

FCC SAR Test Report

Product : MiFi
Trade mark : HORIZON
Model/Type reference : MH04
Serial Number : N/A
Report Number : EED32P81369103
FCC ID : 2A8I7MH04
Date of Issue: : Nov. 02, 2023
Test Standards : Refer to Section 1.5
Test result : PASS

Prepared for:

Teleworld Fzco

Warehouse C16 Dubai Airport Freezone Dubai, UAE

Prepared by:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District,

Shenzhen, Guangdong, China

TEL: +86-755-3368 3668

FAX: +86-755-3368 3385

Compiled by:

Frazer Li

Reviewed by:

Tom Chen

Frazer Li

Tom Chen

Approved by:

Aaron Ma

Date:

Nov. 02, 2023

Aaron Ma



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Table of contents

1 General information	6
1.1 Notes	6
1.2 Application details	6
1.3 Statement of Compliance	7
1.4 EUT Information	8
1.5 Test standard/s	10
1.6 RF exposure limits	11
1.7 SAR Definition	11
1.8 Testing laboratory	12
1.9 Test Environment	12
1.10 Applicant and Manufacturer	12
2 SAR Measurement System Description and Setup	13
2.1 The Measurement System Description	13
2.2 Probe description	14
2.3 Data Acquisition Electronics description	15
2.4 SAM Twin Phantom description	16
2.5 ELI4 Phantom description	17
2.6 Device Holder description	18
3 SAR Test Equipment List	19
4 SAR Measurement Procedures	20
4.1 Spatial Peak SAR Evaluation	20
4.2 Data Storage and Evaluation	21
4.3 Data Storage and Evaluation	25
5 SAR Verification Procedure	27
5.1 Tissue Simulating Liquids	27
5.2 Tissue Verification	28
5.3 System check procedure	30
5.4 System check results	31
6 SAR Measurement variability and uncertainty	33
6.1 SAR measurement variability	33
6.2 SAR measurement uncertainty	33
7 SAR Test Configuration	34
7.1 GSM Test Configurations	34
7.2 UMTS Test Configurations	34
7.3 LTE Test Configuration	39

7.4 WIFI 5G Test Configurations	41
7.5 WIFI 2.4G Test Configurations	44
8 SAR Test Results	46
8.1 Conducted Power Measurements	46
8.1.1 Conducted Power of UMTS Band II	46
8.1.2 Conducted Power of UMTS Band IV	47
8.1.3 Conducted Power of UMTS Band V	47
8.1.4 Conducted Power of LTE Band 2	48
8.1.5 Conducted Power of LTE Band 4	51
8.1.6 Conducted Power of LTE Band 5	54
8.1.7 Conducted Power of LTE Band 7	56
8.1.8 Conducted Power of LTE Band 12	58
8.1.9 Conducted Power of LTE Band 13	60
8.1.10 Conducted Power of LTE Band 17	61
8.1.11 Conducted Power of LTE Band 25	62
8.1.12 Conducted Power of LTE Band 26	65
8.1.13 Conducted Power of LTE Band 41	68
8.1.14 Conducted Power of LTE Band 66	70
8.1.15 Conducted Power of WiFi 2.4G	73
8.2 SAR test results	74
8.2.1 Results overview of UMTS Band II	75
8.2.2 Results overview of UMTS Band IV	76
8.2.3 Results overview of UMTS Band V	77
8.2.4 Results overview of LTE Band 2	78
8.2.5 Results overview of LTE Band 4	79
8.2.6 Results overview of LTE Band 5	80
8.2.7 Results overview of LTE Band 7	81
8.2.8 Results overview of LTE Band 12	82
8.2.9 Results overview of LTE Band 13	83
8.2.10 Results overview of LTE Band 17	84
8.2.11 Results overview of LTE Band 25	85
8.2.12 Results overview of LTE Band 26	87
8.2.13 Results overview of LTE Band 41	88
8.2.14 Results overview of LTE Band 66	90
8.2.15 Results overview of WiFi 2.4G	92
8.3 Multiple Transmitter Information	93
8.4 Simultaneous Transmission Possibilities	94
8.5 SAR Summation Scenario	94
8.6 Simultaneous Transmission Conclusion	95
Annex A: Appendix A: SAR System performance Check Plots	96
Annex B: Appendix B: SAR Measurement results Plots	96

Annex C: Appendix C: Calibration reports 96

Annex D: Appendix D: Photo documentation96

Modified History

REV.	Modification Description	Issued Date	Remark
REV.1.0	Initial Test Report Release	Nov. 02, 2023	

1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report.

Centre Testing International Group Co., Ltd. does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report is not to be reproduced or published in full without the prior written permission.

1.2 Application details

Date of receipt of test item:	2023-09-13
Start of test:	2023-09-13
End of test:	2023-10-30

1.3 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Ultra. Model Name: MH04 are as below:

Frequency Band	MAX Reported SAR (W/kg)	SAR Test Limit (W/kg)
	1-g SAR Hotspot (10mm)	
UMTS Band II	1.047	1.60
UMTS Band IV	1.260	
UMTS Band V	1.055	
LTE Band 2	0.862	
LTE Band 4	1.249	
LTE Band 5	0.848	
LTE Band 7	1.371	
LTE Band 12	0.169	
LTE Band 13	0.313	
LTE Band 17	0.210	
LTE Band 25	1.275	
LTE Band 26	0.955	
LTE Band 41	1.089	
LTE Band 66	1.355	
WiFi 2.4G	0.198	
Highest Simultaneous Transmission	1.483	

Note:

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits(1.6W/kg) according to the FCC rule §2.1093, the ANSI/IEEE C95.1:1992, the NCRP Report Number 86 for uncontrolled environment, according to the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure, and had been tested in accordance with the measurement methods and Procedures specified in IEEE Std 1528-2013.

1.4 EUT Information

Device Information:			
Product Name:		MiFi	
Model:		MH04	
Trade mark:		HORIZON	
SN:		N/A	
Device Type:		Portable device	
Exposure Category:		uncontrolled environment / general population	
Antenna Type :		Internal Antenna	
Antenna Gain:		2.4G WIFI: -2.35dBi; WCDMA Band II: 0.36dBi WCDMA Band IV: 0.43dBi WCDMA Band V: -4.01dBi LTE Band 2: 0.36dBi LTE Band 4: 0.43dBi LTE Band 5: -4.01dBi LTE Band 7: 1.85dBi LTE Band 12: -4.14dBi LTE Band 13: -3.12dBi LTE Band 17: -4.14dBi LTE Band 25: 0.36dBi LTE Band 26: -3.89dBi LTE Band 41: 2.37dBi LTE Band 66: 0.43dBi	
Device Operating Configurations:			
Supporting Modes :		WCDMA Band II/IV/V LTE Band 2/4/5/7/12/13/17/25/26/41/66 WiFi 2.4G	
Duty Cycle used for SAR testing		Max duty cycle: 2.4G WiFi:99.76%	
Modulation:		WCDMA(QPSK) LTE(QPSK/16QAM) WiFi(DSSS/OFDM)	
Operating Frequency Range(s)		Band	TX(MHz)
		UMTS Band V	824~849
		UMTS Band IV	1710~1755
		UMTS Band II	1850~1910
		LTE Band 2	1850~1910
		LTE Band 4	1710~1755
		LTE Band 5	824~849
		LTE Band 7	:2500-2570
		RX(MHz)	
			869~894
			2110~2155
			1930~1990
			1930~1990
			2110~2155
			869~894
			2620-2690

	LTE Band 12	699-716	729-746
	LTE Band 13	777-787	746-756
	LTE Band 17	704-716	734-746
	LTE Band 25	1850-1915	1930-1995
	LTE Band 26	824-849	869-894
	LTE Band 41	2496-2690	2496-2690
	LTE Band 66	1710-1780	2110-2200
	WiFi 2.4G	2412~2462	
Test Channels (low-mid-high):	9262-9400-9538 (UMTS Band II)		
	1312-1413-1513 (UMTS Band IV)		
	4132-4182-4233 (UMTS Band V)		
	18700-18900-19100(LTE Band 2)		
	20050-20175-20300(LTE Band 4)		
	20450-20525-20600(LTE Band 5)		
	20850-21100-21350(LTE Band 7)		
	23060-23095-23130(LTE Band 12)		
	23230-23230-23230(LTE Band 13)		
	23780-23790-23800(LTE Band 17)		
	26140-26365-26590(LTE Band 25)		
	26853-26909-26965(LTE Band 26)		
	39750-40340-40620-40880-41490(LTE Band 41)		
132072-132322-132572(LTE Band 66)			
1/3-6-11/9 (WiFi 2.4G)			
Power Source:	USB port:	DC 5.0V	
	Battery:	DC 3.8V,2100mAh,7.98Wh	

Remark:

Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

1.5 Test standard/s

ANSI Std C95.1-1992	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
IEEE Std 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 248227 D01	SAR guidance for IEEE 802.11(Wi-Fi) transmitters v02r02
KDB 447498 D01	General RF Exposure Guidance v06
KDB 648474 D04	Handsets SAR v01r03
KDB 690783 D01	SAR Listings on Grants v01r03
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 941225 D01	3G SAR Procedures v03r01
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 941225 D06	Hotspot SAR v02r01

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain/Body/Arms/Legs)	1.60 mW/g	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

The limit applied in this test report is shown in bold letters

Notes:

* 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 the appropriate averaging time.

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

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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).

1.7 SAR Definition

Specific Absorption Rate is defined as 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).

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

SAR is expressed in units of watts per kilogram (W/kg). SAR can be related to the electric field at a point by

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

where:

σ = conductivity of the tissue (S/m)
ρ = mass density of the tissue (kg/m³)
E = rms electric field strength (V/m)

1.8 Testing laboratory

Test Site	Centre Testing International Group Co., Ltd.
Test Location	Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China
Telephone	+86 (0) 755 3368 3668
Fax	+86 (0) 755 3368 3385

1.9 Test Environment

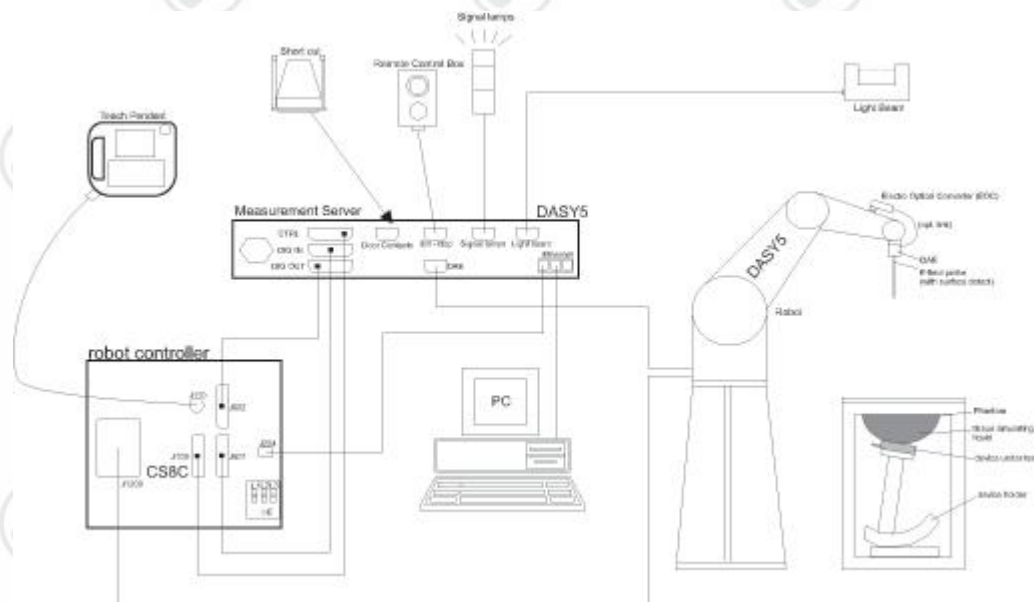
	Required	Actual
Ambient temperature:	18 – 25 °C	21.5 ± 2.0 °C
Tissue Simulating liquid:	18 – 25 °C	21.5 ± 2.0 °C
Relative humidity content:	30 – 70 %	30 – 70 %

1.10 Applicant and Manufacturer

Applicant/Client :	Teleworld Fzco
Applicant Address:	Warehouse C16 Dubai Airport Freezone Dubai, UAE
Manufacturer Name:	Teleworld Fzco
Manufacturer Address:	Warehouse C16 Dubai Airport Freezone Dubai, UAE
Factory:	Teleworld Fzco
Address of Factory:	Warehouse C16 Dubai Airport Freezone Dubai, UAE

2 SAR Measurement System Description and Setup

2.1 The Measurement System Description



The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli TX/RX family) 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 Win7 professional operating system 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.

2.2 Probe description

Dosimetric Probes: These probes are specially designed and calibrated for use in liquids with high permittivities. They should not be used in air, since the spherical isotropy in air is poor(± 2 dB). The dosimetric probes have special calibrations in various liquids at different frequencies.

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Dynamic range	5 μ W/g to 100 mW/g; Linearity: ± 0.2 dB



2.3 Data Acquisition Electronics description

The data acquisition electronics (DAE4) consist 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 with a 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 mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE4 box is 200M Ω ; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Batteries: The DAE works with either two standard 9V batteries or two 9V (actually 8.4V or 9.6 V) rechargeable batteries. Because the electronics automatically power-down unused components during braking or between measurements, the battery lifetime depends on system usage. Typical lifetimes are >20 hours for batteries and >10 hours for accus. Remove the batteries if you do not plan to use the DAE for a long period of time.



