FCC SAR Test Report

APPLICANT	:	TCL Communication Ltd.
EQUIPMENT	:	R5.5
BRAND NAME	:	lively
MODEL NAME	:	LVR52
FCC ID	:	2ACCJ-LVR52
STANDARD	:	FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.

Approved by: Hank Huang

Sporton International Inc. (Shenzhen)
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People's Republic of China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA4N0506	Rev. 01	Initial issue of report	Apr. 30, 2025

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **TCL Communication Ltd., R5.5, LVR52,** are as follows.

Highest 1g SAR Summary					
Equipment Class	Frequency Band		Head (Separation 10mm)	Body (Separation 0mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)		
Licensed	LTE	LTE Band 12	0.71	0.11	1.20
		LTE Band 13	0.51	<0.10	
		LTE Band 5	**1.18**	0.13	
		LTE Band 66/4	0.95	**0.32**	
		LTE Band 2	1.02	**0.32**	
DTS	Bluetooth	2.4GHz Bluetooth	<0.10	<0.10	1.20

Highest 10g SAR Summary				
Equipment Class	Frequency Band		Extremity SAR (W/kg) (Separation 0mm)	Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	LTE	LTE Band 12	0.77	2.31
		LTE Band 13	0.67	
		LTE Band 5	1.02	
		LTE Band 66/4	2.25	
		LTE Band 2	**2.27**	
DTS	Bluetooth	2.4GHz Bluetooth	<0.10	2.31
Date of Testing:		2024/12/10 ~ 2024/12/12		

Remark:
1. This device supports LTE B4 and B66. Since the supported frequency span for LTE B4 falls completely within the supports frequency span for LTE B66, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B66.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR02-SZ	CN1256	421272

Applicant	
Company Name	TCL Communication Ltd.
Address	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong

Manufacturer	
Company Name	TCL Communication Ltd.
Address	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	R5.5
Brand Name	lively
Model Name	LVR52
FCC ID	2ACCJ-LVR52
IMEI Code	358608620200772
Wireless Technology and Frequency Range	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 66: 1710 MHz ~ 1780 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	LTE: QPSK, 16QAM Bluetooth LE
HW Version	V7.0
SW Version	1G0101
EUT Stage	Production Unit

Remark:
1. This device has voice function and PTT (push-to-talk) function, so in-front-of the face and bottom side SAR is performed with 10mm for head SAR testing.
2. This device will be equipped with one clip and one Strap, when using them, body exposure Condition is considered, and spot check the worst case of each band to satisfy SAR compliance.

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	2ACCJ-LVR52
Equipment Name	R5.5
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 66: 1710 MHz ~ 1780 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
Uplink Modulations used	QPSK / 16QAM
LTE Voice / Data requirements	Data only
LTE Release Version	R10
CA Support	Not Supported
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3
256 QAM	≥ 1						≤ 5

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Transmission (H, M, L) channel numbers and frequencies in each LTE band

LTE Band 2

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900

LTE Band 4

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745

LTE Band 5

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844

LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711

LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Specific Absorption Rate (SAR)

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

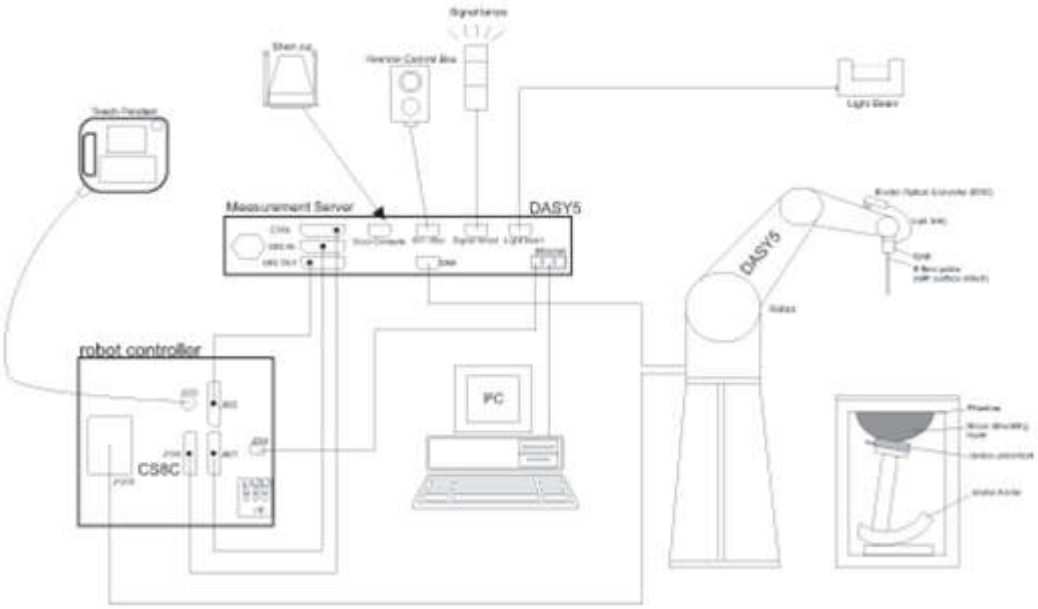
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.1 E-Field Probe

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

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	4 MHz – 10 GHz Linearity: ±0.2 dB (30 MHz – 10 GHz)
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

7.2 Data Acquisition Electronics (DAE)

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

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

Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

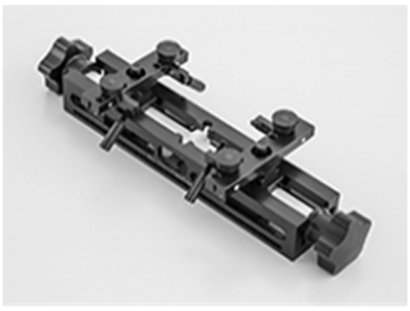
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body Transmitters>

