FCC SAR TEST REPORT

FCC ID	:	**A4RG1F8F**
Equipment	:	**Phone**
Model Name	:	**G1F8F**
Applicant	:	**Google LLC** **1600 Amphitheatre Parkway,** **Mountain View, California, 94043 USA**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on Dec 07, 2020 and testing was started from Jun. 25, 2021 and completed on Jun. 25, 2021. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

Sporton International Inc. EMC & Wireless Communications Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan

Table of Contents

1. Statement of Compliance 4
2. Equipment Under Test (EUT) Information 5
2.1 General Information 5
2.2 Maximum Tune-up Limit 6
2.3 General LTE SAR Test and Reporting Considerations 17
2.4 General 5G NR SAR Test and Reporting Considerations 20
3. Smart Transmit feature for RF Exposure compliance 22
4. Guidance Applied 26
5. RF Exposure Limits 26
5.1 Uncontrolled Environment 26
5.2 Controlled Environment 26
6. Specific Absorption Rate (SAR) 27
6.1 Introduction 27
6.2 SAR Definition 27
7. System Description and Setup 28
7.1 Test Site Location 28
7.2 E-Field Probe 29
7.3 Data Acquisition Electronics (DAE) 29
7.4 Phantom 30
7.5 Device Holder 31
8. Measurement Procedures 32
8.1 Spatial Peak SAR Evaluation 32
8.2 Power Reference Measurement 33
8.3 Area Scan 33
8.4 Zoom Scan 34
8.5 Volume Scan Procedures 34
8.6 Power Drift Monitoring 34
9. Test Equipment List 35
10. System Verification 36
10.1 Tissue Verification 36
10.2 System Performance Check Results 36
11. RF Exposure Positions 37
11.1 Ear and handset reference point 37
11.2 Definition of the cheek position 38
11.3 Definition of the tilt position 39
11.4 Body Worn Accessory 39
11.5 Product Specific Exposure 40
11.6 Wireless Router 40
12. 5G NR Output Power (Unit: dBm) 41
13. RF Exposure position consideration 46
14. SAR Test Results 47
14.1 Head SAR 48
14.2 Hotspot SAR 48
14.3 Body Worn Accessory SAR 49
15. Simultaneous Transmission Analysis 50
15.1 5G NR + LTE + WLAN + BT Sim-Tx analysis 51
15.2 Head Exposure Conditions 52
15.3 Hotspot Exposure Conditions 52
15.4 Body-Worn Accessory Exposure Conditions 52
16. Uncertainty Assessment 53
17. References 53
Appendix A. Plots of System Performance Check
Appendix B. Plots of High SAR Measurement
Appendix C. DASY Calibration Certificate
Appendix D. Test Setup Photos and Antenna Location

History of this test report

Report No.	Version	Description	Issued Date
FA0O1507-05A	01	Initial issue of report	Jul. 29, 2021

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Google LLC, Phone, G1F8F, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	
		1g SAR (W/kg)			
Licensed	FR1 n77	0.15	0.73	0.73	1.21
Date of Testing:		2021/6/25			

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. 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

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Equipment Under Test (EUT) Information

2.1 General Information

Product Feature & Specification	
Equipment Name	Phone
Model Name	G1F8F
FCC ID	A4RG1F8F
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n12 : 699 MHz ~ 716 MHz 5G NR n25 : 1850 MHz ~ 1915 MHz 5G NR n41 : 2496 MHz ~ 2690 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n71 : 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz WLAN 2.4GHz Band: 2402 MHz ~ 2462 MHz WLAN U-NII 1: 5150 MHz ~ 5250 MHz WLAN U-NII 2: 5250 MHz ~ 5350 MHz WLAN U-NII 3: 5470 MHz ~ 5725 MHz WLAN U-NII 4: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) LTE: QPSK, 16QAM, 64QAM, 256QAM 5G NR: DFT-s-OFDM/CP-OFDM, Pi/2 BPSK/QPSK/16QAM/64QAM/256QAM WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC: ASK
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.
Remark: 1. Based on original report FCC ID: A4RG1F8F Report No. FA0O1507-01B to enable 3450MHz ~ 3550 MHz of 5G NR n77. 2. Since n77/78 which Plimit > Pmax, the smart transmit part2 validation test is not needed as no power penformance will be required in this condition. Detail Plimit and Pmax refer to section 3.0.	

