FCC SAR Report

Report No.	**:**	**SESF1503074**
Client	**:**	**Kintech Co., Ltd.**
Address	**:**	**1F-5F, Bldg 22, Chen Tian Industral Zone, Xi Xiang, Bao An District, Shenzhen, Guang Dong, China**
Manufacturer	**:**	**Kintech Co., Ltd.**
Address	**:**	**1F-5F, Bldg 22, Chen Tian Industral Zone, Xi Xiang, Bao An District, Shenzhen, Guang Dong, China**
Product	**:**	**Tablet PC**
Brand	**:**	**Kinwei, Titan**
Model	**:**	**PC8020, PC8020ME, PC8020Y,** **PCXXXX(XXXX represents0000~9999),** **PCXXXXME(XXXX represents0000~9999),** **PCXXXXY(XXXXrepresents0000~9999;Y represents A~Z),** **KW-PC8020I,KW-PC8020,** **KW-PCXXXXI(XXXX represents0000~9999),** **KW-PCXXXX(XXXXrepresents0000~9999)**
FCC ID	**:**	**BRCPC8020**
Standards	**:**	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 /** **IEEE 1528-2003 / KDB 865664 D01 v01r03/KDB648474 D04 v01r02/ KDB 447498 D01 v05r02 / KDB 616217 D04 v01r01**
Test Date	**:**	**April 06th, 2015~ April 07th, 2015**

Statement of Compliance:

The SAR values measured for the test sample are below the maximum recommended level of 1.6W/kg averaged over any 1g tissue according to FCC Acknowledge Data Base/ FCC 47CFR Part 2 (2.1093)/ IEEE Std.1528-2003.

The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

Prepared By: ______________________

Leo Chen

Approved By: ______________________

Miro Chueh

Release Version

Report No.	Issue Date	Description
SESF1503074	2015-04-08	Initial release

Contents

1. Summary of Maximum SAR Value

Highest Reported SAR	Head
GSM850	0.016
PCS1900	0.147
WCDMA Band II	0.157
WCDMA Band V	0.087
	Body
GSM850	0.4
PCS1900	0.752
WCDMA Band II	0.78
WCDMA Band V	0.768
Highest Simultaneous Transmission SAR	Head
WCDMA Band II +802.11b	0.837
	Body
WCDMA Band II +802.11b	**1.167**

<Unite: W/kg>

2. Description of Equipment under Test

Product Name	Tablet PC
Model No.	PC8020
Brand Name	Kinwei, Titan
IMEI1	867731020001006
IMEI2	867731020001006
Hardware Version	SM619_MAIN_PCB_V1.2
Software Version	AM526-HN-SM619_W_TRX_A25_AMGOO_V0.0.3.3_S1127
Antenna Type	Internal
Device Category	Portable
RF Exposure Environment	Uncontrolled
2G	
Support Band	GSM850/PCS1900
GPRS Type	Class B
GPRS Class	Class 12
Uplink	GSM 850: 824~849MHz PCS 1900: 1850~1910MHz
Downlink	GSM 850: 869~894MHz PCS 1900: 1930~1990MHz
Release Version	R99
Type of modulation	GMSK for GSM/GPRS; 8PSK for EDGE
Antenna Gain	GSM 850: -1.0dBi PCS1900: -0.8dBi
3G	
Support Band	WCDMA Band II/WCDMA Band V
Uplink	WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz
Downlink	WCDMA Band II: 1930~1990MHz WCDMA Band V: 869~894MHz
Release Version	Rel-6
Type of modulation	QPSK
Antenna Gain	WCDMA Band II: -0.8dBi WCDMA Band V: -1.0dBi

Bluetooth	
Bluetooth Frequency	2402~2480MHz
Channel separation	1MHz/2MHz
Modulation technology	GFSK, Pi/4QPSK, 8DPSK
Antenna Gain	0dBi
Wi-Fi	
Hotspots Function	YES
Tx Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150 Mbps
Type of modulation	802.11b: DSSS; 802.11g/n: OFDM
Wi-Fi Frequency	802.11b/g/n(20MHz): 2412 ~ 2462 MHz 802.11n(40MHz):2422~2452 MHz
Antenna Gain	0dBi

3. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Head	1. GSM 850/1900 (GPRS/EDGE) + WiFi 2.4GHz 2. WCDMA Band II/V (RMC)+ WiFi 2.4GHz
Body-worn Accessory	1. GSM 850/1900 Voice +BT 2. GSM 850/1900(GPRS/EDGE) + BT 3. WCDMA Band II/V (Voice)+ BT 4. WCDMA Band II/V (RMC) + BT 5. GSM 850/1900(GPRS/EDGE) + WiFi 2.4GHz 6. WCDMA Band II/V (RMC)+ WiFi 2.4GHz
Wireless Router (Hotspot)	1. GSM 850/1900 (GPRS/EDGE) + WiFi 2.4GHz 2. WCDMA Band II/V + WiFi 2.4GHz

Notes:

1. GPRS/EDGE and WCDMA support hotspot mode.
2. By reason of their independent modules and antennas, when GSM/GPRS or WCDMA is on, BT function can also be at work.
3. WiFi 2.4GHz Radio cannot transmit simultaneously with Bluetooth Radio.
4. According to FCC KDB Publication 447498 D01v05r02 section5.3, transmitter are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneously transmission analysis.

4. Basic restrictions and Standards

4.1. Test Standards

1. IEEE 1528-2003
2. FCC KDB Publication 447498 D01 General RF Exposure Guidance v05r02
3. FCC KDB Publication 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
4. FCC KDB Publication 616217 D04 SAR for laptop and tablets v01r01
5. FCC KDB Publication 648474 D04 D04 Handset SAR v01r02
6. FCC KDB Publication 941225 D01 3G SAR Procedures v03

4.2. Environment Condition

Item	Target	Measured
Ambient Temperature(°C)	18~25	21.5±2
Temperature of Simulant(°C)	20~22	21±2
Relative Humidity(%RH)	30~70	52

4.3. RF Exposure Limits

Human Exposure	Basic restrictions for electric, magnetic and electromagnetic fields. (Unit in mW/g or W/kg)
Spatial Peak SAR[1](Head and Body)	1.60
Spatial Average SAR[2](Whole Body)	0.08
Spatial Peak SAR[3](Arms and Legs)	4.00

Notes:

1. The Spatial Peak value of the SAR averaged over any 1gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

2. The Spatial Average value of the SAR averaged over the whole body.

3. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over appropriate averaging time.

5. General Information

Our Lab,

Test Site	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China

6. DASY5 Measurement System

DASY5 Measurement System

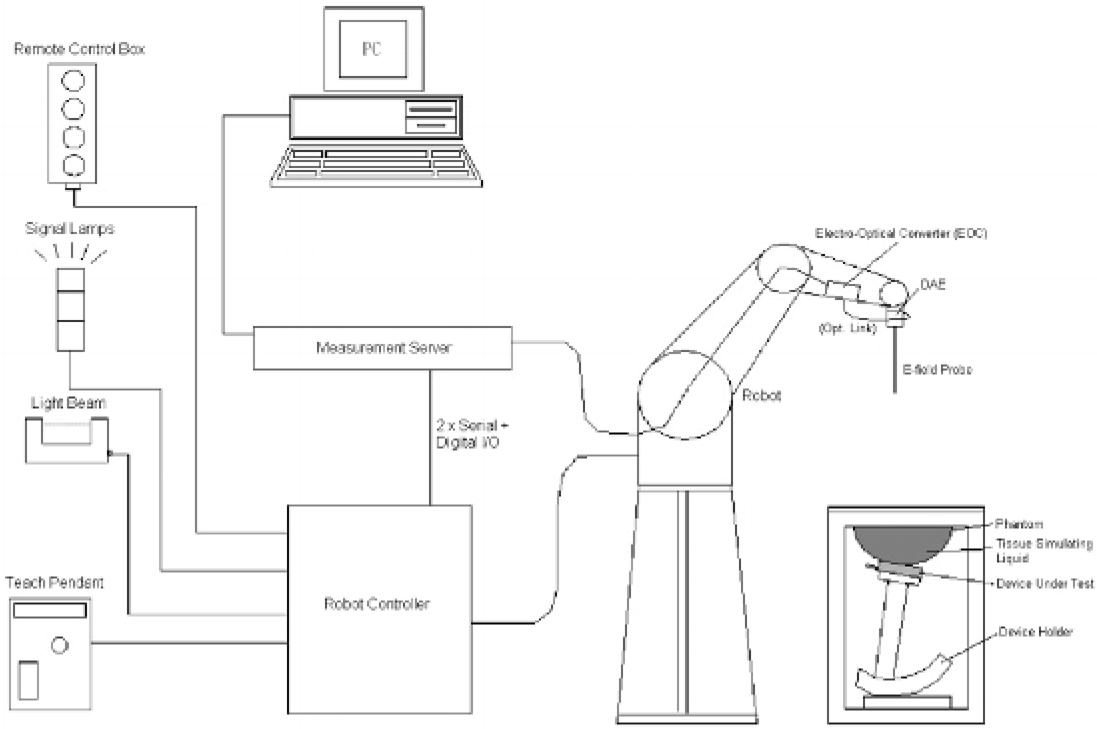


Figure 2.1 SPEAG DASY5 System Configurations

The DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- ■ A standard high precision 6-axis robot with controller, a teach pendant and software
- ■ A data acquisition electronic(DAE)attached to the robot arm extension
- ■ A dosimetric probe equipped with an optical surface detector system
- ■ The electro-optical converter(ECO)performs the conversion between optical and electrical signals
- ■ A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- ■ A probe alignment unit which improves the accuracy of the probe positioning
- ■ A computer operating Windows 7
- ■ DASY5 software
- ■ Remove control with teach pendant additional circuitry for robot safety such as warming lamps, etc.
- ■ The SAM twin phantom
- ■ A device holder
- ■ Tissue simulating liquid
- ■ Dipole for evaluating the proper functioning of the system

