TESTING
NVLAP LAB CODE 600118-0

SAR TEST REPORT

No. I23Z70141-SEM01

For

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

Model Name: SM-A057F/DS，SM-A057F

with

Hardware Version: REV1.0

Software Version: A057F.001

FCC ID: ZCASMA057F

Issued Date: 2023-8-15

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Issue Date	Description
I23Z70141-SEM01	Rev.0	2023-8-15	Initial creation of test report

TABLE OF CONTENT

1 Test Laboratory

1.1 Testing Location

Company Name:	CTTL
Address:	No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

1.2 Testing Environment

Temperature:	18°C~25°C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω
Ambient noise & Reflection:	< 0.012 W/kg

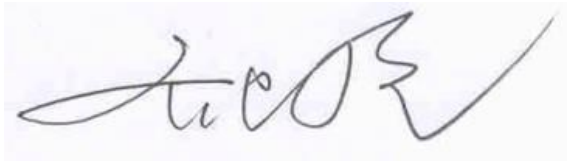
1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Yao Juming
Testing Start Date:	July 6, 2023
Testing End Date:	August 3, 2023

1.4 Signature

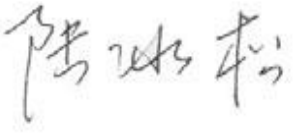
Yao Juming

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Samsung Electronics Co., Ltd. Multi-band GSM/WCDMA/LTE Phone with Bluetooth, WLAN SM-A057F/DS, SM-A057F is as follows:

Table 2.1: Highest Reported SAR (1g)

Technology Band	Head	Hotspot	Body-Worn	Phablet-10g	Equipment Class
GSM850	**0.28**	**0.60**	**0.60**	/	TNE
WCDMA 850	**0.34**	**0.63**	**0.63**	/	
LTE Band5	**0.41**	**0.54**	**0.54**	/	
LTE Band7	**0.67**	**0.92**	**0.52**	/	
LTE Band28	**0.18**	**0.33**	**0.33**	/	
LTE Band38	**0.32**	**0.73**	**0.57**	/	
LTE Band41	**0.56**	**0.54**	**0.54**	/	
WLAN 2.4GHz	**0.44**	**0.24**	**0.24**	/	DTS
WLAN 5GHz	**0.35**	**0.49**	**0.36**	/	NII
BT	**0.16**	**0.03**	**0.03**	/	DSS

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/kg as averaged over any 1g tissue according to the ANSI C95.1-1992.

For body operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and which provides a minimum separation distance of 10 mm/13mm/14mm/20mm/21mm/22mm/23mm between this device and the body of the user. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output.

The measurement together with the test system set-up is described in annex C of this test report. A detailed description of the equipment under test can be found in chapter 4 of this test report. The highest reported SAR value is obtained at the case of **(Table 2.1),** and the values are**:**

Head: 0.67 W/kg(1g)

Body: 0.92 W/kg(1g) .

Table 2.2: The sum of SAR values for Main antenna + Wifi2.4G

	Position	**Main antenna**	**WiFi-2.4G**	**Sum**
Highest SAR value for Head	Left head, Cheek (LTE B7)	0.67	0.44	**1.11**
Highest SAR value for Body	Rear 10mm (WB5)	0.63	0.24	**0.87**

Table 2.3: The sum of SAR values for Main antenna + Wifi5G +BT

	Position	Main antenna	WiFi-5G	BT	Sum
Highest SAR value for Head	Left head, Cheek (LTE B7)	0.67	0.35	0.16	**1.18**
Highest SAR value for Body	Rear 10mm (WB5)	0.63	0.36	0.03	**1.02**

Conclusion:

According to the above tables, the sum of reported SAR values is<1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

According to the above tables, the highest sum of reported SAR values is **1.18 W/kg (1g)**. The detail for simultaneous transmission consideration is described in chapter 13.

3 Client Information

3.1 Applicant Information

Company Name:	SAMSUNG Electronics Co., Ltd.
Address/Post:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact Person:	Jenni Chun
Contact Email:	j1.chun@samsung.com
Telephone:	+1-201-937-4203
Fax	/

3.2 Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address/Post:	Samsung R5, Maetan dong 129, Samsung ro
Contact Person:	Sunghoon Cho
Contact Email:	ggobi.cho@samsung.com
Telephone:	+82-10-2722-4159

4 Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1 About EUT

Description:	Multi-band GSM/WCDMA/LTE Phone with Bluetooth, WLAN
Model name:	SM-A057F/DS，SM-A057F
Operating mode(s):	GSM 850/900/1800, WCDMA B1/B5/B8 LTE Band 1/3/5/7/8/20/28/38/40/41 BT, Wi-Fi(2.4G/5G)
Tested Tx Frequency:	824 – 849 MHz (GSM 850)
	824 – 849 MHz (WCDMA 850 Band V)
	824 – 849 MHz (LTE Band 5)
	2502.5 – 2567.5 MHz (LTE Band 7)
	704.5–746.5 MHz (LTE Band 28)
	2570-2620 MHz(LTE Band 38)
	2498.5 – 2687.5 MHz (LTE Band41)
	2412 – 2462 MHz (Wi-Fi 2.4G)
	5180 – 5240 MHz (Wi-Fi 5.2G)
	5260 – 5320 MHz (Wi-Fi 5.3G)
	5500 – 5700 MHz (Wi-Fi 5.5G)
	5745 – 5825 MHz (Wi-Fi 5.8G)
	2400 – 2483.5 MHz (Bluetooth)
GPRS/EGPRS Multislot Class:	33
Test device production information:	Production unit
Device type:	Portable device
Antenna type:	Integrated antenna
Hotspot mode:	Support

4.2 Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version
EUT1	I23Z70141UT18a	REV1.0	A055F.001
EUT2	I23Z70141UT26a	REV1.0	A055F.001
EUT3	I23Z70141UT29a	REV1.0	A055F.001
EUT4	I23Z70141UT21a	REV1.0	A055F.001
EUT5	I23Z70141UT03a	REV1.0	A055F.001
EUT6	I23Z70141UT17a	REV1.0	A055F.001
EUT7	I23Z70141UT27a	REV1.0	A055F.001

*EUT ID: is used to identify the test sample in the lab internally.

Note: It is performed to test SAR with the EUT1-4 and conducted power with the EUT5-7.

4.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	SLC-51	/	Ningde Amperex Technology Limited

*AE ID: is used to identify the test sample in the lab internally.

5 TEST METHODOLOGY

5.1 Applicable Limit Regulations

ANSI C95.1–1992:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

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.

KDB447498 D01: General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

KDB648474 D04 Handset SAR v01r03: SAR Evaluation Considerations for Wireless Handsets.

KDB941225 D01 SAR test for 3G devices v03r01: SAR Measurement Procedures for 3G Devices

KDB941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

KDB941225 D06 Hotspot Mode SAR v02r01: SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

KDB248227 D01 802.11 Wi-Fi SAR v02r02: SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS

KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz.

KDB865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations

6 Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

SAR is expressed in units of Watts per kilogram (W/kg)
SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 Tissue Simulating Liquids

7.1 Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

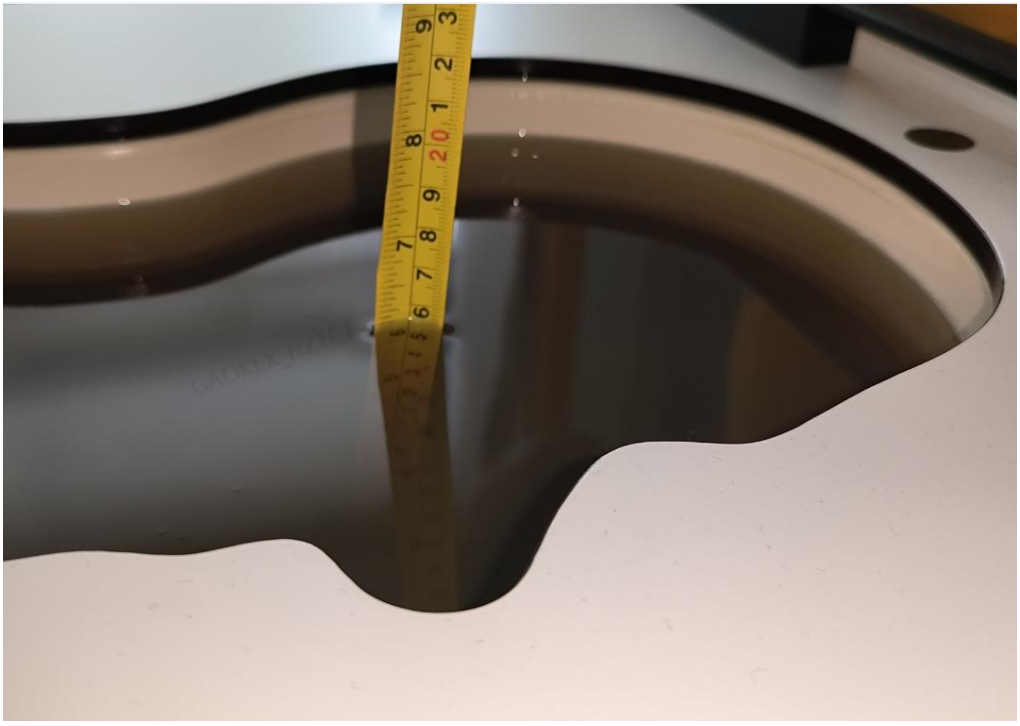
Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
750	Head	0.89	0.85～0.93	41.94	39.8～44.0
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
2450	Head	1.67	1.59～1.75	39.47	37.5～41.4
2600	Head	1.96	1.76～2.16	39.01	35.11～42.91
5250	Head	4.71	4.47～4.95	35.93	34.13～37.73
5600	Head	5.07	4.82～5.32	35.53	33.8～37.3
5750	Head	5.22	4.96～5.48	35.36	33.59～37.13

7.2 Dielectric Performance

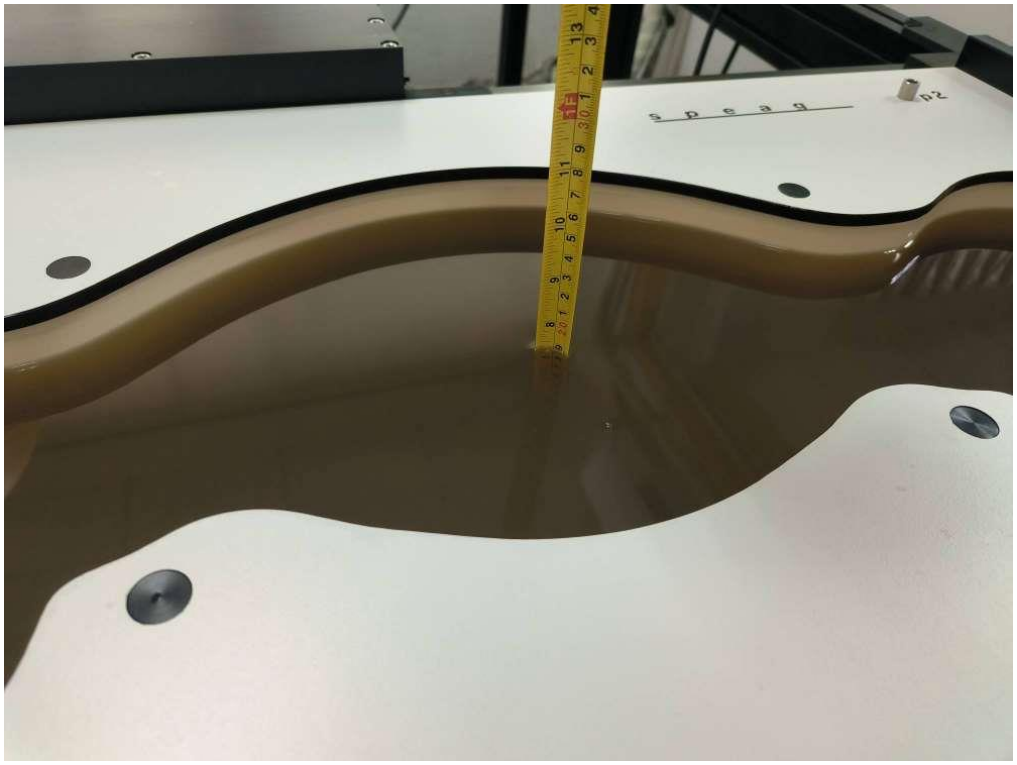
Table 7.3: Dielectric Performance of Tissue Simulating Liquid

Measurement Date (yyyy-mm-dd)	Type	Frequency	Permittivity ε	Drift (%)	Conductivity σ (S/m)	Drift (%)
2023-7-15	Head	750 MHz	40.35	-3.79	0.894	0.45
2023-7-6	Head	835 MHz	42.587	2.62	0.884	-1.78
2023-7-14	Head	2450 MHz	40.236	2.64	1.761	-2.17
2023-7-11	Head	2600 MHz	40.12	2.85	1.895	-3.32
2023-7-28	Head	5250 MHz	35.657	-0.76	4.736	0.55
2023-7-31	Head	5600 MHz	36.549	2.87	4.97	-1.97
2023-8-3	Head	5750 MHz	35.756	1.12	5.184	-0.69

