



SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd

Report No.: SUCR241100043807

Rev.: 01

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FCC SAR TEST REPORT

Application No.: SUCR2411000438TL
Applicant: Gosuncn Technology Group Co., Ltd.
Manufacturer: Gosuncn Technology Group Co., Ltd.
Product Name: LTE OBDII Dongle
Model No.(EUT): GD201E
FCC ID: 2APNR-GD201E
Standards: FCC 47CFR §2.1093
Date of Receipt: 2024-11-04
Date of Test: 2024-11-13 to 2024-11-16
Date of Issue: 2024-11-22
Test conclusion: **PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Prepared by: Leon Liu/ Project Manager

Approved by: Nick HU/ Technical
Manager (Title)

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Revision Record			
Version	Description	Date	Remark
01	Original	2024-11-22	

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TEST SUMMARY

Frequency Band	Maximum Reported SAR (W/kg)
	Body
LTE Cat-M1 Band 2	0.29
LTE Cat-M1 Band 4	0.33
LTE Cat-M1 Band 5	<0.10
LTE Cat-M1 Band 12	<0.10
LTE Cat-M1 Band 13	<0.10
LTE Cat-M1 Band 26	<0.10
LTE Cat-M1 Band 66	0.33
BT	<0.10
SAR Limited(W/kg)	1.6
Maximum Simultaneous Transmission SAR (W/kg)	
Scenario	Body
Sum SAR	0.413
SPLSR	/
SPLSR Limited	0.04
Note: According to TCB workshop October,2014 RF Exposure Procedures Update (Overlapping Bands): SAR for LTE Band 5 (Frequency range:824 - 849 MHz)/ LTE Band 4 (Frequency range: 1710 ~ 1755 MHz)is respectively covered by LTE Band 26 (Frequency range:814 - 849 MHz)/ LTE Band 66 (Frequency range: 1710 ~ 1780 MHz) due to similar frequency range, same maximum tune up limit and same channel bandwidth.	

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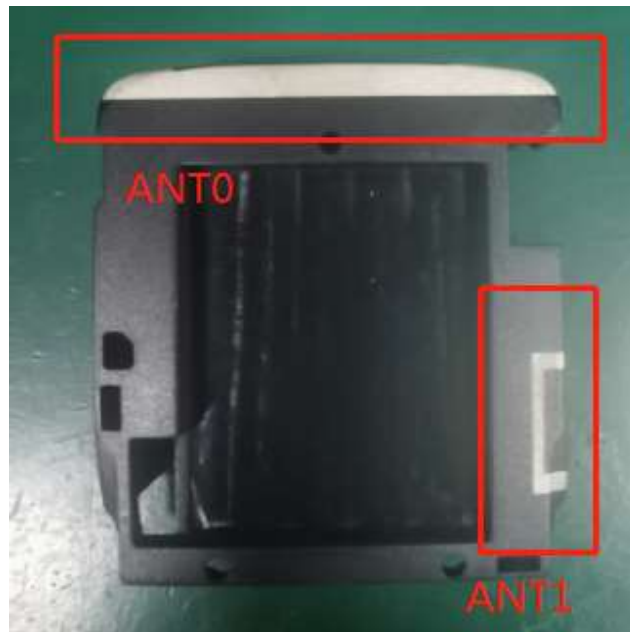
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1 DUT Antenna Locations



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2 General Information

2.1 Details of Client

Applicant:	Gosuncn Technology Group Co., Ltd.
Address:	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China.
Manufacturer:	Gosuncn Technology Group Co., Ltd.
Address:	6F, 2819 KaiChuang Blvd., Science Town, Huangpu District, Guangzhou City, Guangdong, China.

2.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test Engineer:	Koller Chen

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2.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

- **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

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2.4 General Description of EUT

Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Name:	LTE OBDII Dongle		
Model No.(EUT):	GD201E		
FCC ID:	2APNR-GD201E		
Trade Mark:	GOSUNCN		
Product Phase:	production unit		
IMEI:	866088070670090		
Hardware Version:	GD201_HW_V1.0		
Software Version:	BG95M3LAR02A03		
Device Operating Configurations :			
Modulation Mode:	LTE Cat-M1: QPSK,16QAM;		
Device Class:	B		
Power Class	3, tested with power control Max Power(LTE Band)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	LTE Cat-M1 Band 2	1850 ~ 1910	1930 ~ 1990
	LTE Cat-M1 Band 4	1710 ~ 1755	2110 ~ 2155
	LTE Cat-M1 Band 5	824 ~ 849	869 - 894
	LTE Cat-M1 Band 12	699 ~ 716	729 ~ 746
	LTE Cat-M1 Band 13	777 ~ 787	746 ~ 756
	LTE Cat-M1 Band 26	814 ~ 849	859 ~ 894
	LTE Cat-M1 Band 66	1710 ~ 1780	2110 ~ 2200
	BT	2402~2480	2402~2480
RF Cable:	☒ Provided by the aplicant ☐ Provided by the laboratory		
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2.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE C95.1-1992	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 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 941225 D05	SAR for LTE Devices v02r05
KDB 447498 D01	General RF Exposure Guidance v06
KDB 447498 D02	D02 SAR Procedures for Dongle Xmtr v02r01
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 690783 D01	SAR Listings on Grants v01r03

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2.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	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

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.)

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3 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

Table 1: The Ambient Conditions

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4 SAR Measurements System Configuration

4.1 The SAR Measurement System

This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

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

A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

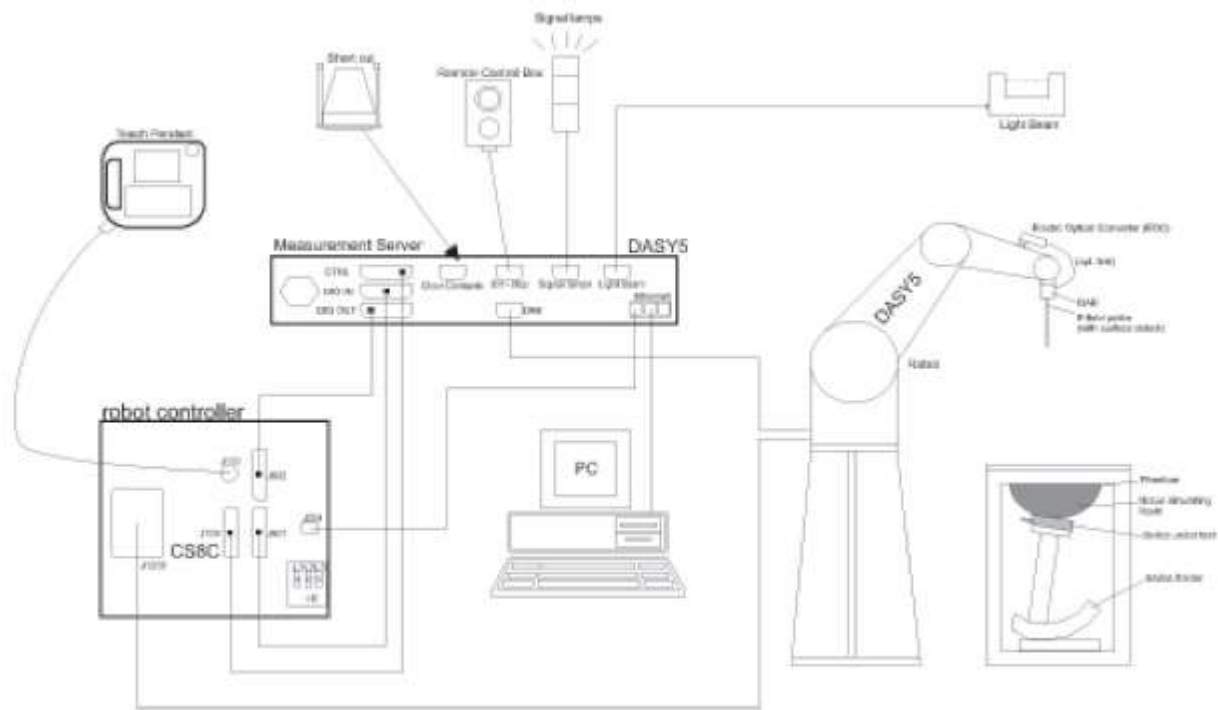
A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

