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FCC SAR TEST REPORT

Application No:	CKSEM1906000172CR
Applicant:	Hytera Communications Corporation Limited
Manufacturer:	Hytera Communications Corporation Limited
Product Name:	Multi-mode Advanced Radio
Model No.(EUT):	PTC680 FxB1
Trade Mark:	Hytera
FCC ID:	YAMPTC680FXB1
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2019-01-11
Date of Test:	2019-05-07 to 2019-05-14
Date of Issue:	2019-05-19
Test conclusion:	**PASS ***

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

Authorized Signature:

Eric Lin

Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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REVISION HISTORY

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-05-19		Original
02		2019-07-03		Series/ Variant

TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)			
	Head	Body-worn	Hotspot	Product specific 10g SAR
GSM850	0.11	0.07	0.16	/
GSM1900	0.15	0.12	0.43	/
CDMA BC0	0.25	0.16	0.19	/
LTE Band 2	0.25	0.19	0.36	/
LTE Band 4	0.35	**0.22**	**0.82**	/
LTE Band 5	0.21	0.12	0.14	/
LTE Band 7	**0.58**	0.12	0.30	/
LTE Band 26	0.17	0.15	0.17	/
LTE Band 38	0.38	0.13	0.22	/
LTE Band 40	0.31	0.10	0.23	/
LTE Band 41	0.36	<0.10	0.20	/
WI-FI (2.4GHz)	0.47	<0.10	<0.10	/
BT	/	/	/	/
SAR Limited(W/kg)	1.6			4.0
Maximum Simultaneous Transmission SAR (W/kg)				
Scenario	Head	Body-worn	Hotspot	Product specific 10g SAR
Sum SAR	0.91	0.34	1.11	/
SPLSR	NA	NA	NA	NA
SPLSR Limited	0.04			0.1

Approved & Released by

Eric Lin

SAR Manager

Tested by

Richard Kong

SAR Engineer

CONTENTS

1 GENERAL INFORMATION 7

1.1 DETAILS OF CLIENT 7
1.2 TEST LOCATION 7
1.3 TEST FACILITY 8
1.4 GENERAL DESCRIPTION OF EUT 9
1.4.1 DUT Antenna Locations(Back View) 10
1.5 TEST SPECIFICATION 11
1.6 RF EXPOSURE LIMITS 12

2 LABORATORY ENVIRONMENT 13

3 SAR MEASUREMENTS SYSTEM CONFIGURATION 14

3.1 THE SAR MEASUREMENT SYSTEM 14
3.2 ISOTROPIC E-FIELD PROBE EX3DV4 15
3.3 DATA ACQUISITION ELECTRONICS (DAE) 16
3.4 SAM TWIN PHANTOM 16
3.5 ELI PHANTOM 17
3.6 DEVICE HOLDER FOR TRANSMITTERS 18
3.7 MEASUREMENT PROCEDURE 19
3.7.1 Scanning procedure 19
3.7.2 Data Storage 21
3.7.3 Data Evaluation by SEMCAD 21

4 SAR MEASUREMENT VARIABILITY AND UNCERTAINTY 23

4.1 SAR MEASUREMENT VARIABILITY 23
4.2 SAR MEASUREMENT UNCERTAINTY 24

5 DESCRIPTION OF TEST POSITION 25

5.1 HEAD EXPOSURE CONDITION 25
5.1.1 SAM Phantom Shape 25
5.1.2 EUT constructions 25
5.1.3 Definition of the “cheek” position 26
5.1.4 Definition of the “tilted” position 27
5.2 BODY EXPOSURE CONDITION 28
5.2.1 Body-worn accessory exposure conditions 28
5.2.2 Wireless Router exposure conditions 29
5.3 BODY EXPOSURE CONDITION 29

6 SAR SYSTEM CHECK PROCEDURE 30
6.1 TISSUE SIMULATE LIQUID 30
6.1.1 Recipes for Tissue Simulate Liquid 30
6.1.2 Measurement for Tissue Simulate Liquid 31
6.2 SAR SYSTEM CHECK 32
6.2.1 Justification for Extended SAR Dipole Calibrations 33
6.2.2 Summary System Check Result(s) 34
6.2.3 Detailed System Check Results 34
7 TEST CONFIGURATION 35
7.1 3G SAR TEST REDUCTION PROCEDURE 35
7.2 OPERATION CONFIGURATIONS 35
7.2.1 GSM Test Configuration 35
7.2.2 CDMA Test Configuration 35
7.2.3 WiFi Test Configuration 37
7.2.4 LTE Test Configuration 42
8 TEST RESULT 45
8.1 MEASUREMENT OF RF CONDUCTED POWER 45
8.1.1 Conducted Power of GSM 45
8.1.2 Conducted Power of CDMA 46
8.1.3 Conducted Power of LTE 47
8.1.4 Conducted Power of WIFI and BT 60
8.2 STAND-ALONE SAR TEST EVALUATION 62
8.3 MEASUREMENT OF SAR DATA 63
8.3.1 SAR Result of GSM850 63
8.3.2 SAR Result of GSM1900 63
8.3.3 SAR Result of CDMA BC0 65
8.3.4 SAR Result of LTE Band 2 66
8.3.5 SAR Result of LTE Band 4 68
8.3.6 SAR Result of LTE Band 5 70
8.3.7 SAR Result of LTE Band 7 72
8.3.8 SAR Result of LTE Band 26 74
8.3.9 SAR Result of LTE Band 38 76
8.3.10 SAR Result of LTE Band 40 77
8.3.11 SAR Result of LTE Band 41 79
8.3.12 SAR Result of 2.4GHz WIFI 82
8.4 MULTIPLE TRANSMITTER EVALUATION 82

8.4.1 Simultaneous SAR SAR test evaluation 83
8.4.2 Estimated SAR 84
8.4.3 Simultaneous Transmission SAR Summation Scenario 85

9 EQUIPMENT LIST 86

10 CALIBRATION CERTIFICATE 87

11 PHOTOGRAPHS 87

APPENDIX F: DETAILED SYSTEM CHECK RESULTS 88

APPENDIX G: DETAILED TEST RESULTS 88

APPENDIX H: CALIBRATION CERTIFICATE 88

APPENDIX I: PHOTOGRAPHS 88

1 General Information

1.1 Details of Client

Applicant:	Hytera Communications Corporation Limited
Address:	Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, People's Republic of China
Manufacturer:	Hytera Communications Corporation Limited
Address:	Hytera Tower, Hi-Tech Industrial Park North, 9108# Beihuan Road, Nanshan District, Shenzhen, People's Republic of China

1.2 Test Location

Company: Compliance Certification Services Inc. Kun shan Laboratory

Address: No.10 Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China

Post code: 215300

Telephone: 86-512-57355888

Fax: 86-512-57370818

E-mail: sgs.china@sgs.com

1.3 Test Facility

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

• CNAS (No. CNAS L4354)

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• FCC –Designation Number: CN1172

Compliance Certification Services Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172. Test Firm Registration Number: 995260.

• Industry Canada (IC) – IC Assigned Code: 2324E CAB ID: CN0072

The 10m and 3m Semi-anechoic chamber of Compliance Certification Services (Kunshan) Inc. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 2324E-1 for 10m chamber, 2324E-2 for 3m chamber.

• VCCI (Member No.: 1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-1600, C-1707, T-1499, G-216 respectively.

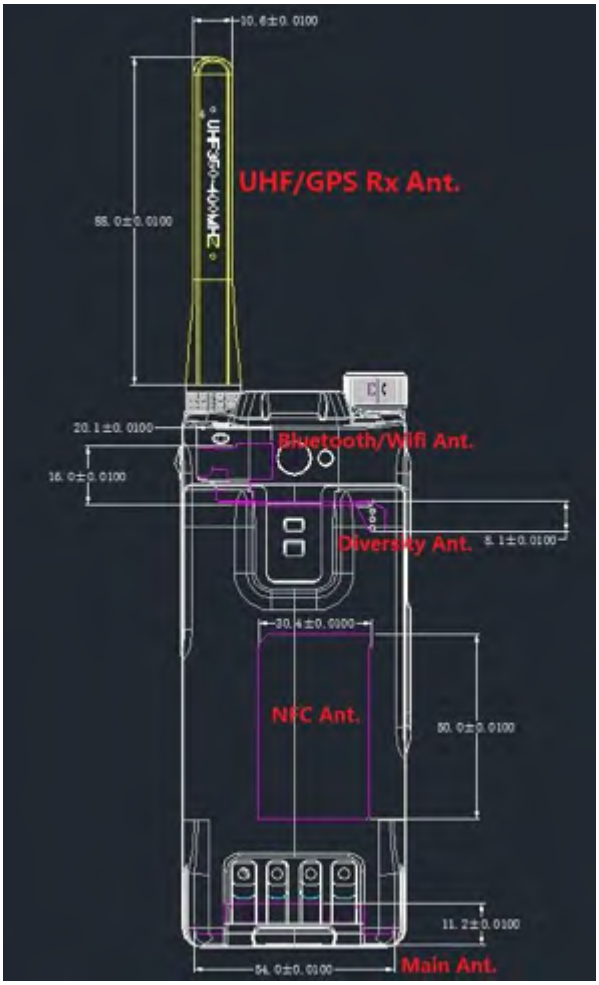
1.4 General Description of EUT

Product Name:	Multi-mode Advanced Radio		
Model No.(EUT):	PTC680 FxB1		
FCC ID:	YAMPTC680FXB1		
Trade Mark:	Hytera		
Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
SN:	0607RD1450		
Hardware Version:	C		
Software Version:	V2.5.03		
Antenna Type:	internal		
Device Operating Configurations :			
Modulation Mode:	**GSM:** GMSK, 8PSK; **CDMA:** QPSK **LTE:** QPSK,16QAM; **WIFI:** DSSS; OFDM; **BT:** GFSK, π/4DQPSK,8DPSK		
Device Class:	B		
GPRS Multi-slots Class:	33	EGPRS Multi-slots Class:	33
Power Class	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control “all 1”(CDMA BC0)		
	3, tested with power control Max Power(LTE Band 2/4/5/7/26/38/40/41)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824~849	869~894
	GSM1900	1850~1910	1930~1990
	CDMA BC0	824~849	869~894
	LTE Band 2	1850~1910	1930~1990
	LTE Band 4	1710~1755	2110~2155
	LTE Band 5	824~849	869~894
	LTE Band 7	2500~2570	2620~2690
	LTE Band 26	814~849	859~894
	LTE Band 38	2570~2620	2570~2620
	LTE Band 40	2300~2400	2300~2400
	LTE Band 41	2496~2690	2496~2690
	WIFI2.4G	2412~2462	2412~2462
	BT	2402~2480	2402~2480
Battery Information:	Model:	T4	
	Normal Voltage:	7.7V	
	Rated capacity:	2400mAh	
	Manufacturer:	FPR Connectivity Technology Inc.	

Battery2 Information:	Model:	T4H
	Normal Voltage:	7.7V
	Rated capacity:	4000mAh
	Manufacturer:	FPR Connectivity Technology Inc.

There are two model batteries with similar construction mentioned in this report and only different on the specification of battery. The data of battery T4 in this report based on report no. SZEM190101023909. This report test SAR only with additional battery T4H that is expected to result of battery T4 in the highest SAR.

1.4.1 DUT Antenna Locations(Back View)



Unit:mm

Note:

1）The DIV Antenna does not support transmitter function.

2）The test device is a Smartphone. The overall diagonal dimension of this device is 161mm. According to the distance between GSM/CDMA/LTE antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing							
Mode	Exposure Condition	Front	Back	Left	Right	Top	Bottom
Main Antenna	Hotspot/Product specific 10g SAR	Yes	Yes	Yes	Yes	No	Yes
2.4G WIFI & BT	Hotspot/Product specific 10g SAR	Yes	Yes	Yes	Yes	Yes	No

Table 1： EUT Sides for SAR Testing

Note:

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

1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE Std C95.1 – 1992	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01 3G SAR Procedures v03r01	3G SAR Measurement Procedures
KDB 941225 D05 SAR for LTE Devices v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
KDB 941225 D06 Hotspot Mode SAR v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB 248227 D01 802.11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 648474 D04 Handset SAR v01r03	SAR Evaluation Considerations for Wireless Handsets
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB447498 D03 Supplement C Cross-Reference v01	OET Bulletin 65, Supplement C Cross-Reference
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	**1.60 W/kg**	8.00 W/kg
Spatial Average SAR** (Whole Body)	0.08 W/kg	0.40 W/kg
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	**4.00 W/kg**	20.00 W/kg

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

2 Laboratory Environment

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

Table 2： The Ambient Conditions

3 SAR Measurements System Configuration

3.1 The SAR Measurement System

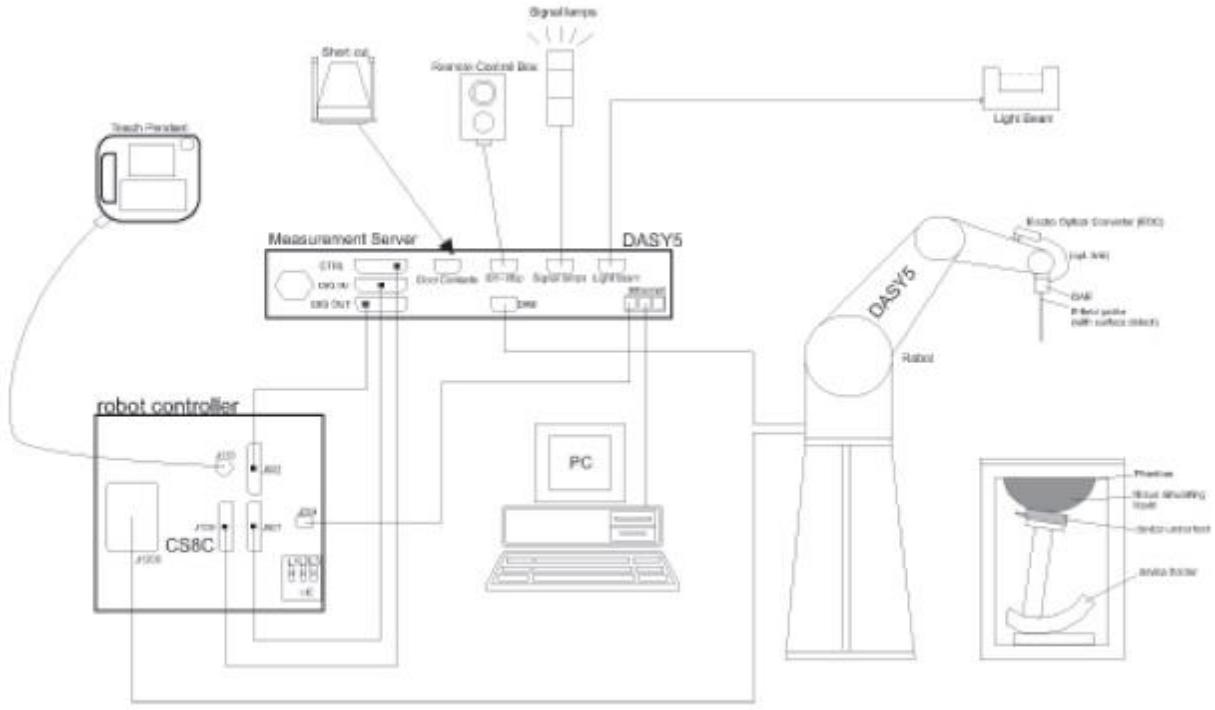
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the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

The DASY5 system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension for accommodation the data acquisition electronics (DAE).

