# FCC SAR TEST REPORT

| | |
|---|---|
| **Application No.:** | SUCR2405000162 |
| **Applicant:** | COOSEA GROUP (HK) COMPANY LIMITED |
| **Manufacturer:** | COOSEA GROUP (HK) COMPANY LIMITED |
| **Product Name:** | Smart Phone |
| **Model No.(EUT):** | SN339D-SMT |
| **FCC ID:** | 2A28USN339D |
| **Standards:** | FCC 47CFR §2.1093 |
| **Date of Receipt:** | **2024-05-21** |
| **Date of Test:** | 2024-05-24 to 2024-05-28 |
| **Date of Issue:** | 2024-05-29 |
| **Test conclusion:** | **PASS *** |

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

Authorized Signature:

Well Wei

Well Wei
Wireless Laboratory Manager

# REVISION HISTORY

| Report Number | Revision | Description | Issue Date |
|---|---|---|---|
| SUCR240500016201 | 01 | Original | 2024-05-29 |
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# TEST SUMMARY

| Frequency Band | Maximum Reported SAR(W/kg) | | | |
|---|---|---|---|---|
| | Head | Body-worn | Hotspot | Product specific 10g SAR |
| GSM850 | 0.44 | 0.50 | 0.81 | / |
| GSM1900 | 0.89 | 0.70 | 0.93 | 3.04 |
| WCDMA Band II | 0.79 | 1.04 | 0.81 | 2.24 |
| WCDMA Band V | 0.33 | 0.34 | 0.48 | / |
| LTE Band 2 | 0.99 | 0.88 | 1.11 | 2.70 |
| LTE Band 12(17) | 0.26 | 0.40 | 0.44 | / |
| LTE Band 14 | 0.28 | 0.36 | 0.42 | / |
| LTE Band 26(5) | 0.29 | 0.39 | 0.49 | / |
| LTE Band 30 | 1.20 | 0.92 | 1.16 | 2.72 |
| LTE Band 48 | 0.68 | 0.30 | 0.73 | / |
| LTE Band 66(4) | 1.07 | 0.66 | 0.98 | 2.24 |
| LTE Band 71 | 0.23 | 0.34 | 0.44 | / |
| NR Band n2 | 0.93 | 0.75 | 1.09 | 3.13 |
| NR Band n25 | 1.11 | 1.00 | 1.06 | 3.15 |
| NR Band n26 | 0.41 | 0.36 | 0.68 | / |
| NR Band n30 | 1.13 | 0.94 | 1.03 | 2.67 |
| NR Band n41 | 1.19 | 0.94 | 1.05 | 2.96 |
| NR Band n66 | 1.11 | 0.91 | 0.77 | 2.74 |
| NR Band n70 | 1.18 | 0.62 | 0.99 | / |
| NR Band n71 | 0.35 | 0.51 | 0.64 | / |
| NR Band n48 | 1.12 | 0.59 | 1.08 | 2.89 |
| NR Band n77-3500 | 1.08 | 0.51 | 1.12 | 2.38 |
| NR Band n77-3900 | 1.15 | 1.19 | 1.11 | / |
| WI-FI (2.4GHz) | 0.38 | 0.36 | 0.36 | / |
| WI-FI (5GHz) | 0.38 | 0.34 | 0.35 | 0.73 |
| BT | 0.24 | <0.10 | <0.10 | / |
| SAR Limited(W/kg) | 1.6 | | | 4.0 |
| Maximum Simultaneous Transmission SAR (W/kg) | | | | |
| Scenario | Head | Body-worn | Hotspot | Product specific 10g SAR |
| Sum SAR | 1.52 | 1.55 | 1.51 | 3.88 |
| SPLSR | / | / | / | / |
| SPLSR Limited | 0.04 | | | 0.1 |

Note:
1) According to TCB workshop October,2014 RF Exposure Procedures Update (Overlapping Bands): SAR for LTE Band 5 (Frequency range:824 - 849 MHz)/ LTE Band 17 (Frequency range:704-716 MHz)/LTE Band 38 (Frequency range:2570 - 2620 MHz)/ n78 (Frequency range:3300 - 3800 MHz is respectively covered by LTE Band 26 (Frequency range:814 - 849 MHz)/ LTE Band 12 (Frequency range:699-716 MHz)/LTE Band41 (Frequency range:2496 - 2690 MHz)/ n78 (Frequency range:3300 - 3800 MHz) due to similar frequency range, same maximum tune up limit and same channel bandwidth.
2) For LTE band 4/5/12/13/26 and n7/n41/n66/n77 that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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.
3) According to the manufacturer's statement, perform verification testing in the original report (original report number SUCR240000065AT) and select the worst position of each antenna for verification.

Reviewed by

Nick Hu

Nick Hu

Prepared by

Koller Chen

Koller Chen

CONTENTS

### 1.1.1 DUT Antenna Locations (Back View)

The DUT Antenna Locations (Back View) can refer to Appendix D.

Note:

1) The test device is a smart phone. The overall diagonal dimension of this device is 178.1 mm. Per KDB 648474 D04, because the diagonal distance of this device is ≥160mm, so it is a phablet.
2) Ant 0 is sensor CS0
   Ant 3 is sensor CS3
   Ant 5 is sensor CS2

According to the distance between 5G NR/LTE/WCDMA/GSM&WIFI&BT antennas and the sides of the EUT we can draw the conclusion that:

| EUT Sides for SAR Testing | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | Exposure Condition | Front | Back | Left | Right | Top | Bottom |
| Ant 0 | Hotspot/Product specific 10g SAR | Yes | Yes | Yes | Yes | No | Yes |
| Ant 2 | Hotspot/Product specific 10g SAR | Yes | Yes | Yes | No | Yes | No |
| Ant 3 | Hotspot/Product specific 10g SAR | Yes | Yes | Yes | No | Yes | No |
| Ant 4 | Hotspot/Product specific 10g SAR | Yes | Yes | No | Yes | Yes | No |
| Ant 5 | Hotspot/Product specific 10g SAR | Yes | Yes | No | Yes | Yes | No |

Table 1：EUT Sides for SAR Testing

Note:

1) When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.



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# 2 General Information

## 2.1 Details of Client

| | |
|---|---|
| Applicant: | COOSEA GROUP (HK) COMPANY LIMITED |
| Address: | UNIT 5-6 16/F MULTIFIELD PLAZA 3-7A PRAT AVENUE TSIMSHATSUI KL |
| Manufacturer: | COOSEA GROUP (HK) COMPANY LIMITED |
| Address: | UNIT 5-6 16/F MULTIFIELD PLAZA 3-7A PRAT AVENUE TSIMSHATSUI KL |

## 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 |

## 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

## 2.4 General Description of EUT

| | | | |
|---|---|---|---|
| Device Type : | portable device | | |
| Exposure Category: | uncontrolled environment / general population | | |
| Product Name: | Smart Phone | | |
| Model No.(EUT): | SN339D-SMT | | |
| FCC ID: | 2A28USN339D | | |
| Product Phase: | Identical Prototype | | |
| IMEI: | 1# 354780960002946 | | |
| Hardware Version: | 1.0 | | |
| Software Version: | SN339DD20001 | | |
| Device Operating Configurations : | | | |
| Modulation Mode: | **GSM:** GMSK, 8PSK; **WCDMA:** QPSK,16QAM;<br>**LTE:** QPSK,16QAM,64QAM,256QAM;<br>**5G NR:** DFT-s-OFDM (PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM), CP-OFDM (QPSK, 16QAM, 64QAM, 256QAM)<br>**WIFI:** DSSS, OFDM, OFDMA; **BT:** GFSK, π/4DQPSK,8DPSK | | |
| Device Class: | B | | |
| GPRS Multi-slots Class: | 12 | EGPRS Multi-slots Class: | 12 |
| HSDPA UE Category: | 14 | HSUPA UE Category | 7 |
| DC-HSDPA UE Category: | 24 | | |
| Power Class | 4,tested with power level 5(GSM850) | | |
| | 1,tested with power level 0(GSM1900) | | |
| | 3, tested with power control “all 1”(WCDMA Band) | | |
| | 3, tested with power control Max Power(LTE Band) | | |
| Frequency Bands: | Band | Tx (MHz) | Rx (MHz) |
| | GSM850 | 824~849 | 869~894 |
| | GSM1900 | 1850~1910 | 1930~1990 |
| | WCDMA Band II | 1850~1910 | 1930~1990 |
| | WCDMA Band V | 824~849 | 869~894 |
| | LTE Band 2 | 1850~1910 | 1930~1990 |
| | LTE Band 4 | 1710~1755 | 2110~2155 |
| | LTE Band 5 | 824~849 | 869-894 |
| | LTE Band 12 | 699~716 | 729~746 |
| | LTE Band 14 | 788~798 | 758~768 |
| | LTE Band 17 | 704~716 | 734~746 |
| | LTE Band 26 | 814~849 | 859~894 |
| | LTE Band 30 | 2305~2315 | 2350~2360 |
| | LTE Band 48 | 3550~3700 | 3550~3700 |
| | LTE Band 66 | 1710~1780 | 2110~2200 |
| | LTE Band 71 | 663~698 | 617~652 |
| | NR Band n2 | 1850~1910 | 1930~1990 |
| | NR Band n5 | 824~849 | 869~894 |
| | NR Band n25 | 1850~1915 | 1930~1995 |
| | NR Band n26 | 814~849 | 859~894 |

| | | | |
|---|---|---|---|
| | NR Band n30 | 2305~2315 | 2350~2360 |
| | NR Band n41 | 2496~ 2690 | 2496~269 |
| | NR Band n48 | 3550~3700 | 3550~3700 |
| | NR Band n66 | 1710~1780 | 2110~2200 |
| | NR Band n70 | 1695~1710 | 1995~2020 |
| | NR Band n71 | 663~698 | 617~652 |
| | NR Band n77 | 3450~3550 | 3450~3550 |
| | | 3700~3980 | 3700~3980 |
| | Bluetooth | 2400~2483.5 | 2400~2483.5 |
| | Wi-Fi 2.4G | 2402~2462 | 2402~2462 |
| | Wi-Fi 5G | 5150~5250 | 5150~5250 |
| | | 5250~5350 | 5250~5350 |
| | | 5470~5725 | 5470~5725 |
| | | 5725~5850 | 5725~5850 |
| RF Cable: | ☒ Provided by the aplicant ☐ Provided by the laboratory | | |
| 1# Battery Information: | Model: | BL-A62CT | |
| | Normal Voltage: | 3.87V | |
| | Typical capacity: | 4900mAh | |
| | Manufacturer: | Guangdong Fenghua New Energy Co.,Ltd. | |

Note: *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

Remark:
As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

### 2.4.1 LTE CA additional specification

The device supports downlink and inter-band contiguous uplink LTE Carrier Aggregation (CA). When carrier aggregation applies, implementation and measurement details for the following are necessary.

a) Intra-band and inter-band carrier aggregation requirements for downlink.

The possible downlink and uplink LTE CA combinations supported by this device are as below tables per 3GPP TS 36.101 V15.4.0. The conducted power measurement results of downlink and uplink LTE CA are provided in Appendix E of this report per 3GPP TS 36.521-1 V14.4.0. The downlink LTE CA SAR test is not required since the maximum output power for downlink LTE CA was not more than 0.25dB higher than the maximum output power for without downlink LTE CA.

| 2CC Downlink Carrier Aggregation | 2CC Downlink Carrier Aggregation |
|---|---|
| CA_2A-2A | CA_5A-30A |
| CA_2A-4A | CA_5A-66A |
| CA_2A-5A | CA_12A-30A |
| CA_2A-12A | CA_12A-66A |
| CA_2A-14A | CA_14A-30A |
| CA_2A-29A | CA_14A-66A |
| CA_2A-30A | CA_29A-30A |
| CA_2A-48A | CA_29A-66A |
| CA_2A-66A | CA_30A-66A |
| CA_2A-71A | CA_48C |
| CA_2C | CA_48B |
| CA_4A-4A | CA_48A-66A |
| CA_4A-5A | CA_66C |
| CA_4A-12A | CA_66B |
| CA_4A-71A | CA_66A-66A |
| CA_4A-29A | CA_66A-71A |
| CA_4A-30A | |

b) Intra-band carrier aggregation requirements for uplink.

| 2CC Uplink Carrier Aggregation | 2CC Uplink Carrier Aggregation |
|---|---|
| CA_2A-12A | CA_2A-5A |
| CA_12A-66A | CA_2A-14A |
| CA_4A-12A | CA_5A-66A |


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SAR test procedure for intra-band contiguous UL LTE CA is as below:

1)Maximum output power is measured for each UL CA configuration for the required test channels described in KDB 941225 D05

－UL PCC configuration is determined by the required test channel

－SCC and subsequent CCs are added alternatively to either side of the PCC or within the transmission band for channels at the ends of a frequency band.

2)SAR for UL CA is required in each exposure condition and frequency band combination

3)For this device , as the maximum output for Intra-band uplink LTE CA is ≤ standalone LTE mode (without CA),

- PCC is configured according to the highest standalone SAR configuration tested.

- SCC and subsequent CCs are configured according to procedures used for power measurement and parameters (BW, RB etc.) similar to that used for the PCC

4)When the reported SAR for UL CA configuration, described above, is > 1.2 W/kg, UL CA SAR is also required for all required test channels (PCC based)

5)UL CA SAR is also required for standalone SAR configurations > 1.2 W/kg when they are scaled to the UL CA power level.

c) The device supports Inter-band uplink LTE CA for CA_2A-4A,CA_4A-7A with two component carriers in the uplink.

1. For Inter-band uplink LTE CA SAR, as the existing SAR test system cannot test the multiple different frequency bands simultaneous Transmission SAR at the same time, we suggest that the conservative “max + max” multi-Tx and SAR scaling method can be used to evaluate the inter-band Uplink LTE CA SAR from standalone SAR test results of each LTE component band and the conservative “max + max” multi-Tx method to combine the scaled SAR value from each Inter-band uplink LTE CA component band as the inter-band Uplink LTE CA SAR. All Simultaneous Transmission Scenarios will be evaluated independently in the final SAR report. Since the maximum output power of the LTE Inter-band uplink band is ≤ the LTE Band, the SAR data of the LTE Band is used instead of the SAR data of the LTE Inter-band uplink band.



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### 2.4.2 Power reduction specification

This device uses a single fixed level of power reduction through static table look-up for SAR compliance and it is triggered by a single event or operation.

1) A fixed level power reduction is applied for some frequency bands when hotspot mode becomes active. When the hotspot is disabled, the power value will be recovered.
2) A fixed level power reduction is applied for some frequency bands when handset operate "held to the ear" condition, the power reduction triggered by audio receiver detection. The audio receiver detection is used to determine head or body scenario.
3) The proximity sensor is used to indicate when the device is held close to a user’s body exposure condition. It utilizes the proximity sensor to reduce the output power in specific wireless and operating modes of main antenna to ensure SAR compliance (Refer to section 5.4 for detailed proximity Sensor information and validation data per KDB 616217).

The detailed power reduction information can be referred to Appendix E.

## 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 D01 | 3G SAR Measurement Procedures v03r01 |
| KDB 941225 D05 | SAR for LTE Devices v02r05 |
| KDB 941225 D05A | LTE Rel.10 KDB Inquiry Sheet v01r02 |
| KDB 941225 D06 | Hotspot Mode SAR v02r01 |
| KDB 248227 D01 | SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02 |
| KDB 648474 D04 | Handset SAR v01r03 |
| KDB 447498 D01 | General RF Exposure Guidance v06 |
| 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 |
| KDB 616217 D04 | SAR for laptop and tablets v01r02 |

## 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.)

# 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.<br>Reflection of surrounding objects is minimized and in compliance with requirement of standards. | |

Table 2：The Ambient Conditions

# 4 SAR Measurements System Configuration

## 4.1 The SAR Measurement System

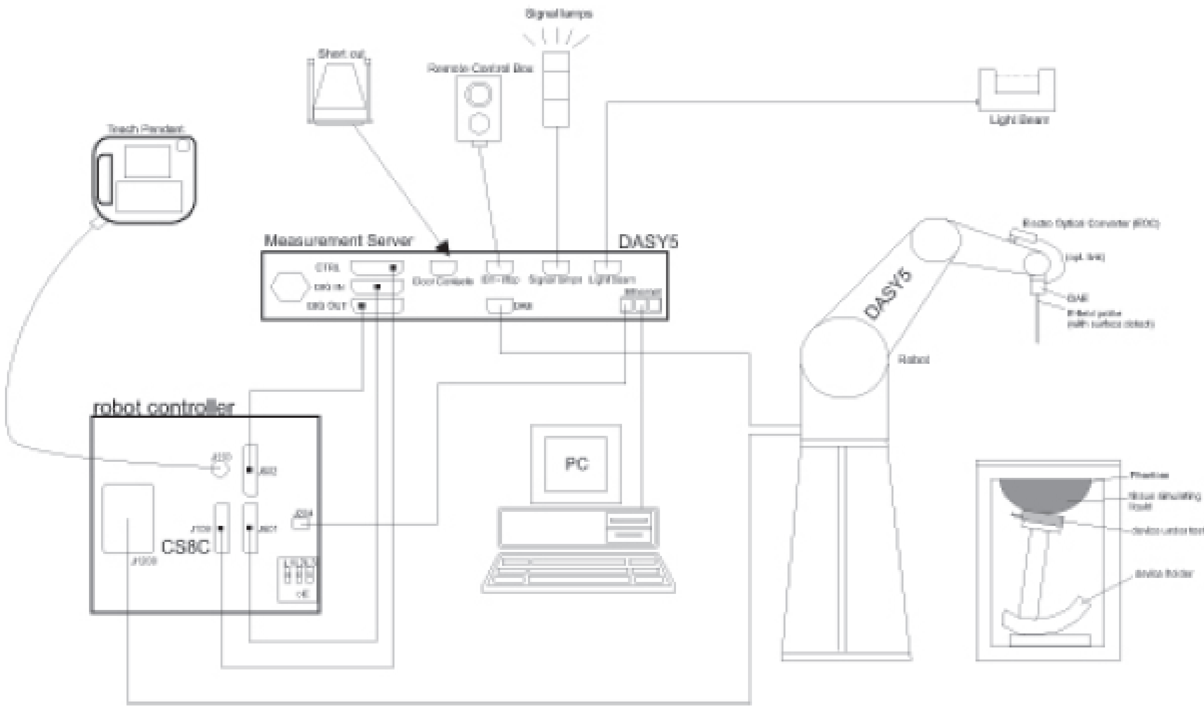
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the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




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.

## 4.2 Isotropic E-field Probe EX3DV4

| | |
|---|---|
|  | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| **Calibration** | ISO/IEC 17025 calibration service available. |
| **Frequency** | 10 MHz to > 6 GHz<br>Linearity: ± 0.2 dB (30 MHz to 6 GHz) |
| **Directivity** | ± 0.3 dB in TSL (rotation around probe axis)<br>± 0.5 dB in TSL (rotation normal to probe axis) |
| **Dynamic Range** | 10 µW/g to > 100 mW/g<br>Linearity: ± 0.2 dB (noise: typically < 1 µW/g) |
| **Dimensions** | Overall length: 337 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>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 |

## 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<br>Width: 500 mm<br>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.



