FCC SAR Test Report

Product	:	Tablet PC
Trade mark	:	Wishtel
Model/Type reference	:	IRA T1021
Serial Number	:	N/A
Report Number	:	EED32R80053307
FCC ID	:	2BHIY-IRAT1021
Date of Issue:	:	Feb. 27, 2025
Test Standards	:	Refer to Section 1.5
Test result	:	PASS

Prepared for:

Wishtel Pvt Ltd

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Check No.: 3110100125

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Modified History

REV.	Modification Description	Issued Date	Remark
REV.1.0	Initial Test Report Release	Feb. 27, 2025	

1 General information

1.1 Notes

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

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1.2 Application details

Date of receipt of test item:	2025-02-10
Start of test:	2025-02-13
End of test:	2025-02-25

1.3 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Ultra. Model Name: RA T1021 are as below:

Frequency Band	MAX Reported SAR (W/kg)		SAR Test Limit (W/kg)
	1-g Head	1-g Body (0mm)	
GSM850	N/A	1.037	1.60
GSM1900	N/A	0.993	
UMTS Band II	N/A	1.214	
UMTS Band V	N/A	1.194	
LTE Band 2	N/A	1.057	
LTE Band 5	N/A	1.148	
LTE Band 7	N/A	0.950	
LTE Band 41	N/A	1.203	
WiFi 2.4G	N/A	0.217	
Highest Simultaneous Transmission	N/A	1.431	

Remark: N/A: This devices doesn't support voice mode, the head mode is not applicable.

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:	Tablet PC
Model:	IRA T1021
Trade mark:	Wishtel
SN:	N/A
Device Type:	Portable device
Exposure Category:	uncontrolled environment / general population
Antenna Type :	FPC Antenna
Antenna Gain:	BT: -3.69dBi GSM850: −0.59dBi GSM1900: −1.39dBi WCDMA Band II: 0.56dBi WCDMA Band V: -0.59dBi LTE Band 2: 0.56dBi LTE Band 5: -0.59dBi LTE Band 7: 0.20dBi LTE Band 41: -4.61dBi 2.4G Wi-Fi: -3.69dBi 5G Wi-Fi: U-NII-1: -3.62dBi U-NII-2A: -4.72dBi U-NII-2C: -4.98dBi
Device Operating Configurations:	
Supporting Modes :	BT/BLE GSM 850/1900 WCDMA Band II/V LTE Band 2/5/7/41 Wi-Fi 2.4G Wi-Fi 5G: U-NII-1, U-NII-2A, U-NII-2C
Duty Cycle used for SAR testing	Max duty cycle: 2.4G WiFi:98.24%
Modulation:	GSM(GMSK/8PSK) WCDMA(QPSK) LTE(QPSK/16QAM) Wi-Fi(DSSS/OFDM/OFDMA)

Operating Frequency Range(s)

Band	TX(MHz)	RX(MHz)
GSM850	824~849	869~894
GSM1900	1850~1910	1930~1990
UMTS Band II	1850~1910	1930~1990
UMTS Band V	824~849	869~894
LTE Band 2	1850~1910	1930~1990
LTE Band 5	824~849	869~894

	LTE Band 7	:2500-2570	2620-2690
	LTE Band 41	2496-2690	2496-2690
	WiFi 2.4G	2412~2462	
	WiFi 5G	5150-5250, 5250-5350, 5500-5700	
	BT	2402~2480	
Test Channels (low-mid-high):	128-190-251 (GSM850)		
	512-661-810 (GSM1900)		
	9262-9400-9538 (UMTS Band II)		
	4132-4182-4233 (UMTS Band V)		
	18700-18900-19100(LTE Band 2)		
	20450-20525-20600(LTE Band 5)		
	20850-21100-21350(LTE Band 7)		
	40340-40620-41140(LTE Band 41)		
	1/3-6-11/9 (Wi-Fi 2.4G)		
	Wi-Fi 5G 802.11a/n/ac(20M): 36-40-44-48-52-56-60-64-100-104-108-112-116-132-136-140 Wi-Fi 5G 802.11 n/ac(40M): 38-46-54-62-102-110-134-142		
	0-39-78 (BT 2450) 0-19-39 (BLE 2450)		
Power Supply:	Battery:	DC 3.8V	
Test voltage:	DC 3.8V		

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 D04	Interim General RF Exposure Guidance v01
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/m^3)
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

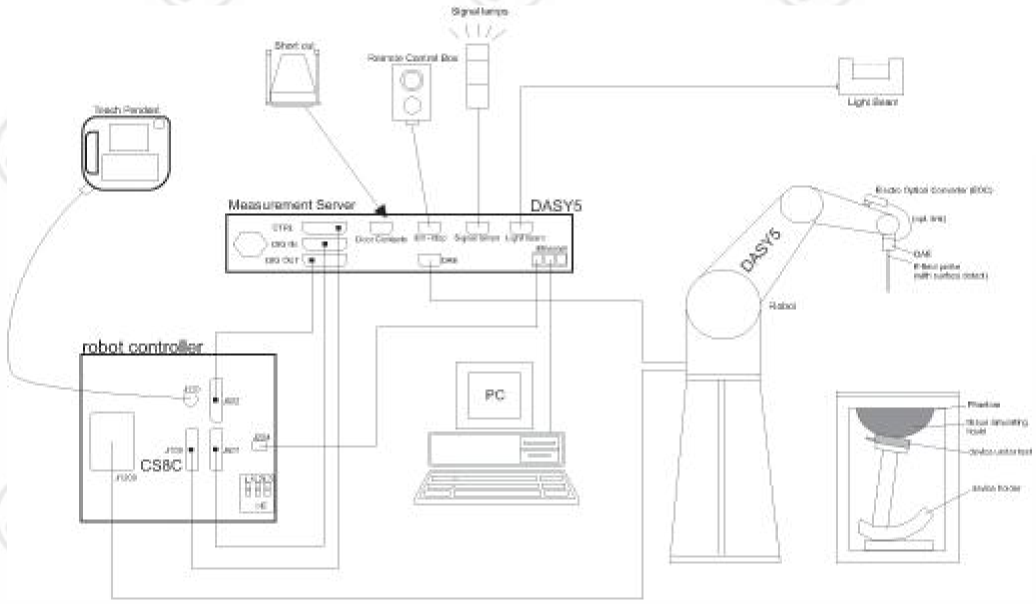
	Required	Actual
Ambient temperature:	18 – 25 °C	21.5 ± 2.0 °C
Tissue Simulating liquid:	18 – 25 °C	21.5 ± 2.0 °C
Relative humidity content:	30 – 70 %	30 – 70 %

1.10 Applicant and Manufacturer

Applicant/Client :	Wishtel Pvt Ltd
Applicant Address:	4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022
Manufacturer Name:	Wishtel Pvt Ltd
Manufacturer Address:	4, Champaklal Industrail Estate, Sion East, Mumbai, MH - 400022
Factory:	Guangdong Alldocube Science and Technology Co., Ltd.
Address of Factory:	Building 3, 4th to 8th Floor, No. 5 Xiangjun Street, Wanqingsha Town, Nansha District, Guangzhou City.

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 profesional 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 μW/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.

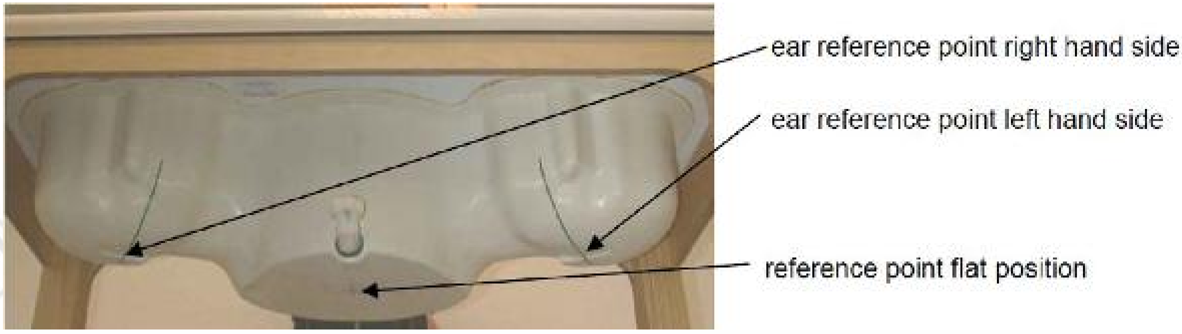
The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE4 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection 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 xWx 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.

