Reduced	20850	2510	15.21	16.00	1.199	0.09	0.734	0.880
	LTE Band 7	20M	QPSK	50	24	Bottom Side	5	Reduced	21100	2535	15.08	16.00	1.236	-0.01	0.811	1.002
	LTE Band 7	20M	QPSK	100	0	Bottom Side	5	Reduced	21350	2560	15.33	16.00	1.167	0.07	0.890	1.038

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	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)
	LTE Band 41	20M	QPSK	1	49	Front	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.07	0.222	0.252
	LTE Band 41	20M	QPSK	50	0	Front	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	-0.04	0.214	0.244
	LTE Band 41	20M	QPSK	1	49	Back	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.07	0.348	0.395
	LTE Band 41	20M	QPSK	50	0	Back	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	0.03	0.344	0.393
	LTE Band 41	20M	QPSK	1	49	Left Side	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.05	0.121	0.137
	LTE Band 41	20M	QPSK	50	0	Left Side	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	-0.1	0.115	0.131
	LTE Band 41	20M	QPSK	1	49	Right Side	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.08	0.013	0.015
	LTE Band 41	20M	QPSK	50	0	Right Side	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	0.02	0.011	0.013
	LTE Band 41	20M	QPSK	1	49	Bottom Side	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.16	0.587	0.666
	LTE Band 41	20M	QPSK	1	49	Bottom Side	5	Reduced	40140	2545	15.24	16.50	1.337	62.9	1.006	0.01	0.561	0.754
	LTE Band 41	20M	QPSK	1	49	Bottom Side	5	Reduced	40400	2571	15.89	16.50	1.151	62.9	1.006	-0.03	0.587	0.680
19	LTE Band 41	20M	QPSK	1	49	Bottom Side	5	Reduced	41140	2645	15.88	16.50	1.153	62.9	1.006	0.03	0.723	0.839
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	0.05	0.552	0.630
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5	Reduced	40140	2545	15.36	16.50	1.300	62.9	1.006	0.15	0.524	0.685
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5	Reduced	40400	2571	15.53	16.50	1.250	62.9	1.006	0.01	0.538	0.677
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5	Reduced	41140	2645	15.81	16.50	1.172	62.9	1.006	0.09	0.711	0.838
	LTE Band 41	20M	QPSK	100	0	Bottom Side	5	Reduced	40670	2598	15.83	16.50	1.167	62.9	1.006	0.05	0.593	0.696

<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.487			
20	WLAN 2.4GHz	802.11b 1Mbps	Back	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.831	0.02	0.505	0.522
	WLAN 2.4GHz	802.11b 1Mbps	Right Side	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.598	0.07	0.407	0.421
	WLAN 2.4GHz	802.11b 1Mbps	Top Side	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.374			

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	Bluetooth	1Mbps	Front	5	39	2441	11.80	12.50	1.175	76.78	1.085	-0.01	0.066	0.084
21	Bluetooth	1Mbps	Back	5	39	2441	11.80	12.50	1.175	76.78	1.085	-0.05	0.081	0.103
	Bluetooth	1Mbps	Right Side	5	39	2441	11.80	12.50	1.175	76.78	1.085	-0.02	0.062	0.079
	Bluetooth	1Mbps	Top Side	5	39	2441	11.80	12.50	1.175	76.78	1.085	0.16	0.029	0.037

**<WLAN 5GHz SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.2GHz	802.11a 6Mbps	Front	5	Reduced	48	5240	13.33	13.50	1.039	87.04	1.149	0.356			
22	WLAN5.2GHz	802.11a 6Mbps	Back	5	Reduced	48	5240	13.33	13.50	1.039	87.04	1.149	1.180	0.01	0.439	0.524
	WLAN5.2GHz	802.11a 6Mbps	Top Side	5	Reduced	48	5240	13.33	13.50	1.039	87.04	1.149	0.469	0.05	0.230	0.275
	WLAN5.8GHz	802.11a 6Mbps	Front	5	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.714			
23	WLAN5.8GHz	802.11a 6Mbps	Back	5	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.816	0.02	0.219	0.357
	WLAN5.8GHz	802.11a 6Mbps	Top Side	5	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.226			

**15.3 Body Worn Accessory SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS 4 Tx slots	Front	5	Full	251	848.8	26.43	27.50	1.279	0.05	0.471	0.603
24	GSM850	GPRS 4 Tx slots	Back	5	Full	251	848.8	26.43	27.50	1.279	-0.02	0.481	0.615
	GSM1900	GPRS 4 Tx slots	Front	5	Reduced	661	1880	20.95	22.50	1.429	0.03	0.415	0.593
25	GSM1900	GPRS 4 Tx slots	Back	5	Reduced	661	1880	20.95	22.50	1.429	-0.05	0.484	0.692

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	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 Band V	RMC 12.2Kbps	Front	5	Full	4132	826.4	23.63	24.00	1.089	0.06	0.457	0.498
26	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4132	826.4	23.63	24.00	1.089	-0.14	0.477	0.519
	WCDMA Band II	RMC 12.2Kbps	Front	5	Reduced	9538	1907.6	17.39	18.00	1.151	0.01	0.349	0.402
27	WCDMA Band II	RMC 12.2Kbps	Back	5	Reduced	9538	1907.6	17.39	18.00	1.151	-0.16	0.394	0.453

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 5	10M	QPSK	1	49	Front	5	Full	20525	836.5	22.96	24.00	1.271	0.07	0.501	0.637
	LTE Band 5	10M	QPSK	25	12	Front	5	Full	20525	836.5	22.08	23.00	1.236	-0.04	0.259	0.320
28	LTE Band 5	10M	QPSK	1	49	Back	5	Full	20525	836.5	22.96	24.00	1.271	0.05	0.544	0.691
	LTE Band 5	10M	QPSK	25	12	Back	5	Full	20525	836.5	22.08	23.00	1.236	0.01	0.249	0.308
	LTE Band 7	20M	QPSK	1	49	Front	5	Reduced	21350	2560	15.52	16.00	1.117	-0.19	0.408	0.456
	LTE Band 7	20M	QPSK	50	24	Front	5	Reduced	21350	2560	15.36	16.00	1.159	-0.14	0.416	0.482
	LTE Band 7	20M	QPSK	1	49	Back	5	Reduced	21350	2560	15.52	16.00	1.117	-0.07	0.560	0.625
29	LTE Band 7	20M	QPSK	50	24	Back	5	Reduced	21350	2560	15.36	16.00	1.159	-0.06	0.556	0.644

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	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)
	LTE Band 41	20M	QPSK	1	49	Front	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.07	0.222	0.252
	LTE Band 41	20M	QPSK	50	0	Front	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	-0.04	0.214	0.244
30	LTE Band 41	20M	QPSK	1	49	Back	5	Reduced	40670	2598	15.98	16.50	1.127	62.9	1.006	0.07	0.348	0.395
	LTE Band 41	20M	QPSK	50	0	Back	5	Reduced	40670	2598	15.95	16.50	1.135	62.9	1.006	0.03	0.344	0.393



<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.487			
31	WLAN 2.4GHz	802.11b 1Mbps	Back	5	6	2437	18.46	18.50	1.009	97.59	1.025	0.831	0.02	0.505	0.522

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	Bluetooth	1Mbps	Front	5	39	2441	11.80	12.50	1.175	76.78	1.085	-0.01	0.066	0.084
32	Bluetooth	1Mbps	Back	5	39	2441	11.80	12.50	1.175	76.78	1.085	-0.05	0.081	0.103

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Max Area Scan SAR	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Front	5	Reduced	64	5320	13.47	13.50	1.006	87.04	1.149	0.336	0.08	0.130	0.150
33	WLAN5.3GHz	802.11a 6Mbps	Back	5	Reduced	64	5320	13.47	13.50	1.006	87.04	1.149	1.45	0.01	0.535	0.619
	WLAN5.5GHz	802.11a 6Mbps	Front	5	Reduced	116	5580	13.35	13.50	1.034	87.04	1.149	0.245	0.07	0.092	0.109
34	WLAN5.5GHz	802.11a 6Mbps	Back	5	Reduced	116	5580	13.35	13.50	1.034	87.04	1.149	0.848	-0.08	0.343	0.408
	WLAN5.8GHz	802.11a 6Mbps	Front	5	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.714			
35	WLAN5.8GHz	802.11a 6Mbps	Back	5	Full	149	5745	11.98	13.50	1.419	87.04	1.149	0.816	0.02	0.219	0.357

15.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Power Mode	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	Left Cheek	-	Full	6	2437	18.46	18.50	1.009	97.59	1.025	0.04	1.020	1	1.055
2nd	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Left Cheek	-	Full	6	2437	18.46	18.50	1.009	97.59	1.025	0.08	1.010	1.010	1.045
1st	LTE Band 7	20M	QPSK	100	0	-	Bottom Side	5	Reduced	21350	2560	15.33	16.00	1.167	-	-	0.07	0.890	1	1.038
2nd	LTE Band 7	20M	QPSK	100	0	-	Bottom Side	5	Reduced	21350	2560	15.33	16.00	1.167	-	-	-0.03	0.870	1.023	1.015

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/kg}$, 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.

16. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset		
		Head	Body-worn	Hotspot
1.	GSM Voice + WLAN2.4GHz	Yes	Yes	
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes
5.	GSM Voice + WLAN5.2/5.3/5.5GHz	Yes	Yes	
6.	GPRS/EDGE + WLAN5.2/5.3/5.5GHz	Yes	Yes	
7.	WCDMA + WLAN5.2/5.3/5.5GHz	Yes	Yes	
8.	LTE + WLAN5.2/5.3/5.5GHz	Yes	Yes	
9.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes	
10.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes
11.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes
12.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes
13.	GSM Voice + Bluetooth	Yes	Yes	
14.	GPRS/EDGE + Bluetooth	Yes	Yes	Yes
15.	WCDMA + Bluetooth	Yes	Yes	Yes
16.	LTE + Bluetooth	Yes	Yes	Yes
17.	Bluetooth + WLAN5.2/5.3/5.5GHz	Yes	Yes	Yes
18.	Bluetooth + WLAN5.2/5.8GHz	Yes	Yes	Yes
19.	GSM Voice + Bluetooth + WLAN5.2/5.3/5.5GHz	Yes	Yes	
20.	GPRS/EDGE + Bluetooth + WLAN5.2/5.3/5.5GHz	Yes	Yes	Yes
21.	WCDMA + Bluetooth + WLAN5.2/5.3/5.5GHz	Yes	Yes	Yes
22.	LTE + Bluetooth + WLAN5.2/5.3/5.5GHz	Yes	Yes	Yes
23.	GSM Voice + Bluetooth + WLAN5.2/5.8GHz	Yes	Yes	
24.	GPRS/EDGE + Bluetooth + WLAN5.2/5.8GHz	Yes	Yes	Yes
25.	WCDMA + Bluetooth + WLAN5.2/5.8GHz	Yes	Yes	Yes
26.	LTE + Bluetooth + WLAN5.2/5.8GHz	Yes	Yes	Yes

General Note:

- This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- 2.4GHz WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
- According to the character of EUT, WLAN2.4GHz and WLAN5GHz can't transmit simultaneously.
- This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
- This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
- For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2Tx combination of simultaneously transmission.
- The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
- Chose the worst zoom scan SAR of WLAN correspondingly for co-located with WWAN analysis.
- The reported SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$, 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.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

16.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Right Cheek	0.171	1.055	0.590	0.055	1.23	0.82
		Right Tilted	0.097	1.055	0.642	0.054	1.15	0.79
		Left Cheek	0.109	1.055	0.642	0.184	1.16	0.94
		Left Tilted	0.078	0.900	0.642	0.163	0.98	0.88
	GSM1900	Right Cheek	0.072	1.055	0.590	0.055	1.13	0.72
		Right Tilted	0.038	1.055	0.642	0.054	1.09	0.73
		Left Cheek	0.123	1.055	0.642	0.184	1.18	0.95
		Left Tilted	0.054	0.900	0.642	0.163	0.95	0.86
WCDMA	Band V	Right Cheek	0.130	1.055	0.590	0.055	1.19	0.78
		Right Tilted	0.074	1.055	0.642	0.054	1.13	0.77
		Left Cheek	0.099	1.055	0.642	0.184	1.15	0.93
		Left Tilted	0.076	0.900	0.642	0.163	0.98	0.88
	Band II	Right Cheek	0.138	1.055	0.590	0.055	1.19	0.78
		Right Tilted	0.077	1.055	0.642	0.054	1.13	0.77
		Left Cheek	0.246	1.055	0.642	0.184	1.30	1.07
		Left Tilted	0.103	0.900	0.642	0.163	1.00	0.91
LTE	Band 5	Right Cheek	0.175	1.055	0.590	0.055	1.23	0.82
		Right Tilted	0.090	1.055	0.642	0.054	1.15	0.79
		Left Cheek	0.128	1.055	0.642	0.184	1.18	0.95
		Left Tilted	0.094	0.900	0.642	0.163	0.99	0.90
	Band 7	Right Cheek	0.146	1.055	0.590	0.055	1.20	0.79
		Right Tilted	0.111	1.055	0.642	0.054	1.17	0.81
		Left Cheek	0.121	1.055	0.642	0.184	1.18	0.95
		Left Tilted	0.034	0.900	0.642	0.163	0.93	0.84
	Band 41	Right Cheek	0.045	1.055	0.590	0.055	1.10	0.69
		Right Tilted	0.029	1.055	0.642	0.054	1.08	0.73
		Left Cheek	0.073	1.055	0.642	0.184	1.13	0.90
		Left Tilted	0.029	0.900	0.642	0.163	0.93	0.83

16.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Front	0.603	0.522	0.524	0.084	1.13	1.21
		Back	0.615	0.522	0.524	0.103	1.14	1.24
		Left Side	0.142				0.14	0.14
		Right Side	0.310	0.421		0.079	0.73	0.39
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	0.439				0.44	0.44
	GSM1900	Front	0.593	0.522	0.524	0.084	1.12	1.20
		Back	0.692	0.522	0.524	0.103	1.21	1.32
		Left Side	0.143				0.14	0.14
		Right Side	0.056	0.421		0.079	0.48	0.14
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	1.151				1.15	1.15
WCDMA	Band V	Front	0.498	0.522	0.524	0.084	1.02	1.11
		Back	0.519	0.522	0.524	0.103	1.04	1.15
		Left Side	0.155				0.16	0.16
		Right Side	0.274	0.421		0.079	0.70	0.35
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	0.359				0.36	0.36
	Band II	Front	0.402	0.522	0.524	0.084	0.92	1.01
		Back	0.453	0.522	0.524	0.103	0.98	1.08
		Left Side	0.078				0.08	0.08
		Right Side	0.037	0.421		0.079	0.46	0.12
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	0.907				0.91	0.91
LTE	Band 5	Front	0.637	0.522	0.524	0.084	1.16	1.25
		Back	0.691	0.522	0.524	0.103	1.21	1.32
		Left Side	0.168				0.17	0.17
		Right Side	0.386	0.421		0.079	0.81	0.47
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	0.526				0.53	0.53
	Band 7	Front	0.482	0.522	0.524	0.084	1.00	1.09
		Back	0.644	0.522	0.524	0.103	1.17	1.27
		Left Side	0.290				0.29	0.29
		Right Side	0.024	0.421		0.079	0.45	0.10
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	1.038				1.04	1.04
	Band 41	Front	0.252	0.522	0.524	0.084	0.77	0.86
		Back	0.395	0.522	0.524	0.103	0.92	1.02
		Left Side	0.137				0.14	0.14
		Right Side	0.015	0.421		0.079	0.44	0.09
		Top Side		0.522	0.357	0.037	0.52	0.39
		Bottom Side	0.839				0.84	0.84

16.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2	1+3+4
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Front	0.603	0.522	0.619	0.084	1.13	1.31
		Back	0.615	0.522	0.619	0.103	1.14	1.34
	GSM1900	Front	0.593	0.522	0.619	0.084	1.12	1.30
		Back	0.692	0.522	0.619	0.103	1.21	1.41
WCDMA	Band V	Front	0.498	0.522	0.619	0.084	1.02	1.20
		Back	0.519	0.522	0.619	0.103	1.04	1.24
	Band II	Front	0.402	0.522	0.619	0.084	0.92	1.11
		Back	0.453	0.522	0.619	0.103	0.98	1.18
LTE	Band 5	Front	0.637	0.522	0.619	0.084	1.16	1.34
		Back	0.691	0.522	0.619	0.103	1.21	1.41
	Band 7	Front	0.482	0.522	0.619	0.084	1.00	1.19
		Back	0.644	0.522	0.619	0.103	1.17	1.37
	Band 41	Front	0.252	0.522	0.619	0.084	0.77	0.96
		Back	0.395	0.522	0.619	0.103	0.92	1.12

Test Engineer : Nick Hu



17. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.

18. 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. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [6] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.
- [7] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [8] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [9] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [10] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [11] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [12] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [13] FCC KDB 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_835MHz**DUT: D835V2 - SN:4d091**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_835 Medium parameters used: $f = 835$ MHz; $\sigma = 0.893$ S/m; $\epsilon_r = 41.63$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.2, 10.2, 10.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.48 W/kg

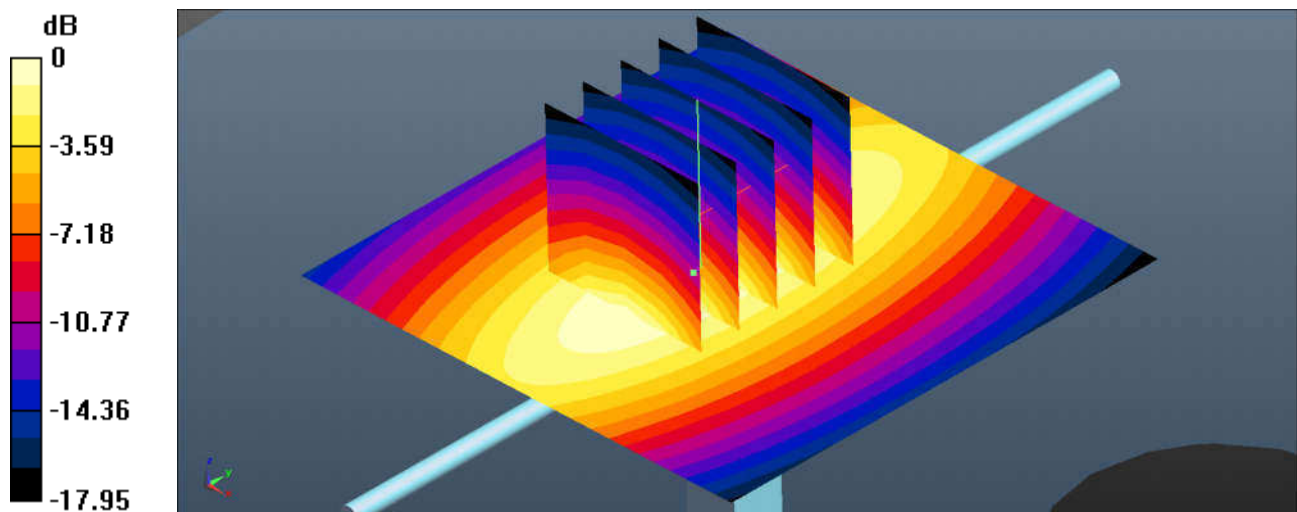
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 37.14 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.78 W/kg

SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 2.50 W/kg



0 dB = 2.50 W/kg = 3.98 dBW/kg

System Check_Head_1900MHz**DUT: D1900V2 - SN:5d118**

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.428$ S/m; $\epsilon_r = 41.105$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(8.41, 8.41, 8.41); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 13.7 W/kg

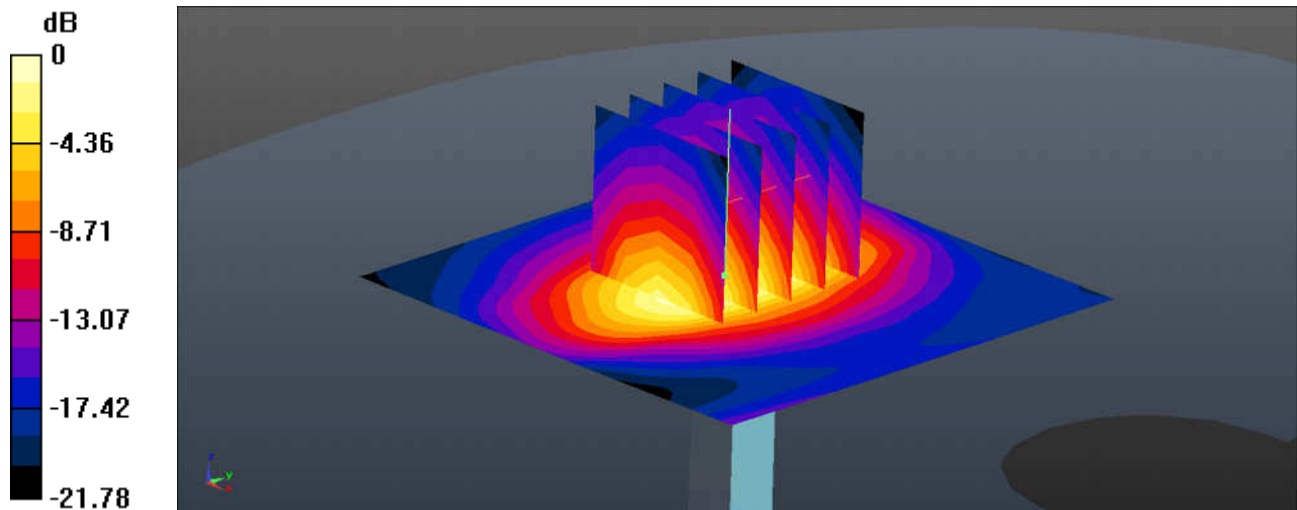
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80.77 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 15.6 W/kg

SAR(1 g) = 9.78 W/kg; SAR(10 g) = 5.47 W/kg

Maximum value of SAR (measured) = 13.2 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