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

8.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

8.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

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

8.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

8.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1099	Dec. 15, 2021	Dec. 13, 2024
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 15, 2024
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Oct. 15, 2024	Oct. 14, 2025
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 18, 2024
SPEAG	2450MHz System Validation Kit	D2450V2	924	Nov. 03, 2023	Nov. 01, 2025
SPEAG	Data Acquisition Electronics	DAE4	1386	Aug. 30, 2024	Aug. 29, 2025
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Aug. 22, 2024	Aug. 21, 2025
SPEAG	SAM Twin Phantom	QD 000 P40 CD	1670	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Jul. 05, 2024	Jul. 04, 2025
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 03, 2024	Jul. 02, 2025
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 15, 2024	Oct. 14, 2025
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Feb. 19, 2024	Feb. 18, 2025
Anritsu	Power Senor	MA2411B	1306099	Oct. 15, 2024	Oct. 14, 2025
Anritsu	Power Meter	ML2495A	1349001	Oct. 15, 2024	Oct. 14, 2025
Anritsu	Power Sensor	MA2411B	1542004	Dec. 28, 2023	Dec. 27, 2024
Anritsu	Power Meter	ML2495A	1339473	Dec. 28, 2023	Dec. 27, 2024
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 28, 2023	Dec. 27, 2024
TES	Hygrometer	1310	200505600	Jul. 08, 2024	Jul. 07, 2025
Anymetre	Thermo-Hygrometer	JR593	2015030903	Jan. 02, 2024	Jan. 01, 2025
Anymetre	Thermo-Hygrometer	JR593	2015102801	Jan. 02, 2024	Jan. 01, 2025
AR	Amplifier	5S1G4	0333096	Note 1	
Mini-Circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
Mini-Circuits	Amplifier	ZVA-183W-S+	726202215	Note 1	
SPEAG	Device Holder	N/A	N/A	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
Jinkexinhua	Attenuator	10db-8G	N/A	Note 1	

Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

10. System Verification

10.1 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. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

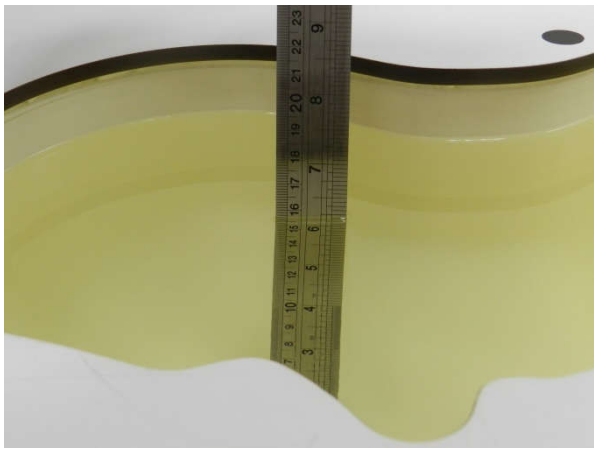


Fig 10.1Photo of Liquid Height for Head SAR

Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	22.3	0.878	41.538	0.89	41.90	-1.35	-0.86	±5	2024/12/10
835	Head	22.3	0.913	41.031	0.90	41.50	1.44	-1.13	±5	2024/12/10
1750	Head	22.1	1.383	39.711	1.37	40.10	0.95	-0.97	±5	2024/12/11
1900	Head	22.2	1.443	40.023	1.40	40.00	3.07	0.06	±5	2024/12/11
2450	Head	22.4	1.811	37.601	1.80	39.20	0.61	-4.08	±5	2024/12/12

10.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2024/12/10	750	Head	250	1099	3819	1386	2.200	8.540	8.8	3.04	1.430	5.650	5.72	1.24
2024/12/10	835	Head	250	4d162	3819	1386	2.530	9.640	10.12	4.98	1.640	6.260	6.56	4.79
2024/12/11	1750	Head	250	1137	3819	1386	9.710	36.800	38.84	5.54	5.130	19.600	20.52	4.69
2024/12/11	1900	Head	250	5d182	3819	1386	10.100	39.600	40.4	2.02	5.310	20.200	21.24	5.15
2024/12/12	2450	Head	250	924	3819	1386	12.600	52.300	50.4	-3.63	5.890	24.500	23.56	-3.84

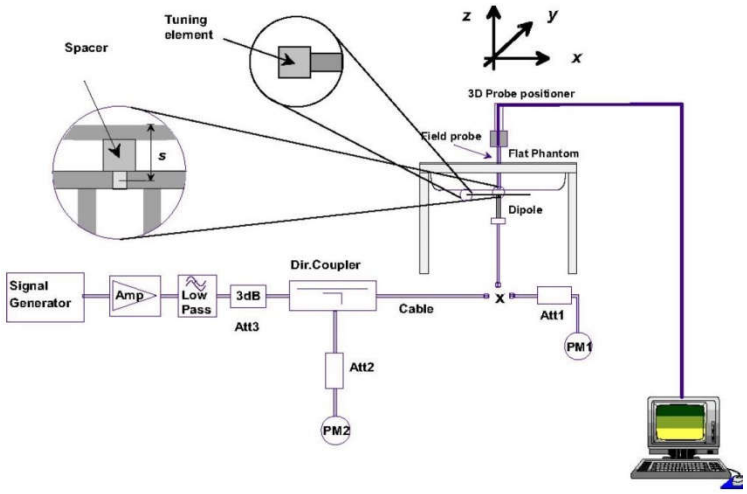


Fig 10.3.1 System Performance Check Setup

Fig 10.3.2 Setup Photo

11. RF Exposure Positions

11.1 SAR Testing for Head

(a) To position the device parallel to the phantom surface with either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device surface and the flat phantom to 10 cm.