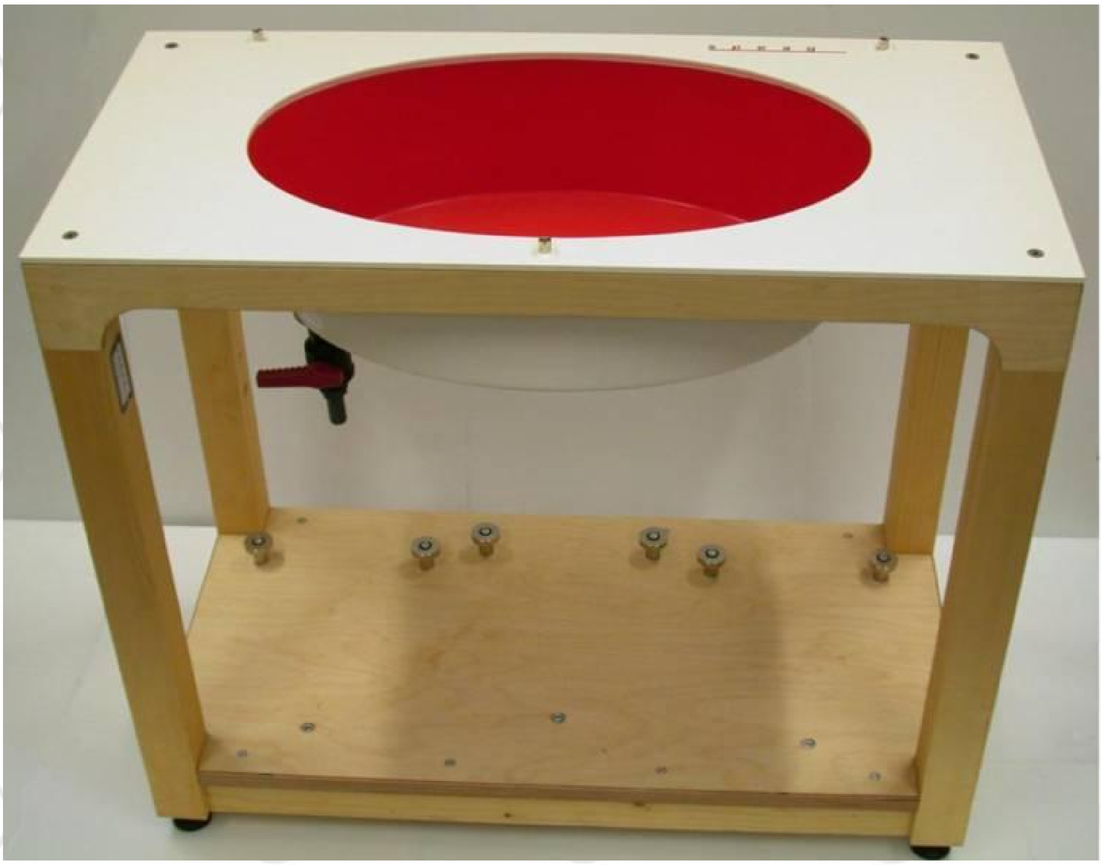
A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters.

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 ±0.5mm would produce a SAR uncertainty of ±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 ε = 3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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	2024-04-18	One year
☐	SPEAG	750 MHz Dipole	D750V3	1088	2024-01-17	Three years
☒	SPEAG	835 MHz Dipole	D835V2	4d193	2024-01-17	Three years
☒	SPEAG	1750 MHz Dipole	D1750V2	1134	2024-01-18	Three years
☒	SPEAG	1900 MHz Dipole	D1900V2	5d198	2024-01-22	Three years
☐	SPEAG	2000 MHz Dipole	D2000V2	1078	2023-01-11	Three years
☐	SPEAG	2300 MHz Dipole	D2300V2	1082	2024-01-17	Three years
☒	SPEAG	2450 MHz Dipole	D2450V2	959	2024-01-22	Three years
☒	SPEAG	2600 MHz Dipole	D2600V2	1101	2024-01-16	Three years
☐	SPEAG	5 GHz Dipole	D5GHzV2	1208	2024-04-22	Three years
☒	SPEAG	DAKS probe	DAKS-3.5	1052	2024-04-22	Three years
☒	SPEAG	Planar R140 Vector Reflectometer	DAKS-VNA R140	0200514	2025-01-20	Three years
☒	SPEAG	Data acquisition electronics	DAE4	1458	2024-04-18	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	2024-12-05	One year
☒	R & S	Universal Radio Communication Tester	CMW500	102898	2024-12-05	One year
☒	Agilent	Signal Generator	N5181A	MY50142334	2024-12-05	One year
☒	BONN	Power Amplifier and directional coupler	SU319W	BL-SZ1550140	2024-06-12	One year
☒	KEITHLEY	RF Power Meter	3500	1128079	2024-06-12	One year
☒	KEITHLEY	RF Power Meter	3500	1128081	2024-06-05	One year
☒	JINGCHUANG	Temperature/ Humidity Indicator	GSP-8	EMK197F00095	2024-12-05	One year

Note:

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) 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 30mm^3 (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 - fieldprobes : $E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$

H - 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)

uV/(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 (Δx_{Area},Δy_{Area})	Maximun Zoom Scan spatial resolution (Δx_{Zoom},Δy_{Zoom})	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤ 2GHz	≤ 15mm	≤ 8mm	≤ 5mm	≤ 4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥ 30mm
2-3GHz	≤ 12mm	≤ 5mm	≤ 5mm	≤ 4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥ 30mm
3-4GHz	≤ 12mm	≤ 5mm	≤ 4mm	≤ 3mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥ 28mm
4-5GHz	≤ 10mm	≤ 4mm	≤ 3mm	≤ 2.5mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥ 25mm
5-6GHz	≤ 10mm	≤ 4mm	≤ 2mm	≤ 2mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥ 22mm

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:

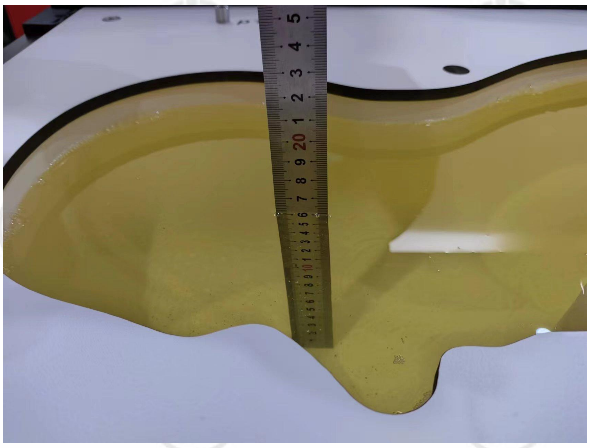


Photo of Liquid Height for Head SAR

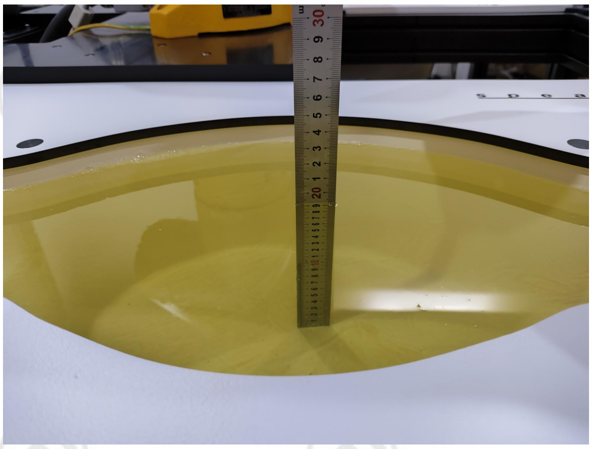


Photo of Liquid Height for Body SAR

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)**							
Tissue Type	**Head Tissue**							
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 monohexylether	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.24