System Check_Head_2450MHz**DUT: D2450V2 - SN:840**

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL_2450 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.846$ S/m; $\epsilon_r = 39.011$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.49, 7.49, 7.49); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 19.6 W/kg

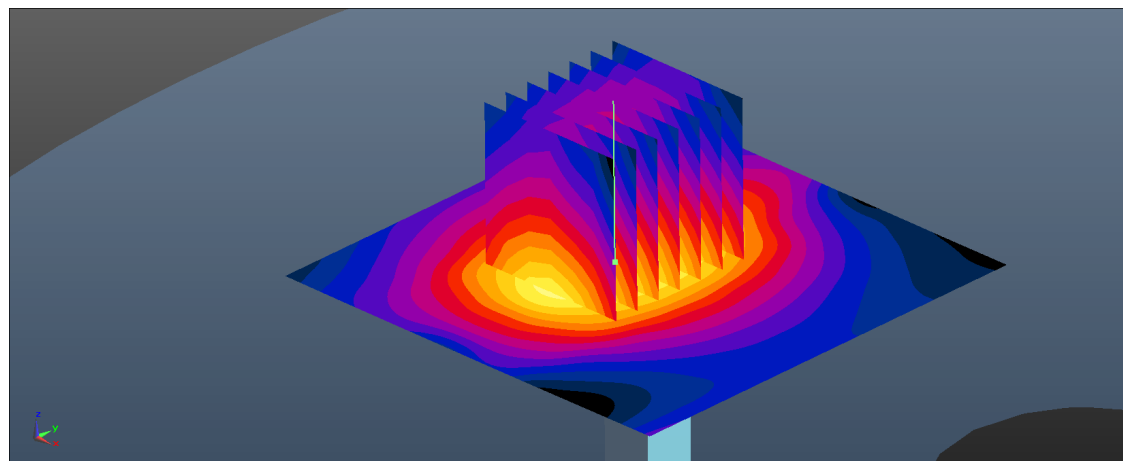
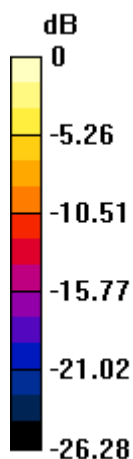
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 73.89 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 24.1 W/kg

SAR(1 g) = 12.8 W/kg; SAR(10 g) = 6.27 W/kg

Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

System Check_Head_2600MHz**DUT: D2600V2 - SN:1061**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL_2600 Medium parameters used: $f = 2600$ MHz; $\sigma = 2.021$ S/m; $\epsilon_r = 38.679$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.31, 7.31, 7.31); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 22.4 W/kg

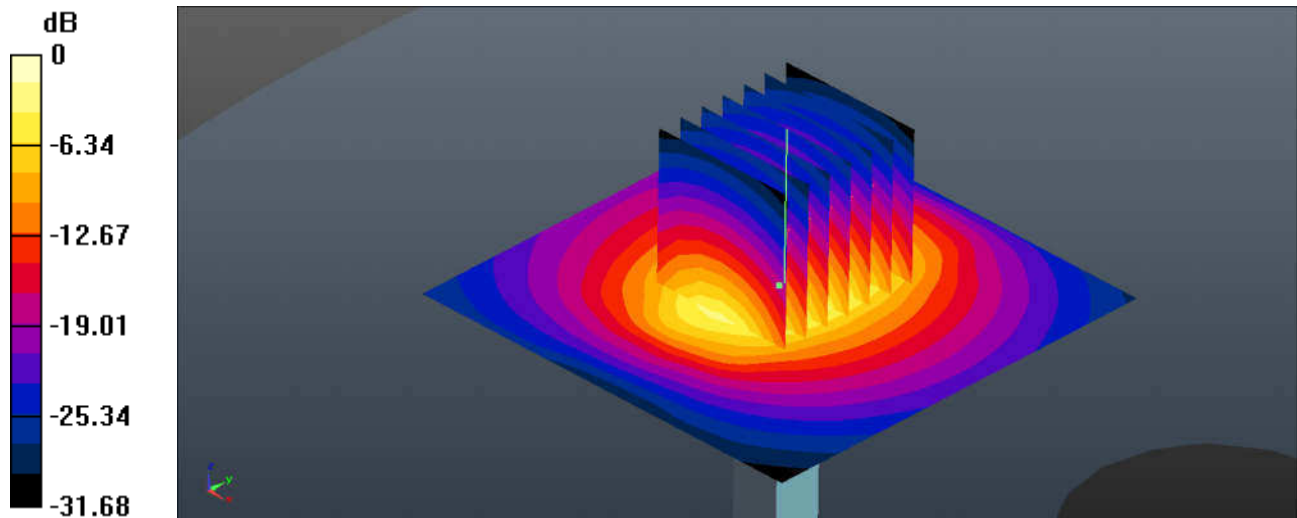
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.44 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 29.0 W/kg

SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.57 W/kg

Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

System Check_Head_5250MHz

DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: HSL_5000 Medium parameters used: $f = 5250$ MHz; $\sigma = 4.565$ S/m; $\epsilon_r = 36.009$; $\rho = 1000$

kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(5.2, 5.2, 5.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 16.3 W/kg

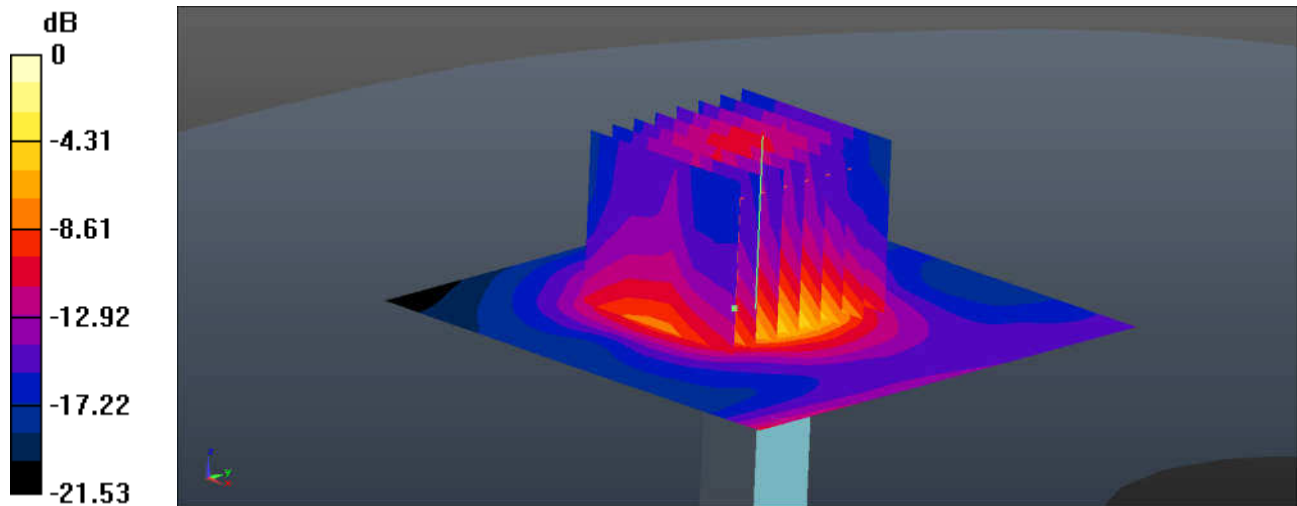
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 38.27 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 23.2 W/kg

SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.45 W/kg

Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 16.3 W/kg = 12.12 dBW/kg

System Check_Head_5600MHz

DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: HSL_5000 Medium parameters used: $f = 5600$ MHz; $\sigma = 4.968$ S/m; $\epsilon_r = 35.22$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.59, 4.59, 4.59); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.4 W/kg

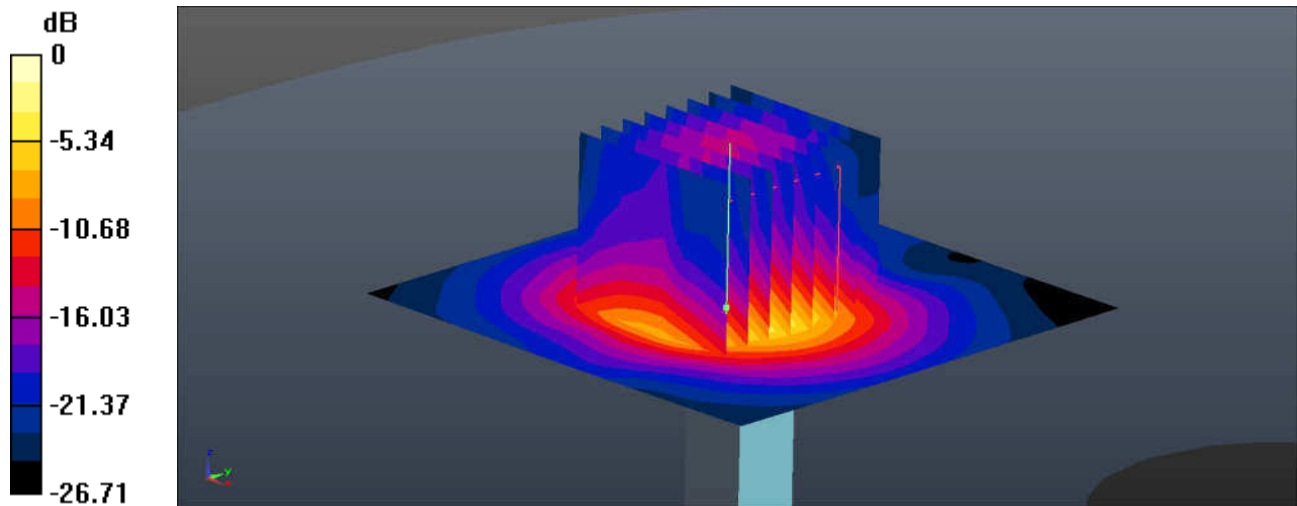
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 38.94 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 27.9 W/kg

SAR(1 g) = 8.06 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

System Check_Head_5750MHz**DUT: D5GHzV2-SN:1006**

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL_5000 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.147$ S/m; $\epsilon_r = 34.924$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.74, 4.74, 4.74); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 16.0 W/kg