Note: The liquid temperature is 22.0℃



Picture 7-1 Liquid depth in the Head Phantom

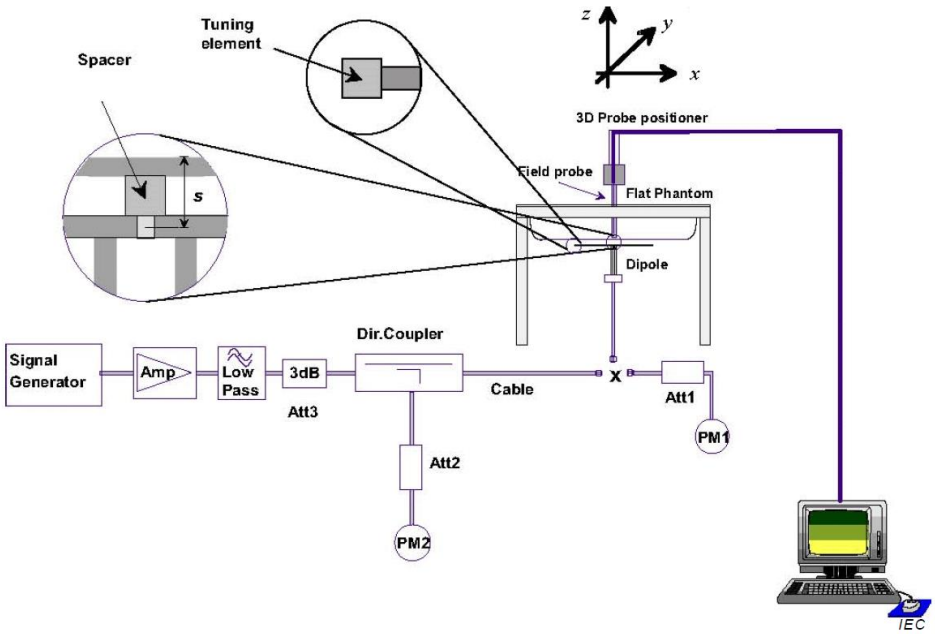


Picture 7-2 Liquid depth in the Flat Phantom

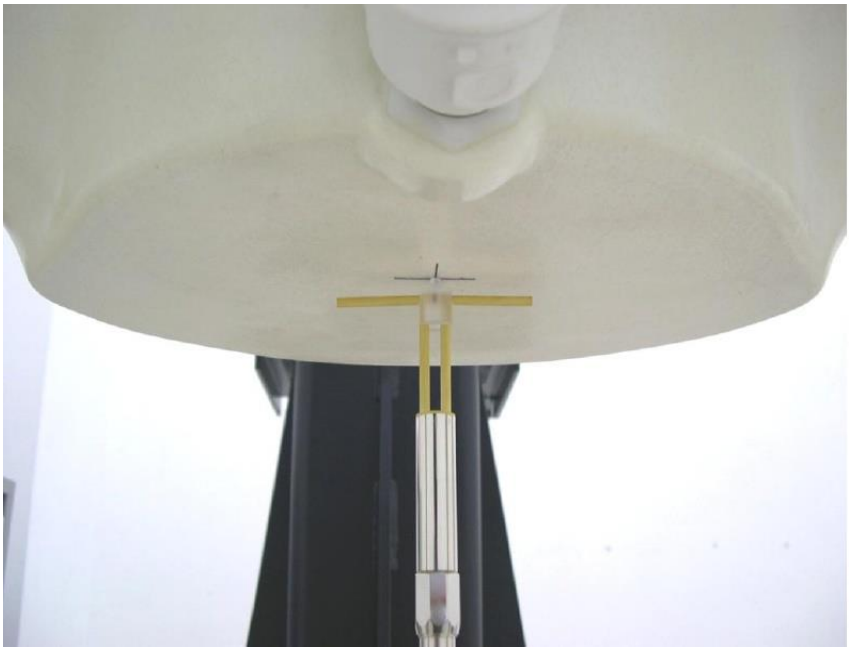
8 System verification

8.1 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2 System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

The system verification results are required that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR. The details are presented in annex B.

Table 8.1: System Verification of Head

Measurement Date (yyyy-mm-dd)	Frequency	Target value (W/kg)		Measured value(W/kg)		Deviation	
		10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average
2023-7-15	750 MHz	5.64	8.63	5.88	9	4.26%	4.29%
2023-7-6	835 MHz	6.34	9.73	6.24	9.56	-1.58%	-1.75%
2023-7-14	2450 MHz	24.9	52.7	24.36	51.4	-2.17%	-2.47%
2023-7-11	2600 MHz	25.2	55.8	25	55.28	-0.79%	-0.93%
2023-7-28	5250 MHz	22.8	79.6	22.7	78.9	-0.44%	-0.88%
2023-7-31	5600 MHz	23.8	83.6	23.4	82.4	-1.68%	-1.44%
2023-8-3	5750 MHz	22.7	80.5	23.1	81.6	1.76%	1.37%

9 Measurement Procedures

9.1 Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in picture 9.1.

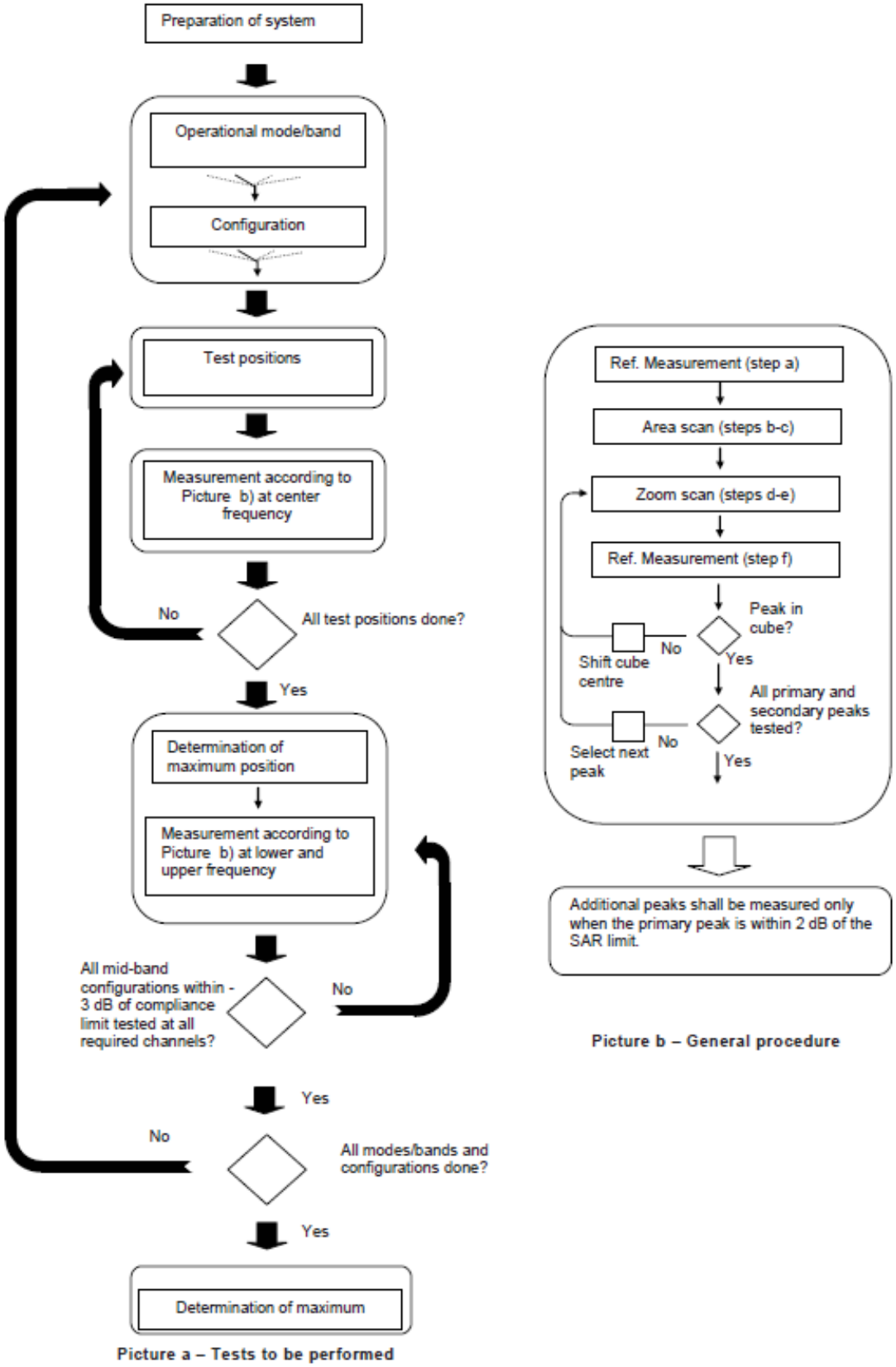
Step 1: The tests described in 9.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in annex D),
b) all configurations for each device position in a), e.g., antenna extended and retracted, and
c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., N_c > 3), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1,perform all tests described in 9.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9.1Block diagram of the tests to be performed

9.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. 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 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

<table>
<tr><td colspan="3"></td><td>≤ 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: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 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 ≤ 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: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 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>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 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>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

9.3 WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCH$_n$), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d （SF）	β_c/β_d	β_{hs}	CM/dB
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15	15/15	64	12/15	24/25	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

For Release 6 HSPA Data Devices

Sub-test	β_c	β_d	β_d （SF）	β_c/β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} （SF）	β_{ed} （codes）	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	1.5	1.5	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	1.5	1.5	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	1.5	1.5	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	1.5	1.5	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	1.5	1.5	21	81

Rel.8 DC-HSDPA (Cat 24)

SAR test exclusion for Rel.8 DC-HSDPA must satisfy the SAR test exclusion requirements of Rel.5 HSDPA. SAR test exclusion for DC-HSDPA devices is determined by power measurements according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to qualify for SAR test exclusion.

9.4 SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, Rohde & Rchwarz CMW500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.
It is performed for conducted power and SAR based on the KDB941225 D05.
SAR is evaluated separately according to the following procedures for the different test positions in each exposure condition – head, body, body-worn accessories and other use conditions. The procedures in the following subsections are applied separately to test each LTE frequency band.

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 among 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.

TDD test:

TDD testing is performed using guidance from FCC KDB 941225 D05 and the SAR test guidance provided in April 2013 TCB works hop notes. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211.

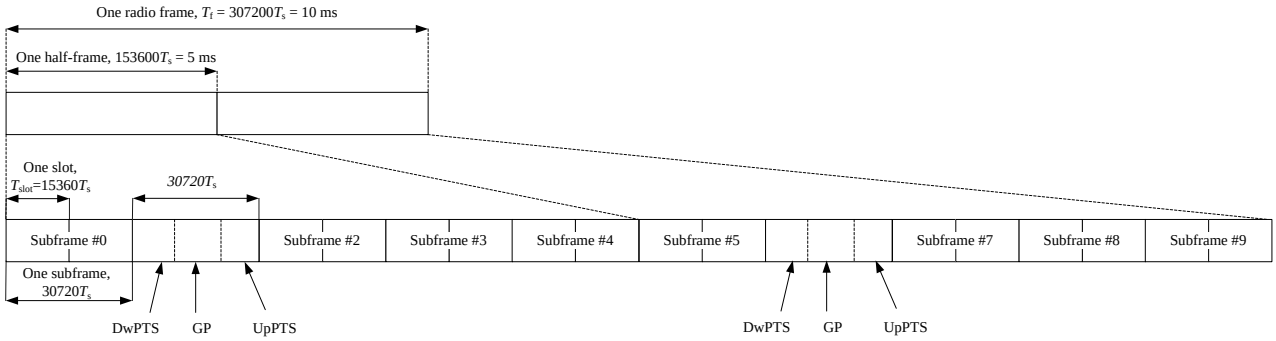


Figure 9.2: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 9.1: 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	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Table 9.2: 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

Duty factor is calculated by:

Duty factor = uplink frame*6+UpPTS*2/one frame length

= (30720.T_s * 6+5120. T_s*2)/307200.T_s

= 0.633

9.5 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.6 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in section14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10 Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-gSAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz)and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm mare 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11 Conducted Output Power

Table11.1: Summary of Receiver detection mechanism-

Antenna	Receiver on	Receiver off+ Sar sensor off	Receiver off+ Sar sensor on
Main Antenna	Power Level A1	Power Level B1	Power Level C1
WIFI Antenna	Power Level A1	Power Level B1	Power Level C1

11.1 GSM Measurement result

Table 11.1-1: The conducted power measurement results –GSM850

-Power Level A1/B1/C1

GSM 850 Speech (GMSK)	Measured timeslot-averaged output power (dBm)			Tune up	calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.37	33.28	33.25	34.00	/	/	/	/
GSM 850 GPRS (GMSK)	Measured timeslot-averaged output power (dBm)				calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.61	33.43	33.35	34.00	-9.03	24.58	24.40	24.32
2 Txslots	32.35	32.26	32.14	32.50	-6.02	26.33	26.24	26.12
3 Txslots	29.88	29.80	29.74	30.50	-4.26	25.62	25.54	25.48
4 Txslots	27.56	27.51	27.46	28.50	-3.01	24.55	24.50	24.45
GSM 850 EGPRS (GMSK)	Measured timeslot-averaged output power (dBm)				calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	33.19	33.18	33.15	34.00	-9.03	24.16	24.15	24.12
2 Txslots	31.95	31.98	31.92	32.50	-6.02	25.93	25.96	25.90
3 Txslots	29.48	29.50	29.54	30.50	-4.26	25.22	25.24	25.28
4 Txslots	27.20	27.23	27.27	28.50	-3.01	24.19	24.22	24.26
GSM 850 EGPRS (8PSK)	Measured timeslot-averaged output power (dBm)				calculation	Source-based time-averaged output power (dBm)		
	251	190	128			251	190	128
1 Txslot	26.77	26.83	26.82	27.50	-9.03	17.74	17.80	17.79
2 Txslots	25.24	25.38	25.58	26.00	-6.02	19.22	19.36	19.56
3Txslots	23.10	23.22	23.56	24.00	-4.26	18.84	18.96	19.30
4 Txslots	20.46	21.12	20.57	21.50	-3.01	17.45	18.11	17.56

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 2Txslots for GSM850.