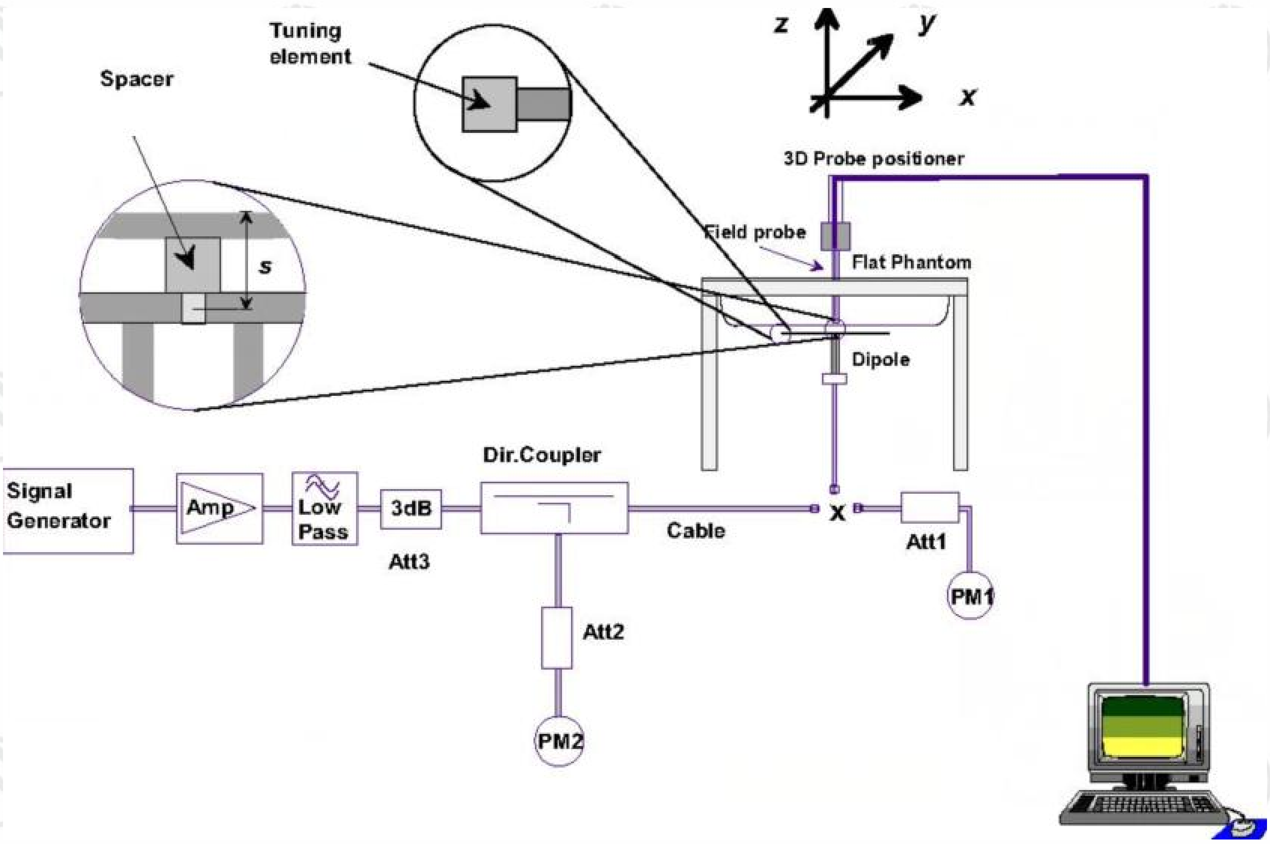
Salt: 99+% Pure Sodium Chloride
Sugar: 98+% Pure Sucrose
Water: De-ionized, 16MΩ+ resistivity
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue simulating liquids: parameters:

Tissue Type	Measured Frequency (MHz)	Target Tissue		Measured Tissue		Deviation (Within ±5%)		Liquid Temp.	Test Date
		ε_r (+/-5%)	σ (S/m) (+/-5%)	ε_r	σ (S/m)	Δεr %	Δσ %		
835 Head	**835**	41.50 (39.43~43.58)	0.90 (0.86~0.95)	39.98	0.880	-3.66	-2.22	20.82° C	2/17/2025
	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	39.97	0.924	-3.69	2.67	20.35° C	2/20/2025
1900 Head	**1900**	40.00 (38.00~42.00)	1.40 (1.33~1.47)	41.15	1.401	2.88	0.07	20.39° C	2/21/2025
	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	41.30	1.397	3.25	-0.21	20.28° C	2/22/2025
2450 Head	**2450**	39.20 (37.24~41.16)	1.80 (1.71~1.89)	40.71	1.835	3.85	1.94	20.22° C	2/24/2025
2600 Head	**2600**	39.00 (37.05~40.95)	1.96 (1.86~2.06)	38.65	1.987	-0.90	1.38	20.32° C	2/23/2025
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)		Measured SAR (Tolerances)		Liquid Temp .	Test Date
	1-g (mW/g)	10-g (mW/g)	1-g (mW/g)	10-g (mW/g)	1-g (%)	10-g (%)		
D835V2 Head	9.53 (8.658~10.582)	6.37 (5.643~6.897)	9.48	6.76	-0.52	6.12	20.82 °C	2/17/2025
D835V2 Head	9.53 (8.577~10.483)	6.31 (5.679~6.941)	9.40	6.60	-1.36	3.61	20.35 °C	2/20/2025
D1900V2 Head	40.50 (36.45~44.55)	21.10 (18.99~23.21)	38.84	20.32	-4.10	-3.70	20.39 °C	2/21/2025
D1900V2 Head	40.50 (36.45~44.55)	21.10 (18.99~23.21)	38.52	20.00	-4.89	-5.21	20.28 °C	2/22/2025
D2450V2 Head	53.60 (48.24~58.96)	24.70 (22.23~27.17)	52.80	22.40	-1.49	-9.31	20.22 °C	2/24/2025
D2600V2 Head	57.20 (51.48~62.92)	25.40 (22.86~27.94)	53.30	23.10	-6.82	-9.06	20.32 °C	2/23/2025
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 $DPDCH_1$ 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 DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn 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, ΔNACK, ΔCQI = 8. The variation of the β_c /β_d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	bβ_c	bβ_d	bβ_d (SF)	bβ_c /β_d	bβ_{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, ΔNACK and ΔCQI = 8Þ A_{hs} = β_{hs}/β_c = 30/15Þ β_{hs} = 30/15 * β_c

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

Note 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 β_c = 11/15 and β_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	bβ_c	bβ_d	β_d (SF)	bβ_c/β_d	bβ_{hs}(1)	bβ_{ec}	bβ_{ed}	β_{ec} (SF)	β_{ed} (code)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: △ACK, △NACK and △CQI = 8Þ $A_{hs} = \beta_{hs}/\beta_c$ = 30/15Þ β_{hs} = 30/15 * β_c

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

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

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 14/15 and β_d = 15/15

Note 5 : 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 Speading 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&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	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 > ½ 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 > ½ 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 CMU200/CMW500 was used.
2.Establish communication link between emulator and EUT and set EUT to operate at maximum output power all the time.
3.Source-based Time Averaged Burst Power Calculation:
For TDMA,the following duty cycle factor was used to calculate the Source-based Time Averaged power.