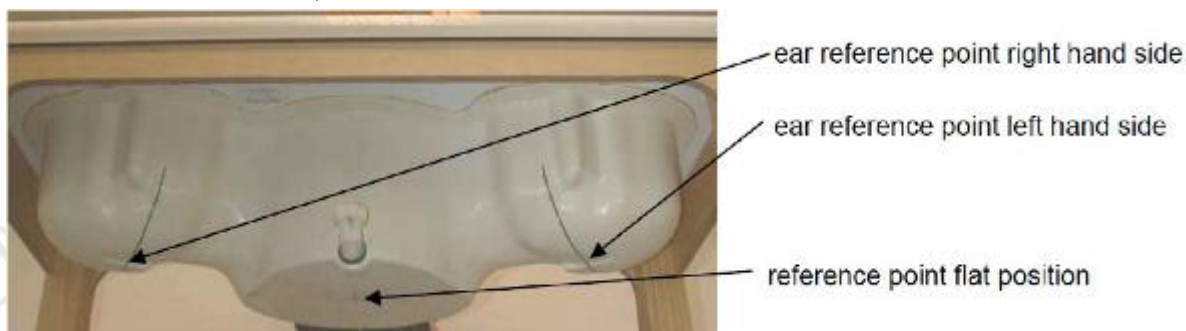
2.4 SAM Twin Phantom description

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

◆ Left hand

◆ Right hand

◆ Flat phantom



The phantom table for the DASY systems have the size of 100 x 50 x 85 cm (L x W x H). These tables are reinforced for mounting of the robot onto the table. For easy dislocation these tables have fork lift cut outs at the bottom.

The bottom plate contains three pairs 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 cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters.

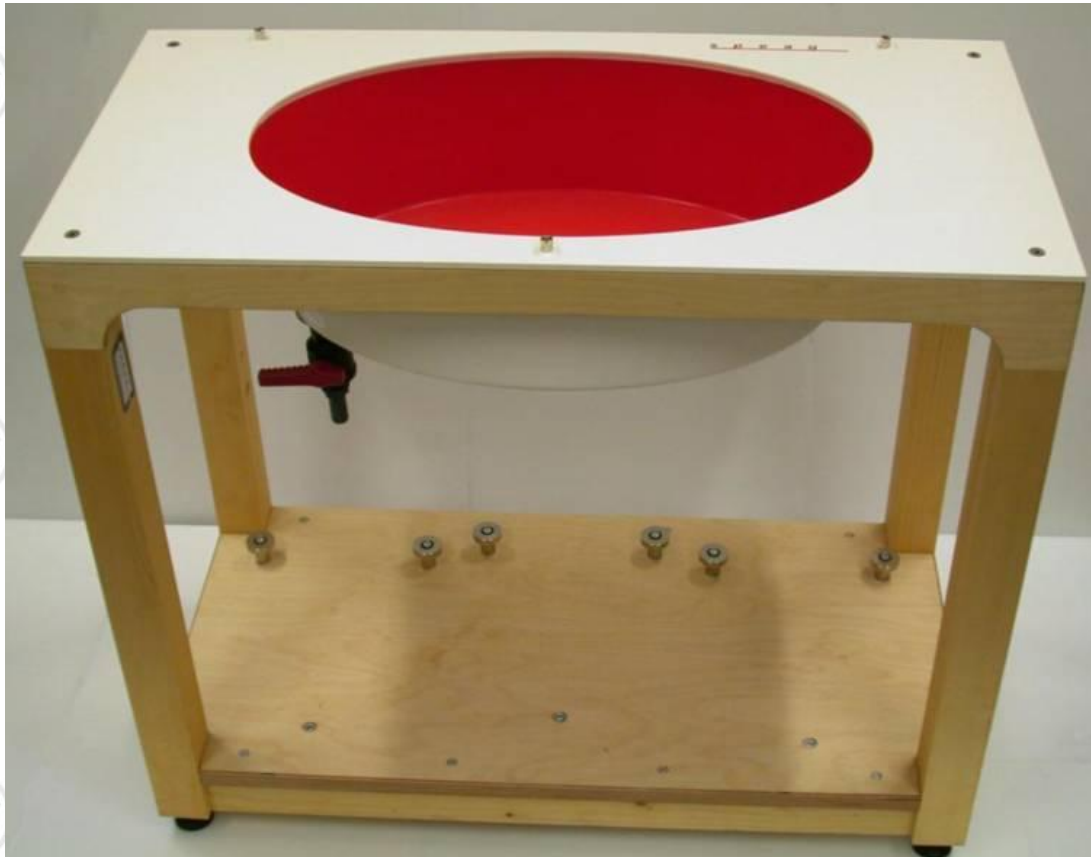
Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.



2.5 ELI4 Phantom description

The ELI4 phantom is intended for compliance testing of handheld and body mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.

ELI4 has been optimized regarding its performance and can be integrated into a SPEAG standard phantom table. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points



2.6 Device Holder description

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of $\pm 0.5\text{mm}$ would produce a SAR uncertainty of $\pm 20\%$. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$. 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.



3 SAR Test Equipment List

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

	Manufacturer	Device Type	Type(Model)	Serial number	Date of last calibration	Valid period
☒	SPEAG	E-Field Probe	EX3DV4	7328	2023-03-23	One year
☒	SPEAG	E-Field Probe	EX3DV4	7769	2022-09-20	One year
☒	SPEAG	750 MHz Dipole	D750V3	1088	2023-04-11	Three years
☒	SPEAG	835 MHz Dipole	D835V2	4d193	2021-01-12	Three years
☒	SPEAG	1750 MHz Dipole	D1750V2	1134	2021-01-12	Three years
☒	SPEAG	1900 MHz Dipole	D1900V2	5d198	2021-01-12	Three years
☐	SPEAG	2000 MHz Dipole	D2000V2	1078	2021-01-12	Three years
☐	SPEAG	2300 MHz Dipole	D2300V2	1082	2023-01-11	Three years
☒	SPEAG	2450 MHz Dipole	D2450V2	959	2021-01-12	Three years
☒	SPEAG	2600 MHz Dipole	D2600V2	1101	2021-01-12	Three years
☒	SPEAG	5 GHz Dipole	D5GHzV2	1208	2021-01-12	Three years
☒	SPEAG	DAKS probe	DAKS-3.5	1052	2021-01-27	Three years
☒	SPEAG	Planar R140 Vector Reflectometer	DAKS-VNA R140	0200514	2021-01-27	Three years
☒	SPEAG	Data acquisition electronics	DAE4	1458	2023-01-11	One year
☒	SPEAG	Software	DASY 5	NA	NCR	NCR
☒	SPEAG	Twin Phantom	SAM V5.0	1875	NCR	NCR
☐	SPEAG	Flat Phantom	ELI V6.0	2024	NCR	NCR
☒	R & S	Universal Radio Communication Tester	CMU200	101553	2022-12-23	One year
☒	R & S	Universal Radio Communication Tester	CMW500	102898	2022-12-23	One year
☒	Agilent	Signal Generator	N5181A	MY50142334	2022-12-19	One year
☒	BONN	Power Amplifier and directional coupler	SU319W	BL-SZ1550140	2022-12-23	One year
☒	KEITHLEY	RF Power Meter	3500	1128079	2023-06-07	One year
☒	KEITHLEY	RF Power Meter	3500	1128081	2023-06-07	One year
☒	JINGCHUAN G	Temperature/ Humidity Indicator	GSP-8	EMK197F0009 5	2023-06-07	One year

Note:

- There is no physical damage on the dipole;
- System check with specific dipole is within 10% of calibrated value;
- The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.

- d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

4 SAR Measurement Procedures

4.1 Spatial Peak SAR Evaluation

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. The base for the evaluation is a "cube" measurement in a volume of 30mm³ (7x7x7 points). The measured volume must include the 1 g and 10 g 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. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Postprocessing engine (SEMCAD X). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location. The entire evaluation of the spatial peak values is performed within the Postprocessing engine (SEMCAD X). The system always gives the maximum values for the 1 g and 10 g cubes.

The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. generation of a high-resolution mesh within the measured volume
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface

6. calculation of the averaged SAR within masses of 1 g and 10 g

4.2 Data Storage and Evaluation

Data Storage

The DASY5 software stores the measured voltage acquired by the Data Acquisition Electronics (DAE) as raw data together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and communication system parameters) in measurement files with the extension .da5x. The postprocessing software evaluates the data every time the data is visualized or exported. This allows the verification and modification of the setup after completion of the measurement. For example, if a measurement has been performed with an incorrect crest factor, the parameter can be corrected afterwards and the data can be reevaluated.

To avoid unintentional parameter changes or data manipulations, the parameters in measured files are locked. In the administrator access mode of the software, the parameters can be unlocked. After changing the parameters, the measured scans can be reevaluated in the postprocessing engine. The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., E-field, H-field, SAR). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

The fields and SAR are calculated from the measured voltage (probe voltage acquired by the DAE) and the following parameters:

Probe parameters:

- Sensitivity

norm_i, a_{i0}, a_{i1}, a_{i2}

- Conversion Factor

convF_i

- Diode Compression Point

dcp_i

- Probe Modulation Response Factors

a_i, b_i, c_i, d

Device parameters:

- Frequency

f

- Crest factor

cf

Media parameters:

- Conductivity

σ

- Relative Permittivity

ρ

This parameters are stored in the DASY5 V52 measurement file.

These parameters must be correctly set in the DASY5 V52 software setup. They are available as configuration file and can be imported into the measurement file. The values displayed in the multimeter window are assessed using the parameters of the actual system setup. In the scan visualization and export modes, the parameters stored in the measurement file are used.

The measured voltage is not proportional to the exciting. It must be first linearized.

Approximated Probe Response Linearization using Crest Factor.

This linearization method is enabled when a custom defined communication system is measured. The compensation applied is a function of the measured voltage, the detector diode compression point and the crest factor of the measured signal.

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = linearized voltage of channel i (uV) (i = x,y,z)
 U_i = measured voltage of channel i (uV) (i = x,y,z)
 cf = crest factor of exciting field (DASY parameter)
 dcp_i = diode compression point of channel i (uV) (Probe parameter, i = x,y,z)

Field and SAR Calculation

The primary field data for each channel are calculated using the linearized voltage:

$$E_i - \text{fieldprobes : } E_i = \sqrt{\frac{V_i}{\text{Norm}_i \cdot \text{ConvF}}}$$

$$H_i - \text{fieldprobes : } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

with V_i = linearized voltage of channel i (i = x,y,z)

Norm_i = sensor sensitivity of channel i (i = x,y,z)

$\mu\text{V}/(\text{V/m})^2$ for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RMS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ = conductivity in [mho/m] or [Siemens/m]

ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

Spatial Peak SAR for 1 g and 10 g

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. The base for the evaluation is a "cube" measurement at the points of the fine cube grid consisting of 5 x 5 x 7 points (with 8mm horizontal resolution) or 7 x 7 x 7 points (with 5mm horizontal resolution) or 8 x 8 x 7 points (with 4mm horizontal resolution). The entire evaluation of the spatial peak values is performed within the Postprocessing engine (SEMCAD X). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. extraction of the measured data (grid and values) from the Zoom Scan.
2. calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
3. generation of a high-resolution mesh within the measured volume.
4. interpolation of all measured values from the measurement grid to the high-resolution grid
5. extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface.
6. calculation of the averaged SAR within masses of 1 g and 10 g.

4.3 Data Storage and Evaluation

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

Step 1: Power reference measurement

The Power Reference Measurement and Power Drift Measurement 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. By default, the Minimum distance of probe sensors to surface is 4 mm. This distance can be modified by the user, but cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties. The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

Step 2: 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 finer measurement around the hotspot. The sophisticated interpolation routines implemented in DASY5 software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maxima 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 1528-2003 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.

Step 3: Zoom Scan

The 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 default Zoom Scan is defined in the following table. DASY5 is also able to perform repeated zoom scans if more than 1 peak is found during area scan. 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.

Area scan and Zoom scan resolutions per FCC KDB Publication 865664 D01:

Frequency	Maximun Area Scan resolution ($\Delta x_{Area}, \Delta y_{Area}$)	Maximun Zoom Scan spatial resolution ($\Delta x_{Zoom}, \Delta y_{Zoom}$)	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)^*$	$\Delta z_{Zoom}(n>1)^*$	
$\leq 2\text{GHz}$	$\leq 15\text{mm}$	$\leq 8\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 30\text{mm}$
2-3GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 30\text{mm}$
3-4GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 28\text{mm}$
4-5GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 2.5\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 25\text{mm}$
5-6GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 2\text{mm}$	$\leq 2\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 22\text{mm}$

Step 4: Power Drift Monitoring

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. If the value changed by more than 5%, the evaluation should be retested.

5 SAR Verification Procedure

5.1 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. 5.1. 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 as followed:

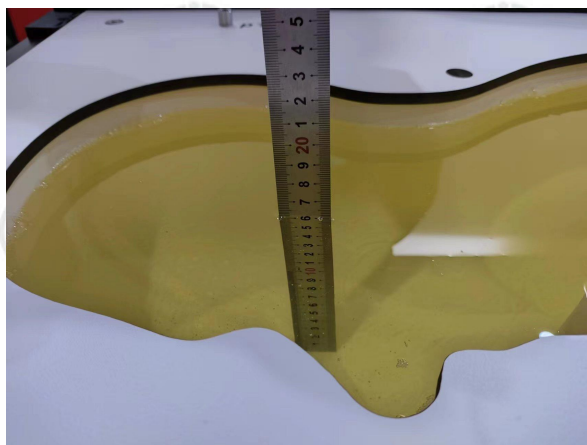


Photo of Liquid Height for Head SAR

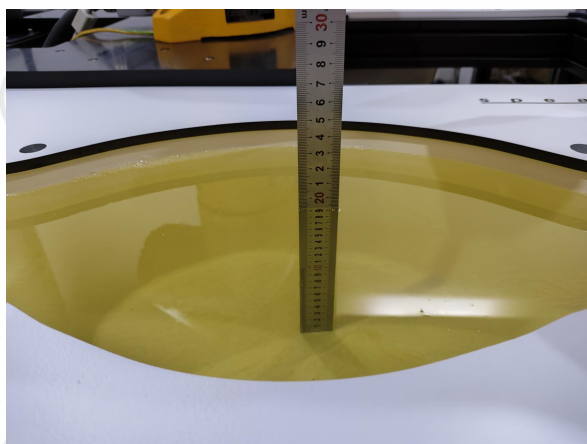


Photo of Liquid Height for Body SAR

5.2 Tissue Verification

The following materials are used for producing the tissue-equivalent materials.