11.2 WCDMA Measurement result

Table 11.2-1: The conducted Power for WCDMA B5 -Power Level A1/B1/C1

WCDMA850	FDDV result (dBm)			Tune up
	4233/4458	4183/4408	4132/4357	
	(846.6MHz)	(836.6MHz)	(826.4MHz)	
	23.71	23.75	23.62	25.00
HSUPA	21.89	22.04	21.75	23.00
	21.43	21.58	21.34	23.00
	21.94	21.95	21.85	23.00
	21.84	22.01	21.94	23.00
	21.93	21.97	21.84	23.00
DC-HSDPA	21.92	21.93	21.84	23.50
	21.95	21.92	21.81	23.50
	21.49	21.53	21.31	23.00
	21.47	21.52	21.29	23.00

11.3 LTE Measurement result

Maximum Target Power for Production Unit

Band	Receiver on	Receiver off+ Sar sensor off	Receiver off+ Sar sensor on
	Power Level A1	Power Level B1	Power Level C1
LTE B5	25.7	25.7	25.7
LTE B7	25.7	25.7	22.5
LTE B28	25.7	25.7	25.7
LTE B38	25.7	25.7	25.7
LTE B41	25.7	25.7	25.7

LTE B5 (Power Level A1/B1/C1)

LTE B5					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
1.4MHz	1RB-High (5)	848.3 (20643)	24.93	23.12	22.55
		836.5 (20525)	24.87	23.35	23.15
		824.7 (20407)	24.83	23.28	23.22
	1RB-Middle (3)	848.3 (20643)	24.89	23.34	22.15
		836.5 (20525)	24.93	23.52	23.45
		824.7 (20407)	24.85	23.34	22.92
	1RB-Low (0)	848.3 (20643)	24.77	23.12	22.20
		836.5 (20525)	24.91	23.27	23.31
		824.7 (20407)	24.91	23.23	23.07
	3RB-High (3)	848.3 (20643)	24.85	23.48	23.63
		836.5 (20525)	24.96	23.74	23.01
		824.7 (20407)	24.90	23.41	22.82
	3RB-Middle (1)	848.3 (20643)	24.91	23.54	23.65
		836.5 (20525)	25.00	23.79	23.08
		824.7 (20407)	25.01	23.57	22.99
	3RB-Low (0)	848.3 (20643)	24.69	23.53	23.62
		836.5 (20525)	24.88	23.77	22.96
		824.7 (20407)	24.93	23.59	22.89
	6RB (0)	848.3 (20643)	23.22	22.48	22.65
		836.5 (20525)	23.37	22.68	21.14
		824.7 (20407)	23.23	22.60	21.14
3MHz	1RB-High (14)	847.5 (20635)	25.05	23.10	22.40
		836.5 (20525)	24.83	23.27	22.97
		825.5 (20415)	24.83	23.19	23.16
	1RB-Middle (7)	847.5 (20635)	25.01	23.17	22.54
		836.5 (20525)	25.07	23.43	23.04

		825.5 (20415)	24.80	23.28	23.50
	1RB-Low (0)	847.5 (20635)	24.98	23.22	22.57
		836.5 (20525)	24.87	23.28	22.70
		825.5 (20415)	24.67	23.35	22.91
	8RB-High (7)	847.5 (20635)	23.39	22.55	22.45
		836.5 (20525)	23.29	22.64	22.70
		825.5 (20415)	23.30	22.56	21.23
	8RB-Middle (4)	847.5 (20635)	23.28	22.56	22.56
		836.5 (20525)	23.37	22.64	22.68
		825.5 (20415)	23.35	22.52	21.23
	8RB-Low (0)	847.5 (20635)	23.24	22.50	22.40
		836.5 (20525)	23.39	22.64	22.66
		825.5 (20415)	23.20	22.49	21.28
	15RB (0)	847.5 (20635)	23.42	22.46	22.50
		836.5 (20525)	23.35	22.46	22.60
		825.5 (20415)	23.26	22.11	21.17
5MHz	1RB-High (24)	846.5 (20625)	25.04	23.09	22.32
		836.5 (20525)	24.63	23.11	22.85
		826.5 (20425)	24.72	23.15	22.73
	1RB-Middle (12)	846.5 (20625)	24.99	23.28	23.25
		836.5 (20525)	25.06	23.39	23.48
		826.5 (20425)	25.20	23.27	23.12
	1RB-Low (0)	846.5 (20625)	24.66	23.11	22.48
		836.5 (20525)	24.74	23.17	22.71
		826.5 (20425)	24.95	23.26	23.12
	12RB-High (13)	846.5 (20625)	23.43	22.53	22.52
		836.5 (20525)	23.46	22.54	21.39
		826.5 (20425)	23.31	22.41	21.05
	12RB-Middle (6)	846.5 (20625)	23.44	22.53	22.64
		836.5 (20525)	23.52	22.61	21.46
		826.5 (20425)	23.48	22.57	21.05
	12RB-Low (0)	846.5 (20625)	23.34	22.40	22.47
		836.5 (20525)	23.38	22.31	21.33
		826.5 (20425)	23.39	22.54	21.39
	25RB (0)	846.5 (20625)	23.35	22.50	22.50
		836.5 (20525)	23.49	22.73	21.11
		826.5 (20425)	23.37	22.63	21.13
10MHz	1RB-High (49)	844 (20600)	24.62	23.10	22.45
		836.5 (20525)	24.40	23.16	22.86
		829 (20450)	24.43	23.12	22.74
	1RB-Middle (24)	844 (20600)	24.75	23.17	22.42
		836.5 (20525)	24.86	23.17	22.39

		829 (20450)	24.78	23.21	22.88
	1RB-Low (0)	844 (20600)	24.47	23.09	22.60
		836.5 (20525)	24.73	23.15	22.40
		829 (20450)	24.73	23.05	22.53
	25RB-High (25)	844 (20600)	23.02	22.42	22.50
		836.5 (20525)	23.02	22.33	22.33
		829 (20450)	23.17	22.46	22.28
	25RB-Middle (12)	844 (20600)	23.17	22.46	22.34
		836.5 (20525)	23.25	22.38	22.52
		829 (20450)	23.04	22.42	22.34
	25RB-Low (0)	844 (20600)	23.13	22.36	22.42
		836.5 (20525)	23.14	22.32	22.40
		829 (20450)	23.15	22.45	22.36
	50RB (0)	844 (20600)	23.08	22.30	22.35
		836.5 (20525)	23.06	22.34	22.33
		829 (20450)	23.02	22.42	22.33

LTE B7 (Power Level A1/B1)

LTE B7					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
5MHz	1RB-High (24)	2567.5 (21425)	24.53	22.76	22.01
		2535 (21100)	24.47	22.74	22.60
		2502.5 (20775)	25.02	23.09	22.32
	1RB-Middle (12)	2567.5 (21425)	24.52	22.95	22.78
		2535 (21100)	24.79	22.75	22.12
		2502.5 (20775)	24.96	23.18	22.94
	1RB-Low (0)	2567.5 (21425)	24.51	22.86	22.12
		2535 (21100)	24.52	22.99	21.80
		2502.5 (20775)	25.02	23.42	22.61
	12RB-High (13)	2567.5 (21425)	22.06	21.10	20.98
		2535 (21100)	21.97	20.98	20.87
		2502.5 (20775)	22.47	21.21	21.26
	12RB-Middle (6)	2567.5 (21425)	22.23	21.18	21.01
		2535 (21100)	22.00	20.95	20.98
		2502.5 (20775)	22.54	21.59	21.48
	12RB-Low (0)	2567.5 (21425)	22.15	20.82	20.92
		2535 (21100)	21.96	20.99	20.90
		2502.5 (20775)	22.57	21.50	21.27
	25RB (0)	2567.5 (21425)	22.09	21.11	21.06
		2535 (21100)	21.94	20.79	20.91

		2502.5 (20775)	22.47	21.58	21.42
10MHz	1RB-High (49)	2565 (21400)	24.74	23.01	22.95
		2535 (21100)	24.47	22.86	21.71
		2505 (20800)	25.01	23.00	21.91
	1RB-Middle (24)	2565 (21400)	24.93	22.82	23.15
		2535 (21100)	24.69	22.76	21.85
		2505 (20800)	24.97	23.11	22.34
	1RB-Low (0)	2565 (21400)	24.86	22.88	22.33
		2535 (21100)	24.72	22.75	21.93
		2505 (20800)	25.05	23.27	22.59
	25RB-High (25)	2565 (21400)	22.07	21.07	21.12
		2535 (21100)	21.94	21.12	19.84
		2505 (20800)	22.38	21.30	20.36
	25RB-Middle (12)	2565 (21400)	22.15	21.07	21.09
		2535 (21100)	21.99	21.16	20.17
		2505 (20800)	22.47	21.45	20.62
	25RB-Low (0)	2565 (21400)	22.13	21.13	21.15
		2535 (21100)	21.96	21.13	19.92
		2505 (20800)	22.48	21.45	20.35
	50RB (0)	2565 (21400)	22.20	20.99	21.12
		2535 (21100)	21.98	20.85	19.93
		2505 (20800)	22.46	21.37	20.40
15MHz	1RB-High (74)	2562.5 (21375)	24.88	22.83	22.51
		2535 (21100)	24.81	22.88	22.08
		2507.5 (20825)	24.63	22.92	22.61
	1RB-Middle (37)	2562.5 (21375)	24.66	22.86	22.77
		2535 (21100)	24.49	22.78	22.15
		2507.5 (20825)	25.02	22.99	22.26
	1RB-Low (0)	2562.5 (21375)	24.63	22.78	21.88
		2535 (21100)	24.53	22.71	22.41
		2507.5 (20825)	24.98	23.31	22.59
	36RB-High (38)	2562.5 (21375)	22.13	21.13	21.09
		2535 (21100)	21.94	20.79	20.90
		2507.5 (20825)	22.31	21.22	20.35
	36RB-Middle (19)	2562.5 (21375)	22.13	21.09	21.01
		2535 (21100)	21.96	20.91	21.00
		2507.5 (20825)	22.36	21.28	20.51
	36RB-Low (0)	2562.5 (21375)	22.10	20.90	20.99
		2535 (21100)	21.99	20.92	21.02
		2507.5 (20825)	22.44	21.38	20.60
	75RB (0)	2562.5 (21375)	22.13	21.00	21.00
		2535 (21100)	21.99	20.82	20.93

		2507.5 (20825)	22.37	21.27	20.35
20MHz	1RB-High (99)	2560 (21350)	24.67	22.72	22.06
		2535 (21100)	24.04	22.72	22.05
		2510 (20850)	24.19	22.79	21.82
	1RB-Middle (50)	2560 (21350)	24.42	23.01	21.76
		2535 (21100)	24.51	22.85	21.78
		2510 (20850)	24.75	22.83	21.77
	1RB-Low (0)	2560 (21350)	24.50	22.93	21.88
		2535 (21100)	24.32	22.75	21.72
		2510 (20850)	24.09	22.71	21.94
	50RB-High (50)	2560 (21350)	21.77	21.21	20.01
		2535 (21100)	21.62	20.89	19.82
		2510 (20850)	21.92	20.90	19.63
	50RB-Middle (25)	2560 (21350)	21.78	21.16	19.99
		2535 (21100)	21.65	20.96	19.88
		2510 (20850)	22.09	20.95	19.90
	50RB-Low (0)	2560 (21350)	21.87	21.23	20.10
		2535 (21100)	21.74	20.88	19.74
		2510 (20850)	22.18	21.03	19.88
	100RB (0)	2560 (21350)	21.85	21.19	20.29
		2535 (21100)	21.62	20.80	19.93
		2510 (20850)	22.00	20.90	19.94

LTE B7 (Power Level C1)

LTE B7					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
5MHz	1RB-High (24)	2567.5 (21425)	20.97	20.74	21.59
		2535 (21100)	20.83	19.94	21.14
		2502.5 (20775)	20.56	20.04	20.61
	1RB-Middle (12)	2567.5 (21425)	21.23	20.94	21.53
		2535 (21100)	20.99	20.61	20.92
		2502.5 (20775)	21.22	20.53	21.31
	1RB-Low (0)	2567.5 (21425)	20.99	20.67	21.49
		2535 (21100)	21.10	20.34	21.15
		2502.5 (20775)	21.11	20.90	21.44
	12RB-High (13)	2567.5 (21425)	21.04	21.21	20.30
		2535 (21100)	20.83	20.74	20.07
		2502.5 (20775)	20.86	20.92	20.32
	12RB-Middle (6)	2567.5 (21425)	21.14	21.21	20.55
		2535 (21100)	20.69	20.71	20.34
		2502.5 (20775)	21.14	21.23	20.49
	12RB-Low (0)	2567.5 (21425)	21.10	21.21	20.16
		2535 (21100)	20.85	20.83	20.06
		2502.5 (20775)	20.98	21.07	20.28
	25RB (0)	2567.5 (21425)	21.09	20.93	20.42
		2535 (21100)	20.94	20.87	20.11
		2502.5 (20775)	21.13	21.02	20.19
10MHz	1RB-High (49)	2565 (21400)	21.13	20.76	21.50
		2535 (21100)	20.84	20.11	20.86
		2505 (20800)	20.53	19.87	20.73
	1RB-Middle (24)	2565 (21400)	21.34	21.12	21.57
		2535 (21100)	20.85	20.66	20.90
		2505 (20800)	21.22	20.52	21.31
	1RB-Low (0)	2565 (21400)	21.07	20.73	21.55
		2535 (21100)	21.13	20.62	21.18
		2505 (20800)	21.05	20.98	21.36
	25RB-High (25)	2565 (21400)	21.11	21.24	20.27
		2535 (21100)	20.97	20.79	20.24
		2505 (20800)	20.98	21.19	20.12
	25RB-Middle (12)	2565 (21400)	21.20	21.09	20.72
		2535 (21100)	20.88	20.67	20.33
		2505 (20800)	21.18	21.14	20.35
	25RB-Low (0)	2565 (21400)	21.11	20.97	20.19

		2535 (21100)	20.83	20.86	19.87
		2505 (20800)	21.03	21.09	20.43
	50RB (0)	2565 (21400)	21.03	21.15	20.46
		2535 (21100)	20.98	20.81	20.08
		2505 (20800)	20.99	21.03	20.08
15MHz	1RB-High (74)	2562.5 (21375)	20.92	20.63	21.32
		2535 (21100)	20.75	20.00	21.02
		2507.5 (20825)	20.59	19.81	20.61
	1RB-Middle (37)	2562.5 (21375)	21.29	21.16	21.51
		2535 (21100)	20.92	20.73	20.99
		2507.5 (20825)	21.04	20.67	21.21
	1RB-Low (0)	2562.5 (21375)	21.07	20.70	21.45
		2535 (21100)	21.09	20.56	21.19
		2507.5 (20825)	21.08	20.86	21.49
	36RB-High (38)	2562.5 (21375)	21.23	21.13	20.24
		2535 (21100)	20.93	20.76	20.06
		2507.5 (20825)	20.87	21.13	20.34
	36RB-Middle (19)	2562.5 (21375)	21.26	21.12	20.48
		2535 (21100)	20.79	20.91	20.31
		2507.5 (20825)	21.01	21.12	20.48
	36RB-Low (0)	2562.5 (21375)	21.28	21.03	20.12
		2535 (21100)	20.75	20.75	19.90
		2507.5 (20825)	20.97	21.05	20.26
	75RB (0)	2562.5 (21375)	21.04	20.92	20.37
		2535 (21100)	20.90	20.90	20.10
		2507.5 (20825)	20.99	20.83	20.18
20MHz	1RB-High (99)	2560 (21350)	21.07	20.71	21.52
		2535 (21100)	20.77	20.13	21.05
		2510 (20850)	20.56	19.96	20.74
	1RB-Middle (50)	2560 (21350)	21.31	21.12	21.71
		2535 (21100)	21.02	20.72	20.94
		2510 (20850)	21.19	20.70	21.21
	1RB-Low (0)	2560 (21350)	21.07	20.83	21.48
		2535 (21100)	21.03	20.53	21.17
		2510 (20850)	21.05	21.03	21.54
	50RB-High (50)	2560 (21350)	21.15	21.18	20.35
		2535 (21100)	20.94	20.92	20.22
		2510 (20850)	21.05	21.11	20.30
	50RB-Middle (25)	2560 (21350)	21.24	21.19	20.63
		2535 (21100)	20.89	20.86	20.27
		2510 (20850)	21.15	21.22	20.43
	50RB-Low (0)	2560 (21350)	21.22	21.15	20.31

		2535 (21100)	20.84	20.81	20.00
		2510 (20850)	21.14	21.11	20.33
	100RB (0)	2560 (21350)	21.13	21.08	20.49
		2535 (21100)	20.95	20.90	20.21
		2510 (20850)	21.09	21.03	20.27

LTE B28 (Power Level A1/B1/C1)