11.2 Body and Extremity SAR Testing for Device

(d) To position the device parallel to the phantom surface with all surfaces of the device.
(e) To adjust the device parallel to the flat phantom.
(f) To adjust the distance between the device surface and the flat phantom to 0 cm.

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

12. Conducted RF Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

<LTE Conducted Power>

General Note:

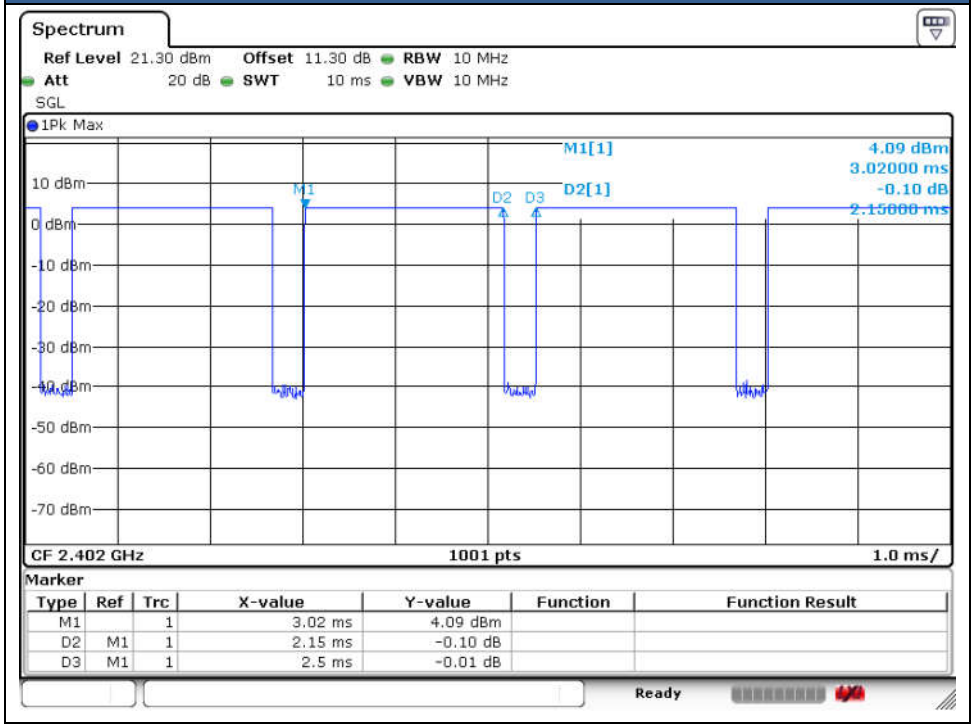
1. Anritsu MT8821C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE band 4 SAR test was covered by Band 66; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
    a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
    b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 86.0% as following figure, according to Oct. 2016 TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to100% for Bluetooth reported SAR calculation.

Bluetooth time-domain plot



13. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of Bluetooth signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. The actual transmission duty cycle for LTE bands is 8.1% for body exposure condition on declared by Manufacturer. For LTE bands: Reported SAR(W/kg)= Measured SAR(W/kg)* Actual Transmission Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB447498 D01v06, SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge.
5. The following table “n/a” in the result means the SAR cube is too small to be detected.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE B4 SAR test was covered by LTE B66; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