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

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

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

3.2 Isotropic E-field Probe EX3DV4

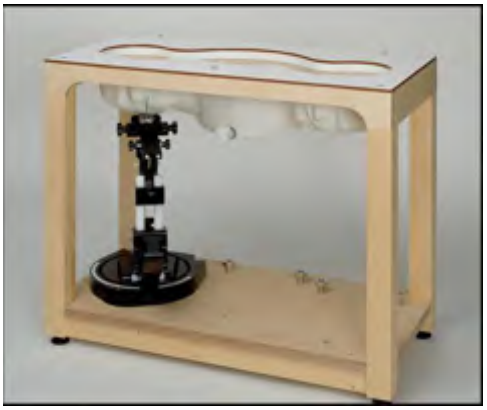
	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

3.3 Data Acquisition Electronics (DAE)

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

3.4 SAM Twin Phantom

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

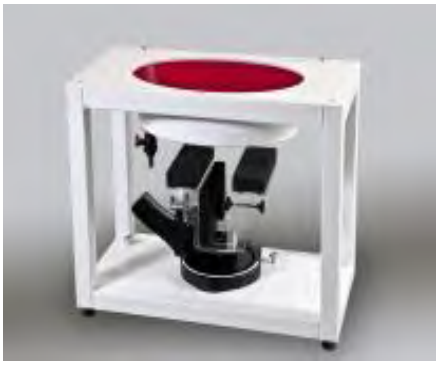


The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the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

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

3.5 ELI Phantom

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



Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

3.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

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

3.7 Measurement procedure

3.7.1 Scanning procedure

Step 1: Power reference measurement

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

Step 2: *Area scan*

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

Step 3: *Zoom scan*

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

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

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

Except when area scan based 1-g SAR estimation applies, a zoom scan measurement is required at the highest peak SAR location determined in the area scan to determine the 1-g SAR. When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR (per KDB publication 865664 D01), and the DASY System will be set up based on this condition to ensure that the measurement results is the maximum SAR.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$½\cdot\delta\cdot\ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ $1.5\cdot\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %

3.7.2 Data Storage

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

3.7.3 Data Evaluation by SEMCAD

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

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

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

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

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

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

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

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

cf = crest factor of exciting field (DASY parameter)

dcp i = diode compression point (DASY parameter)

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

E-field probes:

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

H-field probes:

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

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel I (i = x, y, z)
[mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m

Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

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

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

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

with SAR = local specific absorption rate in mW/g

Etot = total field strength in V/m

σ= conductivity in [mho/m] or [Siemens/m]

ε= equivalent tissue density in g/cm3

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

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

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

Htot = total magnetic field strength in A/m

4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

4.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

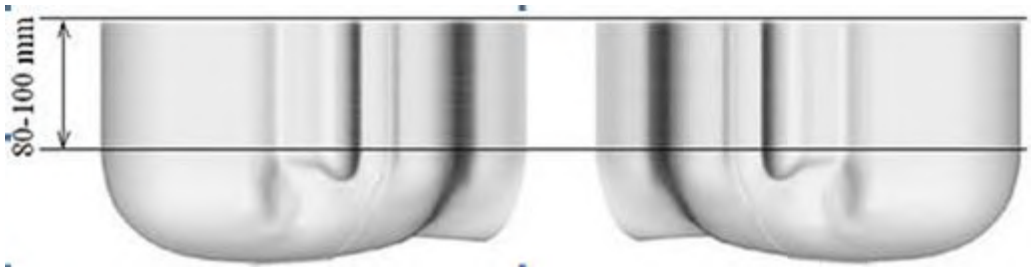
5 Description of Test Position

5.1 Head Exposure Condition

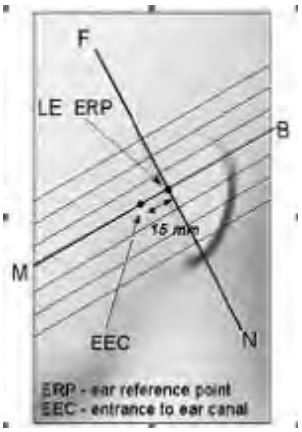
5.1.1 SAM Phantom Shape

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

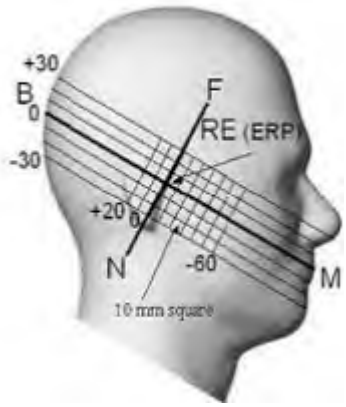
Note: The centre strip including the nose region has a different thickness tolerance.



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

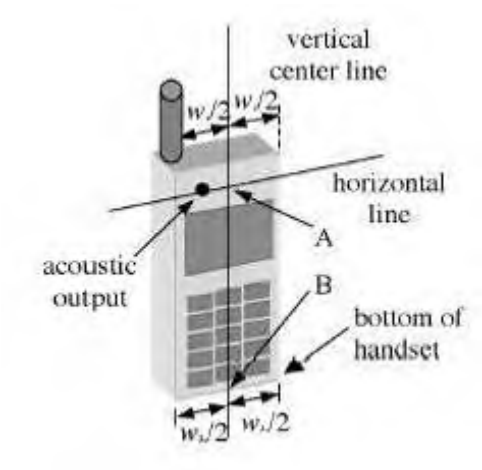


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

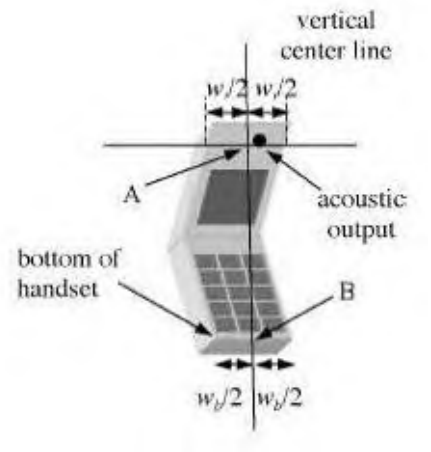


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

5.1.2 EUT constructions



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



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

5.1.3 Definition of the “cheek” position

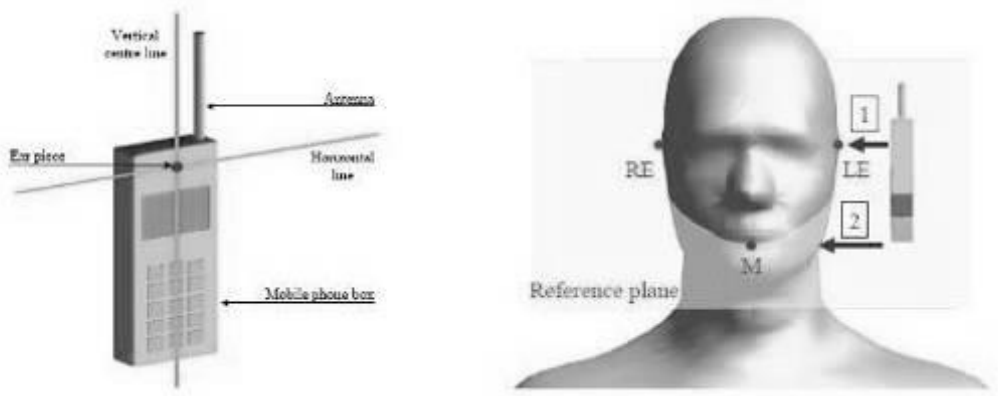
a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the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

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

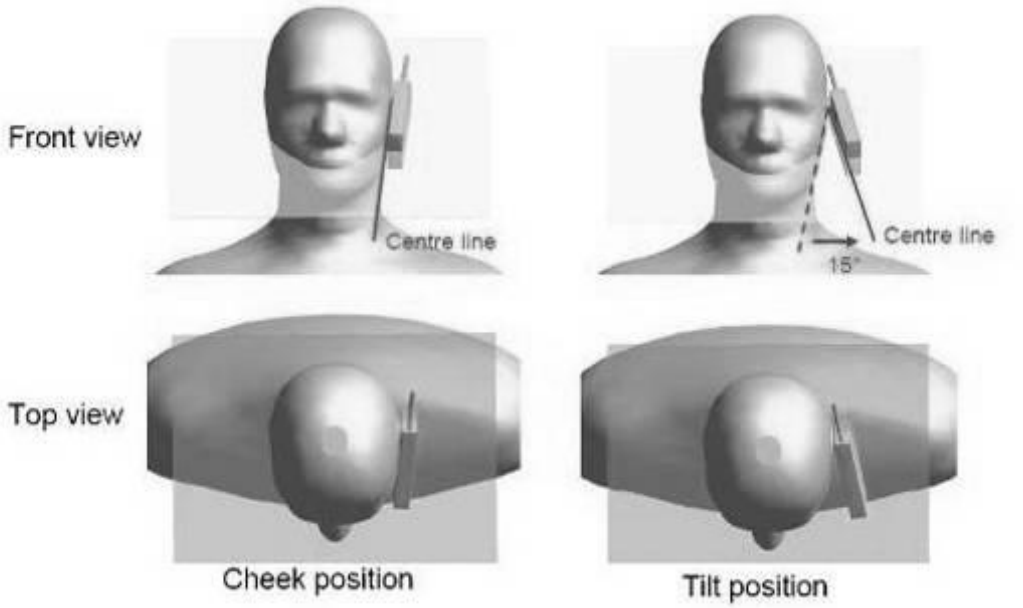
5.1.4 Definition of the “tilted” position

a) Position the device in the “cheek” position described above;

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



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



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

5.2 Body Exposure Condition

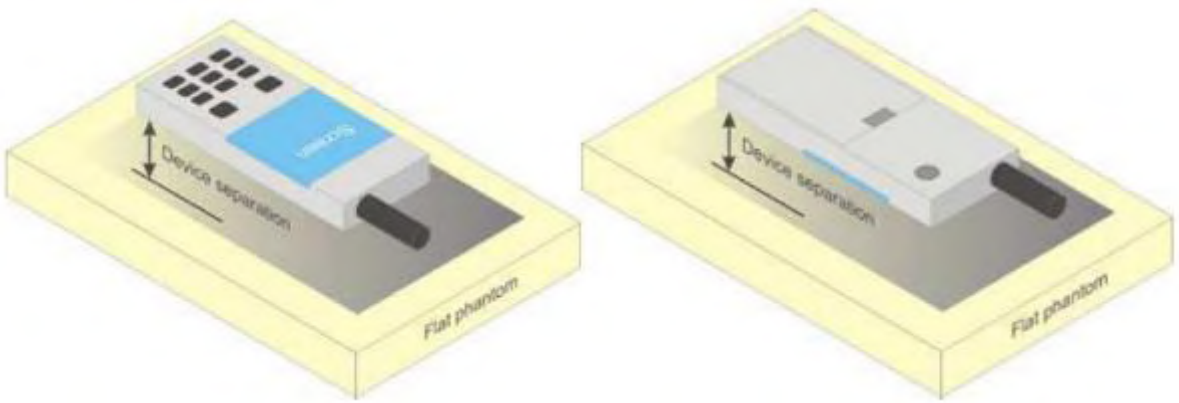
5.2.1 Body-worn accessory exposure conditions

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

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

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

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



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

5.2.2 Wireless Router exposure conditions

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

5.3 Body Exposure Condition

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

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

Due to the SAR result, the main antenna frequency bands are not required to test with 0mm for the Product Specific 10-g SAR.

6 SAR System Check Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

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

Ingredients (% by weight)	Frequency (MHz)							
	450		835		1800-2000		2300-2700	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	38.56	51.16	40.30	50.75	55.24	70.17	55.00	68.53
Salt (NaCl)	3.95	1.49	1.38	0.94	0.31	0.39	0.2	0.1
Sucrose	56.32	46.78	57.90	48.21	0	0	0	0
HEC	0.98	0.52	0.24	0	0	0	0	0
Bactericide	0.19	0.05	0.18	0.10	0	0	0	0
Tween	0	0	0	0	44.45	29.44	44.80	31.37
Salt: 99+% Pure Sodium Chloride Water: De-ionized, 16 MΩ+ resistivity Tween: Polyoxyethylene (20) sorbitan monolaurate					Sucrose: 98+% Pure Sucrose HEC: Hydroxyethyl Cellulose			
HSL5GHz is composed of the following ingredients： Water：50-65% Mineral oil：10-30% Emulsifiers：8-25% Sodium salt：0-1.5%								
MSL5GHz is composed of the following ingredients： Water：64-78% Mineral oil：11-18% Emulsifiers：9-15% Sodium salt：2-3%								

Table 3： Recipe of Tissue Simulate Liquid

6.1.2 Measurement for Tissue Simulate Liquid

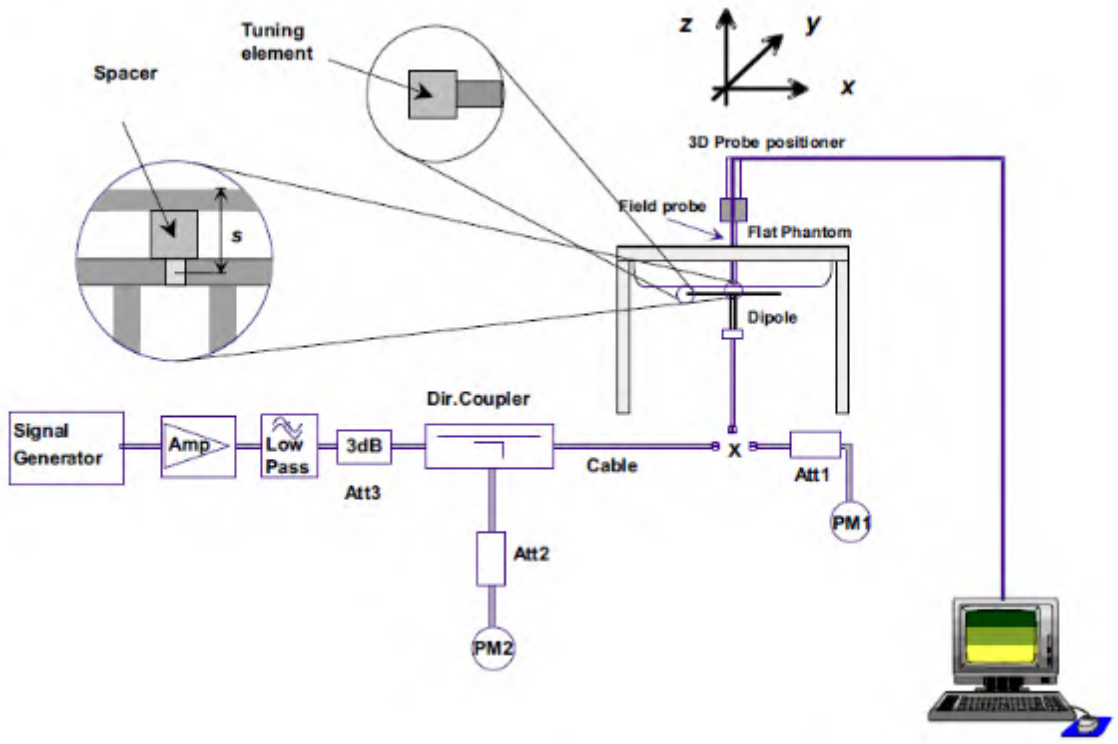
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Tissue Type	Measured Frequency（MHz）	Target Tissue (±5%)		Measured Tissue		Liquid Temp.	Measured Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	(℃)	
835 Head	835	41.5 (39.43~43.58)	0.90 (0.86~0.95)	40.842	0.887	22.1	2019/6/24
835 Body	835	55.2 (52.44~57.96)	0.97 (0.92~1.02)	54.425	1.012	22.1	2019/6/24
1800 Head	1800	40.0 (38.00~42.00)	1.40 (1.33~1.47)	40.307	1.367	22.2	2019/6/25
1800 Body	1800	53.3 (50.64~55.97)	1.52 (1.44~1.60)	51.142	1.481	22.2	2019/6/23
1900 Head	1900	40.0 (38.00~42.00)	1.40 (1.33~1.47)	40.64	1.372	22.3	2019/6/25
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	53.826	1.513	22.3	2019/6/23
2300 Head	2300	39.5 (37.53~41.48)	1.67 (1.53~1.69)	40.475	1.645	22	2019/6/21
2300 Body	2300	52.9 (50.26~55.55)	1.81 (1.71~1.89)	53.158	1.776	22	2019/6/22
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.901	1.826	22	2019/6/21
2450 Body	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	52.693	1.97	22	2019/6/22
2600 Head	2600	39.0 (37.05~40.95)	1.96 (1.86~2.06)	39.388	2	22.1	2019/6/21
2600 Body	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	52.234	2.162	22.1	2019/6/22

Table 4： Measurement result of Tissue electric parameters

6.2 SAR System Check

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



F-12. the microwave circuit arrangement used for SAR system check

6.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix H.
a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) Return-loss is within 10% of calibrated measurement;
d) Impedance is within 5Ω from the previous measurement.

