

FCC SAR Test Report

APPLICANT : Xiaomi Communications Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : POCO
MODEL NAME : 24095PCADG
FCC ID : 2AFZZRA8EG
STANDARD : FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Kunshan), 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. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang



Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**

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Revision History

[illegible]

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Xiaomi Communications Co., Ltd., Mobile Phone, 24095PCADG**, are as follows.

Highest 1g SAR Summary							
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 10mm)	Highest Simultaneous Transmission	
			1g SAR (W/kg)			1g SAR (W/kg)	
Licensed	GSM	GSM850	0.96	0.59	0.53	1.59	
		GSM1900	0.97	0.96	0.52		
	WCDMA	WCDMA II	0.96	0.85	0.47		
		WCDMA IV	0.85	1.04	0.72		
		WCDMA V	1.04	0.46	0.43		
	LTE	LTE Band 2	0.85	0.99	0.40		
		LTE Band 4	0.81	1.06	0.71		
		LTE Band 5	0.96	0.36	0.36		
		LTE Band 7	0.91	0.97	0.48		
		LTE Band 66	0.94	1.04	0.64		
		LTE Band 38	0.73	0.43	0.31		
		LTE Band 41	0.82	0.42	0.30		
		LTE Band 42	0.98	1.06	1.06		
		LTE Band 48	1.09	0.75	0.75		
		5G NR	FR1 n2	1.07	1.09		0.47
			FR1 n5	1.07	0.44		0.38
	FR1 n7		0.93	0.77	0.50		
	FR1 n66		1.04	1.09	0.73		
	FR1 n38		0.78	0.72	0.56		
	FR1 n41		0.94	0.79	0.58		
	FR1 n48		1.09	1.08	0.96		
	FR1 n77		1.08	0.80	0.79		
	FR1 n78	1.06	1.06	0.86			
DTS	WLAN	2.4GHz WLAN	1.05	0.38	0.24	1.58	
NII		5GHz WLAN	1.09	0.59	0.59	1.59	
DSS	Bluetooth	2.4GHz Bluetooth	0.17	<0.10	<0.10	1.59	
Highest 10g SAR Summary							
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)			Highest Simultaneous Transmission 10g SAR (W/kg)	
NII	WLAN	5GHz WLAN	1.68			1.68	
DXX	NFC	13.56MHz	<0.10			1.68	
Date of Testing:			2024/8/2~ 2024/9/10				

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. (Kunshan) 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. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR07-KS	CN1257	314309

Applicant	
Company Name	Xiaomi Communications Co., Ltd.
Address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

Manufacturer	
Company Name	Xiaomi Communications Co., Ltd.
Address	#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

3. Data Reuse Approach

3.1 Introduction Section

This application re-uses data collected on a similar device, FCC ID: 2AFZZRA29G (reference model) and FCC ID: 2AFZZRA8EG (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 v02r03, 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 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: 2AFZZRA8EG

3.2 Model Difference Information

The **main** difference between FCC ID: 2AFZZRA29G and FCC ID: 2AFZZRA8EG is as below:

- Removed LTE Band 12/13/17/26/32.
- Removed TX1 B20 alternative path of B20 which used for low band + low band CA and ENDC

ther differences and all the details of similarity and difference can be found in the confidential documents (24095PCADG_Operational Description of Product Equality Declaration).

3.3 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	GSM	GSM850/1900	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
		WCDMA	B5/2/4	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
		LTE	B2/4/5/7/66/38/41/42/48	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
		5G NR FR1	n2/5/7/66/38/41/48/n77/n78	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
	DTS	BLE/ WiFi	2400~2483.5	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
	NII	Wi-Fi	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check
	DXX	NFC	13.56	2AFZZRA29G	Original Grant	FA471506A	2AFZZRA8EG	Spot check
	DSS	Bluetooth	2400~2483.5	2AFZZRA29G	Original Grant	FA471506	2AFZZRA8EG	Spot check

4. 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
- IEC/IEEE 62209-1528:2020
- 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 616217 D04 SAR for laptop and tablets v01r02
- 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 v02r03

5. Equipment Under Test (EUT) Information

5.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Phone
Brand Name	POCO
Model Name	24095PCADG
FCC ID	2AFZZRA8EG
IMEI Code	Sample 1: IMEI1: 862769070026429 IMEI2: 862769070026437 Sample 2: IMEI1: 862769070026585 IMEI2: 862769070026593 Sample 4: IMEI1: 862769070028524 IMEI2: 862769070028532
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 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz 5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 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 ~ 5720 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, 256QAM 5G NR: CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 2.4GHz 802.11ax HE20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/HE20/HE40/HE80 Bluetooth BR/EDR/LE

	NFC: ASK
HW Version	135300O16
SW Version	Xiaomi HyperOS 1.0
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	Identical Prototype

Remark:

1. This device supports VoIP in GPRS, EGPRS, WCDMA, LTE and 5GNR (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. This device does not support DTM operation and supports GPRS/EGPRS mode up to multi-slot class 12.
5. For dual SIM card mobile has two SIM slots and supports Dual SIM Dual Access. Dual-SIM Dual-Access means that two mobile phone cards can be inserted into the mobile phone and it can answer calls at the same time.
6. The device implements Proximity sensors/receiver detect mechanism reduced power for the power management for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.
7. For WLAN/BT when transmit simultaneously with each other, or when transmit simultaneous with WWAN/BT, power reduction will be activated to head, Body and hotspot exposure conditions.
8. 5GNR n77/n78 supports HPUE mode, HPUE power and SAR testing performed separately.
9. 5GNR n77/n78 HUPE with higher power, 5GNR n77/n78 HUPE SAR can represent power class 3 level SAR.
10. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
11. For 5GNR EN-DC mode, standalone SAR performed for 5GNR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5GNR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.
12. The device supports the UL duty cycle detection mechanism limited to LTE TDD frequency bands (LTE Band 38/41/42/48) and 5GNR TDD frequency bands (5GNR n38/41/48/77/78).
13. There are four samples for the differences are as the following table shows. According to the difference, sample 1 was chosen to perform full test and sample 2/4 verified the worst cases. For sample 3, the differences do not affect the test, so sample3 is not tested.

Sample	Memory	Battery	Screen
Sample 1	8+256G	Battery 1(NVT)	3rd Screen(Visionox)
Sample 2	8+128G	Battery 2(SWD)	2nd Screen(TIANMA)
Sample 3	12+256G	Battery 1(NVT)	3rd Screen(Visionox)
Sample 4	12+512G	Battery 1(NVT)	1st Screen(China Star)

14. This device supports 5GNR FR1 bands as following table, including NSA mode and SA mode. NSA and SA mode performed SAR separately.

<5G NR>

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
NSA	n5	FDD	15	5, 10, 15, 20
	n7	FDD	15	5, 10, 15, 20, 25, 30, 40, 50
	n41	TDD	30	10, 15, 20, 30, 40, 50, 60, 80, 90, 100
	n78	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100
SA	n2	FDD	15	5, 10, 15, 20
	n5	FDD	15	5, 10, 15, 20
	n7	FDD	15	5, 10, 15, 20, 25, 30, 40, 50
	n66	FDD	15	5, 10, 15, 20, 25, 30, 40
	n38	TDD	30	10, 15, 20, 25, 30, 40
	n41	TDD	30	10, 15, 20, 30, 40, 50, 60, 80, 90, 100
	n48	TDD	30	10, 15, 20, 30, 40
	n77	TDD	30	10, 15, 20, 40, 50, 60, 80, 90, 100
	n78	TDD	30	10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 100

5.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																																													
FCC ID	2AFZZRA8EG																																																																												
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 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 42: 3450 MHz ~ 3550 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 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 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 42: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz																																																																												
uplink modulations used	QPSK / 16QAM / 64QAM / 256QAM																																																																												
LTE Voice / Data requirements	Voice and Data																																																																												
LTE Release Version	R15																																																																												
CA Support	Supported, Uplink and Downlink																																																																												
LTE MPR permanently built-in by design	<table><tr><th colspan="8">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</th></tr><tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr><tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr><tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr><tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr><tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr><tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr><tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr></table>							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
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16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1																																																																						
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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 SAR report.																																																																												
Power reduction applied to satisfy SAR compliance	Yes, when operating in Proximity sensors/receiver/hotspot detect mechanism, head/body-worn /hotspot/extremity will trigger reduced power for some bands applied to satisfy SAR compliance, the detail please referred to section 14.																																																																												
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power verification please referred to section 14.																																																																												
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 3 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 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

LTE Band 66												
	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	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

LTE Band 42								
	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	42115	3452.5	42140	3455	42165	3457.5	42190	3460
M	42590	3500	42590	3500	42590	3500	42590	3500
H	43065	3547.5	43040	3545	43015	3542.5	42990	3540

LTE Band 48								
	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	55265	3552.5	55290	3555	55315	3557.5	55340	3560
LM	55810	3607	55815	3607.5	55820	3608	55830	3609
MH	56170	3643	56165	3642.5	56160	3642	56150	3641
H	56715	3697.5	56690	3695	56665	3692.5	56640	3690

5.3 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
Operating Frequency Range of each 5G NR transmission band	5G NR n2: 1850 MHz ~ 1910 MHz 5G NR n5: 824 MHz ~ 849 MHz 5G NR n7: 2500 MHz ~ 2570 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n38: 2570 MHz ~ 2620 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n48 : 3550 MHz ~ 3700 MHz 5G NR n77: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3800 MHz
Channel Bandwidth	The detail please refers to section 5.1 5G NR FR1 bands table.
SCS	FDD: SCS15KHz, TDD: SCS30KHz
uplink modulations used	DFT-s-OFDM: PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM
A-MPR (Additional MPR) disabled for SAR Testing?	Yes
LTE Anchor Bands for n5	LTE B7
LTE Anchor Bands for n7	LTE B5/7
LTE Anchor Bands for n41	LTE B41
LTE Anchor Bands for n78	LTE B2/5/7/38/41

Transmission (H, M, L) channel numbers and frequencies in each 5G NR band								
NR Band 2								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860
M	376000	1880	376000	1880	376000	1880	376000	1880
H	381500	1907.5	381000	1905	380500	1902.5	380000	1900

NR Band 5								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	165300	826.5	165800	829	166300	831.5	166800	834
M	167300	836.5	167300	836.5	167300	836.5	167300	836.5
H	169300	846.5	168800	844	168300	841.5	167800	839

NR Band 7 SCS15KHz																
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	500500	2502.5	501000	2505	501500	2507.5	502000	2510	502500	2512.5	503000	2515	504000	2520	505000	2525
M	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535	507000	2535
H	513500	2567.5	513000	2565	512500	2562.5	512000	2560	511500	2557.5	511000	2555	510000	2550	509000	2545

NR Band 66														
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720	344500	1722.5	345000	1725	346000	1730
M	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770	353500	1767.5	353000	1765	352000	1760

NR Band 38												
	Bandwidth10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	515004	2575.02	515502	2577.51	516000	2580	516504	2582.52	517002	2585.01	518004	2590.02
M	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595	519000	2595
H	522996	2614.98	522498	2612.49	522000	2610	521496	2607.48	520998	2604.99	519996	2599.98



NR Band 41																			
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L 500202	2501.01	500700	2503.5	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	507204	2536.02	508200	2541	509202	2546.01
M 518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99
H 537000	2685	536496	2682.48	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	529998	2649.99	528996	2644.98	528000	2640

NR Band 48									
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz	
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L 637000	3555			637168	3557.52			637334	3560.01
M 641666	3624.99			641666	3624.99			641666	3624.99
H 646332	3695			646166	3692.49			646000	3690

NR Band 77																	
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L 647000	3705	647168	3707.52	647334	3710.01	648000	3720	648334	3725.01	648668	3730.02	649334	3740.01	649668	3745.02	650000	3750
M 656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H 665000	3975	664834	3972.51	664668	3970.02	664000	3960	663668	3955.02	663334	3950.01	662668	3940.02	662334	3935.01	662000	3930

NR Band 78																					
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L 647000	3705	647168	3707.52	647334	3710.01	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02		
M 650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750
H 653000	3795	652834	3792.51	652668	3790.02	652334	3785.01	652000	3780	651668	3775.02	651334	3770.01	651000	3765	650668	3760.02	650334	3755.01		

For <3450 MHz ~ 3550 MHz >

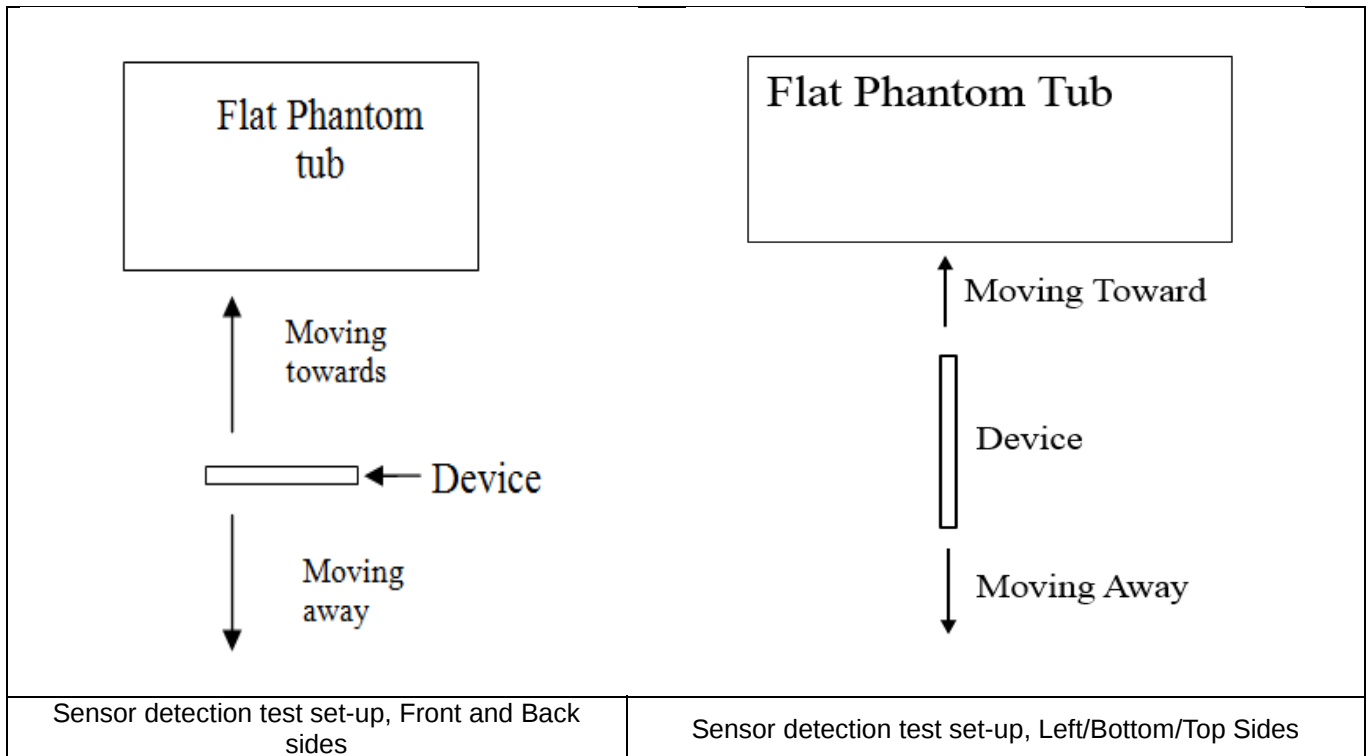
NR Band 77																	
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L 630334	3455.01	630500	3457.5	630668	3460.02	631334	3470.01	631668	3475.02	632000	3480	632668	3490.02	633000	3495		
M 633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01
H 636334	3545.01	636168	3542.52	636000	3540	635334	3530.01	635000	3525	634668	3520.02	634000	3510	633668	3505.02		

NR Band 78																						
Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz		
Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	
L	630334	3455.01	630500	3457.5	630668	3460.02	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495		
M	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01
H	636334	3545.01	636168	3542.52	636000	3540	635668	3535.02	635334	3530.01	635000	3525	634668	3520.02	634334	3515.01	634000	3510	633668	3505.02		

6. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance>:

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (3980MHz) and lowest (835MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body or finger or hand at the front or back or bottom or left or top side of the device. There is no need to do sensor coverage testing for the proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antenna.
3. The sensors can use to detect the proximity of the user's body or handheld states at the front or back or bottom or left or top side of the device use a detection threshold distance. When front/back/left/top/bottom sides of body or handheld condition is detected reduced power will be active. The trigger distance shown in the sections below.
4. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance -1mm was performed:



<P-Sensor>

< Sensor for Ant1>

Proximity Sensor Triggering Distance (mm)						
Position	Front		Back		Bottom Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	16	16	16	16	16	16

< Sensor for Ant4/5>

Proximity Sensor Triggering Distance (mm)								
Position	Front		Back		Top Side		Left Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	16	16	16	16	16	16	6	6

< Sensor for Ant2/3>

Proximity Sensor Triggering Distance (mm)						
Position	Front		Back		Left Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	6	6	6	6	6	6

7. RF Exposure Limits

7.1 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.

