FCC SAR Test Report

APPLICANT	: Guangdong OPPO Mobile Telecommunications Corp., Ltd.
EQUIPMENT	: Mobile Phone
BRAND NAME	: OPPO
MODEL NAME	: CPH2603/A401OP
FCC ID	: R9C-OP23243
STANDARD	: FCC 47 CFR Part 2 (2.1093)

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

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

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.01

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People's Republic of China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA3O3018-02	Rev. 01	Initial issue of report.	Jan. 17, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Guangdong OPPO Mobile Telecommunications Corp., Ltd., Mobile Phone, CPH2603/A401OP**, are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.97	0.76	0.46	1.57
		GSM1900	0.99	**0.92**	0.48	
	WCDMA	WCDMA II	1.06	0.62	0.49	
		WCDMA IV	1.15	0.60	0.48	
		WCDMA V	0.75	0.61	0.47	
	LTE	LTE Band 2	0.91	0.51	0.40	
		LTE Band 4	0.91	0.62	0.40	
		LTE Band 26/5	0.65	0.56	0.45	
		LTE Band 7	1.10	0.77	0.50	
		LTE Band 12/17	0.69	0.63	0.31	
		LTE Band 38	1.03	0.59	0.39	
		LTE Band 41	**1.18**	0.55	0.36	
DTS	WLAN	2.4GHz WLAN	0.67	0.18	0.16	1.48
NII		5GHz WLAN	1.12	0.69	**0.70**	1.57
DSS	Bluetooth	2.4GHz Bluetooth	0.46	0.17	<0.10	1.57

Highest 10g SAR Summary				
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)	
Licensed	LTE	LTE Band 7	1.88	2.69
NII	WLAN	5GHz WLAN	**2.79**	2.79
Date of Testing:		2023/12/9 ~ 2023/12/13		

Remark:
This device supports LTE B5 / B17 and B26 / B12. Since the supported frequency span for LTE B5 / B17 falls completely within the supports frequency span for LTE B26 / B12, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B26 / B12.

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

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

2. Administration Data

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

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-SZ	CN1256	421272

Applicant	
Company Name	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China

Manufacturer	
Company Name	Guangdong OPPO Mobile Telecommunications Corp., Ltd.
Address	NO.18 Haibin Road, Wusha Village, Chang'an Town, Dongguan City, Guangdong, China

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01
- FCC KDB 484596 D01 Referencing Test Data v02r02

4. Data Reuse Approach

4.1 Introduction Section

This application re-uses data collected on a similar device, FCC ID: R9C-OP23051 (reference model) and FCC ID: R9C-OP23243 (variant model). Due to the same design are identical between parent model and variant model, SAR data reuse is requested and spot check data in this report is used to justify the SAR data reuse.

Per KDB 484596 D01 v02r02, the deviation of variant model 1g SAR and 10g SAR spot check result was no larger than 3 dB, the WWAN/WLAN/BT max SAR summary are identical with parent model/ was always choose the higher SAR between parent model and variant model.

The applicant should take full responsibility that the test data as referenced in this report represent compliance for this FCC ID: R9C-OP23243

4.2 Model Difference Information

The **main** difference between FCC ID: R9C-OP23051 and FCC ID: R9C-OP23243 is as below:

- Remove WCDMA B6, LTE Band 13/66 and UL CA_7C/38C, and All 5GNR bands.
- NFC Chip variance.

ther differences and all the details of similarity and difference can be found in the confidential documents (CPH2603/A401OP_Operational Description of Product Equality Declaration).

4.3 Reference detail Section

Rule Part	Equipment Class	Wireless Technology	Frequency Band (MHz)	FCC ID (Reference)	Type Grant/ Permissive Change	Reference Title	FCC ID Filling (Variant)	Test on the variant
Part 2.1093	PCE/CBE	GSM	GSM850/1900	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
		WCDMA	B2/4/5	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
		LTE	B2/4/5/7/12/17/ 26/38/41	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
	DTS	BLE/ WiFi	2400~2483.5	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
	NII	Wi-Fi	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
	DSS	Bluetooth	2400~2483.5	R9C-OP23051	Original Grant	FA3O3018B	R9C-OP23243	Spot check
	DXX	NFC	13.56				R9C-OP23243	Full test

5. Equipment Under Test (EUT) Information

5.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Phone
Brand Name	OPPO
Model Name	CPH2603/A401OP
FCC ID	R9C-OP23243
IMEI Code	IMEI 1: 866845070019493 IMEI 2: 866845070019485
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac VHT20/VHT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 WLAN 5GHz 802.11ax HE20/HE40/HE80 Bluetooth BR/EDR/LE NFC: ASK
HW Version	11
SW Version	ColorOS 14.0
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Production Unit

Remark:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
3. This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
4. The 2.4GHz/5GHz WLAN can transmit in SISO and MIMO antenna mode.
5. This device does not support DTM operation and support GRPS/EGRPS mode up to multi-slot class 12.
6. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
7. The device implements receiver detect mechanism trigger reduced power for the power management for SAR compliance at different exposure conditions (head, hotspot, body, and extremity). It uses the receiver to indicate whether the user is making a call in head scenario or not. The selection between head and body power levels is based on the receiver detection mechanism. It can

determine proximity to head or body and set the relevant power level for 2G&3G&4G and Wi-Fi antennas accordingly. The device will invoke corresponding work scenarios power level base on frequency bands/antennas, power table which can refer to original report and the detailed DSI descriptions of below table.

DSI	Trigger Conditions	Antenna No.	Exposure conditions	
DSI2	Receiver on	All Ant	Head Standalone	Head all Position
DSI6	Receiver on WWAN+ WLAN/BT Receiver on WWAN+WLAN 5GHz+BT Receiver on WWAN + WLAN2.4GHz+WLAN 5GHz	All Ant	Head Simultaneous	Head all Position
DSI1	Receiver off	All Ant	Body Worn/Extremity Standalone	Body Worn/Extremity all Position
DSI5	Receiver off WWAN+ WLAN/BT Receiver off WWAN+WLAN 5GHz+BT Receiver off WWAN + WLAN2.4GHz+WLAN 5GHz	All Ant	Hotspot Body-worn / Extremity Simultaneous	Hotspot/ Body Worn/Extremity all Position

8. For WLAN when transmit, when transmit simultaneously together with WWAN/BT, the device power will be reduced power at head and extremity exposure conditions.
9. This device supports HPUE for LTE Band 41 with class 2 level, HPUE power has been measured separately. For HPUE power is higher than power class 3 but with lower duty cycle, the maximum average power for class 2 and class 3 is almost the same, so we chose power class 3 full SAR testing and power class 2 verify the worst case of power class 3 SAR.
10. The two model names are only for market differentiation, all the others are the same.
11. This device has NFC function and the NFC SAR report will be separately submitted.

5.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	R9C-OP23243
Equipment Name	Mobile Phone
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Voice and Data
LTE Release Version	R15, Cat13
CA Support	Supported, Uplink and Downlink
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3** Modulation | Channel bandwidth / Transmission bandwidth (N_{RB}) | MPR (dB) 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz QPSK: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 16 QAM: ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 16 QAM: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 64 QAM: ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 2 64 QAM: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 3 256 QAM: ≥ 1 | ≤ 5
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the original report.

Power reduction applied to satisfy SAR compliance	Yes, when operating in receiver detect mechanism, head/ body-worn /hotspot/extremity will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to original report.
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power verification please referred to original report.
LTE Carrier Aggregation Additional Information	1. This device supports LTE Carrier Aggregation (CA) in the uplink for intra-band with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance. 2. This device supports maximum of 2 carriers in the downlink and 2 carriers in the uplink.

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

LTE Band 2

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

LTE Band 4

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

LTE Band 5

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

LTE Band 7

	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560

LTE Band 12

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

LTE Band 17

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 26

	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 38								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

6. RF Exposure Limits

6.1 Uncontrolled Environment

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

6.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

7. Specific Absorption Rate (SAR)

7.1 Introduction

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

7.2 SAR Definition

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

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

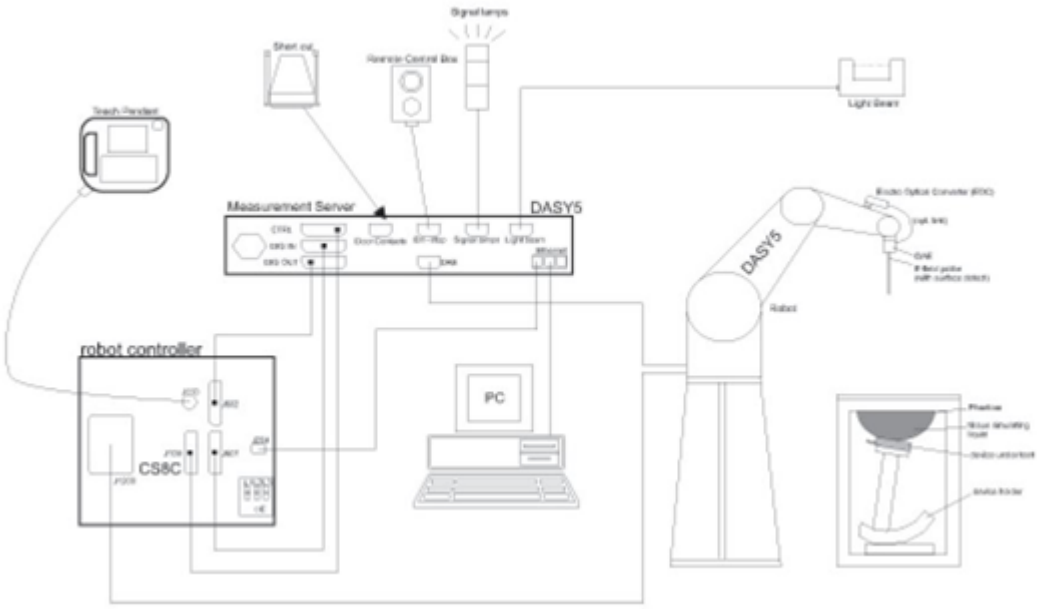
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. System Description and Setup