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

6.2.2 Summary System Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Liquid Temp. (℃)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D835V2	Head	2.35	1.55	9.4	6.2	9.40 (8.46~10.34)	6.23 (5.61~6.85)	22.1	2019/6/24
	Body	2.45	1.64	9.8	6.56	9.63 (8.67~10.59)	6.38 (5.74~7.02)	22.1	2019/6/24
D1800V2	Head	8.99	4.91	35.96	19.64	38.7 (34.83~42.57)	20.2 (18.18~22.22)	22.2	2019/6/25
	Body	9.97	4.8	39.88	19.2	38.4 (34.56~42.24)	20.2 (18.18~22.22)	22.2	2019/6/23
D1900V2	Head	10.8	5.22	43.2	20.88	40.1 (36.09~44.11)	21.2 (9.08~23.32)	22.3	2019/6/25
	Body	9.76	5.14	39.04	20.56	40.2 (36.18~44.22)	21.4 (19.26~23.54)	22.3	2019/6/23
D2300V2	Head	10.8	5.16	43.2	20.64	47.4 (42.66~52.14)	22.8 (20.52~25.08)	22	2019/6/21
	Body	10.9	5.4	43.6	21.6	46.3 (41.67~50.93)	22.4 (20.61~24.64)	22	2019/6/22
D2450V2	Head	12.3	5.53	49.2	22.12	51.6 (46.44~56.76)	24 (21.6~26.4)	22	2019/6/21
	Body	13	6.06	52	24.24	50.5 (45.45~55.55)	23.5 (21.15~25.85)	22	2019/6/22
D2600V2	Head	13.8	6.06	55.2	24.24	56.2 (50.58~61.82)	25 (22.50~27.50)	22.1	2019/6/21
	Body	14	6.15	56	24.6	53.1 (47.79~58.41)	23.7 (21.33~26.07)	22.1	2019/6/22

Table 5： SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A

7 Test Configuration

7.1 3G SAR Test Reduction Procedure

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

7.2 Operation Configurations

7.2.1 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a base station by air link. Using CMW500 the power lever is set to “5”and “0” in SAR of GSM 850 and GSM 1900. The tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 33 for this EUT, it has at most 4 timeslots in uplink and at most 5 timeslots in downlink, the maximum total timeslot is 6. The EGPRS class is 33 for this EUT, it has at most 4 timeslots in uplink, and at most 5 timeslots in downlink, the maximum total timeslot is 6.

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

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

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

7.2.2 CDMA Test Configuration

1）. 1x RTT Handsets

The following procedures apply to CDMA 2000 Release 0 and Release A single carrier (1x RTT) handsets operating with Mobile Protocol Revision 6 or 7 (MOB_P_REV 6 or 7). The default test configuration is to measure SAR in RC3 with an established radio link between the handset and a communication test set. SAR in RC1 is selectively confirmed according to the 3G SAR test reduction procedure with RC3 as the primary mode. The forward and reverse links are configured with the same RC for SAR measurement. Maximum output power is verified by applying the procedures defined in 3GPP2 C. S0011 and TIA-98-E. SAR must be measured according to these maximum output conditions and requirements in KDB Publication 447498 D01.

2）. Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Results for at least steps 3, 4 and 10 of the power measurement procedures are required in the SAR report. Steps 3 and 4 are measured using Loopback Service Option SO55 with power control bits in “All Up” condition. TDSO/SO32 may be used instead of SO55 for step 4. Step 10 is measured using TDSO/SO32 with power control bits in the “Bits Hold” condition (i.e. alternative Up/Down Bits). All power measurements defined in C.S0011/TIA-98-E that are inapplicable to the handset or cannot be measured due to technical or equipment limitations must be clearly identified in the test report.

3）. Head SAR

SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55. The 3G SAR test reduction procedure is applied to RC1 with RC3 as the primary mode; otherwise, SAR is required for the channel with maximum measured output in RC1 using the head exposure configuration that results in the highest reported SAR in RC3.

4）. Body-Worn Accessory SAR

Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 D01 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCHn), with FCH only as the primary mode. Otherwise, SAR is required for multiple code channel configuration (FCH + SCHn), with FCH at full rate and SCH0 enabled at 9600 bps, using the highest reported SAR configuration for FCH only. When multiple code channels are enabled, the transmitter output can shift by more than 0.5 dB and may lead to higher SAR drifts and SCH dropouts.

The 3G SAR test reduction procedure is applied to body-worn accessory SAR in RC1 with RC3 as the primary mode. Otherwise, SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

5）. Handsets with built-in Ev-Do

For handsets with Ev-Do capabilities, the 3G SAR test reduction procedure is applied to Ev-Do Rev. 0 with 1x RTT RC3 as the primary mode to determine body-worn accessory test requirements. Otherwise, body-worn accessory SAR is required for Rev. 0, at 153.6 kbps, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

The 3G SAR test reduction procedure is applied separately to Rev. A and Rev. B, with Rev. 0 as the primary mode to determine body-worn accessory SAR test requirements. When SAR is not required for Rev. 0, the 3G SAR test reduction is applied with 1x RTT RC3 as the primary mode. Otherwise, SAR is required for Rev. A or Rev. B, with a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 and 3 Physical Layer configurations, using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0 or RC3, as appropriate.

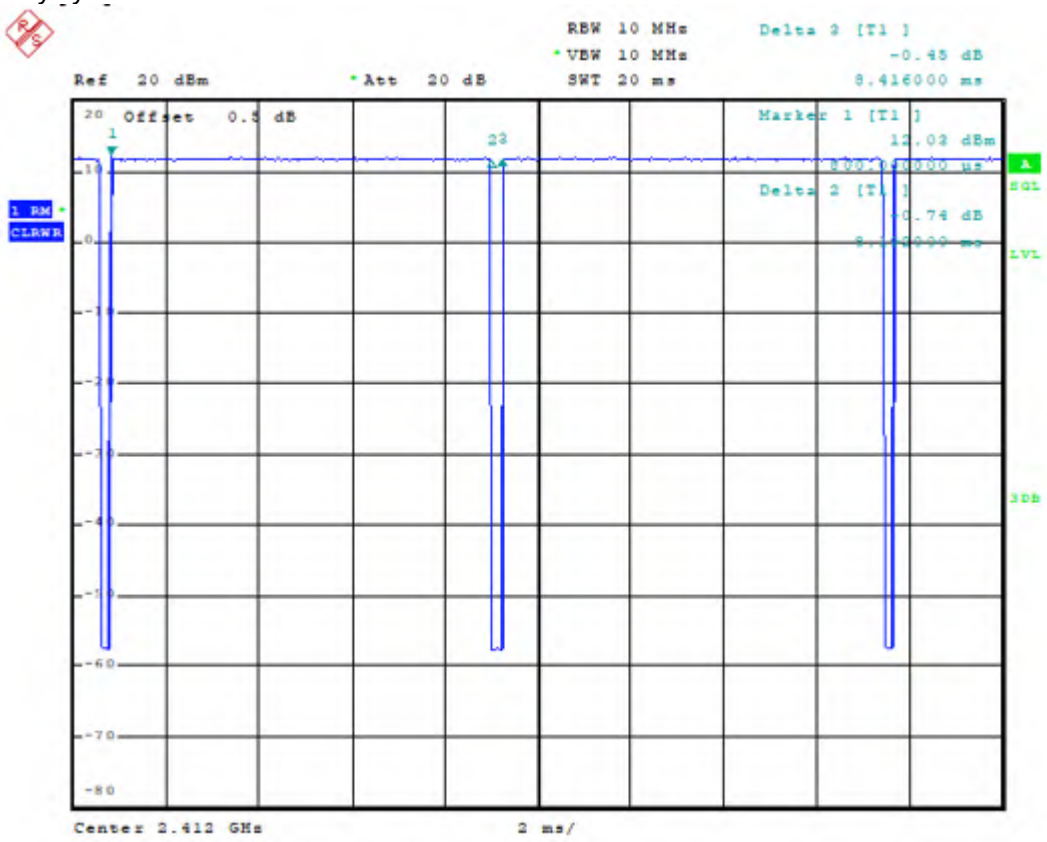
A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with ACK Channel transmitting in all slots is configured in the downlink for Rev. 0, Rev. A and Rev. B

7.2.3 WiFi Test Configuration

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

7.2.3.1 Duty cycle

2.4GHz Wi-Fi 802.11b:
Duty cycle=8.192/8.416=97.34%



7.2.3.2 Initial Test Position SAR Test Reduction Procedure

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

1） . When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).

2） . When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g

3） SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.

4） . For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

7.2.3.3 Initial Test Configuration Procedures

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

7.2.3.4 Subsequent Test Configuration Procedures

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

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

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

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

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

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

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

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

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

7.2.3.5 2.4 GHz WiFi SAR Procedures

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

- **802.11b DSSS SAR Test Requirements**

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

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

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

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

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

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

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

- **SAR Test Requirements for OFDM configurations**

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

7.2.4 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

TDD LTE test consideration

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

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

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

Frame structure type 2:

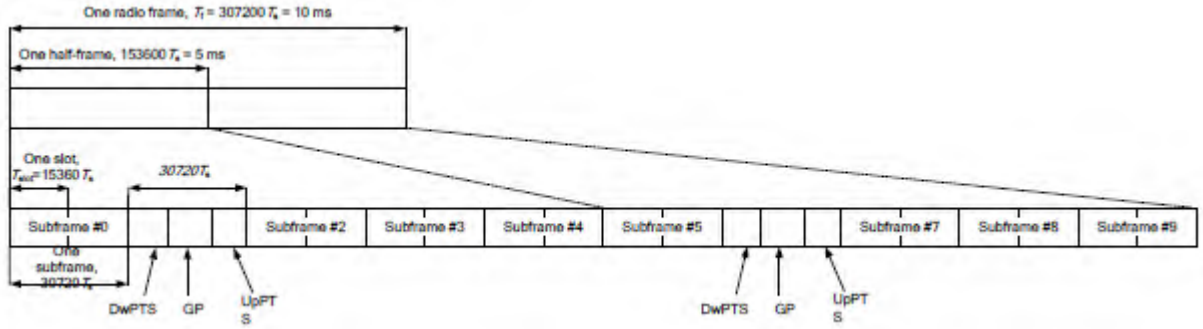


Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

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.Ts	2192.Ts	2560.Ts	7680.Ts	2192.Ts	2560.Ts
1	19760.Ts			20480.Ts		
2	21952.Ts			23040.Ts		
3	24144.Ts			25600.Ts		
4	26336.Ts			7680.Ts	4384.Ts	5120.Ts
5	6592.Ts	4384.Ts	5120.Ts	20480.Ts		
6	19760.Ts			23040.Ts		
7	21952.Ts			25600.Ts		
8	24144.Ts			-	-	-
9	13168.Ts			-	-	-

Table 4.2-2: 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

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

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

A) Spectrum Plots for RB Configurations

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

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 V13.5.0 (201609) Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

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

C) A-MPR

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

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

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

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

4) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

8 Test Result

8.1 Measurement of RF Conducted Power

8.1.1 Conducted Power of GSM

GSM 850										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		128	190	251			128	190	251	
GSM(GMSK)	GSM	31.14	**31.25**	31.13	32.00	-9.19	21.95	22.06	21.94	22.81
GPRS/EGPRS (GMSK)	1 TX Slot	31.29	31.22	31.19	32.00	-9.19	22.1	22.03	22	22.81
	2 TX Slots	29.79	**29.78**	29.74	31.00	-6.18	23.61	23.6	23.56	**24.82**
	3 TX Slots	27.73	27.82	27.95	29.00	-4.42	23.31	23.4	23.53	24.58
	4 TX Slots	25.67	25.92	25.94	27.00	-3.17	22.5	22.75	22.77	23.83
EGPRS(8PSK)	1 TX Slot	24.50	24.72	24.54	26.00	-9.19	15.31	15.53	15.35	16.81
	2 TX Slots	23.51	23.58	23.64	25.00	-6.18	17.33	17.4	17.46	18.82
	3 TX Slots	21.80	21.96	21.97	23.00	-4.42	17.38	17.54	17.55	18.58
	4 TX Slots	20.86	21.05	20.98	22.00	-3.17	17.69	17.88	17.81	18.83
GSM 1900										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		512	661	810			512	661	810	
GSM(GMSK)	GSM	31.82	**31.59**	31.06	32.00	-9.19	22.63	22.40	21.87	22.81
GPRS/EGPRS (GMSK)	1 TX Slot	31.93	31.61	31.22	32.00	-9.19	22.74	22.42	22.03	22.81
	2 TX Slots	30.78	**30.51**	30.25	31.00	-6.18	24.60	24.33	24.07	**24.82**
	3 TX Slots	28.50	28.58	28.48	29.00	-4.42	24.08	24.16	24.06	24.58
	4 TX Slots	27.01	27.10	27.11	27.50	-3.17	23.84	23.93	23.94	24.33
EGPRS(8PSK)	1 TX Slot	27.02	27.09	27.09	27.50	-9.19	17.83	17.90	17.90	18.31
	2 TX Slots	26.02	25.96	26.05	26.50	-6.18	19.84	19.78	19.87	20.32
	3 TX Slots	24.25	24.34	24.47	25.50	-4.42	19.83	19.92	20.05	21.08
	4 TX Slots	22.76	22.84	23.02	23.50	-3.17	19.59	19.67	19.85	20.33

Table 6： Conducted Power of GSM

Note:

1）. CMW500 measures GSM peak and average output power for active timeslots. For SAR the time based average power is relevant. The difference in between depends on the duty cycle of the TDMA signal:

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

2）. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8

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

8.1.2 Conducted Power of CDMA

CDMA BC0				
Average Conducted Power(dBm)				
Channel	1013	384	777	Tune up
1XRTT RC1 SO55	23.60	**24.20**	23.97	24.50
1XRTT RC3 SO55	23.75	24.17	23.96	24.50
1XRTT RC3 SO32(FCH)	23.71	24.16	23.92	24.50
1XRTT RC3 SO32(FCH + SCH)	23.59	24.26	23.95	24.50
1XEVDO RTAP153.6Kbps	23.73	24.17	23.95	24.50
1XEVDO RETAP4096Bits	23.59	24.13	23.93	24.50