7.2 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.

8. Specific Absorption Rate (SAR)

8.1 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.

8.2 SAR Definition

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

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

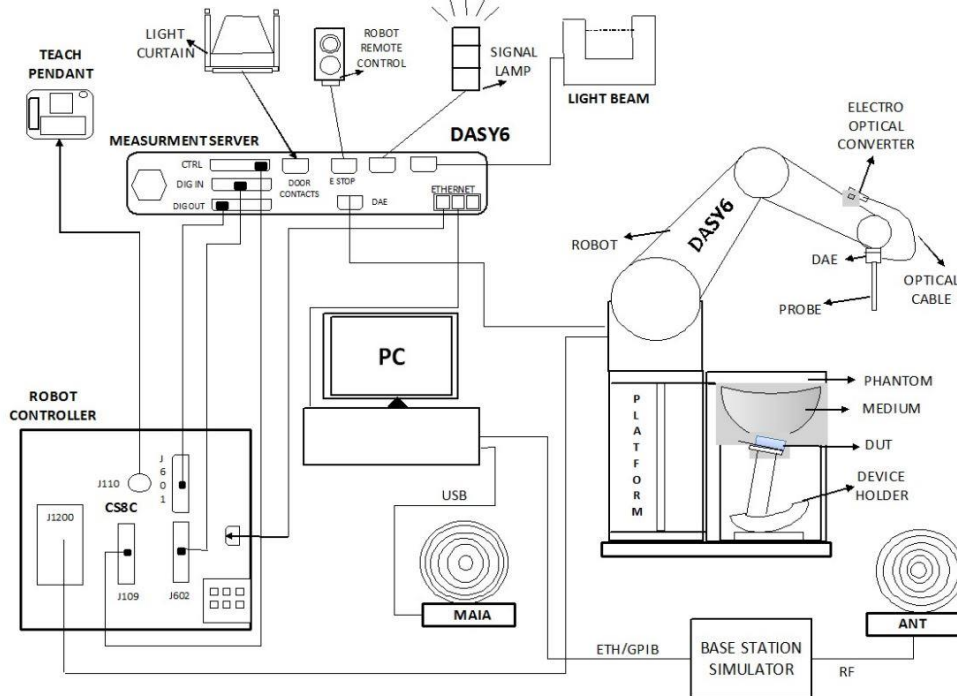
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

9. System Description and Setup

The DASY 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 Win7 or Win10 and the DASY6 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.

9.1 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	4 MHz – 10 GHz Linearity: ± 0.2 dB (30 MHz – 10 GHz)	
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

9.2 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

9.3 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.

9.4 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

10. 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

10.1 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 from 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

10.2 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.

10.3 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 dB) 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	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	≤ 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 $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

10.4 Zoom Scan

Zoom scans are used to 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 whose 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: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			≤ 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: $\Delta z_{\text{Zoom}}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$	
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 <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> 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.				

10.5 Volume Scan Procedures

The volume scan is used to 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.

10.6 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.

11. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d091	2022/8/19	2025/8/18
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2022/2/24	2025/2/22
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	2022/3/30	2025/3/28
SPEAG	2450MHz System Validation Kit	D2450V2	1095	2024/2/8	2025/2/7
SPEAG	2600MHz System Validation Kit	D2600V2	1112	2023/12/18	2024/12/17
SPEAG	3500MHz System Validation Kit	D3500V2	1037	2023/11/20	2024/11/19
SPEAG	3700MHz System Validation Kit	D3700V2	1008	2023/11/20	2024/11/19
SPEAG	3900MHz System Validation Kit	D3900V2	1048	2023/3/9	2026/3/8
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2022/9/23	2025/9/22
SPEAG	13MHz System Validation Kit	CLA13	1023	2024/1/22	2025/1/21
SPEAG	Data Acquisition Electronics	DAE4	1649	2024/7/3	2025/7/2
SPEAG	Data Acquisition Electronics	DAE4	1303	2023/11/20	2024/11/19
SPEAG	Dosimetric E-Field Probe	EX3DV4	7706	2024/1/24	2025/1/23
SPEAG	SAM Twin Phantom	SAM Twin	TP-2024	NCR	NCR
SPEAG	ELI Phantom	ELI V8.0	TP-2135	NCR	NCR
CHIGO	Thermo-Hygrometer	HTC-1	55009	2024/1/4	2025/1/3
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Rohde & Schwarz	Signal Generator	SMB100A	100455	2024/1/2	2025/1/1
Rohde & Schwarz	Vector Signal Generator	SMBV100A	258305	2024/1/2	2025/1/1
Keysight	Preamplifier	83017A	MY57280106	2024/4/18	2025/4/17
Anritsu	Radio Communication Analyzer	MT8821C	6262306175	2024/7/4	2025/7/3
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	2024/7/4	2025/7/3
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	2023/8/17	2024/8/16
SPEAG	Dielectric Probe Kit	DAK-3.5	1071	2024/2/19	2025/2/18
SPEAG	Dielectric Probe Kit	DAK-12	1173	2023/9/20	2024/9/19
Anritsu	Vector Signal Generator	MG3710A	6201682672	2024/1/2	2025/1/1
Rohde & Schwarz	Power Meter	NRVD	102081	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRP50S	101385	2023/10/11	2024/10/10
R&S	BLUETOOTH TESTER	CBT	101246	2024/7/4	2025/7/3
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2023/10/11	2024/10/10
TES	DIGITAC THERMOMETER	TYPE-K	220305411	2024/1/4	2025/1/3
ARRA	Power Divider	A3200-2	N/A	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	

Note:

- 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.
- 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.

12. System Verification

12.1 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.

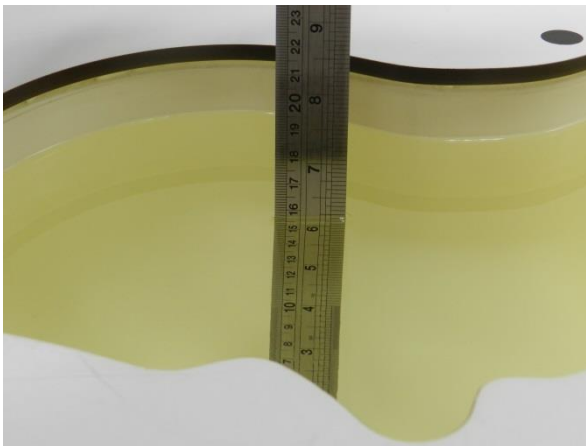


Fig 11.1 Photo of Liquid Height for Head SAR

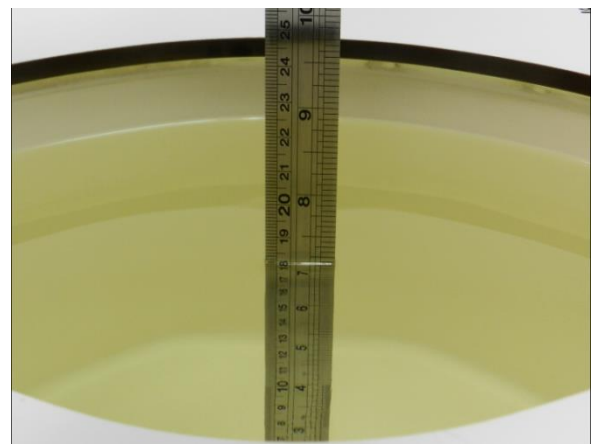


Fig 11.2 Photo of Liquid Height for Body SAR

12.2 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 (ϵ_r)
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. (°C)	Conductivity (σ)	Permittivity (ε _r)	Conductivity Target (σ)	Permittivity Target (ε _r)	Delta (σ) (%)	Delta (ε _r) (%)	Limit (%)	Date
835	Head	22.6	0.911	42.7	0.90	41.50	1.25	2.94	±5	2024/8/2
1750	Head	22.6	1.34	38.5	1.37	40.10	-1.97	-3.89	±5	2024/8/3
1900	Head	22.8	1.40	41.4	1.40	40.00	-0.12	3.61	±5	2024/8/4
2600	Head	22.9	1.93	38.3	1.96	39.00	-1.69	-1.74	±5	2024/8/5
3500	Head	22.7	2.85	38.6	2.91	37.90	-2.09	1.87	±5	2024/8/6
3700	Head	22.6	3.08	38.0	3.12	37.70	-1.36	0.90	±5	2024/8/7
3900	Head	22.8	3.28	37.6	3.32	37.50	-1.20	0.30	±5	2024/8/8
2450	Head	22.7	1.83	37.5	1.80	39.20	1.75	-4.37	±5	2024/8/9
5250	Head	22.6	4.58	35.7	4.71	35.90	-2.79	-0.46	±5	2024/8/10
5600	Head	22.7	4.95	35.1	5.07	35.50	-2.30	-1.09	±5	2024/8/11
5750	Head	22.7	5.11	34.9	5.22	35.40	-2.06	-1.46	±5	2024/8/12
13	Head	22.6	0.757	53.7	0.75	55.00	0.93	-2.36	±5	2024/8/16
2600	Head	22.9	1.96	40.4	1.96	39.00	0.00	3.59	±5	2024/9/10

12.3 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 (%)
2024/8/2	835	Head	50	4d091	7706	1649	0.48	9.45	9.6	1.59
2024/8/3	1750	Head	50	1090	7706	1649	1.95	37.00	39	5.41
2024/8/4	1900	Head	50	5d118	7706	1649	1.87	39.30	37.4	-4.83
2024/8/5	2600	Head	50	1112	7706	1649	2.71	55.10	54.2	-1.63
2024/8/6	3500	Head	50	1037	7706	1649	3.24	65.40	64.8	-0.92
2024/8/7	3700	Head	50	1008	7706	1649	3.25	67.20	65	-3.27
2024/8/8	3900	Head	50	1048	7706	1649	3.36	69.10	67.2	-2.75
2024/8/9	2450	Head	50	1095	7706	1649	2.72	52.60	54.4	3.42
2024/8/10	5250	Head	50	1113	7706	1649	3.90	81.50	78	-4.29
2024/8/11	5600	Head	50	1113	7706	1649	4.10	82.60	82	-0.73
2024/8/12	5750	Head	50	1113	7706	1649	3.85	80.80	77	-4.70
2024/9/10	2600	Head	50	1112	7706	1649	2.82	55.10	56.4	2.36

<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 (%)
2024/8/2	835	Head	50	4d091	7706	1649	0.321	6.22	6.42	3.22
2024/8/3	1750	Head	50	1090	7706	1649	1.05	19.50	21	7.69
2024/8/4	1900	Head	50	5d118	7706	1649	0.997	20.40	19.94	-2.25
2024/8/5	2600	Head	50	1112	7706	1649	1.25	24.80	25	0.81
2024/8/6	3500	Head	50	1037	7706	1649	1.27	24.70	25.4	2.83
2024/8/7	3700	Head	50	1008	7706	1649	1.24	24.40	24.8	1.64
2024/8/8	3900	Head	50	1048	7706	1649	1.22	24.10	24.4	1.24
2024/8/9	2450	Head	50	1095	7706	1649	1.30	24.70	26	5.26
2024/8/10	5250	Head	50	1113	7706	1649	1.11	23.30	22.2	-4.72
2024/8/11	5600	Head	50	1113	7706	1649	1.14	23.70	22.8	-3.80
2024/8/12	5750	Head	50	1113	7706	1649	1.10	23.00	22	-4.35
2024/8/16	13	Head	250	1023	7706	1303	0.090	0.335	0.36	5.88
2024/9/10	2600	Head	50	1112	7706	1649	1.29	24.80	25.8	4.03

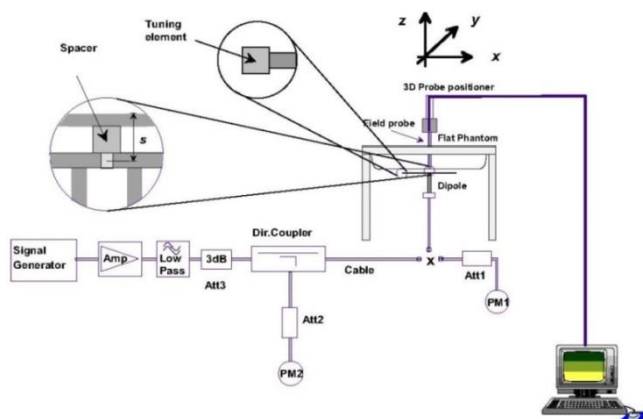


Fig 11.3.1 System Performance Check Setup



Fig 11.3.2 Setup Photo



Fig 8.3.2 Setup Photo

13. RF Exposure Positions

13.1 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.

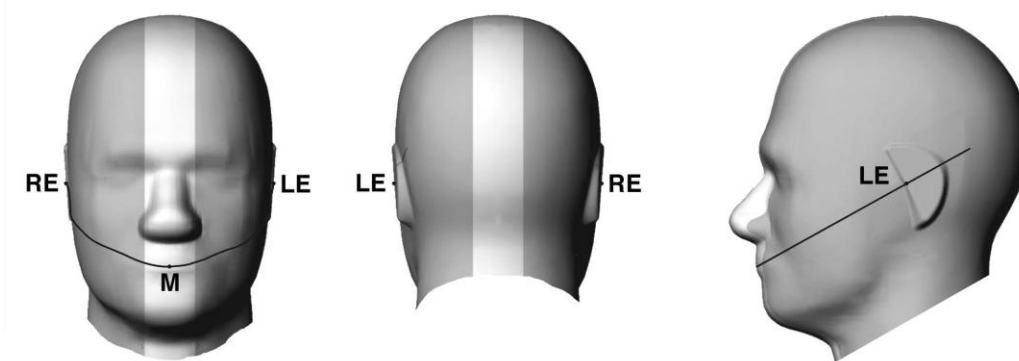


Fig 12.1.1 Front, back, and side views of SAM twin phantom

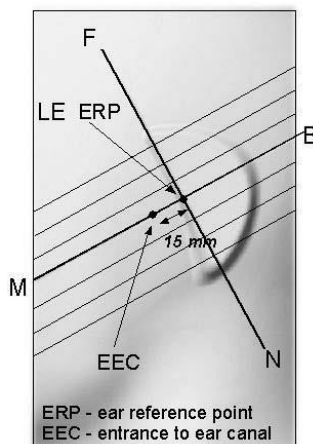


Fig 12.1.2 Close-up side view of phantom showing the ear region.