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## 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<br>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 ε=3 and loss tangent δ=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

## 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≤2GHz), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points (f≤2GHz), 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.

<table>
<tr><td colspan="3"></td><td>$\leq$ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: $\Delta x_{Area}$, $\Delta y_{Area}$</td><td>$\leq$ 2 GHz: $\leq$ 15 mm<br>2 – 3 GHz: $\leq$ 12 mm</td><td>3 – 4 GHz: $\leq$ 12 mm<br>4 – 6 GHz: $\leq$ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: $\Delta x_{Zoom}$, $\Delta y_{Zoom}$</td><td>$\leq$ 2 GHz: $\leq$ 8 mm<br>2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*<br>4 – 6 GHz: $\leq$ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm<br>4 – 5 GHz: $\leq$ 3 mm<br>5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm<br>4 – 5 GHz: $\leq$ 2.5 mm<br>5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm<br>4 – 5 GHz: $\geq$ 25 mm<br>5 – 6 GHz: $\geq$ 22 mm</td></tr>
</table>

## 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. ± 5 %

### 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 Vi = compensated signal of channel i ( i = x, y, z )
Ui = 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:

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

H-field probes:

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

With Vi = 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
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = 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.

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g
Etot = 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.

$$P_{pwe} = E_{tot}{}^2{}_2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}{}^2 \cdot 37.7$$

with Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m

# 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 (~ 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.

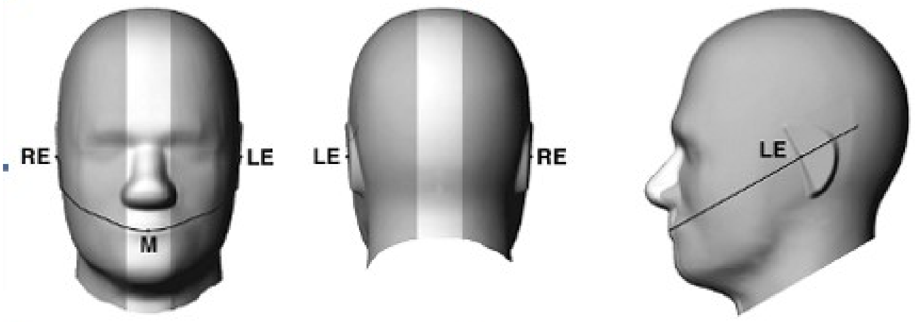
## 5.2 SAR measurement uncertainty

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.

# 6 Description of Test Position

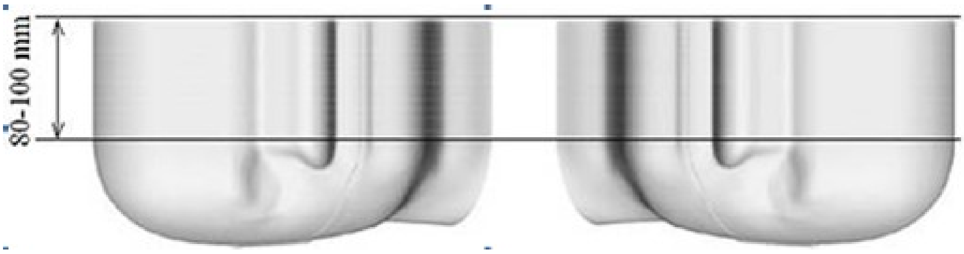
## 6.1 Head Exposure Condition

### 6.1.1 SAM Phantom Shape

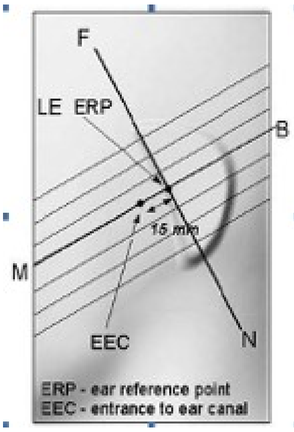


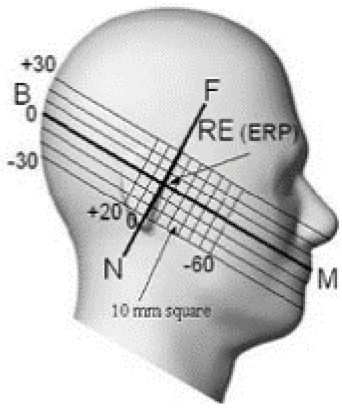

F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

Note: The centre strip including the nose region has a different thickness tolerance.




F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

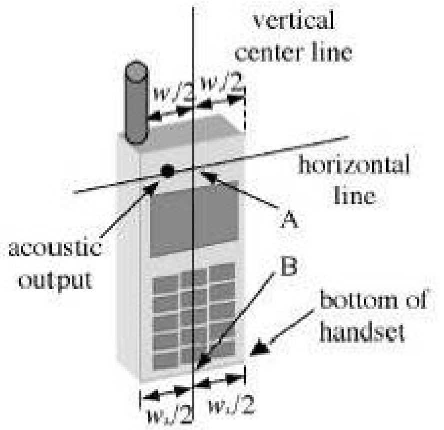


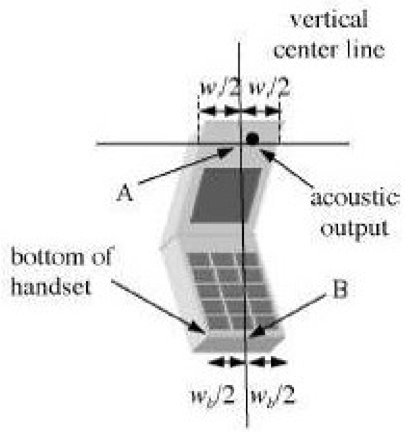

F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

### 6.1.2 EUT constructions




F-7. Handset vertical and horizontal reference lines-“fixed case”




F-8. Handset vertical and horizontal reference lines-“clam-shell case”

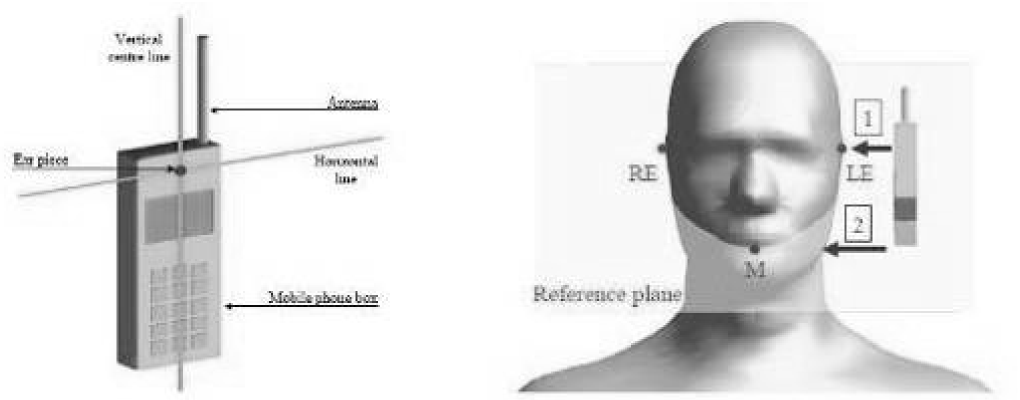
### 6.1.3 Definition of the “cheek” position

a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE.

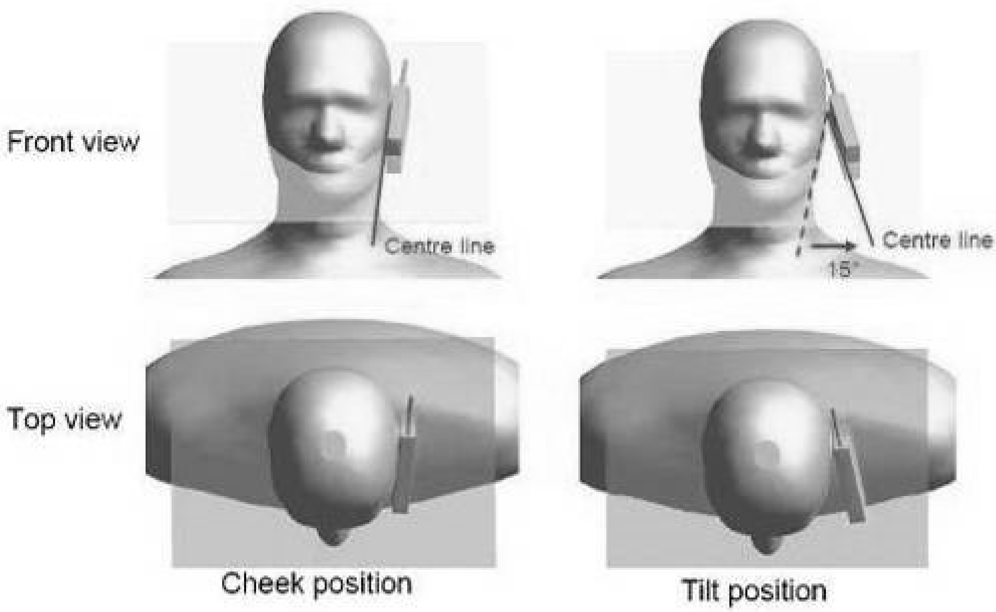
b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

### 6.1.4 Definition of the "tilted" position

a) Position the device in the "cheek" position described above;
b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.




F-9. **Definition of the reference lines and points, on the phone and on the phantom and initial position**




F-10. **"Cheek" and "tilt" positions of the mobile phone on the left side**

## 6.2 Body Exposure Condition

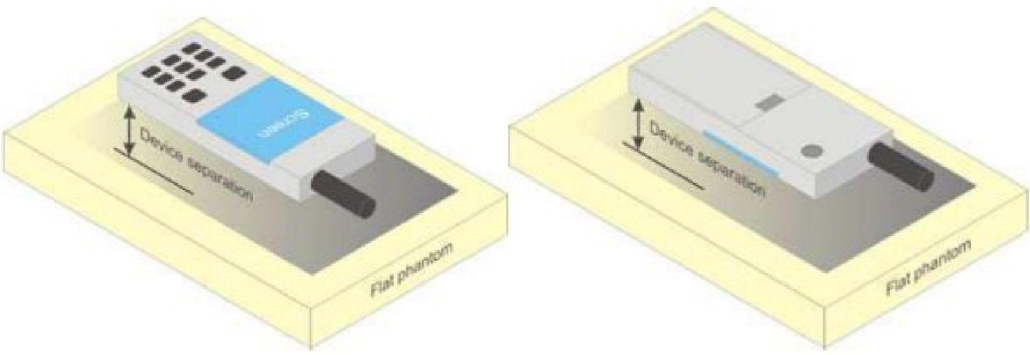
### 6.2.1 Body-worn accessory exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.




F-11. **Test positions for body-worn devices**

### 6.2.2 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

## 6.3 Extremity exposure conditions

Per FCC KDB 648474 D04, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as “Phablet”.

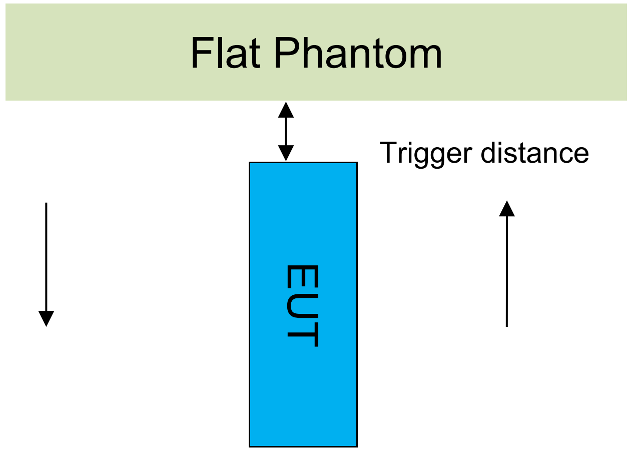
The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for Product Specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, Product Specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

Due to the SAR result, hotspot power levels, and product specific 10g SAR power levels are the same， no frequency bands need to test with 0mm for the Product Specific 10-g SAR are not required.

## 6.4 Proximity Sensor Triggering Test

**Proximity sensor triggering distances:**

The Proximity sensor triggering was applied to WWAN antenna. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed.

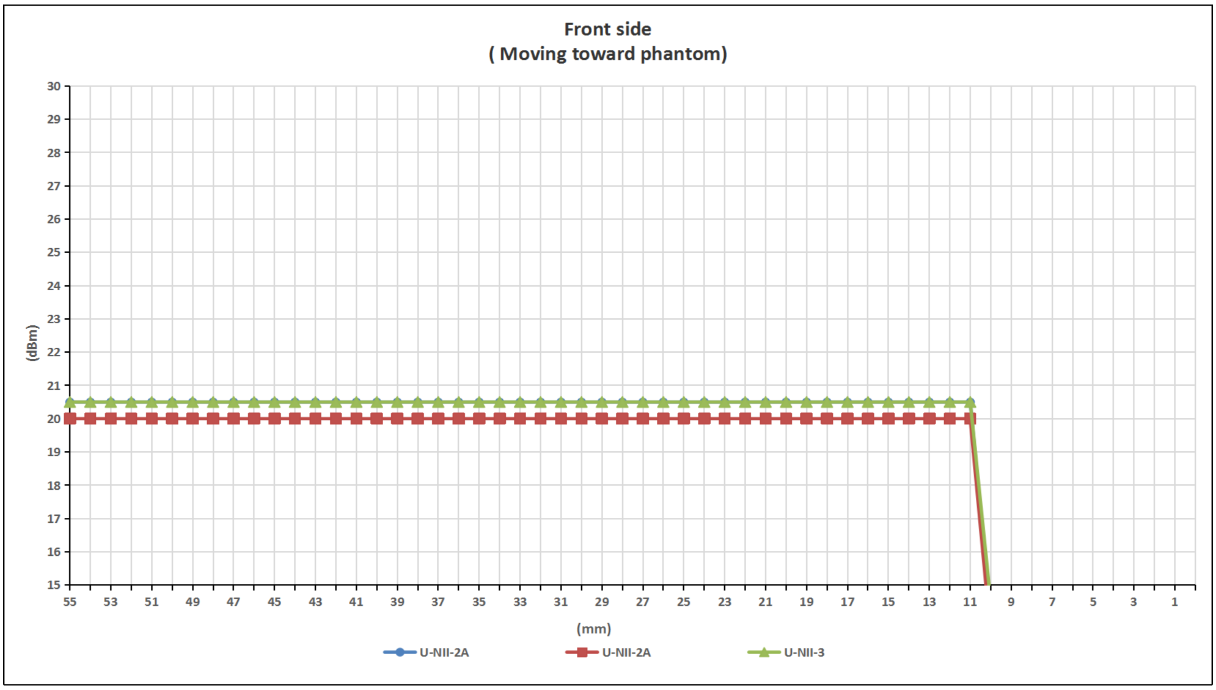


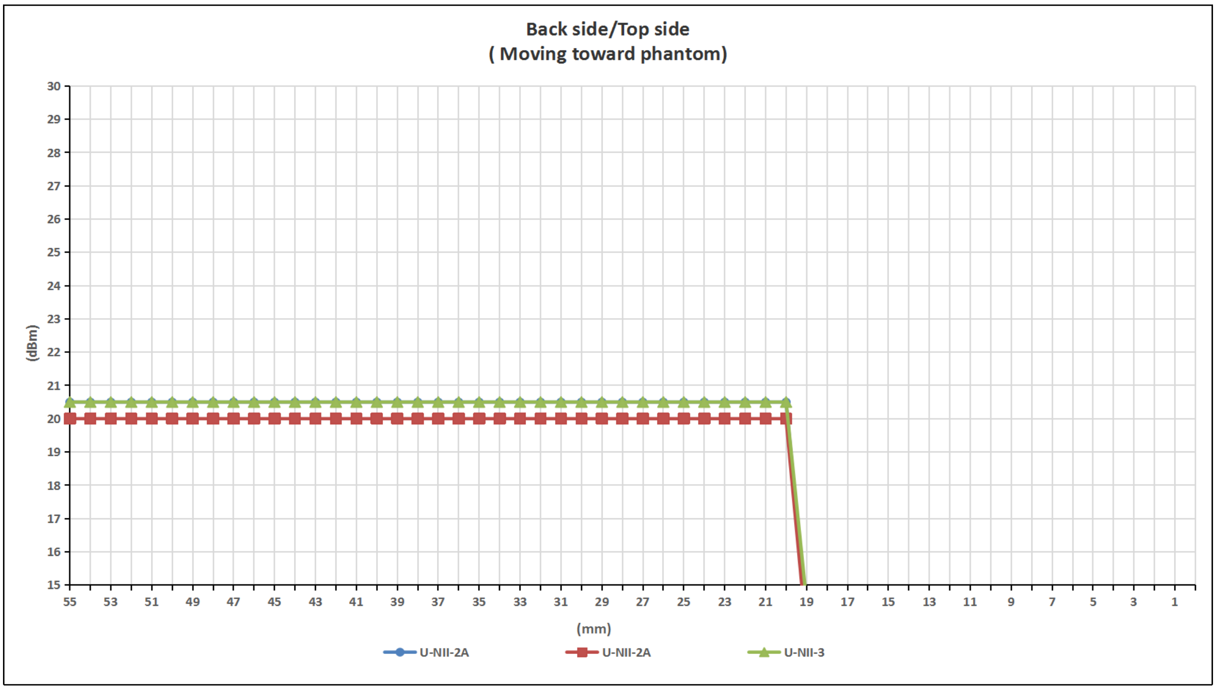

| Proximity Sensor Triggering Distance(mm) | | | | |
|---|---|---|---|---|
| Ant5 | | | | |
| Position | Front | Back | Right Side | Top Side |
| Minimum | 10 | 19 | 17 | 19 |
| Required SAR Test | 9 | 18 | 16 | 18 |
| Ant3 | | | | |
| Position | Front | Back | Top Side | |
| Minimum | 6 | 19 | 18 | |
| Required SAR Test | 5 | 18 | 17 | |

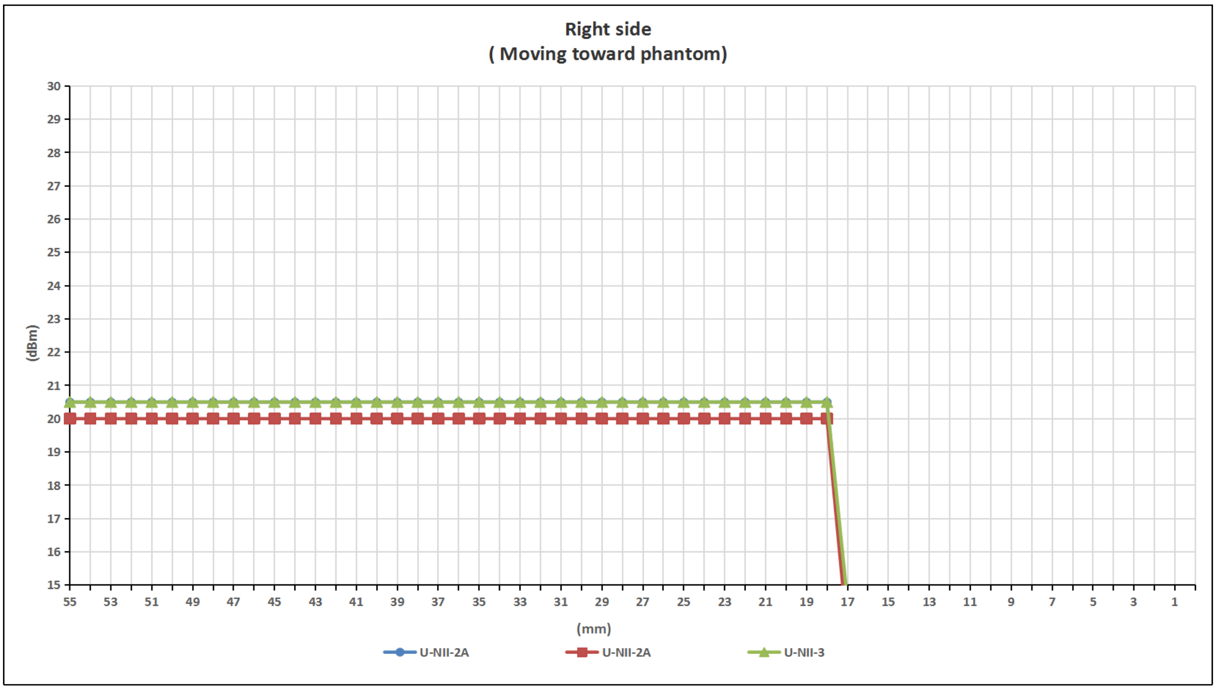
Note:

SAR tests with proximity sensor power reduction are only required for the sides of frequency bands in the table above. For the other sides or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off.