14.1 Head SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz															
01	LTE Band 12	10M	QPSK	1	25	Front	10mm	23095	707.5	23.18	24.00	1.208	0.11	0.587	**0.709**
	LTE Band 12	10M	QPSK	1	25	Bottom Side	10mm	23095	707.5	23.18	24.00	1.208	-0.1	0.201	0.243
	LTE Band 12	10M	QPSK	25	12	Front	10mm	23095	707.5	22.39	23.00	1.151	-0.19	0.455	0.524
	LTE Band 12	10M	QPSK	25	12	Bottom Side	10mm	23095	707.5	22.39	23.00	1.151	0.1	0.151	0.174
02	LTE Band 13	10M	QPSK	1	25	Front	10mm	23230	782	23.62	24.00	1.091	0.11	0.470	**0.513**
	LTE Band 13	10M	QPSK	1	25	Bottom Side	10mm	23230	782	23.62	24.00	1.091	0.1	0.125	0.136
	LTE Band 13	10M	QPSK	25	12	Front	10mm	23230	782	22.39	23.00	1.151	-0.06	0.336	0.387
	LTE Band 13	10M	QPSK	25	12	Bottom Side	10mm	23230	782	22.39	23.00	1.151	0.08	0.107	0.123
835MHz															
03	LTE Band 5	10M	QPSK	1	25	Front	10mm	20525	836.5	23.78	24.00	1.052	0.08	1.120	**1.178**
	LTE Band 5	10M	QPSK	1	25	Bottom Side	10mm	20525	836.5	23.78	24.00	1.052	-0.08	0.163	0.171
	LTE Band 5	10M	QPSK	25	12	Front	10mm	20525	836.5	22.71	23.00	1.069	0.01	0.883	0.944
	LTE Band 5	10M	QPSK	25	12	Bottom Side	10mm	20525	836.5	22.71	23.00	1.069	-0.07	0.142	0.152
	LTE Band 5	10M	QPSK	50	0	Front	10mm	20525	836.5	22.67	23.00	1.079	0.04	0.872	0.941
1750MHz															
04	LTE Band 66	20M	QPSK	1	49	Front	10mm	132322	1745	22.52	22.60	1.019	-0.18	0.937	**0.954**
	LTE Band 66	20M	QPSK	1	49	Bottom Side	10mm	132322	1745	22.52	22.60	1.019	0.15	0.108	0.110
	LTE Band 66	20M	QPSK	1	49	Front	10mm	132072	1720	22.49	22.60	1.026	-0.14	0.834	0.855
	LTE Band 66	20M	QPSK	1	49	Front	10mm	132572	1770	22.38	22.60	1.052	-0.1	0.900	0.947
	LTE Band 66	20M	QPSK	50	24	Front	10mm	132322	1745	21.36	21.60	1.057	0.1	0.673	0.711
	LTE Band 66	20M	QPSK	50	24	Bottom Side	10mm	132322	1745	21.36	21.60	1.057	-0.05	0.082	0.087
	LTE Band 66	20M	QPSK	50	24	Front	10mm	132072	1720	21.31	21.60	1.069	0.01	0.617	0.660
	LTE Band 66	20M	QPSK	50	24	Front	10mm	132572	1770	21.27	21.60	1.079	-0.14	0.652	0.703
	LTE Band 66	20M	QPSK	100	0	Front	10mm	132322	1745	21.44	21.60	1.038	0.15	0.650	0.674
1900MHz															
	LTE Band 2	20M	QPSK	1	49	Front	10mm	18700	1860	22.32	22.50	1.042	-0.15	0.902	0.940
	LTE Band 2	20M	QPSK	1	49	Bottom Side	10mm	18700	1860	22.32	22.50	1.042	-0.01	0.164	0.171
	LTE Band 2	20M	QPSK	1	49	Front	10mm	18900	1880	22.08	22.50	1.102	0.18	0.910	1.002
05	LTE Band 2	20M	QPSK	1	49	Front	10mm	19100	1900	22.08	22.50	1.102	0.18	0.922	**1.016**
	LTE Band 2	20M	QPSK	50	24	Front	10mm	18700	1860	21.03	21.50	1.114	0.1	0.644	0.718
	LTE Band 2	20M	QPSK	50	24	Bottom Side	10mm	18700	1860	21.03	21.50	1.114	0.03	0.122	0.136
	LTE Band 2	20M	QPSK	50	24	Front	10mm	18900	1880	20.82	21.50	1.169	-0.03	0.620	0.725
	LTE Band 2	20M	QPSK	50	24	Front	10mm	19100	1900	20.87	21.50	1.156	0.09	0.626	0.724
	LTE Band 2	20M	QPSK	100	0	Front	10mm	18700	1860	20.91	21.50	1.146	0.02	0.628	0.719

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
2450MHz														
06	Bluetooth	BLE 1Mbps	Front	10mm	0	2402	4.40	5.50	1.288	86	1.163	0.02	0.015	**0.023**
	Bluetooth	BLE 1Mbps	Bottom Side	10mm	0	2402	4.40	5.50	1.288	86	1.163	-	n/a	n/a

14.2 Body SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Accessory	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Actual Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz																		
	LTE Band 12	10M	QPSK	1	25	Front	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.04	1.040	0.102
07	LTE Band 12	10M	QPSK	1	25	Back	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.11	1.110	**0.109**
	LTE Band 12	10M	QPSK	1	25	Back	0mm	Lanyard	23095	707.5	23.18	24.00	1.208	8.1	0.081	-0.12	1.030	0.101
	LTE Band 12	10M	QPSK	1	25	Back	0mm	Blet Clip	23095	707.5	23.18	24.00	1.208	8.1	0.081	-0.14	0.460	0.045
	LTE Band 12	10M	QPSK	1	25	Left Side	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.01	0.787	0.077
	LTE Band 12	10M	QPSK	1	25	Right Side	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	-0.1	1.050	0.103
	LTE Band 12	10M	QPSK	1	25	Top Side	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.09	0.170	0.017
	LTE Band 12	10M	QPSK	1	25	Bottom Side	0mm	-	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.13	0.489	0.048
	LTE Band 12	10M	QPSK	25	12	Front	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	0.06	0.867	0.081
	LTE Band 12	10M	QPSK	25	12	Back	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	-0.01	0.915	0.085
	LTE Band 12	10M	QPSK	25	12	Left Side	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	0.06	0.645	0.060
	LTE Band 12	10M	QPSK	25	12	Right Side	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	0.01	0.900	0.084
	LTE Band 12	10M	QPSK	25	12	Top Side	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	0.1	0.128	0.012
	LTE Band 12	10M	QPSK	25	12	Bottom Side	0mm	-	23095	707.5	22.39	23.00	1.151	8.1	0.081	0.18	0.377	0.035
	LTE Band 13	10M	QPSK	1	25	Front	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	0.18	0.799	0.071
08	LTE Band 13	10M	QPSK	1	25	Back	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	0.03	1.020	**0.090**
	LTE Band 13	10M	QPSK	1	25	Back	0mm	Lanyard	23230	782	23.62	24.00	1.091	8.1	0.081	-0.14	0.882	0.078
	LTE Band 13	10M	QPSK	1	25	Back	0mm	Blet Clip	23230	782	23.62	24.00	1.091	8.1	0.081	0.15	0.302	0.027
	LTE Band 13	10M	QPSK	1	25	Left Side	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	0.14	0.293	0.026
	LTE Band 13	10M	QPSK	1	25	Right Side	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	0.01	0.620	0.055
	LTE Band 13	10M	QPSK	1	25	Top Side	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	0.02	0.131	0.012
	LTE Band 13	10M	QPSK	1	25	Bottom Side	0mm	-	23230	782	23.62	24.00	1.091	8.1	0.081	-0.13	0.476	0.042
	LTE Band 13	10M	QPSK	25	12	Front	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	0.04	0.614	0.057
	LTE Band 13	10M	QPSK	25	12	Back	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	0.12	0.659	0.061
	LTE Band 13	10M	QPSK	25	12	Left Side	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	0.13	0.247	0.023
	LTE Band 13	10M	QPSK	25	12	Right Side	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	0.12	0.485	0.045
	LTE Band 13	10M	QPSK	25	12	Top Side	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	-0.18	0.118	0.011
	LTE Band 13	10M	QPSK	25	12	Bottom Side	0mm	-	23230	782	22.39	23.00	1.151	8.1	0.081	-0.17	0.362	0.034
835MHz																		
	LTE Band 5	10M	QPSK	1	25	Front	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	-0.06	1.230	0.105
09	LTE Band 5	10M	QPSK	1	25	Back	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.08	1.490	**0.127**
	LTE Band 5	10M	QPSK	1	25	Back	0mm	Lanyard	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.04	1.280	0.109
	LTE Band 5	10M	QPSK	1	25	Back	0mm	Blet Clip	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.06	0.719	0.061
	LTE Band 5	10M	QPSK	1	25	Left Side	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.19	1.210	0.103
	LTE Band 5	10M	QPSK	1	25	Right Side	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	-0.08	1.300	0.111
	LTE Band 5	10M	QPSK	1	25	Top Side	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	-0.05	0.292	0.025
	LTE Band 5	10M	QPSK	1	25	Bottom Side	0mm	-	20525	836.5	23.78	24.00	1.052	8.1	0.081	-0.05	0.452	0.039
	LTE Band 5	10M	QPSK	25	12	Front	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	0.16	1.000	0.087
	LTE Band 5	10M	QPSK	25	12	Back	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	-0.12	1.160	0.100
	LTE Band 5	10M	QPSK	25	12	Left Side	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	0.1	1.000	0.087
	LTE Band 5	10M	QPSK	25	12	Right Side	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	0	1.120	0.097
	LTE Band 5	10M	QPSK	25	12	Top Side	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	-0.06	0.216	0.019
	LTE Band 5	10M	QPSK	25	12	Bottom Side	0mm	-	20525	836.5	22.71	23.00	1.069	8.1	0.081	0.05	0.373	0.032
1750MHz																		
	LTE Band 66	20M	QPSK	1	49	Front	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	-0.14	2.240	0.185
	LTE Band 66	20M	QPSK	1	49	Back	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	-0.02	3.470	0.286
	LTE Band 66	20M	QPSK	1	49	Left Side	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	-0.13	1.650	0.136
	LTE Band 66	20M	QPSK	1	49	Right Side	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	0.06	1.100	0.091
	LTE Band 66	20M	QPSK	1	49	Top Side	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	-0.12	0.058	0.005
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	-	132322	1745	22.52	22.60	1.019	8.1	0.081	-0.12	0.605	0.050