Number of Time slot	1	2	3	4
Duty cycle	1:8.3	1:4.1	1:2.77	1:2.08
Duty cycle factor	-9.19	-6.13	-4.42	-3.18

8.1.1 Conducted Power of GSM850

GSM850		Burst-Averaged output Power (dBm)			Division Factors	Source Based time Average Power(dBm)		
		128CH	190CH	251CH		128CH	190CH	251CH
GSM(CS)		33.20	33.15	33.14	-9.19	24.01	23.96	23.95
GPRS/ EDGE (GMSK)	1 Tx Slot	33.21	33.09	33.07	-9.19	24.02	23.90	23.88
	2 Tx Slots	31.13	31.04	30.99	-6.13	25.00	24.91	24.86
	3 Tx Slots	29.14	29.08	29.02	-4.42	24.72	24.66	24.60
	4 Tx Slots	26.82	26.77	26.73	-3.18	23.64	23.59	23.55
EDGE (8PSK)	1 Tx Slot	25.38	25.30	24.94	-9.19	16.19	16.11	15.75
	2 Tx Slots	23.98	24.11	23.80	-6.13	17.85	17.98	17.67
	3 Tx Slots	21.49	21.73	21.55	-4.42	17.07	17.31	17.13
	4 Tx Slots	18.96	19.12	19.03	-3.18	15.78	15.94	15.85

Note: 1) The conducted power of GSM850 is measured with RMS detector.
2) Source Based time Average Power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
3) The bolded GPRS 4Tx slots mode was selected for SAR testing according the highest Source Based time Average Power table.
4) channel/Frequency: 128/824.2,190/836.6,251/848.8

8.1.2 Conducted Power of GSM1900

GSM1900		Burst-Averaged output Power (dBm)			Division Factors	Source Based time Average Power(dBm)		
		512CH	661CH	810CH		512CH	661CH	810CH
GSM(CS)		28.67	28.84	29.18	-9.19	19.48	19.65	19.99
GPRS/ EDGE (GMSK)	1 Tx Slot	28.66	28.88	29.19	-9.19	19.47	19.69	20.00
	2 Tx Slots	26.60	26.73	26.84	-6.13	20.47	20.60	20.71
	3 Tx Slots	25.09	25.22	25.31	-4.42	20.67	20.80	20.89
	4 Tx Slots	23.07	23.20	23.26	-3.18	19.89	20.02	20.08
EDGE (8PSK)	1 Tx Slot	26.15	25.67	25.34	-9.19	16.96	16.48	16.15
	2 Tx Slots	24.72	24.41	24.17	-6.13	18.59	18.28	18.04
	3 Tx Slots	22.33	22.17	21.94	-4.42	17.91	17.75	17.52
	4 Tx Slots	20.02	19.87	19.57	-3.18	16.84	16.69	16.39

Note: 1) The conducted power of GSM1900 is measured with RMS detector.

2) Source Based time Average Power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

3) The bolded GPRS 4Tx slots mode was selected for SAR testing according the highest Source Based time Average Power table.

4) channel/Frequency: 512/1850.2,661/1880,810/1909.8

8.1.3 Conducted Power of UMTS Band II

UMTS Band II		Conducted Power (dBm)		
		9262CH	9400CH	9538CH
WCDMA	12.2kbps RMC	22.37	22.49	22.64
HSDPA	Subtest 1	22.04	23.01	22.52
	Subtest 2	22.06	23.03	22.52
	Subtest 3	22.05	23.03	22.51
	Subtest 4	22.05	23.05	22.50
HSUPA	Subtest 1	21.90	22.85	22.35
	Subtest 2	21.83	22.73	22.35
	Subtest 3	21.65	22.74	22.31
	Subtest 4	22.18	23.25	22.78
	Subtest 5	22.23	23.29	22.85

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

8.1.4 Conducted Power of UMTS Band V

UMTS Band V		Conducted Power (dBm)		
		4132CH	4182CH	4233CH
WCDMA	12.2kbps RMC	23.46	23.45	23.48
HSDPA	Subtest 1	23.28	22.65	22.29
	Subtest 2	23.31	22.70	22.28
	Subtest 3	23.31	22.69	22.27
	Subtest 4	23.29	22.66	22.25
HSUPA	Subtest 1	20.76	20.00	20.31
	Subtest 2	21.57	20.74	22.32
	Subtest 3	21.56	20.76	21.42
	Subtest 4	21.55	20.77	22.33
	Subtest 5	23.07	22.37	22.05

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

8.1.5 Conducted Power of LTE Band 2

Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193
1.4MHz	QPSK	1	0	22.94	23.17	22.64
		1	3	23.07	23.15	22.73
		1	5	23.13	23.23	22.55
		3	0	22.89	23.20	22.54
		3	2	22.90	23.23	22.60
		3	3	22.87	23.22	22.56
		6	0	21.96	22.23	22.26
	16QAM	1	0	23.14	24.08	24.07
		1	3	23.13	24.01	24.05
		1	5	23.11	23.99	24.08
		3	0	23.65	23.89	23.92
		3	2	23.64	23.88	23.92
		3	3	23.50	23.83	23.97
		6	0	22.81	23.06	23.54
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185
3MHz	QPSK	1	0	22.90	23.24	23.31
		1	7	23.11	23.23	22.47
		1	14	23.11	23.29	22.48
		8	0	21.95	22.22	22.33
		8	4	21.86	22.17	22.33
		8	7	22.02	22.27	22.33
		15	0	21.92	22.12	22.33
	16QAM	1	0	23.12	23.12	24.06
		1	7	23.15	24.37	24.16
		1	14	23.64	24.30	24.14
		8	0	22.96	23.22	23.33
		8	4	22.99	23.25	23.31
		8	7	22.97	23.46	23.29
		15	0	22.71	23.14	23.24

Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175
5MHz	QPSK	1	0	23.02	23.20	23.29
		1	13	23.12	23.13	23.39
		1	24	23.11	23.06	22.27
		12	0	21.93	22.07	22.22
		12	6	22.02	22.18	22.24
		12	13	22.03	22.01	22.26
		25	0	21.97	22.04	22.35
	16QAM	1	0	23.91	23.04	23.37
		1	13	24.01	23.57	23.41
		1	24	24.09	23.66	23.58
		12	0	22.90	22.97	23.13
		12	6	22.91	22.96	23.10
		12	13	23.05	23.43	23.24
		25	0	22.99	23.11	23.21

Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150
10MHz	QPSK	1	0	22.99	23.96	24.90
		1	24	22.94	24.88	24.98
		1	49	23.09	24.96	25.07
		25	0	21.93	24.03	24.06
		25	12	22.04	24.01	24.06
		25	25	21.97	23.89	24.05
		50	0	22.10	23.91	24.04
	16QAM	1	0	23.58	23.13	23.71
		1	24	23.75	24.47	23.89
		1	49	23.79	24.52	23.89
		25	0	23.01	23.06	23.04
		25	12	23.01	22.99	23.01
		25	25	22.99	23.04	23.07
		50	0	22.98	23.12	23.14

Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125
15MHz	QPSK	1	0	24.00	23.99	24.07
		1	37	25.07	24.10	24.04
		1	74	25.13	24.06	24.07
		36	0	24.90	24.12	24.03
		36	18	25.09	24.15	24.08
		36	38	25.18	24.06	24.03
		75	0	23.99	23.95	24.10
	16QAM	1	0	23.58	23.10	23.71
		1	37	23.74	24.08	24.10
		1	74	23.99	24.05	24.24
		37	0	23.82	24.04	23.98
		37	18	24.00	24.08	24.09
		37	38	24.00	24.02	24.22
		75	0	22.96	23.15	23.10
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100
20MHz	QPSK	1	0	23.90	24.05	24.17
		1	50	24.49	24.43	24.22
		1	99	25.17	24.22	24.15
		50	0	23.87	24.14	24.01
		50	25	23.86	24.05	24.04
		50	50	24.12	24.29	24.01
		100	0	23.94	24.07	24.07
	16QAM	1	0	24.27	23.12	23.80
		1	50	24.05	23.85	23.82
		1	99	24.08	23.88	24.05
		50	0	23.01	23.26	23.10
		50	25	23.00	23.21	23.12
		50	50	23.05	23.19	23.19
		100	0	23.10	23.24	22.99