(Liquids used for tests are marked with☒):

Ingredients (% of weight)	Frequency (MHz)							
	Head Tissue							
Tissue Type								
frequency band	☒ 750	☒ 835	☒ 1750	☒ 1900	☐ 2300	☒ 2450	☒ 2600	☒ 5200-5800
Water	41.45	41.45	52.64	55.242	62.82	62.7	55.242	65.52
Salt (NaCl)	1.45	1.45	0.36	0.306	0.51	0.5	0.306	0.0
Sugar	56.0	56.0	0.0	0.0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	36.8	0.0	17.24
DGBE	0.0	0.0	47.0	44.542	36.67	0.0	44.452	0.0
Diethylenglycol monoheylether	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.24

Salt: 99+% Pure Sodium Chloride

Sugar: 98+% Pure Sucrose

Water: De-ionized, 16MΩ+ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue simulating liquids: parameters:

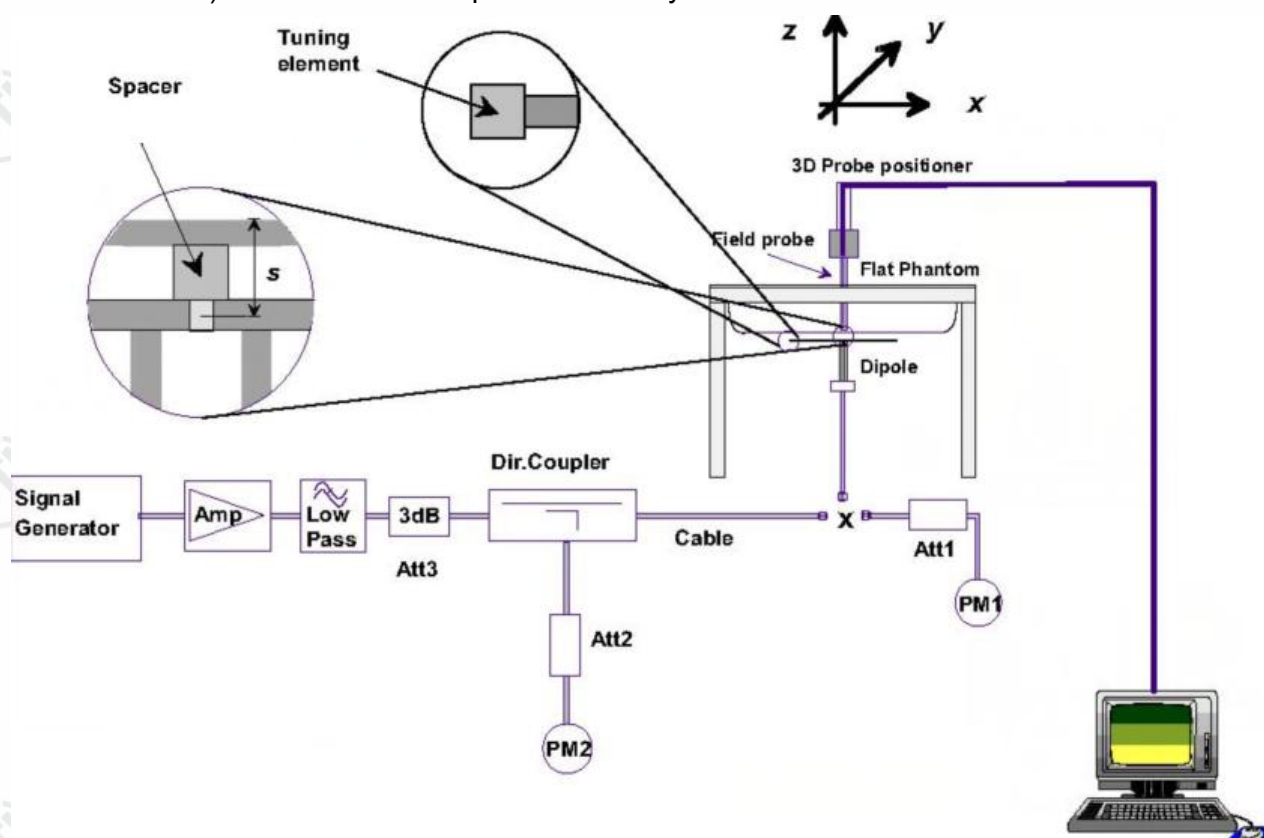
Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		ϵ_r (+/-5%)	σ (S/m) (+/-5%)	ϵ_r	σ (S/m)		
750 Head	750	41.90 (39.81~44.00)	0.89 (0.85~0.93)	43.03	0.851	20.88°C	9/14/2023
	750	41.90 (39.81~44.00)	0.89 (0.85~0.93)	43.03	0.855	20.45°C	9/17/2023
	750	41.90 (39.81~44.00)	0.89 (0.85~0.93)	39.90	0.921	20.53°C	9/18/2023
	750	41.90 (39.81~44.00)	0.89 (0.85~0.93)	43.27	0.874	20.63°C	9/19/2023
835 Head	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	39.70	0.891	20.81°C	9/24/2023
	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	39.72	0.892	20.51°C	9/25/2023
	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	42.89	0.889	20.83°C	9/27/2023
1800 Head	1750	40.10 (38.10~42.10)	1.37 (1.31~1.43)	40.72	1.316	20.05°C	10/7/2023
	1750	40.10 (38.10~42.10)	1.37 (1.31~1.43)	40.21	1.320	20.74°C	10/8/2023
	1750	40.10 (38.10~42.10)	1.37 (1.31~1.43)	40.92	1.340	20.45°C	10/10/2023
1900 Head	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.98	1.377	20.86°C	10/23/2023
	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.28	1.408	20.78°C	10/25/2023
	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.48	1.407	20.08°C	10/26/2023
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	38.19	1.764	20.88°C	10/14/2023
	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	37.93	1.878	20.84°C	10/16/2023
2600 Head	2600	39.00 (37.05~40.95)	1.96 (1.86~2.06)	40.00	1.999	20.44°C	10/16/2023
	2600	39.00 (37.05~40.95)	1.96 (1.86~2.06)	39.62	1.995	20.23°C	10/17/2023
	2600	39.00 (37.05~40.95)	1.96 (1.86~2.06)	39.62	1.995	20.46°C	10/19/2023

ϵ_r = Relative permittivity, σ = Conductivity

5.3 System check procedure

The System check is performed by using a System check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 250mW. To adjust this power a power meter is used. The power sensor is connected to the cable before the System check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



5.4 System check results

The system Check is performed for verifying the accuracy of the complete measurement system and performance of the software. The following table shows System check results for all frequency bands and tissue liquids used during the tests (plot(s) see annex A).

System Check (MHz)	Target SAR (1W) (+/-10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (mW/g)	10-g (mW/g)	1-g (mW/g)	10-g (mW/g)		
D750V2 Head	8.58 (7.722~9.438)	5.71 (5.139~6.281)	8.16	5.44	20.88°C	9/14/2023
D750V2 Head	8.58 (7.722~9.438)	5.71 (5.139~6.281)	7.88	5.24	20.45°C	9/17/2023
D750V2 Head	8.58 (7.722~9.438)	5.71 (5.139~6.281)	8.16	5.40	20.53°C	9/18/2023
D750V2 Head	8.58 (7.722~9.438)	5.71 (5.139~6.281)	8.44	5.60	20.63°C	9/19/2023
D835V2 Head	9.53 (8.577~10.483)	6.31 (5.679~6.941)	9.36	6.16	20.81°C	9/24/2023
D835V2 Head	9.53 (8.577~10.483)	6.31 (5.679~6.941)	9.60	6.32	20.51°C	9/25/2023
D835V2 Head	9.53 (8.577~10.483)	6.31 (5.679~6.941)	10.04	6.60	20.83°C	9/27/2023
D1750V2 Head	37.00 (33.30~40.70)	19.40 (17.46~21.34)	38.68	20.76	20.05°C	10/7/2023
D1750V2 Head	37.00 (33.30~40.70)	19.40 (17.46~21.34)	35.96	19.08	20.74°C	10/8/2023
D1750V2 Head	37.00 (33.30~40.70)	19.40 (17.46~21.34)	37.32	20.00	20.45°C	10/10/2023
D1900V2 Head	39.60 (35.64~43.56)	20.40 (18.36~22.44)	37.20	19.36	20.86°C	10/23/2023
D1900V2 Head	39.60 (35.64~43.56)	20.40 (18.36~22.44)	37.88	19.68	20.78°C	10/25/2023
D1900V2 Head	39.60 (35.64~43.56)	20.40 (18.36~22.44)	42.40	22.16	20.08°C	10/26/2023
D2450V2 Head	51.70 (46.53~56.87)	23.70 (21.33~26.07)	53.20	24.60	20.88°C	10/14/2023
D2450V2 Head	51.70 (46.53~56.87)	23.70 (21.33~26.07)	51.60	24.04	20.84°C	10/16/2023
D2600V2 Head	57.30 (51.57~63.03)	25.10 (22.59~27.61)	58.40	25.84	20.44°C	10/16/2023

Report No.: EED32P81369103

Page 32 of 96

D2600V2 Head	57.30 (51.57~63.03)	25.10 (22.59~27.61)	52.40	23.12	20.23°C	10/17/2023
D2600V2 Head	57.30 (51.57~63.03)	25.10 (22.59~27.61)	54.80	24.32	20.46°C	10/19/2023
Note: All SAR values are normalized to 1W forward power.						

6 SAR Measurement variability and uncertainty

6.1 SAR measurement variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure.

- 1) Repeated measurement is not required when the original highest measured SAR is < 2.0 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 2.0 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 3.0 or when the original or repeated measurement is ≥ 3.6 W/kg (~ 10% from the 10-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 3.75 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

6.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04, 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 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

7 SAR Test Configuration

7.1 GSM Test Configurations

SAR tests for GSM850 and GSM1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5” and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS/EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

7.2 UMTS Test Configurations

1) RMC

As the SAR body tests for WCDMA Band II/V, we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:

- 1) 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to ‘all 1’.
- 2) Test loop Mode 1.

For the output power, the configurations for the DPCCH and DPDCH₁ are as followed (EUT do not support the DPDCH_{2-n})

	Channel Bit Rate (kbps)	Channel Symbol Rate (ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
DPDCH ₁	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640
DPDCH _n	960	960	4	1, 2, 3	640

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCH_n, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCH_n configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

2) HSDPA

SAR for body exposure configurations is measured according to the "Body SAR Measurements" procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/ HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the below table, β_{hs} for HS-DPCCH is set automatically to the correct value when ΔACK , $\Delta NACK$, $\Delta CQI = 8$. The variation of the β_c / β_d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	$b\beta_c$	$b\beta_d$	$b\beta_d$ (SF)	$b\beta_c / \beta_d$	$b\beta_{hs}$ (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	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: ΔACK , $\Delta NACK$ and $\Delta CQI = 8$ $A_{hs} = \beta_{hs} / \beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2 : CM=1 for $\beta_c / \beta_d = 12/15$, $\beta_{hs} / \beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

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

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI's
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Note: settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

3) HSUPA

Body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-set 1 and QPSK for FRC and 12.2kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.

Due to inner loop power control requirements in HSDPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the b values indicated below as well as other applicable procedures described in the 'UMTS Handset' and 'Release 5 HSDPA Data Device' sections of 3G device.

Sub - test	$b\beta_c$	$b\beta_d$	β_d (S F)	$b\beta_c/\beta_d$	$b\beta_{hs}^{(1)}$	$b\beta_{ec}$	$b\beta_{ed}$	β_{ec} (S F)	β_{ed} (code)	CM ⁽²⁾ (dB)	MP R (dB)	AG ⁽⁴⁾ Index	E-TFC I
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/25	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	$\beta_{ed1}: 4/7/15$ $\beta_{ed2}: 4/7/15$	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: ΔACK , $\Delta NACK$ and $\Delta CQI = 8P A_{hs} = \beta_{hs}/\beta_c = 30/15P \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to

TS 25.306 Table 5.1g

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

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF 4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF 4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4. UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)

7.3 LTE Test Configuration

SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices. The CMW500 WideBand Radio Communication Tester was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR test were performed with the same number of RB and RB offsets transmitting on all TTI frames(Maximum TTI)

1) Spectrum Plots for RB configurations

A properly configured base station simulator was used for LTE output power measurements and SAR testing. Therefore, spectrum plots for RB configurations were not required to be included in this report.

2) MPR

When MPR is implemented permanently within the UE, regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

3) A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by using Network Signaling Value of "NS_01" on the base station simulator.

4) LTE procedures for SAR testing**4.1) Largest channel bandwidth standalone SAR test requirements****4.1.1) QPSK with 1 RB allocation**

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. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

4.1.2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 4.1.1) are applied to measure the SAR for QPSK with 50% RB allocation.