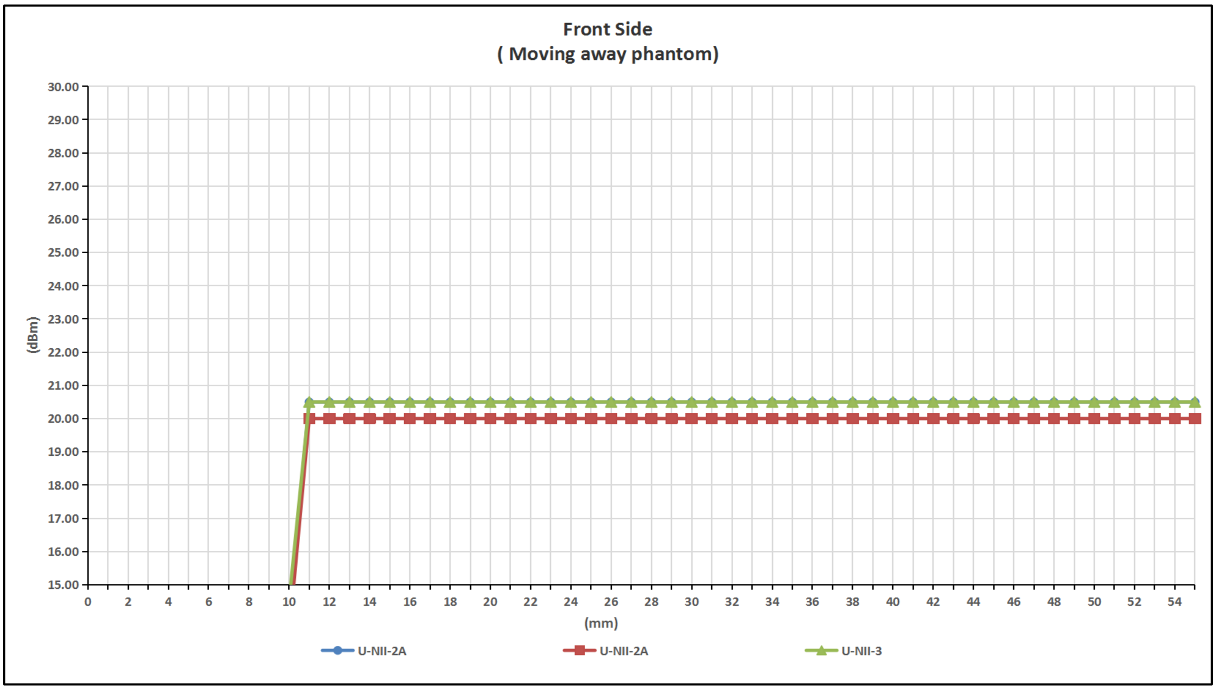
- Ant 5 DUT Moving Toward(Trigger)the Phantom

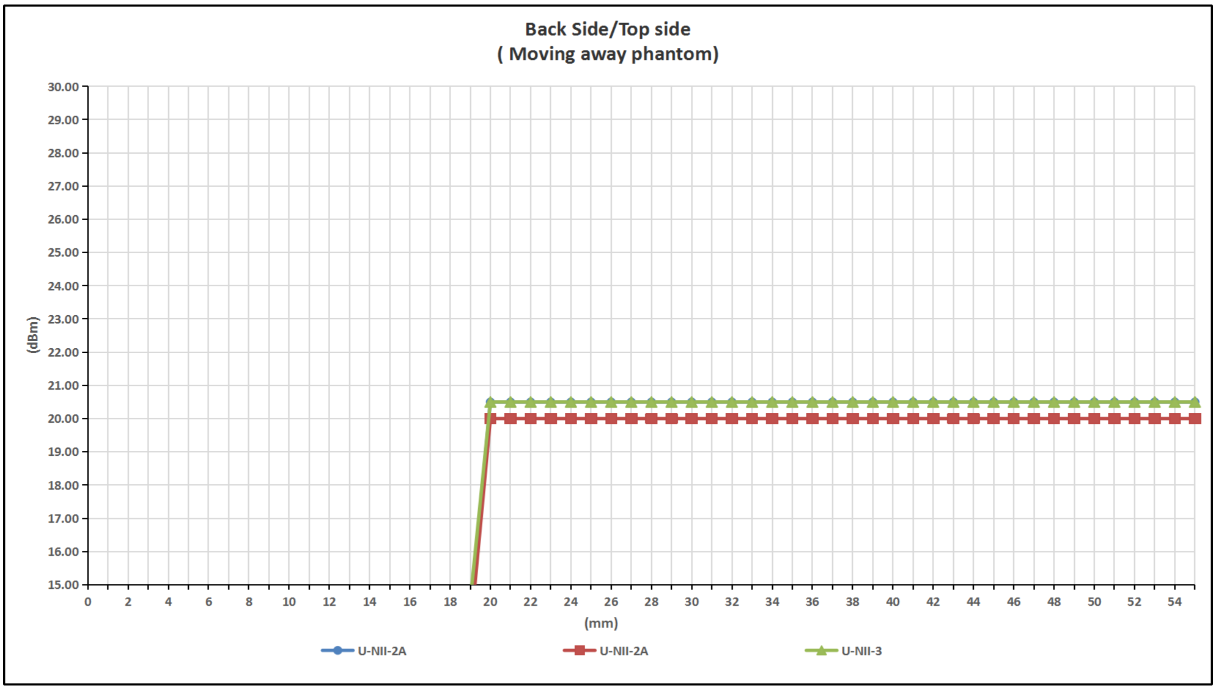


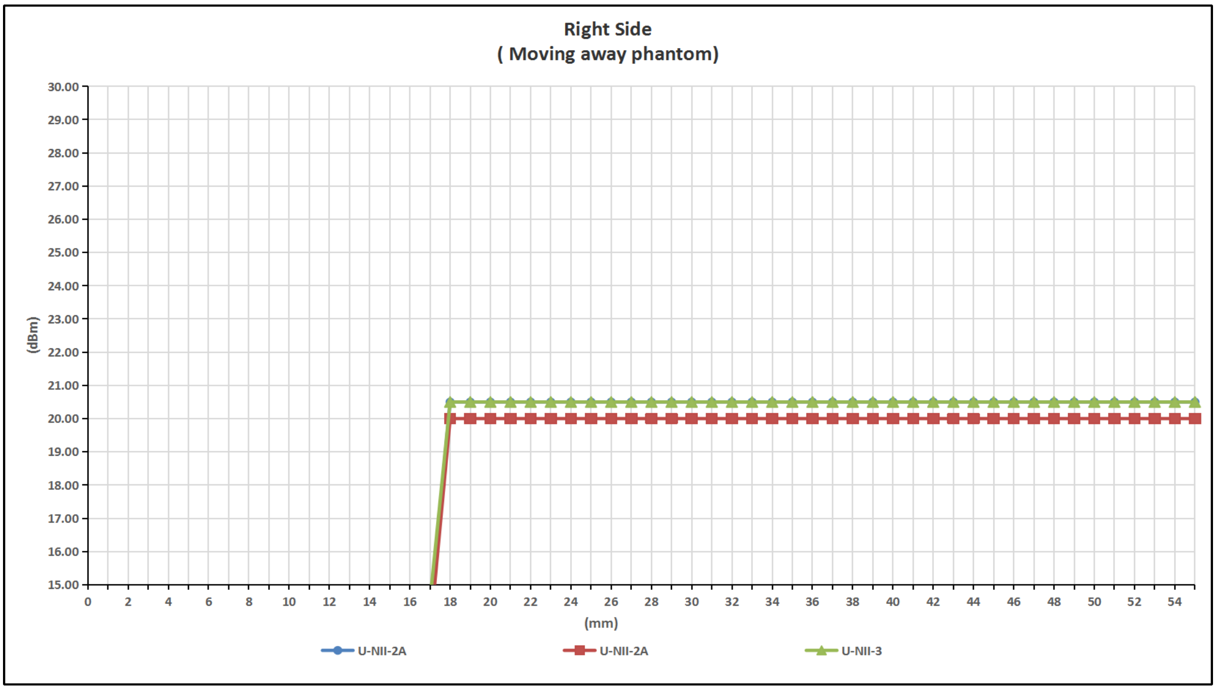





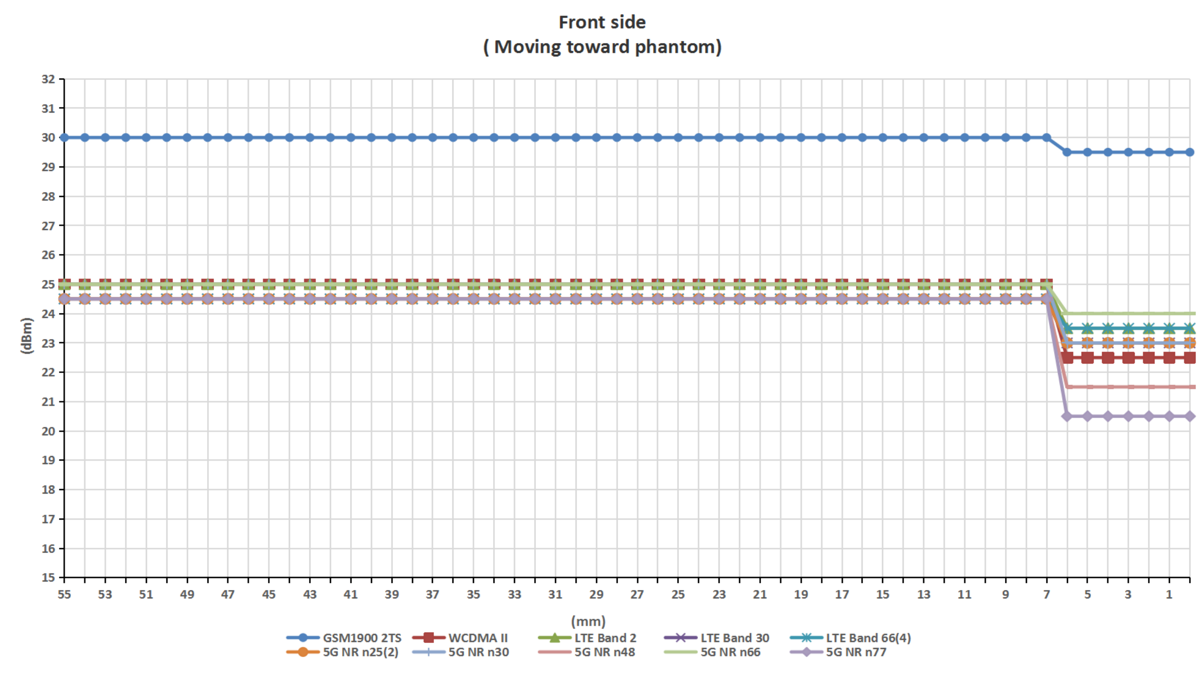

- Ant 5 DUT Moving Away(Release) from the Phantom

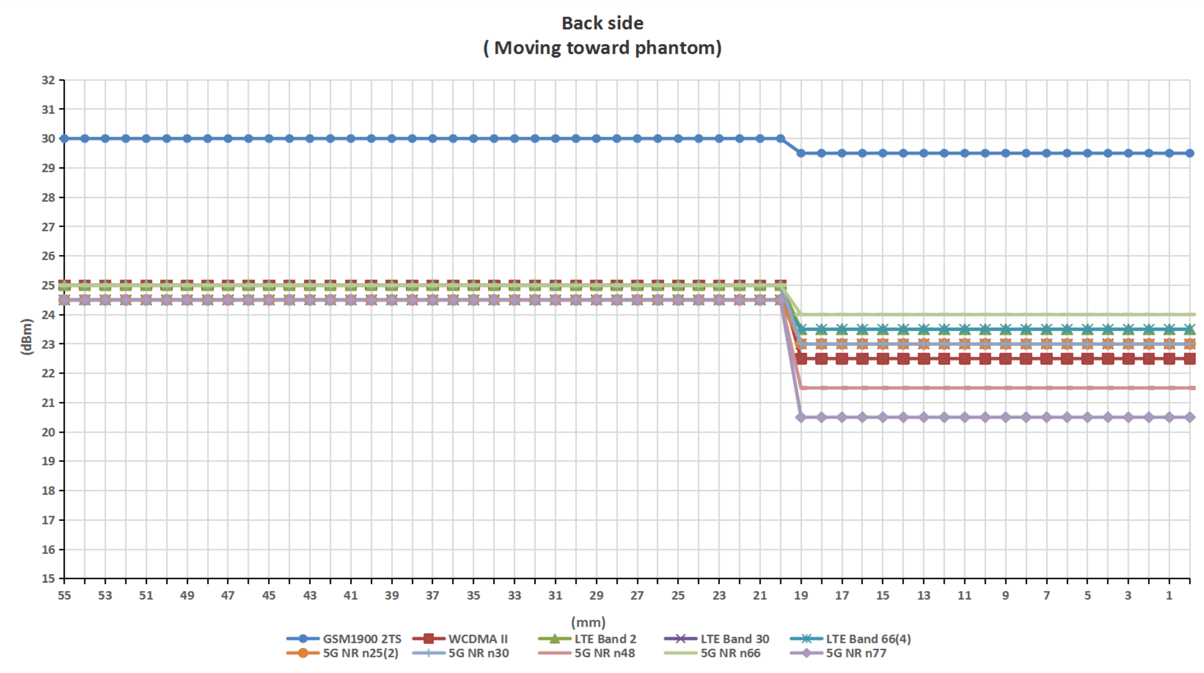


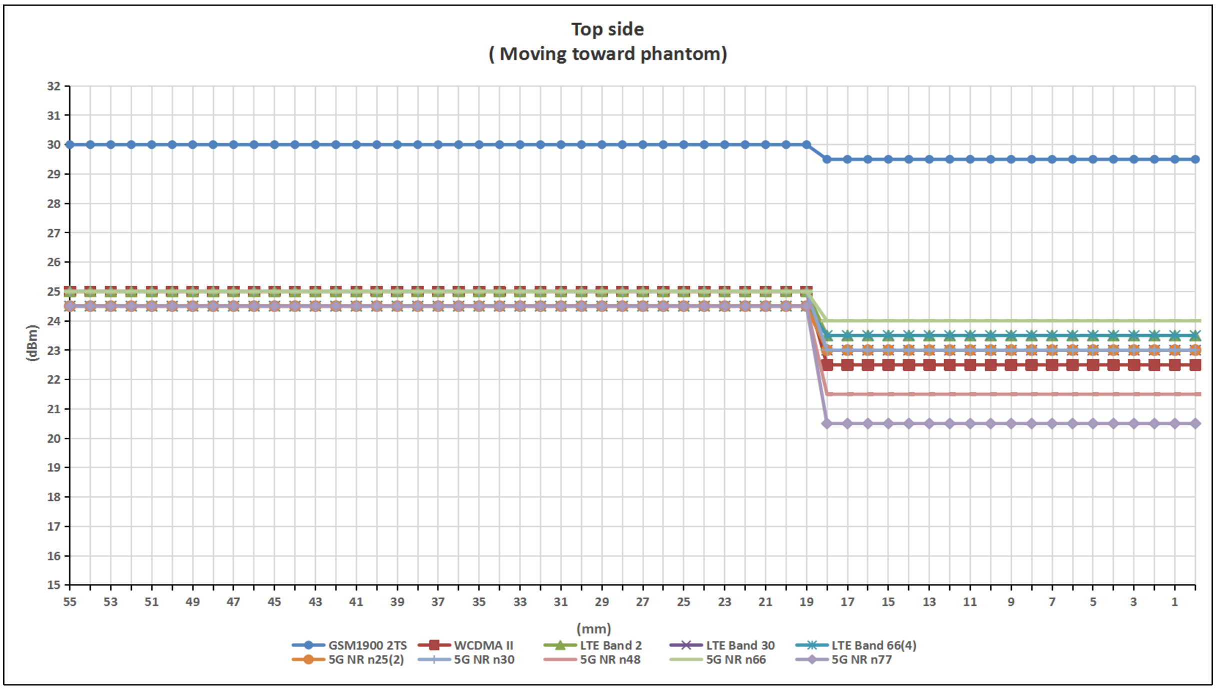

Back Side/Top side
( Moving away phantom)
(dBm)
(mm)
U-NII-2A
U-NII-2A
U-NII-3


Right Side
( Moving away phantom)
(dBm)
(mm)
U-NII-2A
U-NII-2A
U-NII-3

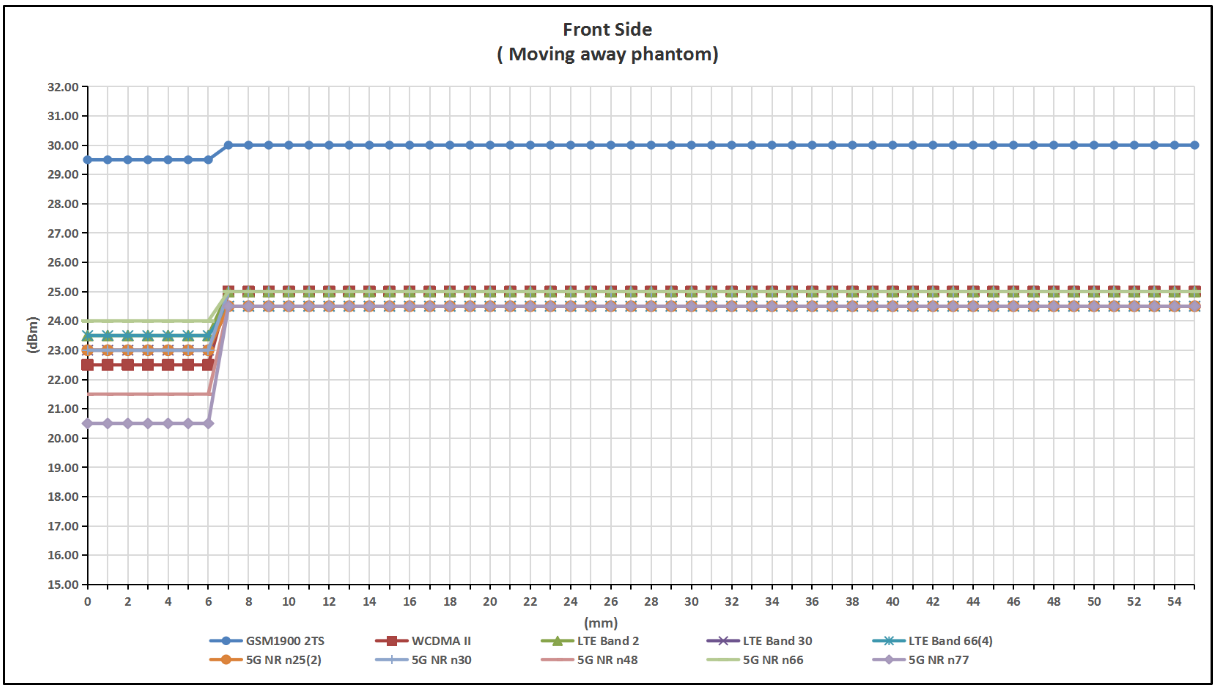
- Ant 3 DUT Moving Toward(Trigger)the Phantom