LTE B28					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
3MHz	1RB-High (14)	746.5 (27645)	24.83	23.06	22.47
		719.5 (27375)	24.49	23.05	22.04
		704.5 (27225)	24.51	23.20	22.13
	1RB-Middle (7)	746.5 (27645)	25.01	23.12	22.96
		719.5 (27375)	24.60	23.22	22.19
		704.5 (27225)	24.79	23.33	22.00
	1RB-Low (0)	746.5 (27645)	24.73	23.10	22.64
		719.5 (27375)	24.23	23.14	22.12
		704.5 (27225)	24.58	23.37	22.06
	8RB-High (7)	746.5 (27645)	23.53	22.33	22.28
		719.5 (27375)	23.59	22.77	21.43
		704.5 (27225)	23.58	22.61	21.43
	8RB-Middle (4)	746.5 (27645)	23.39	22.41	22.32
		719.5 (27375)	23.62	22.71	21.46
		704.5 (27225)	23.55	22.57	21.27
	8RB-Low (0)	746.5 (27645)	23.19	22.65	22.32
		719.5 (27375)	23.37	22.64	21.44
		704.5 (27225)	23.57	22.60	21.37
	15RB (0)	746.5 (27645)	23.49	22.32	22.37
		719.5 (27375)	23.53	22.58	21.38
		704.5 (27225)	23.54	22.54	21.52
5MHz	1RB-High (24)	745.5 (27635)	24.57	23.05	22.62
		720.5 (27385)	24.37	23.21	22.55
		705.5 (27235)	24.16	23.19	22.52
	1RB-Middle (12)	745.5 (27635)	24.97	23.08	22.79
		720.5 (27385)	23.84	23.15	22.11
		705.5 (27235)	24.78	23.32	22.02
	1RB-Low (0)	745.5 (27635)	24.28	23.16	22.70
		720.5 (27385)	23.81	23.28	22.67
		705.5 (27235)	24.28	23.32	22.96
	12RB-High (13)	745.5 (27635)	23.43	22.22	22.38

		720.5 (27385)	23.67	22.59	21.53
		705.5 (27235)	23.54	22.42	21.26
	12RB-Middle (6)	745.5 (27635)	23.44	22.25	22.41
		720.5 (27385)	23.71	22.46	21.35
		705.5 (27235)	23.54	22.67	21.24
	12RB-Low (0)	745.5 (27635)	23.48	22.34	22.34
		720.5 (27385)	23.41	22.43	21.23
		705.5 (27235)	23.54	22.68	21.21
	25RB (0)	745.5 (27635)	23.28	22.31	22.60
		720.5 (27385)	23.50	22.64	21.52
		705.5 (27235)	23.52	22.67	21.27
10MHz	1RB-High (49)	743 (27610)	24.84	23.07	22.80
		723 (27410)	24.41	23.15	22.58
		708 (27260)	24.38	23.14	22.30
	1RB-Middle (24)	743 (27610)	25.13	23.06	22.36
		723 (27410)	24.53	23.09	22.97
		708 (27260)	24.90	23.38	22.23
	1RB-Low (0)	743 (27610)	24.56	23.22	23.05
		723 (27410)	24.40	23.23	23.07
		708 (27260)	24.46	23.32	22.03
	25RB-High (25)	743 (27610)	23.40	22.33	22.37
		723 (27410)	23.46	22.51	22.52
		708 (27260)	23.56	22.48	21.17
	25RB-Middle (12)	743 (27610)	23.45	22.40	22.51
		723 (27410)	23.54	22.50	22.58
		708 (27260)	23.54	22.58	21.47
	25RB-Low (0)	743 (27610)	23.53	22.42	22.59
		723 (27410)	23.55	22.51	22.68
		708 (27260)	23.60	22.64	21.23
	50RB (0)	743 (27610)	23.44	22.53	22.50
		723 (27410)	23.50	22.57	22.55
		708 (27260)	23.60	22.62	21.30
15MHz	1RB-High (74)	740.5 (27585)	24.83	23.05	22.79
		725.5 (27435)	24.10	23.76	23.10
		710.5 (27285)	24.24	23.12	22.93
	1RB-Middle (37)	740.5 (27585)	25.14	23.03	22.92
		725.5 (27435)	25.17	23.14	23.10
		710.5 (27285)	24.94	23.12	23.07
	1RB-Low (0)	740.5 (27585)	24.42	23.19	23.21
		725.5 (27435)	23.89	23.29	23.08
		710.5 (27285)	24.31	23.15	22.99
	36RB-High (38)	740.5 (27585)	23.53	22.38	22.41

		725.5 (27435)	23.61	22.65	22.73
		710.5 (27285)	23.50	22.46	22.65
	36RB-Middle (19)	740.5 (27585)	23.54	22.50	22.57
		725.5 (27435)	23.56	22.59	22.56
		710.5 (27285)	23.60	22.57	22.74
	36RB-Low (0)	740.5 (27585)	23.63	22.54	22.59
		725.5 (27435)	23.65	22.62	22.60
		710.5 (27285)	23.63	22.52	22.58
	75RB (0)	740.5 (27585)	23.60	22.56	22.53
		725.5 (27435)	23.66	22.76	22.64
		710.5 (27285)	23.63	22.61	22.59
20MHz	1RB-High (99)	738 (27560)	24.17	23.05	22.12
		728 (27460)	24.17	23.10	22.32
		713 (27310)	23.87	23.06	22.15
	1RB-Middle (50)	738 (27560)	24.85	23.34	22.15
		728 (27460)	24.98	23.45	22.15
		713 (27310)	24.89	23.33	22.05
	1RB-Low (0)	738 (27560)	24.07	23.31	22.05
		728 (27460)	24.19	23.16	22.10
		713 (27310)	24.23	23.09	22.06
	50RB-High (50)	738 (27560)	23.09	22.41	21.10
		728 (27460)	23.15	22.76	21.43
		713 (27310)	23.35	22.45	21.13
	50RB-Middle (25)	738 (27560)	23.31	22.52	21.22
		728 (27460)	23.29	22.68	21.40
		713 (27310)	23.41	22.53	21.41
	50RB-Low (0)	738 (27560)	23.32	22.65	21.36
		728 (27460)	23.28	22.56	21.32
		713 (27310)	23.45	22.62	21.32
	100RB (0)	738 (27560)	23.17	22.56	21.18
		728 (27460)	23.28	22.55	21.32
		713 (27310)	23.38	22.43	21.33

LTE B38 (Power Level A1/B1/C1)

LTE B38					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
5MHz	1RB-High (24)	2617.5 (38225)	24.30	22.85	22.08
		2595 (38000)	24.59	22.78	21.89
		2572.5 (37775)	24.67	22.72	22.34
	1RB-Middle (12)	2617.5 (38225)	24.50	23.15	22.45
		2595 (38000)	24.83	23.26	22.76
		2572.5 (37775)	24.83	22.72	22.83
	1RB-Low (0)	2617.5 (38225)	24.35	22.99	22.31
		2595 (38000)	24.50	22.74	21.87
		2572.5 (37775)	24.67	22.76	22.55
	12RB-High (13)	2617.5 (38225)	22.94	22.04	22.20
		2595 (38000)	23.13	22.12	22.17
		2572.5 (37775)	23.37	22.40	22.25
	12RB-Middle (6)	2617.5 (38225)	23.00	22.12	22.24
		2595 (38000)	23.14	22.25	22.21
		2572.5 (37775)	23.30	22.50	22.32
	12RB-Low (0)	2617.5 (38225)	23.05	22.09	22.11
		2595 (38000)	23.17	22.00	22.04
		2572.5 (37775)	23.28	22.42	22.27
	25RB (0)	2617.5 (38225)	23.14	22.34	22.21
		2595 (38000)	23.22	22.02	22.45
		2572.5 (37775)	23.26	22.62	22.40
10MHz	1RB-High (49)	2615 (38200)	24.37	22.72	22.04
		2595 (38000)	24.77	23.13	22.37
		2575 (37800)	24.85	23.31	22.49
	1RB-Middle (24)	2615 (38200)	24.77	23.23	22.24
		2595 (38000)	24.87	23.30	22.32
		2575 (37800)	24.91	23.07	22.49
	1RB-Low (0)	2615 (38200)	24.71	22.70	22.21
		2595 (38000)	24.76	22.89	22.11
		2575 (37800)	24.89	23.37	22.16
	25RB-High (25)	2615 (38200)	22.90	22.03	22.22
		2595 (38000)	23.19	22.62	22.30
		2575 (37800)	23.30	22.48	22.55
	25RB-Middle (12)	2615 (38200)	22.97	22.35	22.27
		2595 (38000)	23.22	22.25	22.32
		2575 (37800)	23.25	22.55	22.43
	25RB-Low (0)	2615 (38200)	22.87	22.39	22.15

		2595 (38000)	23.16	22.20	22.28
		2575 (37800)	23.31	22.67	22.43
	50RB (0)	2615 (38200)	23.08	22.01	22.06
		2595 (38000)	23.27	22.35	22.42
		2575 (37800)	23.36	22.57	22.42
15MHz	1RB-High (74)	2612.5 (38175)	24.34	23.02	21.77
		2595 (38000)	24.60	23.00	22.05
		2577.5 (37825)	24.67	23.27	22.19
	1RB-Middle (37)	2612.5 (38175)	24.03	23.15	22.44
		2595 (38000)	24.63	22.76	22.61
		2577.5 (37825)	24.75	23.39	22.60
	1RB-Low (0)	2612.5 (38175)	24.75	22.84	22.18
		2595 (38000)	24.74	22.81	22.34
		2577.5 (37825)	24.87	22.72	22.12
	36RB-High (38)	2612.5 (38175)	23.44	22.18	20.79
		2595 (38000)	23.13	22.25	20.92
		2577.5 (37825)	23.34	22.39	20.89
	36RB-Middle (19)	2612.5 (38175)	23.12	22.18	20.73
		2595 (38000)	23.15	22.34	21.00
		2577.5 (37825)	22.93	22.51	21.18
	36RB-Low (0)	2612.5 (38175)	23.02	22.19	20.82
		2595 (38000)	23.13	22.13	20.78
		2577.5 (37825)	23.34	22.46	20.79
	75RB (0)	2612.5 (38175)	23.01	22.15	20.77
		2595 (38000)	23.24	22.31	20.94
		2577.5 (37825)	22.91	21.89	20.88
20MHz	1RB-High (99)	2610 (38150)	24.37	22.81	21.72
		2595 (38000)	24.33	23.05	21.93
		2580 (37850)	24.56	22.86	21.99
	1RB-Middle (50)	2610 (38150)	24.97	23.05	22.14
		2595 (38000)	25.04	23.29	22.28
		2580 (37850)	25.13	22.87	22.54
	1RB-Low (0)	2610 (38150)	23.76	22.76	22.15
		2595 (38000)	24.13	22.75	22.35
		2580 (37850)	24.40	23.17	22.05
	50RB-High (50)	2610 (38150)	22.88	22.15	22.01
		2595 (38000)	23.19	21.98	22.13
		2580 (37850)	23.15	22.21	22.46
	50RB-Middle (25)	2610 (38150)	22.98	22.17	22.22
		2595 (38000)	23.26	22.10	22.24
		2580 (37850)	23.28	22.39	22.64
	50RB-Low (0)	2610 (38150)	23.08	22.03	22.20

		2595 (38000)	23.14	22.06	22.21
		2580 (37850)	23.16	22.46	22.49
	100RB (0)	2610 (38150)	23.08	21.99	22.04
		2595 (38000)	23.16	22.13	22.26
		2580 (37850)	23.15	22.30	22.34

LTE B41 (Power Level A1/B1/C1)

LTE B41					
BANDWIDTH	**Number of RBs**	**Frequency**	**QPSK**	**16QAM**	**64QAM**
5MHz	1RB-High (24)	2687.5 (41565)	24.89	22.98	20.93
		2640.3(41093)	24.34	22.39	20.47
		2593 (40620)	24.55	22.61	21.04
		2545.8(40148)	24.26	22.62	21.30
		2498.5 (39675)	24.80	23.13	21.32
	1RB-Middle (12)	2687.5 (41565)	24.91	23.20	21.77
		2640.3(41093)	24.41	22.87	20.90
		2593 (40620)	24.80	23.05	21.19
		2545.8(40148)	24.43	22.50	20.97
		2498.5 (39675)	25.03	23.26	22.06
	1RB-Low (0)	2687.5 (41565)	24.89	23.10	21.06
		2640.3(41093)	24.35	22.21	20.01
		2593 (40620)	24.81	22.68	20.27
		2545.8(40148)	24.24	22.31	20.73
		2498.5 (39675)	24.60	23.10	21.23
	12RB-High (13)	2687.5 (41565)	23.45	22.51	20.88
		2640.3(41093)	23.03	22.30	20.56
		2593 (40620)	23.34	22.65	20.82
		2545.8(40148)	23.09	22.03	20.53
		2498.5 (39675)	23.65	22.64	21.38
	12RB-Middle (6)	2687.5 (41565)	23.50	22.61	21.01
		2640.3(41093)	23.07	22.20	20.61
		2593 (40620)	23.48	22.64	20.87
		2545.8(40148)	23.24	22.21	20.66
		2498.5 (39675)	23.58	22.80	21.30
	12RB-Low (0)	2687.5 (41565)	23.52	22.66	21.02
		2640.3(41093)	23.08	22.21	20.53
		2593 (40620)	23.46	22.60	20.85
		2545.8(40148)	23.20	22.07	20.63
		2498.5 (39675)	23.58	22.77	21.36
	25RB (0)	2687.5 (41565)	23.52	22.51	21.06

		2640.3(41093)	23.08	22.45	20.54
		2593 (40620)	23.39	22.75	21.16
		2545.8(40148)	23.12	22.04	20.96
		2498.5 (39675)	23.63	23.06	21.45
10MHz	1RB-High (49)	2685 (41540)	24.89	22.67	22.18
		2639(41080)	24.34	22.18	21.91
		2593 (40620)	24.79	22.50	22.12
		2547(40160)	24.36	22.87	21.93
		2501 (39700)	24.81	22.24	22.49
	1RB-Middle (24)	2685 (41540)	25.22	23.27	22.37
		2639(41080)	24.57	22.84	21.94
		2593 (40620)	24.92	23.19	22.30
		2547(40160)	24.62	22.86	21.90
		2501 (39700)	25.08	23.42	22.48
	1RB-Low (0)	2685 (41540)	24.95	22.81	22.37
		2639(41080)	24.50	22.29	21.48
		2593 (40620)	24.82	22.87	21.88
		2547(40160)	24.31	22.58	21.77
		2501 (39700)	24.77	22.82	21.93
	25RB-High (25)	2685 (41540)	23.51	22.81	22.62
		2639(41080)	23.22	22.27	22.18
		2593 (40620)	23.50	22.52	22.56
		2547(40160)	23.21	22.27	22.26
		2501 (39700)	23.62	22.85	22.75
	25RB-Middle (12)	2685 (41540)	23.50	22.87	22.68
		2639(41080)	23.07	22.25	22.24
		2593 (40620)	23.46	22.60	22.65
		2547(40160)	23.26	22.25	22.40
		2501 (39700)	23.59	22.82	22.72
	25RB-Low (0)	2685 (41540)	23.59	22.67	22.70
		2639(41080)	23.09	22.33	22.23
		2593 (40620)	23.52	22.69	22.56
		2547(40160)	23.12	22.30	22.38
		2501 (39700)	23.67	22.81	22.80
	50RB (0)	2685 (41540)	23.56	22.50	22.73
		2639(41080)	23.16	22.26	22.32
		2593 (40620)	23.57	22.48	22.54
		2547(40160)	23.11	22.23	22.29
		2501 (39700)	23.65	22.82	22.89
15MHz	1RB-High (74)	2682.5 (41515)	24.85	23.18	22.11
		2637.8(41068)	24.39	22.81	21.74
		2593 (40620)	24.59	22.81	21.93