4.1.3) QPSK with 100% RB allocation

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 in 4.1.1) and 4.1.2) 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.

4.1.4) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

4.2) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 4.1) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> \frac{1}{2}$ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

7.4 WIFI 5G Test Configurations

1) U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following:

1.1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.

1.2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

1.3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest reported SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

2) U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures.

When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

3) OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

3.1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.

3.2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.

3.3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.

3.4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.

3.4.1) The channel closest to mid-band frequency is selected for SAR measurement.

3.4.2) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

4) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7.5 WIFI 2.4G Test Configurations

For WiFi SAR testing, a communication link is set up with the testing software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The RF signal utilized in SAR measurement has 100% duty cycle and its crest factor is 1. The test procedures in KDB 248227D01 v02r02 are applied.

Per KDB 248227 D01 802.11 Wi-Fi SAR v02r02, SAR Test Reduction criteria are as follows:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The relative SAR levels of multiple exposure test positions can be established by area scan measurements on the highest measured output power channel to determine the initial test position. The area scans must be measured using the same SAR measurement configurations, including test channel, maximum output power, probe tip to phantom distance, scan resolution etc.

When the reported SAR for the initial test position is:

- 1) ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- 2) > 0.4 W/kg, SAR is repeated using the same wireless mode test 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 reported SAR is ≤ 0.8 W/kg or all required test positions are tested.
- 3) For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.

SAR is not required for the following 2.4 GHz OFDM conditions.

- 1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
- 2) 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.

8 SAR Test Results

8.1 Conducted Power Measurements

- 1.For the measurements a Rohde & Schwarz Radio Communication Tester CMW500 was used.
- 2.Establish communication link between emulator and EUT and set EUT to operate at maximum output power all the time.

8.1.1 Conducted Power of UMTS Band II

UMTS Band II		Conducted Power (dBm)		
		9262CH	9400CH	9538CH
WCDMA	12.2kbps RMC	22.02	21.90	21.34
HSDPA	Subtest 1	22.04	21.80	21.44
	Subtest 2	21.27	22.86	22.25
	Subtest 3	20.44	21.74	21.63
	Subtest 4	21.59	21.44	21.93
HSUPA	Subtest 1	22.26	21.54	20.14
	Subtest 2	22.33	21.62	20.25
	Subtest 3	22.32	20.64	21.26
	Subtest 4	22.33	20.59	21.27
	Subtest 5	22.24	21.54	22.14

Note: channel /Frequency: 9262/1852.4,9400/1880,9538/1907.6

8.1.2 Conducted Power of UMTS Band IV

UMTS Band II		Conducted Power (dBm)		
		1312CH	1413CH	1513CH
WCDMA	12.2kbps RMC	21.74	21.98	21.93
HSDPA	Subtest 1	22.21	22.32	21.15
	Subtest 2	21.63	22.67	21.66
	Subtest 3	21.45	22.81	21.49
	Subtest 4	21.95	21.88	21.15
HSUPA	Subtest 1	21.51	22.53	20.03
	Subtest 2	22.01	22.47	21.01
	Subtest 3	21.78	22.53	21.99
	Subtest 4	20.05	22.50	21.89
	Subtest 5	21.89	22.35	22.03

Note: channel /Frequency: 1312/1712.4,1413/11732.6,1513/1752.6

8.1.3 Conducted Power of UMTS Band V

UMTS Band V		Conducted Power (dBm)		
		4132CH	4182CH	4233CH
WCDMA	12.2kbps RMC	22.07	22.71	22.86
HSDPA	Subtest 1	20.72	22.77	22.01
	Subtest 2	21.00	22.13	20.80
	Subtest 3	21.48	21.01	21.09
	Subtest 4	21.07	20.69	21.69
HSUPA	Subtest 1	21.21	22.22	21.29
	Subtest 2	21.03	22.08	21.14
	Subtest 3	21.90	21.84	20.96
	Subtest 4	21.04	22.00	21.08
	Subtest 5	21.71	22.73	22.92

Note: channel /Frequency: 4132/826.4,4182/836.4,4233/846.6

8.1.4 Conducted Power of LTE Band 2

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18607	18900	19193
1.4MHz	QPSK	1	0	21.83	21.61	21.84
		1	3	21.71	21.51	21.43
		1	5	21.63	21.58	21.21
		3	0	21.60	21.69	21.63
		3	2	21.54	21.63	21.56
		3	3	21.51	21.65	21.24
		6	0	20.98	21.80	21.54
	16QAM	1	0	20.57	20.56	20.67
		1	3	20.46	20.48	20.36
		1	5	20.66	20.85	20.15
		3	0	20.72	20.84	20.69
		3	2	20.73	20.76	20.63
		3	3	20.80	20.77	20.37
		6	0	20.88	20.64	20.65
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18615	18900	19185
3MHz	QPSK	1	0	21.82	20.81	20.11
		1	7	21.21	20.28	20.02
		1	14	21.56	20.87	20.04
		8	0	20.68	20.69	20.84
		8	4	20.89	20.70	20.81
		8	7	20.85	20.82	20.38
		15	0	20.78	20.66	20.54
	16QAM	1	0	20.67	20.64	20.11
		1	7	20.96	20.40	20.05
		1	14	20.48	20.91	20.93
		8	0	20.77	20.60	20.95
		8	4	20.86	20.66	20.87
		8	7	20.84	20.72	20.45
		15	0	20.76	20.70	20.59

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18625	18900	19175
5MHz	QPSK	1	0	21.63	20.35	20.77
		1	13	21.28	20.28	20.42
		1	24	21.08	20.89	20.68
		12	0	20.61	20.53	20.79
		12	6	20.62	20.53	20.81
		12	13	20.40	20.74	20.35
		25	0	20.51	20.69	20.58
	16QAM	1	0	20.32	20.21	20.47
		1	13	20.03	20.24	20.59
		1	24	20.09	20.93	20.59
		12	0	20.56	20.51	20.82
		12	6	20.57	20.53	20.85
		12	13	20.35	20.74	20.43
		25	0	20.47	20.63	20.67
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18650	18900	19150
10MHz	QPSK	1	0	22.19	20.54	20.17
		1	24	21.00	20.06	20.28
		1	49	20.75	20.51	20.57
		25	0	20.88	20.65	20.11
		25	12	20.88	20.63	20.06
		25	25	20.23	20.30	20.07
		50	0	20.57	20.15	20.12
	16QAM	1	0	21.01	20.23	20.14
		1	24	20.88	20.84	20.27
		1	49	20.55	20.50	20.61
		25	0	20.71	20.37	20.92
		25	12	20.70	20.38	20.86
		25	25	20.98	20.36	20.93
		50	0	20.35	20.82	20.95

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18675	18900	19125
15MHz	QPSK	1	0	21.77	20.09	20.53
		1	37	20.40	20.88	20.12
		1	74	20.56	20.77	20.27
		36	0	20.45	20.85	20.35
		36	18	20.27	20.79	20.97
		36	38	20.49	20.68	20.43
		75	0	20.94	20.94	20.13
	16QAM	1	0	20.66	20.88	20.43
		1	37	20.38	20.57	20.28
		1	74	20.44	20.59	20.20
		37	0	20.61	20.06	20.53
		37	18	20.31	20.02	20.94
		37	38	20.46	20.85	20.61
		75	0	20.76	20.66	20.97
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18700	18900	19100
20MHz	QPSK	1	0	21.11	20.14	20.65
		1	50	20.50	20.07	20.35
		1	99	20.11	20.04	20.98
		50	0	20.22	20.27	20.42
		50	25	20.22	20.24	20.40
		50	50	20.82	20.36	20.70
		100	0	20.55	20.73	20.37
	16QAM	1	0	20.69	20.44	20.13
		1	50	20.08	20.37	20.76
		1	99	20.93	20.47	20.49
		50	0	20.18	20.39	20.49
		50	25	20.36	20.37	20.47
		50	50	20.73	20.41	20.68
		100	0	20.51	20.83	20.35

8.1.5 Conducted Power of LTE Band 4

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19957	20175	20393
1.4MHz	QPSK	1	0	22.99	22.52	23.26
		1	3	23.07	22.25	23.15
		1	5	23.11	22.17	23.17
		3	0	23.00	22.35	23.16
		3	2	22.96	22.26	23.13
		3	3	22.94	23.14	23.06
		6	0	22.09	23.43	23.42
	16QAM	1	0	21.83	23.23	23.32
		1	3	21.95	23.11	23.38
		1	5	21.83	23.39	23.08
		3	0	22.08	23.33	23.35
		3	2	21.95	23.13	23.19
		3	3	21.95	23.08	23.18
		6	0	21.20	22.27	22.59
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19965	20175	20385
3MHz	QPSK	1	0	23.26	23.16	23.24
		1	7	22.74	23.85	23.85
		1	14	23.05	23.35	23.98
		8	0	22.20	23.39	23.48
		8	4	22.19	23.37	23.48
		8	7	22.48	23.27	23.45
		15	0	22.46	23.25	23.40
	16QAM	1	0	22.00	22.71	23.21
		1	7	21.82	22.57	22.87
		1	14	22.02	23.65	23.20
		8	0	21.27	22.28	22.38
		8	4	21.45	22.29	22.42
		8	7	21.55	22.25	22.41
		15	0	21.37	22.15	22.32

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19975	20175	20375
5MHz	QPSK	1	0	22.89	23.55	23.83
		1	13	22.60	23.47	23.59
		1	24	22.78	23.79	23.69
		12	0	22.13	22.67	23.12
		12	6	22.11	22.69	23.11
		12	13	21.98	23.37	23.18
		25	0	22.07	22.98	23.16
	16QAM	1	0	22.10	22.44	22.77
		1	13	21.62	22.96	22.72
		1	24	21.97	23.27	22.83
		12	0	21.18	21.61	22.14
		12	6	21.15	21.62	22.12
		12	13	21.04	22.57	22.20
		25	0	21.12	21.93	22.22
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20000	20175	20350
10MHz	QPSK	1	0	23.07	23.70	23.34
		1	25	22.41	23.25	23.22
		1	49	22.83	23.46	23.40
		25	0	22.08	22.81	23.25
		25	13	22.13	22.90	23.22
		25	25	22.06	23.36	23.32
		50	0	22.27	23.15	23.26
	16QAM	1	0	22.17	22.86	23.23
		1	25	21.29	22.34	22.38
		1	49	21.86	23.25	22.94
		25	0	21.88	21.66	22.37
		25	13	21.89	21.64	22.33
		25	25	21.82	22.41	22.36
		50	0	21.05	21.99	22.27

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20025	20175	20325
15MHz	QPSK	1	0	22.73	22.99	23.28
		1	37	22.00	23.14	23.29
		1	74	22.96	23.26	23.35
		36	0	21.67	21.63	23.20
		36	18	21.20	22.37	22.93
		36	38	21.86	23.19	23.02
		75	0	21.74	23.00	23.21
	16QAM	1	0	21.81	21.58	23.19
		1	37	20.96	22.18	22.82
		1	74	21.81	23.07	23.01
		37	0	21.77	21.64	22.98
		37	18	21.05	22.12	22.84
		37	38	21.59	23.17	22.99
		75	0	21.55	21.85	22.58
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20050	20175	20300
20MHz	QPSK	1	0	22.24	21.97	23.11
		1	50	22.01	23.23	23.20
		1	99	23.14	23.03	23.72
		50	0	21.89	22.41	22.93
		50	25	21.99	22.50	22.91
		50	50	22.09	23.02	23.38
		100	0	21.55	22.96	23.21
	16QAM	1	0	21.97	21.31	22.95
		1	50	21.88	22.68	23.36
		1	99	22.98	22.95	23.63
		50	0	21.09	21.40	22.60
		50	25	21.13	21.42	22.80
		50	50	21.20	22.53	22.73
		100	0	21.59	22.22	23.04

8.1.6 Conducted Power of LTE Band 5

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20407	20525	20643
1.4MHz	QPSK	1	0	21.06	20.79	20.36
		1	3	21.07	20.06	20.06
		1	5	21.15	20.14	20.98
		3	0	21.07	20.94	20.14
		3	2	21.07	20.90	20.36
		3	3	21.12	20.99	20.15
		6	0	20.44	20.33	20.39
	16QAM	1	0	20.12	20.78	20.21
		1	3	20.31	20.93	20.94
		1	5	20.32	20.12	20.84
		3	0	20.18	20.97	20.13
		3	2	20.16	20.94	20.23
		3	3	20.17	20.05	20.98
		6	0	20.48	20.43	20.42
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20415	20525	20635
3MHz	QPSK	1	0	21.06	20.51	20.60
		1	7	20.81	20.23	20.36
		1	14	20.96	20.93	20.52
		8	0	20.26	20.32	20.24
		8	4	20.27	20.31	20.25
		8	7	20.26	20.80	20.58
		15	0	20.22	20.60	20.73
	16QAM	1	0	20.12	20.21	20.63
		1	7	20.86	20.51	20.60
		1	14	20.10	20.89	20.21
		7	0	20.31	20.39	20.27
		7	4	20.22	20.34	20.25
		7	7	20.27	20.88	20.67
		15	0	20.22	20.64	20.82