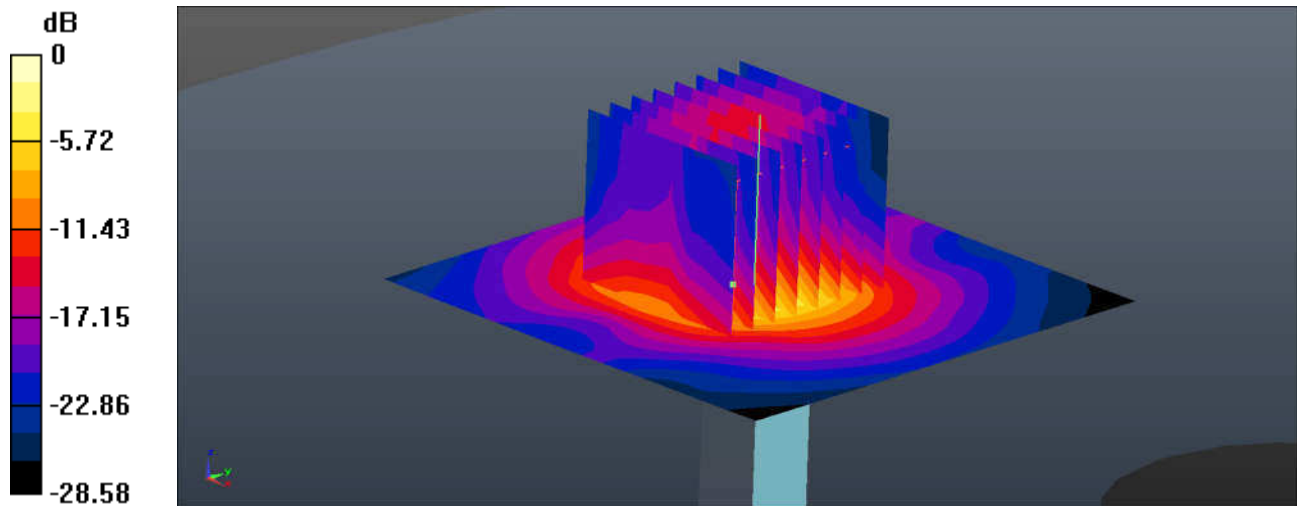
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 35.13 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 23.0 W/kg

SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.33 W/kg

Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 16.0 W/kg = 12.04 dBW/kg

System Check_Body_835MHz

DUT: D835V2 - SN:4d091

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL_835 Medium parameters used: $f = 835$ MHz; $\sigma = 0.984$ S/m; $\epsilon_r = 56.51$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.02, 10.02, 10.02); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 3.10 W/kg

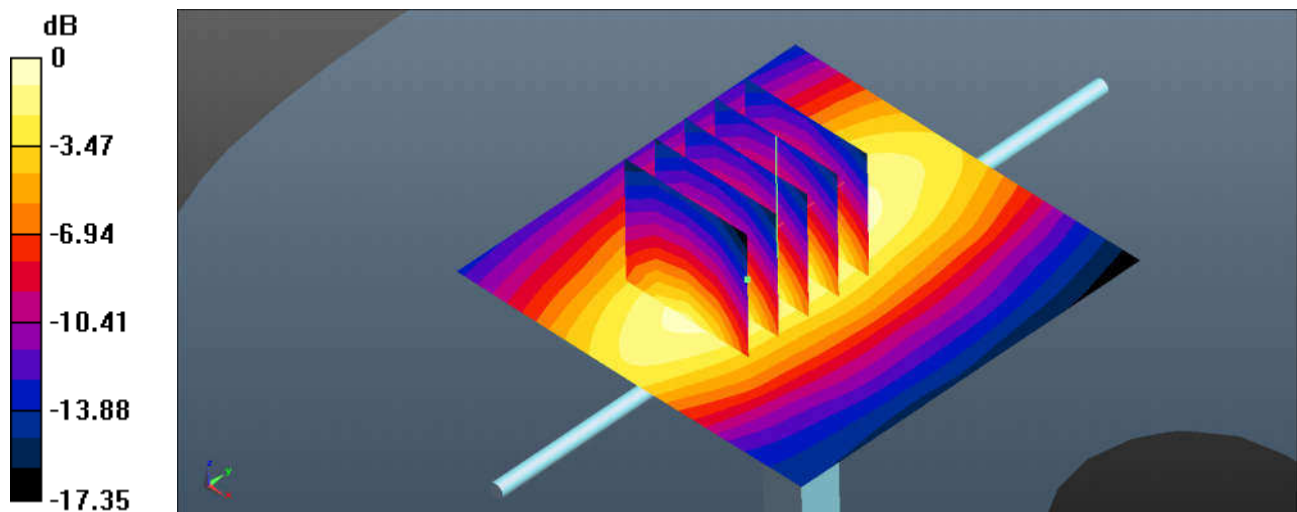
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 48.64 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.5 W/kg; SAR(10 g) = 1.76 W/kg

Maximum value of SAR (measured) = 2.98 W/kg



0 dB = 3.10 W/kg = 4.91 dBW/kg

System Check_Body_1900MHz**DUT: D1900V2 - SN:5d118**

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL_1900 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.537$ S/m; $\epsilon_r = 53.469$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(8.03, 8.03, 8.03); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 14.2 W/kg

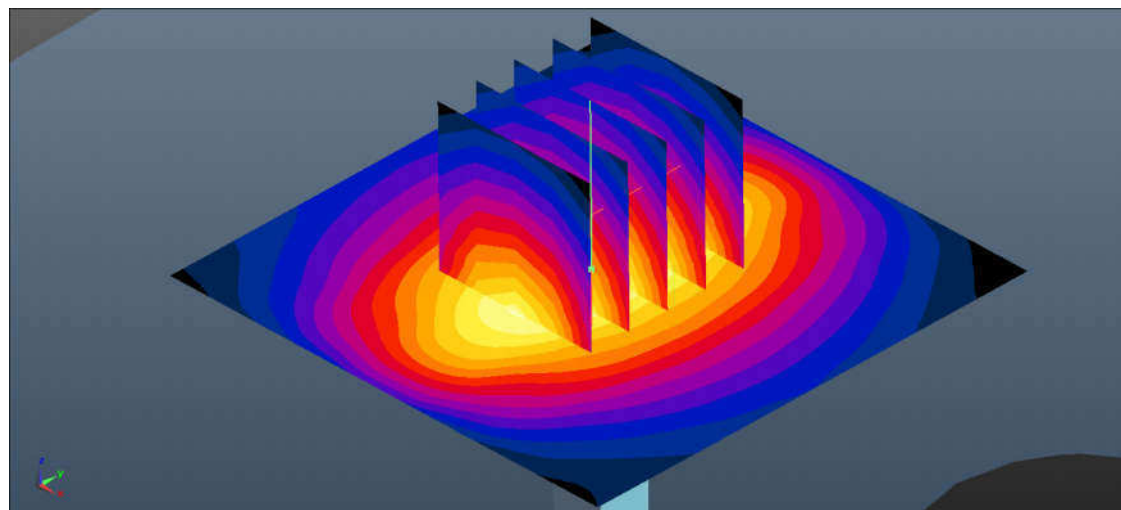
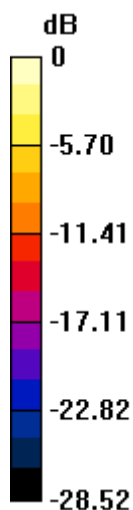
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.53 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.31 W/kg

Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

System Check_Body_2450MHz**DUT: D2450V2 - SN:840**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL_2450 Medium parameters used: $f = 2450$ MHz; $\sigma = 2.021$ S/m; $\epsilon_r = 53.033$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.53, 7.53, 7.53); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 18.2 W/kg

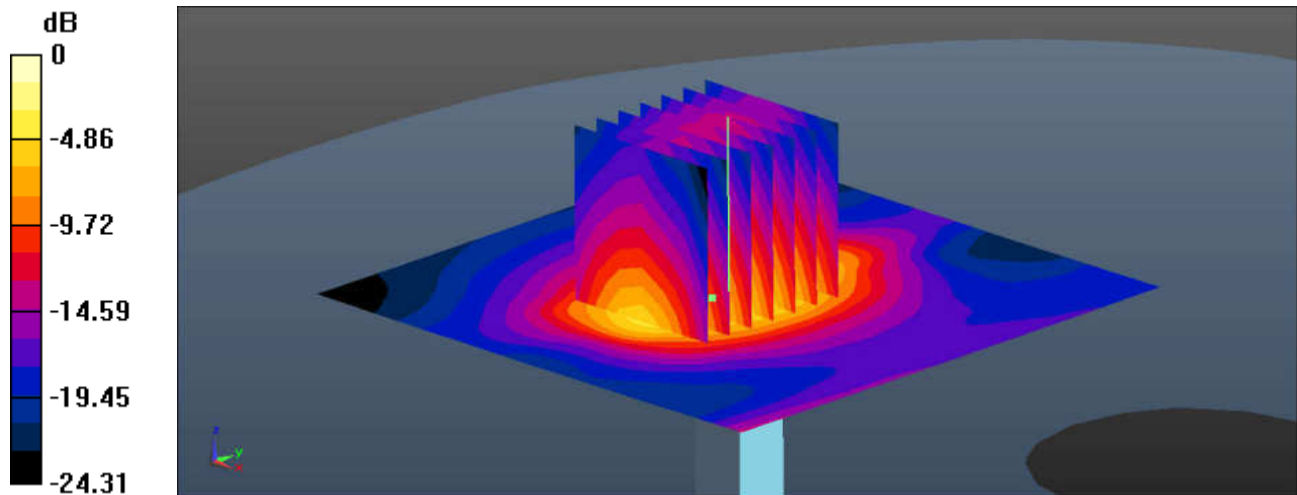
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 77.83 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 21.4 W/kg

SAR(1 g) = 12.6 W/kg; SAR(10 g) = 6.46 W/kg

Maximum value of SAR (measured) = 17.6 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

System Check_Body_2600MHz**DUT: D2600V2 - SN:1061**

Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: MSL_2600 Medium parameters used: $f = 2600$ MHz; $\sigma = 2.231$ S/m; $\epsilon_r = 52.422$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(6.92, 6.92, 6.92); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 22.6 W/kg

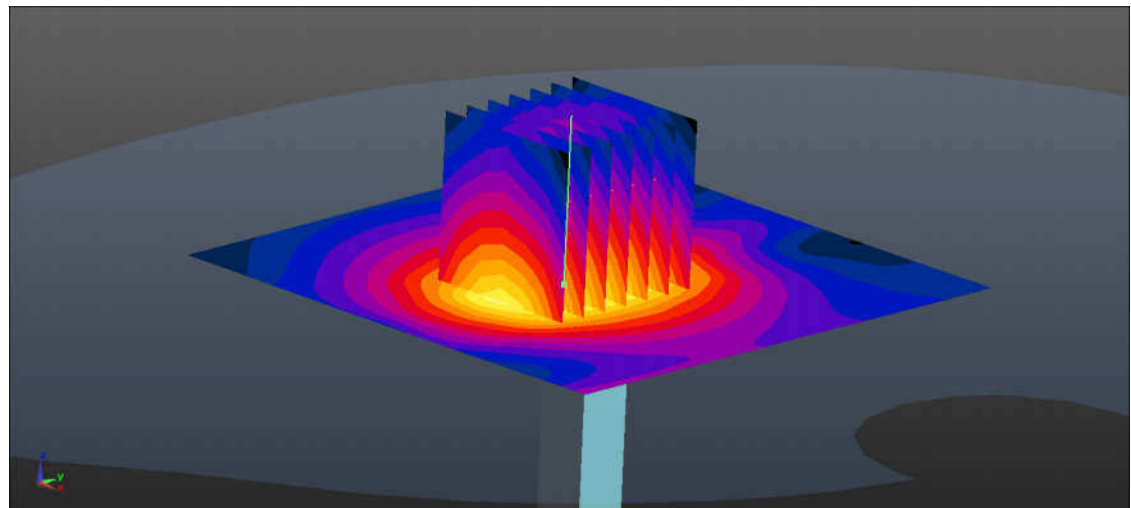
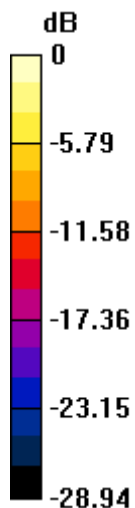
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 83.25 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 29.3 W/kg

SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.8 W/kg

Maximum value of SAR (measured) = 22.3 W/kg



0 dB = 22.6 W/kg = 13.54 dBW/kg

System Check_Body_5250MHz

DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: MSL_5000 Medium parameters used: $f = 5250$ MHz; $\sigma = 5.549$ S/m; $\epsilon_r = 47.004$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.62, 4.62, 4.62); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 19.0 W/kg

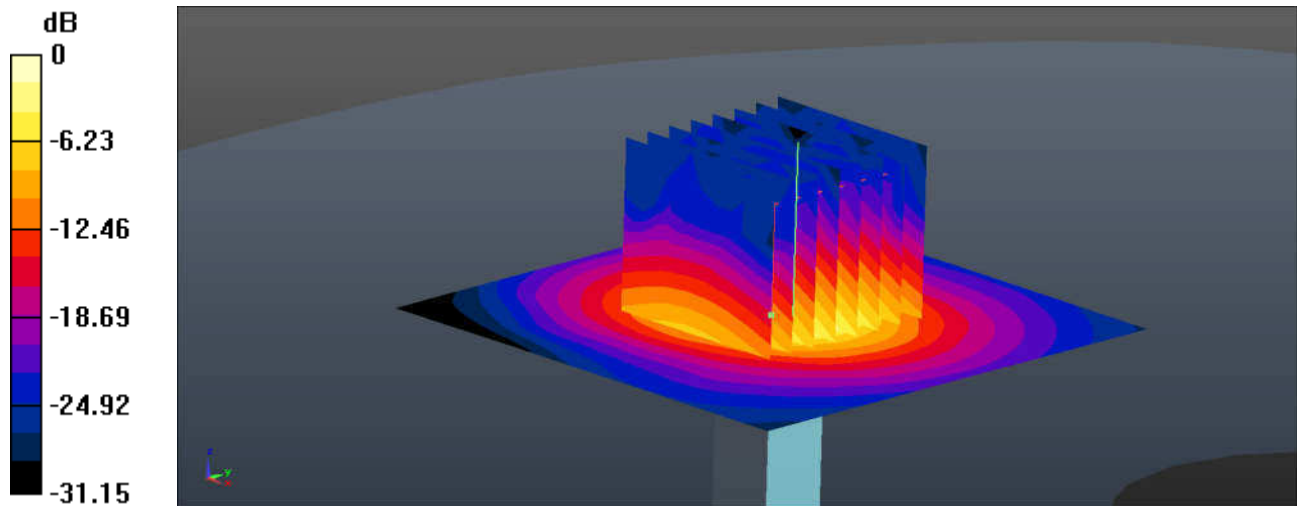
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 38.44 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 35.3 W/kg

SAR(1 g) = 7.97 W/kg; SAR(10 g) = 2.25 W/kg

Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg = 12.88 dBW/kg

$$0 \text{ dB} = 19.4 \text{ W/kg} = 12.88 \text{ dBW/kg}$$

System Check_Body_5750MHz

DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: MSL_5000 Medium parameters used: $f = 5750$ MHz; $\sigma = 6.226$ S/m; $\epsilon_r = 46.158$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.18, 4.18, 4.18); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 19.9 W/kg

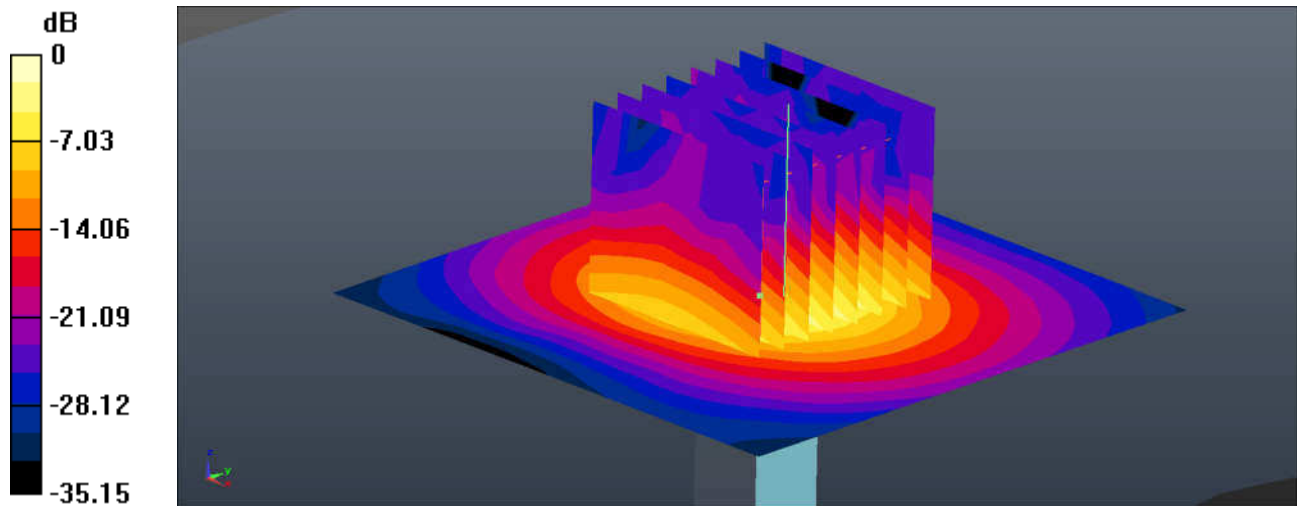
Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 38.55 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 36.6 W/kg

SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.15 W/kg

Maximum value of SAR (measured) = 19.0 W/kg



0 dB = 19.0 W/kg = 12.79 dBW/kg



Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

01_GSM850_GPRS 4 Tx slots_Right Cheek_0mm_Ch251

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 848.8 MHz; Duty Cycle: 1:2.08

Medium: HSL_835 Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.906$ S/m; $\epsilon_r = 41.456$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.2, 10.2, 10.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.158 W/kg

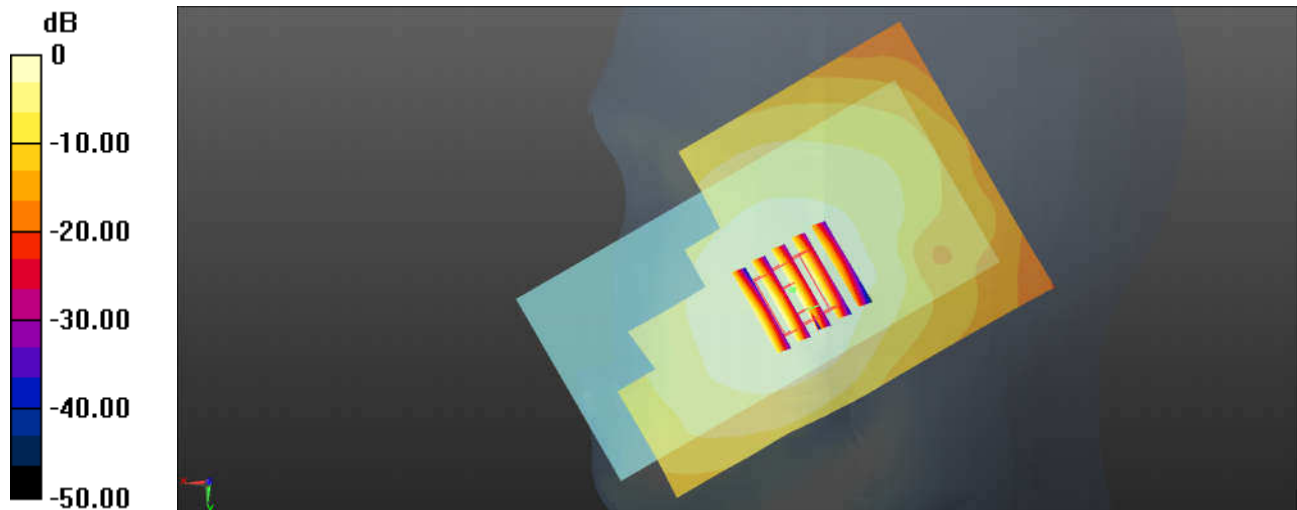
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 4.644 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.193 W/kg

SAR(1 g) = 0.134 W/kg; SAR(10 g) = 0.106 W/kg

Maximum value of SAR (measured) = 0.148 W/kg



0 dB = 0.158 W/kg = -8.01 dBW/kg

02_GSM1900_GPRS 4 Tx slots_Left Cheek_0mm_Ch661

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 1880 MHz; Duty Cycle: 1:2.08

Medium: HSL_1900 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.407$ S/m; $\epsilon_r = 41.213$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(8.41, 8.41, 8.41); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch661/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.111 W/kg

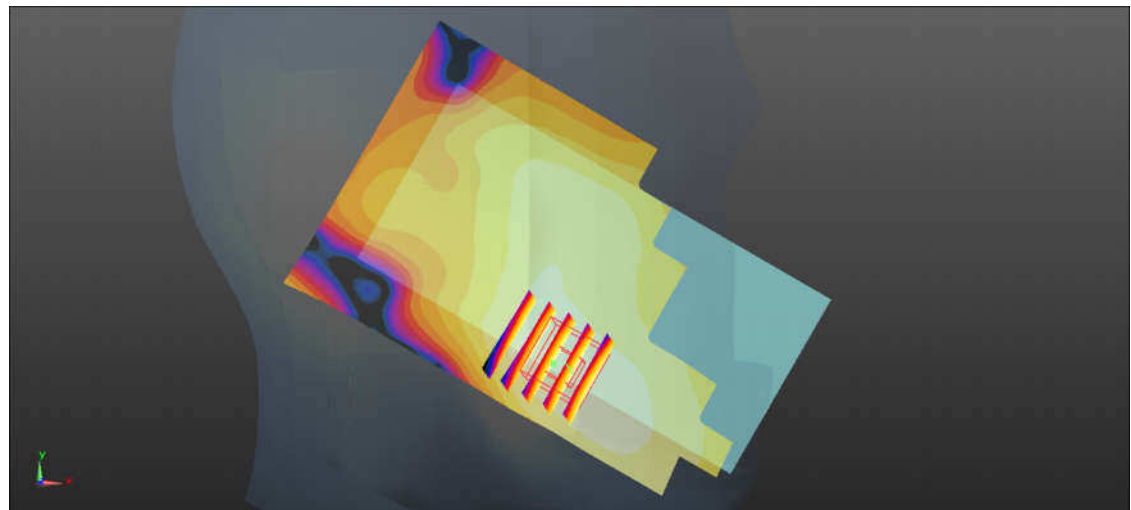
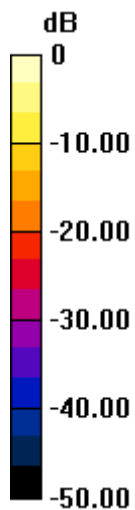
Ch661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.263 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.055 W/kg