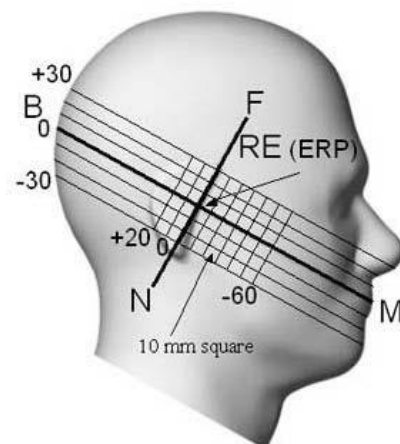


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

13.2 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 w_t 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 w_b 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 handset. 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.

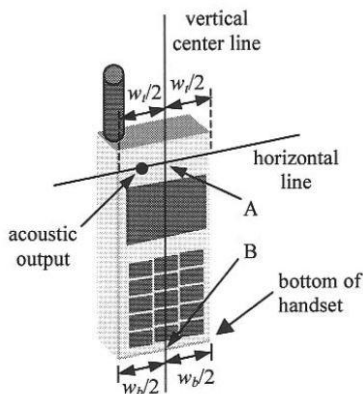


Fig 12.2.1 Handset vertical and horizontal reference lines—"fixed case"

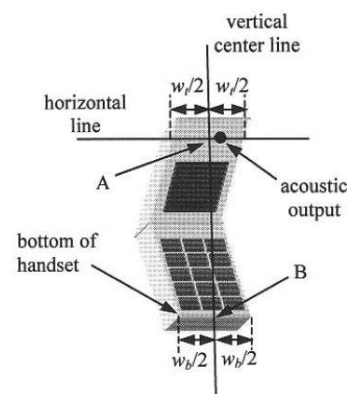


Fig 12.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

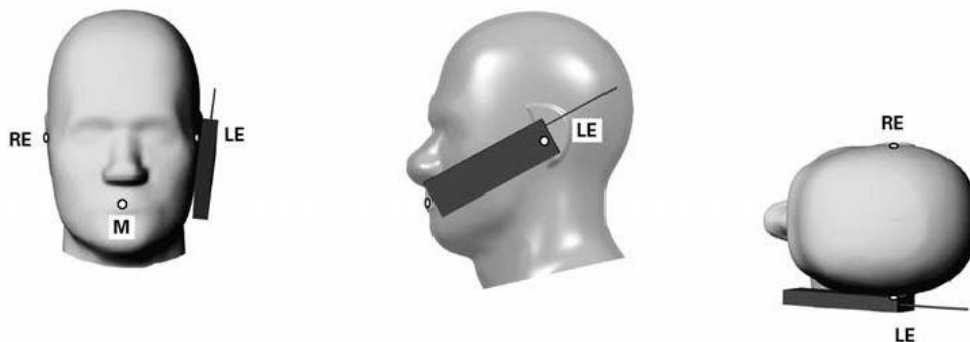


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

13.3 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

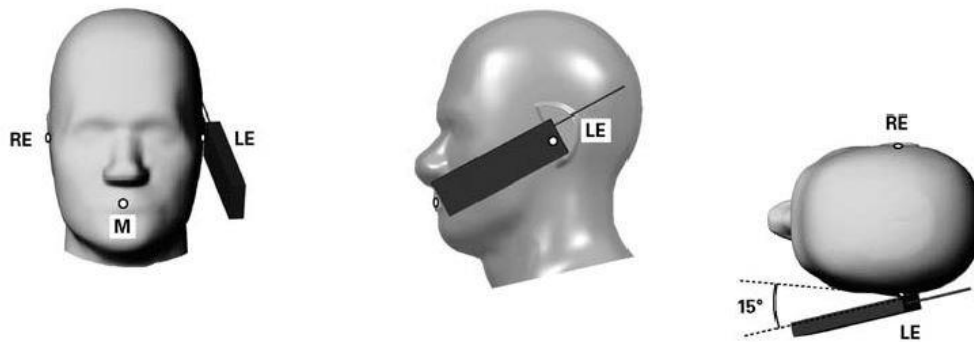


Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

13.4 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 $> 1.2 \text{ W/kg}$, 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-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

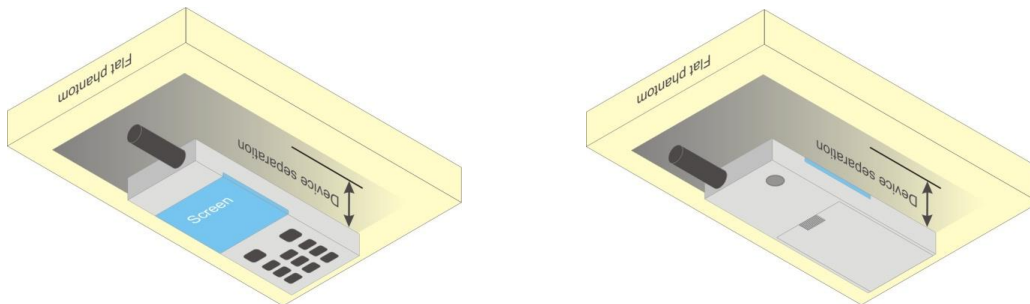


Fig 12.4 Body Worn Position

13.5 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.

13.6 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 ($L \times W \geq 9$ 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 from 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.

14. Conducted RF Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

<LTE Carrier Aggregation>

The detailed LTE Carrier Aggregation conducted power table can refer to Appendix F.

General Note:

1. This device supports Carrier Aggregation on downlink for inter and intra band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.
3. All permutations exist. No restrictions on Pcell & Scell combinations.
4. The gray color table is covered by other combinations and no need to verify power

2CC Downlink Carrier Aggregation				3CC Downlink Carrier Aggregation			
Number	Combination	4X4 MIMO	Covered by Measurement Superset	Number	Combination	4X4 MIMO	Covered by Measurement Superset
1	CA_2A-2A			1	CA_2A-7A-7A	7A	
2	CA_2A-7A	7A	3CC_1	2	CA_2A-7C	7C	
3	CA_2C			3	CA_41A-41A-41A	41A	
4	CA_38C	38C		4	CA_41D	41D	
5	CA_41A-41A	41A	3CC_3	5	CA_4A-7C	4A/7C	
6	CA_41C	41C		6	CA_5A-7C	7C	
7	CA_5A-7A	7A	3CC_6	7	CA_2A-2A-5A		
8	CA_66A-66A	66A					
9	CA_66C	66C					
10	CA_7A-7A	7A	3CC_1				
11	CA_66B	66B					
12	CA_2A-4A	4A					
13	CA_4A-5A	4A					
14	CA_4A-7A	4A	3CC_6				

LTE Carrier Aggregation Conducted Power (Downlink)

- i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. The device supports downlink three carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.
- vi. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.
- vii. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

LTE 4x4 MIMO (Downlink)

This device supports downlink 4x4 MIMO operations for LTE Band 4/7/38/41/66 only. Uplink transmission is limited to a single output stream. Power measurements were performed with downlink 4x4 MIMO active for the configuration with highest measured maximum conducted power with 4x4 downlink MIMO inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

Per FCC Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive. When carrier aggregation is applicable, power measurements were performed with the downlink carrier aggregation and 4x4 DL MIMO active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band.

4X4 MIMO	Band
	LTE Band 4/7/38/41/66

LTE Carrier Aggregation Conducted Power (Uplink)

LTE Uplink CA	2CC Uplink Carrier Aggregation
Intra-band	Antenna Tx
CA_7C	Ant1/4
CA_38C	Ant1/4

<Intra-band>
General Note:

- i. The device supports intra-band uplink carrier aggregation for LTE B7/38 with a maximum of two uplink component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.
- ii. The device supports uplink carrier aggregation with a maximum of two uplink component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.
- iii. According Nov. 2017 TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
- iv. Additional SAR measurement for LTE UL CA with other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

5G NR Output Power (Unit: dBm)

General Note:

1. 5G NR n5/n7 /n41 /n78 is NSA mode.
2. 5G NR n2/n5/n7/n66/n38/n41/n48/n77/n78 is SA mode.
3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
 - a. For DFT-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, the CP-OFDM mode will not higher than DFT-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-s QPSK and the reported SAR for the DFT-s QPSK configuration is ≤ 1.45 W/kg; CP-OFDM testing is not required.
 - b. For DFT-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, for 16QAM/64QAM/256QAM and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the 16QAM/64QAM/256QAM and smaller bandwidth output power will not ½ dB higher than the same configuration in the largest supported bandwidth.
 - c. SAR testing start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel
 - d. 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
 - e. QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested
 - f. PI/2 BPSK/16QAM/64QAM/256QAM output powers according to 3GPP MPR will not ½ dB higher than the same configuration in QPSK, also reported SAR for the QPSK configuration is less than 1.45 W/kg, PI/2 BPSK /16QAM/64QAM/256QAM SAR testing are not required.
 - g. Smaller bandwidth output power for each RB allocation configuration for this device will not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg, smaller bandwidth SAR testing is not required for this device
4. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
5. For 5G NR, the simultaneous transmission analysis is used standalone SAR at total power level to show compliance.
6. NSA and SA mode should perform SAR separately. For the maximum power of NSA mode is the same as SA total power level, so SA SAR can represent NSA mode SAR.
7. 5G NR NSA mode, the power level is the same as 5G NR SA mode, so 5G NR NSA mode and SA mode power table only show one time.
8. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
9. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
10. 5G NR n77/n78 supports HPUE mode, HPUE power and SAR testing performed separately.
11. This device supports HPUE for 5G NR n77/78 with class 2 level, HPUE power has been measured separately. For 5G NR n77/78 performed full SAR testing with class 2, and 5G NR n77/78 HPUE SAR can represent power class 3 level SAR.
12. For 5G NR EN-DC mode, standalone SAR performed for 5G NR NSA band with the maximum power, EN-DC SAR summed EN-DC mode 5G NR standalone SAR and LTE standalone SAR, the result of EN-DC SAR is more conservatively.
13. For DSDA bands mode co-located SAR analysis is performed using standalone SAR summed together and they are more conservatively for DSDA bands mode.

<3GPP 38.101 MPR for EN-DC>

Table 6.2.2-1 Maximum power reduction (MPR) for power class 3

Modulation		MPR (dB)		
		Edge RB allocations	Outer RB allocations	Inner RB allocations
DFT-s-OFDM	Pi/2 BPSK	$\leq 3.5^1$	$\leq 1.2^1$	$\leq 0.2^1$
		$\leq 0.5^2$	$\leq 0.5^2$	0 ²
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
CP-OFDM	256 QAM	≤ 4.5		
	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79. The reference power of 0 dB MPR is 26 dBm.

NOTE 2: Applicable for UE operating in FDD mode, or in TDD mode in bands other than n40, n41, n77, n78 and n79 with Pi/2 BPSK modulation and if the IE *powerBoostPi2BPSK* is set to 0 and if more than 40 % of slots in radio frame are used for UL transmission for bands n40, n41, n77, n78 and n79.

Table 6.2.2-2 Maximum power reduction (MPR) for power class 2

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

<EN-DC combination>

EN-DC combinations	LTE TX	NR TX
DC_2A_n78A	Ant1	Ant5
DC_38A_n78A	Ant2	Ant5
DC_41A_n78A	Ant2	Ant5
DC_5A_n78A	Ant1	Ant5
DC_5A_n7A	Ant4	Ant1
DC_7A_n5A	Ant1	Ant4
DC_7A_n78A	Ant2	Ant5
DC_41_n41A	Ant2	Ant1
DC_7A_n7A	Ant2	Ant1
DC_2A-5A_n78A	LTE B2:Ant2	Ant5
	LTE B5:Ant1	Ant5

Note: * For EN-DC combinations with uplink assigned to one LTE band and one NR band only.

<DSDA Configuration>

DSDA	LTE TX	NR TX
DSDA_B5+n41	Ant4	Ant1
DSDA_B5+n77	Ant1	Ant5
DSDA_B7+n77	Ant2	Ant5
DSDA_B41+n77	Ant2	Ant5



15. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

16. SAR Test Results

Spot Check General Note:

1. According to section 3.3, spot check conducted power test against the variant project based on the worst-case SAR condition from the original project was performed in this filing to demonstrate the test data from original project remains representative for the variant project. Detail Conducted power measurement referred to appendix E.
2. 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.
3. Per KDB 484596 D01 v02r03, 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 d_{dB} from the reference data no larger than 3 dB:
$$d_{dB} = |V_{dB} - R_{dB}| \leq 3 \text{ dB} \quad (1)$$
where between V_{dB} , the variant spot-check level in dB, and R_{dB} is the corresponding measurement level in dB for the reference model.
4. The Spot check results showed that deviation of the SAR results did not exceed 3 dB, therefore referring to the guidance in the KDB inquiry, SAR data reuse is justified.
5. 1st as parent model, 2nd as variant model.

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For SAR testing of Bluetooth signal with 83.3% theoretical duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle) * 83.3%".
 - d. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - e. For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
 - f. For TDD LTE SAR measurement of power class 3, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The reported TDD LTE SAR (W/kg) = Measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - $\leq 0.8 \text{ W/kg}$ or 2.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\leq 100 \text{ MHz}$
 - $\leq 0.6 \text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - $\leq 0.4 \text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200 \text{ MHz}$
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is $\geq 0.8 \text{ W/kg}$. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device implements Proximity sensors/receiver detect mechanism reduced power for the power management for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity). The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to appendix E. power table.
5. For WLAN/BT when transmit simultaneously with each other, or when transmit simultaneous with WWAN/BT, power reduction will be activated to head, Body and hotspot exposure conditions.
6. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
7. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension $> 15.0 \text{ cm}$ or an overall diagonal dimension $> 16.0 \text{ cm}$, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR $> 1.2 \text{ W/kg}$, however, when power reduction applies to hotspot mode the measured SAR

must be scaled to the maximum output power (for handheld on state, the maximum full power means reduced power), including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

- a. WLAN 5.3/5.5GHz tested the product specific 10g SAR since it has no hotspot mode.
- b. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.
8. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hotspot SAR.
9. For Phablet devices, when hotspot mode is not supported, Product specific 10-g SAR is required for all surfaces and edges with an antenna located at $\leq 25\text{mm}$ from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.

UL duty cycle detection mechanism specification:

The device supports the UL duty cycle detection mechanism for LTE TDD & 5G NR TDD (including FR1 SA and FR1 ENDC). The mechanism is that the output power (maximum burst power) is different at different UL duty cycle levels, but maintaining the maximum average power is matched to the SAR is compliant. When at low duty cycle, the transmit power is compensated but does not exceed the upper range defined by the 3GPP standard, thus improving the OTA performance

Note:

1. SAR is not required because the average output power is not higher than the Max UL duty cycle configuration.
2. For each band, the SAR evaluation uses the highest Time-average power configuration.
3. The detail results please referred to KDB inquiry with the FCC and Duty cycle_OD.