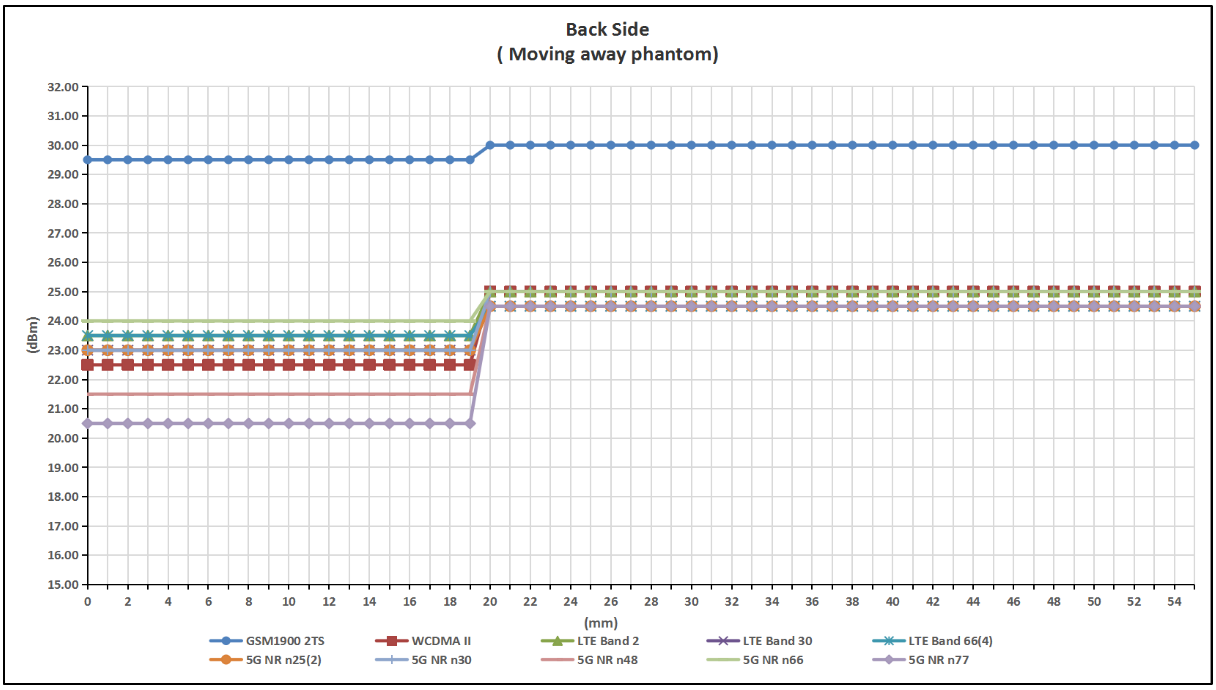


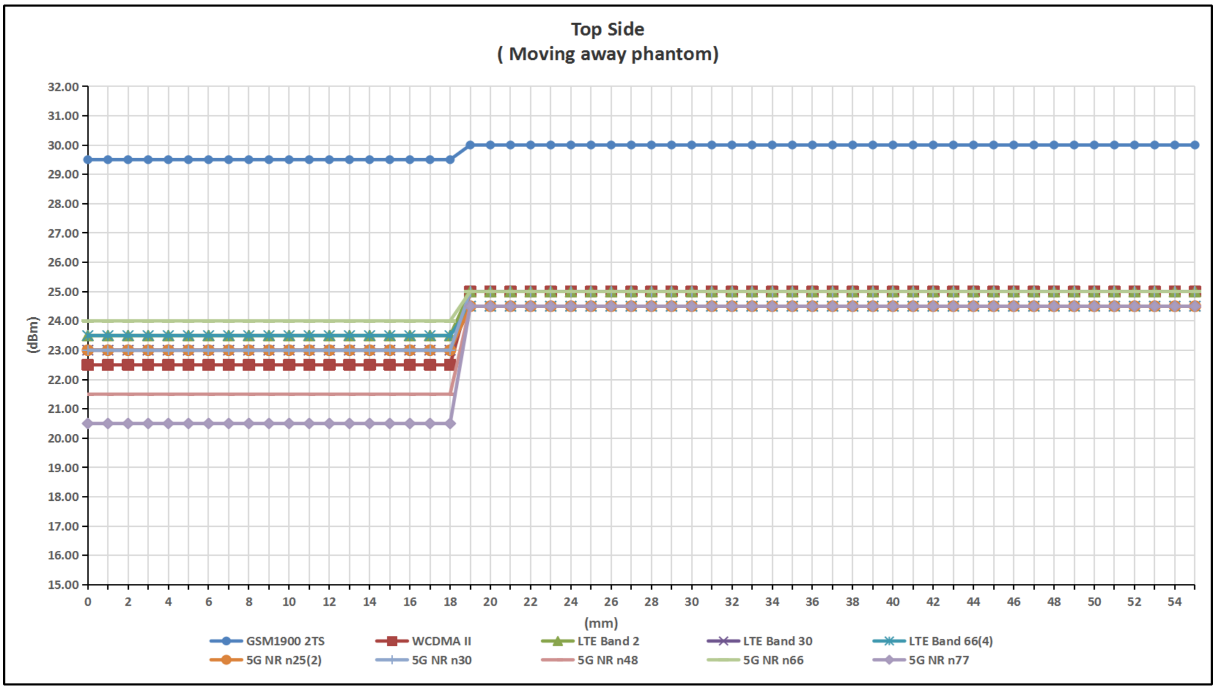



- Ant 3 DUT Moving Away(Release) from the Phantom





Back Side
( Moving away phantom)
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
(dBm)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54
(mm)
GSM1900 2TS
WCDMA II
LTE Band 2
LTE Band 30
LTE Band 66(4)
5G NR n25(2)
5G NR n30
5G NR n48
5G NR n66
5G NR n77

Top Side
( Moving away phantom)
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
(dBm)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54
(mm)
GSM1900 2TS
WCDMA II
LTE Band 2
LTE Band 30
LTE Band 66(4)
5G NR n25(2)
5G NR n30
5G NR n48
5G NR n66
5G NR n77

## Proximity sensor coverage

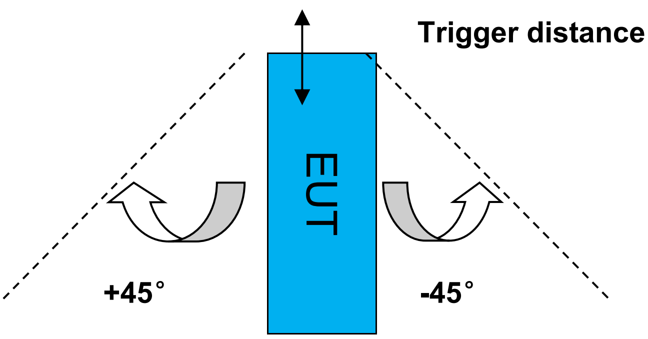
If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and "along the direction of maximum antenna and sensor offset".

The proximity sensor and main antenna use same metallic electrode, so there is no spatial offset.

## Device tilt angle influences to proximity sensor triggering

The influence of device tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom.

Rotating the tablet around the edge next to the phantom in ≤ 10° increments until the tablet is ± 45° from the vertical position at 0°, and the maximum output power remains in the reduced mode.




| Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering for Top Side | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Band (MHz) | Minimum trigger distance Per KDB616217§6.2 | Minimum trigger distance at which power reduction was maintained over ±45° | Power Reduction Status | | | | | | | | | | |
| | | | -45° | -35° | -25° | -15° | -5° | 0° | 5° | 15° | 25° | 35° | 45° |
| Ant5 | Top side:19mm | Top side:19mm | on | on | on | on | on | on | on | on | on | on | on |
| Ant3 | Top side:18mm | Top side:18mm | on | on | on | on | on | on | on | on | on | on | on |

# 7 SAR System Verification Procedure

## 7.1 Tissue Simulate Liquid

### 7.1.1 Recipes for Tissue Simulate Liquid

The bellowing 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
Sucrose: 98⁺% Pure Sucrose
Water: De-ionized, 16 MΩ⁺ resistivity
HEC: Hydroxyethyl Cellulose
Tween: Polyoxyethylene (20) sorbitan monolaurate

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 3：Recipe of Tissue Simulate Liquid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### 7.1.2 Measurement for Tissue Simulate Liquid

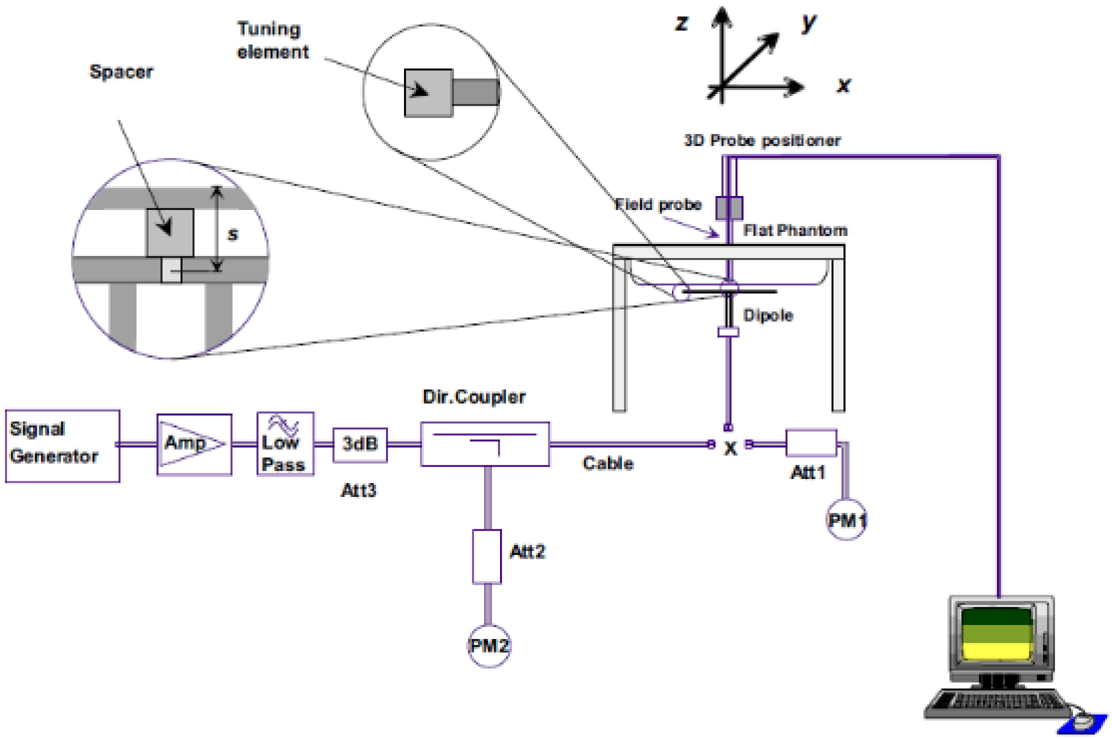
The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

| Measurement for Tissue Simulate Liquid | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tissue Type | Measured Frequency (MHz) | Target Tissue (±5%) | | Measured Tissue | | Liquid Temp. | Test Date |
| | | $\varepsilon_r$ | σ(S/m) | $\varepsilon_r$ | σ(S/m) | (℃) | |
| 750 Head | 750 | 41.9 (39.81~44) | 0.89 (0.85~0.94) | 41.780 | 0.887 | 22.8 | 2024/5/24 |
| 835 Head | 835 | 41.5 (39.43~43.58) | 0.90 (0.86~0.95) | 42.025 | 0.907 | 22.8 | 2024/5/24 |
| 1950 Head | 1950 | 40.0 (38.00~42.00) | 1.40 (1.33~1.47) | 38.645 | 1.408 | 22.9 | 2024/5/25 |
| 2300 Head | 2300 | 39.5 (37.53~41.48) | 1.67 (1.59~1.75) | 38.550 | 1.683 | 23.1 | 2024/5/25 |
| 2450 Head | 2450 | 39.20 (37.24~41.16) | 1.80 (1.71~1.89) | 38.504 | 1.819 | 23.0 | 2024/5/26 |
| 2600 Head | 2600 | 39.0 (37.05~40.95) | 1.96 (1.86~2.06) | 38.194 | 2.028 | 23.0 | 2024/5/26 |
| 3500 Head | 3500 | 37.9 (36.01~39.8) | 2.91 (2.76~3.06) | 38.320 | 3.021 | 23.0 | 2024/5/27 |
| 3700 Head | 3700 | 37.7 (35.82~39.59) | 3.12 (2.96~3.28) | 37.700 | 3.257 | 23.0 | 2024/5/27 |
| 3900 Head | 3900 | 37.5 (35.63~39.38) | 3.32 (3.15~3.49) | 37.083 | 3.484 | 23.0 | 2024/5/27 |
| 5250 Head | 5250 | 35.9 (34.11~37.70) | 4.66 (4.47~4.95) | 35.503 | 4.706 | 23.0 | 2024/5/28 |

Table 4: Measurement result of Tissue electric parameters.

## 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 +/- 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±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 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-12. the microwave circuit arrangement used for SAR system check

### 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.

### 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 ±10% ) | | Liquid Temp. (℃) | 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 | 2.17 | 1.42 | 8.68 | 5.68 | 8.48 | 5.56 | 2.36% | 2.16% | 22.8 | 2024/5/24 |
| D835V2 | Head | 2.53 | 1.64 | 10.12 | 6.56 | 9.52 | 6.17 | 6.30% | 6.32% | 22.8 | 2024/5/24 |
| D1950V3 | Head | 10.70 | 5.49 | 42.80 | 21.96 | 39.70 | 20.30 | 7.81% | 8.18% | 22.9 | 2024/5/25 |
| D2300V2 | Head | 12.7 | 6.09 | 50.80 | 24.36 | 48.70 | 23.30 | 4.31% | 4.55% | 23.1 | 2024/5/25 |
| D2450V2 | Head | 12.50 | 5.58 | 50.00 | 22.32 | 52.20 | 24.50 | -4.21% | -8.90% | 23.0 | 2024/5/26 |
| D2600V2 | Head | 14.50 | 6.48 | 58.00 | 25.92 | 57.10 | 25.40 | 1.58% | 2.05% | 23.0 | 2024/5/26 |
| Validation Kit | | Measured SAR 100mW | Measured SAR 100mW | Measured SAR (normalized to 1W) | Measured SAR (normalized to 1W) | Target SAR (normalized to 1W) | Target SAR (normalized to 1W) | Deviation (Within ±10% ) | | Liquid Temp. (℃) | 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) | | |
| D3500V2 | Head(3.5GHz) | 6.45 | 2.45 | 64.50 | 24.50 | 66.60 | 24.90 | -3.15% | -1.61% | 23.0 | 2024/5/27 |
| D3700V2 | Head(3.7GHz) | 6.39 | 2.34 | 63.90 | 23.40 | 68.00 | 24.60 | -6.03% | -4.88% | 23.0 | 2024/5/27 |
| D3900V2 | Head(3.9GHz) | 7.54 | 2.50 | 75.40 | 25.00 | 69.70 | 24.00 | 8.18% | 4.17% | 23.0 | 2024/5/27 |
| D5GHzV2 | Head(5.25GHz) | 7.20 | 2.05 | 72.00 | 20.50 | 78.00 | 21.80 | -7.69% | -5.96% | 23.0 | 2024/5/28 |

Table 5：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 3G SAR Test Reduction Procedure

According to KDB 941225D01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

## 8.2 Operation Configurations

### 8.2.1 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a base station by air link. Using CMW500 the power lever is set to “5”and “0” in SAR of GSM 850 and GSM 1900. The tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 33 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 33 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

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

The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode

### 8.2.2 WCDMA Test Configuration

**1）. Output Power Verification**

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1’s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

**2）. Head SAR**

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure

**3）. Body SAR**

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreaing code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

**4）. HSDPA / HSUPA / DC-HSDPA**

According to KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA

**a) HSDPA**

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) are set according to values indicated in the following table The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

| Sub-test | βc | Bd | βd(SF) | βc/βd | βhs | CM(dB) | MPR (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 0.0 | 0 |
| 2 | 12/15(3) | 15/15(3) | 64 | 12/15(3) | 24/15 | 1.0 | 0 |
| 3 | 15/15 | 8/15 | 64 | 15/8 | 30/15 | 1.5 | 0.5 |
| 4 | 15/15 | 4/15 | 64 | 15/4 | 30/15 | 1.5 | 0.5 |

Note1: △ACK, △NACK and △CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc
Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, △ACK and △NACK= 8 ( Ahs=30/15) with βhs=30/15*βc,and △CQI= 7 ( Ahs=24/15) with βhs=24/15*βc.
Note3: CM=1 forβc/βd =12/15, βhs/βc=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

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

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

Table 6：settings of required H-Set 1 QPSK acc. to 3GPP 34.121

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

Table 7：HSDPA UE category

**b) HSUPA**

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

| Sub-test | $\beta_c$ | $\beta_d$ | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{hs}$ (1) | $\beta_{ec}$ | $\beta_{ed}$ | $\beta_{ec}$ (SF) | $\beta_{ed}$ (code) | CM(2) (dB) | MPR (dB) | AG(4) Index | E-TFCI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11/15(3) | 15/15(3) | 64 | 11/15(3) | 22/15 | 209/225 | 1039/225 | 4 | 1 | 1.0 | 0.0 | 20 | 75 |
| 2 | 6/15 | 15/15 | 64 | 6/15 | 12/15 | 12/15 | 94/75 | 4 | 1 | 3.0 | 2.0 | 12 | 67 |
| 3 | 15/15 | 9/15 | 64 | 15/9 | 30/15 | 30/15 | $\beta_{ed1}$:47/15<br>$\beta_{ed2}$:47/15 | 4 | 2 | 2.0 | 1.0 | 15 | 92 |
| 4 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 2/15 | 56/75 | 4 | 1 | 3.0 | 2.0 | 17 | 71 |
| 5 | 15/15(4) | 15/15(4) | 64 | 15/15(4) | 30/15 | 24/15 | 134/15 | 4 | 1 | 1.0 | 0.0 | 21 | 81 |