Maximum value of SAR (measured) = 0.106 W/kg



0 dB = 0.111 W/kg = -9.55 dBW/kg

03_WCDMA V_RMC 12.2Kbps_Right Cheek_0mm_Ch4132

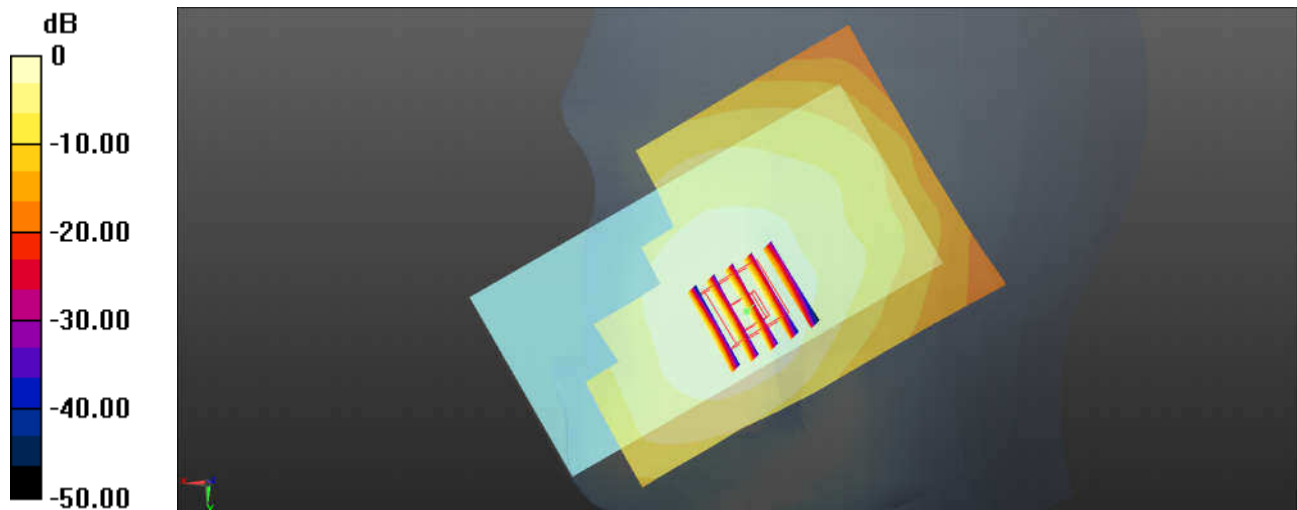
Communication System: UID 0, UMTS (0); Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: HSL_835 Medium parameters used: $f = 826.4$ MHz; $\sigma = 0.886$ S/m; $\epsilon_r = 41.744$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.2, 10.2, 10.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4132/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.136 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.033 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.144 W/kg
SAR(1 g) = 0.119 W/kg; SAR(10 g) = 0.094 W/kg
Maximum value of SAR (measured) = 0.135 W/kg



0 dB = 0.136 W/kg = -8.66 dBW/kg

04_WCDMA II_RMC 12.2Kbps_Left Cheek_0mm_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: HSL_1900 Medium parameters used: $f = 1907.6$ MHz; $\sigma = 1.436$ S/m; $\epsilon_r = 41.068$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(8.41, 8.41, 8.41); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.291 W/kg

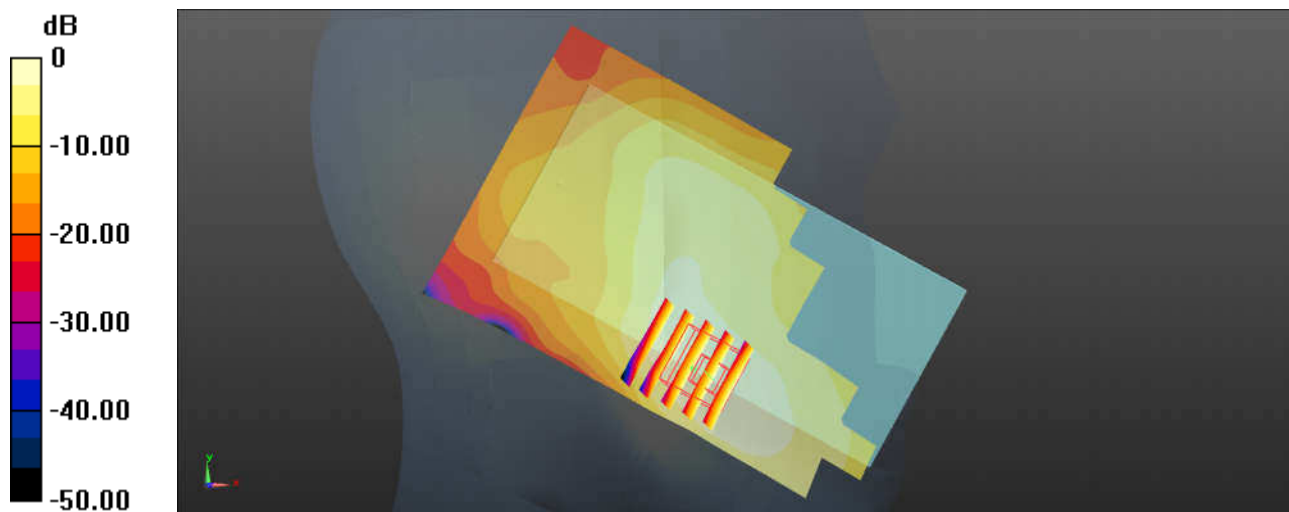
Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.490 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.318 W/kg

SAR(1 g) = 0.217 W/kg; SAR(10 g) = 0.143 W/kg

Maximum value of SAR (measured) = 0.274 W/kg



0 dB = 0.291 W/kg = -5.36 dBW/kg

05_LTE Band 5_10M_QPSK_1RB_49Offset_Right Cheek_0mm_Ch20525

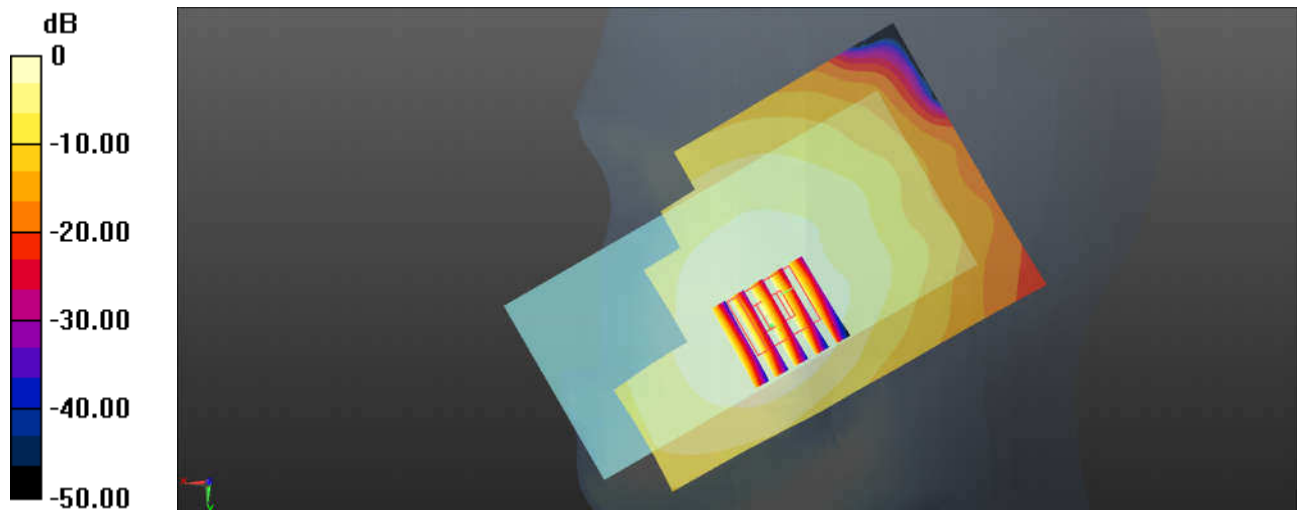
Communication System: UID 0, FDD_LTE (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: HSL_835 Medium parameters used: $f = 836.5$ MHz; $\sigma = 0.895$ S/m; $\epsilon_r = 41.616$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.2, 10.2, 10.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.158 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 3.800 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.138 W/kg; SAR(10 g) = 0.109 W/kg
Maximum value of SAR (measured) = 0.152 W/kg



0 dB = 0.158 W/kg = -8.01 dBW/kg

06_LTE Band 7_20M_QPSK_1RB_49Offset_Right Cheek_0mm_Ch21350

Communication System: UID 0, FDD_LTE (0); Frequency: 2560 MHz; Duty Cycle: 1:1

Medium: HSL_2600 Medium parameters used: $f = 2560$ MHz; $\sigma = 1.971$ S/m; $\epsilon_r = 38.835$; $\rho = 1000$

kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.31, 7.31, 7.31); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch21350/Area Scan (91x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.193 W/kg

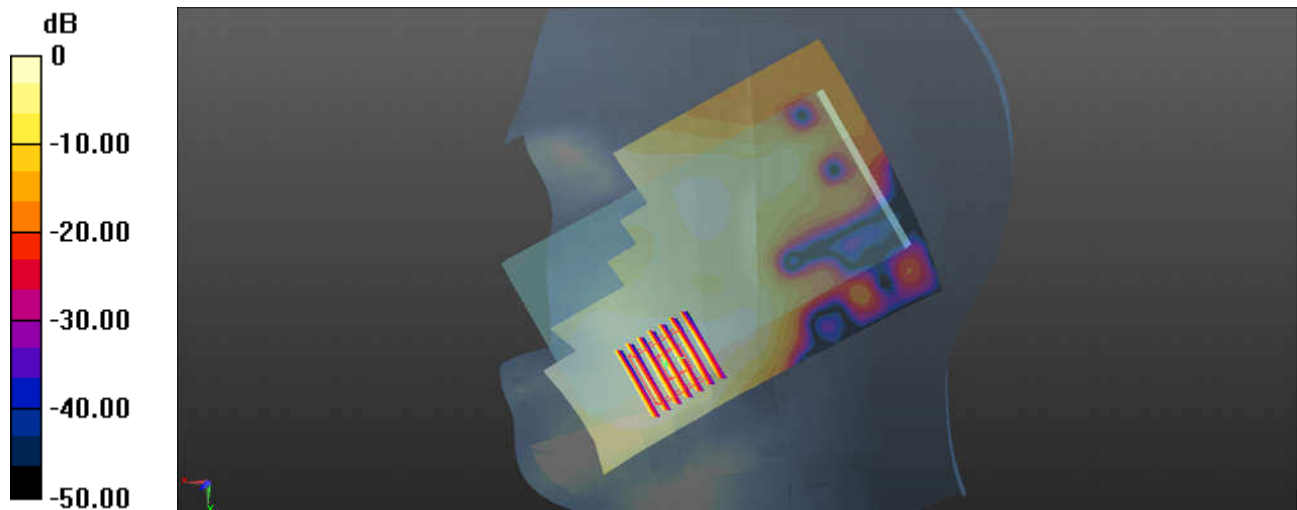
Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.288 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.216 W/kg

SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.077 W/kg

Maximum value of SAR (measured) = 0.178 W/kg



0 dB = 0.193 W/kg = -7.14 dBW/kg

07_LTE Band 41_20M_QPSK_1RB_49Offset_Left Cheek_0mm_Ch40670

Communication System: UID 0, TDD_LTE (0); Frequency: 2598 MHz; Duty Cycle: 1:1.59