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 between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.

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F-1. SAR Measurement System Configuration

- 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

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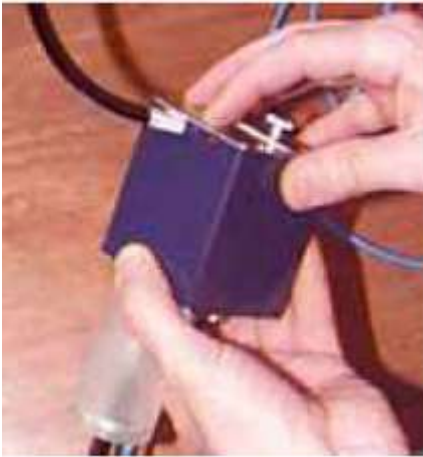
4.2 Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core 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 (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

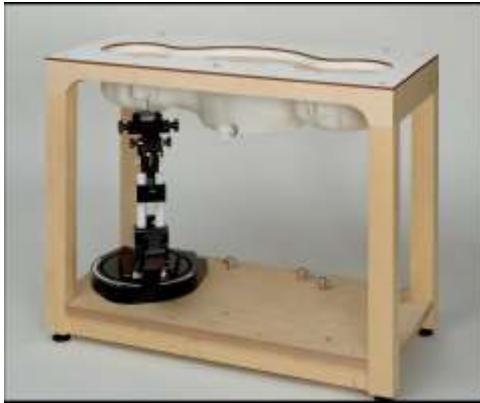
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4.3 Data Acquisition Electronics (DAE)

Model	DAE	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)	
Input Offset Voltage	< 5μV (with auto zero)	
Input Bias Current	< 50 f A	
Dimensions	60 x 60 x 68 mm	

4.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	
Wooden Support	SPEAG standard phantom table	

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

4.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices in the frequency range of 4 MHz to 10 GHz. ELI is fully compatible with the IEC/IEEE 62209-1528 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. 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. The phantom is compatible with all of SPEAG's dosimetric probes and dipoles.

ELI V5.0 and higher has the same shell geometry and is manufactured from the same material as ELI V4.0 but has a reinforced top structure.

4.6 Device Holder for Transmitters



F-2. Device Holder for Transmitters

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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4.7 Measurement procedure

4.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: Area scan

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Zoom scan

Around this point, a volume of 32mm*32mm*30mm ($f \leq 2\text{GHz}$), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points ($f \leq 2\text{GHz}$), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification). The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

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		$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		$5 \pm 1 \text{ mm}$	$\frac{1}{4} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$		$\leq 2 \text{ GHz}: \leq 15 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 12 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 12 \text{ mm}$ $4 - 6 \text{ GHz}: \leq 10 \text{ mm}$
		When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		$\leq 2 \text{ GHz}: \leq 8 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz}: \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz}: \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$	$\leq 5 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 4 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 3 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
	graded grid $\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	$\leq 4 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 3 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
	$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz}: \geq 28 \text{ mm}$ $4 - 5 \text{ GHz}: \geq 25 \text{ mm}$ $5 - 6 \text{ GHz}: \geq 22 \text{ mm}$

Step 4: Power reference measurement (drift)

The Power Drift Measurement job 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 indicated drift is mainly the variation of the DUT's output power and should vary max. $\pm 5\%$

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4.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.DAE4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show 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.

4.7.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	Normi, ai0, ai1, ai2
- Conversion factor	ConvFi	
- Diode compression point	Dcpi	
Device parameters:	- Frequency	f
- Crest factor	cf	
Media parameters:	- Conductivity	ε
- Density	ρ	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With V_i = compensated signal of channel i ($i = x, y, z$)

U_i = input signal of channel i ($i = x, y, z$)

cf = crest factor of exciting field (DASY parameter)

dcp i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

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H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2) / f$$

With V_i = compensated signal of channel i ($i = x, y, z$)

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

[mV/(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 RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

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]

ϵ = equivalent tissue density in g/cm³

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \text{ or } P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

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

H_{tot} = total magnetic field strength in A/m

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5 SAR measurement variability and uncertainty

5.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The 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.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
 - 2) When the original highest measured SAR is ≥ 0.80 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 > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
 - 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 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.

5.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 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.

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6 Description of Test Position

6.1 Body Exposure Condition

6.1.1 Dongle exposure conditions

The FCC has provided instructions in FCC KDB Publication 447498 D02 v02r01, which includes the aspects to be considered for SAR testing of dongles. In accordance with the stipulations of KDB Publication 447498 D01, conduct tests in all directions while maintaining a separation distance of 5 millimeters or less between the device and the phantom.

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7 SAR System Verification Procedure

7.1 Tissue Simulate Liquid

7.1.1 Recipes for Tissue Simulate Liquid

The following tables give the recipes for tissue simulating liquids to be used in different frequency bands:

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1750-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85
Salt: 99+% Pure Sodium Chloride Water: De-ionized, 16 MΩ ⁺ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate					
Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose					
HSL13MHz is composed of the following ingredients: Water: 50-90% Non-ionic detergents: 5-50% NaCl: 0-2% Preservative: 0.03-0.1% HSL5GHz is composed of the following ingredients: Water: 50-65% Mineral oil: 10-30% Emulsifiers: 8-25% Sodium salt: 0-1.5%					

Table 2: Recipe of Tissue Simulate Liquid

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7.1.2 Measurement for Tissue Simulate Liquid

The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $22\pm 2^{\circ}\text{C}$.