8.1.6 Conducted Power of LTE Band 5

Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643
1.4MHz	QPSK	1	0	23.75	22.82	22.82
		1	3	23.76	23.83	23.82
		1	5	23.78	23.82	23.77
		3	0	23.90	23.91	23.88
		3	2	23.90	23.89	23.87
		3	3	23.99	23.85	23.83
		6	0	23.04	22.81	22.87
	16QAM	1	0	22.85	23.98	22.90
		1	3	22.86	23.89	22.60
		1	5	22.76	23.68	22.94
		3	0	22.52	22.66	22.49
		3	2	22.56	22.66	22.46
		3	3	22.60	22.61	22.44
		6	0	22.04	22.12	22.78
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635
3MHz	QPSK	1	0	22.90	22.81	22.79
		1	7	23.89	23.85	23.89
		1	14	23.01	23.84	23.75
		8	0	23.03	22.93	22.84
		8	4	23.04	22.94	22.89
		8	7	22.99	22.91	22.93
		15	0	23.04	22.92	22.82
	16QAM	1	0	22.30	21.93	22.99
		1	7	22.39	22.68	22.59
		1	14	22.28	22.74	22.64
		7	0	22.16	22.02	22.01
		7	4	22.17	22.01	22.95
		7	7	22.09	22.95	22.02
		15	0	22.00	22.86	22.84

Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625
5MHz	QPSK	1	0	22.92	22.77	22.81
		1	13	23.11	23.07	23.99
		1	24	23.05	23.05	23.97
		12	0	23.06	23.12	22.88
		12	6	23.07	23.14	22.97
		12	13	22.98	22.84	22.89
		25	0	23.04	22.87	22.92
	16QAM	1	0	23.13	22.01	22.98
		1	13	23.07	22.50	22.28
		1	24	23.18	22.48	22.38
		12	0	22.13	22.94	22.86
		12	6	22.05	22.94	22.95
		12	13	22.00	22.81	22.82
		25	0	22.05	22.94	22.99
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600
10MHz	QPSK	1	0	22.89	22.80	22.75
		1	25	23.45	23.22	23.35
		1	49	23.85	23.05	23.78
		25	0	23.04	23.09	22.81
		25	12	23.08	23.04	22.87
		25	25	22.94	22.82	22.94
		50	0	22.85	22.75	22.85
	16QAM	1	0	22.74	22.94	22.81
		1	25	22.80	23.38	22.86
		1	49	22.64	23.35	22.85
		25	0	22.98	22.06	22.83
		25	12	22.97	22.05	22.76
		25	25	22.08	22.99	22.83
		50	0	22.02	22.98	22.82

8.1.7 Conducted Power of LTE Band 7

Bandwidth	Modulation	RB size	RB offset	Channel 20775	Channel 21100	Channel 21425
5MHz	QPSK	1	0	23.09	23.10	23.12
		1	13	23.08	23.10	23.17
		1	24	23.12	23.11	23.20
		12	0	23.02	23.06	23.14
		12	6	22.99	23.04	23.13
		12	13	23.02	23.14	23.10
		25	0	22.93	23.19	23.12
	16QAM	1	0	22.35	22.63	22.76
		1	13	22.24	22.72	22.80
		1	24	22.50	22.65	22.76
		12	0	22.00	22.24	22.23
		12	6	21.99	22.25	22.23
		12	13	21.92	22.17	22.21
		25	0	22.09	22.32	22.20
Bandwidth	Modulation	RB size	RB offset	Channel 20800	Channel 21100	Channel 21400
10MHz	QPSK	1	0	23.00	23.19	22.92
		1	25	22.90	23.22	23.09
		1	49	23.03	23.01	22.98
		25	0	23.08	23.09	23.10
		25	13	23.07	23.16	22.95
		25	25	23.11	23.04	23.08
		50	0	23.08	22.96	23.01
	16QAM	1	0	22.27	22.15	22.79
		1	25	22.38	22.69	22.74
		1	49	22.89	22.67	23.12
		25	0	22.19	22.29	22.13
		25	13	22.28	22.31	22.14
		25	25	22.24	22.37	22.08
		50	0	22.19	22.33	22.19

Bandwidth	Modulation	RB size	RB offset	Channel 20825	Channel 21100	Channel 21375
15MHz	QPSK	1	0	22.04	22.18	22.81
		1	37	22.98	22.99	22.85
		1	74	22.66	22.92	22.92
		36	0	22.89	22.84	22.73
		36	18	22.99	22.72	22.72
		36	38	22.96	22.69	22.78
		75	0	22.90	22.12	22.92
	16QAM	1	0	22.37	22.19	22.76
		1	37	22.36	22.74	22.81
		1	74	22.93	22.72	22.73
		37	0	22.91	22.73	22.75
		37	18	22.88	22.74	22.70
		37	38	22.96	22.71	22.78
		75	0	22.08	22.24	22.14
Bandwidth	Modulation	RB size	RB offset	Channel 20850	Channel 21100	Channel 21350
20MHz	QPSK	1	0	22.99	22.27	22.02
		1	50	22.14	22.21	22.12
		1	99	22.10	22.07	22.18
		50	0	22.08	22.19	22.97
		50	25	22.04	22.21	22.99
		50	50	22.06	22.05	22.05
		100	0	22.16	22.00	22.01
	16QAM	1	0	22.35	22.05	22.67
		1	50	22.57	22.01	22.82
		1	99	22.54	22.89	22.77
		50	0	22.22	22.40	22.30
		50	25	22.10	22.41	22.30
		50	50	22.30	22.23	22.22
		100	0	22.28	22.20	22.18

8.1.8 Conducted Power of LTE Band 41

Bandwidth	Modulation	RB size	RB offset	Channel 40265	Channel 40620	Channel 41215
5MHz	QPSK	1	0	23.02	23.97	23.92
		1	13	23.03	23.96	23.86
		1	24	23.04	23.96	23.86
		12	0	23.02	23.08	23.95
		12	6	23.04	23.09	23.02
		12	13	23.10	23.11	23.06
		25	0	23.01	23.11	23.87
	16QAM	1	0	22.10	22.32	22.49
		1	13	22.21	22.32	22.44
		1	24	22.10	22.35	22.55
		12	0	22.17	22.13	22.02
		12	6	22.18	22.13	22.02
		12	13	22.07	22.04	22.06
		25	0	22.18	22.22	22.22
Bandwidth	Modulation	RB size	RB offset	Channel 40290	Channel 40620	Channel 41190
10MHz	QPSK	1	0	23.00	23.20	23.76
		1	25	22.95	23.14	23.80
		1	49	23.05	23.02	23.75
		25	0	23.13	23.08	23.01
		25	13	23.19	23.09	23.02
		25	25	23.06	23.03	23.86
		50	0	22.74	23.68	23.49
	16QAM	1	0	22.04	22.48	22.89
		1	25	22.26	22.56	22.79
		1	49	22.15	22.28	22.90
		25	0	22.36	22.22	22.01
		25	13	22.37	22.23	22.01
		25	25	22.31	22.22	22.97
		50	0	22.82	22.95	22.80

Bandwidth	Modulation	RB size	RB offset	Channel 40315	Channel 40620	Channel 41165
15MHz	QPSK	1	0	23.04	23.19	23.99
		1	37	23.06	23.20	23.84
		1	74	23.20	23.11	23.90
		36	0	23.01	23.42	22.86
		36	18	23.02	23.76	22.83
		36	38	23.08	23.39	22.71
		75	0	23.75	22.77	22.50
	16QAM	1	0	22.16	22.42	22.04
		1	37	22.26	22.26	22.82
		1	74	22.70	22.36	22.83
		37	0	22.82	22.42	22.82
		37	18	22.92	22.76	22.82
		37	38	22.73	22.42	22.72
		75	0	22.90	22.91	22.62