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

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

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

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

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

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

Table 8: Subtests for UMTS Release 6 HSUPA

| UE E-DCH Category | Maximum E-DCH Codes Transmitted | Number of HARQ Processes | E-DCH TTI(ms) | Minimum Speading Factor | Maximum E-DCH Transport Block Bits | Max Rate (Mbps) |
|---|---|---|---|---|---|---|
| 1 | 1 | 4 | 10 | 4 | 7110 | 0.7296 |
| 2 | 2 | 8 | 2 | 4 | 2798 | 1.4592 |
| | 2 | 4 | 10 | 4 | 14484 | |
| 3 | 2 | 4 | 10 | 4 | 14484 | 1.4592 |
| 4 | 2 | 8 | 2 | 2 | 5772 | 2.9185 |
| | 2 | 4 | 10 | 2 | 20000 | 2.00 |
| 5 | 2 | 4 | 10 | 2 | 20000 | 2.00 |
| 6 (No DPDCH) | 4 | 8 | 10 | 2SF2&2SF4 | 11484 | 5.76 |
| | 4 | 4 | 2 | | 20000 | 2.00 |
| 7 (No DPDCH) | 4 | 8 | 2 | 2SF2&2SF4 | 22996 | ? |
| | 4 | 4 | 10 | | 20000 | ? |
| NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0). | | | | | | |

Table 9: HSUPA UE category



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c) **DC-HSDPA**

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a Second serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.
The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0.
A summary of these settings are illustrated below:
Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

**Table E.5.0: Levels for HSDPA connection setup**

| Parameter During Connection setup | Unit | Value |
|---|---|---|
| P-CPICH_Ec/Ior | dB | -10 |
| P-CCPCH and SCH_Ec/Ior | dB | -12 |
| PICH _Ec/Ior | dB | -15 |
| HS-PDSCH | dB | off |
| HS-SCCH_1 | dB | off |
| DPCH_Ec/Ior | dB | -5 |
| OCNS_Ec/Ior | dB | -3.1 |

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13.
The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.
The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK.

| Parameter | Value |
|---|---|
| Nominal average inf. bit rate | 60 kbit/s |
| Inter-TTI Distance | 1 TTI's |
| Number of HARQ Processes | 6 Processes |
| Information Bit Payload | 120 Bits |
| Number Code Blocks | 1 Block |
| Binary Channel Bits Per TTI | 960 Bits |
| Total Available SMLs in UE | 19200 SMLs |
| Number of SMLs per HARQ Process | 3200 SMLs |
| Coding Rate | 0.15 |
| Number of Physical Channel Codes | 1 |

Table 10： settings of required H-Set 12 QPSK acc. to 3GPP 34.121

Note:
1. The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table above.
2. Maximum number of transmission is limited to 1,i.e.,retransmission is not allowed. The redundancy and constellation version 0 shall be used.

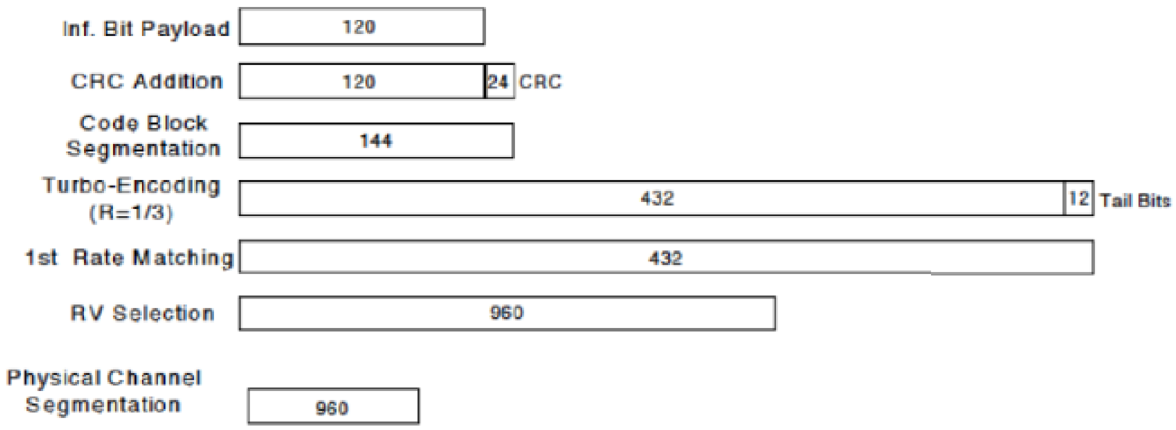



**Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)**

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

| Sub-test | $\beta_c$ | $\beta_d$ | $\beta_d$ (SF) | $\beta_c/\beta_d$ | $\beta_{hs}$ (1) | CM(dB)(2) | MPR (dB) |
|---|---|---|---|---|---|---|---|
| 1 | 2/15 | 15/15 | 64 | 2/15 | 4/15 | 0.0 | 0 |
| 2 | 12/15(3) | 15/15(3) | 64 | 12/15(3) | 24/15 | 1.0 | 0 |
| 3 | 15/15 | 8/15 | 64 | 15/8 | 30/15 | 1.5 | 0.5 |
| 4 | 15/15 | 4/15 | 64 | 15/4 | 30/15 | 1.5 | 0.5 |

Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

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

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

Up commands are set continuously to set the UE to Max power.

Note:

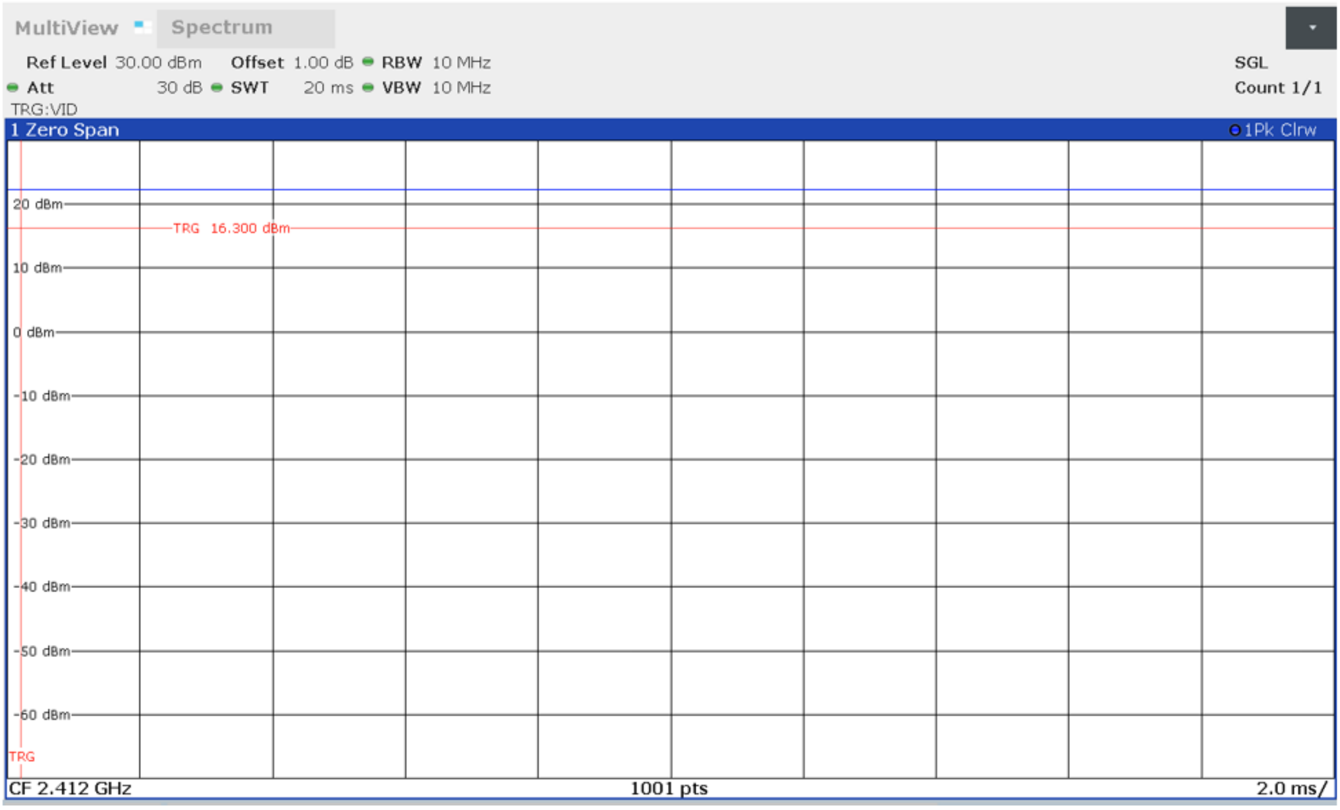
1. The Dual Carriers transmission only applies to HSDPA physical channels
2. The Dual Carriers belong to the same Node and are on adjacent carriers.
3. The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation
4. The Dual Carriers operate in the same frequency band.
5. The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.
6. The device doesn’t support carrier aggregation for it just can operate in Release 8.

### 8.2.3 WiFi Test Configuration

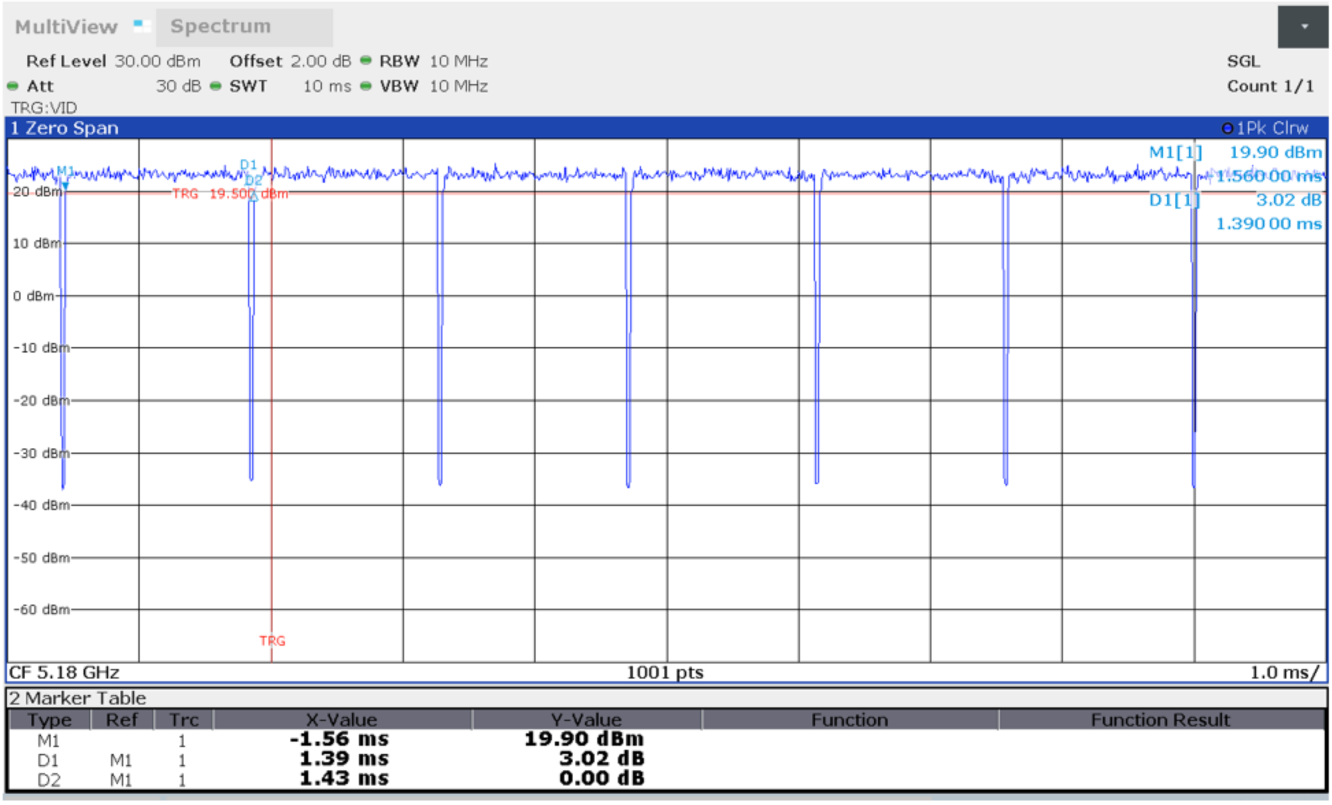
A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

#### 8.2.3.1 Duty cycle

Wi-Fi 2.4GHz 802.11b:
Duty cycle=100%



Wi-Fi 5GHz 802.11a:
Duty cycle=97.2%



#### 8.2.3.2 Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:

1）. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
2）. When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
3）. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

#### 8.2.3.3 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.
For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.
When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

#### 8.2.3.4 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following:

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.

b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

a) replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)

b) replace “initial test configuration” with “all tested higher output power configurations”

#### 8.2.3.5 2.4 GHz WiFi SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1）. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2）. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

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

2）. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

## 8.2.4 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.

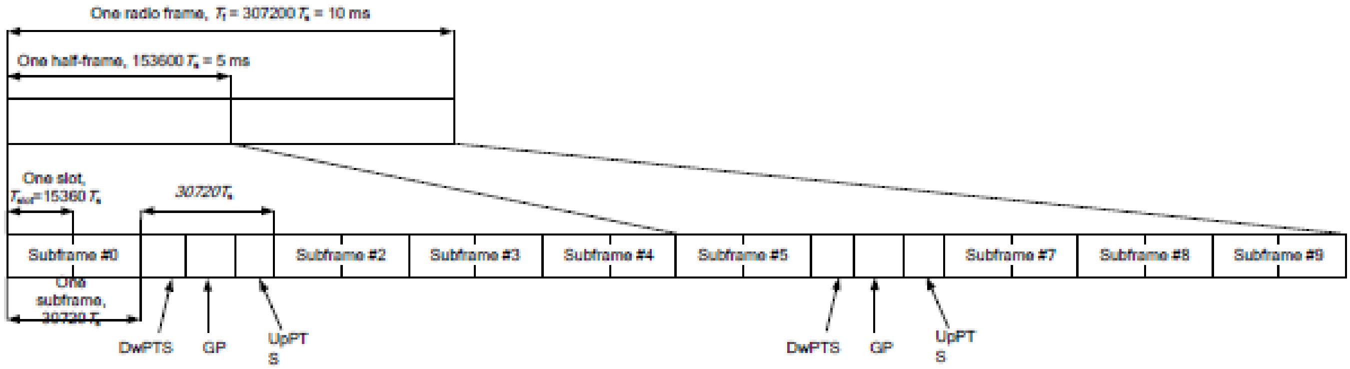
**TDD LTE test consideration**

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

SAR was tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7.

LTE TDD Band support 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations and Table 4.2-1 for Special subframe configurations.

Frame structure type 2:



Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

| Special subframe configuration | Normal cyclic prefix in downlink | | | Extended cyclic prefix in downlink | | |
|---|---|---|---|---|---|---|
| | DwPTS | UpPTS | | DwPTS | UpPTS | |
| | | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink | | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |
| 0 | 6592.Ts | 2192.Ts | 2560.Ts | 7680.Ts | 2192.Ts | 2560.Ts |
| 1 | 19760.Ts | | | 20480.Ts | | |
| 2 | 21952.Ts | | | 23040.Ts | | |
| 3 | 24144.Ts | | | 25600.Ts | | |
| 4 | 26336.Ts | | | 7680.Ts | 4384.Ts | 5120.Ts |
| 5 | 6592.Ts | 4384.Ts | 5120.Ts | 20480.Ts | | |
| 6 | 19760.Ts | | | 23040.Ts | | |
| 7 | 21952.Ts | | | 25600.Ts | | |
| 8 | 24144.Ts | | | - | - | - |
| 9 | 13168.Ts | | | - | - | - |

Uplink-downlink configurations.

| Uplink-downlink configuration | Downlink-to-Uplink Switch-point periodicity | Subframe number | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0 | 5 ms | D | S | U | U | U | D | S | U | U | U |
| 1 | 5 ms | D | S | U | U | D | D | S | U | U | D |
| 2 | 5 ms | D | S | U | D | D | D | S | U | D | D |
| 3 | 10 ms | D | S | U | U | U | D | D | D | D | D |
| 4 | 10 ms | D | S | U | U | D | D | D | D | D | D |
| 5 | 10 ms | D | S | U | D | D | D | D | D | D | D |
| 6 | 5 ms | D | S | U | U | U | D | S | U | U | D |

**Calculated Duty Cycle=[Extended cyclic prefix in uplink x (Ts) x # of S + # of U]/10ms**

| Uplink-Downlink Configuration | Downlink-to-Uplink Switch-point Periodicity | Subframe Number | | | | | | | | | | Calculated Duty Cycle (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 0 | 5 ms | D | S | U | U | U | D | S | U | U | U | 63.33 |
| 1 | 5 ms | D | S | U | U | D | D | S | U | U | D | 43.33 |
| 2 | 5 ms | D | S | U | D | D | D | S | U | D | D | 23.33 |
| 3 | 10 ms | D | S | U | U | U | D | D | D | D | D | 31.67 |
| 4 | 10 ms | D | S | U | U | D | D | D | D | D | D | 21.67 |
| 5 | 10 ms | D | S | U | D | D | D | D | D | D | D | 11.67 |
| 6 | 5 ms | D | S | U | U | U | D | S | U | U | D | 53.33 |

**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.

| 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 |

**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 determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

**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 > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

### 8.2.5 NR Band Test Configuration

1. NR Band n5/n7/n38/n41/n66/n77/n78 support SA mode and n5/n7/n38/n41/n66/n78 support NSA mode. LTE+NR Band operations are possible only with LTE under EN-DC mode and the operations are possible as following table:

| Band/Antenna | | n2 | | n5 | n25 | n41 | n66 | | n71 | n77 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ant2 | Ant3 | Ant0 | Ant3 | Ant3 | Ant2 | Ant3 | Ant0 | Ant4 |
| LTE Band 2 | Ant2 | | √ | | √ | √ | | √ | | |
| | Ant3 | | | √ | | | | | √ | |
| LTE Band 5 | Ant0 | | √ | | √ | | | √ | | √ |
| LTE Band 12 | Ant0 | | √ | | √ | | | √ | | √ |
| LTE Band 14 | Ant0 | | √ | | √ | | | √ | | √ |
| LTE Band 25 | Ant2 | | √ | | √ | √ | | √ | | √ |
| | Ant3 | | | √ | | | | | √ | |
| LTE Band 30 | Ant2 | | | | | | | | | √ |
| | Ant3 | √ | | √ | | | √ | | √ | |
| LTE Band 41 | Ant3 | √ | | √ | | | √ | | √ | |
| LTE Band 66 | Ant2 | | √ | | √ | √ | | √ | | √ |
| | Ant3 | | | √ | | | | | √ | |