Table 7： Conducted Power of CDMA

8.1.3 Conducted Power of LTE

LTE Band 2				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune up
1.4MHz	QPSK	1	0	21.17	21.36	21.60	22.00
		1	2	21.25	21.81	21.64	22.00
		1	5	21.01	21.59	21.59	22.00
		3	0	21.03	21.58	21.61	22.00
		3	2	21.24	21.65	21.70	22.00
		3	3	21.04	21.55	21.57	22.00
		6	0	19.87	20.42	20.77	21.00
	16QAM	1	0	19.66	20.19	20.35	21.00
		1	2	19.75	20.48	20.67	21.00
		1	5	19.71	20.41	19.94	21.00
		3	0	19.90	20.27	20.39	21.00
		3	2	20.06	20.31	20.53	21.00
		3	3	19.98	20.23	20.59	21.00
		6	0	18.89	19.12	19.45	20.00
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune up
3MHz	QPSK	1	0	21.09	21.67	21.54	22.00
		1	7	20.94	21.61	21.79	22.00
		1	14	21.00	21.46	21.79	22.00
		8	0	19.96	20.41	20.51	21.00
		8	4	19.98	20.48	20.72	21.00
		8	7	20.05	20.42	20.60	21.00
		15	0	20.12	20.53	20.59	21.00
	16QAM	1	0	19.67	20.52	20.19	21.00
		1	7	19.79	20.46	19.86	21.00
		1	14	19.64	20.53	20.06	21.00
		8	0	18.94	19.19	19.90	20.00
		8	4	18.84	19.32	19.71	20.00
		8	7	19.24	19.65	19.79	20.00
		15	0	18.96	19.52	19.17	20.00
Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune up
5MHz	QPSK	1	0	21.00	21.37	21.46	22.00
		1	13	21.23	21.73	21.54	22.00
		1	24	21.13	21.55	21.80	22.00
		12	0	19.98	20.30	20.51	21.00
		12	6	19.82	20.51	20.49	21.00
		12	13	20.04	20.38	20.46	21.00
		25	0	19.98	20.44	20.54	21.00
	16QAM	1	0	19.70	20.26	20.17	21.00
		1	13	19.70	20.01	20.46	21.00
		1	24	19.52	20.19	20.32	21.00
		12	0	19.11	19.13	19.47	20.00
		12	6	19.10	19.27	19.61	20.00
		12	13	18.91	19.19	19.55	20.00
		25	0	18.84	19.38	19.61	20.00

Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150	Tune up
10MHz	QPSK	1	0	21.16	21.74	21.73	22.00
		1	25	21.64	21.78	21.88	22.00

		1	49	21.29	21.78	21.74	22.00
		25	0	20.06	20.56	20.59	21.00
		25	13	20.24	20.56	20.67	21.00
		25	25	20.13	20.38	20.63	21.00
		50	0	20.03	20.46	20.65	21.00
	16QAM	1	0	19.93	20.44	19.99	21.00
		1	25	20.08	20.12	20.70	21.00
		1	49	19.58	20.32	20.35	21.00
		25	0	18.96	19.44	19.83	20.00
		25	13	18.98	19.47	19.80	20.00
		25	25	19.19	19.43	19.60	20.00
		50	0	19.07	19.40	19.53	20.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18675	18900	19125	
15MHz	QPSK	1	0	21.27	21.57	21.61	22.00
		1	38	21.58	21.56	21.57	22.00
		1	74	21.24	21.65	21.62	22.00
		36	0	20.08	20.48	20.57	21.00
		36	18	20.18	20.33	20.62	21.00
		36	39	19.92	20.56	20.55	21.00
		75	0	20.14	20.49	20.62	21.00
	16QAM	1	0	19.80	20.14	20.03	21.00
		1	38	19.65	20.09	20.38	21.00
		1	74	19.95	20.20	20.54	21.00
		36	0	18.99	19.39	19.41	20.00
		36	18	19.02	19.42	19.70	20.00
		36	39	18.77	19.43	19.58	20.00
		75	0	19.20	19.34	19.60	20.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				18700	18900	19100	
20MHz	QPSK	1	0	21.34	21.52	21.71	22.00
		1	50	21.53	**21.92**	21.50	22.00
		1	99	21.35	21.67	21.78	22.00
		50	0	20.18	20.60	20.47	21.00
		50	25	20.31	20.47	**20.79**	21.00
		50	50	20.10	20.45	20.73	21.00
		100	0	20.25	20.37	20.49	21.00
	16QAM	1	0	19.84	19.96	20.16	21.00
		1	50	19.60	20.48	20.57	21.00
		1	99	20.14	20.02	20.63	21.00
		50	0	19.08	19.51	19.49	20.00
		50	25	19.06	19.62	19.60	20.00
		50	50	19.22	19.61	19.72	20.00
		100	0	19.27	19.50	19.49	20.00

LTE Band 4				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19957	20175	20393	
1.4MHz	QPSK	1	0	20.24	20.41	20.36	21.50
		1	2	20.23	20.55	20.41	21.50
		1	5	20.39	20.35	20.35	21.50
		3	0	20.32	20.50	20.35	20.50
		3	2	20.38	20.43	20.52	20.50
		3	3	20.57	20.42	20.38	20.50

		6	0	19.27	19.27	19.38	20.50
	16QAM	1	0	19.18	19.14	18.96	20.50
		1	2	18.95	19.11	18.97	20.50
		1	5	19.10	19.22	19.27	20.50
		3	0	19.29	19.53	19.43	19.50
		3	2	19.38	19.45	19.54	19.50
		3	3	19.44	19.45	19.37	19.50
		6	0	18.29	18.41	18.52	19.50
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune up
3MHz	QPSK	1	0	20.32	20.35	20.37	21.50
		1	7	20.58	20.53	20.72	21.50
		1	14	20.44	20.41	20.47	21.50
		8	0	19.39	19.47	19.32	20.50
		8	4	19.37	19.41	19.50	20.50
		8	7	19.40	19.54	19.21	20.50
		15	0	19.26	19.46	19.34	20.50
	16QAM	1	0	19.10	19.01	19.19	20.50
		1	7	19.28	19.20	18.78	20.50
		1	14	19.02	19.29	19.20	20.50
		8	0	18.40	18.50	18.34	19.50
		8	4	18.30	18.60	18.29	19.50
		8	7	18.45	18.80	18.32	19.50
		15	0	18.27	18.41	18.43	19.50
Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune up
5MHz	QPSK	1	0	20.25	20.28	20.41	21.50
		1	13	20.39	20.70	20.64	21.50
		1	24	19.96	20.67	20.32	21.50
		12	0	19.27	19.31	19.50	20.50
		12	6	19.30	19.51	19.38	20.50
		12	13	19.26	19.50	19.43	20.50
		25	0	19.30	19.30	19.51	20.50
	16QAM	1	0	19.11	19.39	19.11	20.50
		1	13	18.97	19.20	19.15	20.50
		1	24	19.11	19.48	19.25	20.50
		12	0	18.15	18.59	18.55	19.50
		12	6	18.25	18.45	18.41	19.50
		12	13	18.21	18.67	18.58	19.50
		25	0	18.20	18.57	18.49	19.50
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350	Tune up
10MHz	QPSK	1	0	20.36	20.31	20.55	21.50
		1	25	20.67	20.86	20.60	21.50
		1	49	20.33	20.28	20.51	21.50
		25	0	19.44	19.35	19.44	20.50
		25	13	19.37	19.46	19.45	20.50
		25	25	19.35	19.42	19.49	20.50
		50	0	19.45	19.49	19.52	20.50
	16QAM	1	0	19.00	19.47	19.19	20.50
		1	25	19.46	19.38	19.44	20.50
		1	49	19.01	19.16	19.28	20.50
		25	0	18.50	18.42	18.49	19.50
		25	13	18.45	18.50	18.52	19.50
		25	25	18.61	18.63	18.47	19.50
		50	0	18.40	18.53	18.56	19.50
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up

				20025	20175	20325	
15MHz	QPSK	1	0	20.38	20.41	20.53	21.50
		1	38	20.52	20.44	20.37	21.50
		1	74	20.35	20.31	20.51	21.50
		36	0	19.30	19.31	19.40	20.50
		36	18	19.38	19.34	19.38	20.50
		36	39	19.32	19.40	19.33	20.50
		75	0	19.18	19.36	19.35	20.50
	16QAM	1	0	19.02	19.09	19.24	20.50
		1	38	19.05	19.16	19.21	20.50
		1	74	19.05	18.96	19.14	20.50
		36	0	18.19	18.54	18.50	19.50
		36	18	18.28	18.46	18.39	19.50
		36	39	18.20	18.62	18.44	19.50
		75	0	18.23	18.54	18.56	19.50
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300	Tune up
20MHz	QPSK	1	0	20.49	20.50	20.65	21.50
		1	50	**21.02**	**21.05**	**20.99**	21.50
		1	99	20.44	20.50	20.73	21.50
		50	0	19.78	19.65	**19.79**	20.50
		50	25	19.64	19.69	19.62	20.50
		50	50	19.60	19.68	19.65	20.50
		100	0	19.69	19.65	**19.81**	20.50
	16QAM	1	0	19.34	19.54	19.59	20.50
		1	50	19.55	19.75	19.67	20.50
		1	99	19.36	19.27	19.57	20.50
		50	0	18.78	18.59	18.88	19.50
		50	25	18.80	18.73	18.78	19.50
		50	50	18.57	18.81	18.57	19.50
		100	0	18.81	18.69	18.87	19.50

LTE Band 5				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643	Tune up
1.4MHz	QPSK	1	0	22.16	22.06	22.13	23.50
		1	2	22.06	22.26	22.17	23.50
		1	5	22.08	22.12	22.09	23.50
		3	0	22.20	22.33	22.13	22.50
		3	2	22.08	22.22	22.14	22.50
		3	3	22.31	22.05	22.25	22.50
		6	0	21.10	21.02	21.17	22.50
	16QAM	1	0	21.04	20.97	21.22	22.50
		1	2	20.90	20.87	21.34	22.50
		1	5	20.82	20.92	20.87	22.50
		3	0	21.08	20.95	21.03	21.50
		3	2	21.18	21.23	21.12	21.50
		3	3	21.10	21.13	21.10	21.50
		6	0	20.05	19.94	19.86	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635	Tune up
3MHz	QPSK	1	0	21.92	22.10	21.86	23.50

		1	7	21.69	22.30	22.30	23.50
		1	14	21.79	21.93	21.88	23.50
		8	0	21.24	21.17	21.28	22.50
		8	4	21.11	21.15	21.26	22.50
		8	7	21.06	21.22	21.33	22.50
		15	0	20.97	21.31	21.18	22.50
	16QAM	1	0	20.81	21.07	21.06	22.50
		1	7	20.82	21.02	21.34	22.50
		1	14	20.47	21.46	21.03	22.50
		8	0	20.20	20.23	20.24	21.50
		8	4	20.19	20.19	20.35	21.50
		8	7	20.18	20.28	20.24	21.50
		15	0	20.07	20.10	19.93	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625	Tune up
5MHz	QPSK	1	0	21.86	21.70	21.57	23.50
		1	13	21.99	22.31	21.91	23.50
		1	24	21.78	21.96	21.82	23.50
		12	0	20.96	21.23	21.09	22.50
		12	6	21.11	21.25	21.07	22.50
		12	13	21.22	21.12	21.26	22.50
		25	0	21.11	21.04	21.15	22.50
	16QAM	1	0	21.05	20.91	20.79	22.50
		1	13	20.87	20.91	21.12	22.50
		1	24	20.74	20.57	21.00	22.50
		12	0	20.18	20.29	20.01	21.50
		12	6	19.98	20.11	20.31	21.50
		12	13	20.03	20.19	20.33	21.50
		25	0	19.88	20.06	20.14	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600	Tune up
10MHz	QPSK	1	0	21.80	21.79	21.98	23.50
		1	25	21.97	**22.36**	22.11	23.50
		1	49	22.04	21.80	21.90	23.50
		25	0	21.12	21.14	21.08	22.50
		25	13	21.17	21.15	21.07	22.50
		25	25	**21.28**	21.26	21.16	22.50
		50	0	21.21	21.14	21.14	22.50
	16QAM	1	0	20.95	20.59	21.30	22.50
		1	25	21.13	21.16	21.15	22.50
		1	49	20.92	20.97	20.75	22.50
		25	0	20.22	20.40	20.34	21.50
		25	13	20.27	20.18	20.18	21.50
		25	25	20.21	20.21	20.10	21.50
		50	0	20.16	20.33	20.23	21.50

LTE Band 7				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 20775	Channel 21100	Channel 21425	Tune up
5MHz	QPSK	1	0	23.43	24.03	23.74	24.50
		1	13	23.72	24.16	24.05	24.50
		1	24	23.94	23.64	23.61	24.50
		12	0	22.77	22.83	23.01	23.50
		12	6	22.80	23.10	22.99	23.50
		12	13	22.76	22.78	22.66	23.50

		25	0	22.89	22.77	22.70	23.50
	16QAM	1	0	23.01	22.36	22.81	23.50
		1	13	22.58	22.71	22.82	23.50
		1	24	22.59	22.70	22.20	23.50
		12	0	21.90	21.82	21.69	22.50
		12	6	21.96	21.84	21.76	22.50
		12	13	21.87	21.99	21.77	22.50
		25	0	21.80	22.00	21.68	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 20800	Channel 21100	Channel 21400	Tune up
10MHz	QPSK	1	0	23.80	23.97	24.02	24.50
		1	25	23.82	24.04	24.02	24.50
		1	49	23.87	24.22	23.64	24.50
		25	0	22.80	22.99	23.23	23.50
		25	13	22.87	23.01	23.09	23.50
		25	25	22.95	22.98	22.90	23.50
		50	0	22.94	22.82	23.04	23.50
	16QAM	1	0	22.36	22.62	23.09	23.50
		1	25	23.07	23.43	22.58	23.50
		1	49	21.93	22.71	23.09	23.50
		25	0	21.88	22.07	22.20	22.50
		25	13	21.75	22.16	22.09	22.50
		25	25	21.96	22.33	21.88	22.50
		50	0	21.77	22.19	21.84	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 20825	Channel 21100	Channel 21375	Tune up
15MHz	QPSK	1	0	23.95	23.91	23.82	24.50
		1	38	23.69	23.80	23.99	24.50
		1	74	23.67	23.99	24.01	24.50
		36	0	22.86	22.84	22.94	23.50
		36	18	22.79	23.07	23.01	23.50
		36	39	23.00	22.99	23.03	23.50
		75	0	22.91	22.87	23.03	23.50
	16QAM	1	0	22.53	23.18	22.89	23.50
		1	38	22.44	22.59	22.98	23.50
		1	74	22.54	22.39	22.26	23.50
		36	0	21.94	21.84	21.93	22.50
		36	18	21.94	21.96	21.93	22.50
		36	39	21.93	22.14	21.97	22.50
		75	0	21.93	21.93	21.93	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 20850	Channel 21100	Channel 21350	Tune up
20MHz	QPSK	1	0	23.46	23.67	23.58	24.50
		1	50	**24.20**	23.76	24.07	24.50
		1	99	23.91	23.97	23.61	24.50
		50	0	22.81	23.00	22.84	23.50
		50	25	22.83	22.99	**23.13**	23.50
		50	50	22.85	22.58	23.02	23.50
		100	0	22.86	22.85	22.86	23.50
	16QAM	1	0	22.46	23.42	22.74	23.50
		1	50	22.77	22.67	22.33	23.50
		1	99	21.53	21.96	22.42	23.50
		50	0	21.94	21.87	21.88	22.50
		50	25	21.80	21.96	21.77	22.50
		50	50	21.81	22.09	21.69	22.50
		100	0	21.94	21.85	21.89	22.50