DSI status description:

The device has the following DSI state which used at different exposure condition.

Exposure Condition	DSI	Trigger conditions
Head SAR	DSI 1	Earpiece On
Body worn/Hotspot/Extremity SAR	DSI 4	Sensor On for top Ant (Ant2/4/5/7)
Body worn/Hotspot/Extremity SAR	DSI 3	Sensor On for bottom Ant (Ant1)
Body worn/Hotspot/Extremity SAR	DSI 2	Sensor Off/ receiver off



16.1 Head SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 1	DSI 1	189	836.4	1	28.87	30.00	1.297	-	-	-0.07	0.294	0.381	0.07
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 1	DSI 1	189	836.4	1	28.76	30.00	1.330	-	-	0.02	0.282	0.375	
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 4	DSI 1	189	836.4	1	26.26	27.50	1.330	-	-	-0.07	0.718	0.955	1.51
01	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 4	DSI 1	189	836.4	1	26.18	27.50	1.355	-	-	0.02	0.497	0.674	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	4182	836.4	1	24.50	25.50	1.259	-	-	-0.02	0.175	0.220	0.08
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	4182	836.4	1	24.38	25.50	1.294	-	-	0.02	0.167	0.216	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 4	DSI 1	4182	836.4	1	22.97	24.00	1.268	-	-	0.03	0.819	1.038	1.07
02	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 4	DSI 1	4182	836.4	1	22.77	24.00	1.327	-	-	-0.02	0.611	0.811	
	1st	LTE Band 5	10M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	20525	836.5	1	24.34	25.50	1.306	-	-	0.07	0.238	0.311	0.17
	2nd	LTE Band 5	10M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	20525	836.5	1	24.28	25.50	1.324	-	-	0.05	0.226	0.299	
	1st	LTE Band 5	10M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 1	20525	836.5	1	22.53	23.50	1.250	-	-	-0.05	0.766	0.958	0.80
03	2nd	LTE Band 5	10M	QPSK	1	0	-	Right Cheek	0mm	Ant 4	DSI 1	20525	836.5	1	22.45	23.50	1.274	-	-	0.01	0.625	0.796	
	1st	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	167300	836.5	1	24.58	25.70	1.294	-	-	-0.09	0.259	0.335	0.12
	2nd	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	167300	836.5	1	24.22	25.70	1.406	-	-	0.02	0.232	0.326	
	1st	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 4	DSI 1	167300	836.5	1	23.26	24.20	1.242	-	-	0.08	0.860	1.068	1.17
04	2nd	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 4	DSI 1	167300	836.5	1	23.20	24.20	1.259	-	-	0.01	0.648	0.816	
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	1413	1732.6	1	23.96	25.00	1.271	-	-	0.06	0.068	0.086	0.15
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	1413	1732.6	1	23.42	25.00	1.439	-	-	0.02	0.058	0.083	
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 4	DSI 1	1513	1752.6	1	14.71	15.50	1.199	-	-	-0.01	0.706	0.847	0.38
05	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 4	DSI 1	1513	1752.6	1	14.60	15.50	1.230	-	-	0.01	0.631	0.776	
	1st	LTE Band 4	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	20175	1732.5	1	23.86	25.00	1.300	-	-	0.06	0.063	0.082	1.28
	2nd	LTE Band 4	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	20175	1732.5	1	23.80	25.00	1.318	-	-	0.02	0.046	0.061	
	1st	LTE Band 4 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	20175	1732.5	1	22.32	23.00	1.169	-	-	0.01	0.431	0.504	0.64
	2nd	LTE Band 4 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	20175	1732.5	1	22.21	23.00	1.199	-	-	0.05	0.363	0.435	
	1st	LTE Band 4	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	20175	1732.5	1	15.21	16.00	1.199	-	-	-0.05	0.672	0.806	0.80
06	2nd	LTE Band 4	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	20175	1732.5	1	15.09	16.00	1.233	-	-	0.04	0.543	0.670	
	1st	LTE Band 66	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	132322	1745	1	23.94	25.00	1.276	-	-	0.09	0.068	0.087	1.33
	2nd	LTE Band 66	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	132322	1745	1	23.73	25.00	1.340	-	-	0.02	0.048	0.064	
	1st	LTE Band 66 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	132322	1745	1	22.40	23.00	1.148	-	-	0.16	0.438	0.503	0.42
	2nd	LTE Band 66 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	132322	1745	1	22.28	23.00	1.180	-	-	0.02	0.387	0.457	
	1st	LTE Band 66	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	132572	1770	1	14.58	15.50	1.236	-	-	-0.03	0.757	0.936	0.36
07	2nd	LTE Band 66	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	132572	1770	1	14.46	15.50	1.271	-	-	0.04	0.678	0.861	
	1st	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Left Cheek	0mm	Ant 1	DSI 1	349000	1745	1	23.78	25.50	1.486	-	-	0.16	0.056	0.083	0.38
	2nd	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Left Cheek	0mm	Ant 1	DSI 1	349000	1745	1	23.70	25.50	1.514	-	-	0.02	0.050	0.076	
	1st	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Right Cheek	0mm	Ant 2	DSI 1	349000	1745	1	20.65	22.00	1.365	-	-	0.01	0.391	0.534	1.00
	2nd	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Right Cheek	0mm	Ant 2	DSI 1	349000	1745	1	20.51	22.00	1.409	-	-	0.02	0.301	0.424	
	1st	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	349000	1745	1	15.08	16.50	1.387	-	-	-0.08	0.753	1.044	0.90
08	2nd	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	349000	1745	1	15.01	16.50	1.409	-	-	0.05	0.602	0.848	
1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 1	DSI 1	661	1880	1	25.61	27.00	1.377	-	-	0.01	0.076	0.105	1.24
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Cheek	0mm	Ant 1	DSI 1	661	1880	1	25.53	27.00	1.403	-	-	0.05	0.056	0.079	
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Tilted	0mm	Ant 4	DSI 1	661	1880	1	18.37	19.50	1.297	-	-	-0.01	0.745	0.966	0.91
09	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Right Tilted	0mm	Ant 4	DSI 1	661	1880	1	18.28	19.50	1.324	-	-	0.11	0.591	0.783	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	9400	1880	1	22.98	24.00	1.265	-	-	-0.12	0.070	0.089	0.20
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI 1	9400	1880	1	22.90	24.00	1.288	-	-	0.02	0.066	0.085	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 4	DSI 1	9538	1907.6	1	15.58	16.50	1.236	-	-	-0.03	0.776	0.959	0.25
10	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 4	DSI 1	9538	1907.6	1	15.29	16.50	1.321	-	-	-0.03	0.685	0.905	
	1st	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	18900	1880	1	22.98	24.00	1.265	-	-	-0.08	0.060	0.076	0.17



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	2nd	LTE Band 2	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	18900	1880	1	22.67	24.00	1.358	-	-	0.06	0.054	0.073	
	1st	LTE Band 2 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	18900	1880	1	14.57	15.50	1.239	-	-	-0.03	0.411	0.509	1.91
	2nd	LTE Band 2 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	18900	1880	1	14.49	15.50	1.262	-	-	0.03	0.260	0.328	
	1st	LTE Band 2	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	19100	1900	1	14.98	16.00	1.265	-	-	0.07	0.670	0.847	0.57
11	2nd	LTE Band 2	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	19100	1900	1	14.83	16.00	1.309	-	-	-0.01	0.567	0.742	
	1st	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	376000	1880	1	23.05	24.50	1.396	-	-	-0.03	0.078	0.109	1.34
	2nd	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	376000	1880	1	22.97	24.50	1.422	-	-	0.02	0.056	0.080	
	1st	FR1 n2 Other PA	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 2	DSI 1	380000	1900	1	17.57	19.00	1.390	-	-	-0.07	0.758	1.054	0.94
	2nd	FR1 n2 Other PA	20M	QPSK	50	28	DFT-SCS-15KHz	Right Cheek	0mm	Ant 2	DSI 1	380000	1900	1	17.62	19.00	1.374	-	-	0.05	0.617	0.848	
	1st	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	380000	1900	1	14.51	16.00	1.409	-	-	0.18	0.758	1.068	0.80
12	2nd	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	380000	1900	1	14.27	16.00	1.489	-	-	0.05	0.597	0.889	
2600MHz																							
	1st	LTE Band 7	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	21100	2535	1	23.47	24.50	1.268	-	-	-0.09	0.110	0.139	0.09
	2nd	LTE Band 7	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	21100	2535	1	23.35	24.50	1.303	-	-	0.06	0.104	0.136	
	1st	LTE Band 7 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	21100	2535	1	20.29	21.00	1.178	-	-	-0.13	0.437	0.515	1.27
	2nd	LTE Band 7 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	21100	2535	1	20.15	21.00	1.216	-	-	0.02	0.316	0.384	
	1st	LTE Band 7 ENDC&UL CA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	21100	2535	1	19.22	20.00	1.197	-	-	0.03	0.431	0.516	0.10
	2nd	LTE Band 7 ENDC&UL CA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	21100	2535	1	19.16	20.00	1.213	-	-	0.05	0.415	0.504	
	1st	LTE Band 7	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI 1	21100	2535	1	16.97	18.50	1.422	-	-	0.05	0.574	0.816	0.46
13	2nd	LTE Band 7	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI 1	21100	2535	1	17.01	18.50	1.409	-	-	0.07	0.644	0.908	
	1st	LTE Band 38	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	38000	2595	1	23.51	24.50	1.256	62.9	1.006	-0.04	0.072	0.091	0.05
	2nd	LTE Band 38	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	38000	2595	1	23.43	24.50	1.279	62.9	1.006	0.06	0.070	0.090	
	1st	LTE Band 38 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	38000	2595	1	22.30	23.00	1.175	62.9	1.006	-0.04	0.425	0.502	0.16
	2nd	LTE Band 38 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	38000	2595	1	22.21	23.00	1.199	62.9	1.006	0.04	0.401	0.484	
	1st	LTE Band 38	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	38000	2595	1	19.19	20.50	1.352	62.9	1.006	0.06	0.533	0.725	1.11
14	2nd	LTE Band 38	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	38000	2595	1	19.01	20.50	1.409	62.9	1.006	0.04	0.396	0.561	
	1st	LTE Band 41	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	40620	2593	1	23.60	24.50	1.230	62.9	1.006	0.07	0.072	0.089	0.63
	2nd	LTE Band 41	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 1	DSI 1	40620	2593	1	23.49	24.50	1.262	62.9	1.006	0.06	0.061	0.077	
	1st	LTE Band 41 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	40620	2593	1	22.79	23.50	1.178	62.9	1.006	-0.07	0.429	0.508	0.03
	2nd	LTE Band 41 Other PA	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 2	DSI 1	40620	2593	1	22.72	23.50	1.197	62.9	1.006	-0.03	0.419	0.504	
	1st	LTE Band 41	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	40185	2549.5	1	19.14	20.50	1.368	62.9	1.006	-0.01	0.594	0.817	1.41
15	2nd	LTE Band 41	20M	QPSK	1	0	-	Right Tilted	0mm	Ant 4	DSI 1	40185	2549.5	1	19.05	20.50	1.396	62.9	1.006	0.01	0.420	0.590	
	1st	FR1 n7	50M	QPSK	135	68	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	507000	2535	1	23.42	25.00	1.439	-	-	-0.03	0.138	0.199	0.39
	2nd	FR1 n7	50M	QPSK	135	68	DFT-SCS-15KHz	Right Cheek	0mm	Ant 1	DSI 1	507000	2535	1	23.36	25.00	1.459	-	-	0.06	0.125	0.182	
	1st	FR1 n7 Only ENDC	50M	QPSK	135	68	DFT-SCS-15KHz	Right Cheek	0mm	Ant 3	DSI 1	507000	2535	1	19.42	20.00	1.143	-	-	-0.03	0.439	0.502	0.65
	2nd	FR1 n7 Only ENDC	50M	QPSK	135	68	DFT-SCS-15KHz	Right Cheek	0mm	Ant 3	DSI 1	507000	2535	1	19.36	20.00	1.159	-	-	0.01	0.373	0.432	
	1st	FR1 n7	50M	QPSK	135	68	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	507000	2535	1	17.51	19.00	1.409	-	-	-0.08	0.657	0.926	0.03
16	2nd	FR1 n7	50M	QPSK	135	68	DFT-SCS-15KHz	Right Tilted	0mm	Ant 4	DSI 1	507000	2535	1	17.77	19.00	1.327	-	-	-0.06	0.693	0.920	
	1st	FR1 n38	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 1	DSI 1	519000	2595	1	23.42	25.00	1.439	-	-	-0.01	0.154	0.222	0.43
	2nd	FR1 n38	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 1	DSI 1	519000	2595	1	23.36	25.00	1.459	-	-	0.06	0.138	0.201	
	1st	FR1 n38 Only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	519000	2595	1	19.35	20.00	1.161	-	-	-0.07	0.433	0.503	0.86
	2nd	FR1 n38 Only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	519000	2595	1	19.26	20.00	1.186	-	-	0.06	0.348	0.413	
	1st	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Right Tilted	0mm	Ant 4	DSI 1	519000	2595	1	16.09	17.50	1.384	-	-	-0.05	0.518	0.717	0.06
17	2nd	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Right Tilted	0mm	Ant 4	DSI 1	519000	2595	1	16.05	17.50	1.396	-	-	0.06	0.506	0.707	
	1st	FR1 n38 Only ENDC	40M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	519000	2595	1	18.38	20.00	1.452	-	-	-0.04	0.535	0.777	0.95
	2nd	FR1 n38 Only ENDC	40M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	519000	2595	1	18.25	20.00	1.496	-	-	0.01	0.418	0.625	
	1st	FR1 n41	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 1	DSI 1	518598	2592.99	1	23.51	25.00	1.409	-	-	-0.07	0.161	0.227	0.16
	2nd	FR1 n41	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 1	DSI 1	518598	2592.99	1	23.44	25.00	1.432	-	-	0.06	0.153	0.219	
	1st	FR1 n41 Only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	518598	2592.99	1	19.34	20.00	1.164	-	-	-0.03	0.436	0.508	0.96
	2nd	FR1 n41 Only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	518598	2592.99	1	19.22	20.00	1.197	-	-	0.05	0.340	0.407	
	1st	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Right Tilted	0mm	Ant 4	DSI 1	518598	2592.99	1	17.22	19.00	1.507	-	-	-0.03	0.603	0.908	0.13