6.1. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528.The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x,y,z) = Ae^{-\frac{z}{2a}} \cos^2\left(\frac{\pi}{2}\frac{\sqrt{x'^2+y'^2}}{5a}\right)$$

$$f_2(x,y,z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2+x'^2}\left(3-e^{-\frac{2z}{a}}\right)\cos^2\left(\frac{\pi}{2}\frac{y'}{3a}\right)$$

$$f_3(x,y,z) = A\frac{a^2}{\frac{a^2}{4}+x'^2+y'^2}\left(e^{-\frac{2z}{a}}+\frac{a^2}{2(a+2z)^2}\right)$$

6.2. DASY5 E-Field Probe

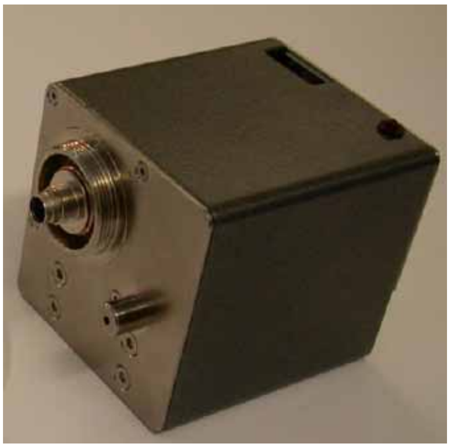
The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

Model	EX3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

6.3. 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 DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



6.4. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.
The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller

6.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.
The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

6.6. Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

6.7. SAM Phantom

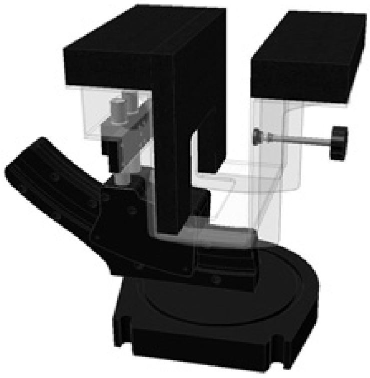
The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom

The ELI4 Phantom also is a fiberglass shell phantom with 2mm shell thickness. It has 30 liters filling volume, and with a dimension of 600mm for major ellipse axis, 400mm for minor axis. It is intended for compliance testing of handheld and body-mounted wireless devices in frequency range of 30 MHz to 6GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

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.

6.8. Device Holder

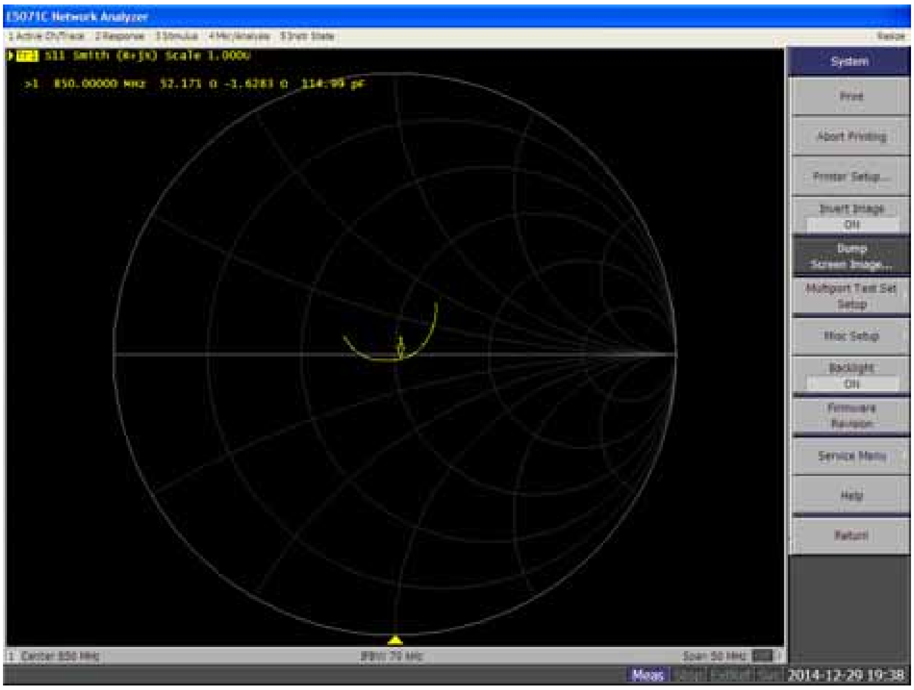
The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR).Thus the device needs no repositioning when changing the angles. The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.	
The laptop extension is lightweight and made of POM, acrylic glass and foam. It fits easily on upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.	

6.9. Test Equipment List

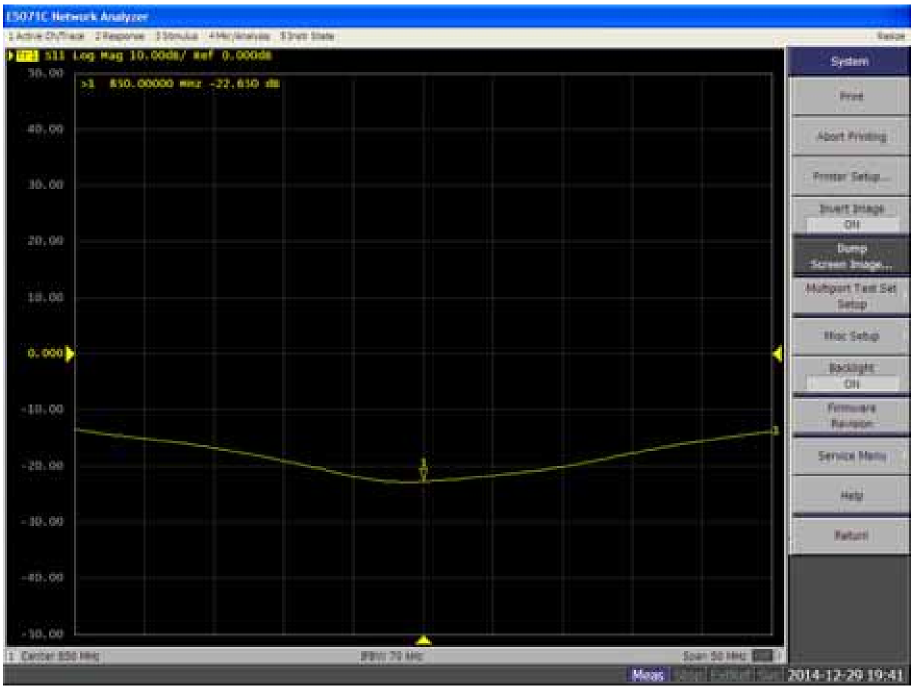
Instrument	Manufacturer	Model No.	Serial No.	Cali. Due Date
Stäubli Robot TX60L	Stäubli	TX60L	5P6VA1/A/01	only once
Robot Controller	Stäubli	CS8C	5P6VA1/C/01	only once
Dipole Validation Kits	Speag	D850V2	1008	2015.06.12
Dipole Validation Kits	Speag	D1900V2	5d174	2015.06.09
SAM ELI Phantom	Speag	SAM	1211	N/A
Laptop Holder	Speag	SM LH1 001CD	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1379	2015.05.18
E-Field Probe	Speag	EX3DV4	3927	2015.05.22
SAR Software	Speag	DASY5	V5.2 Build 162	N/A
Power Amplifier	Mini-Circuit	ZVA-183W-S+	MN136701248	2015.09.03
Directional Coupler	Agilent	778D	MY52180185	2015.09.03
Spectrum Analyzer	R&S	FSP40	100324	2016.03.23
Vector Network	Agilent	E5071C	MY4631693	2016.01.15
Signal Generator	R&S	SML	103287	2016.03.09
Power Meter	BONN	BLWA0830-160/100/40D	76659	2015.11.10
AUG Power Sensor	R&S	NRP-Z91	100384	2016.03.09

6.10. Annul Internal Check of Impedance and Return Loss

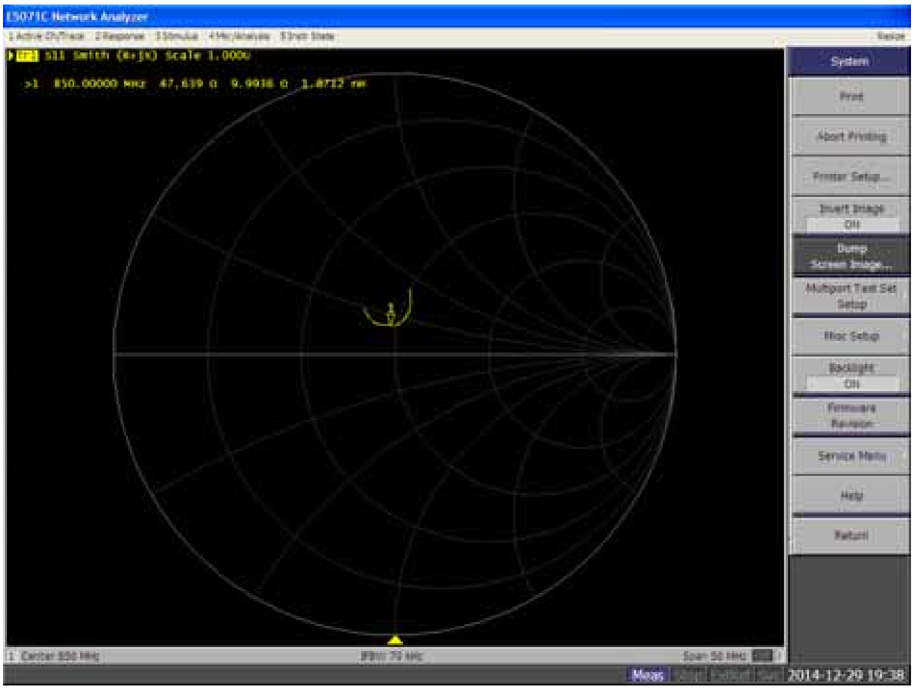
850MHz Head calibrated impedance 52.230Ω; measured impedance: 52.171Ω (within 5Ω)