	LTE Band 66	20M	QPSK	1	49	Back	0mm	-	132072	1720	22.49	22.60	1.026	8.1	0.081	-0.17	2.780	0.231
10	LTE Band 66	20M	QPSK	1	49	Back	0mm	-	132572	1770	22.38	22.60	1.052	8.1	0.081	0.01	3.710	**0.316**
	LTE Band 66	20M	QPSK	1	49	Back	0mm	Lanyard	132572	1770	22.38	22.60	1.052	8.1	0.081	-0.12	3.440	0.293
	LTE Band 66	20M	QPSK	1	49	Back	0mm	Blet Clip	132572	1770	22.38	22.60	1.052	8.1	0.081	0.09	1.080	0.092
	LTE Band 66	20M	QPSK	50	24	Front	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	0.06	1.870	0.160
	LTE Band 66	20M	QPSK	50	24	Back	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	-0.09	3.050	0.261
	LTE Band 66	20M	QPSK	50	24	Left Side	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	-0.12	1.420	0.122
	LTE Band 66	20M	QPSK	50	24	Right Side	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	0.16	0.920	0.079
	LTE Band 66	20M	QPSK	50	24	Top Side	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	-0.18	0.044	0.004
	LTE Band 66	20M	QPSK	50	24	Bottom Side	0mm	-	132322	1745	21.36	21.60	1.057	8.1	0.081	-0.16	0.529	0.045
	LTE Band 66	20M	QPSK	50	24	Back	0mm	-	132072	1720	21.31	21.60	1.069	8.1	0.081	0.05	2.480	0.215
	LTE Band 66	20M	QPSK	50	24	Back	0mm	-	132572	1770	21.27	21.60	1.079	8.1	0.081	0.08	2.740	0.239
1900MHz																		
	LTE Band 2	20M	QPSK	1	49	Front	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	0.01	2.550	0.215
	LTE Band 2	20M	QPSK	1	49	Back	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	-0.12	3.430	0.290
	LTE Band 2	20M	QPSK	1	49	Left Side	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	0.04	1.490	0.126
	LTE Band 2	20M	QPSK	1	49	Right Side	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	0.11	1.140	0.096
	LTE Band 2	20M	QPSK	1	49	Top Side	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	-0.08	0.085	0.007
	LTE Band 2	20M	QPSK	1	49	Bottom Side	0mm	-	18700	1860	22.32	22.50	1.042	8.1	0.081	0.03	0.814	0.069
11	LTE Band 2	20M	QPSK	1	49	Back	0mm	-	18900	1880	22.08	22.50	1.102	8.1	0.081	0.07	3.540	**0.316**
	LTE Band 2	20M	QPSK	1	49	Back	0mm	Lanyard	18900	1880	22.08	22.50	1.102	8.1	0.081	-0.08	3.530	0.315
	LTE Band 2	20M	QPSK	1	49	Back	0mm	Blet Clip	18900	1880	22.08	22.50	1.102	8.1	0.081	-0.18	1.110	0.099
	LTE Band 2	20M	QPSK	1	49	Back	0mm	-	19100	1900	22.08	22.50	1.102	8.1	0.081	0.01	3.500	0.312
	LTE Band 2	20M	QPSK	50	24	Front	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	0.05	1.850	0.167
	LTE Band 2	20M	QPSK	50	24	Back	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	0.11	2.510	0.227
	LTE Band 2	20M	QPSK	50	24	Left Side	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	-0.08	1.130	0.102
	LTE Band 2	20M	QPSK	50	24	Right Side	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	0.13	0.830	0.075
	LTE Band 2	20M	QPSK	50	24	Top Side	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	-0.12	0.067	0.006
	LTE Band 2	20M	QPSK	50	24	Bottom Side	0mm	-	18700	1860	21.03	21.50	1.114	8.1	0.081	0.12	0.617	0.056
	LTE Band 2	20M	QPSK	50	24	Back	0mm	-	18900	1880	20.82	21.50	1.169	8.1	0.081	0.08	2.740	0.260
	LTE Band 2	20M	QPSK	50	24	Back	0mm	-	19100	1900	20.87	21.50	1.156	8.1	0.081	0.04	2.550	0.239