		2548.3(40173)	24.33	22.65	21.94
		2503.5 (39725)	24.59	22.64	21.66
	1RB-Middle (37)	2682.5 (41515)	25.04	23.26	22.18
		2637.8(41068)	24.40	22.83	21.83
		2593 (40620)	24.68	23.15	22.05
		2548.3(40173)	24.28	22.85	21.79
		2503.5 (39725)	24.90	23.32	22.20
	1RB-Low (0)	2682.5 (41515)	25.06	22.75	22.50
		2637.8(41068)	24.51	22.46	21.89
		2593 (40620)	24.82	22.87	21.92
		2548.3(40173)	24.33	22.29	21.83
		2503.5 (39725)	24.60	22.99	21.76
	36RB-High (38)	2682.5 (41515)	23.55	22.63	22.79
		2637.8(41068)	23.22	22.27	22.13
		2593 (40620)	23.36	22.51	22.42
		2548.3(40173)	23.08	22.13	22.37
		2503.5 (39725)	23.40	22.51	22.53
	36RB-Middle (19)	2682.5 (41515)	23.61	22.69	22.81
		2637.8(41068)	23.21	22.28	22.13
		2593 (40620)	23.45	22.58	22.66
		2548.3(40173)	23.08	22.24	22.41
		2503.5 (39725)	23.69	22.69	22.78
	36RB-Low (0)	2682.5 (41515)	23.59	22.68	22.75
		2637.8(41068)	23.14	22.10	22.26
		2593 (40620)	23.55	22.44	22.53
		2548.3(40173)	23.10	22.22	22.20
		2503.5 (39725)	23.57	22.65	22.74
	75RB (0)	2682.5 (41515)	23.56	22.67	22.60
		2637.8(41068)	23.19	22.23	22.18
		2593 (40620)	23.47	22.53	22.47
		2548.3(40173)	23.10	22.28	22.23
		2503.5 (39725)	23.41	22.64	22.70
20MHz	1RB-High (99)	2680 (41490)	24.07	22.64	21.20
		2636.5(41055)	24.39	22.84	21.29
		2593 (40620)	24.35	22.30	20.86
		2549.5(40185)	23.85	22.59	21.34
		2506 (39750)	24.00	22.95	21.18
	1RB-Middle (50)	2680 (41490)	24.55	23.20	21.43
		2636.5(41055)	24.35	23.30	21.30
		2593 (40620)	24.95	22.94	21.56
		2549.5(40185)	24.34	22.92	21.15
		2506 (39750)	24.58	22.97	21.86

	1RB-Low (0)	2680 (41490)	24.38	22.14	21.18
		2636.5(41055)	24.50	23.07	21.30
		2593 (40620)	24.47	22.38	20.93
		2549.5(40185)	23.72	22.22	21.23
		2506 (39750)	23.96	22.55	20.71
	50RB-High (50)	2680 (41490)	23.20	22.75	20.95
		2636.5(41055)	22.97	22.46	20.94
		2593 (40620)	23.25	22.36	20.66
		2549.5(40185)	23.13	22.44	21.05
		2506 (39750)	23.29	22.64	21.31
	50RB-Middle (25)	2680 (41490)	23.24	22.76	21.24
		2636.5(41055)	23.00	22.68	21.06
		2593 (40620)	23.31	22.38	20.78
		2549.5(40185)	23.00	22.52	21.08
		2506 (39750)	23.36	22.81	21.01
	50RB-Low (0)	2680 (41490)	23.29	22.74	21.23
		2636.5(41055)	23.03	22.68	21.07
		2593 (40620)	23.42	22.41	20.72
		2549.5(40185)	23.00	22.44	20.96
		2506 (39750)	23.23	22.69	20.84
	100RB (0)	2680 (41490)	23.17	22.56	20.88
		2636.5(41055)	23.04	22.80	21.16
		2593 (40620)	23.33	22.33	20.84
		2549.5(40185)	23.12	22.61	20.80
		2506 (39750)	23.33	22.47	20.97

11.5 Wi-Fi and BT Measurement result

The maximum output power of BT antenna is 9.76dBm.
The maximum tune up of BT antenna is 10dBm.

The average conducted power for Wi-Fi 2.4G is as following:

Power Level A1

802.11b				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11(2462MHz)	15.53	15.51	15.45	15.27
6(2437(MHz)	15.28	/	/	/
1(2412MHz)	15.03	/	/	/
Tune up	16.50	16.50	16.50	16.50

802.11g								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11(2462MHz)	15.21	15.22	15.17	15.89	15.55	15.26	15.19	15.13
6(2437(MHz)	15.08	/	/	15.62	/	/	/	/
1(2412MHz)	14.65	/	/	15.13	/	/	/	/
Tune up	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50

802.11n-20MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11(2462MHz)	15.03	14.85	15.67	15.68	15.27	15.19	15.17	15.05
6(2437(MHz)	14.91	/	/	15.59	/	/	/	/
1(2412MHz)	14.49	/	/	15.07	/	/	/	/
Tune up	16.50	16.50	16.50	16.50	16.50	16.00	16.00	16.00

Power Level B1/C1

802.11b				
Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
11(2462MHz)	18.97	18.42	18.33	18.19
6(2437(MHz)	17.86	/	/	/
1(2412MHz)	18.94	/	/	/
Tune up	19.00	19.00	19.00	19.00

802.11g								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
11(2462MHz)	17.79	/	/	/	/	/	/	/
6(2437(MHz)	16.75	/	/	/	/	/	/	/
1(2412MHz)	17.82	17.01	16.96	17.54	16.50	16.10	15.98	15.95
Tune up	18.00	18.00	18.00	18.00	17.00	17.00	17.00	17.00
802.11n-20MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
11(2462MHz)	17.11	/	/	/	/	/	/	/
6(2437(MHz)	16.11	/	/	/	/	/	/	/
1(2412MHz)	17.13	16.35	17.00	15.92	15.62	14.69	14.66	14.59
Tune up	17.50	17.50	17.50	17.00	17.00	16.00	16.00	16.00

The tune up power for Wi-Fi 5G is as following:

	Mode	Channel	Frequency	Output Power Tolerance(dbm)		Head Reduced Power(dbm)		Body Reduced Power(dbm)	
			(MHz)	Target	Maximum	Target	Maximum	Target	Maximum
5GHz WLAN	802.11a 6M	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 9M	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 12M	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 18M	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a24M	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 36M	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 48M	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11a 54M	36-64	5180-5320	15	16	14	15	14.5	15.5
		100-140	5500-5700	15	16	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC0	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC1	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC2	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC3	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5

	802.11n HT20 MSC4	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC5	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC6	36-64	5180-5320	15	16	14	15	14.5	15.5
		100-140	5500-5700	15	16	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT20 MSC7	36-64	5180-5320	15	16	14	15	14.5	15.5
		100-140	5500-5700	15	16	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11n HT40 MSC0	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11n HT40 MSC1	38-62	5190-5310	15	16	14	15	14	15
		102-134	5510-5670	15	16	14	15	14	15
		151-159	5755-5795	14.5	15.5	14	15	14	15
	802.11n HT40 MSC2	38-62	5190-5310	15	16	14	15	14	15
		102-134	5510-5670	15	16	14	15	14	15
		151-159	5755-5795	14	15	14	15	14	15
	802.11n HT40 MSC3	38-62	5190-5310	15	16	14	15	14	15
		102-134	5510-5670	15	16	14	15	14	15
		151-159	5755-5795	14	15	14	15	14	15
	802.11n HT40 MSC4	38-62	5190-5310	15	16	14	15	13	14
		102-134	5510-5670	15	16	14	15	13	14
		151-159	5755-5795	13	14	13	14	13	14
	802.11n HT40 MSC5	38-62	5190-5310	15	16	14	15	13	14
		102-134	5510-5670	15	16	14	15	13	14
		151-159	5755-5795	13	14	13	14	13	14
	802.11n HT40 MSC6	38-62	5190-5310	14	15	14	15	12	13
		102-134	5510-5670	14	15	14	15	12	13
		151-159	5755-5795	13	14	13	14	12	13
	802.11n HT40 MSC7	38-62	5190-5310	14	15	14	15	12	13
		102-134	5510-5670	14	15	14	15	12	13
		151-159	5755-5795	13	14	13	14	12	13
	802.11ac VHT20 MCS0	36-64	5180-5320	17	18	14	15	14.5	15.5
		100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
		36-64	5180-5320	17	18	14	15	14.5	15.5

	802.11ac VHT20 MCS1	100-140	5500-5700	17	18	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS2	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS3	36-64	5180-5320	16.5	17.5	14	15	14.5	15.5
		100-140	5500-5700	16.5	17.5	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS4	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS5	36-64	5180-5320	16	17	14	15	14.5	15.5
		100-140	5500-5700	16	17	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS6	36-64	5180-5320	15	16	14	15	14.5	15.5
		100-140	5500-5700	15	16	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS7	36-64	5180-5320	15	16	14	15	14.5	15.5
		100-140	5500-5700	15	16	14	15	14.5	15.5
		149-165	5745-5825	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT20 MCS8	36-64	5180-5320	14	15	14	15	14	15
		100-140	5500-5700	14	15	14	15	14	15
		149-165	5745-5825	14	15	14	15	14	15
	802.11ac VHT20 MCS9	36-64	5180-5320	14	15	14	15	14	15
		100-140	5500-5700	14	15	14	15	14	15
		149-165	5745-5825	14	15	14	15	14	15
	802.11ac VHT40 MSC0	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC1	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC2	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC3	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC4	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5

		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC5	38-62	5190-5310	15	16	14	15	14.5	15.5
		102-134	5510-5670	15	16	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC6	38-62	5190-5310	14.5	15.5	14	15	14.5	15.5
		102-134	5510-5670	14.5	15.5	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC7	38-62	5190-5310	14.5	15.5	14	15	14.5	15.5
		102-134	5510-5670	14.5	15.5	14	15	14.5	15.5
		151-159	5755-5795	14.5	15.5	14	15	14.5	15.5
	802.11ac VHT40 MSC8	38-62	5190-5310	13	14	13	14	13	14
		102-134	5510-5670	13	14	13	14	13	14
		151-159	5755-5795	13	14	13	14	13	14
	802.11ac VHT40 MSC9	38-62	5190-5310	13	14	13	14	13	14
		102-134	5510-5670	13	14	13	14	13	14
		151-159	5755-5795	13	14	13	14	13	14
	802.11ac VHT80 MCS0	42-58	5210-5290	14	15	14	15	14	15
		106-122	5530-5610	14	15	14	15	14	15
		155	5775	14	15	14	15	14	15
	802.11ac VHT80 MCS0	42-58	5210-5290	14	15	14	15	14	15
		106-122	5530-5610	14	15	14	15	14	15
		155	5775	14	15	14	15	14	15
	802.11ac VHT80 MCS1	42-58	5210-5290	14	15	14	15	14	15
		106-122	5530-5610	14	15	14	15	14	15
		155	5775	14	15	14	15	14	15
	802.11ac VHT80 MCS2	42-58	5210-5290	14	15	14	15	14	15
		106-122	5530-5610	14	15	14	15	14	15
		155	5775	14	15	14	15	14	15
	802.11ac VHT80 MCS3	42-58	5210-5290	14	15	13	14	14	15
		106-122	5530-5610	14	15	13	14	14	15
		155	5775	14	15	13	14	14	15
	802.11ac VHT80 MCS4	42-58	5210-5290	14	15	12	13	14	15
		106-122	5530-5610	14	15	12	13	14	15
		155	5775	14	15	12	13	14	15
	802.11ac VHT80 MCS5	42-58	5210-5290	14	15	12	13	14	15
		106-122	5530-5610	14	15	12	13	14	15
		155	5775	14	15	12	13	14	15
	802.11ac VHT80 MCS6	42-58	5210-5290	13.5	14.5	12	13	13.5	14.5
		106-122	5530-5610	13.5	14.5	12	13	13.5	14.5
		155	5775	13.5	14.5	12	13	13.5	14.5

	802.11ac VHT80 MCS7	42-58	5210-5290	13.5	14.5	12	13	13.5	14.5
		106-122	5530-5610	13.5	14.5	12	13	13.5	14.5
		155	5775	13.5	14.5	12	13	13.5	14.5
	802.11ac VHT80 MCS8	42-58	5210-5290	12	13	10	11	12	13
		106-122	5530-5610	12	13	10	11	12	13
		155	5775	12	13	10	11	12	13
	802.11ac VHT80 MCS9	42-58	5210-5290	12	13	10	11	12	13
		106-122	5530-5610	12	13	10	11	12	13
		155	5775	12	13	10	11	12	13

The average conducted power for Wi-Fi 5G is as following:

Power Level A1

802.11ac(dBm)-80MHz										
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
42(5210 MHz)	13.06	13.24	13.12	12.91	12.15	11.95	11.46	11.34	9.85	9.71
58(5290 MHz)	13.54	13.41	13.26	13.04	12.29	12.08	11.52	11.45	9.92	9.87
106(5530 MHz)	13.75	/	/	/	/	/	/	/	/	/
122(5610 MHz)	13.21	/	/	/	/	/	/	/	/	/
138(5690 MHz)	13.91	13.22	13.09	12.93	12.18	11.96	11.59	11.52	9.57	9.47
155(5775 MHz)	13.68	13.07	12.89	12.65	11.84	11.64	11.16	11.06	9.41	9.29
Tune up	15	15	15	14	13	13	13	13	11	11