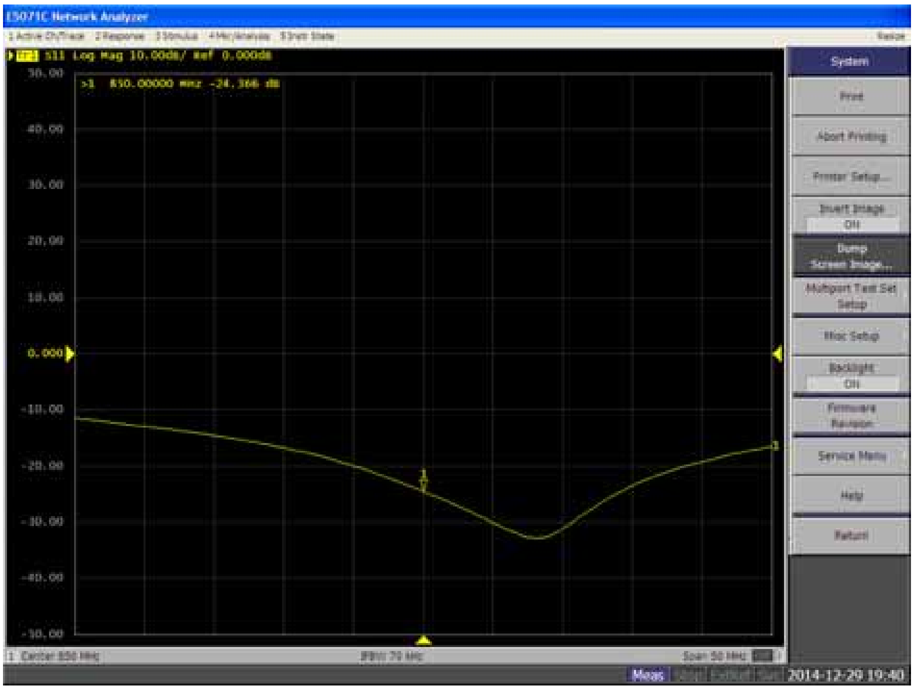
850MHz Head calibrated return loss: -20.560dB; Measured return loss: -22.650dB (within 20%)



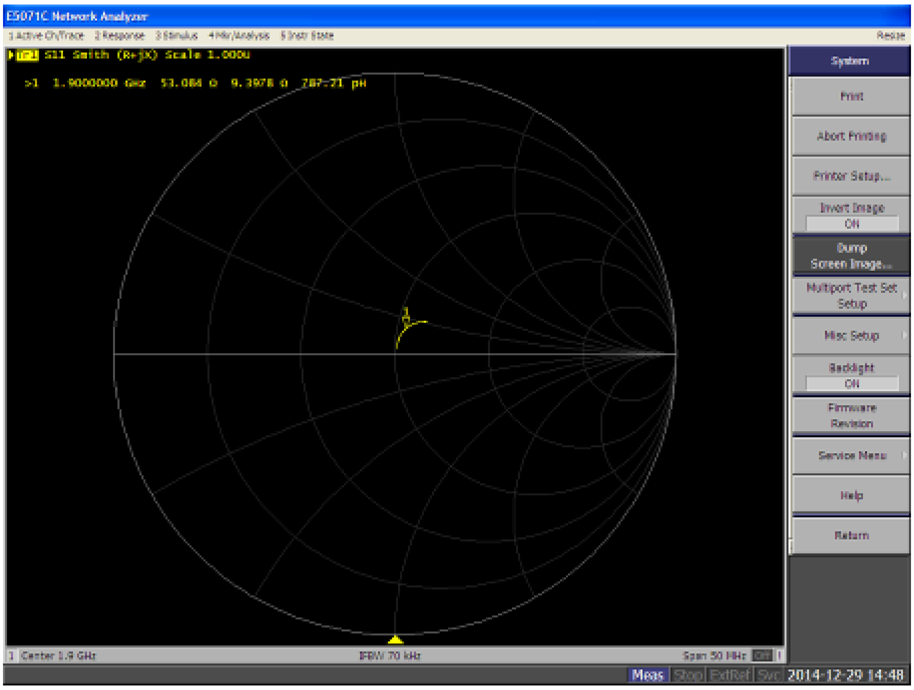
850MHz Body calibrated impedance 47.514Ω; measured impedance: 47.639Ω (within 5Ω)



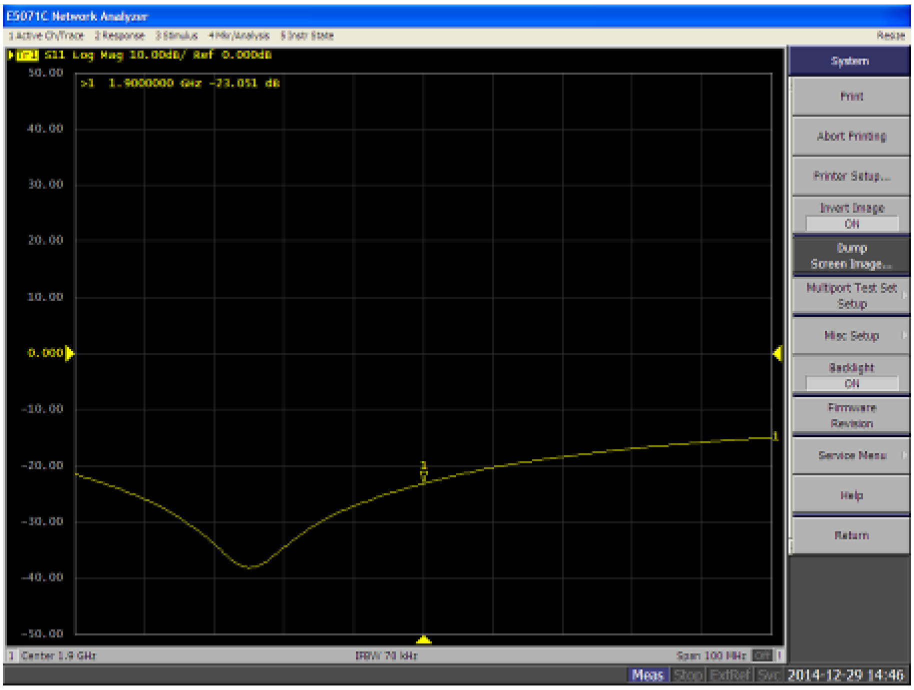
850MHz Body calibrated return loss: -24.393dB; Measured return loss: -24.366dB (within 20%)



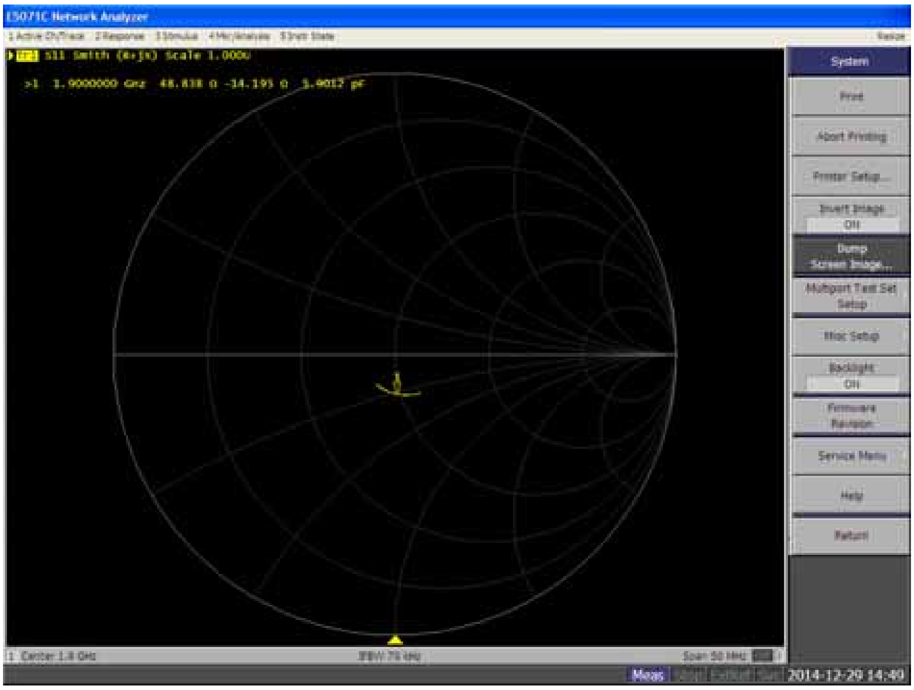
1900MHz Head calibrated impedance 53.2Ω; measured impedance: 53.084Ω (within 5Ω)