Medium: HSL_2600 Medium parameters used: $f = 2598$ MHz; $\sigma = 2.019$ S/m; $\epsilon_r = 38.688$; $\rho = 1000$

kg/m³

Ambient Temperature : 23.2 °C ; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.31, 7.31, 7.31); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch40670/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.0891 W/kg

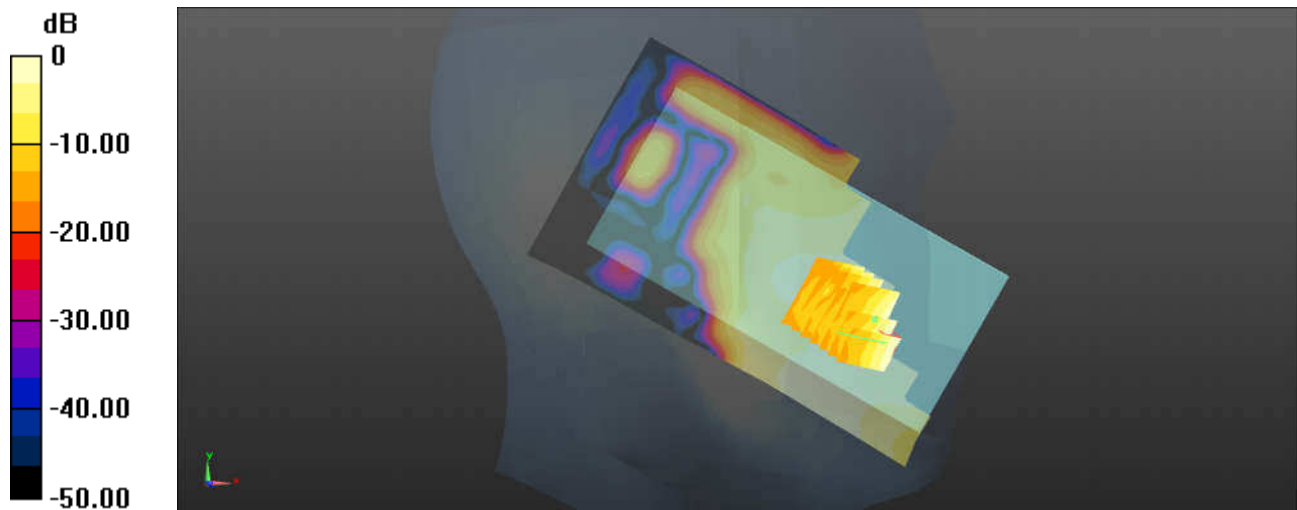
Ch40670/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.349 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.064 W/kg; SAR(10 g) = n.a.

Maximum value of SAR (measured) = 0.0956 W/kg



0 dB = 0.0891 W/kg = -10.50 dBW/kg

08_WLAN2.4GHz_802.11b 1Mbps_Left Cheek_0mm_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz; Duty Cycle: 1:1.025

Medium: HSL_2450 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.832$ S/m; $\epsilon_r = 39.069$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.49, 7.49, 7.49); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 1.55 W/kg

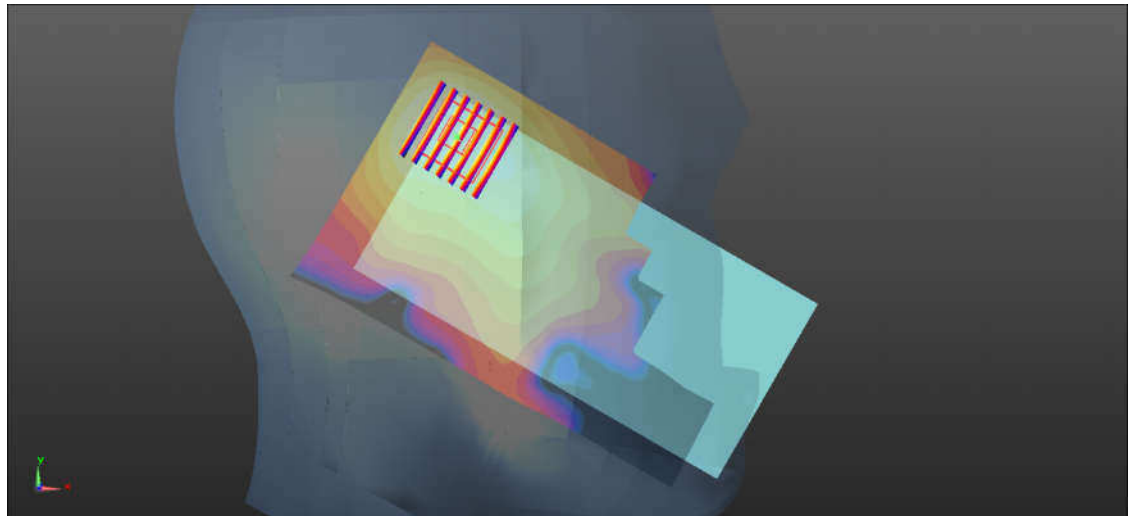
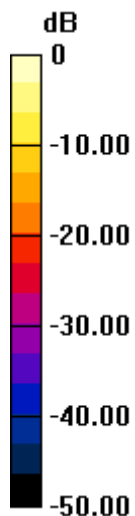
Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.44 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.93 W/kg

SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.519 W/kg

Maximum value of SAR (measured) = 1.43 W/kg



0 dB = 1.55 W/kg = 1.90 dBW/kg

09_Bluetooth_1Mbps_Left Cheek_0mm_Ch39

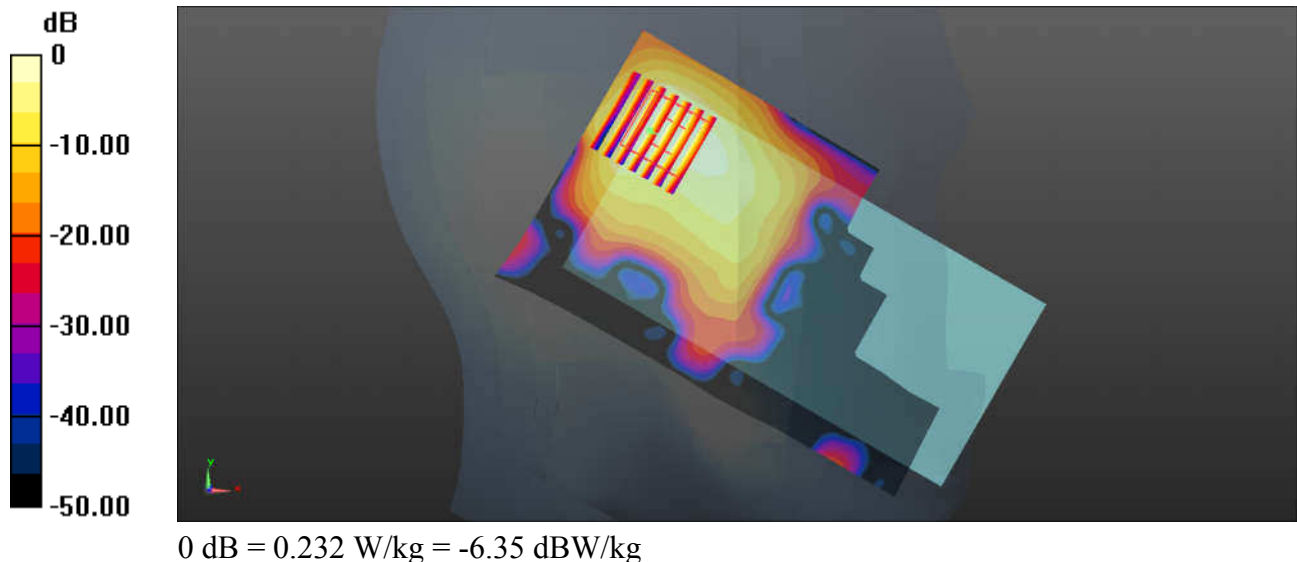
Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz; Duty Cycle: 1:1.302
Medium: HSL_2450 Medium parameters used: $f = 2441$ MHz; $\sigma = 1.836$ S/m; $\epsilon_r = 39.05$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.3 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(7.49, 7.49, 7.49); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch39/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.232 W/kg

Ch39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.077 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.287 W/kg
SAR(1 g) = 0.144 W/kg; SAR(10 g) = 0.072 W/kg
Maximum value of SAR (measured) = 0.228 W/kg



10_WLAN5.2GHz_802.11a 6Mbps_Right Tilted_0mm_Ant 1_Ch40

Communication System: UID 0, WIFI (0); Frequency: 5200 MHz; Duty Cycle: 1:1.149

Medium: HSL_5000 Medium parameters used: $f = 5200$ MHz; $\sigma = 4.509$ S/m; $\epsilon_r = 36.14$; $\rho = 1000$

kg/m³

Ambient Temperature : 23.3 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(5.2, 5.2, 5.2); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch40/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.13 W/kg

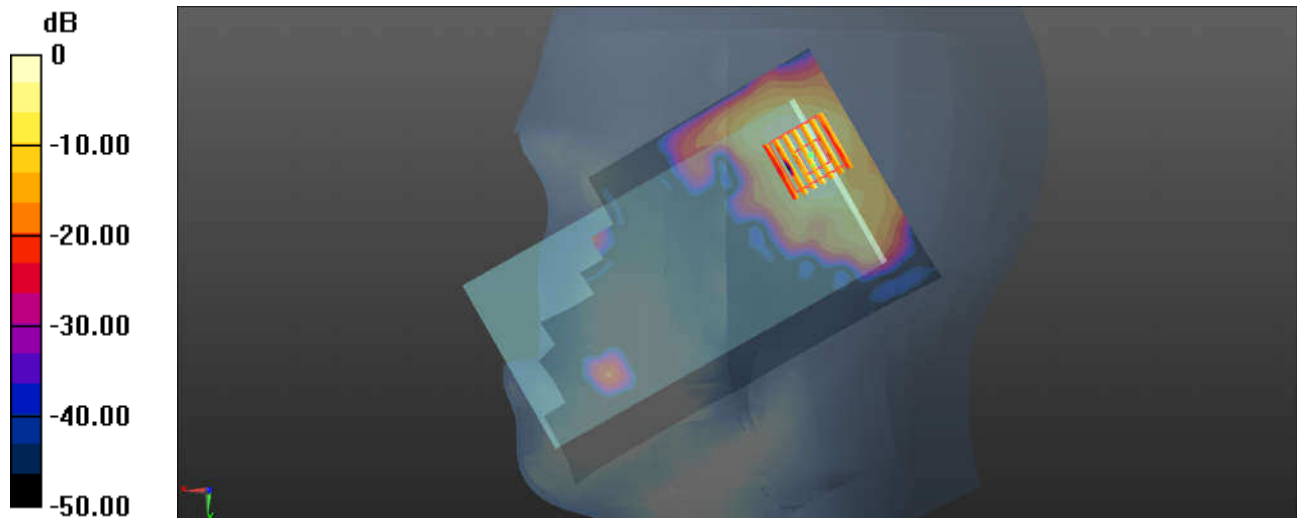
Ch40/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 11.61 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.54 W/kg