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



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

8.1 E-Field Probe

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

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 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 – >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

8.2 Data Acquisition Electronics (DAE)

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

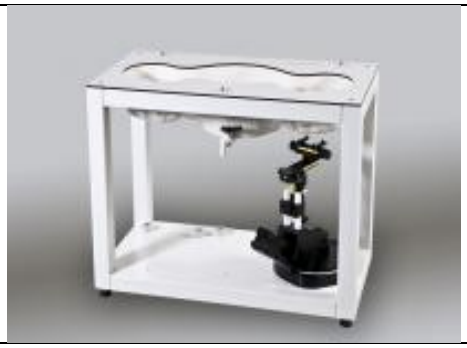
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

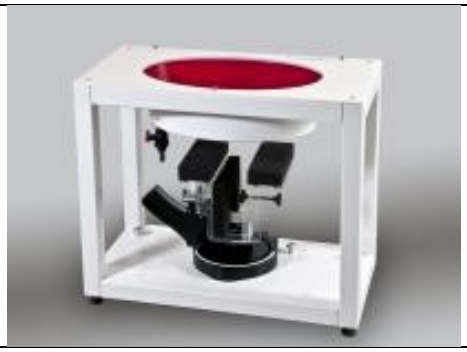
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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

<ELI Phantom>

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



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

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

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

Mounting Device for Laptops

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

9.1 Spatial Peak SAR Evaluation

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

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

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

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

9.2 Power Reference Measurement

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

9.3 Area Scan

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

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

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

9.4 Zoom Scan

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

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

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

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

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

9.5 Volume Scan Procedures

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

9.6 Power Drift Monitoring

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

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1099	Dec. 15, 2021	Dec. 14, 2024
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 16, 2024
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Oct. 19, 2021	Oct. 17, 2024
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 19, 2024
SPEAG	2450MHz System Validation Kit	D2450V2	1040	Apr. 25, 2023	Apr. 24, 2024
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 20, 2021	Dec. 19, 2024
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Sep. 23, 2022	Sep. 22, 2025
SPEAG	Data Acquisition Electronics	DAE4	1386	Jul. 17, 2023	Jul. 16, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7576	Aug. 23, 2023	Aug. 22, 2024
SPEAG	SAM Twin Phantom	QD 000 P40 CD	1671	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Jul. 05, 2023	Jul. 04, 2024
Anritsu	Radio communication analyzer	MT8821C	6262314715	Jul. 05, 2023	Jul. 04, 2024
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 05, 2023	Jul. 04, 2024
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 16, 2023	Oct. 15, 2024
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Feb. 20, 2023	Feb. 19, 2024
Agilent	Signal Generator	N5181A	MY50145381	Dec. 27, 2022	Dec. 26, 2023
Anritsu	Power Sensor	MA2411B	1542004	Dec. 27, 2022	Dec. 26, 2023
Anritsu	Power Meter	ML2495A	1339473	Dec. 27, 2022	Dec. 26, 2023
R&S	Power Sensor	NRP50S	101254	Apr. 06, 2023	Apr. 05, 2024
R&S	Power Sensor	NRP8S	109228	Apr. 06, 2023	Apr. 05, 2024
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 27, 2022	Dec. 26, 2023
R&S	Spectrum Analyzer	FSP7	100818	Jul. 05, 2023	Jul. 04, 2024
TES	Hygrometer	1310	200505600	Jul. 08, 2023	Jul. 07, 2024
Anymetre	Thermo-Hygrometer	JR593	2015030904	Jul. 08, 2023	Jul. 07, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
AR	Amplifier	5S1G4	0333096	Note 1	
Mini-Circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
Mini-Circuits	Amplifier	ZVA-183W-S+	726202215	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
Weinschel	Attenuator 1	3M-10	N/A	Note 1	
Weinschel	Attenuator 2	3M-20	N/A	Note 1	

Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

11. System Verification

11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.

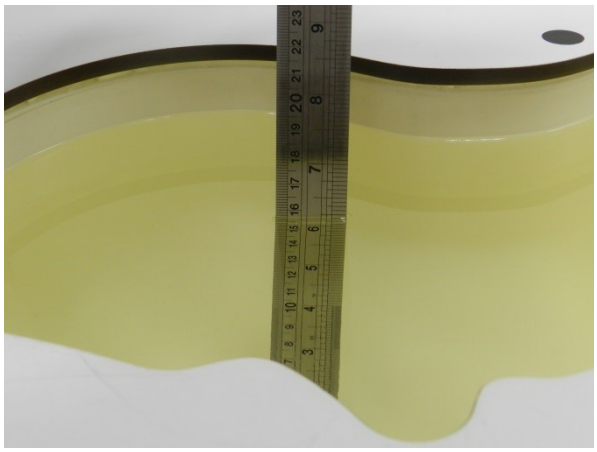


Fig 11.1 Photo of Liquid Height for Head SAR

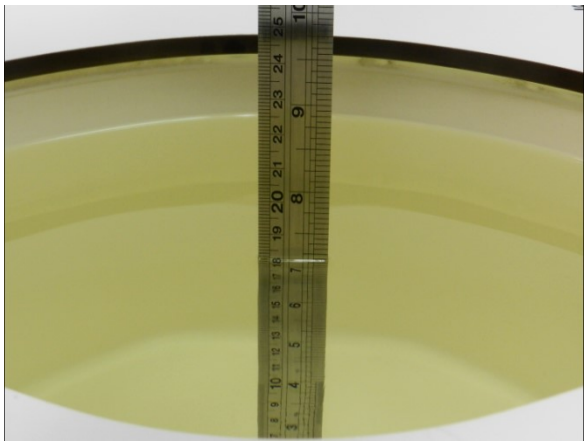


Fig 11.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	22.6	0.903	41.798	0.89	41.90	1.46	-0.24	±5	2023/12/9
835	Head	22.3	0.910	41.302	0.90	41.50	1.11	-0.48	±5	2023/12/9
1750	Head	22.6	1.342	39.902	1.37	40.10	-2.04	-0.49	±5	2023/12/11
1900	Head	22.4	1.423	39.723	1.40	40.00	1.64	-0.69	±5	2023/12/11
2450	Head	22.4	1.787	38.972	1.80	39.20	-0.72	-0.58	±5	2023/12/10
2600	Head	22.6	1.894	38.752	1.96	39.00	-3.37	-0.64	±5	2023/12/10
5250	Head	22.5	4.613	35.588	4.71	35.95	-2.06	-1.01	±5	2023/12/13
5600	Head	22.5	4.899	34.978	5.07	35.50	-3.37	-1.47	±5	2023/12/13
5750	Head	22.3	5.069	34.699	5.22	35.35	-2.89	-1.84	±5	2023/12/13

11.3 System Performance Check Results

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

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2023/12/9	750	Head	250	1099	7576	1386	2.220	8.540	8.88	3.98
2023/12/9	835	Head	250	4d162	7576	1386	2.420	9.640	9.68	0.41
2023/12/11	1750	Head	250	1137	7576	1386	8.670	36.500	34.68	-4.99
2023/12/11	1900	Head	250	5d182	7576	1386	9.360	39.600	37.44	-5.45
2023/12/10	2450	Head	250	1040	7576	1386	12.900	52.700	51.6	-2.09
2023/12/10	2600	Head	250	1070	7576	1386	13.700	56.200	54.8	-2.49
2023/12/13	5250	Head	100	1113	7576	1386	8.250	81.500	82.5	1.23
2023/12/13	5600	Head	100	1113	7576	1386	8.120	82.600	81.2	-1.69
2023/12/13	5750	Head	100	1113	7576	1386	7.940	80.800	79.4	-1.73

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2023/12/9	750	Head	250	1099	7576	1386	1.480	5.650	5.92	4.78
2023/12/9	835	Head	250	4d162	7576	1386	1.600	6.260	6.4	2.24
2023/12/11	1750	Head	250	1137	7576	1386	4.670	19.200	18.68	-2.71
2023/12/11	1900	Head	250	5d182	7576	1386	4.850	20.200	19.4	-3.96
2023/12/10	2450	Head	250	1040	7576	1386	6.030	24.600	24.12	-1.95
2023/12/10	2600	Head	250	1070	7576	1386	6.120	24.600	24.48	-0.49
2023/12/13	5250	Head	100	1113	7576	1386	2.210	23.300	22.1	-5.15
2023/12/13	5600	Head	100	1113	7576	1386	2.350	23.700	23.5	-0.84
2023/12/13	5750	Head	100	1113	7576	1386	2.170	23.000	21.7	-5.65