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20425	20525	20625
5MHz	QPSK	1	0	20.86	20.95	20.69
		1	13	20.60	20.50	20.82
		1	24	20.14	20.18	20.22
		12	0	20.14	20.35	20.95
		12	6	20.17	20.32	20.99
		12	13	20.72	20.95	20.64
		25	0	20.93	20.80	20.35
	16QAM	1	0	20.93	20.00	20.84
		1	13	20.09	20.28	20.01
		1	24	20.23	20.06	20.45
		12	0	20.17	20.41	20.06
		12	6	20.17	20.38	20.05
		12	13	20.68	20.09	20.71
		25	0	20.97	20.89	20.41
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20450	20525	20600
10MHz	QPSK	1	0	20.37	20.66	20.87
		1	25	20.92	20.22	20.53
		1	49	20.41	20.91	20.84
		25	0	20.15	20.37	20.83
		25	12	20.22	20.55	20.89
		25	25	20.02	20.87	20.96
		50	0	20.77	20.39	20.93
	16QAM	1	0	20.21	20.56	20.97
		1	25	20.00	20.24	20.60
		1	49	20.35	20.99	20.87
		25	0	20.01	20.16	20.76
		25	12	20.22	20.35	20.74
		25	25	20.74	20.74	20.74
		50	0	20.61	20.22	20.73

8.1.7 Conducted Power of LTE Band 7

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20775	21100	21425
5MHz	QPSK	1	0	21.02	21.85	20.89
		1	13	21.84	21.86	20.35
		1	24	21.94	21.13	20.46
		12	0	21.31	21.28	20.78
		12	6	21.29	21.25	20.76
		12	13	21.25	21.30	20.90
		25	0	21.23	21.15	20.90
	16QAM	1	0	20.97	20.99	20.84
		1	13	20.76	20.87	20.47
		1	24	20.87	21.28	20.73
		12	0	20.30	20.32	20.84
		12	6	20.29	20.29	20.78
		12	13	20.24	20.37	20.95
		25	0	20.43	20.23	20.95
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20800	21100	21400
10MHz	QPSK	1	0	21.48	21.46	21.32
		1	25	21.64	21.61	20.41
		1	49	21.86	21.09	20.26
		25	0	21.48	21.32	20.96
		25	13	21.48	21.26	20.19
		25	25	21.97	21.48	20.21
		50	0	21.57	21.32	20.38
	16QAM	1	0	21.36	21.21	20.49
		1	25	20.60	20.53	20.38
		1	49	21.73	20.97	20.79
		25	0	20.24	20.15	20.01
		25	13	20.47	20.07	20.98
		25	25	20.74	20.37	20.96
		50	0	20.34	20.16	20.16

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20825	21100	21375
15MHz	QPSK	1	0	21.87	21.61	21.48
		1	37	21.34	21.20	20.85
		1	74	21.78	21.20	20.76
		36	0	20.84	20.43	20.54
		36	18	20.28	20.11	20.21
		36	38	20.58	20.29	20.73
		75	0	21.15	20.92	20.92
	16QAM	1	0	20.81	20.28	20.37
		1	37	20.38	20.26	20.76
		1	74	20.53	20.16	20.45
		37	0	20.66	20.30	20.56
		37	18	20.30	20.17	20.13
		37	38	20.68	20.19	20.68
		75	0	20.01	20.73	20.79
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20850	21100	21350
20MHz	QPSK	1	0	21.30	21.23	21.20
		1	50	21.25	21.26	20.30
		1	99	21.37	21.23	20.47
		50	0	20.58	20.95	20.46
		50	25	20.70	20.90	20.53
		50	50	21.00	20.45	20.68
		100	0	20.80	20.74	20.34
	16QAM	1	0	20.87	20.38	20.43
		1	50	20.97	20.59	20.83
		1	99	21.20	20.47	20.47
		50	0	20.70	20.87	20.53
		50	25	20.75	20.86	20.53
		50	50	20.90	20.56	20.21
		100	0	20.93	20.80	20.45

8.1.8 Conducted Power of LTE Band 12

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23025	23095	23165
3MHz	QPSK	1	0	21.67	21.63	21.01
		1	7	21.58	21.14	21.95
		1	14	21.12	21.85	21.76
		8	0	21.06	20.67	21.56
		8	4	21.04	20.77	21.63
		8	7	21.38	20.82	20.92
		15	0	21.26	20.70	21.31
	16QAM	1	0	21.47	20.52	21.74
		1	7	21.74	20.36	20.95
		1	14	21.11	20.85	20.52
		8	0	21.18	20.92	20.76
		8	4	21.19	20.90	20.84
		8	7	21.53	20.93	20.03
		15	0	21.40	20.80	20.46
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23035	23095	23155
5MHz	QPSK	1	0	21.45	21.22	21.70
		1	13	21.92	21.25	21.06
		1	24	21.86	21.05	21.16
		12	0	21.32	20.46	21.78
		12	6	21.36	20.44	21.84
		12	13	21.74	20.80	20.95
		25	0	21.11	20.63	21.31
	16QAM	1	0	21.69	20.37	21.50
		1	13	21.02	20.19	20.80
		1	24	20.44	21.01	20.00
		12	0	21.45	20.57	20.99
		12	6	21.46	20.56	20.94
		12	13	20.88	20.95	20.94
		25	0	21.15	20.72	20.46

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23060	23095	23130
10MHz	QPSK	1	0	21.45	21.77	21.76
		1	25	21.22	21.19	21.45
		1	49	21.03	21.17	21.91
		25	0	21.24	21.00	21.46
		25	13	21.27	20.94	21.47
		25	25	20.85	21.75	21.83
		50	0	21.28	21.56	21.77
	16QAM	1	0	21.97	21.45	20.58
		1	25	20.18	20.99	21.27
		1	49	20.90	21.14	20.82
		25	0	21.08	20.73	20.29
		25	13	21.10	20.70	20.28
		25	25	20.61	20.56	20.70
		50	0	20.31	20.35	20.59

8.1.9 Conducted Power of LTE Band 13

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23205	23230	23255
5MHz	QPSK	1	0	20.24	21.18	20.50
		1	13	21.07	20.64	20.83
		1	24	21.23	20.17	20.75
		12	0	20.62	20.99	20.34
		12	6	20.63	20.01	20.27
		12	13	20.33	20.56	20.38
		25	0	20.00	20.69	20.37
	16QAM	1	0	20.27	20.11	20.29
		1	13	20.90	20.24	20.79
		1	24	20.87	20.23	20.78
		12	0	20.75	20.17	20.19
		12	6	20.75	20.11	20.15
		12	13	20.42	20.45	20.18
		25	0	20.10	20.83	20.13
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
10MHz	QPSK	1	0	/	20.88	/
		1	25	/	20.05	/
		1	49	/	20.53	/
		25	0	/	20.23	/
		25	13	/	20.24	/
		25	25	/	20.82	/
		50	0	/	20.92	/
	16QAM	1	0	/	20.89	/
		1	25	/	20.88	/
		1	49	/	20.39	/
		25	0	/	20.84	/
		25	13	/	20.84	/
		25	25	/	20.35	/
		50	0	/	20.52	/

8.1.10 Conducted Power of LTE Band 17

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23755	23790	23825
5MHz	QPSK	1	0	22.34	22.03	22.08
		1	13	21.46	22.46	22.92
		1	24	22.23	22.11	21.84
		12	0	21.21	21.41	22.29
		12	6	21.16	21.37	22.34
		12	13	21.15	22.19	21.73
		25	0	21.99	21.87	22.09
	16QAM	1	0	21.17	21.98	22.18
		1	13	21.70	21.34	21.78
		1	24	21.19	22.29	21.73
		12	0	21.13	21.27	21.30
		12	6	21.11	21.30	21.30
		12	13	21.08	21.17	21.64
		25	0	19.90	21.81	21.09
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23780	23790	23800
10MHz	QPSK	1	0	22.74	22.33	22.30
		1	25	22.16	22.45	22.91
		1	49	22.51	22.11	22.47
		25	0	21.31	21.66	21.91
		25	13	21.26	21.65	21.90
		25	25	22.50	22.52	22.51
		50	0	22.18	22.25	22.19
	16QAM	1	0	21.58	21.26	21.22
		1	25	21.06	21.35	21.82
		1	49	22.64	21.91	21.33
		25	0	20.99	21.35	21.56
		25	13	20.99	21.33	21.59
		25	25	21.26	21.29	21.32
		50	0	21.84	21.93	21.91

8.1.11 Conducted Power of LTE Band 25

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26047	26365	26683
1.4MHz	QPSK	1	0	22.25	21.00	20.51
		1	3	22.22	20.96	20.83
		1	5	22.26	21.06	20.66
		3	0	22.21	20.84	20.82
		3	2	22.15	21.06	20.73
		3	3	22.18	21.12	20.47
		6	0	21.41	21.24	20.74
	16QAM	1	0	21.25	20.79	21.37
		1	3	21.21	20.09	20.68
		1	5	21.35	20.87	20.41
		3	0	21.07	20.98	20.83
		3	2	21.17	20.94	20.85
		3	3	21.08	21.02	20.66
		6	0	20.44	21.21	20.96
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26055	26365	26675
3MHz	QPSK	1	0	21.52	21.32	22.04
		1	7	21.88	21.17	22.43
		1	14	22.47	20.82	21.69
		8	0	21.43	21.20	22.29
		8	4	21.39	21.20	22.35
		8	7	21.45	21.79	21.77
		15	0	21.33	21.56	21.93
		1	0	21.30	20.82	21.73
	16QAM	1	7	20.86	21.20	21.59
		1	14	21.32	20.77	21.80
		8	0	21.32	21.44	21.49
		8	4	21.35	20.39	21.51
		8	7	20.43	21.75	21.87
		15	0	21.29	21.51	21.14

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26065	26365	26665
5MHz	QPSK	1	0	22.06	21.73	22.08
		1	13	21.95	18.21	21.94
		1	24	21.90	21.74	21.53
		12	0	21.28	22.00	21.53
		12	6	21.25	21.95	21.56
		12	13	21.22	21.71	22.02
		25	0	21.25	21.50	21.82
	16QAM	1	0	22.15	21.73	21.13
		1	13	21.92	21.18	21.13
		1	24	21.86	21.69	21.49
		12	0	21.24	21.17	21.67
		12	6	21.28	21.15	21.66
		12	13	21.20	21.74	21.03
		25	0	21.21	21.82	21.93
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26090	26365	26640
10MHz	QPSK	1	0	22.62	21.75	21.61
		1	25	21.89	21.58	21.13
		1	49	21.80	21.14	21.93
		25	0	21.65	21.87	21.46
		25	13	21.63	21.84	21.52
		25	25	21.13	21.61	21.40
		50	0	21.42	21.41	21.58
	16QAM	1	0	21.48	21.70	21.75
		1	25	21.58	21.61	21.26
		1	49	21.68	21.17	21.76
		25	0	21.39	21.62	21.32
		25	13	21.40	21.63	21.30
		25	25	21.91	21.48	21.23
		50	0	20.15	21.26	21.37

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26115	26365	26615
15MHz	QPSK	1	0	22.21	21.11	20.93
		1	37	21.04	21.31	21.54
		1	74	21.52	21.18	21.34
		36	0	21.83	21.12	21.54
		36	18	21.73	21.45	21.32
		36	38	21.40	21.14	21.23
		75	0	20.58	21.19	21.41
	16QAM	1	0	20.93	20.92	21.80
		1	37	20.81	21.49	21.41
		1	74	21.33	20.15	22.16
		37	0	20.93	21.20	21.90
		37	18	21.68	21.44	21.45
		37	38	21.36	22.10	21.33
		75	0	21.27	22.00	21.39
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26140	26365	26590
20MHz	QPSK	1	0	21.49	21.58	22.09
		1	50	22.22	22.39	22.32
		1	99	21.99	21.68	22.04
		50	0	21.88	21.33	22.27
		50	25	22.10	22.20	22.31
		50	50	21.69	21.73	22.24
		100	0	21.13	22.15	21.76
	16QAM	1	0	21.97	21.90	21.69
		1	50	21.57	22.02	21.91
		1	99	21.49	22.25	21.72
		50	0	21.87	22.35	22.36
		50	25	21.81	22.39	21.37
		50	50	21.70	21.77	22.32
		100	0	22.02	22.19	21.79

8.1.12 Conducted Power of LTE Band 26

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26785	26909	27033
1.4MHz	QPSK	1	0	21.18	21.08	20.71
		1	3	21.20	21.04	21.27
		1	5	21.56	21.35	21.52
		3	0	21.29	20.95	21.68
		3	2	21.28	20.92	21.62
		3	3	21.43	20.51	21.38
		6	0	20.63	21.34	21.63
	16QAM	1	0	20.97	20.04	20.70
		1	3	20.08	20.00	20.31
		1	5	20.51	20.20	20.28
		3	0	20.31	20.12	20.67
		3	2	20.21	20.20	20.48
		3	3	20.47	20.60	20.24
		6	0	20.60	20.20	20.55
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26793	26909	27025
3MHz	QPSK	1	0	21.92	20.93	20.78
		1	7	21.68	20.43	20.03
		1	14	21.40	20.08	20.03
		8	0	20.78	20.53	20.09
		8	4	20.76	20.51	20.07
		8	7	21.02	20.95	20.24
		15	0	22.12	20.50	20.62
	16QAM	1	0	20.78	20.33	20.21
		1	7	20.52	20.96	21.69
		1	14	21.02	20.85	21.72
		8	0	20.88	20.48	20.03
		8	4	20.82	20.52	20.06
		8	7	20.10	20.83	20.20
		15	0	20.03	20.49	20.52