Bandwidth	Modulation	RB size	RB offset	Channel 40340	Channel 40620	Channel 41140
20MHz	QPSK	1	0	23.06	23.03	23.26
		1	50	23.19	23.19	23.42
		1	99	23.29	23.10	23.41
		50	0	23.05	23.04	22.91
		50	25	23.06	23.08	22.91
		50	50	23.11	22.88	22.76
		100	0	23.73	22.64	22.50
	16QAM	1	0	22.59	22.65	22.78
		1	50	22.22	22.09	22.53
		1	99	22.25	22.11	22.54
		50	0	22.14	22.26	22.14
		50	25	22.13	22.17	22.13
		50	50	22.22	22.20	22.94
		100	0	22.76	22.70	22.46

8.1.9 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	14.00	13.49	Yes
	6	2437		14.00	13.42	Yes
	11	2462		14.00	**13.70**	Yes
802.11g	1	2412	6	13.00	12.66	No
	6	2437		13.00	12.85	No
	11	2462		13.00	12.12	No
802.11n (HT20)	1	2412	6.5	13.00	12.82	No
	6	2437		13.00	12.89	No
	11	2462		13.00	12.17	No
802.11n (HT40)	3	2422	13.5	12.00	11.73	No
	6	2437		12.00	11.02	No
	9	2452		12.00	11.04	No

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

8.1.10 Conducted power of Wi-Fi 5G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-1	802.11a	36	5180	6	-1.50	-1.93	No
		40	5200		-1.50	-1.91	No
		48	5240		-1.50	**-1.68**	No
	802.11n HT20	36	5180	6.5	-1.50	-2.09	No
		40	5200		-1.50	-2.10	No
		48	5240		-1.50	-1.88	No
	802.11n HT40	38	5190	13.5	-1.50	-2.59	No
		46	5230		-1.50	-2.51	No
	802.11ac VHT20	36	5180	6.5	-1.50	-2.15	No
		40	5200		-1.50	-2.20	No
		48	5240		-1.50	-1.93	No
	802.11ac VHT40	38	5190	13.5	-1.50	-2.63	No
		46	5230		-1.50	-2.55	No
U-NII-2A	802.11a	52	5260	6	-1.50	**-1.83**	No
		56	5280		-1.50	-2.26	No
		64	5320		-1.50	-3.26	No
	802.11n HT20	52	5260	6.5	-1.50	-2.02	No
		56	5280		-1.50	-2.44	No
		64	5320		-1.50	-3.44	No
	802.11n HT40	54	5270	13.5	-1.50	-2.75	No
		62	5310		-1.50	-3.67	No
	802.11ac VHT20	52	5260	6.5	-1.50	-2.04	No
		56	5280		-1.50	-2.46	No
		64	5320		-1.50	-3.43	No
	802.11ac VHT40	54	5270	13.5	-1.50	-2.78	No
		62	5310		-1.50	-3.67	No

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
U-NII-2C	802.11a	100	5500	6	-1.50	-2.22	No
		116	5580		-1.50	-2.00	No
		140	5700		-1.50	-2.33	No
	802.11n HT20	100	5500	6.5	-1.50	-2.37	No
		116	5580		-1.50	-2.13	No
		140	5700		-1.50	-2.47	No
	802.11n HT40	102	5510	13.5	-1.50	-2.30	No
		110	5550		-1.50	-1.87	No
		134	5670		-1.50	-3.13	No
	802.11ac VHT20	100	5500	6.5	-1.50	-4.25	No
		116	5580		-1.50	-2.15	No
		140	5700		-1.50	-2.49	No
	802.11ac VHT40	102	5510	13.5	-1.50	-3.28	No
		110	5550		-1.50	-2.86	No
		134	5670		-1.50	-2.27	No

8.1.11 Conducted Power of BT

The output power of BT is as following:

For BT 3.0:

Average Conducted Power(dBm)				Tune-up Power(dBm)
Channel	0CH	39CH	78CH	
GFSK	0.32	1.43	1.08	2.00
π/4DQPSK	0.35	1.30	1.36	
8DPSK	0.64	**1.78**	1.66	

Note: channel /Frequency: 0/2402, 39/2441, 78/2480.

For BT (BLE)

Average Conducted Power(dBm)				Tune-up Power(dBm)
Channel	0CH	19CH	39CH	
BLE_1M	-2.00	**-0.47**	-1.20	0.00
BLE_2M	-1.88	-0.49	-1.16	

Note: channel /Frequency: 0/2402, 19/2440, 39/2480.

8.2 SAR test results

Notes:

1) Per KDB447498 D04, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

2) Per KDB447498 D04, 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 ≥0.8W/Kg; if the deviation among the repeated measurement is ≤ 20%, and the measured SAR <1.45W/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 W/kg, or > 7.0 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 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, 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 ≤1.2 W/kg, no additional SAR evaluations using a headset are required.

8.2.1 Results overview of GSM850

Test Position With 0mm	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	190/836.6	GPRS 4TS	0.394	0.242	0.000	26.770	27.000	0.415	20.35°C
Back Side	190/836.6	GPRS 4TS	0.675	0.424	-0.120	26.770	27.000	0.712	20.35°C
Right Side	190/836.6	GPRS 4TS	0.121	0.064	0.000	26.770	27.000	0.128	20.35°C
Top Side	190/836.6	GPRS 4TS	0.439	0.203	0.140	26.770	27.000	0.463	20.35°C
Back Side	128/824.2	GPRS 4TS	0.985	0.590	0.160	26.820	27.000	**1.027**	20.35°C
Back Side	251/848.8	GPRS 4TS	0.884	0.512	0.000	26.730	27.000	0.941	20.35°C

Test Position With 0mm	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									
Back Side	128/824.2	GPRS 4TS	0.995	0.588	0.050	26.820	27.000	**1.037**	20.35°C
Back Side	251/848.8	GPRS 4TS	0.858	0.505	-0.130	26.730	27.000	0.913	20.35°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 GSM1900

Test Position With 0mm	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	661/1880	GPRS 4TS	0.426	0.227	0.210	23.200	23.500	1.130	20.39°C
Back Side	661/1880	GPRS 4TS	0.850	0.432	0.000	23.200	23.500	**1.167**	20.39°C
Right Side	661/1880	GPRS 4TS	0.103	0.058	0.080	23.200	23.500	0.065	20.39°C
Top Side	661/1880	GPRS 4TS	0.715	0.351	0.010	23.200	23.500	1.140	20.39°C
Back Side	512/1850.2	GPRS 4TS	0.769	0.403	0.020	23.070	23.500	0.498	20.39°C
Back Side	810/1909.8	GPRS 4TS	0.940	0.463	-0.080	23.260	23.500	1.125	20.39°C

Test Position With 0mm	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									
Back Side	661/1880	GPRS 4TS	0.839	0.427	0.050	23.200	23.500	0.899	20.39°C
Back Side	810/1909.8	GPRS 4TS	0.933	0.460	0.050	23.260	23.500	**0.986**	20.39°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 II

Test Position With 0mm	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	0.425	0.240	0.010	22.490	23.000	0.478	20.39°C
Back Side	9400/1880	RMC	0.958	0.516	0.180	22.490	23.000	1.077	20.39°C
Right Side	9400/1880	RMC	0.105	0.058	0.000	22.490	23.000	0.118	20.39°C
Top Side	9400/1880	RMC	0.738	0.422	0.001	22.490	23.000	0.830	20.39°C
Back Side	9612/1852.4	RMC	0.894	0.491	0.020	22.370	23.000	1.034	20.39°C
Back Side	9538/1907.6	RMC	1.070	0.885	0.200	22.640	23.000	**1.162**	20.39°C

Test Position With 0mm	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									
Back Side	9400/1880	RMC	0.959	0.514	-0.070	22.490	23.000	1.078	20.39°C
Back Side	9262/1852.4	RMC	1.050	0.703	0.120	22.370	23.000	**1.214**	20.39°C
Back Side	9538/1907.6	RMC	1.040	0.860	0.000	22.640	23.000	1.130	20.39°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 UMTS Band V