2. The general information supported by the NR band is as following table:

| Band | | | N2 | N5 | N25 | N26 | N30 | N41 | N48 | N66 | N70 | N71 | n77 PC3 | n77 PC3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Modulation | DFT-s-OFDM | PI/2 BPSK | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | QPSK | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 16QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 64QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 256QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | CP-OFDM | QPSK | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 16QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 64QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | | 256QAM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Duty Cycle | | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 50% |

| Band | SCS | Bandwidth | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5Mhz | 10Mhz | 15Mhz | 20Mhz | 25Mhz | 30Mhz | 40Mhz | 50Mhz | 60Mhz | 70Mhz | 80Mhz | 90Mhz | 100Mhz |
| N2 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N5 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N25 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N26 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N30 | 15KHZ | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N41 | 30KHZ | N/A | Yes | Yes | Yes | N/A | N/A | Yes | Yes | Yes | N/A | Yes | Yes | Yes |
| N48 | 30KHZ | N/A | Yes | Yes | Yes | N/A | N/A | Yes | N/A | N/A | N/A | N/A | N/A | N/A |
| N66 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | Yes | N/A | N/A | N/A | N/A | N/A | N/A |
| N70 | 15KHZ | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N71 | 15KHZ | Yes | Yes | Yes | Yes | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| n77 PC3 | 30KHZ | N/A | Yes | Yes | Yes | N/A | N/A | Yes | Yes | Yes | N/A | Yes | Yes | Yes |
| n77 PC2 | 30KHZ | N/A | Yes | Yes | Yes | N/A | N/A | Yes | Yes | Yes | N/A | Yes | Yes | Yes |

3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-OFDM and CP-OFDM output power measurement reduction, according to 3GPP 38.101 maximum power reduction for power class 3, the CP-OFDM mode will not higher than DFT-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-QPSK and the reported SAR for the DFT-QPSK configuration is ≤ 1.45 W/kg; CP-OFDM testing is not required.
   b. For DFT-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class 3, for PI/2 BPSK/16QAM/64QMA/256QAM and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the PI/2 BPSK/16QAM/64QMA/256QAM and smaller bandwidth output power will not ½ dB higher than the same configuration in the largest supported bandwidth.
   c. SAR testing start with the largest SCS and 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.
   d. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
   e. 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.
   f. PI/2 BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, PI/2 BPSK/16QAM/64QAM/256QAM SAR testing are not required.
   g. Smaller SCS/bandwidth output power for each RB allocation configuration for this device will 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, smaller bandwidth SAR testing is not required for this device

4. 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 TS 38.101-1 Section 6.2.2 under Table 6.2.2 -1.

| Modulation | | MPR (dB) | | |
|---|---|---|---|---|
| | | Edge RB allocations | Outer RB allocations | Inner RB allocations |
| DFT-s-OFDM | PI/2 BPSK | ≤ 3.5[1] | ≤ 1.2[1] | ≤ 0.2[1] |
| | | ≤ 0.5[2] | ≤ 0.5[2] | 0[2] |
| | QPSK | ≤ 1 | | 0 |
| | 16 QAM | ≤ 2 | | ≤ 1 |
| | 64 QAM | ≤ 2.5 | | |
| | 256 QAM | ≤ 4.5 | | |
| CP-OFDM | QPSK | ≤ 3 | | ≤ 1.5 |
| | 16 QAM | ≤ 3 | | ≤ 2 |
| | 64 QAM | ≤ 3.5 | | |
| | 256 QAM | ≤ 6.5 | | |

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability powerBoosting-pi2BPSK and if the IE powerBoostPi2BPSK is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n77. The reference power of 0 dB MPR is 26dBm.
NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n77 with Pi/2 BPSK modulation and if the IE powerBoostPi2BPSK is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n77.

5. For FDD NR Band operation does not have the fixed UL/DL frame structure, but during the transmitting/ receiving it can be operated in the slot structure of 100% UL duty cycle, we are proposing the conservative way to evaluate SAR at 100% duty cycle. For the purpose of test NR Band standalone SAR, and also test SAR level at 100% TX duty cycle.
6. For 5G NR Sub6GHz SISO Mode, SAR Test plan as below:
   1) For 5G NR NSA mode with the same UL EN_DC combination but different DL EN_DC combinations, eg: EN-DC configuration: UL DC_2A_n5 (UL two bands) .
   a) The UL EN-DC configuration, including the Tx antenna configuration, RF path, the channel bandwidth and other operating parameters are the same.
   b) The maximum output power, including tolerance, for the UL EN-DC configuration with DL two or more bands must be ≤ the same UL EN-DC configuration with DL two bands only to qualify for the SAR test exclusion.
7. For EN-DC SAR, as the existing SAR test system cannot test the multiple different frequency bands simultaneous Transmission SAR at the same time, we suggest that the conservative "max + max" multi-Tx and SAR scaling method can be used to evaluate the inter-band Uplink EN-DC SAR from standalone SAR test results of each LTE and NR EN-DC component band and the conservative "max + max" multi-Tx method to combine the scaled SAR value from each EN-DC component band as the inter-band Uplink EN-DC SAR. All Simultaneous Transmission Scenarios will be evaluated independently in the final SAR report.
8. When the reported SAR for and EN DC configuration is greater than 1.2 W/kg, EN DC SAR is also required for other NR based test channels.
9. EN DC SAR is also required for standalone NR configurations greater than 1.2 W/kg when scaled to the EN DC power level.

# 9 Test Result

## 9.1 Measurement of RF conducted Power

The detailed conducted power table can refer to Appendix E.

Note:

1）. For GSM SAR the time based average power is relevant. The difference in between depends on the duty cycle of the TDMA signal:

| No. of timeslots | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Duty Cycle | 1:8.3 | 1:4.15 | 1:2.77 | 1:2.075 |
| Time based avg. power compared to slotted avg. power | -9.19 | -6.18 | -4.42 | -3.17 |

2）. 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 x log (Burst-averaged power mW x Slot used / 8

3）. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used

4）. According to FCC guidance, the output power with uplink CA active was measured for the high / middle / low channel configuration with the highest reported SAR for each exposure condition, the power was measured with wideband signal integration over both component carriers.

5）. In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs.

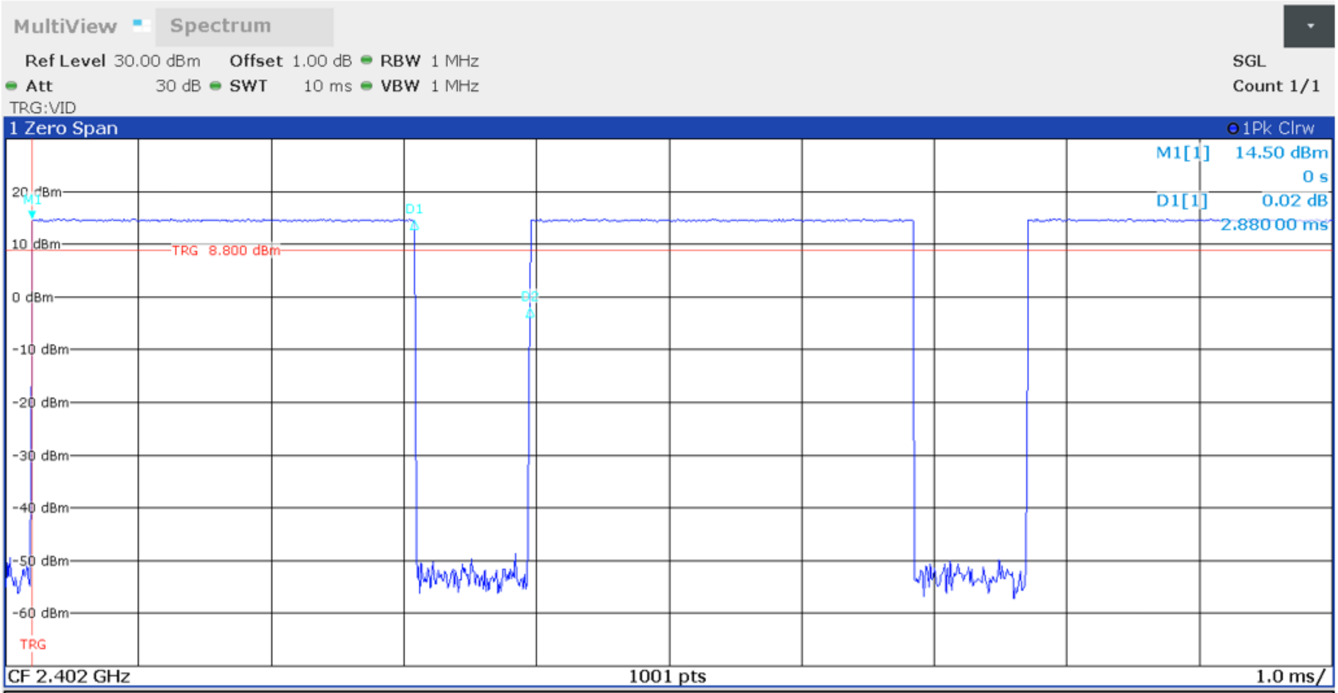
6）. Maximum output power measurement is required for each UL CA configuration for the required test channels described in KDB 941225 D05.

7）. Conducted power measurement results of downlink LTE carrier aggregation are provided to quantify downlink only carrier aggregation SAR test exclusion per KDB 941225 D05A.Uplink maximum output power is measured with downlink carrier aggregation active, using the channel with highest measured maximum output power when downlink carrier aggregation is inactive, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive, therefore SAR evaluation with downlink carrier aggregation can be excluded.
The possible downlink LTE CA combinations supported by this device are as below tables per 3GPP TS 36.101 V15.4.0. The detailed conducted power measurement results of downlink LTE CA are provided in the SAR report per 3GPP TS 36.521-1 V14.4.0. According to KDB 941225 D05A, the downlink only carrier aggregation conditions for this device can be excluded from SAR testing.
The conducted power measurement results of downlink LTE CA Conducted Power are as Appendix E conducted RF output power, so the downlink only carrier aggregation conditions for this device can be excluded from SAR testing

8）. For conducted power of WIFI must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band. For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured. Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.
2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

9）. The conducted power of BT is measured with RMS detector.
BT DH5 Duty Cycle=76.80%




2 Marker Table

| Type | Ref | Trc | X-Value | Y-Value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 0.0 s | 14.50 dBm | | |
| D1 | M1 | 1 | 2.88 ms | 0.02 dB | | |
| D2 | M1 | 1 | 3.75 ms | -16.47 dB | | |

## 9.2 Measurement of SAR Data

**Note:**

1) The maximum Scaled SAR value is select the worst presentation of the original report SUCR2403000065AT and this report. 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:

- ≤ 0.8W/kg for 1-g or 2.0W/kg for 10-g respectively, when the transmission band is ≤ 100MHz.
- ≤ 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) 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.

**WiFi 2.4G:**

1) When the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.

**WiFi 5G:**

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. As the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration.

2) For Wi-Fi 5G, U-NII-2A (5250-5350 MHz) and U-NII-2C (5470-5725 MHz) bands does not support hotspot function.

3) When the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required.

### 9.2.1 SAR Result of GSM850

| GSM850 SAR Test Record | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ant 0 Test Record | | | | | | | | | | |
| **Test position** | **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.(℃)** |
| Head Test Data | | | | | | | | | | |
| Right cheek | GPRS 4TS | 190/836.6 | 1:2.075 | 0.325 | -0.08 | 28.99 | 30.00 | 1.262 | 0.410 | 22.8 |
| Hotspot Test data(Separate 10mm) | | | | | | | | | | |
| Back side | GPRS 4TS | 190/836.6 | 1:2.075 | 0.565 | -0.04 | 28.99 | 30.00 | 1.262 | 0.713 | 22.8 |

Table 11： SAR of GSM850 for Head and Body(original report No:SUCR2403000065AT).

## 9.2.2 SAR Result of LTE Band 2

| LTE Band 2 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant 2 Test Record for ENDC | | | | | | | | | | | |
| 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.(℃) |
| Hotspot Test data(Separate 10mm 1RB) | | | | | | | | | | | |
| Back side | 20 | QPSK 1_0 | 18900/1880 | 1:1 | 0.826 | -0.08 | 23.90 | 25.00 | 1.288 | 1.064 | 22.9 |

Table 12： SAR of LTE Band 2 for Head and Body(original report No:SUCR2403000065AT).

### 9.2.3 SAR Result of LTE Band 30

| LTE Band 30 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ant 2 Test Record for ENDC** | | | | | | | | | | | |
| **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.(℃)** |
| Head (Receiver on) Test Data | | | | | | | | | | | |
| Right cheek | 10 | QPSK 1_0 | 27710/2310 | 1:1 | 0.417 | -0.09 | 19.21 | 20.00 | 1.199 | 0.500 | 23.1 |
| Body worn Test data(Separate 15mm 1RB) | | | | | | | | | | | |
| Back side | 10 | QPSK 1_0 | 27710/2310 | 1:1 | 0.400 | 0.12 | 23.77 | 24.50 | 1.183 | 0.473 | 23.1 |
| **Ant 3 Test Record** | | | | | | | | | | | |
| **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.(℃)** |
| Head (Receiver on) Test Data | | | | | | | | | | | |
| Right tilted | 10 | QPSK 1_0 | 27710/2310 | 1:1 | 0.965 | 0.03 | 20.22 | 21.00 | 1.197 | 1.155 | 23.1 |
| Hotspot on Test data(Separate 10mm 1RB) | | | | | | | | | | | |
| Back side | 10 | QPSK 1_0 | 27710/2310 | 1:1 | 0.944 | -0.03 | 22.61 | 23.50 | 1.227 | 1.159 | 23.1 |

Table 13： SAR of LTE Band 30 for Head and Body(original report No:SUCR2403000065AT).

## 9.2.4 SAR Result of 5G NR n2

| SA N2 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant2 Test Record for ENDC | | | | | | | | | | | |
| **Test position** | **BW.** | **Modulation** | **Test ch./Freq.** | **Duty Cycle** | **SAR (W/kg) 10-g** | **Power drift (dB)** | **Conducted Power(dBm)** | **Tune up Limit(dBm)** | **Scaled factor** | **Scaled SAR 1-g (W/kg)** | **Liquid Temp.(℃)** |
| Product specific 10g SAR Test data(Separate 0mm 50%RB) | | | | | | | | | | | |
| Top side | 20 | QPSK 50_28 | 376000/1880 | 1:1 | 2.410 | 0.07 | 23.68 | 24.50 | 1.208 | **2.911** | 22.9 |

Table 14： SAR of 5G NR n2 for Head and Body(original report No:SUCR2403000065AT).

## 9.2.5 SAR Result of 5G NR n25

| SA N25 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant3 Test Record | | | | | | | | | | | |
| **Test position** | **BW.** | **Test mode** | **Test Ch./Freq.** | **Duty Cycle** | **SAR (W/kg)10-g** | **Power Drift(dB)** | **Conducted power(dBm)** | **Tune up Limit(dBm)** | **Scaled factor** | **Scaled 10-g SAR(W/kg)** | **Liquid Temp.** |
| Product specific (Sensro on) 10gSAR Test data (Separate 0mm 50%RB) | | | | | | | | | | | |
| Top side | 20 | QPSK 50_28 | 376500/1882.5 | 1:1 | 2.490 | 0.06 | 22.05 | 23.00 | 1.245 | **3.099** | 22.9 |

Table 15： SAR of 5G NR n25 for Head and Body(original report No:SUCR2403000065AT).

### 9.2.6 SAR Result of 5G NR n41

| SA N41 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant3 Test Record | | | | | | | | | | | |
| **Test position** | **BW.** | **Modulation** | **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 worn Test data(Separate 15mm 1RB) | | | | | | | | | | | |
| Back side PC2 | 100 | QPSK 1_1 | 518598/2592.99 | 1:1 | 0.838 | -0.01 | 25.52 | 26.00 | 1.117 | **0.936** | 23 |

Table 16： SAR of 5G NR n41 for Head and Body(original report No:SUCR2403000065AT).

### 9.2.7 SAR Result of 5G NR n71

| SA N71 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant0 Test Record | | | | | | | | | | | |
| **Test position** | **BW.** | **Modulation** | **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 worn Test data(Separate 15mm 50%RB) | | | | | | | | | | | |
| Back side | 20 | QPSK 50_28 | 136100/680.5 | 1:1 | 0.358 | 0.06 | 23.61 | 25.00 | 1.377 | **0.493** | 22.8 |

Table 17： SAR of 5G NR n71 for Head and Body(original report No:SUCR2403000065AT).

### 9.2.8 SAR Result of 5G NR n48

| SA N48 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant4 Test Record | | | | | | | | | | | |
| **Test position** | **BW.** | **Test mode** | **Test Ch./Freq.** | **Duty Cycle** | **SAR (W/kg)10-g** | **Power Drift(dB)** | **Conducted power(dBm)** | **Tune up Limit(dBm)** | **Scaled factor** | **Scaled 10-g SAR(W/kg)** | **Liquid Temp.** |
| Product specific (Sensor on) 10g SAR Test data (Separate 0mm 1RB) | | | | | | | | | | | |
| Back side | 40 | QPSK 1_1 | 641666/3624.99 | 1:1 | 1.890 | -0.09 | 20.62 | 21.50 | 1.225 | **2.315** | 23 |

Table 18： SAR of 5G NR n48 for Head and Body(original report No:SUCR2403000065AT).

### 9.2.9 SAR Result of 5G NR n77(3450~3550)

| SA N77 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant4 Test Record | | | | | | | | | | | |
| Test position | BW. | Modulation | 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.(℃) |
| Hotspot on Test data (Separate 10mm 50%RB) | | | | | | | | | | | |
| Back side PC3&PC2 | 100 | QPSK 135_69 | 633334/3500 | 1:1 | 0.955 | -0.05 | 21.67 | 22.50 | 1.211 | **1.156** | 23 |

Table 19： SAR of 5G NR n77(3450~3550) for Head and Body(original report No:SUCR2403000065AT).

### 9.2.10 SAR Result of 5G NR n77(3700~3980)

| SA N77 SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant4 Test Record | | | | | | | | | | | |
| Test position | BW. | Modulation | 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.(℃) |
| Head (Receiver on) Test data(50%RB) | | | | | | | | | | | |
| Left cheek PC3&PC2 | 100 | QPSK 135_69 | 656000/3840 | 1:1 | 0.881 | -0.19 | 17.16 | 18.00 | 1.213 | **1.069** | 23 |
| Body worn Test data(Separate 15mm 50%RB) | | | | | | | | | | | |
| Back side PC2 | 100 | QPSK 135_69 | 656000/3840 | 1:1 | 0.839 | 0.06 | 26.43 | 27.50 | 1.279 | **1.073** | 23 |

Table 20： SAR of 5G NR n77(3700~3980) for Head and Body(original report No:SUCR2403000065AT).



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### 9.2.11 SAR Result of WIFI 2.4G

| Wi-Fi 2.4G SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant5 Test Record | | | | | | | | | | | |
| **Test position** | **Test mode** | **Test ch./Freq.** | **Duty Cycle** | **Duty Cycle Scaled factor** | **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 worn Test data(Separate 15mm) | | | | | | | | | | | |
| Back side | 802.11b | 6/2437 | 100.00% | 1.000 | 0.284 | -0.12 | 20.52 | 21.50 | 1.253 | **0.356** | 23 |
| Hotspot Test data (Separate 10mm) | | | | | | | | | | | |
| Back side | 802.11b | 6/2437 | 100.00% | 1.000 | 0.222 | -0.12 | 15.88 | 16.50 | 1.153 | **0.256** | 23 |

Table 21： SAR of WIFI 2.4G for Head and Body(original report No:SUCR2403000065AT).