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18	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Right Tilted	0mm	Ant 4	DSI 1	518598	2592.99	1	17.48	19.00	1.419	-	-	-0.01	0.659	0.935	
	1st	FR1 n41 Only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	518598	2592.99	1	18.45	20.00	1.429	-	-	0.05	0.512	0.732	0.77
	2nd	FR1 n41 Only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	518598	2592.99	1	18.39	20.00	1.449	-	-	0.06	0.423	0.613	
3500MHz																							
	1st	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 1	42590	3500	1	19.15	20.00	1.216	62.9	1.006	0.01	0.486	0.595	0.73
	2nd	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 1	42590	3500	1	19.11	20.00	1.227	62.9	1.006	0.04	0.407	0.503	
	1st	LTE Band 42	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	42590	3500	1	20.47	21.50	1.268	62.9	1.006	-0.02	0.356	0.454	0.05
	2nd	LTE Band 42	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	42590	3500	1	20.39	21.50	1.291	62.9	1.006	0.05	0.346	0.449	
	1st	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 5	DSI 1	42990	3540	1	18.52	19.50	1.253	62.9	1.006	-0.06	0.776	0.978	0.04
19	2nd	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 5	DSI 1	42990	3540	1	18.46	19.50	1.271	62.9	1.006	0.04	0.759	0.970	
	1st	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 7	DSI 1	42590	3500	1	22.86	24.00	1.300	62.9	1.006	0.05	0.633	0.828	1.30
	2nd	LTE Band 42	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 7	DSI 1	42590	3500	1	22.79	24.00	1.321	62.9	1.006	0.06	0.462	0.614	
	1st	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 1	55340	3560	1	19.03	20.00	1.250	62.9	1.006	-0.03	0.755	0.950	1.02
	2nd	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 2	DSI 1	55340	3560	1	18.99	20.00	1.262	62.9	1.006	0.06	0.592	0.751	
	1st	LTE Band 48	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	55830	3609	1	20.46	21.50	1.271	62.9	1.006	-0.05	0.450	0.575	0.11
	2nd	LTE Band 48	20M	QPSK	1	0	-	Right Cheek	0mm	Ant 3	DSI 1	55830	3609	1	20.40	21.50	1.288	62.9	1.006	0.06	0.433	0.561	
	1st	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 5	DSI 1	56150	3641	1	17.87	19.00	1.297	62.9	1.006	-0.16	0.774	1.010	0.91
	2nd	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 5	DSI 1	56150	3641	1	17.79	19.00	1.321	62.9	1.006	0.02	0.616	0.819	
	1st	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 7	DSI 1	55830	3609	1	22.23	23.50	1.340	62.9	1.006	-0.14	0.810	1.092	0.38
20	2nd	LTE Band 48	20M	QPSK	1	0	-	Left Cheek	0mm	Ant 7	DSI 1	55830	3609	1	22.16	23.50	1.361	62.9	1.006	-0.07	0.730	1.000	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	641666	3624.99	1	17.27	18.50	1.327	-	-	0.01	0.719	0.954	0.14
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	641666	3624.99	1	17.21	18.50	1.346	-	-	0.06	0.686	0.923	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	641666	3624.99	1	20.08	21.50	1.387	-	-	0.16	0.781	1.083	0.04
21	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	641666	3624.99	1	20.07	21.50	1.390	-	-	-0.06	0.773	1.074	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	641666	3624.99	1	15.05	16.50	1.396	-	-	-0.01	0.711	0.993	0.49
	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	641666	3624.99	1	15.00	16.50	1.413	-	-	0.06	0.628	0.887	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	641666	3624.99	1	19.46	21.00	1.426	-	-	-0.17	0.765	1.091	0.81
	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	641666	3624.99	1	19.38	21.00	1.452	-	-	0.06	0.623	0.905	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	656000	3840	1	19.10	20.50	1.380	-	-	-0.03	0.389	0.537	0.54
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	656000	3840	1	18.99	20.50	1.416	-	-	0.06	0.335	0.474	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	633334	3500.01	1	19.24	20.50	1.337	-	-	0.01	0.739	0.988	0.57
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	633334	3500.01	1	19.16	20.50	1.361	-	-	0.06	0.637	0.867	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	656000	3840	1	20.07	21.50	1.390	-	-	0.01	0.722	1.004	0.03
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	656000	3840	1	20.02	21.50	1.406	-	-	0.06	0.710	0.998	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	633334	3500.01	1	20.50	21.50	1.259	-	-	-0.09	0.622	0.783	0.03
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	633334	3500.01	1	20.48	21.50	1.265	-	-	0.06	0.614	0.777	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	656000	3840	1	16.19	17.50	1.352	-	-	-0.09	0.584	0.790	0.39
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	656000	3840	1	16.16	17.50	1.361	-	-	0.02	0.530	0.722	
	1st	FR1 n77 HPUE	100M	QPSK	270	0	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	1	16.10	17.50	1.380	-	-	-0.07	0.779	1.075	0.02
22	2nd	FR1 n77 HPUE	100M	QPSK	270	0	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	1	16.35	17.50	1.303	-	-	-0.1	0.820	1.069	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	656000	3840	1	17.64	19.00	1.368	-	-	0.01	0.775	1.060	2.13
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	656000	3840	1	17.59	19.00	1.384	-	-	0.06	0.469	0.649	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	633334	3500.01	1	17.85	19.00	1.303	-	-	-0.09	0.392	0.511	1.32
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	633334	3500.01	1	17.66	19.00	1.361	-	-	0.06	0.277	0.377	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	650000	3750	1	18.69	20.00	1.352	-	-	0.01	0.605	0.818	0.05
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	650000	3750	1	18.59	20.00	1.384	-	-	0.09	0.584	0.808	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	633334	3500.01	1	18.84	20.00	1.306	-	-	0.01	0.745	0.973	0.61
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 2	DSI 1	633334	3500.01	1	18.77	20.00	1.327	-	-	0.06	0.637	0.846	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	650000	3750	1	19.68	21.00	1.355	-	-	0.04	0.742	1.006	0.06
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	650000	3750	1	19.65	21.00	1.365	-	-	0.05	0.728	0.993	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	633334	3500.01	1	20.09	21.00	1.233	-	-	-0.1	0.563	0.694	0.03
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Cheek	0mm	Ant 3	DSI 1	633334	3500.01	1	20.00	21.00	1.259	-	-	0.05	0.547	0.689	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	650000	3750	1	16.14	17.50	1.368	-	-	0.08	0.776	1.061	0.24
23	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	650000	3750	1	16.02	17.50	1.406	-	-	-0.09	0.715	1.005	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	1	16.06	17.50	1.393	-	-	-0.15	0.696	0.970	0.45



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2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	1	16.03	17.50	1.403	-	-	0.05	0.623	0.874	
1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	650000	3750	1	17.98	19.50	1.419	-	-	0.02	0.708	1.005	1.61
2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	650000	3750	1	17.82	19.50	1.472	-	-	0.02	0.471	0.693	
1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	633334	3500.01	1	18.40	19.50	1.288	-	-	0.02	0.454	0.585	1.71
2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Cheek	0mm	Ant 7	DSI 1	633334	3500.01	1	18.25	19.50	1.334	-	-	0.06	0.296	0.395	

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
2450MHz																			
	1st	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 6	Standalone	6	2437	1	16.62	17.50	1.225	100	1.000	0.09	0.853	1.045	0.01
24	2nd	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 6	Standalone	6	2437	1	16.61	17.50	1.227	100	1.000	0.03	0.850	1.043	
	1st	Bluetooth	1Mbps	Left Cheek	0mm	Ant 6	Full power	78	2480	1	10.82	12.00	1.312	76.59	1.088	-0.02	0.121	0.173	0.10
25	2nd	Bluetooth	1Mbps	Left Cheek	0mm	Ant 6	Full power	78	2480	1	10.76	12.00	1.330	76.59	1.088	0.08	0.117	0.169	
5000MHz																			
	1st	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 6	Standalone	62	5310	1	14.13	15.00	1.222	93.67	1.068	-0.12	0.834	1.088	0.08
26	2nd	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 6	Standalone	62	5310	1	14.10	15.00	1.230	93.67	1.068	-0.07	0.812	1.067	
	1st	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	122	5610	1	13.28	14.00	1.180	88.19	1.134	-0.04	0.814	1.090	0.08
27	2nd	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	122	5610	1	13.25	14.00	1.189	88.19	1.134	-0.09	0.793	1.069	
	1st	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	1	13.25	14.00	1.189	88.19	1.134	-0.04	0.811	1.093	0.02
28	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	1	13.23	14.00	1.194	88.19	1.134	0.02	0.803	1.087	
	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	2	13.23	14.00	1.194	88.19	1.134	0.02	0.748	1.013	
	2nd	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	4	13.23	14.00	1.194	88.19	1.134	-0.13	0.782	1.059	



16.2 Hotspot SAR

Plot No.	No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	10mm	Ant 1	DSI 3	189	836.4	1	28.87	30.00	1.297	-	-	0.01	0.452	0.586	0.18
29	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	10mm	Ant 1	DSI 3	189	836.4	1	28.92	30.00	1.282	-	-	-0.05	0.438	0.562	
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 4	DSI 4	189	836.4	1	28.79	30.00	1.321	-	-	-0.13	0.369	0.488	0.66
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 4	DSI 4	189	836.4	1	28.66	30.00	1.361	-	-	0.01	0.308	0.419	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 1	DSI 3	4182	836.4	1	24.50	25.50	1.259	-	-	-0.01	0.362	0.456	0.11
30	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Side	10mm	Ant 1	DSI 3	4182	836.4	1	24.42	25.50	1.282	-	-	-0.09	0.347	0.445	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 4	DSI 4	4182	836.4	1	23.49	24.50	1.262	-	-	-0.13	0.220	0.278	0.48
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 4	DSI 4	4182	836.4	1	23.26	24.50	1.330	-	-	0.03	0.187	0.249	
	1st	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 1	DSI 3	20525	836.5	1	23.35	24.50	1.303	-	-	-0.14	0.273	0.356	0.06
31	2nd	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 1	DSI 3	20525	836.5	1	23.11	24.50	1.377	-	-	-0.08	0.255	0.351	
	1st	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 4	DSI 4	20525	836.5	1	23.57	24.50	1.239	-	-	-0.18	0.221	0.274	0.58
	2nd	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 4	DSI 4	20525	836.5	1	23.50	24.50	1.259	-	-	-0.08	0.191	0.240	
	1st	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	167300	836.5	1	23.52	24.70	1.312	-	-	-0.08	0.337	0.442	0.22
32	2nd	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	167300	836.5	1	23.42	24.70	1.343	-	-	-0.13	0.313	0.420	
	1st	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Back	10mm	Ant 4	DSI 4	167300	836.5	1	23.61	24.70	1.285	-	-	-0.06	0.223	0.287	0.91
	2nd	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Back	10mm	Ant 4	DSI 4	167300	836.5	1	23.50	24.70	1.318	-	-	0.1	0.177	0.233	
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Bottom Side	15mm	Ant 1	DSI 2	1413	1732.6	1	22.90	24.00	1.288	-	-	0.03	0.809	1.042	0.25
33	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Bottom Side	15mm	Ant 1	DSI 2	1413	1732.6	1	22.61	24.00	1.377	-	-	-0.08	0.714	0.983	
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Top Side	15mm	Ant 4	DSI 2	1413	1732.6	1	22.81	23.50	1.172	-	-	-0.02	0.834	0.978	1.13
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Top Side	15mm	Ant 4	DSI 2	1413	1732.6	1	22.80	23.50	1.175	-	-	0.01	0.642	0.754	
	1st	LTE Band 4	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	20175	1732.5	1	22.83	24.00	1.309	-	-	-0.05	0.716	0.937	0.96
	2nd	LTE Band 4	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	20175	1732.5	1	22.71	24.00	1.346	-	-	-0.08	0.558	0.751	
	1st	LTE Band 4 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	20175	1732.5	1	23.30	24.00	1.175	-	-	-0.18	0.287	0.337	0.13
	2nd	LTE Band 4 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	20175	1732.5	1	23.12	24.00	1.225	-	-	-0.08	0.267	0.327	
	1st	LTE Band 4	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	20175	1732.5	1	23.17	24.00	1.211	-	-	0.1	0.874	1.058	0.83
34	2nd	LTE Band 4	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	20175	1732.5	1	23.08	24.00	1.236	-	-	-0.1	0.706	0.873	
	1st	LTE Band 66	20M	QPSK	1	0	-	Bottom Side	10mm	Ant 1	DSI 3	132322	1745	1	19.96	21.00	1.271	-	-	0.09	0.821	1.043	0.81
35	2nd	LTE Band 66	20M	QPSK	1	0	-	Bottom Side	10mm	Ant 1	DSI 3	132322	1745	1	19.85	21.00	1.303	-	-	-0.01	0.664	0.865	
	1st	LTE Band 66 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	132322	1745	1	23.37	24.00	1.156	-	-	0.02	0.306	0.354	0.19
	2nd	LTE Band 66 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	132322	1745	1	23.25	24.00	1.189	-	-	0.1	0.285	0.339	
	1st	LTE Band 66	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	132322	1745	1	22.69	23.50	1.205	-	-	-0.05	0.789	0.951	1.05
	2nd	LTE Band 66	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	132322	1745	1	22.56	23.50	1.242	-	-	-0.18	0.601	0.746	
	1st	FR1 n66	40M	QPSK	108	54	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	349000	1745	1	19.27	21.00	1.489	-	-	-0.01	0.731	1.089	0.33
36	2nd	FR1 n66	40M	QPSK	108	54	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	349000	1745	1	19.19	21.00	1.517	-	-	-0.02	0.665	1.009	
	1st	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Left Side	10mm	Ant 2	DSI 2	349000	1745	1	23.12	24.50	1.374	-	-	-0.06	0.422	0.580	0.28
	2nd	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Left Side	10mm	Ant 2	DSI 2	349000	1745	1	23.10	24.50	1.380	-	-	0.1	0.394	0.544	
	1st	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	349000	1745	1	23.08	24.50	1.387	-	-	-0.01	0.721	1.000	0.99
	2nd	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	349000	1745	1	23.62	24.50	1.225	-	-	0.12	0.651	0.797	
1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	10mm	Ant 1	DSI 3	512	1850.2	1	23.55	25.00	1.396	-	-	-0.17	0.679	0.948	0.75
37	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Bottom Side	10mm	Ant 1	DSI 3	512	1850.2	1	23.76	25.00	1.330	-	-	0.08	0.599	0.797	
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Top Side	10mm	Ant 4	DSI 4	810	1909.8	1	20.86	22.00	1.300	-	-	0.14	0.739	0.961	1.79
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Top Side	10mm	Ant 4	DSI 4	810	1909.8	1	20.52	22.00	1.406	-	-	-0.17	0.452	0.636	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	15mm	Ant 1	DSI 2	9400	1880	1	22.98	24.00	1.265	-	-	0.14	0.583	0.737	0.16
38	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	15mm	Ant 1	DSI 2	9400	1880	1	22.92	24.00	1.282	-	-	-0.03	0.554	0.710	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Top Side	15mm	Ant 4	DSI 2	9400	1880	1	22.66	23.50	1.213	-	-	0.13	0.701	0.851	0.99