Measurement for Tissue Simulate Liquid							
Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^{\circ}\text{C}$)	Test Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
750 Head	750	41.9 (39.81~44.00)	0.89 (0.85~0.94)	43.434	0.873	22.1	2024/11/13
835 Head	835	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.062	0.901	22.2	2024/11/14
1750 Head	1750	40.1 (38.10~42.11)	1.37 (1.30~1.44)	40.213	1.312	21.9	2024/11/15
1950 Head	1900	40.0 (38.00~42.00)	1.40 (1.33~1.47)	40.507	1.417	22.3	2024/11/16

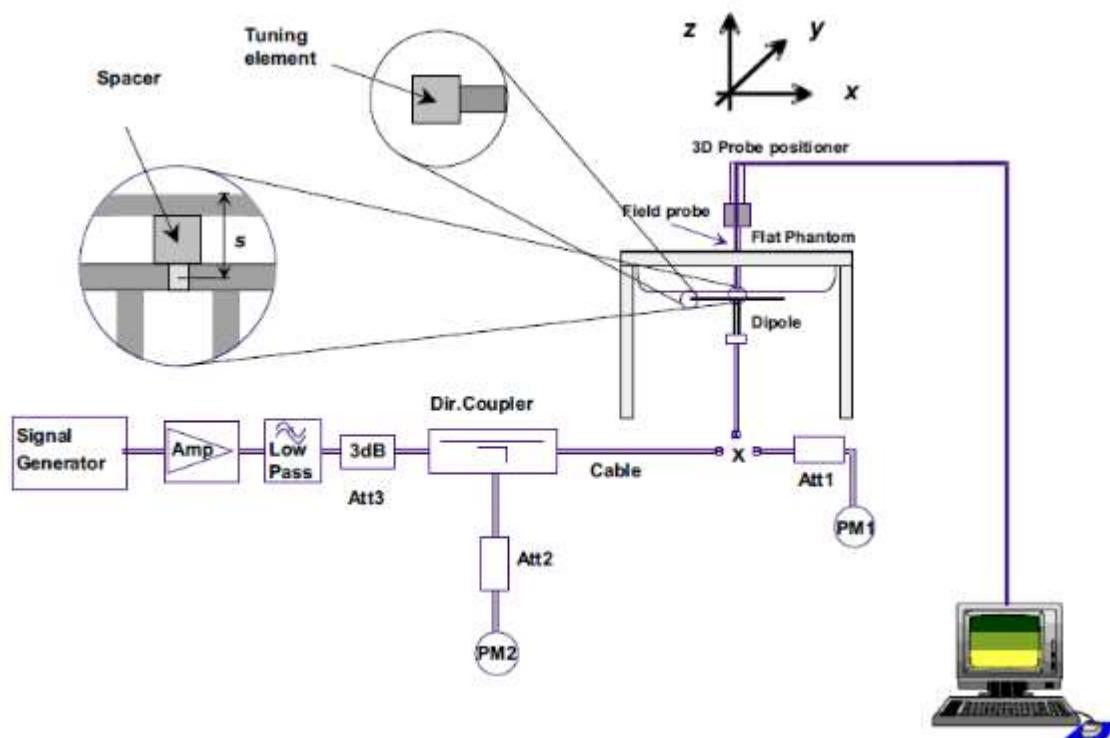
Table 3: Measurement result of Tissue electric parameters.

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7.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range $22 \pm 2^\circ\text{C}$, the relative humidity was in the range 60% and the liquid depth above the ear reference points was 15 ± 0.5 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-1. the microwave circuit arrangement used for SAR system check

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7.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

- a) There is no physical damage on the dipole;
- b) System check with specific dipole is within 10% of calibrated value;
- c) Return-loss is within 10% of calibrated measurement;
- d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

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7.2.2 Summary System Check Result(s)

SAR System Validation Result(s)											
Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W)	Target SAR (normalized to 1W)	Deviation (Within $\pm 10\%$)		Liquid Temp. ($^{\circ}\text{C}$)	Test Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)	1- g(W/kg)	10- g(W/kg)		
D750V3	Head	2.12	1.39	8.48	5.56	8.40	5.52	0.95%	0.72%	22.1	2024/11/13
D835V2	Head	2.26	1.48	9.04	5.92	9.60	6.16	-5.83%	-3.90%	22.2	2024/11/14
D1750V2	Head	8.61	4.58	34.44	18.32	37.00	19.30	-6.92%	-5.08%	21.9	2024/11/15
D1950V3	Head	10.20	5.24	40.80	20.96	40.40	20.80	0.99%	0.77%	22.3	2024/11/16

Table 4: SAR System Check Result.

7.2.3 Detailed System Check Results

Please see the Appendix A

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8 Test Configuration

8.1.1 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The Anritsu MT8820C was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A) Spectrum Plots for RB Configurations

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

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

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

C) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D) Largest channel bandwidth standalone SAR test requirements

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.

2) QPSK with 50% RB allocation

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

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 1) and 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) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to

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

E) 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 A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> \frac{1}{2}$ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

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9 Test Result

9.1 Measurement of RF conducted Power.

- 1) . The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power = $10 \times \log (\text{Burst-averaged power mW} \times \text{Slot used} / 8)$
- 2) . When the maximum output power variation across the required test channels is $> 1/2$ dB, instead of the middle channel, the highest output power channel must be used.

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9.1.1 Conducted Power of LTE Cat-M1

LTE Cat-M1 Band 2							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18607	18900	19193	
1.4MHz	QPSK	1	0	0	0	0	19.55	19.74	19.69	20.50
		1	5	0	0	0	19.60	19.71	19.64	20.50
		3	0	0	0	0	18.68	18.76	18.67	20.50
		3	3	0	0	0	18.68	18.74	18.66	20.50
		6	0	0	0	0	17.62	17.71	17.65	19.50
	16QAM	1	0	0	0	0	18.88	18.97	18.91	20.50
		1	5	0	0	0	18.63	18.69	18.58	20.50
		3	0	0	0	0	18.15	18.21	18.11	19.50
		3	3	0	0	0	18.02	18.16	18.07	19.50
		5	0	0	0	0	17.89	17.94	17.87	19.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18615	18900	19185	
3MHz	QPSK	1	0	0	0	1	19.59	19.69	19.67	20.50
		1	5	0	0	1	19.50	19.60	19.51	20.50
		3	0	0	0	1	19.30	19.64	19.26	20.50
		3	3	0	0	1	19.57	19.63	19.43	20.50
		6	0	0	0	1	19.29	18.68	19.12	20.50
	16QAM	1	0	0	0	1	19.24	19.67	19.38	20.50
		1	5	0	0	1	19.42	19.69	19.32	20.50
		3	0	0	0	1	19.16	19.67	19.49	20.50
		3	3	0	0	1	19.21	19.64	19.19	20.50
		5	0	0	0	1	19.07	19.66	19.26	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18625	18900	19175	
5MHz	QPSK	1	0	0	0	3	19.66	19.79	19.74	20.50
		1	5	0	0	3	19.57	19.69	19.60	20.50
		3	0	0	0	3	19.38	19.72	19.35	20.50
		3	3	0	0	3	19.64	19.68	19.50	20.50
		6	0	0	0	3	19.38	18.77	19.20	20.50
	16QAM	1	0	0	0	3	19.32	19.75	19.43	20.50
		1	5	0	0	3	19.49	19.78	19.42	20.50
		3	0	0	0	3	19.13	19.74	19.10	20.50
		3	3	0	0	3	19.29	19.70	19.29	20.50
		5	0	0	0	3	19.16	19.74	19.35	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18650	18900	19150	
10MHz	QPSK	1	0	0	0	7	19.46	19.76	19.63	20.50