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26803	26909	27015
5MHz	QPSK	1	0	21.65	20.38	20.54
		1	13	21.74	20.47	20.86
		1	24	21.52	20.28	20.76
		12	0	20.88	20.55	20.16
		12	6	20.93	20.53	20.30
		12	13	20.90	20.03	20.68
		25	0	20.90	20.59	20.52
	16QAM	1	0	20.75	20.03	20.40
		1	13	20.55	20.38	20.71
		1	24	20.40	20.37	20.80
		12	0	20.04	20.50	20.20
		12	6	20.03	20.51	20.22
		12	13	20.97	20.84	20.57
		25	0	20.03	20.51	20.46
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26828	26909	26990
10MHz	QPSK	1	0	22.39	20.67	21.28
		1	25	21.38	20.26	20.39
		1	49	20.38	21.58	20.48
		25	0	21.21	20.75	20.49
		25	13	21.23	20.70	20.56
		25	25	20.03	20.84	20.97
		50	0	20.57	20.35	20.75
	16QAM	1	0	21.26	20.20	20.03
		1	25	20.37	20.81	20.35
		1	49	20.05	20.33	20.32
		25	0	20.03	20.46	20.26
		25	13	20.15	20.50	20.25
		25	25	20.80	20.41	20.55
		50	0	20.51	20.96	20.40

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				26853	26909	26965
15MHz	QPSK	1	0	21.95	21.23	20.06
		1	37	20.88	20.17	20.73
		1	74	20.87	21.02	20.24
		36	0	20.77	20.05	20.62
		36	18	20.58	20.02	20.86
		36	38	20.71	20.01	20.20
		75	0	20.68	20.63	20.56
	16QAM	1	0	20.92	20.96	20.71
		1	37	20.65	20.07	20.66
		1	74	20.70	20.12	20.20
		37	0	20.66	20.84	20.68
		37	18	20.80	20.13	20.67
		37	38	20.68	20.23	20.11
		75	0	20.51	20.23	20.26

8.1.13 Conducted Power of LTE Band 41

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39675	40620	41565
5MHz	QPSK	1	0	20.95	22.78	20.69
		1	13	20.26	22.69	20.50
		1	24	20.70	22.88	20.86
		12	0	20.73	21.92	20.56
		12	6	20.74	21.91	20.58
		12	13	20.25	22.11	20.63
		25	0	20.55	22.11	20.09
	16QAM	1	0	20.34	21.49	20.42
		1	13	20.19	21.85	20.30
		1	24	20.29	22.04	20.27
		12	0	20.56	21.02	20.67
		12	6	20.53	21.00	20.64
		12	13	20.10	21.17	20.79
		25	0	20.43	21.25	20.27
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39700	40620	41540
10MHz	QPSK	1	0	20.23	20.19	20.96
		1	25	20.24	22.77	20.50
		1	49	20.86	20.70	20.48
		25	0	20.81	22.16	20.08
		25	13	20.82	22.17	20.15
		25	25	20.67	22.63	20.42
		50	0	20.88	22.63	20.40
	16QAM	1	0	20.40	22.32	20.67
		1	25	20.93	21.64	20.19
		1	49	20.31	22.56	20.19
		25	0	20.19	21.01	20.08
		25	13	20.10	21.02	20.04
		25	25	20.06	21.31	20.34
		50	0	20.25	21.31	20.33

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39725	40620	41515
15MHz	QPSK	1	0	20.72	22.68	21.11
		1	37	20.87	22.52	20.28
		1	74	20.25	20.17	20.30
		36	0	20.06	21.70	20.82
		36	18	20.43	21.36	20.63
		36	38	20.53	21.83	20.14
		75	0	20.53	22.38	20.16
	16QAM	1	0	20.37	21.68	20.88
		1	37	20.38	21.26	20.27
		1	74	20.41	22.09	20.65
		37	0	20.95	21.58	20.79
		37	18	20.25	21.37	20.64
		37	38	20.27	22.03	20.04
		75	0	20.99	21.06	20.07
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				39750	40620	41490
20MHz	QPSK	1	0	20.87	22.17	21.42
		1	50	20.77	22.58	20.34
		1	99	20.67	22.82	20.37
		50	0	20.59	21.90	20.11
		50	25	20.59	21.92	20.12
		50	50	20.14	22.41	20.51
		100	0	20.08	22.39	20.06
	16QAM	1	0	20.06	21.57	20.67
		1	50	20.14	22.05	20.07
		1	99	20.19	22.39	20.70
		50	0	20.21	20.88	20.22
		50	25	20.22	20.88	20.25
		50	50	20.85	21.25	20.63
		100	0	20.77	21.24	20.15

8.1.14 Conducted Power of LTE Band 66

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				131979	132322	132665
1.4MHz	QPSK	1	0	23.79	22.83	23.25
		1	3	23.70	22.63	23.15
		1	5	23.74	22.58	23.28
		3	0	23.80	22.50	23.30
		3	2	23.78	22.44	23.27
		3	3	23.83	22.42	23.19
		6	0	23.10	22.33	22.49
	16QAM	1	0	22.82	22.32	22.28
		1	3	22.53	22.30	22.30
		1	5	23.14	22.22	22.31
		3	0	22.93	22.15	22.46
		3	2	22.95	22.23	22.47
		3	3	23.03	22.14	22.35
		6	0	22.12	23.70	22.36
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				131987	132322	132657
3MHz	QPSK	1	0	23.93	22.67	23.86
		1	7	23.75	22.44	23.09
		1	14	22.15	22.48	23.40
		8	0	23.12	22.34	22.62
		8	4	23.13	22.30	22.62
		8	7	23.27	22.27	22.54
		15	0	23.13	22.27	22.49
	16QAM	1	0	23.17	22.39	22.62
		1	7	22.48	22.09	22.36
		1	14	23.35	22.27	22.40
		8	0	22.12	23.82	22.55
		8	4	22.05	23.71	22.56
		8	7	22.29	23.59	22.47
		15	0	22.10	23.71	22.46

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				131997	132322	132647
5MHz	QPSK	1	0	23.74	22.61	23.55
		1	13	23.85	22.33	23.23
		1	24	23.83	22.57	23.25
		12	0	23.19	22.32	22.68
		12	6	23.18	22.30	22.68
		12	13	23.24	22.31	22.51
		25	0	23.22	22.35	22.60
	16QAM	1	0	22.96	22.33	22.82
		1	13	23.01	22.02	22.15
		1	24	22.75	22.46	22.32
		12	0	22.16	23.73	22.68
		12	6	22.17	23.73	22.67
		12	13	22.24	23.66	22.45
		25	0	22.21	23.85	22.56
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				132022	132322	132622
10MHz	QPSK	1	0	22.31	22.42	23.58
		1	25	23.52	22.21	23.28
		1	49	22.30	25.54	23.49
		25	0	23.43	22.08	22.28
		25	13	23.43	22.04	22.33
		25	25	23.31	22.28	22.83
		50	0	23.53	22.20	23.02
	16QAM	1	0	23.19	22.03	22.50
		1	25	22.51	23.85	22.15
		1	49	23.34	22.10	22.52
		25	0	22.14	23.73	22.08
		25	13	22.17	23.71	22.08
		25	25	22.08	23.71	22.68
		50	0	22.28	23.85	22.90

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				132047	132322	132597
15MHz	QPSK	1	0	22.09	22.41	23.30
		1	37	23.59	22.02	22.41
		1	74	22.28	22.55	23.27
		36	0	22.99	23.75	22.29
		36	18	22.39	23.31	22.23
		36	38	23.25	22.08	22.24
		75	0	23.13	22.11	22.27
	16QAM	1	0	23.07	23.81	22.91
		1	37	22.55	23.39	22.42
		1	74	23.28	23.92	22.37
		37	0	22.99	22.11	22.27
		37	18	22.50	23.33	22.48
		37	38	23.33	23.80	22.19
		75	0	22.92	23.76	22.07
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				132072	132322	132572
20MHz	QPSK	1	0	23.40	22.20	23.62
		1	50	23.59	23.79	22.72
		1	99	22.77	22.12	22.91
		50	0	23.16	23.72	22.42
		50	25	23.22	23.65	22.48
		50	50	23.32	23.92	22.82
		100	0	23.00	23.91	22.34
	16QAM	1	0	22.94	22.00	23.11
		1	50	23.26	23.83	22.23
		1	99	22.55	23.75	22.55
		50	0	22.31	23.60	22.46
		50	25	22.31	23.58	22.46
		50	50	22.41	23.26	22.86
		100	0	22.97	23.80	22.33

8.1.15 Conducted Power of WiFi 2.4G

The output power of WiFi 2.4G is as following:

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power(dBm)	SAR Test (Yes/No)
802.11b	1	2412	1	13.50	10.92	Yes
	6	2437		13.50	12.48	Yes
	11	2462		13.50	13.06	Yes
802.11g	1	2412	6	11.50	10.61	No
	6	2437		11.50	10.46	No
	11	2462		11.50	11.09	No
802.11n (HT20)	1	2412	6.5	12.00	10.86	No
	6	2437		12.00	11.59	No
	11	2462		12.00	11.30	No
802.11n (HT40)	3	2422	13.5	12.00	11.59	No
	6	2437		12.00	11.91	No
	9	2452		12.00	11.77	No

Note: 1) channel /Frequency: 1/2412, 3/2422, 6/2437, 9/2452, 11/2462.

8.2 SAR test results**Notes:**

1) Per KDB447498 D01v06, 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: $\leq 0.8 \text{ W/kg}$ or 2.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\leq 100 \text{ MHz}$. When the maximum output power variation across the required test channels is $> \frac{1}{2} \text{ dB}$, instead of the middle channel, the highest output power channel must be used.

2) Per KDB447498 D01v06, All measurement SAR result is scaled-up to account for tune-up tolerance is compliant.

3) Per KDB865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8 \text{ W/Kg}$; if the deviation among the repeated measurement is $\leq 20\%$, and the measured SAR $< 1.45 \text{ W/Kg}$, only one repeated measurement is required.

4) Per KDB865664 D02v01r02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is $> 1.5 \text{ W/kg}$, or $> 7.0 \text{ W/kg}$ for occupational exposure. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing (Refer to appendix B for details).

5) Per KDB941225 D06, the DUT Dimension is bigger than $9 \text{ cm} \times 5 \text{ cm}$, so 10 mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5 cm , such position does not need to be tested.

6) Per KDB648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is $\leq 1.2 \text{ W/kg}$, no additional SAR evaluations using a headset are required.

8.2.1 Results overview of UMTS Band II

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	9400/1880	RMC	0.586	0.322	-0.180	21.900	22.500	0.673	20.86°C
Back Side	9400/1880	RMC	0.382	0.242	-0.080	21.900	22.500	0.439	20.86°C
Left Side	9400/1880	RMC	0.283	0.175	-0.030	21.900	22.500	0.325	20.86°C
Right Side	9400/1880	RMC	0.170	0.103	0.190	21.900	22.500	0.195	20.86°C
Top Side	9400/1880	RMC	0.363	0.178	-0.650	21.900	22.500	0.417	20.86°C
Front Side	9612/1852.4	RMC	0.894	0.496	-0.810	22.020	22.500	0.998	20.78°C
Front Side	9538/1907.6	RMC	0.499	0.273	0.020	21.340	22.500	0.652	20.78°C

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	9612/1852.4	RMC	0.937	0.519	-0.160	22.020	22.500	1.047	20.78°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.2 Results overview of UMTS Band IV

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	1413/1732.6	RMC	0.787	0.524	-0.160	21.980	22.000	0.791	20.74°C
Back Side	1413/1732.6	RMC	0.488	0.324	-0.080	21.980	22.000	0.490	20.74°C
Left Side	1413/1732.6	RMC	0.203	0.125	0.020	21.980	22.000	0.204	20.74°C
Right Side	1413/1732.6	RMC	0.221	0.139	0.010	21.980	22.000	0.222	20.74°C
Top Side	1413/1732.6	RMC	0.482	0.241	0.040	21.980	22.000	0.484	20.74°C
Front Side	1312/1712.4	RMC	0.599	0.404	0.310	21.740	22.000	0.636	20.74°C
Front Side	1513/1752.6	RMC	1.170	0.644	-0.200	21.930	22.000	1.189	20.74°C

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	1513/1752.6	RMC	1.240	0.686	-0.130	21.930	22.000	1.260	20.74°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.3 Results overview of UMTS Band V

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	4182/836.4	RMC	0.882	0.639	-0.190	22.710	23.000	0.943	20.83°C
Back Side	4182/836.4	RMC	0.335	0.228	0.160	22.710	23.000	0.358	20.83°C
Left Side	4182/836.4	RMC	0.111	0.080	0.070	22.710	23.000	0.119	20.83°C
Right Side	4182/836.4	RMC	0.125	0.088	0.050	22.710	23.000	0.134	20.83°C
Top Side	4182/836.4	RMC	0.145	0.080	-0.030	22.710	23.000	0.155	20.83°C
Front Side	4132/826.4	RMC	0.852	0.624	-0.390	22.070	23.000	1.055	20.83°C
Front Side	4233/846.6	RMC	0.684	0.496	-0.150	22.860	23.000	0.706	20.83°C

Test position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	4182/836.4	RMC	0.797	0.580	-0.050	22.710	23.000	0.852	20.83°C
Front Side	4132/826.4	RMC	0.826	0.602	0.030	22.070	23.000	1.023	20.83°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.4 Results overview of LTE Band 2