SAR(1 g) = 0.432 W/kg; SAR(10 g) = 0.141 W/kg

Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.13 W/kg = 0.53 dBW/kg

11_WLAN5.5GHz_802.11a 6Mbps_Right Tilted_0mm_Ch116

Communication System: UID 0, WIFI (0); Frequency: 5580 MHz; Duty Cycle: 1:1.149

Medium: HSL_5000 Medium parameters used: $f = 5580$ MHz; $\sigma = 4.94$ S/m; $\epsilon_r = 35.266$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.59, 4.59, 4.59); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch116/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.967 W/kg

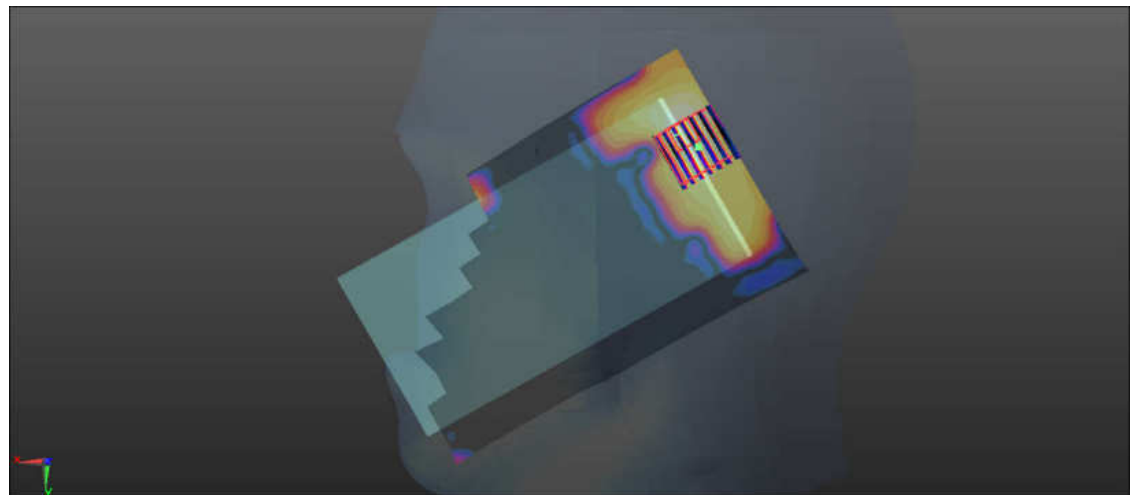
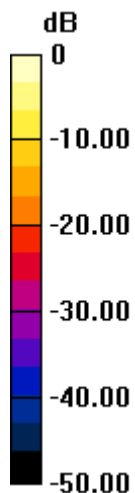
Ch116/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 5.240 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.318 W/kg; SAR(10 g) = 0.104 W/kg

Maximum value of SAR (measured) = 0.796 W/kg



0 dB = 0.967 W/kg = -0.15 dBW/kg

12_WLAN5.8GHz_802.11a 6Mbps_Right Tilted_0mm_Ch149

Communication System: UID 0, WIFI (0); Frequency: 5745 MHz; Duty Cycle: 1:1.149

Medium: HSL_5000 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.143$ S/m; $\epsilon_r = 34.936$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(4.74, 4.74, 4.74); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (101x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.457 W/kg

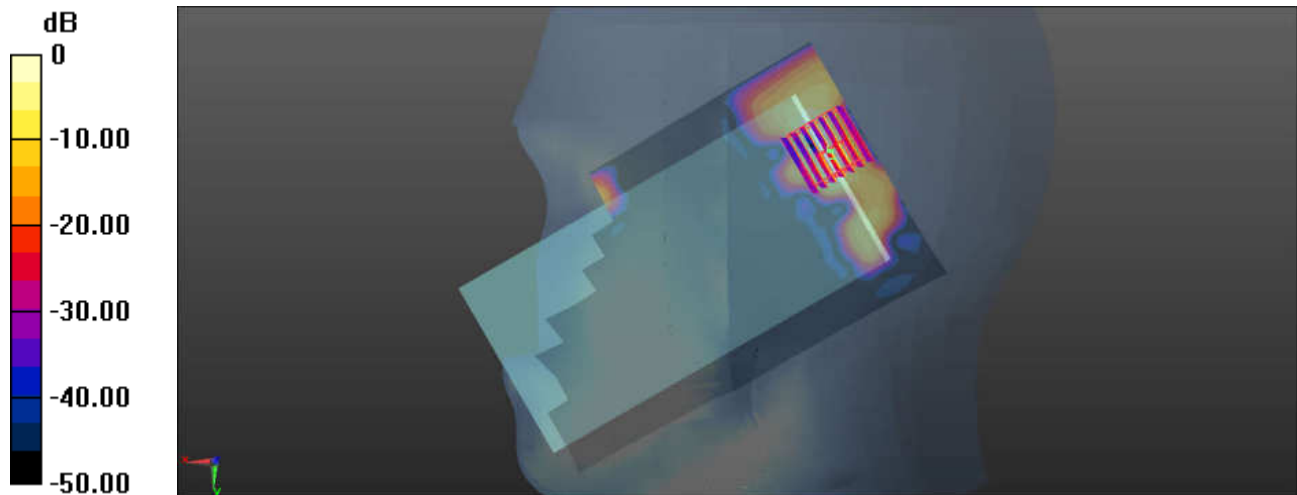
Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 1.477 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.547 W/kg

SAR(1 g) = 0.126 W/kg; SAR(10 g) = 0.031 W/kg

Maximum value of SAR (measured) = 0.342 W/kg



0 dB = 0.457 W/kg = -3.40 dBW/kg

13_GSM850_GPRS 4 Tx slots_Back_5mm_Ch251

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 848.8 MHz; Duty Cycle: 1:2.08

Medium: MSL_835 Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.999$ S/m; $\epsilon_r = 56.388$; $\rho = 1000$

kg/m³

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(10.02, 10.02, 10.02); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.709 W/kg

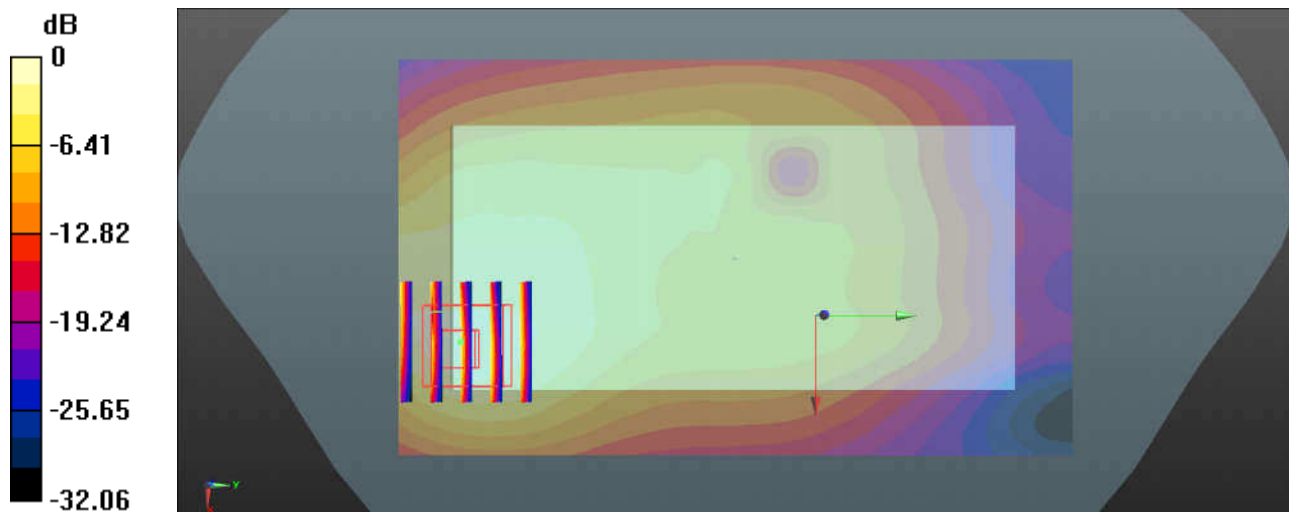
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.38 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 0.481 W/kg; SAR(10 g) = 0.274 W/kg

Maximum value of SAR (measured) = 0.676 W/kg



0 dB = 0.709 W/kg = -1.49 dBW/kg

14_GSM1900_GPRS 4 Tx slots_Bottom Side_5mm_Ch512

Communication System: UID 0, GPRS/EDGE (4 Tx slots) (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08

Medium: MSL_1900 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.479$ S/m; $\epsilon_r = 53.659$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.3 °C ; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3954; ConvF(8.03, 8.03, 8.03); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM3; Type: SAM; Serial: TP-1839
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.04 W/kg

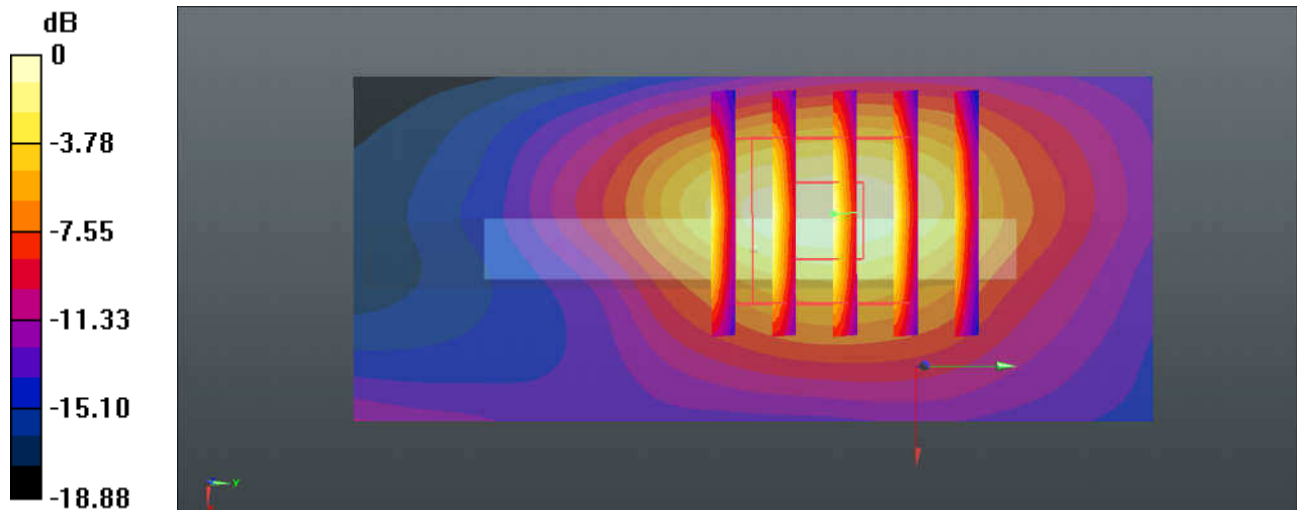
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.19 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.787 W/kg; SAR(10 g) = 0.413 W/kg

Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.04 W/kg = 0.17 dBW/kg