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	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Top Side	15mm	Ant 4	DSI 2	9400	1880	1	22.55	23.50	1.245	-	-	-0.08	0.544	0.677	
	1st	LTE Band 2	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	18900	1880	1	22.98	24.00	1.265	-	-	-0.08	0.529	0.669	0.01
	2nd	LTE Band 2	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	18900	1880	1	22.86	24.00	1.300	-	-	0.14	0.515	0.670	
	1st	LTE Band 2 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	19100	1900	1	18.99	20.00	1.262	-	-	-0.01	0.787	0.993	0.72
39	2nd	LTE Band 2 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	19100	1900	1	18.98	20.00	1.265	-	-	-0.09	0.665	0.841	
	1st	LTE Band 2	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	18900	1880	1	22.13	23.00	1.222	-	-	-0.1	0.612	0.748	1.11
	2nd	LTE Band 2	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	18900	1880	1	22.10	23.00	1.230	-	-	0.11	0.471	0.579	
	1st	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	376000	1880	1	19.06	20.50	1.393	-	-	-0.03	0.551	0.768	0.13
	2nd	FR1 n2	20M	QPSK	50	28	DFT-SCS-15KHz	Bottom Side	10mm	Ant 1	DSI 3	376000	1880	1	18.62	20.50	1.542	-	-	-0.05	0.483	0.745	
	1st	FR1 n2 Other PA(DSDS)	20M	QPSK	1	1	DFT-SCS-15KHz	Left Side	10mm	Ant 2	DSI 2	380000	1900	1	18.58	20.00	1.387	-	-	-0.01	0.783	1.086	1.39
40	2nd	FR1 n2 Other PA(DSDS)	20M	QPSK	1	1	DFT-SCS-15KHz	Left Side	10mm	Ant 2	DSI 2	380000	1900	1	18.52	20.00	1.406	-	-	-0.03	0.561	0.789	
	1st	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	376000	1880	1	22.06	23.50	1.393	-	-	-0.04	0.561	0.782	0.41
	2nd	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	376000	1880	1	21.97	23.50	1.422	-	-	0.18	0.500	0.711	
2600MHz																							
	1st	LTE Band 7	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	21100	2535	1	23.47	24.50	1.268	-	-	-0.1	0.541	0.686	0.38
	2nd	LTE Band 7	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	21100	2535	1	23.32	24.50	1.312	-	-	0.14	0.479	0.629	
	1st	LTE Band 7 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	21100	2535	1	23.25	24.00	1.189	-	-	-0.02	0.477	0.567	0.04
	2nd	LTE Band 7 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	21100	2535	1	23.11	24.00	1.227	-	-	-0.17	0.458	0.562	
	1st	LTE Band 7 UL CA	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	20850	2510	1	23.68	24.50	1.208	-	-	-0.07	0.805	0.972	1.74
41	2nd	LTE Band 7 UL CA	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	20850	2510	1	23.64	24.50	1.219	-	-	-0.05	0.534	0.651	
	1st	LTE Band 7	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	21100	2535	1	23.04	24.50	1.400	-	-	0.04	0.409	0.572	0.11
	2nd	LTE Band 7	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	21100	2535	1	23.15	24.50	1.365	-	-	0.02	0.409	0.558	
	1st	LTE Band 38	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	38000	2595	1	23.51	24.50	1.256	62.9	1.006	0.03	0.283	0.358	0.58
	2nd	LTE Band 38	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	38000	2595	1	23.36	24.50	1.300	62.9	1.006	-0.05	0.239	0.313	
	1st	LTE Band 38 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	38000	2595	1	23.28	24.00	1.180	62.9	1.006	-0.09	0.361	0.429	0.10
42	2nd	LTE Band 38 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	38000	2595	1	23.16	24.00	1.213	62.9	1.006	-0.03	0.343	0.419	
	1st	LTE Band 38	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	38000	2595	1	23.16	24.50	1.361	62.9	1.006	0.02	0.272	0.373	0.11
	2nd	LTE Band 38	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	38000	2595	1	23.05	24.50	1.396	62.9	1.006	0.03	0.259	0.364	
	1st	LTE Band 41	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	40620	2593	1	23.60	24.50	1.230	62.9	1.006	-0.08	0.285	0.353	0.68
	2nd	LTE Band 41	20M	QPSK	1	0	-	Bottom Side	15mm	Ant 1	DSI 2	40620	2593	1	23.48	24.50	1.265	62.9	1.006	0.1	0.237	0.302	
	1st	LTE Band 41 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	40620	2593	1	23.30	24.00	1.175	62.9	1.006	-0.02	0.356	0.421	0.14
43	2nd	LTE Band 41 Other PA	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	40620	2593	1	23.16	24.00	1.213	62.9	1.006	-0.01	0.334	0.408	
	1st	LTE Band 41	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	40620	2593	1	23.27	24.50	1.327	62.9	1.006	0.04	0.281	0.375	0.18
	2nd	LTE Band 41	20M	QPSK	1	0	-	Top Side	15mm	Ant 4	DSI 2	40620	2593	1	23.16	24.50	1.361	62.9	1.006	0.01	0.263	0.360	
	1st	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Bottom Side	15mm	Ant 1	DSI 2	507000	2535	1	23.52	25.00	1.406	-	-	-0.08	0.432	0.607	0.03
	2nd	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Bottom Side	15mm	Ant 1	DSI 2	507000	2535	1	23.40	25.00	1.445	-	-	0.04	0.417	0.603	
	1st	FR1 n7 only ENDC	50M	QPSK	135	68	DFT-SCS-15KHz	Left Side	10mm	Ant 3	DSI 2	507000	2535	1	23.81	24.50	1.172	-	-	0.03	0.542	0.635	0.10
	2nd	FR1 n7 only ENDC	50M	QPSK	135	68	DFT-SCS-15KHz	Left Side	10mm	Ant 3	DSI 2	507000	2535	1	23.68	24.50	1.208	-	-	0.01	0.513	0.620	
	1st	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	507000	2535	1	23.52	25.00	1.406	-	-	-0.08	0.541	0.761	0.06
44	2nd	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Top Side	15mm	Ant 4	DSI 2	507000	2535	1	23.68	25.00	1.355	-	-	-0.03	0.570	0.772	
	1st	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	15mm	Ant 1	DSI 2	519000	2595	1	23.47	25.00	1.422	-	-	0.08	0.503	0.715	0.05
45	2nd	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	15mm	Ant 1	DSI 2	519000	2595	1	23.41	25.00	1.442	-	-	-0.08	0.490	0.707	
	1st	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	519000	2595	1	23.72	24.50	1.197	-	-	-0.17	0.547	0.655	0.18
	2nd	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	519000	2595	1	23.66	24.50	1.213	-	-	0.05	0.518	0.629	
	1st	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 4	DSI 2	519000	2595	1	21.56	23.00	1.393	-	-	-0.11	0.370	0.515	0.19
	2nd	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 4	DSI 2	519000	2595	1	22.26	23.00	1.186	-	-	0.06	0.416	0.493	
	1st	FR1 n38 only ENDC	40M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	519000	2595	1	15.40	17.00	1.445	-	-	-0.08	0.126	0.182	0.37
	2nd	FR1 n38 only ENDC	40M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	519000	2595	1	15.60	17.00	1.380	-	-	-0.09	0.121	0.167	
	1st	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	15mm	Ant 1	DSI 2	518598	2592.99	1	23.53	25.00	1.403	-	-	-0.16	0.527	0.739	0.05
	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Bottom Side	15mm	Ant 1	DSI 2	518598	2592.99	1	23.49	25.00	1.416	-	-	-0.08	0.516	0.731	
	1st	FR1 n41 only ENDC	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	518598	2592.99	1	23.86	24.50	1.159	-	-	-0.15	0.551	0.638	0.35
	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	518598	2592.99	1	23.83	24.50	1.167	-	-	0.13	0.504	0.588	



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		only ENDC																					
	1st	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 4	DSI 2	518598	2592.99	1	22.21	24.00	1.510	-	-	-0.05	0.505	0.763	0.17
46	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 4	DSI 2	518598	2592.99	1	22.15	24.00	1.531	-	-	0.05	0.518	0.793	
	1st	FR1 n41 only ENDC	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	518598	2592.99	1	15.53	17.00	1.403	-	-	-0.08	0.096	0.135	0.10
	2nd	FR1 n41 only ENDC	100M	QPSK	1	1	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	518598	2592.99	1	15.88	17.00	1.294	-	-	0.03	0.102	0.132	
3500MHz																							
	1st	LTE Band 42	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	42590	3500	1	19.15	20.00	1.216	62.9	1.006	-0.06	0.543	0.664	1.73
	2nd	LTE Band 42	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	42590	3500	1	19.62	20.00	1.091	62.9	1.006	0.12	0.406	0.446	
	1st	LTE Band 42	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	42590	3500	1	20.47	21.50	1.268	62.9	1.006	0.05	0.170	0.217	0.98
	2nd	LTE Band 42	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	42590	3500	1	20.39	21.50	1.291	62.9	1.006	0.16	0.133	0.173	
	1st	LTE Band 42	20M	QPSK	1	0	-	Top Side	15mm	Ant 5	DSI 2	42590	3500	1	24.59	25.50	1.233	62.9	1.006	-0.08	0.336	0.417	0.09
	2nd	LTE Band 42	20M	QPSK	1	0	-	Top Side	15mm	Ant 5	DSI 2	42590	3500	1	24.87	25.50	1.156	62.9	1.006	-0.1	0.351	0.408	
	1st	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	42190	3460	1	20.79	22.00	1.321	62.9	1.006	-0.03	0.794	1.055	2.27
47	2nd	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	42190	3460	1	20.66	22.00	1.361	62.9	1.006	-0.01	0.457	0.626	
	1st	LTE Band 48	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	55830	3609	1	19.12	20.00	1.225	62.9	1.006	-0.08	0.599	0.738	1.01
	2nd	LTE Band 48	20M	QPSK	1	0	-	Left Side	10mm	Ant 2	DSI 2	55830	3609	1	19.21	20.00	1.199	62.9	1.006	0.02	0.485	0.585	
	1st	LTE Band 48	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	55830	3609	1	20.46	21.50	1.271	62.9	1.006	-0.04	0.229	0.293	1.09
	2nd	LTE Band 48	20M	QPSK	1	0	-	Left Side	10mm	Ant 3	DSI 2	55830	3609	1	20.40	21.50	1.288	62.9	1.006	0.07	0.176	0.228	
	1st	LTE Band 48	20M	QPSK	1	0	-	Top Side	15mm	Ant 5	DSI 2	55830	3609	1	24.48	25.50	1.265	62.9	1.006	0.05	0.464	0.590	0.12
	2nd	LTE Band 48	20M	QPSK	1	0	-	Top Side	15mm	Ant 5	DSI 2	55830	3609	1	24.36	25.50	1.300	62.9	1.006	0.18	0.439	0.574	
	1st	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	55340	3560	1	22.15	23.50	1.365	62.9	1.006	-0.09	0.543	0.745	0.08
48	2nd	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	55340	3560	1	22.14	23.50	1.368	62.9	1.006	-0.04	0.531	0.731	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	641666	3624.99	1	18.28	19.50	1.324	-	-	0.05	0.753	0.997	0.03
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	641666	3624.99	1	18.25	19.50	1.334	-	-	0.01	0.743	0.991	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	641666	3624.99	1	20.55	22.00	1.396	-	-	-0.11	0.323	0.451	0.11
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	641666	3624.99	1	20.89	22.00	1.291	-	-	-0.15	0.341	0.440	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Top Side	10mm	Ant 5	DSI 4	641666	3624.99	1	21.02	22.50	1.406	-	-	-0.03	0.768	1.080	0.31
49	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Top Side	10mm	Ant 5	DSI 4	641666	3624.99	1	21.43	22.50	1.279	-	-	-0.09	0.786	1.006	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	1	20.95	22.50	1.429	-	-	-0.08	0.670	0.957	0.06
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	1	20.94	22.50	1.432	-	-	-0.01	0.659	0.944	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	656000	3840	1	17.56	19.00	1.393	-	-	-0.05	0.227	0.316	0.21
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	656000	3840	1	17.48	19.00	1.419	-	-	0.07	0.212	0.301	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	633334	3500.01	1	17.74	19.00	1.337	-	-	-0.03	0.484	0.647	1.17
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	633334	3500.01	1	17.70	19.00	1.349	-	-	-0.18	0.366	0.494	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	656000	3840	1	21.58	23.00	1.387	-	-	-0.05	0.453	0.628	0.18
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	656000	3840	1	21.46	23.00	1.426	-	-	0.03	0.423	0.603	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	633334	3500.01	1	21.81	23.00	1.315	-	-	-0.02	0.434	0.571	1.75
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	633334	3500.01	1	21.76	23.00	1.330	-	-	-0.15	0.287	0.382	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	656000	3840	1	24.67	26.00	1.358	-	-	0.13	0.587	0.797	0.70
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	656000	3840	1	24.44	26.00	1.432	-	-	0.02	0.474	0.679	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	633334	3500.01	1	24.63	26.00	1.371	-	-	-0.09	0.582	0.798	0.07
50	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	633334	3500.01	1	24.52	26.00	1.406	-	-	-0.03	0.559	0.786	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	656000	3840	1	17.12	18.50	1.374	-	-	-0.13	0.365	0.502	0.84
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	656000	3840	1	17.50	18.50	1.259	-	-	-0.15	0.329	0.414	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	17.36	18.50	1.300	-	-	-0.03	0.293	0.381	0.10
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	17.62	18.50	1.225	-	-	-0.08	0.304	0.372	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	650000	3750	1	18.68	20.00	1.355	-	-	0.14	0.359	0.487	0.03
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	650000	3750	1	18.88	20.00	1.294	-	-	-0.08	0.374	0.484	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	633334	3500.01	1	18.85	20.00	1.303	-	-	-0.03	0.751	0.979	0.37
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 2	DSI 2	633334	3500.01	1	18.77	20.00	1.327	-	-	-0.17	0.678	0.900	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	650000	3750	1	21.64	23.00	1.368	-	-	0.11	0.466	0.637	0.09
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	650000	3750	1	21.63	23.00	1.371	-	-	-0.08	0.455	0.624	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	633334	3500.01	1	22.05	23.00	1.245	-	-	0.01	0.408	0.508	0.28
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Left Side	10mm	Ant 3	DSI 2	633334	3500.01	1	21.96	23.00	1.271	-	-	-0.04	0.375	0.476	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	650000	3750	1	24.60	26.00	1.380	-	-	0.18	0.771	1.064	0



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51	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	650000	3750	1	24.53	26.00	1.403	-	-	-0.08	0.738	1.035	
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	650000	3750	2	24.53	26.00	1.403	-	-	0.05	0.670	0.940	
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	650000	3750	4	24.53	26.00	1.403	-	-	0.02	0.681	0.955	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	633334	3500.01	1	24.51	26.00	1.409	-	-	-0.17	0.619	0.872	0.12
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Top Side	15mm	Ant 5	DSI 2	633334	3500.01	1	24.66	26.00	1.361	-	-	0.17	0.623	0.848	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	650000	3750	1	17.98	19.50	1.419	-	-	-0.05	0.343	0.487	0.12
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Right Side	10mm	Ant 7	DSI 2	650000	3750	1	18.32	19.50	1.312	-	-	0.18	0.361	0.474	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	18.42	19.50	1.282	-	-	-0.07	0.461	0.591	0.05
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	18.36	19.50	1.300	-	-	-0.13	0.449	0.584	

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
2450MHz																			
	1st	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 6	Full power	6	2437	1	18.06	19.00	1.242	100	1.000	0.02	0.304	0.377	0.06
52	2nd	WLAN2.4GHz	802.11b 1Mbps	Top Side	10mm	Ant 6	Full power	6	2437	1	17.99	19.00	1.262	100	1.000	0.06	0.295	0.372	
	1st	Bluetooth	1Mbps	Top Side	10mm	Ant 6	Full power	78	2480	1	10.82	12.00	1.312	76.59	1.088	-0.02	0.038	0.054	0.16
53	2nd	Bluetooth	1Mbps	Top Side	10mm	Ant 6	Full power	78	2480	1	10.76	12.00	1.330	76.59	1.088	0.1	0.036	0.052	
5000MHz																			
	1st	WLAN5.2GHz	802.11a 6Mbps	Top Side	10mm	Ant 6	Full power	40	5200	1	17.02	18.00	1.253	96.97	1.031	-0.09	0.361	0.466	0.14
54	2nd	WLAN5.2GHz	802.11a 6Mbps	Top Side	10mm	Ant 6	Full power	40	5200	1	16.98	18.00	1.265	96.97	1.031	-0.03	0.346	0.451	
	1st	WLAN5.8GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	157	5785	1	17.29	18.00	1.178	96.97	1.031	0.05	0.482	0.585	0.17
55	2nd	WLAN5.8GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	157	5785	1	17.15	18.00	1.216	96.97	1.031	-0.05	0.449	0.563	