LTE FDD Band 26				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 26697	Channel 26865	Channel 27033	Tune up
1.4MHz	QPSK	1	0	22.15	21.82	22.09	23.50
		1	2	22.25	21.80	22.06	23.50
		1	5	21.98	21.99	22.18	23.50
		3	0	22.32	22.14	22.31	22.50
		3	2	22.31	22.15	22.20	22.50
		3	3	22.39	22.20	22.21	22.50
		6	0	21.05	21.19	21.22	22.50
	16QAM	1	0	21.17	20.96	21.15	22.50
		1	2	20.93	21.01	21.03	22.50
		1	5	21.10	20.84	20.92	22.50
		3	0	21.19	21.26	21.42	21.50
		3	2	20.88	21.26	21.00	21.50
		3	3	20.94	21.13	21.12	21.50
		6	0	19.95	20.09	20.22	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 26705	Channel 26865	Channel 27025	Tune up
3MHz	QPSK	1	0	22.08	21.80	21.90	23.50
		1	7	22.43	22.21	22.32	23.50
		1	14	22.26	22.13	21.92	23.50
		8	0	21.15	21.27	21.19	22.50
		8	4	21.18	21.23	21.20	22.50
		8	7	21.22	21.22	21.16	22.50
		15	0	21.17	21.14	21.22	22.50
	16QAM	1	0	21.04	21.06	20.95	22.50
		1	7	21.00	21.55	21.22	22.50
		1	14	21.10	21.16	20.85	22.50
		8	0	20.23	20.29	20.19	21.50
		8	4	20.26	20.33	20.21	21.50
		8	7	20.37	20.35	20.30	21.50
		15	0	20.27	20.28	20.14	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 26715	Channel 26865	Channel 27015	Tune up
5MHz	QPSK	1	0	21.78	21.84	21.77	23.50
		1	13	21.99	21.74	22.01	23.50
		1	24	21.76	21.96	21.81	23.50
		12	0	21.29	21.25	21.29	22.50
		12	6	21.30	21.23	21.28	22.50
		12	13	21.25	21.03	21.23	22.50
		25	0	21.31	21.24	21.25	22.50
	16QAM	1	0	21.25	20.89	20.76	22.50
		1	13	21.04	20.84	21.02	22.50
		1	24	20.77	21.08	20.86	22.50
		12	0	20.41	20.28	20.42	21.50
		12	6	20.30	20.32	20.37	21.50
		12	13	20.27	20.23	20.27	21.50
		25	0	20.35	20.23	20.23	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 26740	Channel 26865	Channel 26990	Tune up
10MHz	QPSK	1	0	22.07	22.11	22.00	23.50
		1	25	22.22	22.22	22.30	23.50
		1	49	22.18	22.24	21.92	23.50

		25	0	21.25	21.41	21.18	22.50
		25	13	21.28	21.25	21.19	22.50
		25	25	21.27	21.27	21.31	22.50
		50	0	21.21	21.27	21.34	22.50
	16QAM	1	0	21.46	21.23	21.20	22.50
		1	25	21.27	21.11	21.16	22.50
		1	49	21.12	21.17	21.17	22.50
		25	0	20.41	20.30	20.19	21.50
		25	13	20.48	20.31	20.41	21.50
		25	25	20.50	20.27	20.35	21.50
		50	0	20.33	20.22	20.29	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 26765	Channel 26865	Channel 26965	Tune up
15MHz	QPSK	1	0	22.22	22.15	22.16	23.50
		1	38	**22.25**	22.19	22.07	23.50
		1	74	22.13	22.23	22.22	23.50
		36	0	**21.45**	21.25	21.14	22.50
		36	18	21.33	21.06	21.33	22.50
		36	39	21.37	21.30	21.21	22.50
		75	0	21.28	21.32	21.20	22.50
	16QAM	1	0	21.06	21.16	21.05	22.50
		1	38	21.16	20.94	20.98	22.50
		1	74	21.17	21.14	20.86	22.50
		36	0	20.23	20.15	20.23	21.50
		36	18	20.35	20.15	20.21	21.50
		36	39	20.32	20.26	20.19	21.50
		75	0	20.28	20.34	20.22	21.50

LTE Band 38				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 37775	Channel 38000	Channel 38225	Tune up
5MHz	QPSK	1	0	23.68	23.73	23.43	24.50
		1	13	23.84	23.86	23.63	24.50
		1	24	23.78	23.47	23.37	24.50
		12	0	22.89	22.57	22.60	23.50
		12	6	22.82	22.63	22.68	23.50
		12	13	22.92	22.56	22.30	23.50
		25	0	22.75	22.64	22.34	23.50
	16QAM	1	0	22.73	22.38	22.07	23.50
		1	13	22.69	22.37	22.24	23.50
		1	24	22.70	22.28	22.17	23.50
		12	0	22.04	21.55	21.45	22.50
		12	6	21.90	21.76	21.65	22.50
		12	13	21.76	21.63	21.42	22.50
		25	0	22.26	21.85	21.72	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 37800	Channel 38000	Channel 38200	Tune up
10MHz	QPSK	1	0	24.06	23.91	23.80	24.50
		1	25	24.11	23.91	23.75	24.50
		1	49	23.86	23.77	23.63	24.50
		25	0	23.01	22.71	22.50	23.50
		25	13	22.91	22.61	22.53	23.50
		25	25	22.84	22.67	22.47	23.50
		50	0	22.94	22.84	22.60	23.50
	16QAM	1	0	22.67	22.54	22.19	23.50

		1	25	22.82	22.57	22.39	23.50
		1	49	22.56	22.52	22.10	23.50
		25	0	22.23	21.95	21.59	22.50
		25	13	22.15	21.86	21.57	22.50
		25	25	22.15	21.92	21.84	22.50
		50	0	22.06	22.01	21.56	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 37825	Channel 38000	Channel 38175	Tune up
15MHz	QPSK	1	0	24.21	23.82	23.52	24.50
		1	38	23.92	23.90	23.77	24.50
		1	74	23.82	23.90	23.45	24.50
		36	0	22.99	23.03	22.53	23.50
		36	18	22.84	22.67	22.49	23.50
		36	39	22.80	22.70	22.43	23.50
		75	0	22.95	23.03	22.57	23.50
	16QAM	1	0	22.57	22.71	22.50	23.50
		1	38	22.71	22.65	22.34	23.50
		1	74	22.49	22.30	22.36	23.50
		36	0	22.24	21.74	21.68	22.50
		36	18	21.95	21.76	21.65	22.50
		36	39	21.85	21.75	21.62	22.50
		75	0	21.80	21.89	21.57	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 37850	Channel 38000	Channel 38150	Tune up
20MHz	QPSK	1	0	24.07	23.98	23.88	24.50
		1	50	23.89	**24.08**	24.05	24.50
		1	99	23.85	23.81	23.31	24.50
		50	0	23.09	**23.10**	22.70	23.50
		50	25	22.70	23.08	22.57	23.50
		50	50	23.08	22.74	22.82	23.50
		100	0	23.23	22.92	22.95	23.50
	16QAM	1	0	22.58	22.36	22.40	23.50
		1	50	22.79	22.27	22.60	23.50
		1	99	22.38	22.36	22.04	23.50
		50	0	22.11	22.25	21.77	22.50
		50	25	21.98	21.76	21.67	22.50
		50	50	21.86	21.81	21.99	22.50
		100	0	21.90	21.78	21.65	22.50

LTE Band 40				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 38675	Channel 39150	Channel 39625	Tune up
5MHz	QPSK	1	0	22.36	22.54	22.64	23.50
		1	13	22.48	22.82	23.05	23.50
		1	24	22.40	22.63	22.85	23.50
		12	0	21.40	21.69	21.90	22.50
		12	6	21.56	22.02	22.01	22.50
		12	13	21.57	21.80	21.92	22.50
		25	0	21.61	21.79	21.92	22.50
	16QAM	1	0	21.21	21.30	21.40	22.50
		1	13	21.05	22.03	22.13	22.50
		1	24	21.19	21.95	22.04	22.50

		12	0	20.42	20.55	20.83	21.50
		12	6	20.51	20.90	20.96	21.50
		12	13	20.50	20.85	21.04	21.50
		25	0	20.79	21.20	21.25	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 38700	Channel 39150	Channel 39600	Tune up
10MHz	QPSK	1	0	22.61	22.68	22.94	23.50
		1	25	22.52	22.93	22.92	23.50
		1	49	22.54	22.93	23.12	23.50
		25	0	21.46	22.03	21.94	22.50
		25	13	21.53	22.25	21.83	22.50
		25	25	21.64	21.86	22.27	22.50
		50	0	21.57	21.85	22.07	22.50
	16QAM	1	0	21.02	21.06	21.79	22.50
		1	25	21.13	22.07	21.77	22.50
		1	49	21.58	22.10	21.98	22.50
		25	0	20.43	21.11	21.22	21.50
		25	13	20.88	21.15	21.15	21.50
		25	25	20.75	20.81	21.13	21.50
		50	0	20.66	20.90	21.11	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 38725	Channel 39150	Channel 39575	Tune up
15MHz	QPSK	1	0	22.45	22.67	22.80	23.50
		1	38	22.50	22.80	22.98	23.50
		1	74	22.55	22.72	23.07	23.50
		36	0	21.69	21.77	21.87	22.50
		36	18	21.69	21.78	21.97	22.50
		36	39	21.54	21.82	22.12	22.50
		75	0	21.47	22.13	22.05	22.50
	16QAM	1	0	21.10	21.30	21.78	22.50
		1	38	21.21	22.00	21.77	22.50
		1	74	21.68	21.99	22.14	22.50
		36	0	20.46	20.74	20.86	21.50
		36	18	20.55	20.93	21.02	21.50
		36	39	20.56	20.92	21.07	21.50
		75	0	20.64	21.27	21.08	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 38750	Channel 39150	Channel 39550	Tune up
20MHz	QPSK	1	0	22.47	22.73	22.82	23.50
		1	50	22.60	23.01	**23.04**	23.50
		1	99	22.38	22.70	22.96	23.50
		50	0	21.65	22.08	21.97	22.50
		50	25	21.60	**22.28**	21.83	22.50
		50	50	21.63	22.17	21.99	22.50
		100	0	21.63	21.81	21.87	22.50
	16QAM	1	0	21.19	21.39	21.01	22.50
		1	50	21.31	22.02	22.02	22.50
		1	99	21.59	21.83	22.02	22.50
		50	0	20.64	21.14	21.16	21.50
		50	25	20.78	21.34	20.83	21.50
		50	50	20.75	21.21	20.93	21.50
		100	0	20.63	21.00	20.97	21.50

LTE FDD Band 41				**Conducted Power(dBm)**					
Bandwidth	Modulation	RB size	RB	Channel	Channel	Channel	Channel	Channel	Tune up

			offset	39675	40148	40620	41093	41565	
5MHz	QPSK	1	0	23.71	23.79	23.85	23.30	22.77	24.50
		1	13	23.87	23.90	23.61	23.34	22.79	24.50
		1	24	23.83	23.55	23.48	23.37	22.81	24.50
		12	0	22.93	22.78	22.46	22.56	21.90	23.50
		12	6	22.73	22.78	22.62	22.38	21.88	23.50
		12	13	22.95	22.83	22.49	22.29	21.90	23.50
		25	0	22.86	22.74	22.45	22.29	21.75	23.50
	16QAM	1	0	22.52	22.47	22.40	22.05	21.50	23.50
		1	13	22.48	22.63	22.35	22.07	22.07	23.50
		1	24	22.69	22.39	22.40	22.15	21.59	23.50
		12	0	21.72	22.21	21.64	21.41	20.67	22.50
		12	6	21.79	22.14	21.69	21.32	20.82	22.50
		12	13	21.94	21.74	21.59	21.53	20.76	22.50
		25	0	21.95	22.18	21.89	21.57	21.21	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 39700	Channel 40160	Channel 40620	Channel 41080	Channel 41540	Tune up
10MHz	QPSK	1	0	23.78	23.80	23.83	23.52	23.05	24.50
		1	25	24.06	24.31	23.72	23.61	22.92	24.50
		1	49	24.14	23.80	23.58	23.37	23.10	24.50
		25	0	23.00	22.97	22.88	22.40	22.14	23.50
		25	13	23.20	22.78	22.61	22.20	21.89	23.50
		25	25	22.86	22.81	22.56	22.40	21.85	23.50
		50	0	22.89	23.00	22.66	22.36	21.95	23.50
	16QAM	1	0	22.27	22.34	22.40	22.15	21.48	23.50
		1	25	22.63	22.75	22.34	22.14	21.70	23.50
		1	49	22.48	22.48	22.38	22.08	21.70	23.50
		25	0	22.00	22.10	21.87	21.71	20.93	22.50
		25	13	22.41	22.39	21.83	21.72	20.78	22.50
		25	25	22.36	22.49	21.94	21.56	21.16	22.50
		50	0	22.12	21.97	21.57	21.75	21.33	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 39725	Channel 40173	Channel 40620	Channel 41068	Channel 41515	Tune up
15MHz	QPSK	1	0	23.76	24.13	23.57	23.55	23.11	24.50
		1	38	23.79	23.90	23.78	23.42	22.93	24.50
		1	74	23.82	23.77	23.81	23.02	22.94	24.50
		36	0	22.91	23.30	22.57	22.34	21.92	23.50
		36	18	22.80	22.94	22.66	22.40	21.94	23.50
		36	39	22.84	22.92	22.63	22.59	21.86	23.50
		75	0	23.02	22.95	22.89	22.52	21.86	23.50
	16QAM	1	0	22.25	22.79	22.31	22.06	21.58	23.50
		1	38	22.45	22.77	22.45	22.03	22.37	23.50
		1	74	22.66	22.53	21.97	21.87	21.54	23.50
		36	0	21.92	22.31	21.61	21.50	20.89	22.50
		36	18	21.89	21.86	21.95	21.40	20.86	22.50
		36	39	21.84	21.80	21.53	21.27	20.86	22.50
		75	0	21.76	22.21	21.65	21.32	21.43	22.50
Bandwidth	Modulation	RB size	RB offset	Channel 39750	Channel 40185	Channel 40620	Channel 41055	Channel 41490	Tune up
20MHz	QPSK	1	0	23.46	**23.99**	23.74	23.30	23.13	24.50
		1	50	23.92	23.79	23.80	23.57	22.87	24.50
		1	99	23.86	23.74	23.60	23.25	22.83	24.50
		50	0	22.76	**22.95**	22.55	22.43	21.88	23.50
		50	25	22.80	22.73	22.71	22.29	21.89	23.50
		50	50	22.87	22.81	22.55	22.21	21.97	23.50
		100	0	22.92	22.79	22.73	22.53	22.02	23.50
	16QAM	1	0	22.32	22.89	22.27	21.88	21.91	23.50

		1	50	22.77	22.61	22.50	22.11	22.05	23.50
		1	99	22.42	22.44	21.86	22.02	21.70	23.50
		50	0	21.77	21.90	21.86	21.45	20.99	22.50
		50	25	21.81	21.86	21.69	21.09	21.08	22.50
		50	50	21.82	21.73	21.67	21.50	20.96	22.50
		100	0	21.82	21.82	21.62	21.23	21.00	22.50