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		1	5	0	0	7	19.39	19.48	19.30	20.50
		3	0	0	0	7	19.48	19.49	19.52	20.50
		3	3	0	0	7	19.43	19.53	19.15	20.50
		6	0	0	0	7	19.31	19.50	19.33	20.50
	16QAM	1	0	0	0	7	19.29	19.50	19.29	20.50
		1	5	0	0	7	19.11	19.22	19.06	20.50
		3	0	0	0	7	19.24	19.49	19.22	20.50
		3	3	0	0	7	19.07	19.40	19.44	20.50
		5	0	0	0	7	19.31	19.35	19.28	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18675	18900	19125	
15MHz	QPSK	1	0	0	0	11	19.56	19.78	19.55	20.50
		1	5	0	0	11	19.35	19.52	19.30	20.50
		3	0	0	0	11	19.50	19.69	19.30	20.50
		3	3	0	0	11	19.25	19.58	19.28	20.50
		6	0	0	0	11	19.44	19.48	19.44	20.50
	16QAM	1	0	0	0	11	19.34	19.50	19.44	20.50
		1	5	0	0	11	19.09	19.29	19.07	20.50
		3	0	0	0	11	19.31	19.53	19.30	20.50
		3	3	0	0	11	19.17	19.32	19.36	20.50
		5	0	0	0	11	19.40	19.38	19.24	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	18700	18900	19100	
20MHz	QPSK	1	0	0	0	15	19.72	19.82	19.71	20.50
		1	5	0	0	15	19.52	19.60	19.46	20.50
		3	0	0	0	15	19.73	19.78	19.58	20.50
		3	3	0	0	15	19.52	19.66	19.39	20.50
		6	0	0	0	15	19.49	19.70	19.56	20.50
	16QAM	1	0	0	0	15	19.58	19.67	19.50	20.50
		1	5	0	0	15	19.29	19.48	19.30	20.50
		3	0	0	0	15	19.36	19.62	19.38	20.50
		3	3	0	0	15	19.29	19.56	19.49	20.50
		5	0	0	0	15	19.48	19.57	19.48	20.50

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LTE Cat-M1 Band 4							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
1.4MHz	QPSK	1	0	0	0	0	19.25	19.32	19.22	20.00
		1	5	0	0	0	19.15	19.24	19.16	20.00
		3	0	0	0	0	18.25	18.34	18.29	20.00
		3	3	0	0	0	18.14	18.22	18.15	20.00
		6	0	0	0	0	17.11	17.18	17.12	19.00
	16QAM	1	0	0	0	0	18.47	18.56	18.50	20.00
		1	5	0	0	0	18.26	18.35	18.26	20.00
		3	0	0	0	0	17.36	17.45	17.39	19.00
		3	3	0	0	0	17.63	17.73	17.67	19.00
		5	0	0	0	0	17.57	17.65	17.59	19.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	19965	20175	20385	
3MHz	QPSK	1	0	0	0	1	19.18	19.23	19.20	20.00
		1	5	0	0	1	18.92	19.09	18.97	20.00
		3	0	0	0	1	18.82	18.86	18.93	20.00
		3	3	0	0	1	18.89	18.92	18.85	20.00
		6	0	0	0	1	18.88	18.92	18.75	20.00
	16QAM	1	0	0	0	1	18.90	18.94	18.85	20.00
		1	5	0	0	1	18.85	19.03	18.89	20.00
		3	0	0	0	1	18.79	18.93	18.83	20.00
		3	3	0	0	1	19.00	19.10	19.04	20.00
		5	0	0	0	1	18.85	18.99	18.83	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	19975	20175	20375	
5MHz	QPSK	1	0	0	0	3	19.12	19.20	19.04	20.00
		1	5	0	0	3	19.03	19.10	19.05	20.00
		3	0	0	0	3	18.85	18.91	18.90	20.00
		3	3	0	0	3	18.86	19.05	18.93	20.00
		6	0	0	0	3	18.90	18.97	18.70	20.00
	16QAM	1	0	0	0	3	18.86	18.93	18.78	20.00
		1	5	0	0	3	18.85	18.95	18.85	20.00
		3	0	0	0	3	18.87	19.00	18.83	20.00
		3	3	0	0	3	18.95	19.05	19.06	20.00
		5	0	0	0	3	18.84	18.98	18.78	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20000	20175	20350	
10MHz	QPSK	1	0	0	0	7	19.07	19.14	19.03	20.00
		1	5	0	0	7	19.01	18.98	18.99	20.00

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	16QAM	3	0	0	0	7	18.85	18.92	18.83	20.00
		3	3	0	0	7	18.89	19.00	18.95	20.00
		6	0	0	0	7	18.87	18.99	18.75	20.00
		1	0	0	0	7	18.86	18.98	18.78	20.00
		1	5	0	0	7	18.93	19.04	18.97	20.00
		3	0	0	0	7	18.85	19.00	18.77	20.00
		3	3	0	0	7	18.94	19.01	18.95	20.00
		5	0	0	0	7	18.78	18.90	18.79	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20025	20175	20325	
15MHz	QPSK	1	0	0	0	11	19.06	19.13	19.11	20.00
		1	5	0	0	11	19.02	19.05	19.03	20.00
		3	0	0	0	11	18.90	18.94	18.93	20.00
		3	3	0	0	11	18.93	19.04	18.92	20.00
		6	0	0	0	11	18.88	18.92	18.68	20.00
	16QAM	1	0	0	0	11	18.86	18.93	18.84	20.00
		1	5	0	0	11	18.88	19.03	18.98	20.00
		3	0	0	0	11	18.90	18.99	18.73	20.00
		3	3	0	0	11	19.01	19.08	19.01	20.00
		5	0	0	0	11	18.79	18.92	18.86	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20050	20175	20300	
20MHz	QPSK	1	0	0	0	15	19.24	19.38	19.33	20.00
		1	5	0	0	15	19.08	19.18	19.14	20.00
		3	0	0	0	15	18.98	19.06	19.02	20.00
		3	3	0	0	15	19.05	19.11	19.01	20.00
		6	0	0	0	15	19.01	19.09	18.88	20.00
	16QAM	1	0	0	0	15	18.97	19.03	18.94	20.00
		1	5	0	0	15	19.05	19.11	19.03	20.00
		3	0	0	0	15	18.97	19.05	18.90	20.00
		3	3	0	0	15	19.14	19.20	19.12	20.00
		5	0	0	0	15	18.96	19.05	18.96	20.00