Power Level B1

802.11a(dBm)								
Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
36(5180 MHz)	16.75	/	/	/	/	/	/	/
40(5200 MHz)	16.86	/	/	/	/	/	/	/
44(5220 MHz)	17.16	/	/	/	/	/	/	/
48(5240 MHz)	17.38	17.25	17.32	16.82	16.45	15.74	15.28	14.11
52(5260 MHz)	17.41	/	/	/	/	/	/	/
56(5280 MHz)	17.53	/	/	/	/	/	/	/
60(5300 MHz)	17.50	/	/	/	/	/	/	/
64(5320 MHz)	17.60	17.54	17.45	16.87	16.59	15.88	15.37	14.67
100(5500 MHz)	17.45	/	/	/	/	/	/	/
104(5520 MHz)	17.53	/	/	/	/	/	/	/
108(5540 MHz)	17.79	/	/	/	/	/	/	/
112(5560 MHz)	17.81	/	/	/	/	/	/	/
116(5580 MHz)	17.78	/	/	/	/	/	/	/
120(5600 MHz)	17.95	17.84	17.92	17.43	17.11	16.32	16.25	15.11
124(5620 MHz)	17.68	/	/	/	/	/	/	/
128(5640 MHz)	17.73	/	/	/	/	/	/	/
132(5660 MHz)	17.74	/	/	/	/	/	/	/
136(5680 MHz)	17.87	/	/	/	/	/	/	/
140(5700 MHz)	17.82	/	/	/	/	/	/	/
Tune up	18.00	18.00	18.00	17.50	17.50	17.00	17.00	16.00

802.11n(dBm)-40MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
151(5755 MHz)	15.35	/	/	/	/	/	/	/
159(5795 MHz)	14.90	14.35	13.97	13.68	13.15	12.96	12.35	13.18
Tune up	15.50	15.50	15.00	15.00	14.00	14.00	14.00	14.00

Power Level C1

802.11n(dBm)-40MHz								
Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
38(5190 MHz)	13.51	/	/	/	/	/	/	/
46(5230 MHz)	14.21	13.81	13.61	13.42	12.78	12.58	12.07	11.93
54(5270 MHz)	14.36	/	/	/	/	/	/	/
62(5310 MHz)	14.64	14.59	14.44	14.25	13.52	13.38	12.88	12.76
102(5510 MHz)	14.62	/	/	/	/	/	/	/
110(5550 MHz)	14.74	13.91	13.79	13.61	12.83	12.66	12.18	12.08
118(5590 MHz)	13.95	/	/	/	/	/	/	/
126(5630 MHz)	13.97	/	/	/	/	/	/	/
134(5670 MHz)	14.55	/	/	/	/	/	/	/
Tune up	15.50	15.00	15.00	15.00	14.00	14.00	13.00	13.00

12 Simultaneous TX SAR Considerations

12.1 Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.
For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

12.2 Transmit Antenna Separation Distances

Please refer to the file < The Photos of SAR test - I23Z70141>.

12.3 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Antenna	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
ANT1	Yes	Yes	Yes	Yes	No	Yes
ANT2	Yes	Yes	No	Yes	Yes	No

13 Evaluation of Simultaneous

Table 13.1: The sum of SAR values for Main antenna + Wifi2.4G

	Position	Main antenna	WiFi-2.4G	Sum
Highest SAR value for Head	Left head, Cheek (LTE B7)	0.67	0.44	**1.11**
Highest SAR value for Body	Rear 10mm (WB5)	0.63	0.24	**0.87**

Table 13.2: The sum of SAR values for Main antenna + Wifi5G +BT

	Position	Main antenna	WiFi-5G	BT	Sum
Highest SAR value for Head	Left head, Cheek (LTE B7)	0.67	0.35	0.16	**1.18**
Highest SAR value for Body	Rear 10mm (WB5)	0.63	0.36	0.03	**1.41**

Conclusion:

According to the above tables, the sum of reported SAR values is<1.6W/kg. So the simultaneous transmission SAR with volume scans is not required.

14 SAR Test Result

It is determined by user manual for the distance between the EUT and the phantom bottom. The distance is 10 mm and just applied to the condition of body worn accessory.
It is performed for all SAR measurements with area scan based 1-g SAR estimation (Fast SAR). A zoom scan measurement is added when the estimated 1-g SAR is the highest measured SAR in each exposure configuration, wireless mode and frequency band combination or more than 1.2W/kg.
The calculated SAR is obtained by the following formula:

$$\text{Reported SAR} = \text{Measured SAR} \times 10^{(P_{Target}-P_{Measured})/10}$$

Where P_{Target} is the power of manufacturing upper limit;
$P_{Measured}$ is the measured power in chapter 11.

Table 14.1: Duty Cycle

Mode	Duty Cycle
GSM850	1:4
WCDMA&LTE FDD	1:1
LTE TDD	1:1.58

14.1 SAR results for 2G/3G/4G

Table 14.1-1: SAR Values-GSM850/WCDMA B5/LTE B5

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Cheek	L	GSM850	251	848.8	GPRS(2)	1	32.35	32.5	0.267	0.28	0.194	0.20	0.07
Cheek	L	GSM850	190	836.6	GPRS(2)	/	32.26	32.5	0.198	0.21	0.146	0.15	-0.04
Cheek	L	GSM850	128	824.2	GPRS(2)	/	32.14	32.5	0.231	0.25	0.173	0.19	-0.13
Tilt	L	GSM850	190	836.6	GPRS(2)	/	32.35	32.5	0.099	0.10	0.078	0.08	-0.01
Cheek	R	GSM850	190	836.6	GPRS(2)	/	32.35	32.5	0.183	0.19	0.143	0.15	0.06
Tilt	R	GSM850	190	836.6	GPRS(2)	/	32.35	32.5	0.136	0.14	0.093	0.10	0.05
Body	F	GSM850	190	836.6	Front GPRS(2) 10mm	/	32.26	32.5	0.22	0.23	0.159	0.17	0.11
Body	F	GSM850	251	848.8	Rear GPRS(2) 10mm	2	32.35	32.5	0.576	0.60	0.324	0.34	0.05
Body	F	GSM850	190	836.6	Rear GPRS(2) 10mm	/	32.26	32.5	0.444	0.47	0.248	0.26	-0.06
Body	F	GSM850	128	824.2	Rear GPRS(2) 10mm	/	32.14	32.5	0.389	0.42	0.222	0.24	0.13
Body	F	GSM850	190	836.6	Left Edge GPRS(2) 10mm	/	32.26	32.5	0.229	0.24	0.154	0.16	-0.13
Body	F	GSM850	190	836.6	Right Edge GPRS(2) 10mm	/	32.26	32.5	0.175	0.18	0.116	0.12	0.09
Body	F	GSM850	190	836.6	Bottom Edge GPRS(2) 10mm	/	32.26	32.5	0.284	0.30	0.152	0.16	-0.16
Body	F	GSM850	251	848.8	Rear EGPRS(2) 10mm	/	31.95	32.5	0.515	0.58	0.287	0.33	-0.04
Cheek	L	WCDMA 850	4233	846.6	RMC	/	23.71	25	0.242	0.33	0.179	0.24	0.12
Cheek	L	WCDMA 850	4183	836.6	RMC	3	23.75	25	0.253	0.34	0.188	0.25	-0.01
Cheek	L	WCDMA 850	4132	826.4	RMC	/	23.62	25	0.229	0.31	0.171	0.23	0.06
Tilt	L	WCDMA 850	4183	836.6	RMC	/	23.75	25	0.154	0.21	0.121	0.16	-0.04
Cheek	R	WCDMA 850	4183	836.6	RMC	/	23.75	25	0.239	0.32	0.182	0.24	-0.12
Tilt	R	WCDMA 850	4183	836.6	RMC	/	23.75	25	0.147	0.20	0.114	0.15	0.09
Body	F	WCDMA 850	4183	836.6	Front 10mm	/	23.75	25	0.233	0.31	0.145	0.19	0.04
Body	F	WCDMA 850	4233	846.6	Rear 10mm	4	23.71	25	0.469	0.63	0.269	0.36	-0.03
Body	F	WCDMA 850	4183	836.6	Rear 10mm	/	23.75	25	0.455	0.61	0.261	0.35	-0.02
Body	F	WCDMA 850	4132	826.4	Rear 10mm	/	23.62	25	0.431	0.59	0.249	0.34	-0.12
Body	F	WCDMA 850	4183	836.6	Left Edge 10mm	/	23.75	25	0.1	0.13	0.065	0.09	0.16
Body	F	WCDMA 850	4183	836.6	Right Edge 10mm	/	23.75	25	0.182	0.24	0.122	0.16	-0.14
Body	F	WCDMA 850	4183	836.6	Bottom Edge 10mm	/	23.75	25	0.273	0.36	0.154	0.21	-0.06
Cheek	L	LTE Band5	20525	836.5	1RB-Mid	/	24.86	25.7	0.284	0.34	0.209	0.25	-0.14
Tilt	L	LTE Band5	20525	836.5	1RB-Mid	/	24.86	25.7	0.174	0.21	0.135	0.16	0.15
Cheek	R	LTE Band5	20600	844	1RB-Mid	/	24.75	25.7	0.312	0.39	0.237	0.29	0.16
Cheek	R	LTE Band5	20525	836.5	1RB-Mid	/	24.86	25.7	0.287	0.35	0.218	0.26	0.06
Cheek	R	LTE Band5	20450	829	1RB-Mid	5	24.78	25.7	0.332	0.41	0.252	0.31	-0.02
Tilt	R	LTE Band5	20525	836.5	1RB-Mid	/	24.86	25.7	0.172	0.21	0.131	0.16	0.08
Cheek	L	LTE Band5	20525	836.5	25RB-Mid	/	23.25	24.7	0.256	0.36	0.186	0.26	-0.09
Tilt	L	LTE Band5	20525	836.5	25RB-Mid	/	23.25	24.7	0.158	0.22	0.122	0.17	-0.02
Cheek	R	LTE Band5	20525	836.5	25RB-Mid	/	23.25	24.7	0.253	0.35	0.191	0.27	0.07
Tilt	R	LTE Band5	20525	836.5	25RB-Mid	/	23.25	24.7	0.154	0.22	0.118	0.16	-0.05
Body	F	LTE Band5	20525	836.5	1RB-Mid Front 10mm	/	24.86	25.7	0.236	0.29	0.172	0.21	-0.02
Body	F	LTE Band5	20525	836.5	1RB-Mid Rear 10mm	6	24.86	25.7	0.442	0.54	0.254	0.31	-0.01
Body	F	LTE Band5	20525	836.5	1RB-Mid Left Edge 10mm	/	24.86	25.7	0.144	0.17	0.098	0.12	0.05
Body	F	LTE Band5	20525	836.5	1RB-Mid Right Edge 10mm	/	24.86	25.7	0.234	0.28	0.161	0.20	0.05
Body	F	LTE Band5	20525	836.5	1RB-Mid Bottom Edge 10mm	/	24.86	25.7	0.302	0.37	0.174	0.21	0.05
Body	F	LTE Band5	20525	836.5	25RB-Mid Front 10mm	/	23.25	24.7	0.181	0.25	0.135	0.19	-0.03
Body	F	LTE Band5	20525	836.5	25RB-Mid Rear 10mm	/	23.25	24.7	0.313	0.44	0.188	0.26	0.12
Body	F	LTE Band5	20525	836.5	25RB-Mid Left Edge 10mm	/	23.25	24.7	0.081	0.11	0.056	0.08	-0.03
Body	F	LTE Band5	20525	836.5	25RB-Mid Right Edge 10mm	/	23.25	24.7	0.145	0.20	0.1	0.14	0.04
Body	F	LTE Band5	20525	836.5	25RB-Mid Bottom Edge 10mm	/	23.25	24.7	0.221	0.31	0.131	0.18	-0.03