16.3 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)	Sample	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)
835MHz																							
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 1	DSI 3	189	836.4	1	28.87	30.00	1.297	-	-	-0.13	0.412	0.534	0.06
56	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 1	DSI 3	189	836.4	1	28.92	30.00	1.282	-	-	0.08	0.411	0.527	
	1st	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 4	DSI 4	189	836.4	1	28.79	30.00	1.321	-	-	-0.13	0.369	0.488	0.66
	2nd	GSM850	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 4	DSI 4	189	836.4	1	28.66	30.00	1.361	-	-	0.01	0.308	0.419	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 1	DSI 3	4182	836.4	1	24.50	25.50	1.259	-	-	0.05	0.343	0.432	0.15
57	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 1	DSI 3	4182	836.4	1	24.42	25.50	1.282	-	-	-0.04	0.325	0.417	
	1st	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 4	DSI 4	4182	836.4	1	23.49	24.50	1.262	-	-	-0.13	0.220	0.278	0.48
	2nd	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	10mm	Ant 4	DSI 4	4182	836.4	1	23.26	24.50	1.330	-	-	0.03	0.187	0.249	
	1st	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 1	DSI 3	20525	836.5	1	23.35	24.50	1.303	-	-	-0.14	0.273	0.356	0.06
58	2nd	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 1	DSI 3	20525	836.5	1	23.11	24.50	1.377	-	-	-0.08	0.255	0.351	
	1st	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 4	DSI 4	20525	836.5	1	23.57	24.50	1.239	-	-	-0.18	0.221	0.274	0.58
	2nd	LTE Band 5	10M	QPSK	1	0	-	Back	10mm	Ant 4	DSI 4	20525	836.5	1	23.50	24.50	1.259	-	-	-0.08	0.191	0.240	
	1st	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Back	10mm	Ant 1	DSI 3	167300	836.5	1	23.52	24.70	1.312	-	-	-0.15	0.286	0.375	0.09
59	2nd	FR1 n5	20M	QPSK	50	28	DFT-SCS-15KHz	Back	10mm	Ant 1	DSI 3	167300	836.5	1	23.42	24.70	1.343	-	-	-0.06	0.273	0.367	
	1st	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Back	10mm	Ant 4	DSI 4	167300	836.5	1	23.61	24.70	1.285	-	-	-0.06	0.223	0.287	0.91
	2nd	FR1 n5	20M	QPSK	1	1	DFT-SCS-15KHz	Back	10mm	Ant 4	DSI 4	167300	836.5	1	23.50	24.70	1.318	-	-	0.1	0.177	0.233	
1750MHz																							
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 2	1413	1732.6	1	22.90	24.00	1.288	-	-	-0.05	0.443	0.571	0.18
	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 2	1413	1732.6	1	22.61	24.00	1.377	-	-	0.08	0.398	0.548	
	1st	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 2	1413	1732.6	1	22.81	23.50	1.172	-	-	-0.01	0.611	0.716	0.65
60	2nd	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 2	1413	1732.6	1	22.80	23.50	1.175	-	-	-0.05	0.525	0.617	
	1st	LTE Band 4	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	20175	1732.5	1	22.83	24.00	1.309	-	-	0.01	0.398	0.521	0.90
	2nd	LTE Band 4	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	20175	1732.5	1	22.71	24.00	1.346	-	-	-0.18	0.314	0.423	
	1st	LTE Band 4 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	20175	1732.5	1	23.30	24.00	1.175	-	-	-0.06	0.201	0.236	1.74
	2nd	LTE Band 4 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	20175	1732.5	1	23.12	24.00	1.225	-	-	0.01	0.129	0.158	
	1st	LTE Band 4	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	20175	1732.5	1	23.17	24.00	1.211	-	-	-0.08	0.586	0.709	0.10
61	2nd	LTE Band 4	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	20175	1732.5	1	23.08	24.00	1.236	-	-	-0.05	0.561	0.693	
	1st	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	132322	1745	1	22.91	24.00	1.285	-	-	-0.03	0.423	0.544	0.81
	2nd	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	132322	1745	1	22.77	24.00	1.327	-	-	0.1	0.340	0.451	
	1st	LTE Band 66 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	132322	1745	1	23.37	24.00	1.156	-	-	0.09	0.211	0.244	0.07
	2nd	LTE Band 66 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	132322	1745	1	23.25	24.00	1.189	-	-	0.12	0.202	0.240	
	1st	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	132322	1745	1	22.69	23.50	1.205	-	-	-0.05	0.533	0.642	0.04
62	2nd	LTE Band 66	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	132322	1745	1	22.56	23.50	1.242	-	-	-0.02	0.512	0.636	
	1st	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	349000	1745	1	22.75	24.50	1.496	-	-	-0.05	0.367	0.549	0.09
	2nd	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	349000	1745	1	23.10	24.50	1.380	-	-	0.08	0.390	0.538	
	1st	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Back	10mm	Ant 2	DSI 2	349000	1745	1	23.12	24.50	1.374	-	-	-0.04	0.217	0.298	0.12
	2nd	FR1 n66 Other PA	40M	QPSK	108	54	DFT-SCS-15KHz	Back	10mm	Ant 2	DSI 2	349000	1745	1	23.10	24.50	1.380	-	-	-0.17	0.210	0.290	
	1st	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	349000	1745	1	23.08	24.50	1.387	-	-	0.1	0.525	0.728	0.46
63	2nd	FR1 n66	40M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	349000	1745	1	23.62	24.50	1.225	-	-	-0.05	0.535	0.655	
1900MHz																							
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 1	DSI 3	661	1880	1	23.62	25.00	1.374	-	-	-0.07	0.378	0.519	0.02
64	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Back	10mm	Ant 1	DSI 3	661	1880	1	23.79	25.00	1.321	-	-	-0.03	0.391	0.517	
	1st	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Front	15mm	Ant 4	DSI 2	661	1880	1	24.89	26.00	1.291	-	-	-0.08	0.352	0.455	1.56
	2nd	GSM1900	-	-	-	-	GPRS (4 Tx slots)	Front	15mm	Ant 4	DSI 2	661	1880	1	24.69	26.00	1.352	-	-	0.14	0.235	0.318	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 2	9400	1880	1	22.98	24.00	1.265	-	-	0.18	0.287	0.363	0.12
	2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 1	DSI 2	9400	1880	1	22.92	24.00	1.282	-	-	0.11	0.275	0.353	
	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 2	9400	1880	1	22.66	23.50	1.213	-	-	-0.08	0.388	0.471	0.29



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65	1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant 4	DSI 2	9400	1880	1	22.55	23.50	1.245	-	-	-0.05	0.354	0.441	
	2nd	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	18900	1880	1	22.98	24.00	1.265	-	-	-0.09	0.274	0.347	0.03
	2nd	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	18900	1880	1	22.86	24.00	1.300	-	-	-0.05	0.265	0.345	
	1st	LTE Band 2 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	18900	1880	1	19.06	20.00	1.242	-	-	0.11	0.320	0.397	0.24
	2nd	LTE Band 2 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	18900	1880	1	19.00	20.00	1.259	-	-	0.18	0.299	0.376	
	1st	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	18900	1880	1	22.13	23.00	1.222	-	-	0.16	0.327	0.400	0.21
66	2nd	LTE Band 2	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	18900	1880	1	22.10	23.00	1.230	-	-	-0.09	0.310	0.381	
	1st	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	376000	1880	1	23.07	24.50	1.390	-	-	-0.19	0.314	0.436	0.83
	2nd	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	376000	1880	1	23.00	24.50	1.413	-	-	0.14	0.255	0.360	
	1st	FR1 n2 Other PA(DSDS)	20M	QPSK	50	28	DFT-SCS-15KHz	Back	10mm	Ant 2	DSI 2	376000	1880	1	18.62	20.00	1.374	-	-	-0.15	0.340	0.467	0.38
	2nd	FR1 n2 Other PA(DSDS)	20M	QPSK	50	28	DFT-SCS-15KHz	Back	10mm	Ant 2	DSI 2	376000	1880	1	18.53	20.00	1.403	-	-	-0.01	0.305	0.428	
	1st	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	376000	1880	1	22.06	23.50	1.393	-	-	-0.08	0.335	0.467	0.36
67	2nd	FR1 n2	20M	QPSK	1	1	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	376000	1880	1	21.97	23.50	1.422	-	-	-0.17	0.302	0.430	
2600MHz																							
	1st	LTE Band 7	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	21100	2535	1	23.47	24.50	1.268	-	-	0.18	0.376	0.477	0.87
68	2nd	LTE Band 7	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	21100	2535	1	23.32	24.50	1.312	-	-	0.02	0.297	0.390	
	1st	LTE Band 7 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	21100	2535	1	23.25	24.00	1.189	-	-	-0.02	0.218	0.259	0.17
	2nd	LTE Band 7 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	21100	2535	1	23.11	24.00	1.227	-	-	0.17	0.203	0.249	
	1st	LTE Band 7 UL CA	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	21100	2535	1	23.75	24.50	1.189	-	-	-0.01	0.347	0.412	0.26
	2nd	LTE Band 7 UL CA	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	21100	2535	1	23.68	24.50	1.208	-	-	-0.05	0.321	0.388	
	1st	LTE Band 7	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	21100	2535	1	23.04	24.50	1.400	-	-	-0.01	0.304	0.425	1.01
	2nd	LTE Band 7	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	21100	2535	1	23.01	24.50	1.409	-	-	0.02	0.239	0.337	
	1st	LTE Band 38	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	38000	2595	1	23.51	24.50	1.256	62.9	1.006	-0.18	0.245	0.310	0.24
69	2nd	LTE Band 38	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	38000	2595	1	23.36	24.50	1.300	62.9	1.006	-0.07	0.224	0.293	
	1st	LTE Band 38 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	38000	2595	1	23.28	24.00	1.180	62.9	1.006	-0.08	0.157	0.186	0.39
	2nd	LTE Band 38 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	38000	2595	1	23.16	24.00	1.213	62.9	1.006	0.1	0.139	0.170	
	1st	LTE Band 38	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	38000	2595	1	23.16	24.50	1.361	62.9	1.006	-0.05	0.194	0.266	0.67
	2nd	LTE Band 38	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	38000	2595	1	23.05	24.50	1.396	62.9	1.006	0.02	0.162	0.228	
	1st	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	40620	2593	1	23.60	24.50	1.230	62.9	1.006	-0.17	0.243	0.301	0.19
70	2nd	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 1	DSI 2	40620	2593	1	23.48	24.50	1.265	62.9	1.006	-0.06	0.226	0.288	
	1st	LTE Band 41 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	40620	2593	1	23.30	24.00	1.175	62.9	1.006	-0.05	0.153	0.181	0.12
	2nd	LTE Band 41 Other PA	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	40620	2593	1	23.16	24.00	1.213	62.9	1.006	0.04	0.144	0.176	
	1st	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	40620	2593	1	23.27	24.50	1.327	62.9	1.006	-0.07	0.163	0.218	0.08
	2nd	LTE Band 41	20M	QPSK	1	0	-	Back	15mm	Ant 4	DSI 2	40620	2593	1	23.19	24.50	1.352	62.9	1.006	0.01	0.157	0.214	
	1st	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	507000	2535	1	23.52	25.00	1.406	-	-	-0.04	0.358	0.503	0.42
71	2nd	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Back	15mm	Ant 1	DSI 2	507000	2535	1	23.40	25.00	1.445	-	-	-0.02	0.316	0.457	
	1st	FR1 n7 only ENDC	50M	QPSK	1	268	DFT-SCS-15KHz	Back	10mm	Ant 3	DSI 2	507000	2535	1	23.86	24.50	1.159	-	-	-0.09	0.313	0.363	0.06
	2nd	FR1 n7 only ENDC	50M	QPSK	1	268	DFT-SCS-15KHz	Back	10mm	Ant 3	DSI 2	507000	2535	1	23.73	24.50	1.194	-	-	-0.08	0.300	0.358	
	1st	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	507000	2535	1	23.52	25.00	1.406	-	-	-0.06	0.287	0.404	0.02
	2nd	FR1 n7	50M	QPSK	1	268	DFT-SCS-15KHz	Back	15mm	Ant 4	DSI 2	507000	2535	1	23.68	25.00	1.355	-	-	0.02	0.297	0.402	
	1st	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 1	DSI 2	519000	2595	1	23.47	25.00	1.422	-	-	-0.03	0.395	0.562	0.29
72	2nd	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 1	DSI 2	519000	2595	1	23.41	25.00	1.442	-	-	-0.02	0.365	0.526	
	1st	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	519000	2595	1	23.72	24.50	1.197	-	-	-0.08	0.341	0.408	0.11
	2nd	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	519000	2595	1	23.66	24.50	1.213	-	-	-0.09	0.328	0.398	
	1st	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 4	DSI 2	519000	2595	1	21.56	23.00	1.393	-	-	0.05	0.232	0.323	0.19
	2nd	FR1 n38	40M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 4	DSI 2	519000	2595	1	22.26	23.00	1.186	-	-	-0.08	0.261	0.309	
	1st	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	519000	2595	1	15.39	17.00	1.449	-	-	0.01	0.083	0.120	0.11
	2nd	FR1 n38 only ENDC	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	519000	2595	1	15.56	17.00	1.393	-	-	0.13	0.084	0.117	
	1st	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 1	DSI 2	518598	2592.99	1	23.53	25.00	1.403	-	-	0.03	0.411	0.577	0.04
73	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 1	DSI 2	518598	2592.99	1	23.49	25.00	1.416	-	-	-0.06	0.404	0.572	
	1st	FR1 n41 only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	518598	2592.99	1	23.83	24.50	1.167	-	-	-0.03	0.362	0.422	0.11
	2nd	FR1 n41 only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	518598	2592.99	1	23.79	24.50	1.178	-	-	0.03	0.349	0.411	
	1st	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 4	DSI 2	518598	2592.99	1	22.21	24.00	1.510	-	-	0.06	0.349	0.527	0.86