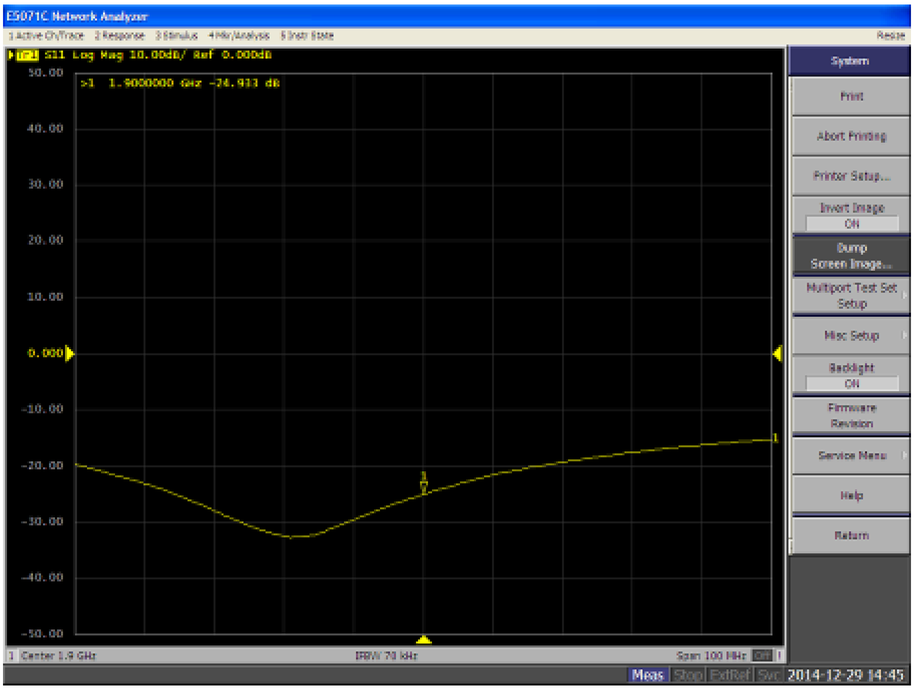
1900MHz Head calibrated return loss: -26.2dB; Measured return loss: -23.051dB (within 20%)



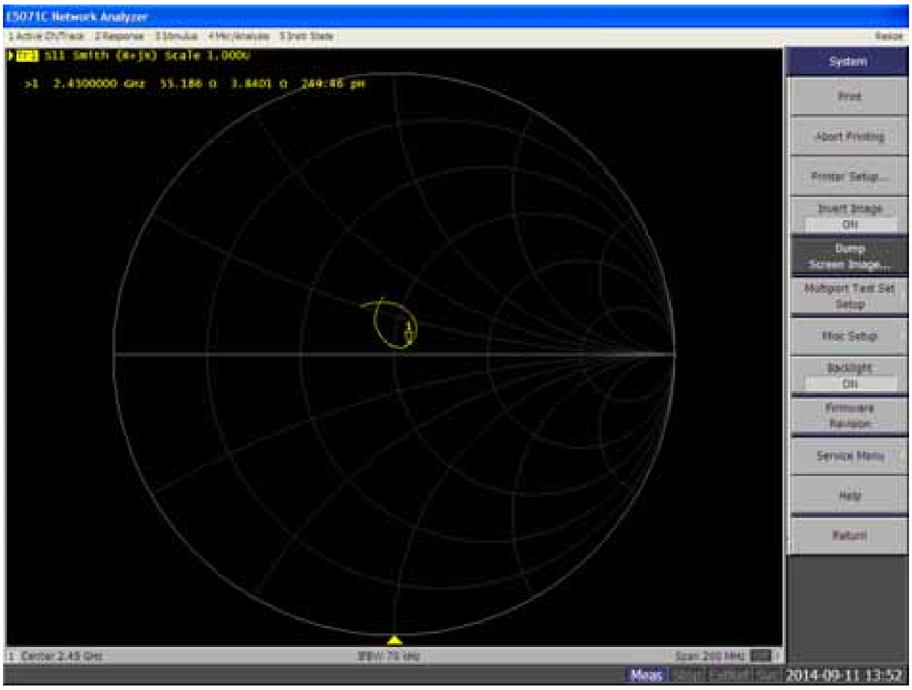
1900MHz Body calibrated impedance 48.270Ω; measured impedance: 48.838Ω (within 5Ω)



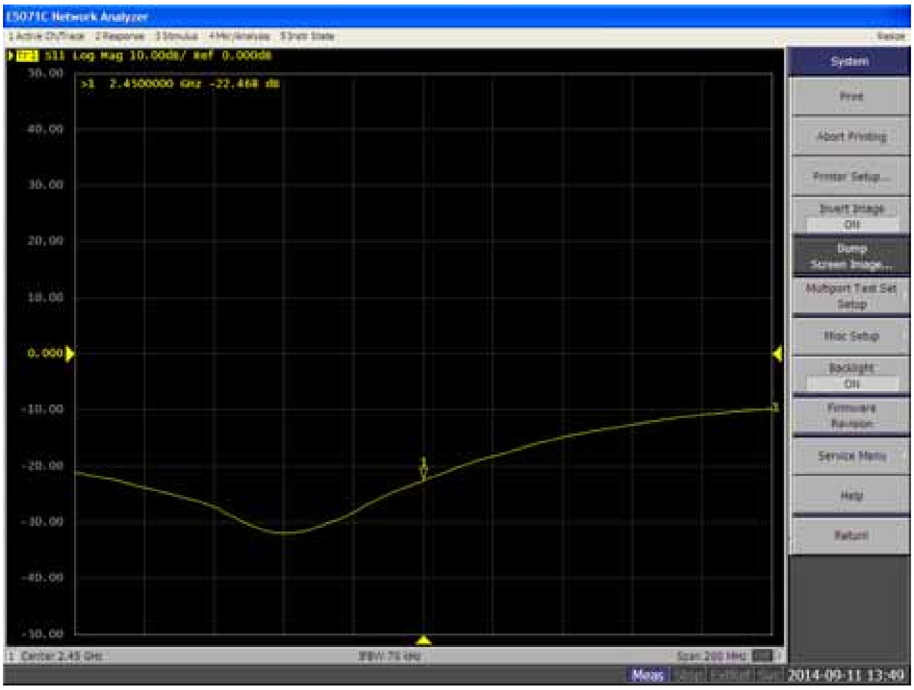
1900MHz Body calibrated return loss: -25.381dB; Measured return loss: -24.933dB (within 20%)



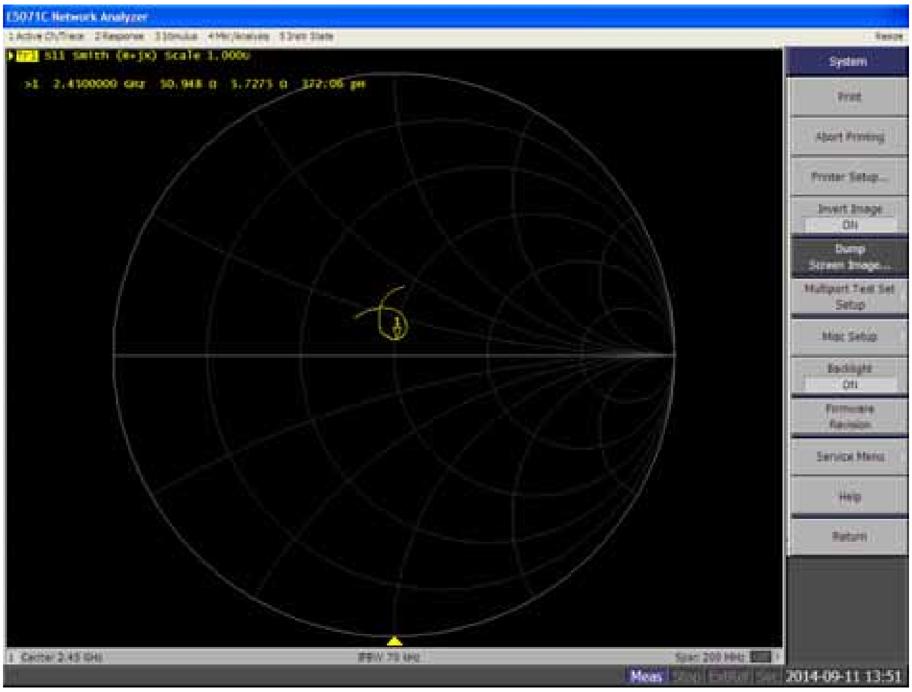
2450MHz Head calibrated impedance 57.025Ω; measured impedance: 55.186Ω (within 5Ω)