Plot No.	Band	Mode	Test Position	Gap (mm)	Accessory	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
2450MHz															
12	Bluetooth	BLE 1Mbps	Front	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.08	0.060	**0.090**
	Bluetooth	BLE 1Mbps	Front	0mm	Lanyard	0	2402	4.40	5.50	1.288	86	1.163	-0.14	0.059	0.088
	Bluetooth	BLE 1Mbps	Front	0mm	Blet Clip	0	2402	4.40	5.50	1.288	86	1.163	0.07	0.055	0.082
	Bluetooth	BLE 1Mbps	Back	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.05	0.056	0.084
	Bluetooth	BLE 1Mbps	Left Side	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.13	0.020	0.030
	Bluetooth	BLE 1Mbps	Right Side	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.05	0.015	0.022
	Bluetooth	BLE 1Mbps	Top Side	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.14	0.013	0.019
	Bluetooth	BLE 1Mbps	Bottom Side	0mm	-	0	2402	4.40	5.50	1.288	86	1.163	0.11	0.011	0.016

14.3 Extremity SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
750MHz															
	LTE Band 12	10M	QPSK	1	25	Front	0mm	23095	707.5	23.18	24.00	1.208	-0.1	0.616	0.744
13	LTE Band 12	10M	QPSK	1	25	Back	0mm	23095	707.5	23.18	24.00	1.208	0.11	0.638	**0.771**
	LTE Band 12	10M	QPSK	1	25	Left Side	0mm	23095	707.5	23.18	24.00	1.208	-0.05	0.447	0.540
	LTE Band 12	10M	QPSK	1	25	Right Side	0mm	23095	707.5	23.18	24.00	1.208	0.07	0.556	0.672
	LTE Band 12	10M	QPSK	1	25	Top Side	0mm	23095	707.5	23.18	24.00	1.208	0.16	0.103	0.124
	LTE Band 12	10M	QPSK	1	25	Bottom Side	0mm	23095	707.5	23.18	24.00	1.208	0.06	0.197	0.238
	LTE Band 12	10M	QPSK	25	12	Front	0mm	23095	707.5	22.39	23.00	1.151	0.05	0.483	0.556
	LTE Band 12	10M	QPSK	25	12	Back	0mm	23095	707.5	22.39	23.00	1.151	-0.03	0.507	0.583
	LTE Band 12	10M	QPSK	25	12	Left Side	0mm	23095	707.5	22.39	23.00	1.151	-0.13	0.366	0.421
	LTE Band 12	10M	QPSK	25	12	Right Side	0mm	23095	707.5	22.39	23.00	1.151	0.13	0.448	0.516
	LTE Band 12	10M	QPSK	25	12	Top Side	0mm	23095	707.5	22.39	23.00	1.151	0.18	0.076	0.087
	LTE Band 12	10M	QPSK	25	12	Bottom Side	0mm	23095	707.5	22.39	23.00	1.151	0.05	0.152	0.175
	LTE Band 13	10M	QPSK	1	25	Front	0mm	23230	782	23.62	24.00	1.091	-0.03	0.467	0.510
14	LTE Band 13	10M	QPSK	1	25	Back	0mm	23230	782	23.62	24.00	1.091	0.03	0.610	**0.666**
	LTE Band 13	10M	QPSK	1	25	Left Side	0mm	23230	782	23.62	24.00	1.091	0.01	0.165	0.180
	LTE Band 13	10M	QPSK	1	25	Right Side	0mm	23230	782	23.62	24.00	1.091	-0.11	0.334	0.365
	LTE Band 13	10M	QPSK	1	25	Top Side	0mm	23230	782	23.62	24.00	1.091	-0.04	0.067	0.073
	LTE Band 13	10M	QPSK	1	25	Bottom Side	0mm	23230	782	23.62	24.00	1.091	-0.13	0.184	0.201
	LTE Band 13	10M	QPSK	25	12	Front	0mm	23230	782	22.39	23.00	1.151	-0.05	0.360	0.414
	LTE Band 13	10M	QPSK	25	12	Back	0mm	23230	782	22.39	23.00	1.151	-0.02	0.387	0.445
	LTE Band 13	10M	QPSK	25	12	Left Side	0mm	23230	782	22.39	23.00	1.151	0.13	0.140	0.161
	LTE Band 13	10M	QPSK	25	12	Right Side	0mm	23230	782	22.39	23.00	1.151	0.06	0.262	0.302
	LTE Band 13	10M	QPSK	25	12	Top Side	0mm	23230	782	22.39	23.00	1.151	-0.15	0.059	0.068
	LTE Band 13	10M	QPSK	25	12	Bottom Side	0mm	23230	782	22.39	23.00	1.151	0.13	0.141	0.162
835MHz															
	LTE Band 5	10M	QPSK	1	25	Front	0mm	20525	836.5	23.78	24.00	1.052	0.08	0.727	0.765
15	LTE Band 5	10M	QPSK	1	25	Back	0mm	20525	836.5	23.78	24.00	1.052	0.08	0.973	**1.024**
	LTE Band 5	10M	QPSK	1	25	Left Side	0mm	20525	836.5	23.78	24.00	1.052	0.04	0.715	0.752