Table 8： Conducted Power of LTE

8.1.4 Conducted Power of WIFI and BT

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Tune up	Average Power (dBm)	SAR Test
802.11b	1	2412	1	15.00	13.15	NO
	6	2437		15.00	13.21	NO
	11	2462		15.00	**14.79**	Yes
802.11g	1	2412	6	10.00	7.71	NO
	6	2437		10.00	8.18	NO
	11	2462		10.00	9.74	NO
802.11n HT20 SISO	1	2412	6.5	9.00	6.60	NO
	6	2437		9.00	7.13	NO
	11	2462		9.00	8.85	NO
802.11n HT40 SISO	3	2422	13.5	9.50	5.85	NO
	6	2437		9.50	7.14	NO
	9	2452		9.50	9.05	NO

Table 9： Conducted Power of WIFI

Note:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

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

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

BT			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	9.00	8.25
	39	2441	9.00	8.87
	78	2480	9.00	7.75
π/4DQPSK	0	2402	8.00	6.67
	39	2441	8.00	7.44
	78	2480	8.00	6.34
8DPSK	0	2402	8.00	6.67
	39	2441	8.00	7.43
	78	2480	8.00	6.37
BLE			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	-3.00	-4.32
	19	2440	-3.00	-3.42
	39	2480	-3.00	-4.69

Table 10：Conducted Power of BT

8.2 Stand-alone SAR test evaluation

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

Freq. Band	Frequency (GHz)	Position	Average Power		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
Wi-Fi	2.462	Head	15.00	31.62	0	9.9	3	N
		Body-worn	15.00	31.62	15	3.3	3	N
		Hotspot	15.00	31.62	10	5.0	3	N
Bluetooth	2.48	Head	9.00	7.94	0	2.5	3	Y
		Body-worn	9.00	7.94	15	0.8	3	Y
		Hotspot	9.00	7.94	10	1.3	3	Y

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where
• f(GHz) is the RF channel transmit frequency in GHz
• Power and distance are rounded to the nearest mW and mm before calculation
• The result is rounded to one decimal place for comparison

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

8.3 Measurement of SAR Data

8.3.1 SAR Result of GSM850

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp
Head Test data										
Left cheek	GSM	190/836.6	1:8.3	0.087	0.03	31.25	32.00	1.189	0.104	22.1
Left tilted	GSM	190/836.6	1:8.3	0.066	0.06	31.25	32.00	1.189	0.078	22.1
Right cheek	GSM	190/836.6	1:8.3	0.101	0.11	31.25	32.00	1.189	**0.120**	22.1
Right tilted	GSM	190/836.6	1:8.3	0.060	0.07	31.25	32.00	1.189	0.071	22.1
Body worn Test data(Separate 15mm)										
Front side	GSM	190/836.6	1:8.3	0.048	0.11	31.25	32.00	1.189	0.057	22.1
Back side	GSM	190/836.6	1:8.3	0.093	-0.03	31.25	32.00	1.189	**0.110**	22.1
Body worn Test Data at the worst case with Back splint(0mm)										
Back side	GSM	190/836.6	1:2.075	0.084	0.12	31.25	32.00	1.189	0.100	22.1
Hotspot Test data(Separate 10mm)										
Front side	GPRS 2TS	190/836.6	1:4.15	0.084	-0.02	29.78	31.00	1.324	0.111	22.1
Back side	GPRS 2TS	190/836.6	1:4.15	0.138	0.04	29.78	31.00	1.324	**0.183**	22.1
Left side	GPRS 2TS	190/836.6	1:4.15	0.115	0.01	29.78	31.00	1.324	0.152	22.1
Right side	GPRS 2TS	190/836.6	1:4.15	0.120	-0.03	29.78	31.00	1.324	0.159	22.1
Bottom side	GPRS 2TS	190/836.6	1:4.15	0.056	0.02	29.78	31.00	1.324	0.074	22.1

Table 11：SAR of GSM850 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp
Head Test data at the Worst Case with Battery2										
Right cheek	GSM	190/836.6	1:8.3	0.096	-0.01	31.25	32.00	1.189	0.114	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)										
Back side	GSM	190/836.6	1:8.3	0.056	0.14	31.25	32.00	1.189	**0.067**	22.1
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)										
Back side	GPRS 2TS	190/836.6	1:4.15	0.094	0.03	29.78	31.00	1.324	0.124	22.1

Table 12：SAR of GSM850 for Head and Body (Variant).

8.3.2 SAR Result of GSM1900

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp
Head Test data										
Left cheek	GSM	661/1880	1:8.3	0.094	0.04	31.59	32.00	1.099	0.103	22.3
Left tilted	GSM	661/1880	1:8.3	0.069	0.03	31.59	32.00	1.099	0.076	22.3
Right cheek	GSM	661/1880	1:8.3	0.161	0.02	31.59	32.00	1.099	**0.177**	22.3
Right tilted	GSM	661/1880	1:8.3	0.054	-0.07	31.59	32.00	1.099	0.059	22.3
Body worn Test data(Separate 15mm)										
Front side	GSM	661/1880	1:8.3	0.135	-0.17	31.59	32.00	1.099	**0.148**	22.3
Back side	GSM	661/1880	1:8.3	0.060	-0.04	31.59	32.00	1.099	0.066	22.3
Body worn Test Data at the worst case with Back splint(0mm)										
Back side	GSM	661/1880	1:8.3	0.100	-0.07	31.59	32.00	1.099	0.110	22.3
Hotspot Test data(Separate 10mm)										
Front side	GPRS 2TS	661/1880	1:2.075	0.491	-0.04	30.51	31.00	1.119	**0.550**	22.3
Back side	GPRS 2TS	661/1880	1:2.075	0.169	-0.03	30.51	31.00	1.119	0.189	22.3
Left side	GPRS 2TS	661/1880	1:2.075	0.101	-0.07	30.51	31.00	1.119	0.113	22.3
Right side	GPRS 2TS	661/1880	1:2.075	0.286	-0.05	30.51	31.00	1.119	0.320	22.3
Bottom side	GPRS 2TS	661/1880	1:2.075	0.383	-0.01	30.51	31.00	1.119	0.429	22.3

Table 13：SAR of GSM1900 for Head and Body (Original Report SZEM190101023909)

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp
Head Test data at the Worst Case with Battery2										
Right cheek	GSM	661/1880	1:8.3	0.137	0.06	31.59	32.00	1.099	0.151	22.3
Body worn Test data at the Worst Case with Battery2(Separate 15mm)										
Front side	GSM	661/1880	1:8.3	0.107	0.15	31.59	32.00	1.099	**0.118**	22.3
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)										
Front side	GPRS 2TS	661/1880	1:2.075	0.317	0.01	30.51	31.00	1.119	0.355	22.3

Table 14：SAR of GSM1900 for Head and Body (Variant).

8.3.3 SAR Result of CDMA BC0

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp
Head Test data										
Left cheek	1xRTT (RC3 SO55)	384/836.52	1:1	0.122	0.13	24.20	24.5	1.072	**0.131**	22.1
Left tilted	1xRTT (RC3 SO55)	384/836.52	1:1	0.116	0.12	24.20	24.5	1.072	0.124	22.1
Right cheek	1xRTT (RC3 SO55)	384/836.52	1:1	0.121	0.07	24.20	24.5	1.072	0.130	22.1
Right tilted	1xRTT (RC3 SO55)	384/836.52	1:1	0.107	0.11	24.20	24.5	1.072	0.115	22.1
Body worn Test data(Separate 15mm)										
Front side	1xRTT (RC3 SO32)	384/836.52	1:1	0.113	0.04	24.16	24.5	1.081	0.122	22.1
Back side	1xRTT (RC3 SO32)	384/836.52	1:1	0.166	0.03	24.16	24.5	1.081	**0.180**	22.1
Body worn Test Data at the worst case with Back splint(0mm)										
Back side	1xRTT (RC3 SO32)	384/836.52	1:1	0.154	0.01	24.16	24.5	1.081	0.167	22.1
Hotspot Test data(Separate 10mm)										
Front side	1xRTT (RC3 SO32)	384/836.52	1:1	0.133	0.11	24.16	24.5	1.081	0.144	22.1
Back side	1xRTT (RC3 SO32)	384/836.52	1:1	0.190	0.05	24.16	24.5	1.081	**0.205**	22.1
Left side	1xRTT (RC3 SO32)	384/836.52	1:1	0.160	0.03	24.16	24.5	1.081	0.173	22.1
Right side	1xRTT (RC3 SO32)	384/836.52	1:1	0.164	0.08	24.16	24.5	1.081	0.177	22.1
Bottom side	1xRTT (RC3 SO32)	384/836.52	1:1	0.060	0.01	24.16	24.5	1.081	0.065	22.1
Back side	1XEVDO RTAP 153.6Kbps	384/836.52	1:1	0.188	0.12	24.17	24.5	1.079	0.203	22.1
Back side	1XEVDO RETAP 4096Bits	384/836.52	1:1	0.183	0.05	24.13	24.5	1.089	0.199	22.1

Table 15：SAR of CDMA BC0 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp
Head Test data at the Worst Case with Battery2										
Left cheek	1xRTT(RC3 SO55)	384/836.52	1:1	0.230	0.11	24.2	24.5	1.072	0.246	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)										
Back side	1xRTT(RC3 SO32)	384/836.52	1:1	0.147	0.01	24.16	24.5	1.081	0.159	22.1
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)										
Back side	1xRTT(RC3 SO32)	384/836.52	1:1	0.174	-0.11	24.16	24.5	1.081	**0.188**	22.1

Table 16：SAR of CDMA BC0 for Head and Body (Variant).

8.3.4 SAR Result of LTE Band 2

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	18900/1880	1:1	0.165	0.11	21.92	22.00	1.019	0.168	22.3
Left tilted	20	QPSK 1RB_50	18900/1880	1:1	0.087	0.05	21.92	22.00	1.019	0.088	22.3
Right cheek	20	QPSK 1RB_50	18900/1880	1:1	0.293	0.04	21.92	22.00	1.019	**0.298**	22.3
Right tilted	20	QPSK 1RB_50	18900/1880	1:1	0.069	0.15	21.92	22.00	1.019	0.070	22.3
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_25	19100/1900	1:1	0.132	0.06	20.79	21.00	1.050	0.139	22.3
Left tilted	20	QPSK 50RB_25	19100/1900	1:1	0.081	0.12	20.79	21.00	1.050	0.085	22.3
Right cheek	20	QPSK 50RB_25	19100/1900	1:1	0.222	0.07	20.79	21.00	1.050	0.233	22.3
Right tilted	20	QPSK 50RB_25	19100/1900	1:1	0.052	0.03	20.79	21.00	1.050	0.054	22.3
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	18900/1880	1:1	0.243	0.07	21.92	22.00	1.019	**0.248**	22.3
Back side	20	QPSK 1RB_50	18900/1880	1:1	0.109	0.05	21.92	22.00	1.019	0.111	22.3
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	19100/1900	1:1	0.156	0.03	20.79	21.00	1.050	0.164	22.3
Back side	20	QPSK 50RB_25	19100/1900	1:1	0.089	0.09	20.79	21.00	1.050	0.093	22.3
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_50	18900/1880	1:1	0.188	0.13	21.92	22.00	1.019	0.191	22.3
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	18900/1880	1:1	0.306	0.11	21.92	22.00	1.019	0.312	22.3
Back side	20	QPSK 1RB_50	18900/1880	1:1	0.145	0.03	21.92	22.00	1.019	0.148	22.3
Left side	20	QPSK 1RB_50	18900/1880	1:1	0.098	-0.04	21.92	22.00	1.019	0.100	22.3
Right side	20	QPSK 1RB_50	18900/1880	1:1	0.267	-0.01	21.92	22.00	1.019	0.272	22.3
Bottom side	20	QPSK 1RB_50	18900/1880	1:1	0.423	-0.14	21.92	22.00	1.019	**0.431**	22.3
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	19100/1900	1:1	0.223	0.06	20.79	21.00	1.050	0.234	22.3
Back side	20	QPSK 50RB_25	19100/1900	1:1	0.127	-0.04	20.79	21.00	1.050	0.133	22.3
Left side	20	QPSK 50RB_25	19100/1900	1:1	0.067	0.08	20.79	21.00	1.050	0.070	22.3
Right side	20	QPSK 50RB_25	19100/1900	1:1	0.195	0.02	20.79	21.00	1.050	0.205	22.3
Bottom side	20	QPSK 50RB_25	19100/1900	1:1	0.271	0.11	20.79	21.00	1.050	0.284	22.3

Table 17：SAR of LTE Band 2 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_50	18900/1880	1:1	0.242	0.05	21.92	22.00	1.019	0.246	22.3
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											

Front side	20	QPSK 1RB_50	18900/1880	1:1	0.182	0.10	21.92	22.00	1.019	0.185	22.3
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Bottom side	20	QPSK 1RB_50	18900/1880	1:1	0.356	-0.19	21.92	22.00	1.019	0.363	22.3

Table 18：SAR of LTE Band 2 for Head and Body (Variant).

8.3.5 SAR Result of LTE Band 4

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	20175/1732.5	1:1	0.202	0.16	21.05	21.50	1.109	0.224	22.2
Left tilted	20	QPSK 1RB_50	20175/1732.5	1:1	0.113	0.01	21.05	21.50	1.109	0.125	22.2
Right cheek	20	QPSK 1RB_50	20175/1732.5	1:1	0.302	0.13	21.05	21.50	1.109	**0.335**	22.2
Right tilted	20	QPSK 1RB_50	20175/1732.5	1:1	0.154	0.11	21.05	21.50	1.109	0.171	22.2
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_0	20300/1745	1:1	0.161	0.14	19.79	20.50	1.178	0.190	22.2
Left tilted	20	QPSK 50RB_0	20300/1745	1:1	0.090	0.09	19.79	20.50	1.178	0.106	22.2
Right cheek	20	QPSK 50RB_0	20300/1745	1:1	0.245	0.11	19.79	20.50	1.178	0.289	22.2
Right tilted	20	QPSK 50RB_0	20300/1745	1:1	0.116	0.08	19.79	20.50	1.178	0.137	22.2
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	20175/1732.5	1:1	0.239	-0.09	21.05	21.50	1.109	**0.265**	22.2
Back side	20	QPSK 1RB_50	20175/1732.5	1:1	0.132	0.05	21.05	21.50	1.109	0.146	22.2
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_0	20300/1745	1:1	0.194	0.02	19.79	20.50	1.178	0.228	22.2
Back side	20	QPSK 50RB_0	20300/1745	1:1	0.101	0.07	19.79	20.50	1.178	0.119	22.2
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_50	20175/1732.5	1:1	0.167	0.06	21.05	21.50	1.109	0.185	22.2
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	20175/1732.5	1:1	0.422	-0.11	21.05	21.50	1.109	0.468	22.2
Back side	20	QPSK 1RB_50	20175/1732.5	1:1	0.187	0.14	21.05	21.50	1.109	0.207	22.2
Left side	20	QPSK 1RB_50	20175/1732.5	1:1	0.132	0.05	21.05	21.50	1.109	0.146	22.2
Right side	20	QPSK 1RB_50	20175/1732.5	1:1	0.306	0.12	21.05	21.50	1.109	0.339	22.2
Bottom side	20	QPSK 1RB_50	20175/1732.5	1:1	0.808	0.06	21.05	21.50	1.109	0.896	22.2
Bottom side	20	QPSK 1RB_50	20050/1720	1:1	0.848	0.01	21.02	21.50	1.117	**0.947**	22.2
Bottom side	20	QPSK 1RB_50	20300/1745	1:1	0.706	0.05	20.99	21.50	1.125	0.794	22.2
Bottom side-Repeat	20	QPSK 1RB_50	20050/1720	1:1	0.833	-0.08	21.02	21.50	1.117	0.930	22.2
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_0	20300/1745	1:1	0.343	0.10	19.79	20.50	1.178	0.404	22.2
Back side	20	QPSK 50RB_0	20300/1745	1:1	0.143	0.03	19.79	20.50	1.178	0.168	22.2
Left side	20	QPSK 50RB_0	20300/1745	1:1	0.110	0.11	19.79	20.50	1.178	0.130	22.2
Right side	20	QPSK 50RB_0	20300/1745	1:1	0.254	0.01	19.79	20.50	1.178	0.299	22.2
Bottom side	20	QPSK 50RB_0	20300/1745	1:1	0.610	0.04	19.79	20.50	1.178	0.718	22.2
Hotspot Test data (Separate 10mm 100%RB)											
Bottom side	20	QPSK 100RB_0	20300/1745	1:1	0.596	0.07	19.81	20.50	1.172	0.699	22.2

Table 19：SAR of LTE Band 4 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_50	20175/1732.5	1:1	0.317	0.02	21.05	21.50	1.109	0.352	22.2
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Front side	20	QPSK 1RB_50	20175/1732.5	1:1	0.202	-0.13	21.05	21.50	1.109	0.224	22.2

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Bottom side	20	QPSK 1RB_50	20050/1720	1:1	0.735	-0.03	21.02	21.50	1.117	**0.821**	22.2

Table 20：SAR of LTE Band 4 for Head and Body (Variant).