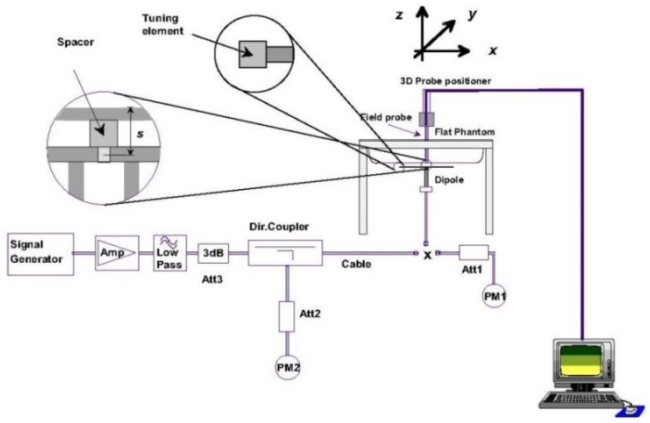


Fig 11.3.1 System Performance Check Setup

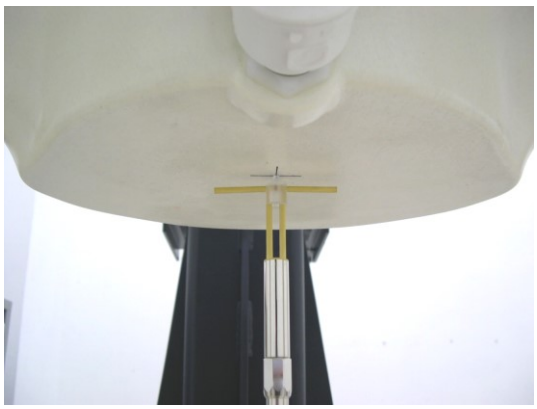


Fig 11.3.2 Setup Photo

12. RF Exposure Positions

12.1 Ear and handset reference point

Figure 12.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 12.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 12.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 12.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

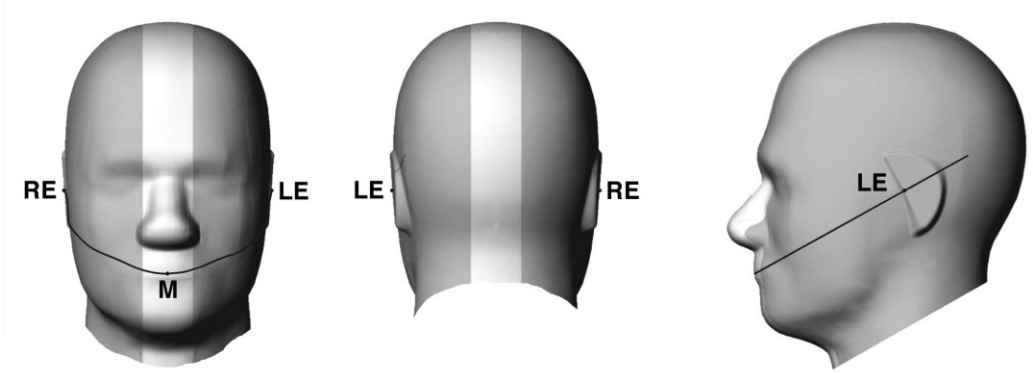


Fig 12.1.1 Front, back, and side views of SAM twin phantom

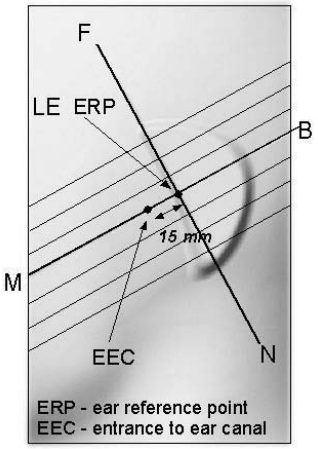


Fig 12.1.2 Close-up side view of phantom showing the ear region.

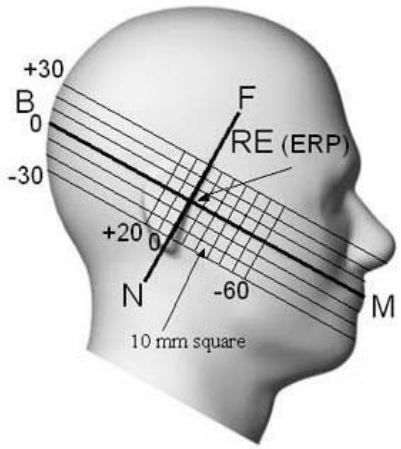


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 12.2.1 and Figure 12.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 12.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 12.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 12.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 12.2.3. The actual rotation angles should be documented in the test report.

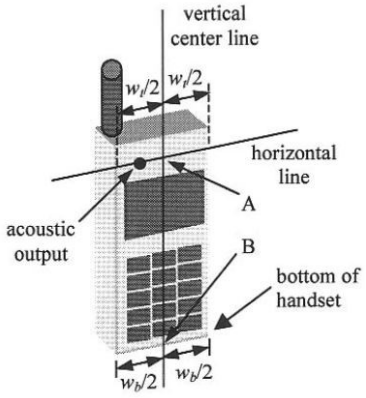


Fig 12.2.1 Handset vertical and horizontal reference lines—"fixed case

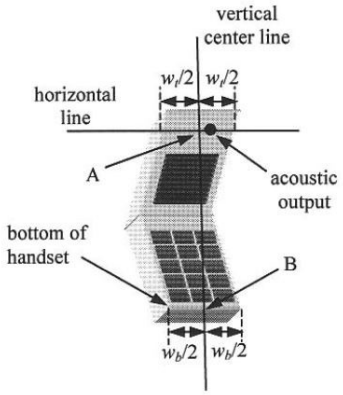


Fig 12.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

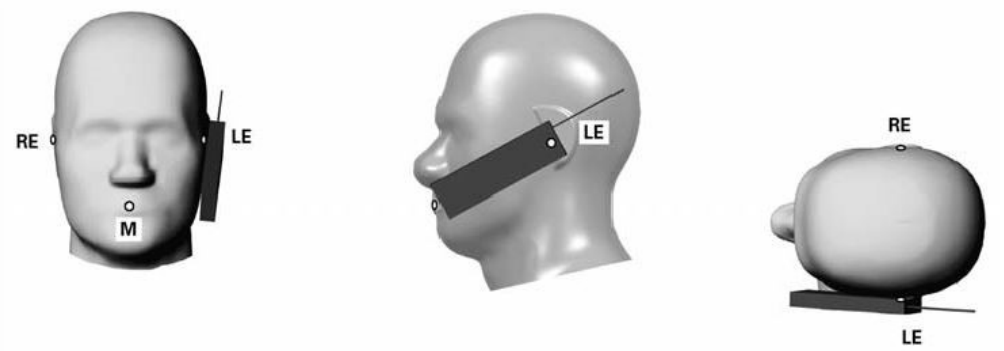


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 12.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

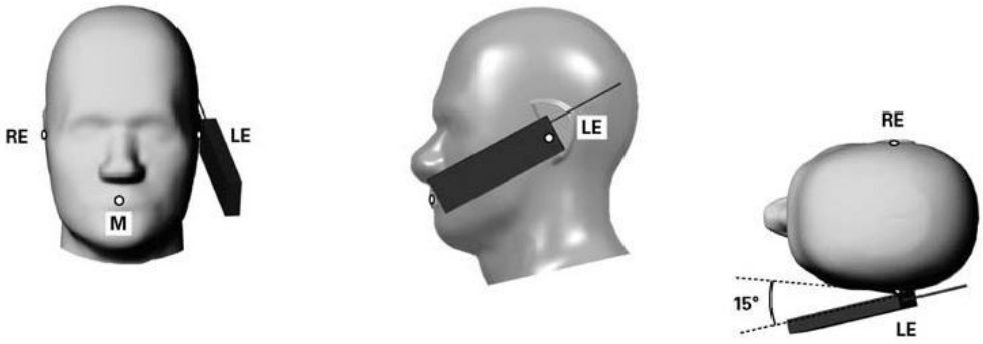


Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 Body Worn Accessory

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 (see Figure 11.4). Per KDB648474 D04v01r03, 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 447498 D01v06 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 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 handset 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 test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

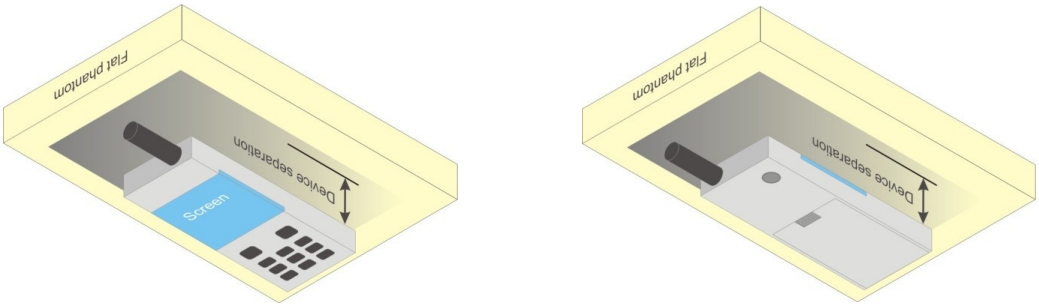


Fig 12.4 Body Worn Position

12.5 Product Specific 10g SAR Exposure

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, that can provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets and support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.

2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.6 The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

12.6 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

13. Spot Check SAR Test Results

General Note:

1. SAR spot check verification on the worst cases from the original model was performed to demonstrate the test data from original model remains representative for the variant model.
2. Per KDB 484596 D01 v02r02, the variant filings must demonstrate that the referenced test data remain valid for the variant device by including spot-check measurements that meet the following criteria:
   a. Spot-check measurements shall be made in correspondence to the worst-case scenario reported in the reference device filing, i.e., for those conditions that are the closest to non-compliance
   b. Spot-check measurements, while being always compliant with the applicable rule part(s) for the test under consideration, may show a deviation ddB from the reference data no larger than 3 dB:

      $$d_{dB} = | VdB – RdB | \leq 3\ dB \quad (1)$$

      where between VdB, the variant spot-check level in dB, and RdB is the corresponding measurement level in dB for the reference model.
3. The Spot check results showed that Deviation of the SAR results did not exceed 3dB, therefore referring to the guidance in the KDB inquiry, SAR data reuse is justified.
4. 1st as parent model, 2nd as variant model.