	LTE Band 5	10M	QPSK	1	25	Right Side	0mm	20525	836.5	23.78	24.00	1.052	0.08	0.800	0.842
	LTE Band 5	10M	QPSK	1	25	Top Side	0mm	20525	836.5	23.78	24.00	1.052	0.03	0.109	0.115
	LTE Band 5	10M	QPSK	1	25	Bottom Side	0mm	20525	836.5	23.78	24.00	1.052	-0.04	0.203	0.214
	LTE Band 5	10M	QPSK	25	12	Front	0mm	20525	836.5	22.71	23.00	1.069	0.08	0.596	0.637
	LTE Band 5	10M	QPSK	25	12	Back	0mm	20525	836.5	22.71	23.00	1.069	-0.06	0.642	0.686
	LTE Band 5	10M	QPSK	25	12	Left Side	0mm	20525	836.5	22.71	23.00	1.069	0.02	0.590	0.631
	LTE Band 5	10M	QPSK	25	12	Right Side	0mm	20525	836.5	22.71	23.00	1.069	0.13	0.626	0.669
	LTE Band 5	10M	QPSK	25	12	Top Side	0mm	20525	836.5	22.71	23.00	1.069	-0.18	0.081	0.087
	LTE Band 5	10M	QPSK	25	12	Bottom Side	0mm	20525	836.5	22.71	23.00	1.069	0.1	0.170	0.182
1750MHz															
	LTE Band 66	20M	QPSK	1	49	Front	0mm	132322	1745	22.52	22.60	1.019	-0.03	1.210	1.232
	LTE Band 66	20M	QPSK	1	49	Back	0mm	132322	1745	22.52	22.60	1.019	0.17	1.820	1.854
	LTE Band 66	20M	QPSK	1	49	Left Side	0mm	132322	1745	22.52	22.60	1.019	0.17	0.811	0.826
	LTE Band 66	20M	QPSK	1	49	Right Side	0mm	132322	1745	22.52	22.60	1.019	-0.1	0.576	0.587
	LTE Band 66	20M	QPSK	1	49	Top Side	0mm	132322	1745	22.52	22.60	1.019	-0.13	0.030	0.031
	LTE Band 66	20M	QPSK	1	49	Bottom Side	0mm	132322	1745	22.52	22.60	1.019	-0.08	0.248	0.253
	LTE Band 66	20M	QPSK	1	49	Back	0mm	132072	1720	22.49	22.60	1.026	0.15	1.510	1.549
16	LTE Band 66	20M	QPSK	1	49	Back	0mm	132572	1770	22.38	22.60	1.052	0.01	2.140	**2.251**
	LTE Band 66	20M	QPSK	50	24	Front	0mm	132322	1745	21.36	21.60	1.057	-0.17	1.010	1.067
	LTE Band 66	20M	QPSK	50	24	Back	0mm	132322	1745	21.36	21.60	1.057	0.16	1.600	1.691
	LTE Band 66	20M	QPSK	50	24	Left Side	0mm	132322	1745	21.36	21.60	1.057	0.18	0.694	0.733
	LTE Band 66	20M	QPSK	50	24	Right Side	0mm	132322	1745	21.36	21.60	1.057	-0.07	0.482	0.509

	LTE Band 66	20M	QPSK	50	24	Top Side	0mm	132322	1745	21.36	21.60	1.057	0.19	0.022	0.023
	LTE Band 66	20M	QPSK	50	24	Bottom Side	0mm	132322	1745	21.36	21.60	1.057	0.12	0.216	0.228
	LTE Band 66	20M	QPSK	100	0	Back	0mm	132322	1745	21.44	21.60	1.038	0.13	1.550	1.608
1900MHz															
	LTE Band 2	20M	QPSK	1	49	Front	0mm	18700	1860	22.32	22.50	1.042	-0.05	1.360	1.418
	LTE Band 2	20M	QPSK	1	49	Back	0mm	18700	1860	22.32	22.50	1.042	-0.15	1.790	1.866
	LTE Band 2	20M	QPSK	1	49	Left Side	0mm	18700	1860	22.32	22.50	1.042	0.14	0.668	0.696
	LTE Band 2	20M	QPSK	1	49	Right Side	0mm	18700	1860	22.32	22.50	1.042	0.15	0.574	0.598
	LTE Band 2	20M	QPSK	1	49	Top Side	0mm	18700	1860	22.32	22.50	1.042	0.16	0.042	0.044
	LTE Band 2	20M	QPSK	1	49	Bottom Side	0mm	18700	1860	22.32	22.50	1.042	0.08	0.348	0.363
17	LTE Band 2	20M	QPSK	1	49	Back	0mm	18900	1880	22.08	22.50	1.102	0.07	2.060	**2.269**
	LTE Band 2	20M	QPSK	1	49	Back	0mm	19100	1900	22.08	22.50	1.102	0.11	1.880	2.071
	LTE Band 2	20M	QPSK	50	24	Front	0mm	18700	1860	21.03	21.50	1.114	0.17	0.986	1.099
	LTE Band 2	20M	QPSK	50	24	Back	0mm	18700	1860	21.03	21.50	1.114	0.05	1.320	1.471
	LTE Band 2	20M	QPSK	50	24	Left Side	0mm	18700	1860	21.03	21.50	1.114	-0.01	0.509	0.567
	LTE Band 2	20M	QPSK	50	24	Right Side	0mm	18700	1860	21.03	21.50	1.114	-0.08	0.416	0.464
	LTE Band 2	20M	QPSK	50	24	Top Side	0mm	18700	1860	21.03	21.50	1.114	-0.02	0.035	0.039
	LTE Band 2	20M	QPSK	50	24	Bottom Side	0mm	18700	1860	21.03	21.50	1.114	-0.17	0.265	0.295
	LTE Band 2	20M	QPSK	100	0	Back	0mm	18700	1860	20.91	21.50	1.146	-0.01	1.280	1.466