Table 14.1-2: SAR Values-LTE B7/LTE B28

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Cheek	L	LTE Band7	21350	2560	1RB-High	/	24.67	25.7	0.483	**0.61**	0.262	**0.33**	0.01
Cheek	L	LTE Band7	21100	2535	1RB-Mid	/	24.51	25.7	0.505	**0.66**	0.265	**0.35**	0.17
Cheek	L	LTE Band7	20850	2510	1RB-Mid	7	24.75	25.7	0.542	**0.67**	0.293	**0.36**	-0.12
Tilt	L	LTE Band7	20850	2510	1RB-Mid	/	24.51	25.7	0.307	**0.40**	0.16	**0.21**	0.09
Cheek	R	LTE Band7	20850	2510	1RB-Mid	/	24.51	25.7	0.215	**0.28**	0.113	**0.15**	-0.11
Tilt	R	LTE Band7	20850	2510	1RB-Mid	/	24.51	25.7	0.189	**0.25**	0.101	**0.13**	-0.05
Cheek	L	LTE Band7	20850	2510	50RB-Low	/	22.18	23.5	0.338	**0.46**	0.182	**0.25**	0.09
Tilt	L	LTE Band7	20850	2510	50RB-Low	/	22.18	23.5	0.169	**0.23**	0.088	**0.12**	-0.14
Cheek	R	LTE Band7	20850	2510	50RB-Low	/	22.18	23.5	0.121	**0.16**	0.065	**0.09**	0.03
Tilt	R	LTE Band7	20850	2510	50RB-Low	/	22.18	23.5	0.112	**0.15**	0.06	**0.08**	0.06
Cheek	L	LTE Band7	20850	2510	1RB-Mid	S2	24.75	25.7	0.523	**0.65**	0.284	**0.35**	0.12
Cheek	L	LTE Band7	20850	2510	1RB-Mid	Single SIM	24.75	25.7	0.511	**0.64**	0.281	**0.35**	-0.17
Body	F	LTE Band7	20850	2510	1RB-Mid Front 20mm	/	24.75	25.7	0.213	**0.27**	0.081	**0.10**	0.1
Body	F	LTE Band7	20850	2510	1RB-Mid Rear 22mm	/	24.75	25.7	0.29	**0.36**	0.106	**0.13**	-0.08
Body	F	LTE Band7	21350	2560	1RB-Mid Left 10mm	/	24.67	25.7	0.336	**0.43**	0.12	**0.15**	0.16
Body	F	LTE Band7	21100	2535	1RB-Mid Left 10mm	/	24.51	25.7	0.394	**0.52**	0.141	**0.19**	-0.04
Body	F	LTE Band7	20850	2510	1RB-Mid Left 10mm	/	24.75	25.7	0.525	**0.65**	0.193	**0.24**	-0.02
Body	F	LTE Band7	20850	2510	1RB-Mid Right 13mm	/	24.75	25.7	0.12	**0.15**	0.045	**0.06**	-0.05
Body	F	LTE Band7	20850	2510	1RB-Mid Bottom 23mm	/	24.75	25.7	0.463	**0.58**	0.164	**0.20**	0.04
Body	F	LTE Band7	20850	2510	50RB-Low Front 20mm	/	22.18	23.5	0.137	**0.19**	0.052	**0.07**	0.06
Body	F	LTE Band7	20850	2510	50RB-Low Rear 22mm	/	22.18	23.5	0.182	**0.25**	0.066	**0.09**	-0.18
Body	F	LTE Band7	20850	2510	50RB-Low Left 10mm	/	22.18	23.5	0.292	**0.40**	0.108	**0.15**	0.09
Body	F	LTE Band7	20850	2510	50RB-Low Right 13mm	/	22.18	23.5	0.085	**0.12**	0.032	**0.04**	-0.01
Body	F	LTE Band7	20850	2510	50RB-Low Bottom 23mm	/	22.18	23.5	0.271	**0.37**	0.096	**0.13**	0.15
Body	F	LTE Band7	21350	2560	1RB-Mid Front 10mm	/	21.31	22.5	0.366	**0.48**	0.206	**0.27**	0.15
Body	F	LTE Band7	21350	2560	1RB-Mid Rear 10mm	/	21.31	22.5	0.393	**0.52**	0.202	**0.27**	-0.15
Body	F	LTE Band7	21350	2560	1RB-Mid Right 10mm	/	21.31	22.5	0.098	**0.13**	0.057	**0.07**	0.08
Body	F	LTE Band7	21350	2560	1RB-Mid Bottom 10mm	/	21.31	22.5	0.591	**0.78**	0.291	**0.38**	-0.12
Body	F	LTE Band7	21100	2535	1RB-Low Bottom 10mm	/	21.03	22.5	0.63	**0.88**	0.316	**0.44**	0.05
Body	F	LTE Band7	20850	2510	1RB-Mid Bottom 10mm	8	21.19	22.5	0.68	**0.92**	0.337	**0.46**	-0.12
Body	F	LTE Band7	20850	2510	100RB Bottom 10mm	/	21.09	22.5	0.654	**0.90**	0.323	**0.45**	0.09
Body	F	LTE Band7	21350	2560	50RB-Middle Front 10mm	/	21.24	22.5	0.302	**0.40**	0.171	**0.23**	-0.06
Body	F	LTE Band7	21350	2560	50RB-Middle Rear 10mm	/	21.24	22.5	0.37	**0.49**	0.194	**0.26**	-0.12
Body	F	LTE Band7	21350	2560	50RB-Middle Right 10mm	/	21.24	22.5	0.092	**0.12**	0.054	**0.07**	0.08
Body	F	LTE Band7	21350	2560	50RB-Middle Bottom 10mm	/	21.24	22.5	0.56	**0.75**	0.275	**0.37**	0.08
Body	F	LTE Band7	20850	2510	1RB-Mid Bottom 10mm	S2	21.19	22.5	0.671	**0.91**	0.331	**0.45**	0.03
Body	F	LTE Band7	20850	2510	1RB-Mid Bottom 10mm	Single SIM	21.19	22.5	0.665	**0.90**	0.327	**0.44**	0.16
Cheek	L	LTE Band28	27460	728	1RB-Mid	/	24.98	25.7	0.095	**0.11**	0.073	**0.09**	0.02
Tilt	L	LTE Band28	27460	728	1RB-Mid	/	24.98	25.7	0.064	**0.08**	0.051	**0.06**	0.12
Cheek	R	LTE Band28	27560	738	1RB-Mid	9	24.85	25.7	0.15	**0.18**	0.115	**0.14**	0.06
Cheek	R	LTE Band28	27460	728	1RB-Mid	/	24.98	25.7	0.109	**0.13**	0.084	**0.10**	0.18
Cheek	R	LTE Band28	27310	713	1RB-Mid	/	24.89	25.7	0.116	**0.14**	0.089	**0.11**	0.03
Tilt	R	LTE Band28	27460	728	1RB-Mid	/	24.98	25.7	0.058	**0.07**	0.046	**0.05**	-0.09
Cheek	L	LTE Band28	27310	713	50RB-Low	/	23.45	25	0.058	**0.08**	0.045	**0.06**	0.13
Tilt	L	LTE Band28	27310	713	50RB-Low	/	23.45	25	0.04	**0.06**	0.032	**0.05**	-0.02
Cheek	R	LTE Band28	27310	713	50RB-Low	/	23.45	25	0.07	**0.10**	0.053	**0.08**	-0.03
Tilt	R	LTE Band28	27310	713	50RB-Low	/	23.45	25	0.04	**0.06**	0.031	**0.04**	-0.05
Body	F	LTE Band28	27460	728	1RB-Mid Front 10mm	/	24.98	25.7	0.127	**0.15**	0.096	**0.11**	0.14
Body	F	LTE Band28	27560	738	1RB-Mid Rear 10mm	/	24.85	25.7	0.265	**0.32**	0.198	**0.24**	0.09
Body	F	LTE Band28	27460	728	1RB-Mid Rear 10mm	/	24.98	25.7	0.225	**0.27**	0.146	**0.17**	0.02
Body	F	LTE Band28	27310	713	1RB-Mid Rear 10mm	10	24.89	25.7	0.278	**0.33**	0.209	**0.25**	-0.18
Body	F	LTE Band28	27460	728	1RB-Mid Left Edge 10mm	/	24.98	25.7	0.077	**0.09**	0.053	**0.06**	-0.03
Body	F	LTE Band28	27460	728	1RB-Mid Right Edge 10mm	/	24.98	25.7	0.093	**0.11**	0.064	**0.08**	0.1
Body	F	LTE Band28	27460	728	1RB-Mid Bottom Edge 10mm	/	24.98	25.7	0.11	**0.13**	0.056	**0.07**	0.1
Body	F	LTE Band28	27310	713	50RB-Low Front 10mm	/	23.45	25	0.136	**0.19**	0.101	**0.14**	-0.05
Body	F	LTE Band28	27310	713	50RB-Low Rear 10mm	/	23.45	25	0.188	**0.27**	0.12	**0.17**	0.13
Body	F	LTE Band28	27310	713	50RB-Low Left Edge 10mm	/	23.45	25	0.064	**0.09**	0.042	**0.06**	-0.15
Body	F	LTE Band28	27310	713	50RB-Low Right Edge 10mm	/	23.45	25	0.086	**0.12**	0.06	**0.09**	0.03
Body	F	LTE Band28	27310	713	50RB-Low Bottom Edge 10mm	/	23.45	25	0.08	**0.11**	0.043	**0.06**	-0.01

Table 14.1-3: SAR Values- LTE B38/LTE B41

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Cheek	L	LTE Band38	38150	2610	1RB-Mid	/	24.97	25.7	0.265	**0.31**	0.138	**0.16**	-0.01
Cheek	L	LTE Band38	38000	2595	1RB-Mid	/	25.04	25.7	0.26	**0.30**	0.139	**0.16**	0.02
Cheek	L	LTE Band38	37850	2580	1RB-Mid	11	25.13	25.7	0.28	**0.32**	0.149	**0.17**	-0.02
Tilt	L	LTE Band38	37850	2580	1RB-Mid	/	25.13	25.7	0.15	**0.17**	0.076	**0.09**	0.14
Cheek	R	LTE Band38	37850	2580	1RB-Mid	/	25.13	25.7	0.121	**0.14**	0.07	**0.08**	-0.18
Tilt	R	LTE Band38	37850	2580	1RB-Mid	/	25.13	25.7	0.099	**0.11**	0.053	**0.06**	-0.04
Cheek	L	LTE Band38	37850	2580	50RB-Middle	/	23.28	24.7	0.185	**0.26**	0.098	**0.14**	-0.12
Tilt	L	LTE Band38	37850	2580	50RB-Middle	/	23.28	24.7	0.106	**0.15**	0.053	**0.07**	-0.12
Cheek	R	LTE Band38	37850	2580	50RB-Middle	/	23.28	24.7	0.083	**0.12**	0.048	**0.07**	-0.18
Tilt	R	LTE Band38	37850	2580	50RB-Middle	/	23.28	24.7	0.068	**0.09**	0.037	**0.05**	-0.18
Body	F	LTE Band38	37850	2580	1RB-Mid Front 10mm	/	25.13	25.7	0.434	**0.49**	0.243	**0.28**	0.12
Body	F	LTE Band38	37850	2580	1RB-Mid Rear 10mm	/	25.13	25.7	0.499	**0.57**	0.252	**0.29**	0.01
Body	F	LTE Band38	37850	2580	1RB-Mid Left 10mm	/	25.13	25.7	0.22	**0.25**	0.125	**0.14**	0.06
Body	F	LTE Band38	37850	2580	1RB-Mid Right 10mm	/	25.13	25.7	0.139	**0.16**	0.078	**0.09**	-0.11
Body	F	LTE Band38	37850	2580	1RB-Mid Bottom 10mm	12	25.13	25.7	0.636	**0.73**	0.31	**0.35**	-0.1
Body	F	LTE Band38	37850	2580	50RB-Middle Front 10mm	/	23.28	24.7	0.333	**0.46**	0.184	**0.26**	0.12
Body	F	LTE Band38	37850	2580	50RB-Middle Rear 10mm	/	23.28	24.7	0.383	**0.53**	0.185	**0.26**	0.12
Body	F	LTE Band38	37850	2580	50RB-Middle Left 10mm	/	23.28	24.7	0.125	**0.17**	0.068	**0.09**	-0.05
Body	F	LTE Band38	37850	2580	50RB-Middle Right 10mm	/	23.28	24.7	0.02	**0.03**	0.01	**0.01**	-0.17
Body	F	LTE Band38	37850	2580	50RB-Middle Bottom 10mm	/	23.28	24.7	0.503	**0.70**	0.253	**0.35**	0.05
Cheek	L	LTE Band41	41490	2680	1RB-Middle	/	24.55	25.7	0.211	**0.27**	0.116	**0.15**	0.05
Cheek	L	LTE Band41	41055	2636.5	1RB-High	/	24.39	25.7	0.269	**0.36**	0.15	**0.20**	0.04
Cheek	L	LTE Band41	40620	2593	1RB-Middle	/	24.95	25.7	0.295	**0.35**	0.165	**0.20**	-0.05
Cheek	L	LTE Band41	40185	2549.5	1RB-Middle	/	24.34	25.7	0.404	**0.55**	0.214	**0.29**	0.02
Cheek	L	LTE Band41	39750	2506	1RB-Middle	13	24.58	25.7	0.435	**0.56**	0.235	**0.30**	-0.07
Tilt	L	LTE Band41	40620	2593	1RB-Middle	/	24.95	25.7	0.155	**0.18**	0.082	**0.10**	0.16
Cheek	R	LTE Band41	40620	2593	1RB-Middle	/	24.95	25.7	0.127	**0.15**	0.076	**0.09**	0.06
Tilt	R	LTE Band41	40620	2593	1RB-Middle	/	24.95	25.7	0.099	**0.12**	0.055	**0.07**	-0.09
Cheek	L	LTE Band41	40620	2593	50RB-Low	/	23.42	24.7	0.131	**0.18**	0.073	**0.10**	-0.12
Tilt	L	LTE Band41	40620	2593	50RB-Low	/	23.42	24.7	0.111	**0.15**	0.06	**0.08**	0.01
Cheek	R	LTE Band41	40620	2593	50RB-Low	/	23.42	24.7	0.106	**0.14**	0.062	**0.08**	0.09
Tilt	R	LTE Band41	40620	2593	50RB-Low	/	23.42	24.7	0.082	**0.11**	0.045	**0.06**	0.15
Body	F	LTE Band41	40620	2593	1RB-Middle Front 10mm	/	24.95	25.7	0.25	**0.30**	0.137	**0.16**	0.03
Body	F	LTE Band41	40620	2593	1RB-Middle Rear 10mm	14	24.95	25.7	0.455	**0.54**	0.228	**0.27**	-0.14
Body	F	LTE Band41	40620	2593	1RB-Middle Left 10mm	/	24.95	25.7	0.195	**0.23**	0.106	**0.13**	-0.02
Body	F	LTE Band41	40620	2593	1RB-Middle Right 10mm	/	24.95	25.7	0.03	**0.04**	0.016	**0.02**	0.03
Body	F	LTE Band41	40620	2593	1RB-Middle Bottom 10mm	/	24.95	25.7	0.417	**0.50**	0.199	**0.24**	-0.18
Body	F	LTE Band41	40620	2593	50RB-Low Front 10mm	/	23.42	24.7	0.148	**0.20**	0.081	**0.11**	0.07
Body	F	LTE Band41	40620	2593	50RB-Low Rear 10mm	/	23.42	24.7	0.255	**0.34**	0.127	**0.17**	-0.15
Body	F	LTE Band41	40620	2593	50RB-Low Left 10mm	/	23.42	24.7	0.104	**0.14**	0.058	**0.08**	0.02
Body	F	LTE Band41	40620	2593	50RB-Low Right 10mm	/	23.42	24.7	0.061	**0.08**	0.032	**0.04**	-0.08
Body	F	LTE Band41	40620	2593	50RB-Low Bottom 10mm	/	23.42	24.7	0.373	**0.50**	0.172	**0.23**	0.12

14.2 SAR Evaluation for WIFI

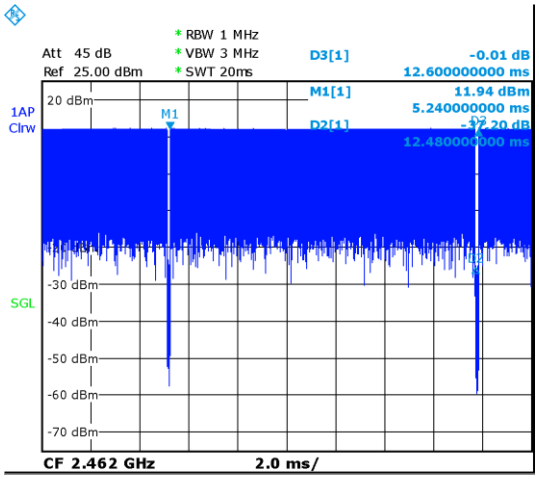
The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/g/n/ac/ax modes, the channel in the lower order/sequence 802.11 mode (i.e. a, g, n ac then ax) is selected.