8.3.6 SAR Result of LTE Band 5

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	10	QPSK 1RB_25	20525/836.5	1:1	0.104	-0.07	22.36	23.50	1.300	**0.135**	22.1
Left tilted	10	QPSK 1RB_25	20525/836.5	1:1	0.075	0.06	22.36	23.50	1.300	0.098	22.1
Right cheek	10	QPSK 1RB_25	20525/836.5	1:1	0.086	0.11	22.36	23.50	1.300	0.112	22.1
Right tilted	10	QPSK 1RB_25	20525/836.5	1:1	0.080	0.07	22.36	23.50	1.300	0.104	22.1
Head Test data(50%RB)											
Left cheek	10	QPSK 25RB_25	20450/829	1:1	0.076	0.03	21.28	22.50	1.324	0.101	22.1
Left tilted	10	QPSK 25RB_25	20450/829	1:1	0.063	0.11	21.28	22.50	1.324	0.083	22.1
Right cheek	10	QPSK 25RB_25	20450/829	1:1	0.074	0.07	21.28	22.50	1.324	0.098	22.1
Right tilted	10	QPSK 25RB_25	20450/829	1:1	0.066	0.02	21.28	22.50	1.324	0.088	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	10	QPSK 1RB_25	20525/836.5	1:1	0.072	0.02	22.36	23.50	1.300	0.094	22.1
Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.101	0.12	22.36	23.50	1.300	**0.131**	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	10	QPSK 25RB_25	20450/829	1:1	0.060	0.04	21.28	22.50	1.324	0.079	22.1
Back side	10	QPSK 25RB_25	20450/829	1:1	0.086	0.08	21.28	22.50	1.324	0.113	22.1
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.100	0.06	22.36	23.50	1.300	0.130	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	10	QPSK 1RB_25	20525/836.5	1:1	0.092	0.14	22.36	23.50	1.300	0.119	22.1
Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.122	0.11	22.36	23.50	1.300	**0.159**	22.1
Left side	10	QPSK 1RB_25	20525/836.5	1:1	0.108	-0.04	22.36	23.50	1.300	0.140	22.1
Right side	10	QPSK 1RB_25	20525/836.5	1:1	0.111	0.06	22.36	23.50	1.300	0.144	22.1
Bottom side	10	QPSK 1RB_25	20525/836.5	1:1	0.045	0.05	22.36	23.50	1.300	0.058	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	10	QPSK 25RB_25	20450/829	1:1	0.074	0.02	21.28	22.50	1.324	0.098	22.1
Back side	10	QPSK 25RB_25	20450/829	1:1	0.103	0.10	21.28	22.50	1.324	0.136	22.1
Left side	10	QPSK 25RB_25	20450/829	1:1	0.081	0.13	21.28	22.50	1.324	0.107	22.1
Right side	10	QPSK 25RB_25	20450/829	1:1	0.087	0.02	21.28	22.50	1.324	0.115	22.1
Bottom side	10	QPSK 25RB_25	20450/829	1:1	0.030	0.15	21.28	22.50	1.324	0.040	22.1

Table 21：SAR of LTE Band 5 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Left cheek	10	QPSK 1RB_25	20525/836.5	1:1	0.163	0.06	22.36	23.50	1.300	0.212	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											

Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.094	-0.04	22.36	23.50	1.300	0.122	22.1
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.111	0.17	22.36	23.50	1.300	0.144	22.1

Table 22：SAR of LTE Band 5 for Head and Body (Variant).

8.3.7 SAR Result of LTE Band 7

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	20850/2510	1:1	0.223	0.12	24.20	24.50	1.072	0.239	22.1
Left tilted	20	QPSK 1RB_50	20850/2510	1:1	0.107	0.13	24.20	24.50	1.072	0.115	22.1
Right cheek	20	QPSK 1RB_50	20850/2510	1:1	0.580	0.06	24.20	24.50	1.072	**0.621**	22.1
Right tilted	20	QPSK 1RB_50	20850/2510	1:1	0.539	0.14	24.20	24.50	1.072	0.578	22.1
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_25	21350/2560	1:1	0.188	-0.13	23.13	23.50	1.089	0.205	22.1
Left tilted	20	QPSK 50RB_25	21350/2560	1:1	0.087	0.10	23.13	23.50	1.089	0.094	22.1
Right cheek	20	QPSK 50RB_25	21350/2560	1:1	0.527	0.12	23.13	23.50	1.089	0.574	22.1
Right tilted	20	QPSK 50RB_25	21350/2560	1:1	0.494	0.11	23.13	23.50	1.089	0.538	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	20850/2510	1:1	0.114	0.11	24.20	24.50	1.072	**0.122**	22.1
Back side	20	QPSK 1RB_50	20850/2510	1:1	0.036	0.12	24.20	24.50	1.072	0.038	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	21350/2560	1:1	0.106	-0.08	23.13	23.50	1.089	0.115	22.1
Back side	20	QPSK 50RB_25	21350/2560	1:1	0.026	0.01	23.13	23.50	1.089	0.028	22.1
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_50	20850/2510	1:1	0.061	0.07	24.20	24.50	1.072	0.065	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	20850/2510	1:1	0.176	0.03	24.20	24.50	1.072	0.189	22.1
Back side	20	QPSK 1RB_50	20850/2510	1:1	0.067	0.05	24.20	24.50	1.072	0.072	22.1
Left side	20	QPSK 1RB_50	20850/2510	1:1	0.060	0.11	24.20	24.50	1.072	0.064	22.1
Right side	20	QPSK 1RB_50	20850/2510	1:1	0.258	-0.06	24.20	24.50	1.072	**0.276**	22.1
Bottom side	20	QPSK 1RB_50	20850/2510	1:1	0.165	0.06	24.20	24.50	1.072	0.177	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	21350/2560	1:1	0.175	-0.15	23.13	23.50	1.089	0.191	22.1
Back side	20	QPSK 50RB_25	21350/2560	1:1	0.053	0.06	23.13	23.50	1.089	0.057	22.1
Left side	20	QPSK 50RB_25	21350/2560	1:1	0.048	-0.01	23.13	23.50	1.089	0.052	22.1
Right side	20	QPSK 50RB_25	21350/2560	1:1	0.228	-0.06	23.13	23.50	1.089	0.248	22.1
Bottom side	20	QPSK 50RB_25	21350/2560	1:1	0.134	0.11	23.13	23.50	1.089	0.146	22.1

Table 23：SAR of LTE Band 7 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_50	20850/2510	1:1	0.468	0.09	24.20	24.50	1.072	0.501	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Front side	20	QPSK 1RB_50	20850/2510	1:1	0.110	0.03	24.20	24.50	1.072	0.118	22.1

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	20	QPSK 1RB_50	20850/2510	1:1	0.280	0.04	24.20	24.50	1.072	0.300	22.1

Table 24：SAR of LTE Band 7 for Head and Body (Variant).

8.3.8 SAR Result of LTE Band 26

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	15	QPSK 1RB_38	26765/821.5	1:1	0.107	0.14	22.25	23.50	1.334	0.143	22.1
Left tilted	15	QPSK 1RB_38	26765/821.5	1:1	0.087	0.16	22.25	23.50	1.334	0.116	22.1
Right cheek	15	QPSK 1RB_38	26765/821.5	1:1	0.112	0.12	22.25	23.50	1.334	**0.149**	22.1
Right tilted	15	QPSK 1RB_38	26765/821.5	1:1	0.093	0.13	22.25	23.50	1.334	0.124	22.1
Head Test data(50%RB)											
Left cheek	15	QPSK 36RB_0	26765/821.5	1:1	0.090	0.03	21.45	22.50	1.274	0.114	22.1
Left tilted	15	QPSK 36RB_0	26765/821.5	1:1	0.072	0.04	21.45	22.50	1.274	0.091	22.1
Right cheek	15	QPSK 36RB_0	26765/821.5	1:1	0.090	0.03	21.45	22.50	1.274	0.114	22.1
Right tilted	15	QPSK 36RB_0	26765/821.5	1:1	0.080	0.08	21.45	22.50	1.274	0.102	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	15	QPSK 1RB_38	26765/821.5	1:1	0.070	0.06	22.25	23.50	1.334	0.093	22.1
Back side	15	QPSK 1RB_38	26765/821.5	1:1	0.112	0.07	22.25	23.50	1.334	**0.149**	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	15	QPSK 36RB_0	26765/821.5	1:1	0.059	0.03	21.45	22.50	1.274	0.074	22.1
Back side	15	QPSK 36RB_0	26765/821.5	1:1	0.082	0.11	21.45	22.50	1.274	0.104	22.1
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	15	QPSK 1RB_38	26765/821.5	1:1	0.101	-0.02	22.25	23.50	1.334	0.135	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	15	QPSK 1RB_38	26765/821.5	1:1	0.083	0.11	22.25	23.50	1.334	0.111	22.1
Back side	15	QPSK 1RB_38	26765/821.5	1:1	0.117	0.03	22.25	23.50	1.334	0.156	22.1
Left side	15	QPSK 1RB_38	26765/821.5	1:1	0.122	0.02	22.25	23.50	1.334	0.163	22.1
Right side	15	QPSK 1RB_38	26765/821.5	1:1	0.123	0.16	22.25	23.50	1.334	**0.164**	22.1
Bottom side	15	QPSK 1RB_38	26765/821.5	1:1	0.043	0.01	22.25	23.50	1.334	0.057	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	15	QPSK 36RB_0	26765/821.5	1:1	0.069	-0.05	21.45	22.50	1.274	0.088	22.1
Back side	15	QPSK 36RB_0	26765/821.5	1:1	0.093	0.08	21.45	22.50	1.274	0.118	22.1
Left side	15	QPSK 36RB_0	26765/821.5	1:1	0.100	-0.03	21.45	22.50	1.274	0.127	22.1
Right side	15	QPSK 36RB_0	26765/821.5	1:1	0.107	0.08	21.45	22.50	1.274	0.136	22.1
Bottom side	15	QPSK 36RB_0	26765/821.5	1:1	0.035	0.11	21.45	22.50	1.274	0.045	22.1

Table 25：SAR of LTE Band 26 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	15	QPSK 1RB_38	26765/821.5	1:1	0.126	-0.06	22.25	23.50	1.334	0.168	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Back side	15	QPSK 1RB_38	26765/821.5	1:1	0.111	-0.12	22.25	23.50	1.334	0.148	22.1

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	15	QPSK 1RB_38	26765/821.5	1:1	0.126	-0.03	22.25	23.50	1.334	0.168	22.1

Table 26：SAR of LTE Band 26 for Head and Body (Variant).

8.3.9 SAR Result of LTE Band 38

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	38000/2595	1:1.58	0.204	0.13	24.08	24.5	1.102	0.225	22.1
Left tilted	20	QPSK 1RB_50	38000/2595	1:1.58	0.068	0.10	24.08	24.5	1.102	0.075	22.1
Right cheek	20	QPSK 1RB_50	38000/2595	1:1.58	0.375	0.13	24.08	24.5	1.102	**0.413**	22.1
Right tilted	20	QPSK 1RB_50	38000/2595	1:1.58	0.072	0.17	24.08	24.5	1.102	0.080	22.1
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_0	38000/2595	1:1.58	0.144	0.09	23.10	23.5	1.096	0.158	22.1
Left tilted	20	QPSK 50RB_0	38000/2595	1:1.58	0.049	0.14	23.10	23.5	1.096	0.054	22.1
Right cheek	20	QPSK 50RB_0	38000/2595	1:1.58	0.288	0.13	23.10	23.5	1.096	0.316	22.1
Right tilted	20	QPSK 50RB_0	38000/2595	1:1.58	0.051	0.11	23.10	23.5	1.096	0.056	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	38000/2595	1:1.58	0.083	-0.18	24.08	24.5	1.102	**0.092**	22.1
Back side	20	QPSK 1RB_50	38000/2595	1:1.58	0.019	0.07	24.08	24.5	1.102	0.020	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_0	38000/2595	1:1.58	0.064	-0.04	23.10	23.5	1.096	0.070	22.1
Back side	20	QPSK 50RB_0	38000/2595	1:1.58	0.019	0.11	23.10	23.5	1.096	0.021	22.1
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_50	38000/2595	1:1.58	0.040	0.00	24.08	24.5	1.102	0.044	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	38000/2595	1:1.58	0.155	0.02	24.08	24.5	1.102	0.171	22.1
Back side	20	QPSK 1RB_50	38000/2595	1:1.58	0.037	0.06	24.08	24.5	1.102	0.040	22.1
Left side	20	QPSK 1RB_50	38000/2595	1:1.58	0.046	0.03	24.08	24.5	1.102	0.051	22.1
Right side	20	QPSK 1RB_50	38000/2595	1:1.58	0.177	0.09	24.08	24.5	1.102	**0.195**	22.1
Bottom side	20	QPSK 1RB_50	38000/2595	1:1.58	0.082	0.08	24.08	24.5	1.102	0.091	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_0	38000/2595	1:1.58	0.111	0.07	23.10	23.5	1.096	0.122	22.1
Back side	20	QPSK 50RB_0	38000/2595	1:1.58	0.025	0.06	23.10	23.5	1.096	0.028	22.1
Left side	20	QPSK 50RB_0	38000/2595	1:1.58	0.034	0.05	23.10	23.5	1.096	0.037	22.1
Right side	20	QPSK 50RB_0	38000/2595	1:1.58	0.140	-0.06	23.10	23.5	1.096	0.154	22.1
Bottom side	20	QPSK 50RB_0	38000/2595	1:1.58	0.063	0.10	23.10	23.5	1.096	0.069	22.1

Table 27：SAR of LTE Band 38 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_50	38000/2595	1:1.58	0.342	-0.02	24.08	24.5	1.102	**0.377**	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Front side	20	QPSK 1RB_50	38000/2595	1:1.58	0.115	0.08	24.08	24.5	1.102	**0.127**	22.1

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	20	QPSK 1RB_50	38000/2595	1:1.58	0.201	0.17	24.08	24.5	1.102	**0.221**	22.1

Table 28：SAR of LTE Band 38 for Head and Body (Variant).