### 9.2.12 SAR Result of WIFI 5G

| Wi-Fi 5G SAR Test Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ant5 Test Record | | | | | | | | | | | |
| **Test position** | **Test mode** | **Test ch./Freq.** | **Duty Cycle** | **Duty Cycle Scaled factor** | **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.(℃)** |
| Head (Receiver on) Test data of U-NII-2A | | | | | | | | | | | |
| Left tilted | 802.11a | 64/5320 | 97.20% | 1.029 | 0.257 | -0.12 | 14.18 | 15.00 | 1.208 | **0.319** | 23 |
| **Test position** | **Test mode** | **Test ch./Freq.** | **Duty Cycle** | **Duty Cycle Scaled factor** | **SAR (W/kg) 10-g** | **Power drift (dB)** | **Conducted Power(dBm)** | **Tune up Limit(dBm)** | **Scaled factor** | **Scaled SAR 10-g (W/kg)** | **Liquid Temp.(℃)** |
| Product specific 10gSAR (Sensor on) Test data of U-NII-2A(Separate 0mm) | | | | | | | | | | | |
| Top side | 802.11a | 64/5320 | 97.20% | 1.029 | 0.477 | -0.08 | 13.27 | 14.00 | 1.183 | **0.581** | 23 |

Table 22： SAR of WIFI 5G for Head and Body(original report No:SUCR2403000065AT).

## 9.3 Multiple Transmitter Evaluation

### 9.3.1 Simultaneous SAR SAR test evaluation

- **Simultaneous Transmission Possibilities**

| NO | Simultaneous Tx Combination | Head | Body- worn | Hotspot | Product Specific 10-g (0mm) |
|---|---|---|---|---|---|
| 1 | WWAN + WIFI2.4G | Y | Y | Y | Y |
| 2 | WWAN + WIFI5G | Y | Y | Y | Y |
| 4 | WWAN + BT | Y | Y | Y | Y |

**Note:**

1) The device support DTM function.
2) For Wi-Fi 5G, U-NII-2A (5250-5350 MHz) and U-NII-2C (5470-5725 MHz) bands does not support hotspot function.
3) NFC is different from the working scenario of WWAN/WIFI(Head/Body-worn/Hotspot) and does not participate in the simultaneous transmission.
4) Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required it wireless router 1g SAR(Scaled to the maximum output power ,including tolerance) ＜ 1.2 W/Kg. Therefore, no further analysis beyond tables included in this section was required to determine that possible Simultaneous transmission scenarios would not exceed the SAR limit.

## 9.3.2 Simultaneous Transmission SAR Summation Scenario

**Simultaneous Transmission SAR Summation Scenario for WLAN Head:**

| Test position | | SARmax (W/kg) | | | | Summed SAR | | |
|---|---|---|---|---|---|---|---|---|
| | | Main | WiFi 2.4G Ant5 | WiFi 5G Ant5 | BT Ant5 | | | |
| | | 1 | 2 | 3 | 4 | 1+2 | 1+3 | 1+4 |
| GSM850 | Left cheek | 0.300 | 0.375 | 0.314 | 0.241 | 0.675 | 0.614 | 0.541 |
| | Left tilted | 0.247 | 0.244 | 0.380 | 0.173 | 0.491 | 0.627 | 0.420 |
| | Right cheek | 0.435 | 0.134 | 0.294 | 0.107 | 0.569 | 0.729 | 0.542 |
| | Right tilted | 0.289 | 0.118 | 0.310 | 0.091 | 0.407 | 0.599 | 0.380 |
| GSM1900 | Left cheek | 0.363 | 0.375 | 0.314 | 0.241 | 0.738 | 0.677 | 0.604 |
| | Left tilted | 0.444 | 0.244 | 0.380 | 0.173 | 0.688 | 0.824 | 0.617 |
| | Right cheek | 0.709 | 0.134 | 0.294 | 0.107 | 0.843 | 1.003 | 0.816 |
| | Right tilted | 0.892 | 0.118 | 0.310 | 0.091 | 1.010 | 1.202 | 0.983 |
| WCDMA II | Left cheek | 0.405 | 0.375 | 0.314 | 0.241 | 0.780 | 0.719 | 0.646 |
| | Left tilted | 0.485 | 0.244 | 0.380 | 0.173 | 0.729 | 0.865 | 0.658 |
| | Right cheek | 0.685 | 0.134 | 0.294 | 0.107 | 0.819 | 0.979 | 0.792 |
| | Right tilted | 0.792 | 0.118 | 0.310 | 0.091 | 0.910 | 1.102 | 0.883 |
| WCDMA V | Left cheek | 0.244 | 0.375 | 0.314 | 0.241 | 0.619 | 0.558 | 0.485 |
| | Left tilted | 0.183 | 0.244 | 0.380 | 0.173 | 0.427 | 0.563 | 0.356 |
| | Right cheek | 0.326 | 0.134 | 0.294 | 0.107 | 0.460 | 0.620 | 0.433 |
| | Right tilted | 0.194 | 0.118 | 0.310 | 0.091 | 0.312 | 0.504 | 0.285 |
| LTE B2 | Left cheek | 0.590 | 0.375 | 0.314 | 0.241 | 0.965 | 0.904 | 0.831 |
| | Left tilted | 0.429 | 0.244 | 0.380 | 0.173 | 0.673 | 0.809 | 0.602 |
| | Right cheek | 0.991 | 0.134 | 0.294 | 0.107 | 1.125 | 1.285 | 1.098 |
| | Right tilted | 0.755 | 0.118 | 0.310 | 0.091 | 0.873 | 1.065 | 0.846 |
| LTE B12 | Left cheek | 0.127 | 0.375 | 0.314 | 0.241 | 0.502 | 0.441 | 0.368 |
| | Left tilted | 0.076 | 0.244 | 0.380 | 0.173 | 0.320 | 0.456 | 0.249 |
| | Right cheek | 0.259 | 0.134 | 0.294 | 0.107 | 0.393 | 0.553 | 0.366 |
| | Right tilted | 0.131 | 0.118 | 0.310 | 0.091 | 0.249 | 0.441 | 0.222 |
| LTE B14 | Left cheek | 0.134 | 0.375 | 0.314 | 0.241 | 0.509 | 0.448 | 0.375 |
| | Left tilted | 0.081 | 0.244 | 0.380 | 0.173 | 0.325 | 0.461 | 0.254 |
| | Right cheek | 0.276 | 0.134 | 0.294 | 0.107 | 0.410 | 0.570 | 0.383 |
| | Right tilted | 0.123 | 0.118 | 0.310 | 0.091 | 0.241 | 0.433 | 0.214 |
| LTE B26 | Left cheek | 0.234 | 0.375 | 0.314 | 0.241 | 0.609 | 0.548 | 0.475 |
| | Left tilted | 0.153 | 0.244 | 0.380 | 0.173 | 0.397 | 0.533 | 0.326 |
| | Right cheek | 0.293 | 0.134 | 0.294 | 0.107 | 0.427 | 0.587 | 0.400 |
| | Right tilted | 0.174 | 0.118 | 0.310 | 0.091 | 0.292 | 0.484 | 0.265 |
| LTE B30 | Left cheek | 0.804 | 0.375 | 0.314 | 0.241 | 1.179 | 1.118 | 1.045 |
| | Left tilted | 0.972 | 0.244 | 0.380 | 0.173 | 1.216 | 1.352 | 1.145 |
| | Right cheek | 1.014 | 0.134 | 0.294 | 0.107 | 1.148 | 1.308 | 1.121 |
| | Right tilted | 1.197 | 0.118 | 0.310 | 0.091 | 1.315 | 1.507 | 1.288 |
| LTE B48 | Left cheek | 0.682 | 0.375 | 0.314 | 0.241 | 1.057 | 0.996 | 0.923 |
| | Left tilted | 0.646 | 0.244 | 0.380 | 0.173 | 0.890 | 1.026 | 0.819 |
| | Right cheek | 0.443 | 0.134 | 0.294 | 0.107 | 0.577 | 0.737 | 0.550 |
| | Right tilted | 0.434 | 0.118 | 0.310 | 0.091 | 0.552 | 0.744 | 0.525 |
| LTE B66 | Left cheek | 0.509 | 0.375 | 0.314 | 0.241 | 0.884 | 0.823 | 0.750 |
| | Left tilted | 0.644 | 0.244 | 0.380 | 0.173 | 0.888 | 1.024 | 0.817 |
| | Right cheek | 0.979 | 0.134 | 0.294 | 0.107 | 1.113 | 1.273 | 1.086 |
| | Right tilted | 1.069 | 0.118 | 0.310 | 0.091 | 1.187 | 1.379 | 1.160 |
| LTE B71 | Left cheek | 0.132 | 0.375 | 0.314 | 0.241 | 0.507 | 0.446 | 0.373 |
| | Left tilted | 0.096 | 0.244 | 0.380 | 0.173 | 0.340 | 0.476 | 0.269 |
| | Right cheek | 0.226 | 0.134 | 0.294 | 0.107 | 0.360 | 0.520 | 0.333 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Right tilted | 0.102 | 0.118 | 0.310 | 0.091 | 0.220 | 0.412 | 0.193 |
| NR n2 | Left cheek | 0.465 | 0.375 | 0.314 | 0.241 | 0.840 | 0.779 | 0.706 |
| | Left tilted | 0.545 | 0.244 | 0.380 | 0.173 | 0.789 | 0.925 | 0.718 |
| | Right cheek | 0.890 | 0.134 | 0.294 | 0.107 | 1.024 | 1.184 | 0.997 |
| | Right tilted | 0.933 | 0.118 | 0.310 | 0.091 | 1.051 | 1.243 | 1.024 |
| NR n25 | Left cheek | 0.545 | 0.375 | 0.314 | 0.241 | 0.920 | 0.859 | 0.786 |
| | Left tilted | 0.592 | 0.244 | 0.380 | 0.173 | 0.836 | 0.972 | 0.765 |
| | Right cheek | 1.090 | 0.134 | 0.294 | 0.107 | 1.224 | 1.384 | 1.197 |
| | Right tilted | 1.109 | 0.118 | 0.310 | 0.091 | 1.227 | 1.419 | 1.200 |
| NR n26 | Left cheek | 0.299 | 0.375 | 0.314 | 0.241 | 0.674 | 0.613 | 0.540 |
| | Left tilted | 0.236 | 0.244 | 0.380 | 0.173 | 0.480 | 0.616 | 0.409 |
| | Right cheek | 0.414 | 0.134 | 0.294 | 0.107 | 0.548 | 0.708 | 0.521 |
| | Right tilted | 0.282 | 0.118 | 0.310 | 0.091 | 0.400 | 0.592 | 0.373 |
| NR n30 | Left cheek | 0.374 | 0.375 | 0.314 | 0.241 | 0.749 | 0.688 | 0.615 |
| | Left tilted | 0.449 | 0.244 | 0.380 | 0.173 | 0.693 | 0.829 | 0.622 |
| | Right cheek | 1.064 | 0.134 | 0.294 | 0.107 | 1.198 | 1.358 | 1.171 |
| | Right tilted | 1.129 | 0.118 | 0.310 | 0.091 | 1.247 | 1.439 | 1.220 |
| NR n41 | Left cheek | 0.606 | 0.375 | 0.314 | 0.241 | 0.981 | 0.920 | 0.847 |
| | Left tilted | 0.345 | 0.244 | 0.380 | 0.173 | 0.589 | 0.725 | 0.518 |
| | Right cheek | 1.192 | 0.134 | 0.294 | 0.107 | 1.326 | 1.486 | 1.299 |
| | Right tilted | 0.988 | 0.118 | 0.310 | 0.091 | 1.106 | 1.298 | 1.079 |
| NR n66 | Left cheek | 0.731 | 0.375 | 0.314 | 0.241 | 1.106 | 1.045 | 0.972 |
| | Left tilted | 0.769 | 0.244 | 0.380 | 0.173 | 1.013 | 1.149 | 0.942 |
| | Right cheek | 1.058 | 0.134 | 0.294 | 0.107 | 1.192 | 1.352 | 1.165 |
| | Right tilted | 1.109 | 0.118 | 0.310 | 0.091 | 1.227 | 1.419 | 1.200 |
| NR n70 | Left cheek | 0.617 | 0.375 | 0.314 | 0.241 | 0.992 | 0.931 | 0.858 |
| | Left tilted | 0.639 | 0.244 | 0.380 | 0.173 | 0.883 | 1.019 | 0.812 |
| | Right cheek | 0.850 | 0.134 | 0.294 | 0.107 | 0.984 | 1.144 | 0.957 |
| | Right tilted | 1.183 | 0.118 | 0.310 | 0.091 | 1.301 | 1.493 | 1.274 |
| NR n71 | Left cheek | 0.270 | 0.375 | 0.314 | 0.241 | 0.645 | 0.584 | 0.511 |
| | Left tilted | 0.186 | 0.244 | 0.380 | 0.173 | 0.430 | 0.566 | 0.359 |
| | Right cheek | 0.354 | 0.134 | 0.294 | 0.107 | 0.488 | 0.648 | 0.461 |
| | Right tilted | 0.187 | 0.118 | 0.310 | 0.091 | 0.305 | 0.497 | 0.278 |
| NR n48 | Left cheek | 1.018 | 0.375 | 0.314 | 0.241 | 1.393 | 1.332 | 1.259 |
| | Left tilted | 1.118 | 0.244 | 0.380 | 0.173 | 1.362 | 1.498 | 1.291 |
| | Right cheek | 0.750 | 0.134 | 0.294 | 0.107 | 0.884 | 1.044 | 0.857 |
| | Right tilted | 0.700 | 0.118 | 0.310 | 0.091 | 0.818 | 1.010 | 0.791 |
| NR n77-3500 | Left cheek | 1.081 | 0.375 | 0.314 | 0.241 | 1.456 | 1.395 | 1.322 |
| | Left tilted | 1.066 | 0.244 | 0.380 | 0.173 | 1.310 | 1.446 | 1.239 |
| | Right cheek | 0.839 | 0.134 | 0.294 | 0.107 | 0.973 | 1.133 | 0.946 |
| | Right tilted | 0.752 | 0.118 | 0.310 | 0.091 | 0.870 | 1.062 | 0.843 |
| NR n77-3900 | Left cheek | 1.148 | 0.375 | 0.314 | 0.241 | 1.523 | 1.462 | 1.389 |
| | Left tilted | 0.906 | 0.244 | 0.380 | 0.173 | 1.150 | 1.286 | 1.079 |
| | Right cheek | 0.732 | 0.134 | 0.294 | 0.107 | 0.866 | 1.026 | 0.839 |
| | Right tilted | 0.678 | 0.118 | 0.310 | 0.091 | 0.796 | 0.988 | 0.769 |

**Simultaneous Transmission SAR Summation Scenario for WLAN Body:**
**Body-worn:**

| Test position | | SARmax (W/kg) | | | | Summed SAR | | |
|---|---|---|---|---|---|---|---|---|
| | | Main | WiFi 2.4G Ant5 | WiFi 5G Ant5 | BT Ant5 | | | |
| | | 1 | 2 | 3 | 4 | 1+2 | 1+3 | 1+4 |
| GSM850 | Front side | 0.337 | 0.219 | 0.043 | 0.000 | 0.556 | 0.380 | 0.337 |
| | Back side | 0.501 | 0.357 | 0.340 | 0.029 | 0.858 | 0.841 | 0.530 |
| GSM1900 | Front side | 0.440 | 0.219 | 0.043 | 0.000 | 0.659 | 0.483 | 0.440 |
| | Back side | 0.701 | 0.357 | 0.340 | 0.029 | 1.058 | 1.041 | 0.730 |
| WCDMA II | Front side | 0.721 | 0.219 | 0.043 | 0.000 | 0.940 | 0.764 | 0.721 |
| | Back side | 1.037 | 0.357 | 0.340 | 0.029 | 1.394 | 1.377 | 1.066 |
| WCDMA V | Front side | 0.266 | 0.219 | 0.043 | 0.000 | 0.485 | 0.309 | 0.266 |
| | Back side | 0.339 | 0.357 | 0.340 | 0.029 | 0.696 | 0.679 | 0.368 |
| LTE B2 | Front side | 0.606 | 0.219 | 0.043 | 0.000 | 0.825 | 0.649 | 0.606 |
| | Back side | 0.883 | 0.357 | 0.340 | 0.029 | 1.240 | 1.223 | 0.912 |
| LTE B12 | Front side | 0.291 | 0.219 | 0.043 | 0.000 | 0.510 | 0.334 | 0.291 |
| | Back side | 0.403 | 0.357 | 0.340 | 0.029 | 0.760 | 0.743 | 0.432 |
| LTE B14 | Front side | 0.268 | 0.219 | 0.043 | 0.000 | 0.487 | 0.311 | 0.268 |
| | Back side | 0.357 | 0.357 | 0.340 | 0.029 | 0.714 | 0.697 | 0.386 |
| LTE B26 | Front side | 0.303 | 0.219 | 0.043 | 0.000 | 0.522 | 0.346 | 0.303 |
| | Back side | 0.392 | 0.357 | 0.340 | 0.029 | 0.749 | 0.732 | 0.421 |
| LTE B30 | Front side | 0.419 | 0.219 | 0.043 | 0.000 | 0.638 | 0.462 | 0.419 |
| | Back side | 0.923 | 0.357 | 0.340 | 0.029 | 1.280 | 1.263 | 0.952 |
| LTE B48 | Front side | 0.196 | 0.219 | 0.043 | 0.000 | 0.415 | 0.239 | 0.196 |
| | Back side | 0.300 | 0.357 | 0.340 | 0.029 | 0.657 | 0.640 | 0.329 |
| LTE B66 | Front side | 0.386 | 0.219 | 0.043 | 0.000 | 0.605 | 0.429 | 0.386 |
| | Back side | 0.661 | 0.357 | 0.340 | 0.029 | 1.018 | 1.001 | 0.690 |
| LTE B71 | Front side | 0.249 | 0.219 | 0.043 | 0.000 | 0.468 | 0.292 | 0.249 |
| | Back side | 0.343 | 0.357 | 0.340 | 0.029 | 0.700 | 0.683 | 0.372 |
| NR n2 | Front side | 0.422 | 0.219 | 0.043 | 0.000 | 0.641 | 0.465 | 0.422 |
| | Back side | 0.747 | 0.357 | 0.340 | 0.029 | 1.104 | 1.087 | 0.776 |
| NR n25 | Front side | 0.664 | 0.219 | 0.043 | 0.000 | 0.883 | 0.707 | 0.664 |
| | Back side | 1.000 | 0.357 | 0.340 | 0.029 | 1.357 | 1.340 | 1.029 |
| NR n26 | Front side | 0.271 | 0.219 | 0.043 | 0.000 | 0.490 | 0.314 | 0.271 |
| | Back side | 0.355 | 0.357 | 0.340 | 0.029 | 0.712 | 0.695 | 0.384 |
| NR n30 | Front side | 0.387 | 0.219 | 0.043 | 0.000 | 0.606 | 0.430 | 0.387 |
| | Back side | 0.944 | 0.357 | 0.340 | 0.029 | 1.301 | 1.284 | 0.973 |
| NR n41 | Front side | 0.281 | 0.219 | 0.043 | 0.000 | 0.500 | 0.324 | 0.281 |
| | Back side | 0.940 | 0.357 | 0.340 | 0.029 | 1.297 | 1.280 | 0.969 |
| NR n66 | Front side | 0.757 | 0.219 | 0.043 | 0.000 | 0.976 | 0.800 | 0.757 |
| | Back side | 0.911 | 0.357 | 0.340 | 0.029 | 1.268 | 1.251 | 0.940 |
| NR n70 | Front side | 0.393 | 0.219 | 0.043 | 0.000 | 0.612 | 0.436 | 0.393 |
| | Back side | 0.621 | 0.357 | 0.340 | 0.029 | 0.978 | 0.961 | 0.650 |
| NR n71 | Front side | 0.372 | 0.219 | 0.043 | 0.000 | 0.591 | 0.415 | 0.372 |
| | Back side | 0.510 | 0.357 | 0.340 | 0.029 | 0.867 | 0.850 | 0.539 |
| NR n48 | Front side | 0.334 | 0.219 | 0.043 | 0.000 | 0.553 | 0.377 | 0.334 |
| | Back side | 0.592 | 0.357 | 0.340 | 0.029 | 0.949 | 0.932 | 0.621 |
| NR n77-3500 | Front side | 0.302 | 0.219 | 0.043 | 0.000 | 0.521 | 0.345 | 0.302 |
| | Back side | 0.512 | 0.357 | 0.340 | 0.029 | 0.869 | 0.852 | 0.541 |
| NR n77-3900 | Front side | 0.436 | 0.219 | 0.043 | 0.000 | 0.655 | 0.479 | 0.436 |
| | Back side | 1.189 | 0.357 | 0.340 | 0.029 | 1.546 | 1.529 | 1.218 |