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
2450MHz														
18	Bluetooth	BLE 1Mbps	Front	0mm	0	2402	4.40	5.50	1.288	86	1.163	0.08	0.029	**0.044**
	Bluetooth	BLE 1Mbps	Back	0mm	0	2402	4.40	5.50	1.288	86	1.163	-0.01	0.028	0.042
	Bluetooth	BLE 1Mbps	Left Side	0mm	0	2402	4.40	5.50	1.288	86	1.163	0.18	0.011	0.016
	Bluetooth	BLE 1Mbps	Right Side	0mm	0	2402	4.40	5.50	1.288	86	1.163	0.19	0.002	0.003
	Bluetooth	BLE 1Mbps	Top Side	0mm	0	2402	4.40	5.50	1.288	86	1.163	0.16	0.002	0.003
	Bluetooth	BLE 1Mbps	Bottom Side	0mm	0	2402	4.40	5.50	1.288	86	1.163	-0.05	0.002	0.003

14.4 Repeated SAR Measurement

<1g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Actual Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 12	10M	QPSK	1	25	Back	0mm	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.11	1.110	1	0.109
2nd	LTE Band 12	10M	QPSK	1	25	Back	0mm	23095	707.5	23.18	24.00	1.208	8.1	0.081	0.03	1.070	1.037	0.105
1st	LTE Band 5	10M	QPSK	1	25	Back	0mm	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.08	1.490	1	0.127
2nd	LTE Band 5	10M	QPSK	1	25	Back	0mm	20525	836.5	23.78	24.00	1.052	8.1	0.081	0.03	1.430	1.042	0.122
1st	LTE Band 66	20M	QPSK	1	49	Back	0mm	132572	1770	22.38	22.60	1.052	8.1	0.081	0.01	3.710	1	0.316
2nd	LTE Band 66	20M	QPSK	1	49	Back	0mm	132572	1770	22.38	22.60	1.052	8.1	0.081	0.07	3.660	1.014	0.312
1st	LTE Band 2	20M	QPSK	1	49	Back	0mm	18900	1880	22.08	22.50	1.102	8.1	0.081	0.07	3.540	1	0.316
2nd	LTE Band 2	20M	QPSK	1	49	Back	0mm	18900	1880	22.08	22.50	1.102	8.1	0.081	0.05	3.470	1.020	0.310

<10g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	LTE Band 66	20M	QPSK	1	49	Back	0mm	132572	1770	22.38	22.60	1.052	-	-	0.01	2.140	1	2.251
2nd	LTE Band 66	20M	QPSK	1	49	Back	0mm	132572	1770	22.38	22.60	1.052	-	-	0.07	2.110	1.014	2.220
1st	LTE Band 2	20M	QPSK	1	49	Back	0mm	18900	1880	22.08	22.50	1.102	-	-	0.07	2.060	1	2.269
2nd	LTE Band 2	20M	QPSK	1	49	Back	0mm	18900	1880	22.08	22.50	1.102	-	-	0.05	2.010	1.025	2.214

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	R5.5		
		Head	Body	Product specific 10g SAR
1.	WWAN + Bluetooth	Yes	Yes	Yes

General Note:

1. All licensed modes share the same antenna part and cannot transmit simultaneously.
2. The reported SAR summation is calculated based on the same configuration and test position
3. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04 for 1g SAR and SPLSR≤ 0.10 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.

15.1 Head Exposure Conditions

WWAN Band	Exposure Position	1	2	1+2
		WWAN	Bluetooth	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands	Front	1.178	0.023	1.20
	Back	0.243		0.24

15.2 Body Exposure Conditions

WWAN Band	Exposure Position	1	2	1+2
		WWAN	Bluetooth	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
All Bands	Front	0.215	0.090	0.31
	Back	0.316	0.084	0.40
	Left side	0.136	0.030	0.17
	Right side	0.111	0.022	0.13
	Top side	0.025	0.019	0.04
	Bottom side	0.069	0.016	0.09

15.3 Extremity Exposure Conditions

WWAN Band	Exposure Position	1	2	1+2
		WWAN	Bluetooth	Summed
		10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
All Bands	Front	1.418	0.044	1.46
	Back	2.269	0.042	2.31
	Left side	0.826	0.016	0.84
	Right side	0.842	0.003	0.85
	Top side	0.124	0.003	0.13
	Bottom side	0.363	0.003	0.37

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16. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

17. References

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

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

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[6] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[7] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[8] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[9] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

Appendixes

Please refer to separated files for the following appendixes

Appendix A. Plots of System Performance Check

Appendix B. Plots of High SAR Measurement

Appendix C. DASY Calibration Certificate

Appendix D. Test Setup Photos

Appendix E. Conducted RF Output Power Table

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