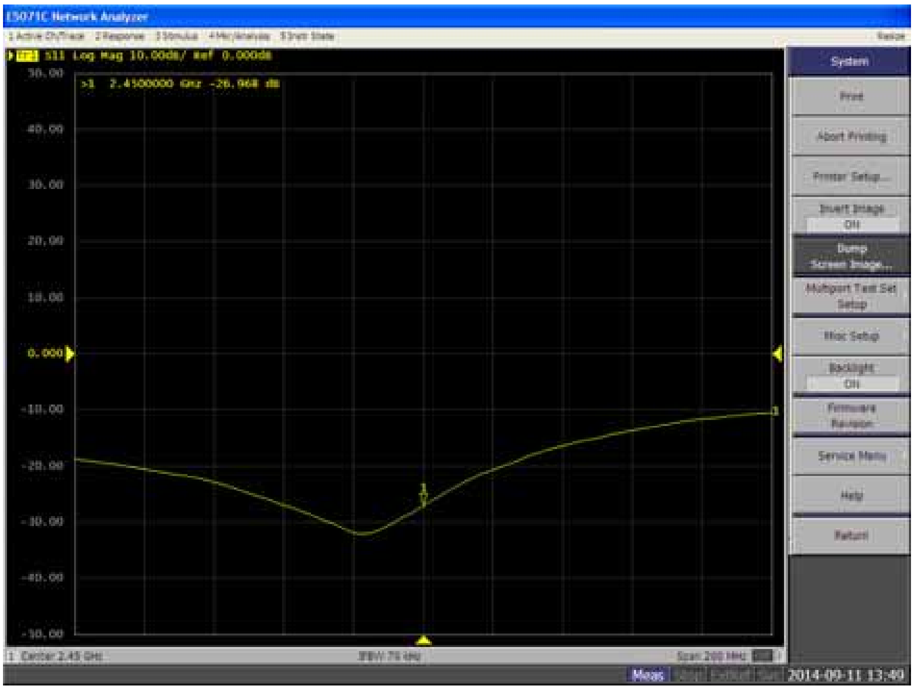
2450MHz Head calibrated return loss: -23.339 dB; Measured return loss: -22.468dB (within 20%)



2450MHz Body calibrated impedance 52.051Ω; measured impedance: 50.948Ω (within 5Ω)



2450MHz Body calibrated return loss: -28.024 dB; Measured return loss: -26.968dB (within 20%)



7. The SAR Measurement Procedure

7.1. System Performance Check

7.1.1 Purpose

1. To verify the simulating liquids are valid for testing.
2. To verify the performance of testing system is valid for testing.

7.1.2 Tissue Dielectric Parameters for Head and Body Phantoms

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
850	**41.5**	**0.92**	**55.2**	**0.99**
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	**40.0**	**1.40**	**53.3**	**1.52**
2450	**39.2**	**1.80**	**52.7**	**1.95**
3000	38.5	2.40	52.0	2.73
5200	36.0	4.66	49.0	5.30
5600	35.5	5.07	48.5	5.77
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

7.1.3 Tissue Calibration Result

■The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Assessment Kit and Agilent Vector Network Analyzer E5071C.

Head Tissue Simulant Measurement

Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε_r	σ [s/m]	
850MHz	Reference result ± 5% window	41.50 39.43 to 43.58	0.92 0.87 to 0.97	N/A
	07-04-2015	41.43	0.9	21.0
1900MHz	Reference result ± 5% window	40.0 38.00 to 42.00	1.40 1.33 to 1.47	N/A
	07-04-2015	39.7	1.43	21.0
2450MHz	Reference result ± 5% window	39.2 37.24 to 41.16	1.80 1.71 to 1.89	N/A
	07-04-2015	38.00	1.83	21.0

Body Tissue Simulant Measurement

Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ε_r	σ [s/m]	
850MHz	Reference result ± 5% window	55.2 52.44 to 57.96	0.99 0.94 to 1.04	N/A
	07-04-2015	55.77	0.97	21.0
1900MHz	Reference result ± 5% window	53.3 50.64 to 55.97	1.52 1.44 to 1.60	N/A
	07-04-2015	51.06	1.53	21.0
2450MHz	Reference result ± 5% window	52.7 50.065 to 55.335	1.95 1.8525 to 2.0475	N/A
	07-04-2015	52.08	1.89	21.0

■Refer to KDB 865664 D01 v01r03, The depth of body tissue-equivalent liquid in a phantom must be ≥ 15.0 cm with ≤ ± 0.5 cm variation for SAR measurements ≤ 3 GHz and ≥ 10.0 cm with ≤ ± 0.5 cm variation for measurements > 3 GHz.

7.1.4 System Performance Check Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and the system performance check. They are read-only document files and destined as fully defined but unmeasured masks, so the finished system performance check must be saved under a different name. The system performance check document requires the SAM Twin Phantom or ELI4 Phantom, so the phantom must be properly installed in your system. (User defined measurement procedures can be created by opening a new document or editing an existing document file). Before you start the system performance check, you need only to tell the system with which components (probe, medium, and device) you are performing the system performance check; the system will take care of all parameters.

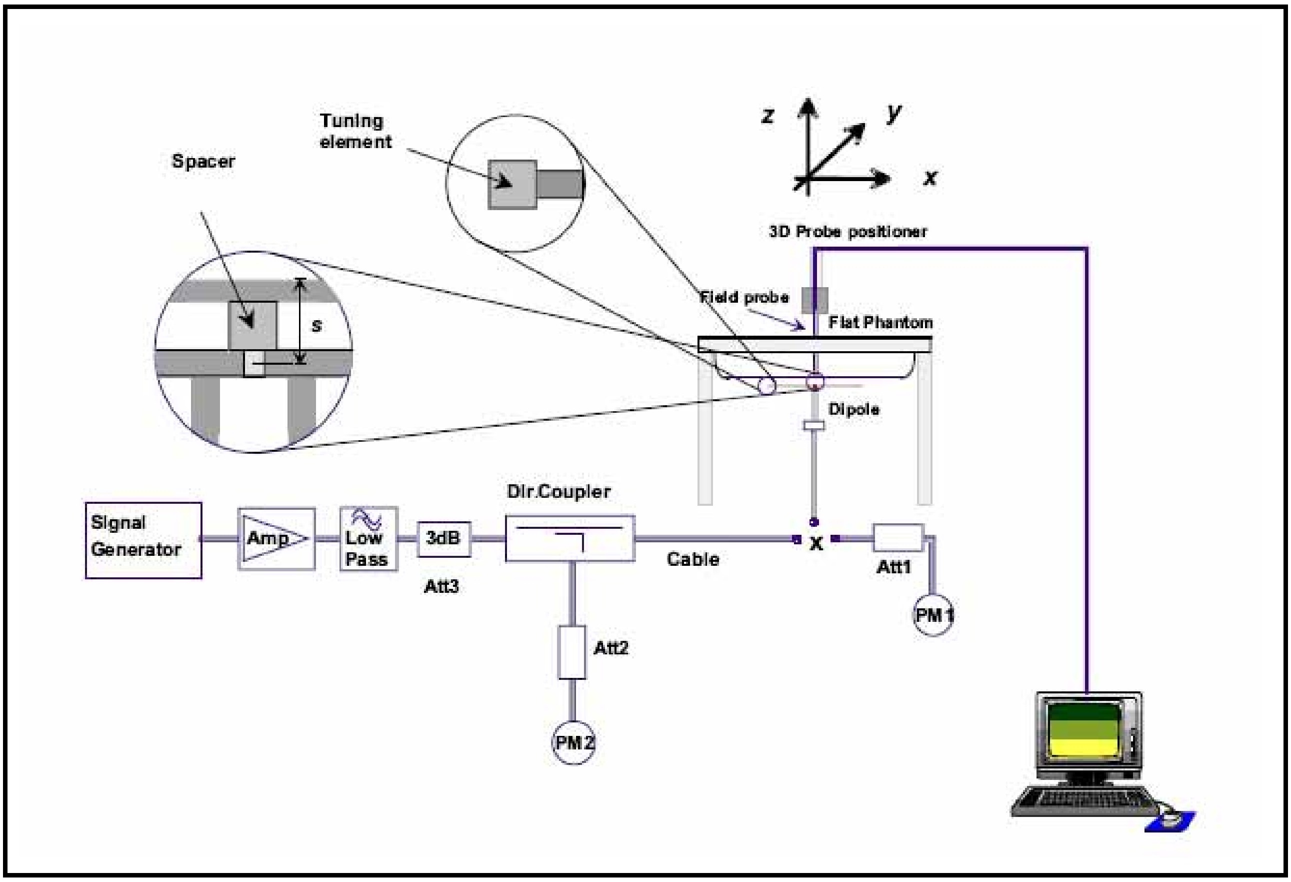
■ **The Power Reference Measurement and Power Drift Measurement** jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the Dipole output power. If it is too high (above ±0.2 dB), the system performance check should be repeated;

■ **The Surface Check** job tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid;

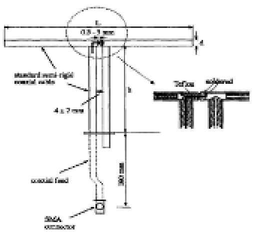
■ **The Area Scan** job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable;

■ **The Zoom Scan** job measures the field in a volume around the peak SAR value assessed in the previous Area Scan job (for more information see the application note on SAR evaluation). If the system performance check gives reasonable results. The dipole input power(forward power) was 250mW, 1 g and 10 g spatial average SAR values normalized to 1W dipole input power give reference data for comparisons and it's equal to 10x(dipole forward power). The next sections analyze the expected uncertainties of these values, as well as additional checks for further information or troubleshooting.

7.1.5 System Performance Check Setup



7.1.6 Validation Dipoles

The dipoles use is based on the IEEE Std.1528-2003 and FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03standard, and is complied with mechanical and electrical specifications in line with the requirements of both EN62209-1 and EN62209-2. The table below provides details for the mechanical and electrical specifications for the dipoles.	

7.1.7 Result of System Performance Check: Valid Result

System Performance Check at 850MHz, 1900MHz, 2450MHz for Head.