13.1 Head SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
750MHz																							
	1st	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 1	DSI 2	23095	707.5	24.42	24.70	1.067	-	-	-0.07	0.579	0.618	0.47	11.33%
01	2nd	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 1	DSI 2	23095	707.5	24.42	24.70	1.067	-	-	0.04	0.645	**0.688**		
	1st	LTE Band 12	10M	QPSK	25	12	-	Left Cheek	0mm	Ant 1	DSI 6	23095	707.5	22.87	23.20	1.079	-	-	0.19	0.432	0.466	0.03	-0.64%
	2nd	LTE Band 12	10M	QPSK	25	12	-	Left Cheek	0mm	Ant 1	DSI 6	23095	707.5	22.87	23.20	1.079	-	-	0.05	0.429	0.463		
	1st	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	23095	707.5	23.42	24.70	1.343	-	-	-0.02	0.085	0.114	0.26	6.14%
	2nd	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	23095	707.5	23.42	24.70	1.343	-	-	-0.06	0.090	0.121		
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 1	DSI 2	128	824.2	26.42	27.50	1.282	-	-	-0.06	0.755	0.968	0.74	-15.70%
02	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 1	DSI 2	128	824.2	26.42	27.50	1.282	-	-	0.05	0.636	**0.816**		
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 1	DSI 6	189	836.4	24.93	26.00	1.279	-	-	-0.17	0.501	0.641	1.21	-24.34%
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 1	DSI 6	189	836.4	24.93	26.00	1.279	-	-	0.05	0.379	0.485		
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	189	836.4	26.31	27.50	1.315	-	-	0.12	0.130	0.171	0.17	4.09%
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	189	836.4	26.31	27.50	1.315	-	-	-0.08	0.135	0.178		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 2	4182	836.4	20.12	20.40	1.067	-	-	-0.14	0.706	0.753	0.59	-12.75%
03	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 2	4182	836.4	20.12	20.40	1.067	-	-	-0.04	0.616	**0.657**		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 6	4182	836.4	18.64	18.90	1.062	-	-	-0.13	0.500	0.531	0.10	-2.26%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI 6	4182	836.4	18.64	18.90	1.062	-	-	0.14	0.489	0.519		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	4182	836.4	22.93	24.40	1.403	-	-	-0.1	0.202	0.283	0.59	-12.72%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	4182	836.4	22.93	24.40	1.403	-	-	-0.06	0.176	0.247		
	1st	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI 2	26865	831.5	19.79	20.10	1.074	-	-	0.04	0.524	0.563	0.65	16.16%
04	2nd	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI 2	26865	831.5	19.79	20.10	1.074	-	-	-0.03	0.609	**0.654**		
	1st	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI 6	26865	831.5	18.79	19.10	1.074	-	-	-0.08	0.427	0.459	0.10	-2.18%
	2nd	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI 6	26865	831.5	18.79	19.10	1.074	-	-	0.03	0.418	0.449		
	1st	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	26865	831.5	23.27	24.60	1.358	-	-	0.15	0.197	0.268	0.43	-9.33%
	2nd	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	26865	831.5	23.27	24.60	1.358	-	-	-0.1	0.179	0.243		
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 2	1312	1712.4	19.24	19.80	1.138	-	-	-0.04	1.010	1.149	0.76	-16.01%
05	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 2	1312	1712.4	19.24	19.80	1.138	-	-	0.02	0.848	**0.965**		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 6	1413	1732.6	17.83	18.30	1.114	-	-	0.16	0.517	0.576	0.12	-2.78%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 6	1413	1732.6	17.83	18.30	1.114	-	-	0	0.503	0.560		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	1413	1732.6	23.95	24.80	1.216	-	-	0.05	0.096	0.117	0.95	-19.66%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	1413	1732.6	23.95	24.80	1.216	-	-	0.16	0.077	0.094		
	1st	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 2	132072	1720	18.68	19.30	1.153	-	-	0.13	0.785	0.905	0.16	-3.54%
06	2nd	LTE Band 4	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 2	20175	1732.5	18.68	19.30	1.153	-	-	0.09	0.757	**0.873**		
	1st	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 6	132322	1745	17.45	17.80	1.084	-	-	0.16	0.515	0.558	0.10	-2.33%
	2nd	LTE Band 4	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 6	20175	1732.5	17.45	17.80	1.084	-	-	-0.09	0.503	0.545		
	1st	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	132322	1745	23.29	24.30	1.262	-	-	0.07	0.085	0.107	0.29	-6.54%
	2nd	LTE Band 4	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	20175	1732.5	23.29	24.30	1.262	-	-	0.09	0.079	0.100		
	1st	LTE Band 66	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	132322	1745	17.38	17.80	1.102	-	-	-0.11	0.502	0.553	0.67	-14.29%
	2nd	LTE Band 4	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	20175	1732.5	17.38	17.80	1.102	-	-	0.03	0.430	0.474		
	1st	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 4	DSI 6	132322	1745	16.53	16.80	1.064	-	-	-0.03	0.412	0.438	0.00	0.00%
	2nd	LTE Band 4	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	20175	1732.5	16.53	16.80	1.064	-	-	-0.01	0.412	0.438		
1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 3	DSI 2	810	1909.8	21.56	21.80	1.057	-	-	0.18	0.933	0.986	0.91	-18.86%
07	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 3	DSI 2	810	1909.8	21.56	21.80	1.057	-	-	0.08	0.757	**0.800**		
		GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 3	DSI 6	661	1880	20.66	20.80	1.033	-	-	-0.19	0.602	0.622	0.93	-19.29%
		GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 3	DSI 6	661	1880	20.66	20.80	1.033	-	-	0.18	0.486	0.502		
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	661	1880	23.29	24.80	1.416	-	-	0.08	0.050	0.071	0.88	-18.31%
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	661	1880	23.29	24.80	1.416	-	-	0.08	0.041	0.058		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 2	9400	1880	17.75	18.40	1.161	-	-	0.07	0.908	1.055	0.73	-15.55%

08	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 2	9400	1880	17.75	18.40	1.161	-	-	0.02	0.767	**0.891**		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 6	9400	1880	16.36	16.90	1.132	-	-	-0.16	0.643	0.728	0.74	-15.66%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 3	DSI 6	9400	1880	16.36	16.90	1.132	-	-	0.09	0.542	0.614		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	9400	1880	23.04	23.90	1.219	-	-	0.19	0.093	0.113	0.04	-0.88%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	9400	1880	23.04	23.90	1.219	-	-	0.17	0.092	0.112		
	1st	LTE Band 2	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 2	19100	1900	17.25	17.80	1.135	-	-	0.19	0.800	0.908	0.43	-9.36%
09	2nd	LTE Band 2	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 3	DSI 2	19100	1900	17.25	17.80	1.135	-	-	0.06	0.725	**0.823**		
	1st	LTE Band 2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 3	DSI 6	18900	1880	16.23	16.80	1.140	-	-	-0.07	0.627	0.715	0.58	-12.59%
	2nd	LTE Band 2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 3	DSI 6	18900	1880	16.23	16.80	1.140	-	-	0.11	0.548	0.625		
	1st	LTE Band 2	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	18900	1880	22.11	22.80	1.172	-	-	-0.1	0.079	0.093	0.44	-9.68%
	2nd	LTE Band 2	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI 2/DSI 6	18900	1880	22.11	22.80	1.172	-	-	-0.08	0.072	0.084		
2600MHz																							
	1st	LTE Band 7	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 2	21100	2535	16.29	17.30	1.262	-	-	-0.11	0.859	1.084	0.06	1.29%
10	2nd	LTE Band 7	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 2	21100	2535	16.29	17.30	1.262	-	-	-0.08	0.870	**1.098**		
	1st	LTE Band 7	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 6	21100	2535	15.29	16.30	1.262	-	-	-0.13	0.682	0.861	0.67	-14.29%
	2nd	LTE Band 7	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 6	21100	2535	15.29	16.30	1.262	-	-	-0.11	0.585	0.738		
	1st	LTE Band 7	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	21100	2535	23.90	24.30	1.096	-	-	-0.04	0.185	0.203	0.45	10.84%
	2nd	LTE Band 7	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	21100	2535	23.90	24.30	1.096	-	-	-0.08	0.205	0.225		
	1st	LTE Band 7	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	21100	2535	20.55	21.80	1.334	-	-	0.02	0.732	0.976	0.23	5.43%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	21100	2535	20.55	21.80	1.334	-	-	0.03	0.772	1.029		
	1st	LTE Band 7	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	21100	2535	19.47	20.80	1.358	-	-	0.03	0.581	0.789	0.35	-7.73%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	21100	2535	19.47	20.80	1.358	-	-	-0.01	0.536	0.728		
	1st	LTE Band 38	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 2	38000	2595	17.23	18.40	1.309	62.9	1.006	0.12	0.715	0.942	0.03	0.64%
	2nd	LTE Band 38	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 2	38000	2595	17.23	18.40	1.309	62.9	1.006	0.05	0.720	0.948		
	1st	LTE Band 38	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 6	38000	2595	15.67	16.90	1.327	62.9	1.006	0.17	0.506	0.676	0.87	-18.20%
	2nd	LTE Band 38	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 3	DSI 6	38000	2595	15.67	16.90	1.327	62.9	1.006	-0.09	0.414	0.553		
	1st	LTE Band 38	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	38000	2595	24.08	24.40	1.076	62.9	1.006	0.04	0.051	0.055	0.52	12.73%
	2nd	LTE Band 38	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	38000	2595	24.08	24.40	1.076	62.9	1.006	0.05	0.057	0.062		
	1st	LTE Band 38	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	38000	2595	22.09	23.40	1.352	62.9	1.006	0.03	0.760	1.034	0.35	-7.83%
11	2nd	LTE Band 38	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	38000	2595	22.09	23.40	1.352	62.9	1.006	0.11	0.701	**0.953**		
	1st	LTE Band 38	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	38000	2595	20.95	22.40	1.396	62.9	1.006	-0.19	0.604	0.848	0.95	-19.69%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	38000	2595	20.95	22.40	1.396	62.9	1.006	-0.06	0.485	0.681		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Tilted	0mm	Ant 3	DSI 2	41490	2680	19.90	20.80	1.230	42.9	1.009	-0.03	0.952	1.182	0.95	-19.63%
12	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Tilted	0mm	Ant 3	DSI 2	41490	2680	19.90	20.80	1.230	42.9	1.009	-0.08	0.765	**0.950**		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Tilted	0mm	Ant 3	DSI 6	40620	2593	18.33	19.30	1.250	42.9	1.009	-0.1	0.719	0.907	0.62	-13.34%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Tilted	0mm	Ant 3	DSI 6	40620	2593	18.33	19.30	1.250	42.9	1.009	-0.05	0.623	0.786		
	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	40620	2593	25.63	25.80	1.040	42.9	1.009	0.13	0.056	0.059	0.35	8.47%
	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI 2/DSI 6	40620	2593	25.63	25.80	1.040	42.9	1.009	-0.08	0.061	0.064		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	40620	2593	23.67	24.80	1.297	42.9	1.009	-0.03	0.681	0.891	0.14	3.25%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 2	40620	2593	23.67	24.80	1.297	42.9	1.009	0.01	0.703	0.920		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	40620	2593	22.53	23.80	1.340	42.9	1.009	-0.17	0.513	0.693	0.08	-1.73%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Right Cheek	0mm	Ant 4	DSI 6	40620	2593	22.53	23.80	1.340	42.9	1.009	-0.19	0.504	0.681		