2.2 Maximum Tune-up Limit

General Note:

1. For each cellular band, the device has several WWAN antennas, the antenna selection is based on the connection quality condition, and only one antenna will transmit at a time.
2. The device implements the power management and sensor detection for SAR compliance at different exposure conditions (head, body-worn, hotspot) by DSI and the Qualcomm Smart Transmit will manage to ensure the power level not exceeding the associated power table. Details about the power management decision and sensor detection are provided in the operational description.
3. Below table shows maximum tune up output power configured for this EUT for various transmit conditions (Device State Index DSI) by manufacturer.
4. The DSI 0 was not used for SAR testing, the other DSI may have the same power levels but DSI 0 is covered for all modes under the mobile RF exposure evaluation, please refer to Sporton's test report FA0O1507-05B

Antenna configuration	
Config*	Support transmit antenna and band
Config 0	ANT 0: GSM850, UMTS B5, CDMA BC0/BC10, LTE B5/B12/B13/B14/B17/B26/B71, NR n5/n12/n71 ANT 2: GSM1900, UMTS B2/B4, CDMA BC1, LTE B2/B4/B7/B25/B30/B66/B38/B41, NR n2/n25/n41/n66 ANT 5: NR n41 ANT 7: LTE B48, NR n77/n78
Config 1	ANT 0: GSM1900, UMTS B2/B4, CDMA BC1, LTE B2/B4/B7/B25/B30/B66/B38/B41, NR n2/n25/n41/n66 ANT 1: GSM850, UMTS B5, CDMA BC0/BC10, LTE B5/B12/B13/B14/B17/B26/B71, NR n5/n12/n71 ANT 2: LTE B48, NR n77/n78

*Config 0 and 1 means output ports of power measurement for different antennas and bands.

Config 0			Maximum Transmit Power Level (dBm)					
			DSI_0	DSI_2	DSI_4	DSI_6	DSI_7	DSI_8
Radio Tech	Band Number	Antenna name	Default	Head Standalone	Body Standalone	Hotspot Simultaneous Transmit	Head Simultaneous Transmit	Body Simultaneous Transmit
GSM/GPRS 1TX	850	ANT0	33.5	33.5	33.5	33.5	33.5	33.5
GPRS2TX	850	ANT0	32.5	32.5	32.5	32.5	32.5	32.5
GPRS3TX	850	ANT0	30.5	30.5	30.5	30.5	30.5	30.5
GPRS4TX	850	ANT0	29.5	29.5	29.5	29.5	29.5	29.5
EGPRS 1TX	850	ANT0	27.5	27.5	27.5	27.5	27.5	27.5
EGPRS 2TX	850	ANT0	27	27	27	27	27	27
EGPRS 3TX	850	ANT0	25	25	25	25	25	25
EGPRS 4TX	850	ANT0	23	23	23	23	23	23
GSM/GPRS 1TX	1900	ANT2	30.5	30.5	30.5	30.5	30.5	30.5
GPRS2TX	1900	ANT2	29.7	29.7	29.7	29.7	29.7	29.7
GPRS3TX	1900	ANT2	28	28	28	28	28	28
GPRS4TX	1900	ANT2	27	27	27	27	27	27
EGPRS 1TX	1900	ANT2	26.5	26.5	26.5	26.5	26.5	26.5
EGPRS 2TX	1900	ANT2	26	26	26	26	26	26
EGPRS 3TX	1900	ANT2	25	25	25	25	25	25
EGPRS 4TX	1900	ANT2	24	24	24	24	24	24
WCDMA AMR/RMC	B2	ANT2	25.7	25.7	25.7	24.9	25.7	24.9
WCDMA HSDPA/HSPA	B2	ANT2	24.7	24.7	24.7	23.9	24.7	23.9
WCDMA AMR/RMC	B4	ANT2	25.7	25.7	25.2	24.4	25.7	24.6
WCDMA HSDPA/HSPA	B4	ANT2	24.7	24.7	24.2	23.4	24.7	23.6
WCDMA AMR/RMC	B5	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
WCDMA HSDPA/HSPA	B5	ANT0	24.7	24.7	24.7	24.7	24.7	24.7
CDMA	BC0	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
CDMA	BC1	ANT2	25.5	25.5	25.1	24.3	25.5	24.3
CDMA	BC10	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
LTE	B2	ANT2	25.7	25.7	24.8	24	25.7	24.4
LTE	B4	ANT2	25.7	25.7	24.8	24	25.7	24
LTE	B5	ANT0	25.7	25.7	25.7	25.7	25.7	25.7