Test Position With 0mm	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	0.458	0.281	0.100	23.450	23.500	0.463	20.82°C
Back Side	4182/836.4	RMC	1.150	0.646	0.140	23.450	23.500	**1.163**	20.82°C
Right Side	4182/836.4	RMC	0.094	0.063	0.000	23.450	23.500	0.095	20.82°C
Top Side	4182/836.4	RMC	1.130	0.430	0.000	23.450	23.500	1.143	20.82°C
Back Side	4132/826.4	RMC	1.140	0.623	-0.040	23.460	23.500	1.151	20.82°C
Back Side	4233/846.6	RMC	1.100	0.618	-0.120	23.480	23.500	1.105	20.82°C

Test Position With 0mm	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									
Back Side	4182/836.4	RMC	1.180	0.649	-0.130	23.450	23.500	**1.194**	20.82°C
Top Side	4182/836.4	RMC	1.150	0.440	0.000	23.450	23.500	1.163	20.82°C
Back Side	4132/826.4	RMC	1.110	0.641	-0.090	23.460	23.500	1.120	20.82°C
Back Side	4233/846.6	RMC	1.170	0.643	0.120	23.480	23.500	1.175	20.82°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 2

Test Position With 0mm	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	0.372	0.214	0.006	24.430	24.500	0.378	20.28°C
Back Side	18900/1880	20M QPSK 1RB#50	1.030	0.567	-0.020	24.430	24.500	**1.047**	20.28°C
Right Side	18900/1880	20M QPSK 1RB#50	0.121	0.062	0.010	24.430	24.500	0.123	20.28°C
Top Side	18900/1880	20M QPSK 1RB#50	0.698	0.344	0.000	24.430	24.500	0.709	20.28°C
Front Side	18900/1880	20M QPSK 50%RB#50	0.370	0.211	-0.050	24.290	24.500	0.388	20.28°C
Back Side	18900/1880	20M QPSK 50%RB#50	0.797	0.436	0.000	24.290	24.500	0.836	20.28°C
Right Side	18900/1880	20M QPSK 50%RB#50	0.118	0.060	0.030	24.290	24.500	0.124	20.28°C
Top Side	18900/1880	20M QPSK 50%RB#50	0.690	0.337	0.100	24.290	24.500	0.724	20.28°C
Back Side	18700/1860	20M QPSK 1RB#50	0.991	0.557	-0.050	24.490	24.500	0.993	20.28°C
Back Side	19100/1900	20M QPSK 1RB#50	0.896	0.482	-0.070	24.220	24.500	0.956	20.28°C

Test Position With 0mm	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									
Back Side	18900/1880	20M QPSK 1RB#50	1.040	0.567	0.030	24.430	24.500	**1.194**	20.28°C
Back Side	18700/1860	20M QPSK 1RB#50	0.992	0.559	0.070	24.490	24.500	1.120	20.28°C
Back Side	19100/1900	20M QPSK 1RB#50	0.917	0.504	-0.200	23.980	24.500	1.175	20.28°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 With 0mm	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	20525/836.5	10M QPSK 1RB#25	0.449	0.274	0.150	23.220	23.500	0.479	20.82°C
Back Side	20525/836.5	10M QPSK 1RB#25	1.000	0.562	0.000	23.220	23.500	1.067	20.82°C
Right Side	20525/836.5	10M QPSK 1RB#25	0.081	0.057	-0.100	23.220	23.500	0.086	20.82°C
Top Side	20525/836.5	10M QPSK 1RB#25	0.987	0.389	-0.210	23.220	23.500	1.053	20.82°C
Front Side	20525/836.5	10M QPSK 25%RB#25	0.374	0.226	-0.170	22.820	23.500	0.437	20.82°C
Back Side	20525/836.5	10M QPSK 25%RB#25	0.971	0.530	0.000	22.820	23.500	**1.136**	20.82°C
Right Side	20525/836.5	10M QPSK 25%RB#25	0.079	0.056	-0.060	22.820	23.500	0.092	20.82°C
Top Side	20525/836.5	10M QPSK 25%RB#25	0.771	0.304	-0.160	22.820	23.500	0.902	20.82°C
Back Side	20450/829	10M QPSK 1RB#25	0.950	0.520	0.000	23.450	23.500	0.961	20.82°C
Back Side	20600/844	10M QPSK 1RB#25	0.984	0.547	0.000	23.350	23.500	1.019	20.82°C

Test Position With 0mm	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									
Back Side	20525/836.5	10M QPSK 1RB#25	0.977	0.534	0.000	23.220	23.500	1.042	20.82°C
Back Side	20525/836.5	10M QPSK 25%RB#25	0.982	0.536	0.000	22.820	23.500	**1.148**	20.82°C
Top Side	20525/836.5	10M QPSK 1RB#25	0.774	0.309	0.000	23.220	23.500	0.826	20.82°C
Back Side	20450/829	10M QPSK 1RB#25	0.954	0.522	0.000	23.450	23.500	0.965	20.82°C
Back Side	20600/844	10M QPSK 1RB#25	0.975	0.544	0.000	23.350	23.500	1.009	20.82°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 With 0mm	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	0.444	0.224	0.000	22.210	22.500	0.475	20.32°C
Back Side	21100/2535	20M QPSK 1RB#50	0.889	0.461	-0.060	22.210	22.500	**0.950**	20.32°C
Right Side	21100/2535	20M QPSK 1RB#50	0.118	0.058	0.000	22.210	22.500	0.126	20.32°C
Top Side	21100/2535	20M QPSK 1RB#50	0.697	0.355	0.140	22.210	22.500	0.745	20.32°C
Front Side	21100/2535	20M QPSK 50%RB#25	0.435	0.211	0.120	22.210	22.500	0.465	20.32°C
Back Side	21100/2535	20M QPSK 50%RB#25	0.713	0.369	0.200	22.210	22.500	0.762	20.32°C
Right Side	21100/2535	20M QPSK 50%RB#25	0.121	0.060	0.070	22.210	22.500	0.129	20.32°C
Top Side	21100/2535	20M QPSK 50%RB#25	0.684	0.349	-0.100	22.210	22.500	0.731	20.32°C
Back Side	20850/2510	20M QPSK 1RB#50	0.809	0.423	-0.030	22.140	22.500	0.879	20.32°C
Back Side	21350/2560	20M QPSK 1RB#50	0.789	0.398	0.010	22.120	22.500	0.861	20.32°C

Test Position With 0mm	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									
Back Side	21100/2535	20M QPSK 1RB#50	0.889	0.460	0.110	22.210	22.500	**0.950**	20.32°C
Back Side	20850/2510	20M QPSK 1RB#50	0.825	0.427	0.030	22.140	22.500	0.896	20.32°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 41

Test Position With 0mm	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	40620/2593	20M QPSK 1RB#50	0.245	0.121	0.120	23.19	23.500	0.263	20.32°C
Back Side	40620/2593	20M QPSK 1RB#50	0.581	0.276	0.000	23.19	23.500	0.624	20.32°C
Right Side	40620/2593	20M QPSK 1RB#50	0.068	0.031	0.080	23.19	23.500	0.073	20.32°C
Top Side	40620/2593	20M QPSK 1RB#50	0.488	0.211	0.030	23.19	23.500	0.524	20.32°C
Front Side	40620/2593	20M QPSK 50%RB#25	0.243	0.128	-0.100	23.08	23.500	0.268	20.32°C
Back Side	40620/2593	20M QPSK 50%RB#25	0.591	0.281	0.020	23.08	23.500	0.651	20.32°C
Right Side	40620/2593	20M QPSK 50%RB#25	0.065	0.030	0.010	23.08	23.500	0.072	20.32°C
Top Side	40620/2593	20M QPSK 50%RB#25	0.481	0.212	-0.020	23.08	23.500	0.530	20.32°C
Back Side	40340/2565	20M QPSK 50%RB#25	0.456	0.226	0.010	23.06	23.500	0.505	20.32°C
Back Side	41140/2645	20M QPSK 50%RB#25	0.944	0.372	0.180	22.910	23.500	**1.081**	20.32°C