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
BT/WIFI																			
	1st	Bluetooth	DH5 1Mbps	Left Cheek	0mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	0.02	0.297	0.457	0.68	-14.44%
13	2nd	Bluetooth	DH5 1Mbps	Left Cheek	0mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	0.17	0.254	**0.391**		
	1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G	11	2462	14.90	15.00	1.023	100	1.000	0.09	0.650	0.665	0.72	-15.19%
14	2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G	11	2462	14.90	15.00	1.023	100	1.000	0.05	0.551	**0.564**		
	1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+5G	6	2437	13.48	14.00	1.127	100	1.000	0.06	0.318	0.358	0.49	-10.61%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+5G	6	2437	13.48	14.00	1.127	100	1.000	0.06	0.284	0.320		
	1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+WWAN	6	2437	12.94	13.50	1.138	100	1.000	0.07	0.284	0.323	1.03	-21.05%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+WWAN	6	2437	12.94	13.50	1.138	100	1.000	0.07	0.224	0.255		
	1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+5G+WWAN	6	2437	9.44	10.00	1.138	100	1.000	-0.16	0.127	0.144	0.86	-18.06%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 7	2.4G+5G+WWAN	6	2437	9.44	10.00	1.138	100	1.000	0.12	0.104	0.118		
	1st	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G	6	2437	14.80	15.00	1.047	100	1.000	0.08	0.469	0.491	0.68	-14.46%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G	6	2437	14.80	15.00	1.047	100	1.000	0.01	0.401	0.420		
	1st	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+5G	6	2437	13.41	14.00	1.146	100	1.000	0.01	0.198	0.227	0.38	-8.37%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+5G	6	2437	13.41	14.00	1.146	100	1.000	-0.17	0.182	0.208		
	1st	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+WWAN	6	2437	12.99	13.50	1.125	100	1.000	-0.12	0.176	0.198	0.18	-4.04%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+WWAN	6	2437	12.99	13.50	1.125	100	1.000	-0.19	0.169	0.190		
	1st	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+5G+WWAN	6	2437	9.42	10.00	1.143	100	1.000	-0.05	0.079	0.090	0.25	-5.56%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 8	2.4G+5G+WWAN	6	2437	9.42	10.00	1.143	100	1.000	0.18	0.074	0.085		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	54	5270	16.91	17.50	1.146	87.66	1.141	-0.07	0.848	1.108	0.69	-14.71%
15	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	54	5270	16.91	17.50	1.146	87.66	1.141	-0.04	0.723	**0.945**		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	54	5270	14.05	15.00	1.245	87.66	1.141	0.01	0.378	0.536	0.87	-18.10%
	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	54	5270	14.05	15.00	1.245	87.66	1.141	-0.01	0.309	0.439		
	1st	WLAN5.3GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	58	5290	11.58	12.50	1.236	87.28	1.146	0.12	0.199	0.282	1.08	-21.99%
	2nd	WLAN5.3GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	58	5290	11.58	12.50	1.236	87.28	1.146	0.08	0.155	0.220		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	54	5270	13.11	14.00	1.227	87.66	1.141	-0.02	0.284	0.398	1.17	-23.62%
	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	54	5270	13.11	14.00	1.227	87.66	1.141	0.19	0.217	0.304		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	122	5610	17.38	18.00	1.153	87.28	1.146	0.05	0.845	1.117	0.48	-10.56%
16	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	122	5610	17.38	18.00	1.153	87.28	1.146	0.08	0.756	**0.999**		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	122	5610	12.55	13.50	1.245	87.28	1.146	0.12	0.291	0.415	1.01	-20.72%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	122	5610	12.55	13.50	1.245	87.28	1.146	-0.03	0.231	0.329		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	122	5610	10.55	11.50	1.245	87.28	1.146	0.16	0.184	0.262	0.36	-8.02%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	122	5610	10.55	11.50	1.245	87.28	1.146	0.01	0.169	0.241		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	122	5610	12.08	13.00	1.236	87.28	1.146	-0.09	0.259	0.367	1.14	-23.16%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	122	5610	12.08	13.00	1.236	87.28	1.146	-0.15	0.199	0.282		
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	155	5775	15.61	16.50	1.227	87.28	1.146	-0.12	0.766	1.077	0.43	-9.47%
17	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G&2.4G+5G&5G+BT	155	5775	15.61	16.50	1.227	87.28	1.146	0.02	0.693	**0.975**		
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	155	5775	11.59	12.50	1.233	87.28	1.146	-0.05	0.305	0.431	0.83	-17.40%
	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN	155	5775	11.59	12.50	1.233	87.28	1.146	-0.06	0.252	0.356		
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	155	5775	8.61	9.50	1.227	87.28	1.146	-0.03	0.153	0.215	0.92	-19.07%
	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	5G+WWAN+BT	155	5775	8.61	9.50	1.227	87.28	1.146	0.12	0.124	0.174		
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	155	5775	10.53	11.50	1.250	87.28	1.146	-0.07	0.242	0.347	0.90	-18.73%
	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 8+6	2.4G+5G+WWAN	155	5775	10.53	11.50	1.250	87.28	1.146	-0.08	0.197	0.282		