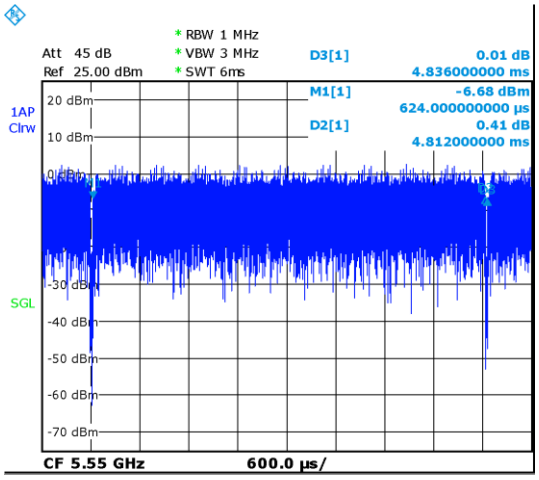
SAR Test reduction was applied from KDB 248227 guidance, when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

Duty factor plot

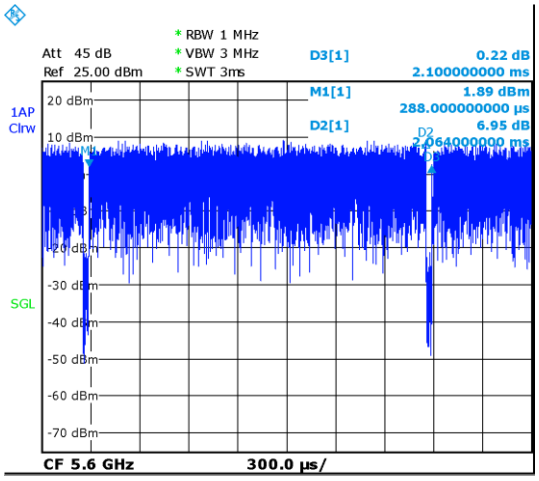
CH11



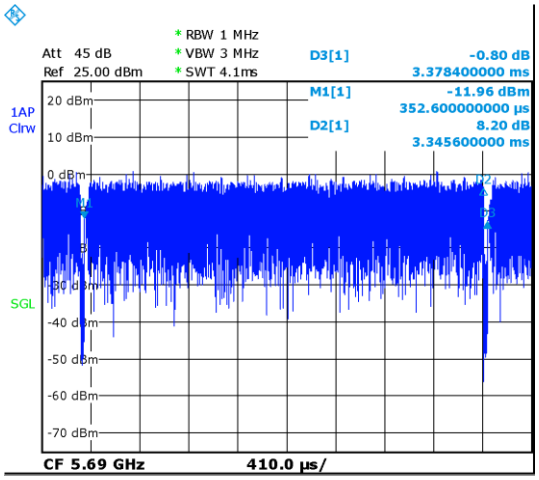
CH110



CH120



CH138



SAR results for WLAN 2.4G

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Duty Cycle	Scaled SAR 1g (W/kg)	Power Drift
WIFI 802.11b 1M 15.5dB													
Cheek	L	WIFI2.4G	11	2462		15	15.53	16.5	0.348	**0.44**	99.05%	**0.44**	0.05
Tilt	L	WIFI2.4G	11	2462		/	15.53	16.5	0.241	**0.30**	99.05%	**0.30**	-0.09
Cheek	R	WIFI2.4G	11	2462		/	15.53	16.5	0.148	**0.19**	99.05%	**0.19**	-0.04
Tilt	R	WIFI2.4G	11	2462		/	15.53	16.5	0.147	**0.18**	99.05%	**0.19**	-0.04
WIFI 802.11b 1M 18dB													
Body	F	WIFI2.4G	11	2462	Front 10mm	/	18.97	19	0.146	**0.15**	99.05%	**0.15**	-0.19
Body	F	WIFI2.4G	11	2462	Rear 10mm	16	18.97	19	0.235	**0.24**	99.05%	**0.24**	-0.02
Body	F	WIFI2.4G	6	2437	Rear 10mm	/	17.86	19	0.179	**0.23**	99.05%	**0.23**	-0.1
Body	F	WIFI2.4G	1	2412	Rear 10mm	/	18.94	19	0.223	**0.23**	99.05%	**0.23**	-0.11
Body	F	WIFI2.4G	11	2462	Left Edge 10mm	/	18.97	19	<0.01	<0.01	99.05%	<0.01	/
Body	F	WIFI2.4G	11	2462	Right Edge 10mm	/	18.97	19	0.176	**0.18**	99.05%	**0.18**	-0.17
Body	F	WIFI2.4G	11	2462	Top Edge 10mm	/	18.97	19	0.13	**0.13**	99.05%	**0.13**	-0.04

SAR results for WLAN 5G

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Duty Cycle	Scaled SAR 1g (W/kg)	Power Drift
WIFI 802.11ac 80M MCS0 14dB													
Cheek	L	WIFI5G	58	5290		/	13.54	15	0.225	**0.31**	99.03%	**0.32**	0.03
Tilt	L	WIFI5G	58	5290		/	13.54	15	0.109	**0.15**	99.03%	**0.15**	-0.13
Cheek	R	WIFI5G	58	5290		/	13.54	15	0.09	**0.13**	99.03%	**0.13**	-0.12
Tilt	R	WIFI5G	58	5290		/	13.54	15	0.084	**0.12**	99.03%	**0.12**	-0.07
WIFI 802.11ac 80M MCS0 14dB													
Cheek	L	WIFI5G	138	5690		17	13.91	15	0.269	**0.35**	99.03%	**0.35**	0.01
Tilt	L	WIFI5G	138	5690		/	13.91	15	0.158	**0.20**	99.03%	**0.21**	0.13
Cheek	R	WIFI5G	138	5690		/	13.91	15	0.118	**0.15**	99.03%	**0.15**	0.17
Tilt	R	WIFI5G	138	5690		/	13.91	15	0.09	**0.12**	99.03%	**0.12**	0.11
WIFI 802.11ac 80M MCS0 14dB													
Cheek	L	WIFI5G	155	5775		/	13.68	15	0.243	**0.33**	99.03%	**0.33**	-0.08
Tilt	L	WIFI5G	155	5775		/	13.68	15	0.161	**0.22**	99.03%	**0.22**	0.06
Cheek	R	WIFI5G	155	5775		/	13.68	15	0.084	**0.11**	99.03%	**0.11**	-0.11
Tilt	R	WIFI5G	155	5775		/	13.68	15	0.097	**0.13**	99.03%	**0.13**	0.08
WIFI 802.11a 6M 17dB													
Body	F	WIFI5G	64	5320	Front 14mm	/	17.6	18	0.096	**0.11**	98.29%	**0.11**	0.16
Body	F	WIFI5G	64	5320	Rear 21mm	/	17.6	18	0.131	**0.14**	98.29%	**0.15**	0.04
Body	F	WIFI5G	64	5320	Right Edge 22mm	/	17.6	18	0.13	**0.14**	98.29%	**0.15**	-0.01
Body	F	WIFI5G	64	5320	Top Edge 10mm	/	17.6	18	0.073	**0.08**	98.29%	**0.08**	-0.07
WIFI 802.11a 6M 17dB													
Body	F	WIFI5G	120	5600	Front 14mm	/	17.95	18	0.102	**0.10**	98.29%	**0.10**	-0.15
Body	F	WIFI5G	120	5600	Rear 21mm	/	17.95	18	0.138	**0.14**	98.29%	**0.14**	-0.09
Body	F	WIFI5G	120	5600	Right Edge 22mm	/	17.95	18	0.098	**0.10**	98.29%	**0.10**	0.08
Body	F	WIFI5G	120	5600	Top Edge 10mm	/	17.95	18	0.05	**0.05**	98.29%	**0.05**	0.17
WIFI 802.11n 40M MCS0 14.5dB													
Body	F	WIFI5G	62	5310	Front 10mm	/	14.64	15.5	0.084	**0.10**	99.50%	**0.10**	-0.12
Body	F	WIFI5G	62	5310	Rear 10mm	/	14.64	15.5	0.153	**0.19**	99.50%	**0.19**	0.02
Body	F	WIFI5G	62	5310	Right Edge 10mm	/	14.64	15.5	0.227	**0.28**	99.50%	**0.28**	-0.09
WIFI 802.11n 40M MCS0 14.5dB													
Body	F	WIFI5G	110	5550	Front 10mm	/	14.74	15.5	0.109	**0.13**	99.50%	**0.13**	-0.04
Body	F	WIFI5G	110	5550	Rear 10mm	/	14.74	15.5	0.299	**0.36**	99.50%	**0.36**	-0.07
Body	F	WIFI5G	110	5550	Right Edge 10mm	18	14.74	15.5	0.408	**0.49**	99.50%	**0.49**	0.05
WIFI 802.11n 40M MCS0 14.5dB													
Body	F	WIFI5G	151	5755	Front 10mm	/	15.35	15.5	0.055	**0.06**	99.50%	**0.06**	-0.05
Body	F	WIFI5G	151	5755	Rear 10mm	/	15.35	15.5	0.188	**0.19**	99.50%	**0.20**	0.01
Body	F	WIFI5G	151	5755	Right Edge 10mm	/	15.35	15.5	0.125	**0.13**	99.50%	**0.13**	0.19
Body	F	WIFI5G	151	5755	Top Edge 10mm	/	15.35	15.5	0.054	**0.06**	99.50%	**0.06**	-0.06

14.3 SAR Evaluation For BT

SAR results for BT

Test Position	Phantom position L/R/F	Frequency Band	Channel Number	Frequency (MHz)	Test setup/Position	Note/Fig No.	EUT Measured Power (dBm)	Tune up (dBm)	Measured SAR 1g (W/kg)	Calculated SAR 1g (W/kg)	Measured SAR 10g (W/kg)	Calculated SAR 10g (W/kg)	Power Drift
Cheek	L	BT	78	2480	DH5	19	9.76	10	0.149	**0.16**	0.062	**0.07**	0.1
Tilt	L	BT	78	2480	DH5	/	9.76	10	0.052	**0.05**	0.021	**0.02**	-0.07
Cheek	R	BT	78	2480	DH5	/	9.76	10	0.072	**0.08**	0.033	**0.03**	0.15
Tilt	R	BT	78	2480	DH5	/	9.76	10	<0.01	<0.01	<0.01	<0.01	/
Body	F	BT	78	2480	DH5 Front 10mm	/	9.76	10	<0.01	<0.01	<0.01	<0.01	/
Body	F	BT	78	2480	DH5 Rear 10mm	20	9.76	10	0.027	**0.03**	0.003	**0.00**	-0.01
Body	F	BT	78	2480	DH5 Right Edge 10mm	/	9.76	10	0.019	**0.02**	0.002	**0.00**	0.08
Body	F	BT	78	2480	DH5 Top Edge 10mm	/	9.76	10	<0.01	<0.01	<0.01	<0.01	/

14.4 SAR results for 10-g extremity SAR

According to the KDB648474 D04, 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 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

For this device, SAR is not required for 10-g extremity SAR because the scaled SAR is ⩽ 1.2 W/kg.

15 SAR Measurement Variability

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. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.
The following procedures are applied to determine if repeated measurements are required.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) 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 ≥ 1.45W/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

16 Measurement Uncertainty

16.1 Measurement Uncertainty for Normal SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	√3	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	N	1	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.4	R	√3	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity (target)	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521

Combined standard uncertainty	$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					9.55	9.43	257
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$					19.1	18.9	

16.2 Measurement Uncertainty for Normal SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	√3	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. restrictions	B	0.8	R	√3	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	√3	1	1	3.9	3.9	∞
13	Post-processing	B	4.0	R	√3	1	1	2.3	2.3	∞
Test sample related										
14	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
15	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
16	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
17	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞
18	Liquid conductivity (target)	B	5.0	R	√3	0.64	0.43	1.8	1.2	∞
19	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
20	Liquid permittivity	B	5.0	R	√3	0.6	0.49	1.7	1.4	∞

	(target)									
21	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$						10.7	10.6	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						21.4	21.1	

16.3 Measurement Uncertainty for Fast SAR Tests (300MHz~3GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.0	N	1	1	1	6.0	6.0	∞
2	Isotropy	B	4.7	R	√3	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	1.0	R	√3	1	1	0.6	0.6	∞
4	Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	√3	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	√3	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	√3	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	√3	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	√3	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	√3	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.4	R	√3	1	1	0.2	0.2	∞
12	Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
13	Post-processing	B	1.0	R	√3	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	7.0	R	√3	1	1	4.0	4.0	∞
Test sample related										
15	Test sample positioning	A	3.3	N	1	1	1	3.3	3.3	71
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	√3	1	1	2.3	2.3	∞

19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						10.4	10.3	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						20.8	20.6	

16.4 Measurement Uncertainty for Fast SAR Tests (3~6GHz)

No.	Error Description	Type	Uncertainty value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement system										
1	Probe calibration	B	6.55	N	1	1	1	6.55	6.55	∞
2	Isotropy	B	4.7	R	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
3	Boundary effect	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
4	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
5	Detection limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
6	Readout electronics	B	0.3	R	$\sqrt{3}$	1	1	0.3	0.3	∞
7	Response time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
8	Integration time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
9	RF ambient conditions-noise	B	0	R	$\sqrt{3}$	1	1	0	0	∞
10	RFambient conditions-reflection	B	0	R	$\sqrt{3}$	1	1	0	0	∞
11	Probe positioned mech. Restrictions	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
12	Probe positioning with respect to phantom shell	B	6.7	R	$\sqrt{3}$	1	1	3.9	3.9	∞
13	Post-processing	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
14	Fast SAR z-Approximation	B	14.0	R	$\sqrt{3}$	1	1	8.1	8.1	∞
Test sample related										
15	Test sample	A	3.3	N	1	1	1	3.3	3.3	71

	positioning									
16	Device holder uncertainty	A	3.4	N	1	1	1	3.4	3.4	5
17	Drift of output power	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and set-up										
18	Phantom uncertainty	B	4.0	R	$\sqrt{3}$	1	1	2.3	2.3	∞
19	Liquid conductivity (target)	B	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
20	Liquid conductivity (meas.)	A	2.06	N	1	0.64	0.43	1.32	0.89	43
21	Liquid permittivity (target)	B	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
22	Liquid permittivity (meas.)	A	1.6	N	1	0.6	0.49	1.0	0.8	521
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$						13.5	13.4	257
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$						27.0	26.8	

17 MAIN TEST INSTRUMENTS

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	E5071C	MY46110673	January 5, 2023	One year
02	Power sensor	NRP110T	101139	January 13, 2023	One year
03	Power sensor	NRP110T	101159	January 13, 2023	One year
04	Signal Generator	E4438C	MY49071430	January 19, 2023	One year
05	Amplifier	60S1G4	0331848	No Calibration Requested	
06	BTS	CMW500	159889	January 6, 2023	One year
07	E-field Probe	SPEAG EX3DV4	7727	June 5, 2023	One year
08	DAE	SPEAG DAE4	1745	August 31, 2022	One year
09	Dipole Validation Kit	SPEAG D835V2	4d069	July 20,2022	One year
10	Dipole Validation Kit	SPEAG D2450V2	853	July 20,2022	Two years
11	Dipole Validation Kit	SPEAG D2600V2	1012	July 20,2022	One year
12	Dipole Validation Kit	SPEAG D5GHzV2	1060	June 19,2023	One year

END OF REPORT BODY

Appendixes

ANNEX A Graph Results
ANNEX B System Verification Results
ANNEX C SAR Measurement Setup
ANNEX D Position of the wireless device in relation to the phantom
ANNEX E Equivalent Media Recipes
ANNEX F System Validation
ANNEX G Probe Calibration Certificate
ANNEX H Dipole Calibration Certificate
ANNEX I SAR Sensor Triggering Data Summary
ANNEX J Extended Calibration SAR Dipole
ANNEX K Accreditation Certificate