Validation Dipole: D850V2-SN: 1008

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
850 MHz	Reference result ± 10% window	9.83 8.85 to 10.81	6.37 5.73 to 7.01	21.0
	07-04-2015	9.76	6.4	

Validation Kit: D1900V2-SN: 5d174

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900MHz	Reference result ± 10% window	39.9 35.91 to 43.89	20.9 18.81 to 22.99	21.0
	07-04-2015	39.8	20.6	

Validation Kit: D2450V2-SN: 914

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450MHz	Reference result ± 10% window	53.4 48.06 to 58.74	24.8 22.32 to 27.28	21.0
	07-04-2015	54.4	24.8	

Note: All SAR values are normalized to 1W forward power.

System Performance Check at 850MHz, 1900MHz, 2450MHz for Body.

Validation Dipole: D850V2-SN: 1008

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
850 MHz	Reference result ± 10% window	9.62 8.66 to 10.58	6.27 5.64 to 6.90	21.0
	07-04-2015	9.92	6.36	

Validation Kit: D1900V2-SN: 5d174

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900MHz	Reference result ± 10% window	40.4 36.36 to 44.44	21.5 19.35 to 23.65	21.0
	07-04-2015	39.36	20.44	

Validation Kit: D2450V2-SN: 914

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450MHz	Reference result ± 10% window	51.5 46.35 to 56.65	23.9 21.51 to 26.29	21.0
	07-04-2015	53.6	24.4	

Note: All SAR values are normalized to 1W forward power.

7.2. Test Requirements

7.2.1 Test Procedures

Step 1 Setup a Connection

First, engineer should record the conducted power before the test. Then establish a call in handset at the maximum power level with a base station simulator via air interface, or make the EUT estimate by itself in testing band. Place the EUT to the specific test location. After the testing, must export SAR test data by SEMCAD. Then writing down the conducted power of the EUT into the report, also the SAR values tested.

Step 2 Power Reference Measurements

To measure the local E-field value at a fixed location which value will be taken as a reference value for calculating a possible power drift.

Step 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 locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal 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 KDB 865664 D01v01r01

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

Step 4 Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g 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 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 v01r03

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

Step 5 Power Drift Measurements

Repetition of the E-field measurement at the fixed location mentioned in Step 1 to make sure the two results differ by less than ± 0.2 dB.

7.2.2 Test Channel

Per FCC KDB 941225 D03 v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

Here are HSDPA/HSUPA sub-test setups as show blow, per FCC KDB 941225 D03 v03:

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	$\beta_{hs}^{(1)}$	CM (dB)$^{(2)}$
1	2/15	15/15	64	2/15	4/15	0.0
2	$12/15^{(3)}$	$15/15^{(3)}$	64	$12/15^{(3)}$	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM$^{(2)}$ (dB)	MPR (dB)	AG$^{(4)}$ Index	E-TFCI
1	$11/15^{(3)}$	$15/15^{(3)}$	64	$11/15^{(3)}$	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{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	$15/15^{(4)}$	$15/15^{(4)}$	64	$15/15^{(4)}$	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

8. Conducted Power<Average>

■**Band850**

Mode	Frequency <MHz>	Average Burst Power<dBm>	Duty Cycle Factor<dB>	Frame Power<dBm>	Max. Tune-up Power(dBm)	Scaling Factor
GSM850	824.2	31.78	9	22.78	32.0	1.05
	836.6	31.66	9	22.66	32.0	1.08
	848.8	31.61	9	22.61	32.0	1.09
GPRS850(1slot)	824.2	31.33	9	22.33	32.0	1.17
	836.6	31.24	9	22.24	32.0	1.19
	848.8	31.21	9	22.21	32.0	1.20
GPRS850(2slot)	824.2	30.12	6	24.12	30.5	1.09
	836.6	30.08	6	24.08	30.5	1.10
	848.8	30.05	6	24.05	30.5	1.11
GPRS850(3slot)	824.2	28.31	4.25	24.06	29.0	1.17
	836.6	28.26	4.25	24.01	29.0	1.19
	848.8	28.23	4.25	23.98	29.0	1.19
GPRS850(4slot)	**824.2**	**27.28**	**3**	**24.28**	**28.0**	**1.18**
	836.6	**27.24**	**3**	**24.24**	**28.0**	**1.19**
	848.8	**27.22**	**3**	**24.22**	**28.0**	**1.20**
EDGE850(1slot)	824.2	27.91	9	18.91	28.0	1.02
	836.6	27.86	9	18.86	28.0	1.03
	848.8	27.81	9	18.81	28.0	1.04
EDGE850(2slot)	824.2	27.89	6	21.89	28.0	1.03
	836.6	27.86	6	21.86	28.0	1.03
	848.8	27.77	6	21.77	28.0	1.05
EDGE850(3slot)	824.2	26.12	4.25	21.87	26.5	1.09
	836.6	26.07	4.25	21.82	26.5	1.10
	848.8	26.04	4.25	21.79	26.5	1.11
EDGE850(4slot)	824.2	25.88	3	22.88	26.0	1.03
	836.6	25.83	3	22.83	26.0	1.04
	848.8	25.81	3	22.81	26.0	1.04
SIM2						
GSM850	824.2	31.71	9	22.71	32.0	1.07

Note：

1. Scaling Factor = Max. Power (mW) / AVG Burst Power (mW); Max. Power is the tune-up power.

2. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

3. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

■ **Band1900**

Mode	Frequency <MHz>	Average Burst Power<dBm>	Duty Cycle Factor<dB>	Frame Power<dBm>	Max. Tune-up Power(dBm)	Scaling Factor
PCS1900	1850.2	28.41	9	19.41	29.0	1.15
	1880	28.36	9	19.36	29.0	1.16
	1909.8	28.33	9	19.33	29.0	1.17
GPRS1900(1slot)	1850.2	28.26	9	19.26	29.0	1.19
	1880	28.23	9	19.23	29.0	1.19
	1909.8	28.21	9	19.21	29.0	1.20
GPRS1900(2slot)	1850.2	27.39	6	21.39	28.0	1.15
	1880	27.34	6	21.34	28.0	1.16
	1909.8	27.31	6	21.31	28.0	1.17
GPRS1900(3slot)	1850.2	25.42	4.25	21.17	26.0	1.14
	1880	25.41	4.25	21.16	26.0	1.15
	1909.8	25.34	4.25	21.09	26.0	1.16
GPRS1900(4slot)	**1850.2**	**24.49**	**3**	**21.49**	**25.0**	**1.12**
	1880	**24.46**	**3**	**21.46**	**25.0**	**1.13**
	1909.8	**24.38**	**3**	**21.38**	**25.0**	**1.15**
EDGE1900(1slot)	1850.2	26.27	9	17.27	27.0	1.18
	1880	26.29	9	17.29	27.0	1.18
	1909.8	26.23	9	17.23	27.0	1.19
EDGE1900(2slot)	1850.2	25.37	6	19.37	26.0	1.16
	1880	25.34	6	19.34	26.0	1.16
	1909.8	25.42	6	19.42	26.0	1.14
EDGE1900(3slot)	1850.2	24.21	4.25	19.96	25.0	1.20
	1880	24.16	4.25	19.91	25.0	1.21
	1909.8	24.14	4.25	19.89	25.0	1.22
EDGE1900(4slot)	1850.2	23.37	3	20.37	24.0	1.16
	1880	23.35	3	20.35	24.0	1.16
	1909.8	23.32	3	20.32	24.0	1.17
SIM2						
PCS1900	1850.2	28.29	9	19.29	29.0	1.18

Note：

1. Scaling Factor = Max. Power (mW) / AVG Burst Power (mW); Max. Power is the tune-up power.

2. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

3. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

■ **WCDMA**

Conducted Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	**22.26**	22.21	22.15	**22.21**	22.16	22.12
HSDPA Subtest-1	22.13	22.11	22.07	21.89	21.85	21.81
HSDPA Subtest-2	20.89	20.78	20.67	21.16	21.12	21.08
HSDPA Subtest-3	20.45	20.39	20.35	20.31	20.28	20.23
HSDPA Subtest-4	20.16	20.12	20.05	19.87	19.95	19.91
HSUPA Subtest-1	22.13	22.08	22.05	22.06	22.02	22.13
HSUPA Subtest-2	21.14	21.12	21.05	21.12	21.15	21.02
HSUPA Subtest-3	20.38	20.32	20.26	20.42	20.46	20.37
HSUPA Subtest-4	19.89	19.84	19.75	19.98	19.96	19.89
HSUPA Subtest-5	19.31	19.21	19.05	19.21	19.25	19.12

Mode	Band II <1900MHz> Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
R99 WCDMA	9262	22.26	23.0	1.19
	9400	22.21	23.0	1.20
	9538	22.15	23.0	1.22
Rel5 HSDPA	9262	22.13	23.0	1.22
	9400	22.11	23.0	1.23
	9538	22.07	23.0	1.24
Rel6 HSUPA	9262	22.13	23.0	1.22
	9400	22.08	23.0	1.24
	9538	22.05	23.0	1.24

Mode	Band V<850MHz> Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
WCDMA	4132	22.21	23.0	1.20
	4183	22.16	23.0	1.21
	4233	22.12	23.0	1.22
HSDPA	4132	21.89	23.0	1.29
	4183	21.85	23.0	1.30
	4233	21.81	23.0	1.32
HSUPA	4132	22.06	23.0	1.24
	4183	22.02	23.0	1.25
	4233	22.13	23.0	1.22