13.2 Hotspot SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
750MHz																							
	1st	LTE Band 12	10M	QPSK	1	25	-	Left Side	10mm	Ant 1	DSI 5	23095	707.5	21.97	22.20	1.054	-	-	0.14	0.544	0.574	0.43	10.45%
18	2nd	LTE Band 12	10M	QPSK	1	25	-	Left Side	10mm	Ant 1	DSI 5	23095	707.5	21.97	22.20	1.054	-	-	-0.09	0.601	**0.634**		
	1st	LTE Band 12	10M	QPSK	1	25	-	Back	10mm	Ant 0	DSI 5	23095	707.5	23.42	24.70	1.343	-	-	-0.02	0.146	0.196	0.09	2.04%
	2nd	LTE Band 12	10M	QPSK	1	25	-	Back	10mm	Ant 0	DSI 5	23095	707.5	23.42	24.70	1.343	-	-	-0.06	0.149	0.200		
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Side	10mm	Ant 1	DSI 5	189	836.4	26.43	27.50	1.279	-	-	0.09	0.595	0.761	0.42	-9.20%
19	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Left Side	10mm	Ant 1	DSI 5	189	836.4	26.43	27.50	1.279	-	-	0.04	0.540	**0.691**		
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 0	DSI 5	189	836.4	26.31	27.50	1.315	-	-	-0.13	0.273	0.359	0.60	14.76%
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 0	DSI 5	189	836.4	26.31	27.50	1.315	-	-	0.01	0.313	0.412		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Side	10mm	Ant 1	DSI 5	4182	836.4	20.12	20.40	1.067	-	-	-0.1	0.504	0.538	0.51	12.45%
20	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Side	10mm	Ant 1	DSI 5	4182	836.4	20.12	20.40	1.067	-	-	-0.08	0.567	**0.605**		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	4182	836.4	22.05	23.40	1.365	-	-	-0.07	0.273	0.373	0.02	-0.54%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	4182	836.4	22.05	23.40	1.365	-	-	-0.15	0.272	0.371		
	1st	LTE Band 26	15M	QPSK	1	37	-	Left Side	10mm	Ant 1	DSI 5	26865	831.5	19.79	20.10	1.074	-	-	-0.04	0.466	0.500	0.52	12.80%
21	2nd	LTE Band 26	15M	QPSK	1	37	-	Left Side	10mm	Ant 1	DSI 5	26865	831.5	19.79	20.10	1.074	-	-	-0.04	0.525	**0.564**		
	1st	LTE Band 26	15M	QPSK	36	20	-	Back	10mm	Ant 0	DSI 5	26865	831.5	22.16	23.60	1.393	-	-	-0.04	0.275	0.383	0.38	9.14%
	2nd	LTE Band 26	15M	QPSK	36	20	-	Back	10mm	Ant 0	DSI 5	26865	831.5	22.16	23.60	1.393	-	-	-0.02	0.300	0.418		
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 3	DSI 5	1413	1732.6	20.72	21.30	1.143	-	-	-0.16	0.396	0.453	0.09	1.99%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 3	DSI 5	1413	1732.6	20.72	21.30	1.143	-	-	-0.03	0.404	0.462		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	1413	1732.6	18.73	19.80	1.279	-	-	0.02	0.472	0.604	0.18	-3.97%
22	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	1413	1732.6	18.73	19.80	1.279	-	-	0.05	0.453	**0.580**		
	1st	LTE Band 66	20M	QPSK	50	24	-	Back	10mm	Ant 3	DSI 5	132322	1745	19.89	20.30	1.099	-	-	0.19	0.315	0.346	0.21	-4.62%
	2nd	LTE Band 4	20M	QPSK	50	24	-	Back	10mm	Ant 3	DSI 5	20175	1732.5	19.89	20.30	1.099	-	-	0.06	0.300	0.330		
	1st	LTE Band 66	20M	QPSK	50	24	-	Back	10mm	Ant 0	DSI 5	132322	1745	18.28	19.30	1.265	-	-	-0.09	0.486	0.615	0.58	-12.52%
23	2nd	LTE Band 4	20M	QPSK	50	24	-	Back	10mm	Ant 0	DSI 5	20175	1732.5	18.28	19.30	1.265	-	-	0.17	0.425	**0.538**		
	1st	LTE Band 66	20M	QPSK	1	49	-	Back	10mm	Ant 4	DSI 5	132322	1745	19.61	19.80	1.045	-	-	-0.19	0.307	0.321	0.04	0.93%
	2nd	LTE Band 4	20M	QPSK	1	49	-	Back	10mm	Ant 4	DSI 5	20175	1732.5	19.61	19.80	1.045	-	-	-0.08	0.310	0.324		
1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 3	DSI 5	661	1880	23.10	24.30	1.318	-	-	-0.18	0.473	0.624	0.61	-13.14%
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 3	DSI 5	661	1880	23.10	24.30	1.318	-	-	0.02	0.411	0.542		
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 0	DSI 5	810	1909.8	22.51	24.30	1.510	-	-	-0.07	0.606	0.915	0.03	-0.77%
24	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 0	DSI 5	810	1909.8	22.51	24.30	1.510	-	-	0.09	0.601	**0.908**		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 3	DSI 5	9400	1880	18.24	18.90	1.164	-	-	0.16	0.324	0.377	0.55	13.53%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 3	DSI 5	9400	1880	18.24	18.90	1.164	-	-	0.04	0.368	0.428		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	9400	1880	18.28	19.40	1.294	-	-	-0.01	0.479	0.620	0.02	-0.48%
25	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 0	DSI 5	9400	1880	18.28	19.40	1.294	-	-	-0.01	0.477	**0.617**		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	10mm	Ant 3	DSI 5	18900	1880	17.65	18.30	1.161	-	-	0.04	0.353	0.410	0.02	-0.49%
	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	10mm	Ant 3	DSI 5	18900	1880	17.65	18.30	1.161	-	-	-0.02	0.351	0.408		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	10mm	Ant 0	DSI 5	18900	1880	17.99	18.80	1.205	-	-	-0.12	0.422	0.509	0.23	-5.11%
26	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	10mm	Ant 0	DSI 5	18900	1880	17.99	18.80	1.205	-	-	0.06	0.401	**0.483**		
2600MHz																							
	1st	LTE Band 7	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	21100	2535	15.67	16.80	1.297	-	-	-0.14	0.210	0.272	0.45	11.03%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	21100	2535	15.67	16.80	1.297	-	-	-0.06	0.233	0.302		
	1st	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	21100	2535	18.78	19.30	1.127	-	-	0.09	0.687	0.774	0.49	-10.72%
27	2nd	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	21100	2535	18.78	19.30	1.127	-	-	0.04	0.613	**0.691**		
	1st	LTE Band 7	20M	QPSK	50	24	-	Back	10mm	Ant 4	DSI 5	21100	2535	17.08	18.30	1.324	-	-	-0.19	0.189	0.250	0.57	14.00%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Back	10mm	Ant 4	DSI 5	21100	2535	17.08	18.30	1.324	-	-	-0.07	0.215	0.285		
	1st	LTE Band 38	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	38000	2595	18.24	19.40	1.306	62.9	1.006	0.06	0.350	0.460	0.31	-6.96%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	38000	2595	18.24	19.40	1.306	62.9	1.006	-0.17	0.326	0.428		

	1st	LTE Band 38	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	38000	2595	22.05	22.40	1.084	62.9	1.006	0.05	0.462	0.504	0.71	17.66%
28	2nd	LTE Band 38	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	38000	2595	22.05	22.40	1.084	62.9	1.006	0.05	0.544	**0.593**		
	1st	LTE Band 38	20M	QPSK	50	24	-	Back	10mm	Ant 4	DSI 5	38000	2595	18.85	20.40	1.429	62.9	1.006	0.01	0.159	0.229	0.48	11.79%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Back	10mm	Ant 4	DSI 5	38000	2595	18.85	20.40	1.429	62.9	1.006	-0.07	0.178	0.256		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	40620	2593	19.87	20.80	1.239	42.9	1.009	-0.17	0.253	0.316	0.86	21.84%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Top Side	10mm	Ant 3	DSI 5	40620	2593	19.87	20.80	1.239	42.9	1.009	0.04	0.308	0.385		
	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	40620	2593	23.71	23.80	1.021	42.9	1.009	0.11	0.534	0.550	0.41	-8.91%
29	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Bottom Side	10mm	Ant 0	DSI 5	40620	2593	23.71	23.80	1.021	42.9	1.009	0.03	0.486	**0.501**		
	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	10mm	Ant 4	DSI 5	40620	2593	20.72	21.80	1.282	42.9	1.009	0.19	0.182	0.235	0.79	20.00%
	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	10mm	Ant 4	DSI 5	40620	2593	20.72	21.80	1.282	42.9	1.009	0.1	0.218	0.282		

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
BT/WIFI																			
	1st	Bluetooth	DH5 1Mbps	Top Side	10mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	-0.12	0.110	0.169	0.55	-11.83%
30	2nd	Bluetooth	DH5 1Mbps	Top Side	10mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	0.02	0.097	**0.149**		
	1st	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 7	Full	6	2437	13.95	14.50	1.135	100	1.000	-0.08	0.145	0.165	0.68	-14.55%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 7	Full	6	2437	13.95	14.50	1.135	100	1.000	0.02	0.124	0.141		
	1st	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 8	Full	6	2437	13.91	14.50	1.146	100	1.000	-0.05	0.159	0.182	0.81	-17.03%
31	2nd	WLAN2.4GHz	802.11b 1Mbps	Right Side	10mm	Ant 8	Full	6	2437	13.91	14.50	1.146	100	1.000	-0.02	0.132	**0.151**		
	1st	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	10mm	Ant 8+6	Full	46	5230	16.11	17.00	1.227	87.66	1.141	-0.03	0.492	0.689	0.18	-4.06%
32	2nd	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	10mm	Ant 8+6	Full	46	5230	16.11	17.00	1.227	87.66	1.141	0.12	0.472	**0.661**		
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 8+6	Full	155	5775	12.55	13.50	1.245	87.28	1.146	-0.02	0.249	0.355	0.63	-13.52%
33	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	10mm	Ant 8+6	Full	155	5775	12.55	13.50	1.245	87.28	1.146	0.05	0.215	**0.307**		