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	18900/1880	20M QPSK 1RB#50	0.611	0.336	0.320	20.070	21.000	0.757	20.78°C
Back Side	18900/1880	20M QPSK 1RB#50	0.498	0.231	-0.280	20.070	21.000	0.617	20.78°C
Left Side	18900/1880	20M QPSK 1RB#50	0.189	0.116	-0.070	20.070	21.000	0.234	20.78°C
Right Side	18900/1880	20M QPSK 1RB#50	0.125	0.075	0.020	20.070	21.000	0.155	20.78°C
Top Side	18900/1880	20M QPSK 1RB#50	0.276	0.152	-0.130	20.070	21.000	0.342	20.78°C
Front Side	18900/1880	20M QPSK 50%RB#50	0.721	0.341	0.000	20.240	21.000	0.859	20.78°C
Back Side	18900/1880	20M QPSK 50%RB#50	0.364	0.229	-0.030	20.240	21.000	0.434	20.78°C
Left Side	18900/1880	20M QPSK 50%RB#50	0.187	0.115	-0.110	20.240	21.000	0.223	20.78°C
Right Side	18900/1880	20M QPSK 50%RB#50	0.121	0.072	0.030	20.240	21.000	0.144	20.78°C
Top Side	18900/1880	20M QPSK 50%RB#50	0.258	0.142	-0.210	20.240	21.000	0.307	20.78°C
Front Side	18700/1860	20M QPSK 50%RB#50	0.720	0.396	-0.590	20.220	21.000	0.862	20.78°C
Front Side	19100/1900	20M QPSK 50%RB#50	0.460	0.253	0.040	20.400	21.000	0.528	20.78°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.5 Results overview of LTE Band 4

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	20175/17 32.5	20M QPSK 1RB#50	0.521	0.345	-0.330	23.230	23.500	0.554	20.05°C
Back Side	20175/17 32.5	20M QPSK 1RB#50	0.267	0.102	-0.060	23.230	23.500	0.284	20.05°C
Left Side	20175/17 32.5	20M QPSK 1RB#50	0.249	0.158	-0.120	23.230	23.500	0.265	20.05°C
Right Side	20175/17 32.5	20M QPSK 1RB#50	0.345	0.215	-0.030	23.230	23.500	0.367	20.05°C
Top Side	20175/17 32.5	20M QPSK 1RB#50	0.571	0.296	0.190	23.230	23.500	0.608	20.05°C
Front Side	20175/17 32.5	20M QPSK 50%RB#25	0.578	0.374	0.340	22.500	23.500	0.728	20.05°C
Back Side	20175/17 32.5	20M QPSK 50%RB#25	0.424	0.189	-0.180	22.500	23.500	0.534	20.05°C
Left Side	20175/17 32.5	20M QPSK 50%RB#25	0.249	0.158	0.040	22.500	23.500	0.313	20.05°C
Right Side	20175/17 32.5	20M QPSK 50%RB#25	0.369	0.129	0.000	22.500	23.500	0.465	20.05°C
Top Side	20175/17 32.5	20M QPSK 50%RB#25	0.549	0.284	0.000	22.500	23.500	0.691	20.05°C
Front Side	20050/17 20	20M QPSK 50%RB#25	0.528	0.347	-0.860	21.990	23.500	0.748	20.05°C
Front Side	20300/17 45	20M QPSK 50%RB#25	0.809	0.315	-0.470	22.910	23.500	0.927	20.05°C

Test position of Hotspot with10mm	Test channel /Frequen cy	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	20300/17 45	20M QPSK 1RB#50	1.090	0.707	-1.160	22.910	23.500	1.249	20.05°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.6 Results overview of LTE Band 5

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	20525/8 36.5	10M QPSK 1RB#25	0.667	0.443	0.120	20.220	21.000	0.798	20.81°C
Back Side	20525/8 36.5	10M QPSK 1RB#25	0.429	0.234	0.360	20.220	21.000	0.513	20.81°C
Left Side	20525/8 36.5	10M QPSK 1RB#25	0.207	0.141	0.030	20.220	21.000	0.248	20.81°C
Right Side	20525/8 36.5	10M QPSK 1RB#25	0.105	0.076	-1.230	20.220	21.000	0.126	20.81°C
Top Side	20525/8 36.5	10M QPSK 1RB#25	0.142	0.079	0.750	20.220	21.000	0.170	20.81°C
Front Side	20525/8 36.5	10M QPSK 25%RB#25	0.641	0.023	0.000	20.870	21.000	0.660	20.81°C
Back Side	20525/8 36.5	10M QPSK 25%RB#25	0.352	0.237	0.250	20.870	21.000	0.363	20.81°C
Left Side	20525/8 36.5	10M QPSK 25%RB#25	0.334	0.178	-0.280	20.870	21.000	0.344	20.81°C
Right Side	20525/8 36.5	10M QPSK 25%RB#25	0.145	0.104	-0.570	20.870	21.000	0.149	20.81°C
Top Side	20525/8 36.5	10M QPSK 25%RB#25	0.174	0.097	-0.050	20.870	21.000	0.179	20.81°C
Front Side	20450/8 29	10M QPSK 1RB#25	0.624	0.415	-0.270	20.920	21.000	0.636	20.81°C
Front Side	20600/8 44	10M QPSK 1RB#25	0.761	0.506	-0.090	20.530	21.000	0.848	20.81°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.7 Results overview of LTE Band 7

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	21100/2535	20M QPSK 1RB#50	0.450	0.234	-0.430	21.260	21.500	0.476	20.44°C
Back Side	21100/2535	20M QPSK 1RB#50	0.196	0.091	1.770	21.260	21.500	0.207	20.44°C
Left Side	21100/2535	20M QPSK 1RB#50	0.165	0.091	-0.160	21.260	21.500	0.174	20.44°C
Right Side	21100/2535	20M QPSK 1RB#50	0.048	0.027	-0.340	21.260	21.500	0.051	20.44°C
Top Side	21100/2535	20M QPSK 1RB#50	0.441	0.184	0.000	21.260	21.500	0.466	20.44°C
Front Side	21100/2535	20M QPSK 50%RB#25	0.850	0.345	-0.840	20.900	21.500	0.976	20.44°C
Back Side	21100/2535	20M QPSK 50%RB#25	0.278	0.151	-0.600	20.900	21.500	0.319	20.44°C
Left Side	21100/2535	20M QPSK 50%RB#25	0.072	0.027	0.000	20.900	21.500	0.083	20.44°C
Right Side	21100/2535	20M QPSK 50%RB#25	0.039	0.020	0.000	20.900	21.500	0.045	20.44°C
Top Side	21100/2535	20M QPSK 50%RB#25	0.325	0.172	0.180	20.900	21.500	0.373	20.44°C
Front Side	20850/2510	20M QPSK 50%RB#25	1.130	0.560	-0.400	20.700	21.500	1.359	20.44°C
Front Side	21350/2560	20M QPSK 50%RB#25	0.712	0.335	0.030	20.530	21.500	0.890	20.44°C

Test position of Hotspot with10mm	Test channel /Frequen cy	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	20850/25 10	20M QPSK 1RB#50	1.140	0.562	-0.640	20.700	21.500	1.371	20.44°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.8 Results overview of LTE Band 12

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	23095/70 7.5	10M QPSK 1RB#25	0.098	0.065	0.030	21.190	22.000	0.118	20.88°C
Back Side	23095/70 7.5	10M QPSK 1RB#25	0.032	0.022	-0.550	21.190	22.000	0.038	20.88°C
Left Side	23095/70 7.5	10M QPSK 1RB#25	0.018	0.011	0.000	21.190	22.000	0.021	20.88°C
Right Side	23095/70 7.5	10M QPSK 1RB#25	0.018	0.011	0.000	21.190	22.000	0.021	20.88°C
Top Side	23095/70 7.5	10M QPSK 1RB#25	0.021	0.011	-0.530	21.190	22.000	0.025	20.88°C
Front Side	23095/70 7.5	10M QPSK 25%RB#25	0.120	0.080	0.050	21.750	22.000	0.127	20.88°C
Back Side	23095/70 7.5	10M QPSK 25%RB#25	0.053	0.037	-0.070	21.750	22.000	0.056	20.88°C
Left Side	23095/70 7.5	10M QPSK 25%RB#25	0.029	0.020	0.580	21.750	22.000	0.031	20.88°C
Right Side	23095/70 7.5	10M QPSK 25%RB#25	0.011	0.008	0.450	21.750	22.000	0.012	20.88°C
Top Side	23095/70 7.5	10M QPSK 25%RB#25	0.027	0.012	1.540	21.750	22.000	0.029	20.88°C
Front Side	23060/70 4	10M QPSK 1RB#25	0.130	0.087	0.070	20.850	22.000	0.169	20.88°C
Front Side	23130/71 1	10M QPSK 1RB#25	0.139	0.092	-0.480	21.830	22.000	0.145	20.88°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.9 Results overview of LTE Band 13

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	23230/78 2	10M QPSK 1RB#25	0.198	0.131	-0.820	20.05	21.000	0.246	20.88°C
Back Side	23230/78 2	10M QPSK 1RB#25	0.086	0.058	-0.090	20.05	21.000	0.106	20.88°C
Left Side	23230/78 2	10M QPSK 1RB#25	0.049	0.034	-0.770	20.05	21.000	0.061	20.45°C
Right Side	23230/78 2	10M QPSK 1RB#25	0.023	0.017	0.430	20.05	21.000	0.029	20.45°C
Top Side	23230/78 2	10M QPSK 1RB#25	0.044	0.023	-0.010	20.05	21.000	0.054	20.45°C
Front Side	23230/78 2	10M QPSK 25%RB#25	0.300	0.156	0.100	20.82	21.000	0.313	20.45°C
Back Side	23230/78 2	10M QPSK 25%RB#25	0.096	0.051	0.220	20.82	21.000	0.100	20.45°C
Left Side	23230/78 2	10M QPSK 25%RB#25	0.070	0.034	0.480	20.82	21.000	0.073	20.45°C
Right Side	23230/78 2	10M QPSK 25%RB#25	0.027	0.014	-0.320	20.82	21.000	0.028	20.45°C
Top Side	23230/78 2	10M QPSK 25%RB#25	0.046	0.025	-0.090	20.82	21.000	0.048	20.45°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.10 Results overview of LTE Band 17

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	23790/710	10M QPSK 1RB#25	0.137	0.091	0.240	22.450	22.500	0.139	20.53°C
Back Side	23790/710	10M QPSK 1RB#25	0.056	0.038	0.010	22.450	22.500	0.057	20.53°C
Left Side	23790/710	10M QPSK 1RB#25	0.029	0.020	0.040	22.450	22.500	0.030	20.53°C
Right Side	23790/710	10M QPSK 1RB#25	0.011	0.008	-0.590	22.450	22.500	0.012	20.53°C
Top Side	23790/710	10M QPSK 1RB#25	0.048	0.026	0.590	22.450	22.500	0.048	20.53°C
Front Side	23790/710	10M QPSK 25%RB#25	0.161	0.107	0.040	21.650	22.500	0.196	20.53°C
Back Side	23790/710	10M QPSK 25%RB#25	0.065	0.045	-0.150	21.650	22.500	0.079	20.53°C
Left Side	23790/710	10M QPSK 25%RB#25	0.035	0.024	0.460	21.650	22.500	0.042	20.53°C
Right Side	23790/710	10M QPSK 25%RB#25	0.013	0.010	-0.010	21.650	22.500	0.016	20.53°C
Top Side	23790/710	10M QPSK 25%RB#25	0.053	0.028	-0.070	21.650	22.500	0.064	20.53°C
Front Side	23780/709	10M QPSK 25%RB#25	0.131	0.088	-0.270	21.260	22.500	0.174	20.53°C
Front Side	23800/711	10M QPSK 25%RB#25	0.183	0.102	0.000	21.900	22.500	0.210	20.53°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.11 Results overview of LTE Band 25

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	26365/18 82.5	20M QPSK 1RB#50	1.170	0.646	-0.040	22.390	22.500	1.200	20.78°C
Back Side	26365/18 82.5	20M QPSK 1RB#50	0.778	0.492	-0.060	22.390	22.500	0.798	20.08°C
Left Side	26365/18 82.5	20M QPSK 1RB#50	0.392	0.241	0.070	22.390	22.500	0.402	20.08°C
Right Side	26365/18 82.5	20M QPSK 1RB#50	0.243	0.146	0.130	22.390	22.500	0.249	20.08°C
Top Side	26365/18 82.5	20M QPSK 1RB#50	0.565	0.314	-0.190	22.390	22.500	0.579	20.08°C
Front Side	26365/18 82.5	20M QPSK 50%RB#25	1.180	0.643	0.060	22.200	22.500	1.264	20.08°C
Back Side	26365/18 82.5	20M QPSK 50%RB#25	0.666	0.423	-0.210	22.200	22.500	0.714	20.08°C
Left Side	26365/18 82.5	20M QPSK 50%RB#25	0.355	0.219	-0.350	22.200	22.500	0.380	20.08°C
Right Side	26365/18 82.5	20M QPSK 50%RB#25	0.214	0.129	-0.120	22.200	22.500	0.229	20.08°C
Top Side	26365/18 82.5	20M QPSK 50%RB#25	0.508	0.284	0.000	22.200	22.500	0.544	20.08°C
Front Side	26140/18 60	20M QPSK 50%RB#25	1.020	0.424	0.030	22.100	22.500	1.118	20.78°C
Front Side	26590/19 05	20M QPSK 50%RB#25	1.220	0.664	0.110	22.310	22.500	1.275	20.78°C

Report No: EEBC27-0100100

Page 36 of 36

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	26365/18 82.5	20M QPSK 1RB#50	1.170	0.648	-0.220	22.390	22.500	1.200	20.78°C
Front Side	26365/18 82.5	20M QPSK 50%RB#25	1.070	0.589	-0.040	22.310	22.500	1.118	20.78°C
Front Side	26140/18 60	20M QPSK 50%RB#25	0.884	0.488	-0.880	22.100	22.500	0.969	20.78°C
Front Side	26590/19 05	20M QPSK 50%RB#25	1.140	0.618	-0.140	22.310	22.500	1.191	20.08°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.12 Results overview of LTE Band 26