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LTE Cat-M1 Band 5							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
1.4MHz	QPSK	1	0	0	0	0	19.26	19.36	19.24	20.00
		1	5	0	0	0	19.28	19.28	19.20	20.00
		3	0	0	0	0	19.19	19.31	19.26	20.00
		3	3	0	0	0	19.01	19.12	19.11	20.00
		6	0	0	0	0	18.22	18.33	18.25	19.00
	16QAM	1	0	0	0	0	19.24	19.26	19.29	20.00
		1	5	0	0	0	19.08	19.13	19.01	20.00
		3	0	0	0	0	18.71	18.64	18.98	19.00
		3	3	0	0	0	18.91	18.94	18.86	19.00
		5	0	0	0	0	18.93	18.96	18.90	19.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20415	20525	20635	
3MHz	QPSK	1	0	0	0	1	19.26	19.31	19.23	20.00
		1	5	0	0	1	19.19	19.23	19.19	20.00
		3	0	0	0	1	19.17	19.28	19.29	20.00
		3	3	0	0	1	19.09	19.11	19.12	20.00
		6	0	0	0	1	18.22	18.25	18.20	20.00
	16QAM	1	0	0	0	1	19.26	19.20	19.20	20.00
		1	5	0	0	1	19.08	19.11	19.05	20.00
		3	0	0	0	1	19.03	19.10	19.06	20.00
		3	3	0	0	1	18.85	18.94	18.87	20.00
		5	0	0	0	1	18.90	19.04	18.89	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20425	20525	20625	
5MHz	QPSK	1	0	0	0	3	19.26	19.35	19.27	20.00
		1	5	0	0	3	19.21	19.30	19.17	20.00
		3	0	0	0	3	19.17	19.24	19.22	20.00
		3	3	0	0	3	19.08	19.16	19.13	20.00
		6	0	0	0	3	18.19	18.32	18.22	20.00
	16QAM	1	0	0	0	3	19.27	19.25	19.30	20.00
		1	5	0	0	3	19.08	19.14	19.07	20.00
		3	0	0	0	3	18.93	19.11	19.02	20.00
		3	3	0	0	3	18.93	18.97	18.87	20.00
		5	0	0	0	3	18.85	19.03	18.94	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	20450	20525	20600	
10MHz	QPSK	1	0	0	0	7	19.38	19.46	19.37	20.00
		1	5	0	0	7	19.33	19.38	19.29	20.00

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		3	0	0	0	7	19.33	19.40	19.35	20.00
		3	3	0	0	7	19.17	19.24	19.19	20.00
		6	0	0	0	7	18.33	18.39	18.32	20.00
	16QAM	1	0	0	0	7	19.33	19.40	19.35	20.00
		1	5	0	0	7	19.17	19.24	19.17	20.00
		3	0	0	0	7	19.09	19.16	19.11	20.00
		3	3	0	0	7	18.99	19.05	18.98	20.00
		5	0	0	0	7	19.00	19.10	19.01	20.00

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LTE Cat-M1 Band 12							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23017	23095	23173	
1.4MHz	QPSK	1	0	0	0	0	19.62	19.71	19.68	20.50
		1	5	0	0	0	19.30	19.49	19.39	20.50
		3	0	0	0	0	18.66	18.85	18.71	20.50
		3	3	0	0	0	18.61	18.68	18.52	20.50
		6	0	0	0	0	17.80	17.86	17.74	19.50
	16QAM	1	0	0	0	0	18.61	18.80	18.68	20.50
		1	5	0	0	0	18.76	18.54	18.77	20.50
		3	0	0	0	0	17.97	18.06	17.86	19.50
		3	3	0	0	0	17.72	17.91	17.80	19.50
		5	0	0	0	0	17.78	17.86	17.67	19.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23025	23095	23165	
3MHz	QPSK	1	0	0	0	1	19.83	19.88	19.71	20.50
		1	5	0	0	1	19.39	19.57	19.41	20.50
		3	0	0	0	1	19.67	19.82	19.56	20.50
		3	3	0	0	1	19.52	19.71	19.58	20.50
		6	0	0	0	1	18.67	18.79	18.73	20.50
	16QAM	1	0	0	0	1	19.46	19.61	19.46	20.50
		1	5	0	0	1	19.54	19.64	19.55	20.50
		3	0	0	0	1	19.10	19.25	19.08	20.50
		3	3	0	0	1	19.27	19.41	19.33	20.50
		5	0	0	0	1	19.18	19.39	19.18	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23035	23095	23155	
5MHz	QPSK	1	0	0	0	3	19.85	19.92	19.90	20.50
		1	5	0	0	3	19.45	19.58	19.46	20.50
		3	0	0	0	3	19.75	19.83	19.56	20.50
		3	3	0	0	3	19.62	19.72	19.57	20.50
		6	0	0	0	3	18.69	18.84	18.82	20.50
	16QAM	1	0	0	0	3	19.55	19.56	19.48	20.50
		1	5	0	0	3	19.57	19.62	19.55	20.50
		3	0	0	0	3	19.07	19.21	19.13	20.50
		3	3	0	0	3	19.32	19.44	19.38	20.50
		5	0	0	0	3	19.21	19.29	19.28	20.50
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23060	23095	23130	
10MHz	QPSK	1	0	0	0	7	19.98	20.05	19.95	20.50
		1	5	0	0	7	19.57	19.72	19.58	20.50

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		3	0	0	0	7	19.81	19.88	19.72	20.50
		3	3	0	0	7	19.68	19.78	19.72	20.50
		6	0	0	0	7	18.80	18.95	18.89	20.50
	16QAM	1	0	0	0	7	19.60	19.69	19.58	20.50
		1	5	0	0	7	19.63	19.74	19.61	20.50
		3	0	0	0	7	19.21	19.36	19.23	20.50
		3	3	0	0	7	19.39	19.52	19.46	20.50
		5	0	0	0	7	19.37	19.44	19.36	20.50

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LTE Cat-M1 Band 13							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23205	23230	23255	
5MHz	QPSK	1	0	0	0	3	20.13	20.22	20.19	21.00
		1	5	0	0	3	20.07	20.14	20.10	21.00
		3	0	0	0	3	20.03	20.12	20.08	21.00
		3	3	0	0	3	19.86	20.03	19.93	21.00
		6	0	0	0	3	19.12	19.26	19.24	21.00
	16QAM	1	0	0	0	3	19.43	19.53	19.45	21.00
		1	5	0	0	3	19.28	19.37	19.29	21.00
		3	0	0	0	3	19.19	19.28	19.21	21.00
		3	3	0	0	3	19.03	19.12	19.04	21.00
		5	0	0	0	3	19.08	19.17	19.09	21.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	23230			
10MHz	QPSK	1	0	0	0	7	/	20.27	/	21.00
		1	5	0	0	7	/	20.12	/	21.00
		3	0	0	0	7	/	20.21	/	21.00
		3	3	0	0	7	/	20.18	/	21.00
		6	0	0	0	7	/	19.32	/	21.00
	16QAM	1	0	0	0	7	/	19.65	/	21.00
		1	5	0	0	7	/	19.44	/	21.00
		3	0	0	0	7	/	19.35	/	21.00
		3	3	0	0	7	/	19.28	/	21.00
		5	0	0	0	7	/	19.33	/	21.00