13.3 Body Worn Accessory SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
750MHz																							
	1st	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 1	DSI 1	23095	707.5	24.42	24.70	1.067	-	-	0.11	0.252	0.269	0.57	14.13%
34	2nd	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 1	DSI 1	23095	707.5	24.42	24.70	1.067	-	-	0.04	0.288	**0.307**		
	1st	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 1	DSI 5	23095	707.5	21.97	22.20	1.054	-	-	0.06	0.178	0.188	0.84	-17.55%
	2nd	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 1	DSI 5	23095	707.5	21.97	22.20	1.054	-	-	0.14	0.147	0.155		
	1st	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 0	DSI 1/DSI 5	23095	707.5	23.42	24.70	1.343	-	-	0.1	0.142	0.191	0.00	0.00%
	2nd	LTE Band 12	10M	QPSK	1	25	-	Back	15mm	Ant 0	DSI 1/DSI 5	23095	707.5	23.42	24.70	1.343	-	-	-0.05	0.142	0.191		
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 1	DSI 1	189	836.4	26.92	28.00	1.282	-	-	-0.01	0.362	0.464	0.50	-10.78%
35	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 1	DSI 1	189	836.4	26.92	28.00	1.282	-	-	-0.07	0.323	**0.414**		
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 1	DSI 5	189	836.4	26.43	27.50	1.279	-	-	-0.03	0.323	0.413	1.05	-21.55%
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 1	DSI 5	189	836.4	26.43	27.50	1.279	-	-	-0.1	0.253	0.324		
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 1/DSI 5	189	836.4	26.31	27.50	1.315	-	-	-0.1	0.139	0.183	0.41	9.84%
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 1/DSI 5	189	836.4	26.31	27.50	1.315	-	-	0.03	0.153	0.201		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 1	4182	836.4	21.74	21.90	1.038	-	-	-0.19	0.456	0.473	0.03	-0.63%
36	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 1	4182	836.4	21.74	21.90	1.038	-	-	-0.11	0.453	**0.470**		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 5	4182	836.4	20.12	20.40	1.067	-	-	-0.06	0.323	0.345	0.52	-11.30%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 5	4182	836.4	20.12	20.40	1.067	-	-	0.09	0.287	0.306		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	4182	836.4	22.93	24.40	1.403	-	-	-0.06	0.170	0.238	0.05	1.26%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	4182	836.4	22.93	24.40	1.403	-	-	-0.08	0.172	0.241		
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	4182	836.4	22.05	23.40	1.365	-	-	-0.04	0.135	0.184	0.07	-1.63%
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	4182	836.4	22.05	23.40	1.365	-	-	-0.1	0.133	0.181		
	1st	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 1	DSI 1	26865	831.5	21.29	21.60	1.074	-	-	-0.07	0.366	0.393	0.57	13.99%
37	2nd	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 1	DSI 1	26865	831.5	21.29	21.60	1.074	-	-	-0.1	0.417	**0.448**		
	1st	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 1	DSI 5	26865	831.5	19.79	20.10	1.074	-	-	-0.16	0.259	0.278	0.31	-6.83%
	2nd	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 1	DSI 5	26865	831.5	19.79	20.10	1.074	-	-	0.01	0.241	0.259		
	1st	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 0	DSI 1	26865	831.5	23.27	24.60	1.358	-	-	0.01	0.196	0.266	0.34	-7.52%
	2nd	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 0	DSI 1	26865	831.5	23.27	24.60	1.358	-	-	0.03	0.181	0.246		
	1st	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 0	DSI 5	26865	831.5	22.28	23.60	1.355	-	-	-0.17	0.141	0.191	0.19	-4.19%
	2nd	LTE Band 26	15M	QPSK	1	37		Back	15mm	Ant 0	DSI 5	26865	831.5	22.28	23.60	1.355	-	-	-0.19	0.135	0.183		
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 1	1413	1732.6	22.77	23.30	1.130	-	-	-0.06	0.302	0.341	0.22	5.28%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 1	1413	1732.6	22.77	23.30	1.130	-	-	0.08	0.318	0.359		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 5	1413	1732.6	20.72	21.30	1.143	-	-	-0.16	0.201	0.230	0.31	-6.96%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 5	1413	1732.6	20.72	21.30	1.143	-	-	-0.11	0.187	0.214		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	1413	1732.6	20.64	21.80	1.306	-	-	-0.11	0.358	0.468	0.06	1.50%
38	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	1413	1732.6	20.64	21.80	1.306	-	-	0.03	0.364	**0.475**		
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	1413	1732.6	18.73	19.80	1.279	-	-	-0.06	0.226	0.289	0.25	-5.54%
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	1413	1732.6	18.73	19.80	1.279	-	-	-0.18	0.213	0.273		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 3	DSI 1	132322	1745	21.75	22.30	1.135	-	-	0.17	0.220	0.250	0.44	-9.60%
	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 3	DSI 1	20175	1732.5	21.75	22.30	1.135	-	-	0.12	0.199	0.226		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 3	DSI 5	132322	1745	18.89	20.30	1.384	-	-	0.08	0.138	0.191	0.46	-9.95%
	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 3	DSI 5	20175	1732.5	18.89	20.30	1.384	-	-	-0.14	0.124	0.172		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 0	DSI 1	132322	1745	20.24	21.30	1.276	-	-	-0.13	0.315	0.402	0.71	-15.17%
39	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 0	DSI 1	20175	1732.5	20.24	21.30	1.276	-	-	0.09	0.267	**0.341**		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 0	DSI 5	132322	1745	18.28	19.30	1.265	-	-	-0.02	0.199	0.252	0.09	-1.98%
	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 0	DSI 5	20175	1732.5	18.28	19.30	1.265	-	-	-0.03	0.195	0.247		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 4	DSI 1	132322	1745	21.30	21.80	1.122	-	-	-0.16	0.190	0.213	0.36	-7.98%
	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 4	DSI 1	20175	1732.5	21.30	21.80	1.122	-	-	0.04	0.175	0.196		
	1st	LTE Band 66	20M	QPSK	50	24		Back	15mm	Ant 4	DSI 5	132322	1745	19.59	19.80	1.050	-	-	-0.07	0.120	0.126	0.10	-2.38%
	2nd	LTE Band 4	20M	QPSK	50	24		Back	15mm	Ant 4	DSI 5	20175	1732.5	19.59	19.80	1.050	-	-	0.13	0.117	0.123		

1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 3	DSI 1	661	1880	24.40	24.80	1.096	-	-	0.17	0.237	0.260	0.61	-13.08%
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 3	DSI 1	661	1880	24.40	24.80	1.096	-	-	-0.18	0.206	0.226		
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 3	DSI 5	661	1880	23.10	24.30	1.318	-	-	0.12	0.192	0.253	0.38	-8.30%
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 3	DSI 5	661	1880	23.10	24.30	1.318	-	-	0.03	0.176	0.232		
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 1	661	1880	23.29	24.80	1.416	-	-	-0.04	0.337	0.477	0.20	-4.40%
40	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 1	661	1880	23.29	24.80	1.416	-	-	0.08	0.322	**0.456**		
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 5	661	1880	22.74	24.30	1.432	-	-	-0.07	0.300	0.430	0.16	-3.72%
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	15mm	Ant 0	DSI 5	661	1880	22.74	24.30	1.432	-	-	0.08	0.289	0.414		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 1	9400	1880	20.31	20.90	1.146	-	-	0.13	0.250	0.286	0.67	16.78%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 1	9400	1880	20.31	20.90	1.146	-	-	0.05	0.292	0.334		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 5	9400	1880	18.24	18.90	1.164	-	-	0.12	0.158	0.184	0.02	-0.54%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 3	DSI 5	9400	1880	18.24	18.90	1.164	-	-	-0.09	0.157	0.183		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	9400	1880	20.31	21.40	1.285	-	-	0.04	0.378	0.486	0.74	-15.64%
41	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 1	9400	1880	20.31	21.40	1.285	-	-	0.04	0.319	**0.410**		
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	9400	1880	18.28	19.40	1.294	-	-	0.1	0.239	0.309	0.03	-0.65%
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 0	DSI 5	9400	1880	18.28	19.40	1.294	-	-	0.06	0.237	0.307		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	18900	1880	19.78	20.30	1.127	-	-	0.01	0.242	0.273	0.52	-11.36%
	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	18900	1880	19.78	20.30	1.127	-	-	0.18	0.215	0.242		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	18900	1880	17.65	18.30	1.161	-	-	0.11	0.153	0.178	0.10	-2.25%
	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	18900	1880	17.65	18.30	1.161	-	-	0.11	0.150	0.174		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 1	18900	1880	20.04	20.80	1.191	-	-	0.02	0.334	0.398	0.01	-0.25%
42	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 1	18900	1880	20.04	20.80	1.191	-	-	0.11	0.333	**0.397**		
	1st	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 5	18900	1880	17.99	18.80	1.205	-	-	0.03	0.211	0.254	0.05	-1.18%
	2nd	LTE Band 2	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 5	18900	1880	17.99	18.80	1.205	-	-	-0.06	0.208	0.251		
2600MHz																							
	1st	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	21100	2535	17.72	18.80	1.282	-	-	0.04	0.175	0.224	0.49	12.05%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	21100	2535	17.72	18.80	1.282	-	-	0.1	0.196	0.251		
	1st	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	21100	2535	15.67	16.80	1.297	-	-	0.15	0.106	0.138	0.43	-9.42%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	21100	2535	15.67	16.80	1.297	-	-	0.16	0.096	0.125		
	1st	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 1	21100	2535	20.84	21.30	1.112	-	-	0.09	0.449	0.499	0.56	-12.02%
43	2nd	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 0	DSI 1	21100	2535	20.84	21.30	1.112	-	-	0.03	0.395	**0.439**		
	1st	LTE Band 7	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	21100	2535	18.78	19.30	1.127	-	-	-0.1	0.297	0.335	1.24	-24.78%
	2nd	LTE Band 7	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	21100	2535	18.78	19.30	1.127	-	-	-0.17	0.224	0.252		
	1st	LTE Band 7	20M	QPSK	1	49	-	Back	15mm	Ant 4	DSI 1	21100	2535	19.13	20.30	1.309	-	-	-0.08	0.153	0.200	0.66	16.50%
	2nd	LTE Band 7	20M	QPSK	1	49	-	Back	15mm	Ant 4	DSI 1	21100	2535	19.13	20.30	1.309	-	-	0.02	0.178	0.233		
	1st	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 5	21100	2535	17.08	18.30	1.324	-	-	0.08	0.095	0.126	0.07	-1.59%
	2nd	LTE Band 7	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 5	21100	2535	17.08	18.30	1.324	-	-	0.09	0.094	0.124		
	1st	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	38000	2595	20.27	21.40	1.297	62.9	1.006	0.07	0.181	0.236	0.57	13.98%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	38000	2595	20.27	21.40	1.297	62.9	1.006	-0.05	0.206	0.269		
	1st	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	38000	2595	18.24	19.40	1.306	62.9	1.006	0	0.114	0.150	1.19	-24.00%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	38000	2595	18.24	19.40	1.306	62.9	1.006	-0.03	0.087	0.114		
	1st	LTE Band 38	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 1	38000	2595	24.08	24.40	1.076	62.9	1.006	-0.15	0.347	0.376	0.20	4.79%
44	2nd	LTE Band 38	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 1	38000	2595	24.08	24.40	1.076	62.9	1.006	0.02	0.364	**0.394**		
	1st	LTE Band 38	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	38000	2595	22.05	22.40	1.084	62.9	1.006	-0.05	0.276	0.301	0.42	-9.30%
	2nd	LTE Band 38	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	38000	2595	22.05	22.40	1.084	62.9	1.006	-0.13	0.250	0.273		
	1st	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 1	38000	2595	20.99	22.40	1.384	62.9	1.006	0.13	0.144	0.200	0.51	12.50%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 1	38000	2595	20.99	22.40	1.384	62.9	1.006	0.05	0.162	0.225		
	1st	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 5	38000	2595	18.85	20.40	1.429	62.9	1.006	0.04	0.091	0.131	0.31	-6.87%
	2nd	LTE Band 38	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 5	38000	2595	18.85	20.40	1.429	62.9	1.006	0.17	0.085	0.122		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	40620	2593	21.91	22.80	1.227	42.9	1.009	0.17	0.167	0.207	0.61	14.98%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 1	40620	2593	21.91	22.80	1.227	42.9	1.009	0.01	0.192	0.238		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	40620	2593	19.87	20.80	1.239	42.9	1.009	0.08	0.105	0.131	0.68	-14.50%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 3	DSI 5	40620	2593	19.87	20.80	1.239	42.9	1.009	-0.11	0.090	0.112		
	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 1	40620	2593	25.63	25.80	1.040	42.9	1.009	0.08	0.341	0.358	0.68	-14.53%
45	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 1	40620	2593	25.63	25.80	1.040	42.9	1.009	0.05	0.292	**0.306**		