8.3.10SAR Result of LTE Band 40

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_50	39550/2390	1:1.58	0.198	0.13	23.04	23.5	1.112	0.220	22.3
Left tilted	20	QPSK 1RB_50	39550/2390	1:1.58	0.085	0.12	23.04	23.5	1.112	0.095	22.3
Right cheek	20	QPSK 1RB_50	39550/2390	1:1.58	0.284	0.02	23.04	23.5	1.112	**0.316**	22.3
Right tilted	20	QPSK 1RB_50	39550/2390	1:1.58	0.080	0.04	23.04	23.5	1.112	0.089	22.3
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_25	39150/2350	1:1.58	0.179	0.04	22.28	22.5	1.052	0.188	22.3
Left tilted	20	QPSK 50RB_25	39150/2350	1:1.58	0.069	0.12	22.28	22.5	1.052	0.073	22.3
Right cheek	20	QPSK 50RB_25	39150/2350	1:1.58	0.232	0.16	22.28	22.5	1.052	0.244	22.3
Right tilted	20	QPSK 50RB_25	39150/2350	1:1.58	0.099	0.11	22.28	22.5	1.052	0.104	22.3
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_50	39550/2390	1:1.58	0.070	0.03	23.04	23.5	1.112	**0.078**	22.3
Back side	20	QPSK 1RB_50	39550/2390	1:1.58	0.021	0.09	23.04	23.5	1.112	0.024	22.3
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_25	39150/2350	1:1.58	0.064	0.01	22.28	22.5	1.052	**0.068**	22.3
Back side	20	QPSK 50RB_25	39150/2350	1:1.58	0.032	0.04	22.28	22.5	1.052	0.033	22.3
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_50	39550/2390	1:1.58	0.031	0.09	23.04	23.5	1.112	0.034	22.3
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_50	39550/2390	1:1.58	0.112	0.07	23.04	23.5	1.112	0.125	22.3
Back side	20	QPSK 1RB_50	39550/2390	1:1.58	0.039	0.12	23.04	23.5	1.112	0.044	22.3
Left side	20	QPSK 1RB_50	39550/2390	1:1.58	0.032	0.04	23.04	23.5	1.112	0.035	22.3
Right side	20	QPSK 1RB_50	39550/2390	1:1.58	0.208	-0.05	23.04	23.5	1.112	**0.231**	22.3
Bottom side	20	QPSK 1RB_50	39550/2390	1:1.58	0.078	0.11	23.04	23.5	1.112	0.087	22.3
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_25	39150/2350	1:1.58	0.111	-0.06	22.28	22.5	1.052	0.117	22.3
Back side	20	QPSK 50RB_25	39150/2350	1:1.58	0.050	0.08	22.28	22.5	1.052	0.053	22.3
Left side	20	QPSK 50RB_25	39150/2350	1:1.58	0.017	0.03	22.28	22.5	1.052	0.018	22.3
Right side	20	QPSK 50RB_25	39150/2350	1:1.58	0.164	0.11	22.28	22.5	1.052	**0.173**	22.3
Bottom side	20	QPSK 50RB_25	39150/2350	1:1.58	0.055	0.08	22.23	22.5	1.064	0.059	22.3

Table 29：SAR of LTE Band 40 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_50	39550/2390	1:1.58	0.278	-0.09	23.04	23.5	1.112	**0.309**	22.3
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Front side	20	QPSK 1RB_50	39550/2390	1:1.58	0.093	0.06	23.04	23.5	1.112	**0.103**	22.3

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	20	QPSK 1RB_50	39550/2390	1:1.58	0.203	0.08	23.04	23.5	1.112	**0.226**	22.3

Table 30：SAR of LTE Band 40 for Head and Body (Variant).

8.3.11SAR Result of LTE Band 41

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data(1RB)											
Left cheek	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.136	0.14	23.99	24.50	1.125	0.153	22.1
Left tilted	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.053	0.06	23.99	24.50	1.125	0.060	22.1
Right cheek	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.278	0.15	23.99	24.50	1.125	**0.313**	22.1
Right tilted	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.070	0.11	23.99	24.50	1.125	0.079	22.1
Head Test data(50%RB)											
Left cheek	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.109	0.13	22.95	23.50	1.135	0.124	22.1
Left tilted	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.042	0.09	22.95	23.50	1.135	0.048	22.1
Right cheek	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.243	0.10	22.95	23.50	1.135	0.276	22.1
Right tilted	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.071	0.08	22.95	23.50	1.135	0.081	22.1
Body worn Test data(Separate 15mm 1RB)											
Front side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.064	-0.19	23.99	24.50	1.125	**0.072**	22.1
Back side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.015	0.09	23.99	24.50	1.125	0.017	22.1
Body worn Test data (Separate 15mm 50%RB)											
Front side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.053	0.13	22.95	23.50	1.135	0.060	22.1
Back side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.013	0.11	22.95	23.50	1.135	0.015	22.1
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.037	0.11	23.99	24.50	1.125	0.042	22.1
Hotspot Test data(Separate 10mm 1RB)											
Front side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.122	-0.06	23.99	24.50	1.125	0.137	22.1
Back side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.032	0.12	23.99	24.50	1.125	0.035	22.1
Left side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.037	0.02	23.99	24.50	1.125	0.041	22.1
Right side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.168	-0.03	23.99	24.50	1.125	**0.189**	22.1
Bottom side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.063	-0.07	23.99	24.50	1.125	0.071	22.1
Hotspot Test data (Separate 10mm 50%RB)											
Front side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.099	-0.12	22.95	23.50	1.135	0.112	22.1
Back side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.023	0.08	22.95	23.50	1.135	0.026	22.1
Left side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.028	-0.12	22.95	23.50	1.135	0.032	22.1
Right side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.126	-0.08	22.95	23.50	1.135	0.143	22.1
Bottom side	20	QPSK 50RB_0	40185/2549.5	1:1.58	0.051	0.03	22.95	23.50	1.135	0.058	22.1

Table 31：SAR of LTE Band 41 for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Right cheek	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.317	0.15	23.99	24.50	1.125	0.356	22.1
Body worn Test data at the Worst Case with Battery2(Separate 15mm)											
Front side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.079	0.08	23.99	24.50	1.125	0.089	22.1

Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	20	QPSK 1RB_0	40185/2549.5	1:1.58	0.176	0.07	23.99	24.50	1.125	0.198	22.1

Table 32：SAR of LTE Band 41 for Head and Body (Variant).

8.3.12 SAR Result of 2.4GHz WIFI

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg)1-g	Power drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Head Test data											
Left cheek	802.11b	11/2462	97.34%	1.027	0.037	0.13	14.79	15.00	1.050	**0.040**	22.0
Left tilted	802.11b	11/2462	97.34%	1.027	0.030	0.04	14.79	15.00	1.050	0.033	22.0
Right cheek	802.11b	11/2462	97.34%	1.027	0.023	0.11	14.79	15.00	1.050	0.025	22.0
Right tilted	802.11b	11/2462	97.34%	1.027	0.025	0.05	14.79	15.00	1.050	0.027	22.0
Body worn Test data(Separate 15mm)											
Front side	802.11b	11/2462	97.34%	1.027	0.008	0.12	14.79	15.00	1.050	0.008	22.0
Back side	802.11b	11/2462	97.34%	1.027	0.017	0.07	14.79	15.00	1.050	**0.019**	22.0
Body worn Test Data at the worst case with Back splint(0mm)											
Back side	802.11b	11/2462	97.34%	1.027	0.028	0.11	14.79	15.00	1.050	0.030	22.0
Hotspot Test data (Separate 10mm)											
Front side	802.11b	11/2462	97.34%	1.027	0.009	0.09	14.79	15.00	1.050	0.010	22.0
Back side	802.11b	11/2462	97.34%	1.027	0.035	0.13	14.79	15.00	1.050	0.038	22.0
Left side	802.11b	11/2462	97.34%	1.027	0.009	0.11	14.79	15.00	1.050	0.010	22.0
Right side	802.11b	11/2462	97.34%	1.027	0.057	0.05	14.79	15.00	1.050	**0.061**	22.0
Top side	802.11b	11/2462	97.34%	1.027	0.023	0.06	14.79	15.00	1.050	0.025	22.0

Table 33：SAR of 2.4GHz WIFI for Head and Body (Original Report SZEM190101023909).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix G

2) If the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg) 1-g	Power Drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp.
Head Test data at the Worst Case with Battery2											
Left cheek	802.11b	11/2462	97.34%	1.027	0.437	-0.06	14.79	15.00	1.050	0.471	22.0
Body worn Test data at the Worst Case with Back Splint with Battery2(Separate 15mm)											
Back side	802.11b	11/2462	97.34%	1.027	0.038	0.06	14.79	15.00	1.050	0.041	22.0
Hotspot Test data at the Worst Case with Battery2 (Separate 10mm)											
Right side	802.11b	11/2462	97.34%	1.027	0.032	0.19	14.79	15.00	1.050	0.034	22.0

Table 34：SAR of 2.4GHz WIFI for Head and Body (Variant).

8.4 Multiple Transmitter Evaluation

8.4.1 Simultaneous SAR SAR test evaluation

Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Head	Body worn	Hotspot
1	GSM(Voice) + WiFi	Yes	Yes	No
2	GSM(Voice) + BT	Yes	Yes	No
3	CDMA(Voice) + WiFi	Yes	Yes	No
4	CDMA(Voice) + BT	Yes	Yes	No
5	GPRS / EDGE(Data) + WiFi	No	No	Yes
6	GPRS / EDGE(Data) + BT	No	No	Yes
7	CDMA(Data) + WiFi	No	No	Yes
8	CDMA(Data) + BT	No	No	Yes
9	LTE(Data) + WiFi	Yes	Yes	Yes
10	LTE(Data) + BT	Yes	Yes	Yes
11	BT+WIFI (They share the same antenna and cannot transmit at the same time by design.)	No	No	No

Note:
1) Wi-Fi and Bluetooth share the same Txantenna and can't transmit simultaneously.

8.4.2 Estimated SAR

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

• (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;

Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

• 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Estimated SAR Result

Freq. Band	Frequency (GHz)	Test Position	max. power(dBm)	Test Separation (mm)	Estimated 1g SAR (W/kg)
Bluetooth	2.48	Head	9.00	0	0.334
		Body-worn	9.00	15	0.111
		Hotspot	9.00	10	0.167
		Product specific 10g SAR	9.00	0	0.133

8.4.3 Simultaneous Transmission SAR Summation Scenario

Test position		Main Antenna SARmax (W/kg)											WiFi Antenna SARmax (W/kg)		Summed 1g SARmax (W/kg)
		GSM 850	GSM 1900	CDMA BC0	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 26	LTE Band 38	LTE Band 40	LTE Band 41	WLAN 2.4G	BT	
Head	Left Touch	0.104	0.103	0.246	0.168	0.224	0.212	0.239	0.143	0.225	0.22	0.153	0.471	0.334	0.717
	Left Tilt	0.078	0.076	0.124	0.088	0.125	0.098	0.115	0.116	0.075	0.095	0.06	0.033	0.334	0.459
	Right Touch	0.114	0.151	0.13	0.246	0.352	0.112	0.501	0.168	0.377	0.309	0.356	0.025	0.334	0.835
	Right Tilt	0.071	0.059	0.115	0.07	0.171	0.104	0.578	0.124	0.08	0.104	0.081	0.027	0.334	**0.912**
Body worn	Front	0.057	0.118	0.122	0.185	0.224	0.094	0.118	0.093	0.127	0.103	0.089	0.008	0.111	**0.335**
	Back	0.067	0.066	0.159	0.191	0.185	0.122	0.065	0.148	0.044	0.034	0.042	0.041	0.111	0.302
Hotspot	Front	0.111	0.355	0.144	0.312	0.468	0.119	0.191	0.111	0.171	0.125	0.137	0.01	0.167	0.635
	Back	0.124	0.189	0.188	0.148	0.207	0.144	0.072	0.156	0.04	0.053	0.035	0.038	0.167	0.374
	Left	0.152	0.113	0.173	0.1	0.146	0.14	0.064	0.163	0.051	0.035	0.041	0.01	0.167	0.34
	Right	0.159	0.32	0.177	0.272	0.339	0.144	0.3	0.168	0.221	0.226	0.198	0.034	0.167	0.506
	Top	/	/	/	/	/	/	/	/	/	/	/	0.025	0.167	0.167
	Bottom	0.074	0.429	0.065	0.363	0.821	0.058	0.177	0.057	0.091	0.087	0.071	/	0.167	**1.114**
Product specific 10g SAR	Front	/	/	/	/	/	/	/	/	/	/	/	/	0.133	0.133
	Back	/	/	/	/	/	/	/	/	/	/	/	/	0.133	0.133
	Left	/	/	/	/	/	/	/	/	/	/	/	/	0.133	0.133
	Right	/	/	/	/	/	/	/	/	/	/	/	/	0.133	0.133
	Top	/	/	/	/	/	/	/	/	/	/	/	/	0.133	0.133
	Bottom	/	/	/	/	/	/	/	/	/	/	/	/	/	/

9 Equipment list

Test Platform	SPEAG DASY5 Professional
Location	SGS-CCS Standards Technical Services Co., Ltd. Kunshan Branch
Description	SAR Test System (Frequency range 300MHz-6GHz)
Software Reference	DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Hardware Reference

	Equipment	Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	P C	HP	Core(rm)3.16 G	CZCO48171H	N/A	N/A
☒	Signal Generator	Agilent	E8257C	US37101915	2019/02/25	2020/02/24
☒	S-Parameter Network Analyzer	Agilent	E5071B	MY42301382	2019/02/25	2020/02/24
☒	Power sensor	Anritsu	E9327A	Us40441788	2019/02/25	2020/02/24
☒	Power meter	Anritsu	E4416A	GB41292714	2019/02/25	2020/02/24
☒	DAE	SPEAG	DAE4	1245	2019/05/21	2020/05/20
☒	E-field PROBE	SPEAG	EX3DV4	3798	2019/05/24	2020/05/23
☒	Validation Kits	SPEAG	CLA150	4025	2018/04/16	2021/04/15
☒	Validation Kits	SPEAG	D835V2	4d166	2019/04/22	2022/04/21
☒	Validation Kits	SPEAG	D1800V2	2d052	2018/06/22	2021/06/21
☒	Validation Kits	SPEAG	D1900V2	5d018	2018/06/21	2021/06/20
☒	Validation Kits	SPEAG	D2300V2	1096	2019/03/08	2022/03/07
☒	Validation Kits	SPEAG	D2450V2	903	2018/10/26	2019/10/25
☒	Validation Kits	SPEAG	D2600V2	1158	2019/03/08	2022/03/07
☒	Electro Thermometer	DTM	DTM3000	3030	2018/12/8	2019/12/7
☒	Amplifier	Mini-circuits	ZVE-8G	110405	N/A	N/A
☒	Amplifier	Mini-circuits	ZHL-42	QA1331003	N/A	N/A
☒	3db ATTENUATOR	MINI	MCL BW-S3W5	0533	N/A	N/A
☒	DUMMY PROBE	SPEAG	DP_2	SPDP2001AA	N/A	N/A
☒	Dual Directional Coupler	Woken	20W couple	DOM2BHW1A1	N/A	N/A
☒	SAM PHANTOM (ELI4 v4.0)	SPEAG	QDOVA001BB	1102	N/A	N/A
☒	Twin SAM Phantom	SPEAG	QD000P40CD	1609	N/A	N/A
☒	ROBOT	SPEAG	TX60	F10/5E6AA1/A101	N/A	N/A
☒	ROBOT KRC	SPEAG	CS8C	F10/5E6AA1/C101	N/A	N/A
☒	LIQUID CALIBRATION KIT	ANTENNESSA	41/05 OCP9	00425167	N/A	N/A
☒						

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

10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

Please refer to the report of SZEM190101023709.

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