■ WIFI

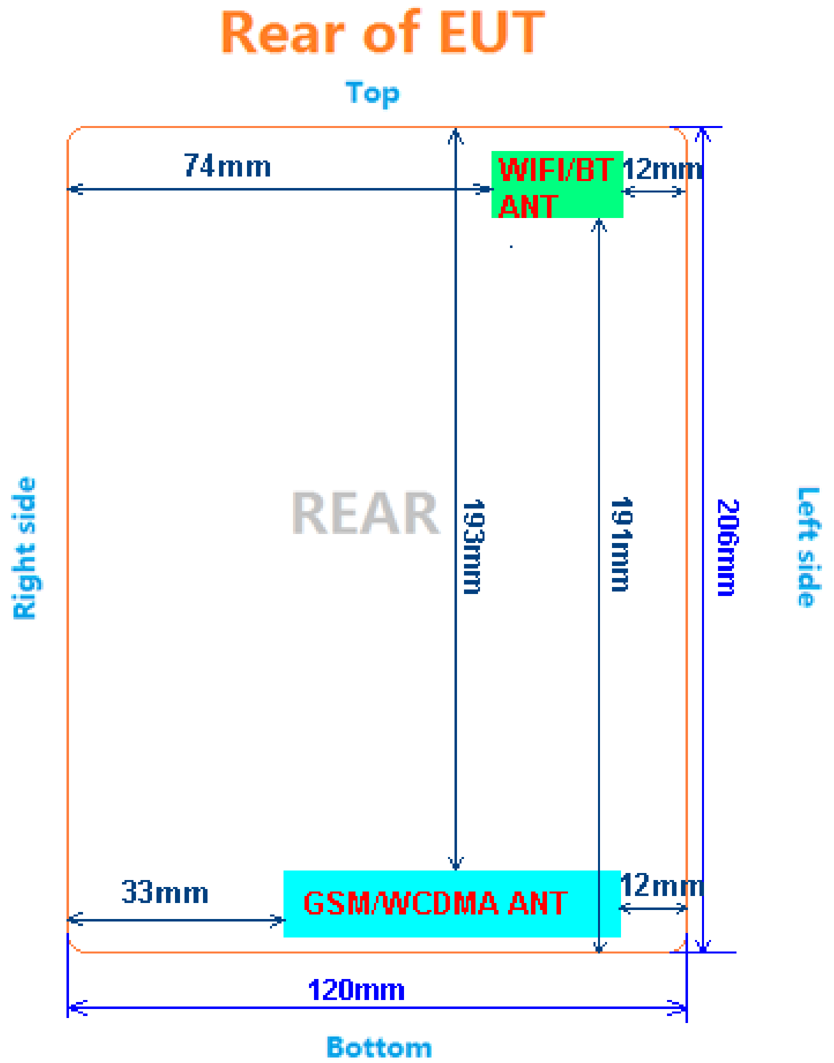
Mode	Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
802.11b	2412	11.41	11.5	1.02
	2437	11.19	11.5	1.07
	2462	11.16	11.5	1.08
802.11g	2412	10.27	10.5	1.05
	2437	10.13	10.5	1.09
	2462	10.10	10.5	1.10
802.11n(HT20)	2412	10.08	10.5	1.10
	2437	10.05	10.5	1.11
	2462	10.01	10.5	1.12
802.11n(HT40)	2412	8.00	8.0	1.00
	2437	7.95	8.0	1.01
	2462	7.89	8.0	1.03

■ Bluetooth

Mode	Channel	Max. Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
GFSK	Low	1.45	2.00	1.14
	Mid	1.77	2.00	1.05
	High	1.75	2.00	1.06

9. Analysis and Results

9.1. Antenna Location



Antenna	Antenna Distance to Edges(mm)				
	Back	Top	Left-side	Right-side	Bottom
GSM/WCDMA	<5	193	12	33	<5
WIFI/BT	<5	<5	12	74	191

9.2. SAR exclusion

■ **Bluetooth**

Per FCC KDB 447498 D01v05r02, the SAR exclusion threshold for distances<50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ \ Channel(mW)}{Test\ Separation\ Distance(mm)} \times \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power and the antenna to use separation distance, Max. Average output power Bluetooth are lower the P_{re}, therefore BT SAR is not required;

[(1.58mW/5) √2.441] = 0.494<3.0, Bluetooth for Head, Body.*

Note: 1.58mW comes from 2.0dBm

■ **Licensed Transmitter(s)**

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is capable of QPSK HSUPA/HSDPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA/HSDPA in KDB 941225 D01 v03.

When the user utilizes multiple services in UMTS 3G mode, it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

9.3. Required Edges for SAR Testing

Test Mode	Back	Top	Left side	Right side	Bottom
Band850	Yes	No	Yes	Yes	Yes
Band1900	Yes	No	Yes	Yes	Yes
WCDMA Band II	Yes	No	Yes	Yes	Yes
WCDMA Band V	Yes	No	Yes	Yes	Yes
WIFI	Yes	Yes	Yes	Yes	N/A
Bluetooth	N/A	N/A	N/A	N/A	N/A

9.4. Estimated SAR

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is≤1.6W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2 2, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$Estimated\ SAR = \frac{\sqrt{f(GHz)}}{7.5} * \frac{(Max\ Power\ of\ channel, mW)}{Min.\ Separation, mm}$$

Mode	Frequency	Maximum Power	Separation Distance	Estimated SAR
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	2.0	5	0.066

9.5. SAR Test Results Summary

■Band 850MHz Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
GSM850	Left-Check	128	824.2	Fixed	0	31.78	32.00	1.05	N/A	N/A	N/A	
	Left-Check	190	836.6	Fixed	0	31.66	32.00	1.08	0.18	0.015	0.016	1
	Left-Check	251	848.8	Fixed	0	31.61	32.00	1.09	N/A	N/A	N/A	
	Left-Tilt	190	836.6	Fixed	0	31.66	32.00	1.08	0.07	0.00298	0.003	
	Right-Check	128	824.2	Fixed	0	31.78	32.00	1.05	N/A	N/A	N/A	
	Right-Check	190	836.6	Fixed	0	31.66	32.00	1.08	0.17	0.0062	0.007	
	Right-Check	251	848.8	Fixed	0	31.61	32.00	1.09	N/A	N/A	N/A	
	Right-Tilt	190	836.6	Fixed	0	31.66	32.00	1.08	0.16	0.00725	0.008	
	SIM2											
	Right-Check	190	836.6	Fixed	0	31.71	32.00	1.07	0.18	0.014	0.015	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■ Band 850MHz Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
GSM850	Back	128	824.20	Fixed	0	31.78	32.00	1.05	N/A	N/A	N/A	
	Back	190	836.60	Fixed	0	31.66	32.00	1.08	0.16	0.113	0.12	
	Back	251	848.80	Fixed	0	31.61	32.00	1.09	N/A	N/A	N/A	
GPRS-4slot	Back	128	824.20	Fixed	0	27.28	28.00	1.18	N/A	N/A	N/A	
	Back	190	836.60	Fixed	0	27.24	28.00	1.19	-0.05	0.334	0.40	4
	Back	251	848.80	Fixed	0	27.22	28.00	1.20	N/A	N/A	N/A	
	Front	190	836.60	Fixed	0	27.24	28.00	1.19	0.01	0.127	0.15	
	Left-side	190	836.60	Fixed	0	27.24	28.00	1.19	0.18	0.065	0.08	
	Right-side	190	836.60	Fixed	0	27.24	28.00	1.19	-0.13	0.032	0.038	
	Bottom	190	836.60	Fixed	0	27.24	28.00	1.19	0.03	0.104	0.124	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■ Band 1900MHz Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
PCS 1900	Left-Check	512	1850.2	Fixed	0	28.41	29.00	1.15	N/A	N/A	N/A	
	Left-Check	661	1880	Fixed	0	28.36	29.00	1.16	0.01	0.011	0.013	
	Left-Check	810	1909.8	Fixed	0	28.33	29.00	1.17	N/A	N/A	N/A	
	Left-Tilt	661	1880	Fixed	0	28.36	29.00	1.16	0.17	0.097	0.112	
	Right-Check	512	1850.2	Fixed	0	28.41	29.00	1.15	N/A	N/A	N/A	
	Right-Check	661	1880	Fixed	0	28.36	29.00	1.16	0.01	0.127	0.147	1
	Right-Check	810	1909.8	Fixed	0	28.33	29.00	1.17	N/A	N/A	N/A	
	Right-Tilt	661	1880	Fixed	0	28.36	29.00	1.16	0.03	0.115	0.133	
	SIM2											
	Right-Check	661	1880	Fixed	0	28.41	29.00	1.15	-0.01	0.127	0.145	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■ Band 1900MHz Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
PCS1900	Back	512	1850.2	Fixed	0	28.41	29.00	1.15	N/A	N/A	N/A	
	Back	661	1880	Fixed	0	28.36	29.00	1.16	0.11	0.208	0.241	
	Back	810	1909.8	Fixed	0	28.33	29.00	1.17	N/A	N/A	N/A	
GPRS-4slot	Back	512	1850.2	Fixed	0	24.49	25.00	1.12	N/A	N/A	N/A	
	Back	661	1880	Fixed	0	24.46	25.00	1.13	0.15	0.664	0.752	4
	Back	810	1909.8	Fixed	0	24.38	25.00	1.15	N/A	N/A	N/A	
	Front	661	1880	Fixed	0	24.46	25.00	1.13	-0.16	0.342	0.387	
	Left-side	661	1880	Fixed	0	24.46	25.00	1.13	0.16	0.096	0.109	
	Right-side	661	1880	Fixed	0	24.46	25.00	1.13	0.12	0.068	0.077	
	Bottom	661	1880	Fixed	0	24.46	25.00	1.13	0.09	0.254	0.288	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■WCDMA Band II Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Band II	Left-Check	9262	1852.4	Fixed	0	22.26	22.5	1.06	N/A	N/A	N/A	
	Left-Check	9400	1880	Fixed	0	22.21	22.5	1.07	-0.03	0.079	0.084	
	Left-Check	9538	1907.6	Fixed	0	22.15	22.5	1.08	N/A	N/A	N/A	
	Left-Tilt	9400	1880	Fixed	0	22.21	22.5	1.07	0.11	0.094	0.100	
	Right-Check	9262	1852.4	Fixed	0	22.26	22.5	1.06	N/A	N/A	N/A	
	Right-Check	9400	1880	Fixed	0	22.21	22.5	1.07	-0.01	0.126	0.135	
	Right-Check	9538	1907.6	Fixed	0	22.15	22.5	1.08	N/A	N/A	N/A	
	Right-Tilt	9400	1880	Fixed	0	22.21	22.5	1.07	-0.1	0.147	0.157	5