	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	40620	2593	23.71	23.80	1.021	42.9	1.009	0.12	0.215	0.221	0.04	-0.90%
	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 0	DSI 5	40620	2593	23.71	23.80	1.021	42.9	1.009	-0.03	0.213	0.219		
	1st	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 1	40620	2593	22.53	23.80	1.340	42.9	1.009	-0.18	0.140	0.189	0.41	-8.99%
	2nd	LTE Band 41 PC2	20M	QPSK	50	24	-	Back	15mm	Ant 4	DSI 1	40620	2593	22.53	23.80	1.340	42.9	1.009	0.04	0.127	0.172		
	1st	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 4	DSI 5	40620	2593	20.60	21.80	1.318	42.9	1.009	0.08	0.088	0.117	0.31	-6.84%
	2nd	LTE Band 41 PC2	20M	QPSK	1	49	-	Back	15mm	Ant 4	DSI 5	40620	2593	20.60	21.80	1.318	42.9	1.009	-0.09	0.082	0.109		

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
BT/WIFI																			
	1st	Bluetooth	DH5 1Mbps	Back	15mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	0.12	0.044	0.068	0.62	-13.24%
46	2nd	Bluetooth	DH5 1Mbps	Back	15mm	Ant 7	Full	39	2441	14.30	15.00	1.175	76.35	1.310	0.08	0.039	**0.059**		
	1st	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 7	Full	11	2462	14.90	15.00	1.023	100	1.000	0.05	0.087	0.089	0.86	-17.98%
	2nd	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 7	Full	11	2462	14.90	15.00	1.023	100	1.000	0.13	0.071	0.073		
	1st	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 8	Full	6	2437	14.80	15.00	1.047	100	1.000	-0.07	0.154	0.161	0.58	-12.42%
47	2nd	WLAN2.4GHz	802.11b 1Mbps	Back	15mm	Ant 8	Full	6	2437	14.80	15.00	1.047	100	1.000	0.06	0.135	**0.141**		
	1st	WLAN5GHz	802.11n-HT40 MCS0	Back	15mm	Ant 8+6	Full	54	5270	18.65	19.50	1.216	87.66	1.141	-0.01	0.507	0.704	0.46	-10.09%
48	2nd	WLAN5GHz	802.11n-HT40 MCS0	Back	15mm	Ant 8+6	Full	54	5270	18.65	19.50	1.216	87.66	1.141	-0.07	0.456	**0.633**		
	1st	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Ant 8+6	Full	122	5610	16.58	17.50	1.236	87.28	1.146	-0.15	0.287	0.407	0.71	-14.99%
49	2nd	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Ant 8+6	Full	122	5610	16.58	17.50	1.236	87.28	1.146	0.03	0.244	**0.346**		
	1st	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Ant 8+6	Full	155	5775	16.11	**17.00**	1.227	87.28	1.146	-0.18	0.345	0.485	0.68	-14.43%
50	2nd	WLAN5GHz	802.11ac-VHT80 MCS0	Back	15mm	Ant 8+6	Full	155	5775	16.11	**17.00**	1.227	87.28	1.146	0.15	0.295	**0.415**		

13.4 Product specific 10g SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
2600MHz																				
	1st	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	Ant 0	DSI 1	21100	2535	20.84	21.30	1.112	0.16	1.690	1.879	0.18	-4.15%
51	2nd	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	Ant 0	DSI 1	21100	2535	20.84	21.30	1.112	0.01	1.620	**1.801**		
	1st	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	Ant 0	DSI 5	21100	2535	18.74	19.30	1.138	-0.16	0.966	1.099	0.04	-1.00%
	2nd	LTE Band 7	20M	QPSK	50	24	Bottom Side	0mm	Ant 0	DSI 5	21100	2535	18.74	19.30	1.138	-0.03	0.956	1.088		

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	Deviation d_{dB}(dB)	Deviation (%)
WIFI																			
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+BT	54	5270	18.65	19.50	1.216	87.66	1.141	-0.07	2.010	2.789	0.78	-16.42%
52	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+BT	54	5270	18.65	19.50	1.216	87.66	1.141	0.18	1.680	**2.331**		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN	54	5270	16.13	17.00	1.222	87.66	1.141	-0.03	0.889	1.239	0.31	-6.86%
	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN	54	5270	16.13	17.00	1.222	87.66	1.141	-0.02	0.828	1.154		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN+BT	54	5270	12.54	13.50	1.247	87.66	1.141	-0.03	0.396	0.564	0.75	-15.78%
	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN+BT	54	5270	12.54	13.50	1.247	87.66	1.141	-0.14	0.334	0.475		
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	2.4G+5G+WWAN	54	5270	15.12	16.00	1.225	87.66	1.141	-0.01	0.714	0.998	1.09	-22.14%
	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 8+6	2.4G+5G+WWAN	54	5270	15.12	16.00	1.225	87.66	1.141	0.04	0.556	0.777		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+BT	122	5610	16.58	17.50	1.236	87.28	1.146	-0.05	0.825	1.169	0.56	-12.06%
53	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+BT	122	5610	16.58	17.50	1.236	87.28	1.146	-0.03	0.726	**1.028**		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN	122	5610	13.09	14.00	1.233	87.28	1.146	-0.14	0.352	0.497	0.39	-8.65%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN	122	5610	13.09	14.00	1.233	87.28	1.146	0.14	0.321	0.454		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN+BT	122	5610	12.08	13.00	1.236	87.28	1.146	0.12	0.298	0.422	0.61	-13.03%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	5G+WWAN+BT	122	5610	12.08	13.00	1.236	87.28	1.146	0.12	0.259	0.367		
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	2.4G+5G+WWAN	122	5610	12.59	13.50	1.233	87.28	1.146	-0.12	0.285	0.403	0.04	-0.99%
	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 8+6	2.4G+5G+WWAN	122	5610	12.59	13.50	1.233	87.28	1.146	-0.16	0.282	0.399		

14. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific 10g SAR
1.	WWAN + WLAN2.4GHz	Yes	Yes	Yes	Yes
2.	WWAN + WLAN5GHz	Yes	Yes	Yes	Yes
3.	WWAN + Bluetooth	Yes	Yes	Yes	Yes
4.	WLAN 5GHz + Bluetooth	Yes	Yes	Yes	Yes
5.	WWAN + WLAN 5GHz + Bluetooth	Yes	Yes	Yes	Yes
6.	WLAN2.4GHz + WLAN5GHz	Yes	Yes	Yes	Yes
7.	WWAN + WLAN2.4GHz + WLAN5GHz	Yes	Yes	Yes	Yes
8.	WWAN + WLAN2.4GHz+NFC				Yes
9.	WWAN + WLAN5GHz+NFC				Yes
10.	WWAN + Bluetooth+NFC				Yes
11.	WLAN 5GHz + Bluetooth+NFC				Yes
12.	WWAN + WLAN 5GHz + Bluetooth+NFC				Yes
13.	WLAN2.4GHz + WLAN5GHz+NFC				Yes
14.	WWAN + WLAN2.4GHz + WLAN5GHz+NFC				Yes

General Note:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. The 2.4GHz/5GHz WLAN can transmit in SISO and MIMO antenna mode and MIMO SAR can represent SISO SAR.
3. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
4. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
5. This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
6. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
7. According to the EUT characteristic, WLAN 2.4GHz and Bluetooth cannot transmit simultaneously.
8. According to the EUT characteristic, WLAN 5GHz and Bluetooth can transmit simultaneously.
9. According to the EUT characteristic, WLAN 5GHz chain 1 and WLAN 2.4GHz chain 0 can transmit simultaneously.
10. NFC can transmit simultaneously with other Radios in extremity exposure condition.
11. When stand-alone SAR is not required for a transmitter or antenna, its SAR is considered zero in the SAR summing process to assess Multi-band transmission SAR compliance.
12. The maximum SAR summation is calculated based on the same configuration and test position.
13. For standalone WWAN, always choose the highest SAR among the selected WWAN bands within the selected antenna for each exposure position to perform simultaneous transmission analysis with WLAN/BT. This is the worst co-located analysis and can represent each band.
14. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
    i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
    ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
    iii) If SPLSR ≤ 0.04 for 1g SAR and SPLSR≤ 0.10 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
    iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.

Conclusion:

1. The Spot check results showed that Deviation of the SAR results did not exceed 3dB, SAR data reuse is justified.

14.1 1g SAR and 10g SAR Exposure Conditions

N/A.

Note: For simultaneously transmission SAR analysis, since the spot check SAR results from chapter 13.1 to 13.4 are most less than original application (Sporton SAR report no.: FA3O3018B), there is no need to consider co-located with WIFI/BT analysis for original report had been performed conservatively.

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15. Uncertainty Assessment

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

16. References

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

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

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

[4] SPEAG DASY System Handbook

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

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

[7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[8] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[9] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

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

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

[12] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

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

[14] FCC KDB 484596 D01 v02r02, “Test Reductions Via Data Referencing”, Dec. 2023

------THE END------