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	2nd	FR1 n41	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 4	DSI 2	518598	2592.99	1	22.15	24.00	1.531	-	-	0.08	0.282	0.432	
	1st	FR1 n41 only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	518598	2592.99	1	15.51	17.00	1.409	-	-	0.06	0.071	0.100	0.22
	2nd	FR1 n41 only ENDC	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	518598	2592.99	1	15.85	17.00	1.303	-	-	0.16	0.073	0.095	
3500MHz																							
	1st	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	42590	3500	1	19.15	20.00	1.216	62.9	1.006	-0.02	0.156	0.191	0.05
	2nd	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	42590	3500	1	19.62	20.00	1.091	62.9	1.006	-0.1	0.172	0.189	
	1st	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	42590	3500	1	20.47	21.50	1.268	62.9	1.006	-0.05	0.094	0.120	0.11
	2nd	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	42590	3500	1	20.39	21.50	1.291	62.9	1.006	0.07	0.090	0.117	
	1st	LTE Band 42	20M	QPSK	1	0	-	Back	15mm	Ant 5	DSI 2	42590	3500	1	24.59	25.50	1.233	62.9	1.006	-0.05	0.301	0.373	0.02
	2nd	LTE Band 42	20M	QPSK	1	0	-	Back	15mm	Ant 5	DSI 2	42590	3500	1	24.87	25.50	1.156	62.9	1.006	0.18	0.319	0.371	
	1st	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	42190	3460	1	20.79	22.00	1.321	62.9	1.006	-0.03	0.794	1.055	2.27
74	2nd	LTE Band 42	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	42190	3460	1	20.66	22.00	1.361	62.9	1.006	-0.01	0.457	0.626	
	1st	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	55830	3609	1	19.12	20.00	1.225	62.9	1.006	-0.07	0.176	0.217	0.06
	2nd	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 2	DSI 2	55830	3609	1	19.21	20.00	1.199	62.9	1.006	-0.1	0.177	0.214	
	1st	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	55830	3609	1	20.46	21.50	1.271	62.9	1.006	-0.05	0.145	0.185	0.27
	2nd	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 3	DSI 2	55830	3609	1	20.40	21.50	1.288	62.9	1.006	0.01	0.134	0.174	
	1st	LTE Band 48	20M	QPSK	1	0	-	Front	15mm	Ant 5	DSI 2	55830	3609	1	24.48	25.50	1.265	62.9	1.006	0.16	0.416	0.529	0.34
	2nd	LTE Band 48	20M	QPSK	1	0	-	Front	15mm	Ant 5	DSI 2	55830	3609	1	24.36	25.50	1.300	62.9	1.006	-0.15	0.374	0.489	
	1st	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	55340	3560	1	22.15	23.50	1.365	62.9	1.006	-0.09	0.543	0.745	0.08
75	2nd	LTE Band 48	20M	QPSK	1	0	-	Back	10mm	Ant 7	DSI 2	55340	3560	1	22.14	23.50	1.368	62.9	1.006	-0.04	0.531	0.731	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	641666	3624.99	1	18.28	19.50	1.324	-	-	-0.02	0.218	0.289	0.15
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	641666	3624.99	1	18.25	19.50	1.334	-	-	0.19	0.209	0.279	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	641666	3624.99	1	20.50	22.00	1.413	-	-	-0.02	0.271	0.383	0.07
	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	641666	3624.99	1	20.85	22.00	1.303	-	-	0.07	0.289	0.377	
	1st	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Front	10mm	Ant 5	DSI 4	641666	3624.99	1	21.02	22.50	1.406	-	-	-0.04	0.672	0.945	0.26
	2nd	FR1 n48	40M	QPSK	50	28	DFT-SCS-30KHz	Front	10mm	Ant 5	DSI 4	641666	3624.99	1	21.43	22.50	1.279	-	-	-0.18	0.696	0.890	
	1st	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	1	20.95	22.50	1.429	-	-	-0.08	0.670	0.957	0.06
76	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	1	20.94	22.50	1.432	-	-	-0.01	0.659	0.944	
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	2	20.94	22.50	1.432			-0.01	0.645	0.924	
	2nd	FR1 n48	40M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	641666	3624.99	4	20.94	22.50	1.432			-0.09	0.612	0.876	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	656000	3840	1	17.56	19.00	1.393	-	-	-0.05	0.157	0.219	1.64
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	656000	3840	1	17.48	19.00	1.419	-	-	0.03	0.106	0.150	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	633334	3500.01	1	17.73	19.00	1.340	-	-	-0.05	0.394	0.528	1.10
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	633334	3500.01	1	17.66	19.00	1.361	-	-	-0.15	0.301	0.410	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 3	DSI 2	656000	3840	1	21.58	23.00	1.387	-	-	-0.07	0.354	0.491	0.39
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Front	10mm	Ant 3	DSI 2	656000	3840	1	21.46	23.00	1.426	-	-	-0.15	0.315	0.449	
	1st	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	633334	3500.01	1	21.81	23.00	1.315	-	-	-0.04	0.132	0.174	0.47
	2nd	FR1 n77 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	633334	3500.01	1	21.76	23.00	1.330	-	-	0.11	0.117	0.156	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	15mm	Ant 5	DSI 2	656000	3840	1	24.67	26.00	1.358	-	-	0.07	0.501	0.681	0.70
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	15mm	Ant 5	DSI 2	656000	3840	1	24.44	26.00	1.432	-	-	-0.08	0.404	0.579	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	633334	3500.01	1	24.63	26.00	1.371	-	-	0.02	0.577	0.791	0.31
77	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	633334	3500.01	1	24.52	26.00	1.406	-	-	-0.03	0.524	0.737	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	656000	3840	1	17.18	18.50	1.355	-	-	0.02	0.169	0.229	0.02
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	656000	3840	1	17.56	18.50	1.242	-	-	-0.17	0.184	0.228	
	1st	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	17.36	18.50	1.300	-	-	-0.03	0.293	0.381	0.10
	2nd	FR1 n77 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	17.62	18.50	1.225	-	-	-0.08	0.304	0.372	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 2	DSI 2	650000	3750	1	18.69	20.00	1.352	-	-	0.1	0.138	0.187	0.02
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Front	10mm	Ant 2	DSI 2	650000	3750	1	18.92	20.00	1.282	-	-	-0.04	0.145	0.186	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	633334	3500.01	1	18.85	20.00	1.303	-	-	-0.17	0.275	0.358	0.90
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 2	DSI 2	633334	3500.01	1	18.77	20.00	1.327	-	-	-0.08	0.219	0.291	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	650000	3750	1	21.64	23.00	1.368	-	-	0.02	0.423	0.579	0.02
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	650000	3750	1	21.63	23.00	1.371	-	-	0.17	0.421	0.577	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	633334	3500.01	1	22.05	23.00	1.245	-	-	-0.08	0.306	0.381	0.21
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 3	DSI 2	633334	3500.01	1	21.96	23.00	1.271	-	-	0.18	0.286	0.363	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	650000	3750	1	24.60	26.00	1.380	-	-	-0.03	0.552	0.762	0.06
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	650000	3750	1	24.53	26.00	1.403	-	-	-0.04	0.535	0.751	



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	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	633334	3500.01	1	24.51	26.00	1.409	-	-	0.01	0.609	0.858	0.11
78	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	15mm	Ant 5	DSI 2	633334	3500.01	1	24.66	26.00	1.361	-	-	-0.07	0.614	0.836	
	1st	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	650000	3750	1	17.98	19.50	1.419	-	-	-0.04	0.242	0.343	0.08
	2nd	FR1 n78 HPUE	100M	QPSK	135	69	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	650000	3750	1	18.32	19.50	1.312	-	-	-0.08	0.257	0.337	
	1st	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	18.42	19.50	1.282	-	-	-0.07	0.461	0.591	0.05
	2nd	FR1 n78 HPUE	100M	QPSK	1	1	DFT-SCS-30KHz	Back	10mm	Ant 7	DSI 2	633334	3500.01	1	18.36	19.50	1.300	-	-	-0.13	0.449	0.584	

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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 _{abs} (dB)
2450MHz																			
	1st	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6	Full power	6	2437	1	18.06	19.00	1.242	100	1.000	-0.19	0.191	0.237	0.02
79	2nd	WLAN2.4GHz	802.11b 1Mbps	Back	10mm	Ant 6	Full power	6	2437	1	17.99	19.00	1.262	100	1.000	0.14	0.187	0.236	
	1st	Bluetooth	1Mbps	Back	10mm	Ant 6	Full power	78	2480	1	10.82	12.00	1.312	76.59	1.088	0.09	0.002	0.003	0.00
80	2nd	Bluetooth	1Mbps	Back	10mm	Ant 6	Full power	78	2480	1	10.76	12.00	1.330	76.59	1.088	0.02	0.002	0.003	
5000MHz																			
	1st	WLAN5.3GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	60	5300	1	16.96	18.00	1.271	96.97	1.031	0.09	0.206	0.270	0.06
81	2nd	WLAN5.3GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	60	5300	1	16.91	18.00	1.285	96.97	1.031	0.06	0.201	0.266	
	1st	WLAN5.5GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	144	5720	1	17.22	18.00	1.197	96.97	1.031	-0.03	0.407	0.502	0.14
82	2nd	WLAN5.5GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	144	5720	1	17.19	18.00	1.205	96.97	1.031	0.09	0.391	0.486	
	1st	WLAN5.8GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	157	5785	1	17.29	18.00	1.178	96.97	1.031	0.05	0.482	0.585	0.17
83	2nd	WLAN5.8GHz	802.11a 6Mbps	Front	10mm	Ant 6	Full power	157	5785	1	17.15	18.00	1.216	96.97	1.031	-0.05	0.449	0.563	

16.4 Product specific 10g SAR

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
5000MHz																			
	1st	WLAN5.3GHz	802.11a 6Mbps	Top Side	0mm	Ant 6	Full power	60	5300	1	16.96	18.00	1.271	96.97	1.031	-0.12	1.07	1.402	0.07
84	2nd	WLAN5.3GHz	802.11a 6Mbps	Top Side	0mm	Ant 6	Full power	60	5300	1	16.91	18.00	1.285	96.97	1.031	0.05	1.040	1.378	
	1st	WLAN5.5GHz	802.11a 6Mbps	Front	0mm	Ant 6	Full power	144	5720	1	17.22	18.00	1.197	96.97	1.031	-0.08	1.36	1.678	0.20
85	2nd	WLAN5.5GHz	802.11a 6Mbps	Front	0mm	Ant 6	Full power	144	5720	1	17.19	18.00	1.205	96.97	1.031	-0.03	1.290	1.603	
	2nd	WLAN5.5GHz	802.11a 6Mbps	Front	0mm	Ant 6	Full power	144	5720	2	17.19	18.00	1.205	96.97	1.031	0.06	1.22	1.516	
	2nd	WLAN5.5GHz	802.11a 6Mbps	Front	0mm	Ant 6	Full power	144	5720	4	17.19	18.00	1.205	96.97	1.031	-0.13	1.10	1.367	

<NFC>

Plot No.	No.	Band	Mode	Test Position	Gap (mm)	Freq. (MHz)	Power Drift (dB)	Measured 10g SAR (W/kg)	Deviation d _{dB} (dB)
	1st	NFC	ASK	Back	0mm	13.56	0.09	0.012	0.79
86	2nd	NFC	ASK	Back	0mm	13.56	0.02	0.010	



16.5 Repeated SAR Measurement

<1g>

Plot 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)	Ratio	Reported 1g SAR (W/kg)
1st	FR1 n77 HPUE	100M	QPSK	270	0	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	16.35	17.50	1.303	-	-	-0.1	0.820	1	1.069
2nd	FR1 n77 HPUE	100M	QPSK	270	0	DFT-SCS-30KHz	Left Cheek	0mm	Ant 5	DSI 1	633334	3500.01	16.35	17.50	1.303	-	-	0.02	0.815	1.006	1.062
1st	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Left Cheek	0mm	Ant 6	Standalone	6	2437	16.61	17.50	1.227	100	1.000	0.03	0.850	1	1.043
2nd	WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Left Cheek	0mm	Ant 6	Standalone	6	2437	16.61	17.50	1.227	100	1.000	0.01	0.844	1.007	1.036
1st	WLAN5.3GHz	-	-	-	-	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 6	Standalone	62	5310	14.10	15.00	1.230	93.67	1.068	-0.07	0.812	1	1.067
2nd	WLAN5.3GHz	-	-	-	-	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 6	Standalone	62	5310	14.10	15.00	1.230	93.67	1.068	0.02	0.808	1.005	1.062
1st	WLAN5.8GHz	-	-	-	-	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	13.23	14.00	1.194	88.19	1.134	0.02	0.803	1	1.087
2nd	WLAN5.8GHz	-	-	-	-	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 6	Standalone	155	5775	13.23	14.00	1.194	88.19	1.134	0.05	0.799	1.005	1.082

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/kg}$, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured* SAR.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

17. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific 10g SAR
1.	WWAN + WLAN 2.4GHz	Yes	Yes	Yes	Yes
2.	WWAN + WLAN 5GHz	Yes	Yes	Yes	Yes
3.	WWAN + Bluetooth	Yes	Yes	Yes	Yes
4.	WWAN + WLAN 5GHz + Bluetooth	Yes	Yes	Yes	Yes
5.	WWAN + WLAN 2.4GHz + NFC				Yes
6.	WWAN + WLAN 5GHz + NFC				Yes
7.	WWAN + Bluetooth + NFC				Yes
8.	WWAN + WLAN 5GHz + Bluetooth + NFC				Yes

General Note:

- This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
- WWAN above includes 5G NR bands and EN-DC combination.
- EUT will choose each GSM, WCDMA, LTE and 5GNR according to the network signal condition; therefore, they will not operate simultaneously at any moment.
- This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
- 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).
- According to the EUT characteristic, WLAN5GHz and Bluetooth can transmit simultaneously.
- According to the EUT characteristic, WLAN2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
- According to the EUT characteristic, WLAN2.4GHz and WLAN5GHz cannot transmit simultaneously.
- NFC can transmit simultaneously with other Radios in extremity exposure condition.
- The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
- For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
- 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.

Conclusion:

- The Spot check results from chapter 16.1 to 16.4, showed that Deviation of the SAR results did not exceed 3dB, SAR data reuse is justified.
- For the verified maximum SAR from chapter 16.1 to 16.4, when the SAR test results were less than reference model SAR results (Sporton SAR report no.: FA471506), there is no need to consider co-located SAR for reference model report had been performed conservatively.

Test Engineer : Martin Li, Varus Wang, Light Wang, Ricky Gu

18. 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 $\leq 30\%$, 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.

Declaration of Conformity:

The test results with all measurement uncertainty excluded is 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.

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	$1/k^{(b)}$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) k is the coverage factor

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.

Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 4 MHz - 10 GHz range)							
Error Description	Uncert. Value (±%)	Prob. Dist.	Div.	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System errors							
Probe calibration	18.6	N	2	1	1	9.3	9.3
Probe calibration drift	1.7	R	1.732	1	1	1.0	1.0
Probe linearity and detection Limit	4.7	R	1.732	1	1	2.7	2.7
Broadband signal	2.8	R	1.732	1	1	1.6	1.6
Probe isotropy	7.6	R	1.732	1	1	4.4	4.4
Other probe and data acquisition errors	2.4	N	1	1	1	2.4	2.4
RF ambient and noise	1.8	N	1	1	1	1.8	1.8
Probe positioning errors	0.006	N	1	0.5	0.5	0.0	0.0
Data processing errors	4.0	N	1	1	1	4.0	4.0
Phantom and Device Errors							
Measurement of phantom conductivity (σ)	2.5	N	1	0.78	0.71	2.0	1.8
Temperature effects (medium)	5.4	R	1.732	0.78	0.71	2.4	2.2
Shell permittivity	14.0	R	1.732	0.5	0.5	4.0	4.0
Distance between the radiating element of the DUT and the phantom medium	2.0	N	1	2	2	4.0	4.0
Repeatability of positioning the DUT or source against the phantom	1.0	N	1	1	1	1.0	1.0
Device holder effects	3.6	N	1	1	1	3.6	3.6
Effect of operating mode on probe sensitivity	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
Variation in SAR due to drift in output of DUT	2.5	N	1	1	1	2.5	2.5
Validation antenna uncertainty (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Uncertainty in accepted power (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Correction to the SAR results							
Phantom deviation from target (ϵ', σ)	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0.0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						14.5%	14.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.0%	28.8%

19. References

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