Test Position With 0mm	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									
Back Side	41140/2645	20M QPSK 50%RB#25	1.050	0.410	0.000	22.910	23.500	**1.203**	20.32°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 WiFi 2.4G

Test Position With 0mm	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)	Actual Duty Cycle	Reported SAR 1-g (W/kg)	Liquid Temp.
			1-g	10-g							
Front Side	6/2437	802.11b	0.140	0.058	0.000	13.70	14.00	0.150	98.12%	0.153	20.22 °C
Back Side	6/2437	802.11b	0.199	0.099	-0.150	13.70	14.00	0.213	98.12%	**0.217**	20.22 °C
Left Side	6/2437	802.11b	0.080	0.043	0.100	13.70	14.00	0.086	98.12%	0.087	20.22 °C
Top Side	6/2437	802.11b	0.090	0.510	0.000	13.70	14.00	0.096	98.12%	0.098	20.22 °C
Back Side	1/2412	802.11b	0.187	0.094	0.000	13.49	14.00	0.210	98.24%	0.214	20.22 °C
Back Side	11/2462	802.11b	0.184	0.092	0.100	13.42	14.00	0.210	97.66%	0.215	20.22 °C

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.

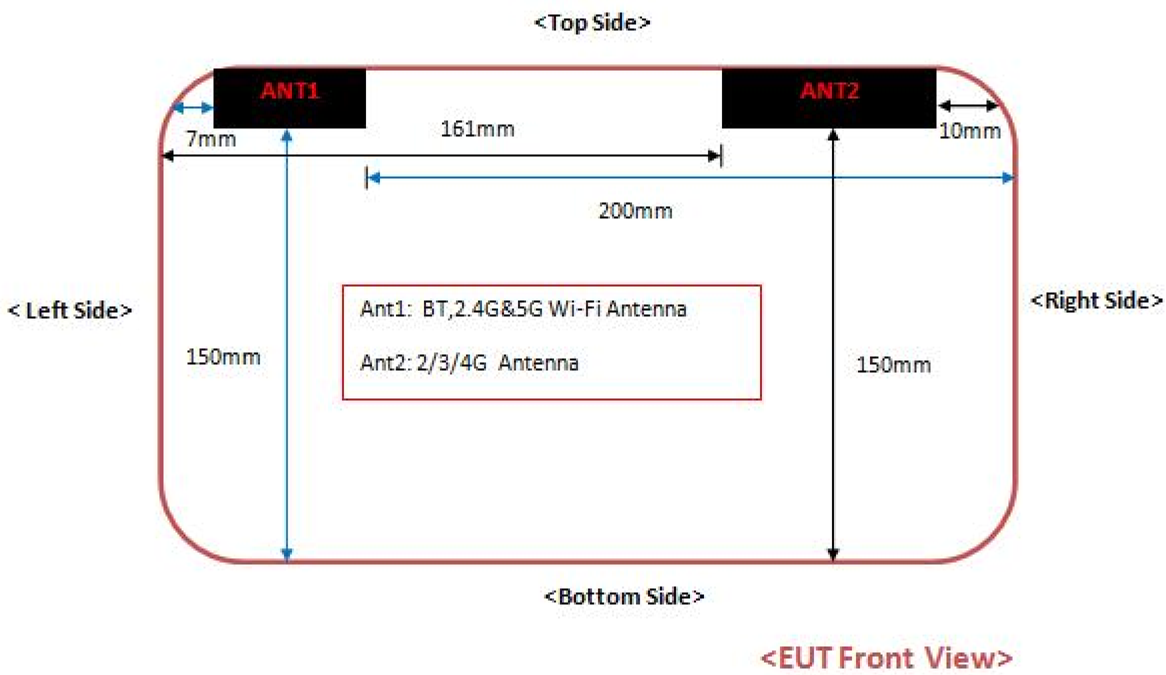
3) Per KDB 648474 D04, product specific 10-g SAR test is not required for this frequency band since hotspot mode 1-g reported SAR < 1.2W/kg.

4) Scaled SAR = SAR Value * $10^{(0.1*(\text{Tune up Power}-\text{Conducted Power}))}$

Reported SAR = SAR Value * $10^{(0.1*(\text{Tune up Power}-\text{Conducted Power}))}$/ Duty factor * 100

8.3 Multiple Transmitter Information

The location of the antennas inside IRA T1021 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 Stand-alone SAR

Per FCC KDB 447498D01:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5mm is applied to determine SAR test exclusion.

Mode	Position	P_{max} (dBm)	P_{max} (mW)	Distance (mm)	F (GHz)	Calculation Result	SAR test exclusion Threshold	SAR test exclusion
BT	Body-Worn	2.00	1.58	5.00	2.450	0.50	3.00	Yes

2) When the standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Mode	Position	Pmax(dBm)	Pmax(mW)	Distance(mm)	f(GHz)	X	Estimated SAR(W/Kg)
BT	Body-Worn	2.00	1.58	5.00	2.45	7.50	0.066

Note: 1) maximum possible output power (including tune-up tolerance) declared by manufacturer
2) Held to ear configurations are not applicable to Bluetooth for this device

8.5 Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

Simultaneous Tx Combination	Configuration	Head	Body-worn	product specific 10-g SAR
1	GSM + WiFi 2.4G	N/A	Yes	Yes
2	UMTS + WiFi 2.4G	N/A	Yes	Yes
3	LTE + WiFi 2.4G	N/A	Yes	Yes
4	GSM + WiFi 5G	N/A	Yes	Yes
5	UMTS + WiFi 5G	N/A	Yes	Yes
6	LTE + WiFi 5G	N/A	Yes	Yes
7	GSM + BT	N/A	Yes	Yes
8	UMTS + BT	N/A	Yes	Yes
9	LTE + BT	N/A	Yes	Yes

Note:

1) The device does not support simultaneous Wi-Fi 2.4G and BT, because the Wi-Fi 2.4G and BT share the same antenna and can't transmit simultaneously.
2) Simultaneous Transmission SAR Evaluation is not required for 2.4GHz WLAN and 5GHz WLAN , because the software mechanism have been incorporated to guarantee that the 2.4GHz WLAN and 5GHz WLAN transmitters would not simultaneously operate.
3) Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.

8.6 SAR Summation Scenario

Test Position		GSM 850	GSM 1900	UMTS Band II	UMTS Band V	LTE Band 2	LTE Band 5	LTE Band 7	LTE Band 41	WiFi/BT Antenna SARmax BT-WiFi 2.4G-WiFi 5G	∑1-g SAR1-g	SPLSP
		2G/3G/4G Antenna SARmax										
Body 0mm	Front Side	0.415	0.456	0.478	0.463	0.378	**0.479**	0.475	0.268	0.153	0.632	NO
	Back Side	1.037	0.993	**1.214**	1.194	1.057	1.148	0.950	1.203	0.217	**1.431**	NO
	Left Side	\	\	\	\	\	\	\	\	0.087	0.087	NO
	Right Side	0.128	0.110	0.118	0.095	0.124	0.092	**0.129**	0.073	\	0.129	NO
	Top Side	0.463	0.766	0.830	**1.143**	0.724	1.053	0.745	0.530	0.098	1.241	NO
	Bottom Side	\	\	\	\	\	\	\	\	\	\	NO

Note: Simultaneous Tx Combination of 2G/3G/4G antenna and Wi-Fi 2.4G/Wi-Fi5G/BT.

8.7 Simultaneous Transmission Conlcusion

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 D04.

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)

Statement

1. This report is considered invalid without approved signature, special seal and the seal on the perforation;

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

3. The result(s) shown in this report refer(s) only to the sample(s) tested;

4. Unless otherwise stated,the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule stated in ILAC-G8:09/2019/CNAS-GL015:2022;

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*** End of Report ***