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LTE Cat-M1 Band 26							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	26697	26865	27033	
1.4MHz	QPSK	1	0	0	0	0	19.29	19.34	19.26	20.00
		1	5	0	0	0	19.23	19.31	19.23	20.00
		3	0	0	0	0	18.30	18.39	18.33	20.00
		3	3	0	0	0	18.25	18.34	18.26	20.00
		6	0	0	0	0	17.55	17.62	17.54	19.00
	16QAM	1	0	0	0	0	18.16	18.24	18.17	20.00
		1	5	0	0	0	18.22	18.31	18.24	20.00
		3	0	0	0	0	17.48	17.58	17.52	19.00
		3	3	0	0	0	17.61	17.71	17.63	19.00
		5	0	0	0	0	17.51	17.59	17.52	19.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	26705	26865	27025	
3MHz	QPSK	1	0	0	0	1	19.38	19.39	19.28	20.00
		1	5	0	0	1	19.09	19.12	19.11	20.00
		3	0	0	0	1	19.13	19.30	19.13	20.00
		3	3	0	0	1	18.97	19.13	19.02	20.00
		6	0	0	0	1	19.23	19.33	19.19	20.00
	16QAM	1	0	0	0	1	19.16	19.22	19.25	20.00
		1	5	0	0	1	19.25	19.35	19.09	20.00
		3	0	0	0	1	19.11	19.11	19.01	20.00
		3	3	0	0	1	18.98	19.14	19.02	20.00
		5	0	0	0	1	19.09	19.15	18.96	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	26715	26865	27015	
5MHz	QPSK	1	0	0	0	3	19.39	19.48	19.33	20.00
		1	5	0	0	3	19.08	19.12	19.14	20.00
		3	0	0	0	3	19.14	19.23	19.09	20.00
		3	3	0	0	3	19.01	19.13	19.07	20.00
		6	0	0	0	3	19.30	19.29	19.18	20.00
	16QAM	1	0	0	0	3	19.23	19.25	19.22	20.00
		1	5	0	0	3	19.24	19.27	19.17	20.00
		3	0	0	0	3	19.02	19.11	18.95	20.00
		3	3	0	0	3	19.03	19.13	19.05	20.00
		5	0	0	0	3	19.14	19.10	18.95	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H	26740	26865	26990	
10MHz	QPSK	1	0	0	0	7	19.35	19.45	19.36	20.00
		1	5	0	0	7	19.03	19.12	19.10	20.00

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		3	0	0	0	7	19.17	19.26	19.15	20.00
		3	3	0	0	7	18.97	19.14	19.06	20.00
		6	0	0	0	7	19.22	19.33	19.27	20.00
	16QAM	1	0	0	0	7	19.22	19.32	19.21	20.00
		1	5	0	0	7	19.26	19.27	19.15	20.00
		3	0	0	0	7	19.04	19.21	18.97	20.00
		3	3	0	0	7	19.05	19.07	19.02	20.00
		5	0	0	0	7	19.12	19.13	18.98	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
15MHz	QPSK	1	0	0	0	11	19.47	19.55	19.44	20.00
		1	5	0	0	11	19.15	19.24	19.20	20.00
		3	0	0	0	11	19.29	19.35	19.22	20.00
		3	3	0	0	11	19.12	19.22	19.16	20.00
		6	0	0	0	11	19.36	19.43	19.33	20.00
	16QAM	1	0	0	0	11	19.28	19.38	19.35	20.00
		1	5	0	0	11	19.32	19.41	19.24	20.00
		3	0	0	0	11	19.17	19.26	19.08	20.00
		3	3	0	0	11	19.13	19.22	19.10	20.00
		5	0	0	0	11	19.19	19.25	19.05	20.00

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LTE Cat-M1 Band 66							Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
1.4MHz	QPSK	1	0	0	0	0	19.32	19.42	19.35	20.00
		1	5	0	0	0	19.22	19.31	19.25	20.00
		3	0	0	0	0	18.27	18.33	18.25	20.00
		3	3	0	0	0	18.14	18.20	18.13	20.00
		6	0	0	0	0	17.04	17.11	17.05	19.00
	16QAM	1	0	0	0	0	18.41	18.49	18.43	20.00
		1	5	0	0	0	18.26	18.35	18.30	20.00
		3	0	0	0	0	17.43	17.49	17.41	19.00
		3	3	0	0	0	17.27	17.15	17.16	19.00
		5	0	0	0	0	17.09	17.17	17.09	19.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
3MHz	QPSK	1	0	0	0	1	19.22	19.36	19.33	20.00
		1	5	0	0	1	18.96	19.02	18.98	20.00
		3	0	0	0	1	19.01	19.09	18.99	20.00
		3	3	0	0	1	18.77	19.03	18.87	20.00
		6	0	0	0	1	18.95	19.02	19.03	20.00
	16QAM	1	0	0	0	1	19.05	19.26	19.13	20.00
		1	5	0	0	1	19.14	19.17	19.10	20.00
		3	0	0	0	1	18.97	19.07	18.90	20.00
		3	3	0	0	1	18.91	18.95	18.81	20.00
		5	0	0	0	1	18.79	18.81	18.75	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
5MHz	QPSK	1	0	0	0	3	19.20	19.34	19.29	20.00
		1	5	0	0	3	18.89	19.01	18.99	20.00
		3	0	0	0	3	19.03	19.14	19.08	20.00
		3	3	0	0	3	18.77	18.99	18.95	20.00
		6	0	0	0	3	18.97	19.01	18.94	20.00
	16QAM	1	0	0	0	3	19.07	19.19	19.13	20.00
		1	5	0	0	3	19.07	19.09	19.03	20.00
		3	0	0	0	3	19.04	18.97	18.93	20.00
		3	3	0	0	3	18.85	18.93	18.83	20.00
		5	0	0	0	3	18.81	18.88	18.71	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
10MHz	QPSK	1	0	0	0	7	19.22	19.38	19.32	20.00
		1	5	0	0	7	18.97	18.99	18.99	20.00

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	16QAM	3	0	0	0	7	18.94	19.10	19.07	20.00
		3	3	0	0	7	18.83	18.96	18.87	20.00
		6	0	0	0	7	18.89	19.07	18.97	20.00
		1	0	0	0	7	19.12	19.27	19.11	20.00
		1	5	0	0	7	19.06	19.11	19.04	20.00
		3	0	0	0	7	18.94	18.98	18.97	20.00
		3	3	0	0	7	18.87	18.89	18.84	20.00
		5	0	0	0	7	18.84	18.85	18.73	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
15MHz	QPSK	1	0	0	0	11	19.31	19.42	19.29	20.00
		1	5	0	0	11	18.98	18.98	18.94	20.00
		3	0	0	0	11	18.97	19.14	19.06	20.00
		3	3	0	0	11	18.76	18.95	18.91	20.00
		6	0	0	0	11	18.94	19.08	18.97	20.00
	16QAM	1	0	0	0	11	19.06	19.19	19.17	20.00
		1	5	0	0	11	19.08	19.14	19.11	20.00
		3	0	0	0	11	18.98	18.96	18.93	20.00
		3	3	0	0	11	18.86	18.86	18.82	20.00
		5	0	0	0	11	18.76	18.81	18.80	20.00
Bandwidth	Modulation	RB size	RB offset	Index			Channel	Channel	Channel	Tune up
				L	M	H				
20MHz	QPSK	1	0	0	0	15	19.33	19.45	19.39	20.00
		1	5	0	0	15	19.04	19.11	19.06	20.00
		3	0	0	0	15	19.09	19.19	19.14	20.00
		3	3	0	0	15	18.89	19.10	19.02	20.00
		6	0	0	0	15	19.03	19.17	19.10	20.00
	16QAM	1	0	0	0	15	19.18	19.34	19.24	20.00
		1	5	0	0	15	19.22	19.25	19.15	20.00
		3	0	0	0	15	19.09	19.12	19.04	20.00
		3	3	0	0	15	18.97	19.02	18.93	20.00
		5	0	0	0	15	18.90	18.95	18.86	20.00