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**Hotspot:**

| Test position | | SARmax (W/kg) | | | | Summed SAR | | |
|---|---|---|---|---|---|---|---|---|
| | | Main | WiFi 2.4G Ant5 | WiFi 5G Ant5 | BT Ant5 | | | |
| | | 1 | 2 | 3 | 4 | 1+2 | 1+3 | 1+4 |
| GSM850 | Front side | 0.540 | 0.210 | 0.041 | - | 0.750 | 0.581 | 0.540 |
| | Back side | 0.808 | 0.359 | 0.353 | 0.037 | 1.167 | 1.161 | 0.845 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.204 | - | - | - | 0.204 | 0.204 | 0.204 |
| GSM1900 | Front side | 0.490 | 0.210 | 0.041 | - | 0.700 | 0.531 | 0.490 |
| | Back side | 0.629 | 0.359 | 0.353 | 0.037 | 0.988 | 0.982 | 0.666 |
| | Left side | 0.163 | - | - | - | 0.163 | 0.163 | 0.163 |
| | Right side | 0.058 | 0.181 | 0.122 | 0.029 | 0.239 | 0.180 | 0.087 |
| | Top side | 0.932 | 0.294 | 0.219 | 0.041 | 1.226 | 1.151 | 0.973 |
| | Bottom side | - | - | - | - | - | - | - |
| WCDMA II | Front side | 0.420 | 0.210 | 0.041 | - | 0.630 | 0.461 | 0.420 |
| | Back side | 0.575 | 0.359 | 0.353 | 0.037 | 0.934 | 0.928 | 0.612 |
| | Left side | 0.139 | - | - | - | 0.139 | 0.139 | 0.139 |
| | Right side | 0.036 | 0.181 | 0.122 | 0.029 | 0.217 | 0.158 | 0.065 |
| | Top side | 0.809 | 0.294 | 0.219 | 0.041 | 1.103 | 1.028 | 0.850 |
| | Bottom side | - | - | - | - | - | - | - |
| WCDMA V | Front side | 0.318 | 0.210 | 0.041 | - | 0.528 | 0.359 | 0.318 |
| | Back side | 0.478 | 0.359 | 0.353 | 0.037 | 0.837 | 0.831 | 0.515 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | 0.058 | 0.181 | 0.122 | 0.029 | 0.239 | 0.180 | 0.087 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.333 | - | - | - | 0.333 | 0.333 | 0.333 |
| LTE B2 | Front side | 0.503 | 0.210 | 0.041 | - | 0.713 | 0.544 | 0.503 |
| | Back side | 1.105 | 0.359 | 0.353 | 0.037 | 1.464 | 1.458 | 1.142 |
| | Left side | 0.899 | - | - | - | 0.899 | 0.899 | 0.899 |
| | Right side | 0.059 | 0.181 | 0.122 | 0.029 | 0.240 | 0.181 | 0.088 |
| | Top side | 0.980 | 0.294 | 0.219 | 0.041 | 1.274 | 1.199 | 1.021 |
| | Bottom side | - | - | - | - | - | - | - |
| LTE B12 | Front side | 0.289 | 0.210 | 0.041 | - | 0.499 | 0.330 | 0.289 |
| | Back side | 0.441 | 0.359 | 0.353 | 0.037 | 0.800 | 0.794 | 0.478 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.310 | - | - | - | 0.310 | 0.310 | 0.310 |
| LTE B14 | Front side | 0.283 | 0.210 | 0.041 | - | 0.493 | 0.324 | 0.283 |
| | Back side | 0.424 | 0.359 | 0.353 | 0.037 | 0.783 | 0.777 | 0.461 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.172 | - | - | - | 0.172 | 0.172 | 0.172 |
| LTE B26 | Front side | 0.308 | 0.210 | 0.041 | - | 0.518 | 0.349 | 0.308 |
| | Back side | 0.491 | 0.359 | 0.353 | 0.037 | 0.850 | 0.844 | 0.528 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.331 | - | - | - | 0.331 | 0.331 | 0.331 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LTE B30 | Front side | 0.428 | 0.210 | 0.041 | - | 0.638 | 0.469 | 0.428 |
| | Back side | 1.164 | 0.359 | 0.353 | 0.037 | 1.523 | 1.517 | 1.201 |
| | Left side | 0.470 | - | - | - | 0.470 | 0.470 | 0.470 |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | 0.518 | 0.294 | 0.219 | 0.041 | 0.812 | 0.737 | 0.559 |
| | Bottom side | - | - | - | - | - | - | - |
| LTE B48 | Front side | 0.360 | 0.210 | 0.041 | - | 0.570 | 0.401 | 0.360 |
| | Back side | 0.728 | 0.359 | 0.353 | 0.037 | 1.087 | 1.081 | 0.765 |
| | Left side | 0.172 | - | - | - | 0.172 | 0.172 | 0.172 |
| | Right side | 0.195 | 0.181 | 0.122 | 0.029 | 0.376 | 0.317 | 0.224 |
| | Top side | 0.558 | 0.294 | 0.219 | 0.041 | 0.852 | 0.777 | 0.599 |
| | Bottom side | - | - | - | - | - | - | - |
| LTE B66 | Front side | 0.585 | 0.210 | 0.041 | - | 0.795 | 0.626 | 0.585 |
| | Back side | 0.984 | 0.359 | 0.353 | 0.037 | 1.343 | 1.337 | 1.021 |
| | Left side | 0.329 | - | - | - | 0.329 | 0.329 | 0.329 |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | 0.960 | 0.294 | 0.219 | 0.041 | 1.254 | 1.179 | 1.001 |
| | Bottom side | - | - | - | - | - | - | - |
| LTE B71 | Front side | 0.281 | 0.210 | 0.041 | - | 0.491 | 0.322 | 0.281 |
| | Back side | 0.438 | 0.359 | 0.353 | 0.037 | 0.797 | 0.791 | 0.475 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | 0.076 | 0.181 | 0.122 | 0.029 | 0.257 | 0.198 | 0.105 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.267 | - | - | - | 0.267 | 0.267 | 0.267 |
| NR n2 | Front side | 0.467 | 0.210 | 0.041 | - | 0.677 | 0.508 | 0.467 |
| | Back side | 0.845 | 0.359 | 0.353 | 0.037 | 1.204 | 1.198 | 0.882 |
| | Left side | 0.133 | - | - | - | 0.133 | 0.133 | 0.133 |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | 1.086 | 0.294 | 0.219 | 0.041 | 1.380 | 1.305 | 1.127 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n25 | Front side | 0.627 | 0.210 | 0.041 | - | 0.837 | 0.668 | 0.627 |
| | Back side | 0.864 | 0.359 | 0.353 | 0.037 | 1.223 | 1.217 | 0.901 |
| | Left side | 0.233 | - | - | - | 0.233 | 0.233 | 0.233 |
| | Right side | 0.063 | 0.181 | 0.122 | 0.029 | 0.244 | 0.185 | 0.092 |
| | Top side | 1.059 | 0.294 | 0.219 | 0.041 | 1.353 | 1.278 | 1.100 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n26 | Front side | 0.443 | 0.210 | 0.041 | - | 0.653 | 0.484 | 0.443 |
| | Back side | 0.677 | 0.359 | 0.353 | 0.037 | 1.036 | 1.030 | 0.714 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.446 | - | - | - | 0.446 | 0.446 | 0.446 |
| NR n30 | Front side | 0.385 | 0.210 | 0.041 | - | 0.595 | 0.426 | 0.385 |
| | Back side | 1.033 | 0.359 | 0.353 | 0.037 | 1.392 | 1.386 | 1.070 |
| | Left side | 0.422 | - | - | - | 0.422 | 0.422 | 0.422 |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | 0.914 | 0.294 | 0.219 | 0.041 | 1.208 | 1.133 | 0.955 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n41 | Front side | 0.434 | 0.210 | 0.041 | - | 0.644 | 0.475 | 0.434 |
| | Back side | 1.054 | 0.359 | 0.353 | 0.037 | 1.413 | 1.407 | 1.091 |
| | Left side | 0.582 | - | - | - | 0.582 | 0.582 | 0.582 |
| | Right side | - | 0.181 | 0.122 | 0.029 | 0.181 | 0.122 | 0.029 |
| | Top side | 0.693 | 0.294 | 0.219 | 0.041 | 0.987 | 0.912 | 0.734 |
| | Bottom side | - | - | - | - | - | - | - |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NR n66 | Front side | 0.488 | 0.210 | 0.041 | - | 0.698 | 0.529 | 0.488 |
| | Back side | 0.682 | 0.359 | 0.353 | 0.037 | 1.041 | 1.035 | 0.719 |
| | Left side | 0.446 | - | - | - | 0.446 | 0.446 | 0.446 |
| | Right side | 0.086 | 0.181 | 0.122 | 0.029 | 0.267 | 0.208 | 0.115 |
| | Top side | 0.771 | 0.294 | 0.219 | 0.041 | 1.065 | 0.990 | 0.812 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n70 | Front side | 0.649 | 0.210 | 0.041 | - | 0.859 | 0.690 | 0.649 |
| | Back side | 0.993 | 0.359 | 0.353 | 0.037 | 1.352 | 1.346 | 1.030 |
| | Left side | 0.353 | - | - | - | 0.353 | 0.353 | 0.353 |
| | Right side | 0.131 | 0.181 | 0.122 | 0.029 | 0.312 | 0.253 | 0.160 |
| | Top side | 0.970 | 0.294 | 0.219 | 0.041 | 1.264 | 1.189 | 1.011 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n71 | Front side | 0.409 | 0.210 | 0.041 | - | 0.619 | 0.450 | 0.409 |
| | Back side | 0.638 | 0.359 | 0.353 | 0.037 | 0.997 | 0.991 | 0.675 |
| | Left side | - | - | - | - | - | - | - |
| | Right side | 0.075 | 0.181 | 0.122 | 0.029 | 0.256 | 0.197 | 0.104 |
| | Top side | - | 0.294 | 0.219 | 0.041 | 0.294 | 0.219 | 0.041 |
| | Bottom side | 0.435 | - | - | - | 0.435 | 0.435 | 0.435 |
| NR n48 | Front side | 0.629 | 0.210 | 0.041 | - | 0.839 | 0.670 | 0.629 |
| | Back side | 1.076 | 0.359 | 0.353 | 0.037 | 1.435 | 1.429 | 1.113 |
| | Left side | 0.341 | - | - | - | 0.341 | 0.341 | 0.341 |
| | Right side | 0.378 | 0.181 | 0.122 | 0.029 | 0.559 | 0.500 | 0.407 |
| | Top side | 0.998 | 0.294 | 0.219 | 0.041 | 1.292 | 1.217 | 1.039 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n77-3500 | Front side | 0.611 | 0.210 | 0.041 | - | 0.821 | 0.652 | 0.611 |
| | Back side | 1.064 | 0.359 | 0.353 | 0.037 | 1.423 | 1.417 | 1.101 |
| | Left side | 0.214 | - | - | - | 0.214 | 0.214 | 0.214 |
| | Right side | 0.553 | 0.181 | 0.122 | 0.029 | 0.734 | 0.675 | 0.582 |
| | Top side | 1.120 | 0.294 | 0.219 | 0.041 | 1.414 | 1.339 | 1.161 |
| | Bottom side | - | - | - | - | - | - | - |
| NR n77-3900 | Front side | 0.918 | 0.210 | 0.041 | - | 1.128 | 0.959 | 0.918 |
| | Back side | 1.106 | 0.359 | 0.353 | 0.037 | 1.465 | 1.459 | 1.143 |
| | Left side | 0.231 | - | - | - | 0.231 | 0.231 | 0.231 |
| | Right side | 0.214 | 0.181 | 0.122 | 0.029 | 0.395 | 0.336 | 0.243 |
| | Top side | 0.957 | 0.294 | 0.219 | 0.041 | 1.251 | 1.176 | 0.998 |
| | Bottom side | - | - | - | - | - | - | - |



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**Product specific 10g SAR :**

| Test position | | SARmax (W/kg) Main | WiFi 5G Ant5 | Summed SAR |
|---|---|---|---|---|
| | | 1 | 2 | 1+2 |
| GSM1900 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.131 | 0.702 | 2.833 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 3.036 | 0.734 | 3.770 |
| | Bottom side | - | - | - |
| WCDMA II | Front side | 2.055 | 0.118 | 2.173 |
| | Back side | 1.711 | 0.702 | 2.413 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 2.239 | 0.734 | 2.973 |
| | Bottom side | - | - | - |
| LTE B2 | Front side | 2.345 | 0.118 | 2.463 |
| | Back side | 1.820 | 0.702 | 2.522 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 2.701 | 0.734 | 3.435 |
| | Bottom side | - | - | - |
| LTE B30 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.721 | 0.702 | 3.423 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | - | 0.734 | 0.734 |
| | Bottom side | - | - | - |
| LTE B66 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.242 | 0.702 | 2.944 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 2.193 | 0.734 | 2.927 |
| | Bottom side | - | - | - |
| NR n2 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.297 | 0.702 | 2.999 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 3.128 | 0.734 | 3.862 |
| | Bottom side | - | - | - |
| NR n25 | Front side | 2.762 | 0.118 | 2.880 |
| | Back side | 2.492 | 0.702 | 3.194 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 3.149 | 0.734 | 3.883 |
| | Bottom side | - | - | - |
| NR n30 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.670 | 0.702 | 3.372 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 1.706 | 0.734 | 2.440 |
| | Bottom side | - | - | - |
| NR n41 | Front side | - | 0.118 | 0.118 |

| | | | | |
|---|---|---|---|---|
| | Back side | 2.956 | 0.702 | 3.658 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | - | 0.734 | 0.734 |
| | Bottom side | - | - | - |
| NR n66 | Front side | 2.187 | 0.118 | 2.305 |
| | Back side | 2.676 | 0.702 | 3.378 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 2.741 | 0.734 | 3.475 |
| | Bottom side | - | - | - |
| NR n48 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.890 | 0.702 | 3.592 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 1.419 | 0.734 | 2.153 |
| | Bottom side | - | - | - |
| NR n77-3500 | Front side | - | 0.118 | 0.118 |
| | Back side | 2.383 | 0.702 | 3.085 |
| | Left side | - | - | - |
| | Right side | - | 0.190 | 0.190 |
| | Top side | 1.072 | 0.734 | 1.806 |
| | Bottom side | - | - | - |

# 10 Equipment list

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Platform | | SPEAG DASY5 Professional | | | | |
| Description | | SAR Test System (Frequency range 300MHz-6GHz) | | | | |
| 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 | SAM 7 | 1702 | NCR | NCR |
| ☒ | DAE | SPEAG | DAE4 | 1327 | 2023-11-17 | 2024-11-16 |
| ☒ | E-Field Probe | SPEAG | EX3DV4 | 7735 | 2023-10-17 | 2024-10-26 |
| ☒ | Validation Kits | SPEAG | D750V3 | 1210 | 2021-09-08 | 2024-09-07 |
| ☒ | 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 |
| ☒ | Validation Kits | SPEAG | D2300V2 | 1072 | 2022-06-16 | 2025-06-15 |
| ☒ | Validation Kits | SPEAG | D2450V2 | 922 | 2023-08-28 | 2026-08-27 |
| ☒ | Validation Kits | SPEAG | D2600V2 | 1187 | 2022-02-03 | 2025-02-02 |
| ☒ | Validation Kits | SPEAG | D3500V2 | 1133 | 2022-02-08 | 2025-02-07 |
| ☒ | Validation Kits | SPEAG | D3700V2 | 1108 | 2022-02-07 | 2025-02-06 |
| ☒ | Validation Kits | SPEAG | D3900V2 | 1083 | 2022-02-08 | 2025-02-07 |
| ☒ | Validation Kits | SPEAG | D5GHzV2 | 1313 | 2022-01-25 | 2025-01-24 |
| ☒ | Dielectric parameter probes | SPEAG | DAKS-3.5 | 1120 | 2023-06-06 | 2024-06-05 |
| ☒ | Vector Network Analyzer and Vector Reflectometer | SPEAG | DAKS_VNA R140 | 0050920 | 2023-06-06 | 2024-06-05 |
| ☒ | Universal Radio Communication Tester | R&S | CMW500 | 111637 | 2023-09-13 | 2024-09-12 |
| ☒ | RF Bi-Directional Coupler | Agilent | 86205-60001 | MY31400031 | NCR | NCR |
| ☒ | Signal Generator | R&S | SMB100A | 182393 | 2024-02-04 | 2025-02-03 |
| ☒ | Preamplifier | Qiji | YX28980933 | 202104001 | NCR | NCR |
| ☒ | Power Sensor | Keysight | U2002H | 121251 | 2023-9-13 | 2024-09-12 |
| ☒ | 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 | SUW201-19-02 | 2023-09-15 | 2024-09-14 |
| ☒ | Humidity and Temperature Indicator | MingGao | MingGao | NA | 2023-09-15 | 2024-09-14 |

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

## 11 Calibration certificate

Please see the Appendix C

## 12 Photographs

Please see the Appendix D

## Appendix A: Detailed System Check Results

## Appendix B: Detailed Test Results

## Appendix C: Calibration certificate

## Appendix D: Photographs

## Appendix E: Conducted RF Output Power

**---END---**