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	26909/83 5.9	15M QPSK 1RB#38	0.746	0.500	0.080	20.170	21.000	0.903	20.51°C
Back Side	26909/83 5.9	15M QPSK 1RB#38	0.620	0.367	0.000	20.170	21.000	0.751	20.51°C
Left Side	26909/83 5.9	15M QPSK 1RB#38	0.292	0.193	-0.230	20.170	21.000	0.353	20.51°C
Right Side	26909/83 5.9	15M QPSK 1RB#38	0.101	0.071	-0.400	20.170	21.000	0.122	20.51°C
Top Side	26909/83 5.9	15M QPSK 1RB#38	0.117	0.063	-0.040	20.170	21.000	0.142	20.51°C
Front Side	26909/83 5.9	15M QPSK 36%RB#39	0.760	0.548	-0.070	20.010	21.000	0.955	20.51°C
Back Side	26909/83 5.9	15M QPSK 36%RB#39	0.407	0.275	-0.340	20.010	21.000	0.511	20.51°C
Left Side	26909/83 5.9	15M QPSK 36%RB#39	0.171	0.117	-0.070	20.010	21.000	0.215	20.51°C
Right Side	26909/83 5.9	15M QPSK 36%RB#39	0.171	0.094	1.310	20.010	21.000	0.215	20.51°C
Top Side	26909/83 5.9	15M QPSK 36%RB#39	0.178	0.099	0.050	20.010	21.000	0.224	20.51°C
Front Side	26853/83 0.3	15M QPSK 36%RB#39	0.431	0.285	0.310	20.710	21.000	0.461	20.51°C
Front Side	26965/84 1.5	15M QPSK 36%RB#39	0.592	0.314	0.000	20.200	21.000	0.712	20.51°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.13 Results overview of LTE Band 41

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	40620/25 93	20M QPSK 1RB#50	0.853	0.234	0.000	21.580	22.000	0.940	20.23°C
Back Side	40620/25 93	20M QPSK 1RB#50	0.187	0.102	-1.130	21.580	22.000	0.206	20.23°C
Left Side	40620/25 93	20M QPSK 1RB#50	0.163	0.087	0.010	21.580	22.000	0.180	20.23°C
Right Side	40620/25 93	20M QPSK 1RB#50	0.011	0.003	-0.290	21.580	22.000	0.012	20.23°C
Top Side	40620/25 93	20M QPSK 1RB#50	0.351	0.182	0.170	21.580	22.000	0.387	20.23°C
Front Side	40620/25 93	20M QPSK 50%RB#25	0.620	0.290	-0.100	21.920	22.000	0.632	20.23°C
Back Side	40620/25 93	20M QPSK 50%RB#25	0.180	0.098	-0.670	21.920	22.000	0.183	20.23°C
Left Side	40620/25 93	20M QPSK 50%RB#25	0.154	0.083	-0.180	21.920	22.000	0.157	20.23°C
Right Side	40620/25 93	20M QPSK 50%RB#25	0.020	0.010	-1.590	21.920	22.000	0.020	20.23°C
Top Side	40620/25 93	20M QPSK 50%RB#25	0.379	0.163	0.000	21.920	22.000	0.386	20.23°C
Front Side	39750/25 06	20M QPSK 1RB#50	0.277	0.109	-1.090	21.770	22.000	0.292	20.23°C
Front Side	40340/25 65	20M QPSK 1RB#50	0.713	0.337	-0.250	21.770	22.000	0.752	20.23°C
Front Side	40880/26 19	20M QPSK 1RB#50	0.968	0.450	-0.570	21.840	22.000	1.004	20.23°C
Front Side	41490/26 80	20M QPSK 1RB#50	0.933	0.313	0.200	21.840	22.000	0.968	20.23°C

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	40620/25 93	20M QPSK 1RB#50	0.662	0.300	-0.560	21.580	22.000	0.729	20.23°C
Front Side	40880/26 19	20M QPSK 1RB#50	1.050	0.475	0.350	21.840	22.000	1.089	20.23°C
Front Side	41490/26 80	20M QPSK 1RB#50	0.743	0.325	-0.430	21.840	22.000	0.771	20.23°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.14 Results overview of LTE Band 66

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
Front Side	132322/1745	20M QPSK 1RB#50	1.100	0.590	0.000	23.790	24.000	1.154	20.45°C
Back Side	132322/1745	20M QPSK 1RB#50	0.796	0.527	-0.720	23.790	24.000	0.835	20.45°C
Left Side	132322/1745	20M QPSK 1RB#50	0.495	0.277	0.150	23.790	24.000	0.520	20.45°C
Right Side	132322/1745	20M QPSK 1RB#50	0.262	0.168	-0.230	23.790	24.000	0.275	20.45°C
Top Side	132322/1745	20M QPSK 1RB#50	0.927	0.481	-0.010	23.790	24.000	0.973	20.45°C
Front Side	132322/1745	20M QPSK 50%RB#25	1.250	0.689	-0.400	23.650	24.000	1.355	20.45°C
Back Side	132322/1745	20M QPSK 50%RB#25	0.630	0.229	0.630	23.650	24.000	0.683	20.45°C
Left Side	132322/1745	20M QPSK 50%RB#25	0.474	0.293	-0.640	23.650	24.000	0.514	20.45°C
Right Side	132322/1745	20M QPSK 50%RB#25	0.308	0.195	-0.340	23.650	24.000	0.334	20.45°C
Top Side	132322/1745	20M QPSK 50%RB#25	1.110	0.580	-0.150	23.650	24.000	1.203	20.45°C
Front Side	132072/1720	20M QPSK 50%RB#25	0.485	0.331	-0.520	23.650	24.000	0.526	20.45°C
Front Side	132572/1770	20M QPSK 50%RB#25	0.744	0.382	0.300	23.650	24.000	0.806	20.45°C

Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR1-g(W/kg)	Liquid Temp.
			1-g	10-g					
SAR1-g >0.8 (W/kg) Repeated									
Front Side	132322/1745	20M QPSK 1RB#50	1.180	0.654	-0.770	23.790	24.000	1.238	20.45°C
Top Side	132322/1745	20M QPSK 1RB#50	1.060	0.556	-0.190	23.790	24.000	1.113	20.45°C
Front Side	132322/1745	20M QPSK 50%RB#25	1.160	0.642	-0.210	23.650	24.000	1.257	20.45°C
Top Side	132322/1745	20M QPSK 50%RB#25	1.160	0.601	0.300	23.650	24.000	1.257	20.45°C

Note: Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

8.2.15 Results overview of WiFi 2.4G

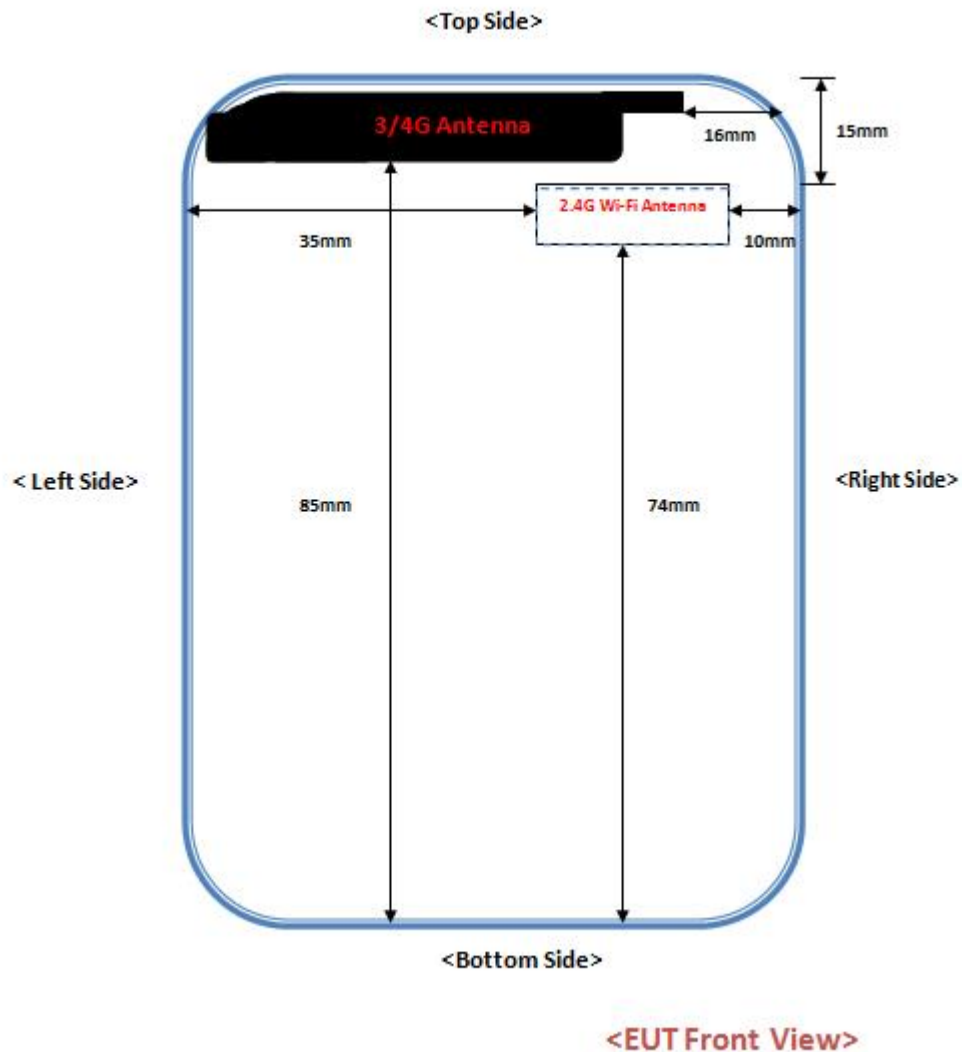
Test position of Hotspot with 10mm	Test channel /Freq. (MHz)	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up power (dBm)	Scaled SAR _{1-g} (W/kg)	Actual Duty Cycle	Reported SAR 1-g (W/kg)
			1-g	10-g						
Front Side	11/2462	802.11b	0.101	0.033	1.090	13.06	13.50	0.112	99.76%	0.112
Back Side	11/2462	802.11b	0.118	0.050	-0.790	13.06	13.50	0.131	99.76%	0.131
Left Side	11/2462	802.11b	0.005	0.001	-0.830	13.06	13.50	0.006	99.76%	0.006
Right Side	11/2462	802.11b	0.037	0.018	-0.190	13.06	13.50	0.041	99.76%	0.041
Top Side	11/2462	802.11b	0.031	0.013	0.000	13.06	13.50	0.034	99.76%	0.034
Back Side	1/2412	802.11b	0.109	0.049	-0.410	10.92	13.50	0.197	99.76%	0.198
Back Side	6/2437	802.11b	0.112	0.048	0.000	12.48	13.50	0.142	99.76%	0.142

Note: Per KDB248227D01:

- 1) SAR is measured for 2.4 GHz 802.11b DSSS using initial test position procedure.
- 2) 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, 802.11g/n OFDM SAR Test is not required.
- 3) Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.
- 4) Scaled SAR = SAR Value * $10^{(0.1 \cdot (\text{Tune up Power} - \text{Conducted Power}))}$
 Reported SAR = SAR Value * $10^{(0.1 \cdot (\text{Tune up Power} - \text{Conducted Power}))} / \text{Duty factor} * 100$

8.3 Multiple Transmitter Information

The location of the antennas inside MH04 is shown as below picture:



Note:

- 1) Per KDB 941225 D06, particular DUT edges were not required to be evaluated for Hotspot SAR if the antenna-to-edge distance is greater than 2.5cm.

8.4 Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

Simultaneous Tx Combination	Configuration	Head	Body-worn	Hotspot	product specific 10-g SAR
1	UMTS + WiFi 2.4G	N/A	N/A	Yes	Yes
2	LTE + WiFi 2.4G	N/A	N/A	Yes	Yes

8.5 SAR Summation Scenario

Test Position		3/4G Antenna SAR _{max}														WiFi Antenna SAR _{max}	Σ1-g SAR _{1-g}	SPLSP
		UMTS Band II	UMTS Band IV	UMTS Band V	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	LTE Band 13	LTE Band 17	LTE Band 25	LTE Band 26	LTE Band 41	LTE Band 66	WiFi 2.4G		
Hotspot 10mm	Front Side	1.047	1.260	1.055	0.862	1.249	0.848	1.371	0.169	0.313	0.210	1.275	0.955	1.089	1.355	0.112	1.483	NO
	Back Side	0.439	0.490	0.358	0.617	0.534	0.513	0.319	0.056	0.106	0.079	0.798	0.751	0.206	0.835	0.198	1.033	NO
	Left Side	0.325	0.204	0.119	0.234	0.313	0.344	0.174	0.031	0.073	0.042	0.402	0.353	0.180	0.520	0.006	0.526	NO
	Right Side	0.195	0.222	0.134	0.155	0.465	0.149	0.051	0.021	0.029	0.016	0.243	0.215	0.020	0.334	0.041	0.375	NO
	Top Side	0.417	0.484	0.155	0.342	0.691	0.179	0.466	0.029	0.054	0.064	0.579	0.224	0.387	1.257	0.034	1.291	NO

Note: Simultaneous Tx Combination of 3G/4G antenna and WiFi 2.4G.

8.6 Simultaneous Transmission Conclusion

The above numeral summed SAR results is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore simultaneous transmission SAR with Volume Scans is not required per KDB 447498 D01v06.

Annex A: Appendix A: SAR System performance Check Plots

(Please See Appendix A)

Annex B: Appendix B: SAR Measurement results Plots

(Please See Appendix B)

Annex C: Appendix C: Calibration reports

(Please See Appendix C)

Annex D: Appendix D: Photo documentation

(Please See Appendix D)

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*** End of Report ***