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9.1.2 Conducted Power of BLE

Mode	TX	Frequency	AVG Conducted Output Power (dBm)	Tune Up
	Type	(MHz)	ANT1	
1M	SISO	2402	1.74	3
		2440	1.96	3
		2480	1.62	3
2M	SISO	2402	1.77	3
		2440	1.95	3
		2480	1.68	3

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9.2 Stand-alone SAR test evaluation

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and Product specific 10g SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Freq. Band	Frequency (GHz)	Position	Average Power		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
Bluetooth	2.48	Head	3.00	2.0	0	0.914	3	Y

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:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ 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

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, 5 mm is applied to determine SAR test exclusion.

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}/x] \text{ W/kg}$$
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	$P_{\text{max}}(\text{dBm})$	$P_{\text{max}}(\text{mw})$	Distance(mm)	$f(\text{GHz})$	X	Estimated SAR(W/Kg)
Bluetooth	Handheld	0	2.00	0	2.48	7.5	0.084

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9.3 Measurement of SAR Data

Note:

- 1) Graph results refer to Appendix B.
- 2) Per KDB447498 D01, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - $\leq 0.8\text{W/kg}$ for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is $\leq 100\text{MHz}$.
 - $\leq 0.6\text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
 - $\leq 0.4\text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200\text{ MHz}$.
- 3) Maximum bandwidth does not support at least three non-overlapping channels in certain channel bandwidths. 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.

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9.3.1 SAR Result of LTE Cat-M1 Band 2

LTE Cat-M1 Band 2 SAR Test Record											
Main Ant.											
Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Body Test data(Separate 5mm 1RB)											
Front side	20	QPSK 1_0	18900/1880	1:1	0.244	-0.19	19.82	20.50	1.169	0.285	22.3
Back side	20	QPSK 1_0	18900/1880	1:1	0.168	0.14	19.82	20.50	1.169	0.196	22.3
Left side	20	QPSK 1_0	18900/1880	1:1	0.191	0.11	19.82	20.50	1.169	0.223	22.3
Right side	20	QPSK 1_0	18900/1880	1:1	0.241	-0.08	19.82	20.50	1.169	0.282	22.3
Top side	20	QPSK 1_0	18900/1880	1:1	0.109	0.13	19.82	20.50	1.169	0.127	22.3
Body Test data(Separate 5mm 50%RB)											
Front side	20	QPSK 3_0	18900/1880	1:1	0.238	0.02	19.78	20.50	1.180	0.281	22.3
Back side	20	QPSK 3_0	18900/1880	1:1	0.159	0.08	19.78	20.50	1.180	0.188	22.3
Left side	20	QPSK 3_0	18900/1880	1:1	0.187	-0.01	19.78	20.50	1.180	0.221	22.3
Right side	20	QPSK 3_0	18900/1880	1:1	0.237	-0.08	19.78	20.50	1.180	0.280	22.3
Top side	20	QPSK 3_0	18900/1880	1:1	0.103	-0.17	19.78	20.50	1.180	0.122	22.3

Table 5: SAR of LTE Band 2 for Body.

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9.3.2 SAR Result of LTE Cat-M1 Band 12

LTE Cat-M1 Band 12 SAR Test Record											
Main Ant.											
Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Body Test data(Separate 5mm 1RB)											
Front side	10	QPSK 1_0	23095/707.5	1:1	0.038	-0.03	20.05	20.50	1.109	0.042	22.1
Back side	10	QPSK 1_0	23095/707.5	1:1	0.019	-0.12	20.05	20.50	1.109	0.021	22.1
Left side	10	QPSK 1_0	23095/707.5	1:1	0.026	-0.19	20.05	20.50	1.109	0.029	22.1
Right side	10	QPSK 1_0	23095/707.5	1:1	0.033	0.13	20.05	20.50	1.109	0.037	22.1
Top side	10	QPSK 1_0	23095/707.5	1:1	0.001	-0.11	20.05	20.50	1.109	0.001	22.1
Body Test data(Separate 5mm 50%RB)											
Front side	10	QPSK 3_0	23095/707.5	1:1	0.033	0.01	19.88	20.50	1.153	0.038	22.1
Back side	10	QPSK 3_0	23095/707.5	1:1	0.016	0.19	19.88	20.50	1.153	0.018	22.1
Left side	10	QPSK 3_0	23095/707.5	1:1	0.024	-0.09	19.88	20.50	1.153	0.028	22.1
Right side	10	QPSK 3_0	23095/707.5	1:1	0.031	-0.19	19.88	20.50	1.153	0.036	22.1
Top side	10	QPSK 3_0	23095/707.5	1:1	0.001	0.03	19.88	20.50	1.153	0.001	22.1

Table 6: SAR of LTE Band 12 for Body.

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9.3.3 SAR Result of LTE Cat-M1 Band 13

LTE Cat-M1 Band 13 SAR Test Record											
Main Ant.											
Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(℃)
Body Test data(Separate 5mm 1RB)											
Front side	10	QPSK 1_0	23230/782	1:1	0.051	-0.11	20.27	21.00	1.183	0.060	22.1
Back side	10	QPSK 1_0	23230/782	1:1	0.028	0.08	20.27	21.00	1.183	0.033	22.1
Left side	10	QPSK 1_0	23230/782	1:1	0.042	-0.16	20.27	21.00	1.183	0.050	22.1
Right side	10	QPSK 1_0	23230/782	1:1	0.040	0.12	20.27	21.00	1.183	0.047	22.1
Top side	10	QPSK 1_0	23230/782	1:1	0.001	0.16	20.27	21.00	1.183	0.001	22.1
Body Test data(Separate 5mm 50%RB)											
Front side	10	QPSK 3_0	23230/782	1:1	0.047	0.06	20.21	21.00	1.199	0.056	22.1
Back side	10	QPSK 3_0	23230/782	1:1	0.022	-0.06	20.21	21.00	1.199	0.026	22.1
Left side	10	QPSK 3_0	23230/782	1:1	0.041	-0.13	20.21	21.00	1.199	0.049	22.1
Right side	10	QPSK 3_0	23230/782	1:1	0.037	-0.12	20.21	21.00	1.199	0.044	22.1
Top side	10	QPSK 3_0	23230/782	1:1	0.001	0.19	20.21	21.00	1.199	0.001	22.1

Table 7: SAR of LTE Band 13 for Body.