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■ WCDMA Band II Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
WCDMA Band II	Back	9262	1852.4	Fixed	0	22.26	22.5	1.06	N/A	N/A	N/A	
	Back	9400	1880	Fixed	0	22.21	22.5	1.07	0.19	0.732	0.78	6
	Back	9538	1907.6	Fixed	0	22.15	22.5	1.08	N/A	N/A	N/A	
	Front	9400	1880	Fixed	0	22.21	22.5	1.07	0.11	0.427	0.456	
	Left-side	9400	1880	Fixed	0	22.21	22.5	1.07	-0.02	0.0551	0.059	
	Right-side	9400	1880	Fixed	0	22.21	22.5	1.07	0.06	0.0208	0.022	
	Bottom	9400	1880	Fixed	0	22.21	22.5	1.07	0.15	0.553	0.591	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■WCDMA Band V Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Band V	Left-Check	4132	826.4	Fixed	0	22.21	22.5	1.07	N/A	N/A	N/A	
	Left-Check	4183	836.6	Fixed	0	22.16	22.5	1.08	0.03	0.041	0.044	
	Left-Check	4233	846.6	Fixed	0	22.12	22.5	1.09	N/A	N/A	N/A	
	Left-Tilt	4183	836.6	Fixed	0	22.16	22.5	1.08	0.13	0.052	0.056	
	Right-Check	4132	826.4	Fixed	0	22.21	22.5	1.07	N/A	N/A	N/A	
	Right-Check	4183	836.6	Fixed	0	22.16	22.5	1.08	0.11	0.08	0.087	7
	Right-Check	4233	846.6	Fixed	0	22.12	22.5	1.09	N/A	N/A	N/A	
	Right-Tilt	4183	836.6	Fixed	0	22.16	22.5	1.08	0.05	0.071	0.077	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■ WCDMA Band V Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
WCDMA Band V	Back	4132	826.4	Fixed	0	22.21	22.5	1.07	N/A	N/A	N/A	
	Back	4183	836.6	Fixed	0	22.16	22.5	1.08	0.18	0.71	0.768	8
	Back	4233	846.6	Fixed	0	22.12	22.5	1.09	N/A	N/A	N/A	
	Front	4183	836.6	Fixed	0	22.16	22.5	1.08	0.17	0.411	0.444	
	Left-side	4183	836.6	Fixed	0	22.16	22.5	1.08	0.13	0.0683	0.074	
	Right-side	4183	836.6	Fixed	0	22.16	22.5	1.08	-0.05	0.044	0.048	
	Bottom	4183	836.6	Fixed	0	22.16	22.5	1.08	0.16	0.451	0.488	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

2. Two SIM cards cannot work simultaneously.

■WIFI Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
802.11b	Left-Check	1	2412	Fixed	0	11.41	11.5	1.02	N/A	N/A	N/A	
	Left-Check	6	2437	Fixed	0	11.19	11.5	1.07	-0.04	0.315	0.338	
	Left-Check	11	2462	Fixed	0	11.16	11.5	1.08	N/A	N/A	N/A	
	Left-Tilt	6	2437	Fixed	0	11.19	11.5	1.07	0.07	0.37	0.397	
	Right-Check	1	2412	Fixed	0	11.41	11.5	1.02	N/A	N/A	N/A	
	Right-Check	6	2437	Fixed	0	11.19	11.5	1.07	0.03	0.552	0.593	
	Right-Check	11	2462	Fixed	0	11.16	11.5	1.08	N/A	N/A	N/A	
	Right-Tilt	6	2437	Fixed	0	11.19	11.5	1.07	-0.12	0.566	0.608	

Note:

3. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

4. Two SIM cards cannot work simultaneously.

■ WIFI Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
802.11b	Back	1	2412	Fixed	0	11.41	11.5	1.02	-0.09	0.327	0.334	
	Back	6	2437	Fixed	0	11.19	11.5	1.07	0.19	0.36	0.387	
	Back	11	2462	Fixed	0	11.16	11.5	1.08	-0.1	0.336	0.363	
	Front	6	2437	Fixed	0	11.19	11.5	1.07	0.05	0.228	0.245	
	Left-side	6	2437	Fixed	0	11.16	11.5	1.08	0.16	0.024	0.026	
	Right-side	6	2437	Fixed	0	11.16	11.5	1.08	0.12	0.042	0.045	
	Top	6	2437	Fixed	0	11.16	11.5	1.08	0.05	0.318	0.344	
802.11g	Back	6	2437	Fixed	0	11.19	11.5	1.07	0.14	0.133	0.143	
802.11n(20)	Back	6	2437	Fixed	0	11.19	11.5	1.07	0.09	0.175	0.188	
802.11n(40)	Back	6	2437	Fixed	0	11.19	11.5	1.07	0.14	0.119	0.128	

Note:

3. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;

4. Two SIM cards cannot work simultaneously.

10. Simultaneous Transmission Analysis

10.1. Simultaneous Transmission Scenario with Wi-Fi

Configuration	Mode	Max. Scaled SAR(W/kg)	Wi-Fi SAR(W/kg)	∑ SAR(W/kg)
Head	GSM850	0.016	0.68	0.696
Head	PCS1900	0.147	0.68	0.827
Head	WCDMA Band II	0.157	0.68	**0.837**
Head	WCDMA Band V	0.087	0.68	0.767
Body	GSM850	0.4	0.387	0.787
Body	PCS1900	0.752	0.387	1.139
Body	WCDMA Band II	0.78	0.387	**1.167**
Body	WCDMA Band V	0.768	0.387	1.155

Note: WIFI SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

10.2. Simultaneous Transmission Scenario with Bluetooth

Configuration	Mode	Max. Scaled SAR(W/kg)	Bluetooth SAR(W/kg)	∑ SAR(W/kg)
Head	GSM850	0.016	0.066	0.082
Head	PCS1900	0.147	0.066	0.213
Head	WCDMA Band II	0.157	0.066	0.223
Head	WCDMA Band V	0.087	0.066	0.153
Body	GSM850	0.4	0.066	0.466
Body	PCS1900	0.752	0.066	0.818
Body	WCDMA Band II	0.78	0.066	0.846
Body	WCDMA Band V	0.768	0.066	0.834

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

10.3. Simultaneous Transmission Scenario with Wi-Fi & Bluetooth

Bluetooth and WIFI cannot be transmit at same time, due to they share the same antenna.

10.4. Simultaneous Transmission Scenario (Hotspot)

Simult Tx	Configuration	GPRS850 SAR(W/kg)	Wi-Fi SAR(W/kg)	∑ SAR(W/kg)
Body	Back	0.4	0.387	0.787
	Front	0.15	0.245	0.395
	Left side	0.08	0.026	0.106
	Right side	0.038	0.045	0.083
	Top	N/A	0.344	0.344
	Bottom	0.124	N/A	0.124
Simult Tx	Configuration	GPRS1900 SAR(W/kg)	Wi-Fi SAR(W/kg)	∑ AR(W/kg)
Body	Back	0.752	0.387	1.139
	Front	0.387	0.245	0.632
	Left side	0.109	0.026	0.135
	Right side	0.077	0.045	0.122
	Top	N/A	0.344	0.344
	Bottom	0.288	N/A	0.288
Simult Tx	Configuration	WCDMA Band II SAR(W/kg)	Wi-Fi SAR(W/kg)	∑ SAR(W/kg)
Body	Back	0.78	0.387	1.167
	Front	0.456	0.245	0.701
	Left side	0.059	0.026	0.085
	Right side	0.022	0.045	0.067
	Top	N/A	0.344	0.344
	Bottom	0.591	N/A	0.591
Simult Tx	Configuration	WCDMA Band V SAR(W/kg)	Wi-Fi SAR (W/kg)	∑ SAR(W/kg)
Body	Back	0.768	0.387	1.155
	Front	0.444	0.245	0.689
	Left side	0.074	0.026	0.1
	Right side	0.048	0.045	0.093
	Top	N/A	0.344	0.344
	Bottom	0.488	N/A	0.488

Note: An estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR for test separation distances >50mm per 447498 D01v05r02.

10.5. Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02.

11. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2003 is not required in SAR reports submitted for equipment approval.

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