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9.3.1 SAR Result of LTE Cat-M1 Band 26

LTE Cat-M1 Band 26 SAR Test Record											
Main Ant.											
Test position	BW	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Body Test data(Separate 5mm 1RB)											
Front side	15	QPSK 1_0	26865/831.5	1:1	0.049	-0.03	19.55	20.00	1.109	0.054	22.2
Back side	15	QPSK 1_0	26865/831.5	1:1	0.024	0.09	19.55	20.00	1.109	0.027	22.2
Left side	15	QPSK 1_0	26865/831.5	1:1	0.038	0.11	19.55	20.00	1.109	0.042	22.2
Right side	15	QPSK 1_0	26865/831.5	1:1	0.039	-0.09	19.55	20.00	1.109	0.043	22.2
Top side	15	QPSK 1_0	26865/831.5	1:1	0.001	-0.10	19.55	20.00	1.109	0.001	22.2
Body Test data(Separate 5mm 50%RB)											
Front side	15	QPSK 3_0	26865/831.5	1:1	0.046	0.05	19.35	20.00	1.161	0.053	22.2
Back side	15	QPSK 3_0	26865/831.5	1:1	0.021	0.01	19.35	20.00	1.161	0.024	22.2
Left side	15	QPSK 3_0	26865/831.5	1:1	0.036	0.16	19.35	20.00	1.161	0.042	22.2
Right side	15	QPSK 3_0	26865/831.5	1:1	0.031	0.03	19.35	20.00	1.161	0.036	22.2
Top side	15	QPSK 3_0	26865/831.5	1:1	0.001	0.05	19.35	20.00	1.161	0.001	22.2

Table 8: SAR of LTE Band 26 for Body.

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9.3.2 SAR Result of LTE Cat-M1 Band 66

LTE Cat-M1 Band 66 SAR Test Record											
Main Ant.											
Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.(°C)
Body Test data(Separate 5mm 1RB)											
Front side	20	QPSK 1_0	132322/1745	1:1	0.290	-0.01	19.45	20.00	1.135	0.329	21.9
Back side	20	QPSK 1_0	132322/1745	1:1	0.165	-0.18	19.45	20.00	1.135	0.187	21.9
Left side	20	QPSK 1_0	132322/1745	1:1	0.193	-0.13	19.45	20.00	1.135	0.219	21.9
Right side	20	QPSK 1_0	132322/1745	1:1	0.211	-0.04	19.45	20.00	1.135	0.239	21.9
Top side	20	QPSK 1_0	132322/1745	1:1	0.082	-0.03	19.45	20.00	1.135	0.093	21.9
Body Test data(Separate 5mm 50%RB)											
Front side	20	QPSK 3_0	132322/1745	1:1	0.254	0.09	19.19	20.00	1.205	0.306	21.9
Back side	20	QPSK 3_0	132322/1745	1:1	0.128	0.03	19.19	20.00	1.205	0.154	21.9
Left side	20	QPSK 3_0	132322/1745	1:1	0.189	-0.03	19.19	20.00	1.205	0.228	21.9
Right side	20	QPSK 3_0	132322/1745	1:1	0.205	-0.04	19.19	20.00	1.205	0.247	21.9
Top side	20	QPSK 3_0	132322/1745	1:1	0.078	0.19	19.19	20.00	1.205	0.094	21.9

Table 9: SAR of LTE Band 66 for Body.

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10 Multiple Transmitter Evaluation

10.1.1 Simultaneous SAR SAR test evaluation

- Simultaneous Transmission Possibilities

NO	Simultaneous TX Combination	Body
1	WWAN+BT	Y

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10.1.2 Simultaneous Transmission SAR Summation Scenario

Simultaneous Transmission SAR Summation Scenario for Body:

Test position		SARmax (W/kg)		Summed SAR
		Main Ant	BT	
		1	2	
LTE Band 2	Front side	0.285	0.084	0.369
	Back side	0.196	0.084	0.280
	Left side	0.223	0.084	0.307
	Right side	0.282	0.084	0.366
	Top side	0.127	0.084	0.211
LTE Band 12	Front side	0.042	0.084	0.126
	Back side	0.021	0.084	0.105
	Left side	0.029	0.084	0.113
	Right side	0.037	0.084	0.121
	Top side	0.001	0.084	0.085
LTE Band 13	Front side	0.060	0.084	0.144
	Back side	0.033	0.084	0.117
	Left side	0.050	0.084	0.134
	Right side	0.047	0.084	0.131
	Top side	0.001	0.084	0.085
LTE Band 26	Front side	0.054	0.084	0.138
	Back side	0.027	0.084	0.111
	Left side	0.042	0.084	0.126
	Right side	0.043	0.084	0.127
	Top side	0.001	0.084	0.085
LTE Band 66	Front side	0.329	0.084	0.413
	Back side	0.187	0.084	0.271
	Left side	0.228	0.084	0.312
	Right side	0.247	0.084	0.331
	Top side	0.094	0.084	0.178

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11 Equipment list

Test Platform		SPEAG DASY5 Professional				
Description		SAR Test System (Frequency range 4MHz-7.25GHz)				
Software Reference		DASY52 52.10.4(1527); SEMCAD X 14.6.14(7483)				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	SAM8	1824	NCR	NCR
☒	DAE	SPEAG	DAE4	1484	2024-10-15	2025-10-14
☒	E-Field Probe	SPEAG	EX3DV4	3982	2024-04-29	2025-04-28
	Validation Kits	SPEAG	D750V3	1214	2022-02-07	2025-02-06
☒	Validation Kits	SPEAG	D835V2	4d161	2023-08-25	2026-08-24
☒	Validation Kits	SPEAG	D1750V2	1038	2021-12-16	2024-12-15
☒	Validation Kits	SPEAG	D1950V3	1218	2023-05-04	2026-05-03
☒	Agilent Network Analyzer	Agilent	E5071C	103535	2024-02-04	2025-02-03
☒	Universal Radio Communication Tester	R&S	CMW500	111637	2024-09-12	2025-09-11
☒	Universal Radio Communication Tester	R&S	CMW500	111637	2024-09-12	2025-09-11
☒	DAKS-3.5 probes	SPEAG	DAKS-3.5	1122	NA	NA
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	R&S	SMB100A	182393	2024-02-05	2025-02-04
☒	Preamplifier	Qiji	YX28980933	202104001	NCR	NCR
☒	Power Sensor	Keysight	U2002H	121251	2024-09-13	2025-09-12
☒	Power Sensor	Keysight	U2002H	121251	2024-09-12	2025-09-11
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
☒	Speed reading thermometer	LKM	DTM3000	NA	2024-09-14	2025-09-13
☒	Speed reading thermometer	LKM	DTM3000	NA	2024-09-13	2025-09-12
☒	Humidity and Temperature Indicator	Anymetre	Anymetre 1964	NA	2024-02-18	2025-02-17

Note: All the equipments are within the valid period when the tests are performed.

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12 Calibration certificate

Please see the Appendix C

13 Photographs

Please see the Appendix D

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Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

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