LTE	B7	ANT2	25.7	25.7	24.1	23.3	25.7	23.3
LTE	B12	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B13	ANT0	25.2	25.2	25.2	25.2	25.2	25.2
LTE	B14	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B17	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B25	ANT2	25.7	25.7	24.8	24	25.7	24.4
LTE	B26	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B30	ANT2	24.2	24.2	24.2	24.2	24.2	24.2
LTE	B38	ANT2	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B41 PC3	ANT2	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B41 HPUE PC2	ANT2	27.5	27.5	27.5	27.5	27.5	27.5
LTE	B48	ANT7	25.7	25.7	24.1	23.3	25.7	23.3
LTE	B66	ANT2	25.7	25.7	24.8	24	25.7	24
LTE	B71	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
5G FR1	n2	ANT2	25.7	25.7	25.1	24.3	25.7	24.7
5G FR1	n5	ANT0	25	25	25	25	25	25
5G FR1	n12	ANT0	24.7	24.7	24.7	24.7	24.7	24.7
5G FR1	n25	ANT2	25.7	25.7	25.1	24.3	25.7	24.7
5G FR1	n41 PC3	ANT2	25.7	25.7	25.7	25.7	25.7	25.7
5G FR1	n41 PC3	ANT5	25.7	25.7	25.7	25.7	25.7	25.7
5G FR1	n41 HPUE PC2	ANT5	27.5	27.5	26.8	25.9	27.5	26.8
5G FR1	n66	ANT2	25.7	25.7	25.1	24.3	25.7	24.3
5G FR1	n71	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
5G FR1	n77 PC3	ANT7	25.7	25.7	25.7	25.7	25.7	25.7
5G FR1	n77 HPUE PC2	ANT7	26.5	26.5	26.5	26.5	26.5	26.5
5G FR1	n78 PC3	ANT7	25	25	25	25	25	25
5G FR1	n78 HPUE PC2	ANT7	26.5	26.5	26.5	26.5	26.5	26.5

Config 1			Maximum Transmit Power Level (dBm)					
			DSI_0	DSI_2	DSI_4	DSI_6	DSI_7	DSI_8
Radio Tech	Band Number	Antenna name	Default	Head Standalone	Body Standalone	Hotspot Simultaneous Transmit	Head Simultaneous Transmit	Body Simultaneous Transmit
GSM/GPRS 1TX	850	ANT1	32.2	32.2	32.2	32.2	32.2	32.2
GPRS2TX	850	ANT1	31.2	31.2	31.2	31.2	31.2	31.2
GPRS3TX	850	ANT1	29.2	29.2	29.2	29.2	29.2	29.2
GPRS4TX	850	ANT1	28.2	28.2	28.2	28.2	28.2	28.2
EGPRS 1TX	850	ANT1	26.5	26.5	26.5	26.5	26.5	26.5
EGPRS 2TX	850	ANT1	26	26	26	26	26	26
EGPRS 3TX	850	ANT1	24	24	24	24	24	24
EGPRS 4TX	850	ANT1	22	22	22	22	22	22
GSM/GPRS 1TX	1900	ANT0	30.2	30.2	30.2	30.2	30.2	30.2
GPRS2TX	1900	ANT0	29.7	29.7	29.7	29.7	29.7	29.7
GPRS3TX	1900	ANT0	27.7	27.7	27.7	27.7	27.7	27.7
GPRS4TX	1900	ANT0	26.7	26.7	26.7	26.7	26.7	26.7
EGPRS 1TX	1900	ANT0	26.5	26.5	26.5	26.5	26.5	26.5
EGPRS 2TX	1900	ANT0	26	26	26	26	26	26
EGPRS 3TX	1900	ANT0	25	25	25	25	25	25
EGPRS 4TX	1900	ANT0	24	24	24	24	24	24
WCDMA AMR/RMC	B2	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
WCDMA HSDPA/HSPA	B2	ANT0	24.5	24.5	24.5	24.5	24.5	24.5
WCDMA AMR/RMC	B4	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
WCDMA HSDPA/HSPA	B4	ANT0	24.5	24.5	24.5	24.5	24.5	24.5
WCDMA AMR/RMC	B5	ANT1	25	25	25	25	25	25
WCDMA HSDPA/HSPA	B5	ANT1	24	24	24	24	24	24
CDMA	BC0	ANT1	25.5	25.4	25.5	25.5	24.6	25.5
CDMA	BC1	ANT0	25.5	25.5	25.5	25.5	25.5	25.5

CDMA	BC10	ANT1	25.5	25.5	25.5	25.5	24.7	25.5
LTE	B2	ANT0	25.5	25.5	25.5	25.1	25.5	25.5
LTE	B4	ANT0	25.5	25.5	25.5	25.1	25.5	25.1
LTE	B5	ANT1	25	25	25	25	25	25
LTE	B7	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
LTE	B12	ANT1	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B13	ANT1	25	25	25	25	25	25
LTE	B14	ANT1	25	25	25	25	25	25
LTE	B17	ANT1	25	25	25	25	25	25
LTE	B25	ANT0	25.5	25.5	25.5	25.1	25.5	25.5
LTE	B26	ANT1	25	25	25	25	25	25
LTE	B30	ANT0	25.7	25.7	25.7	25.7	25.7	25.7
LTE	B38	ANT0	25.2	25.2	25.2	25.2	25.2	25.2
LTE	B41 PC3	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
LTE	B41 HPUE PC2	ANT0	27	27	27	27	27	27
LTE	B48	ANT2	25.7	25.7	24.9	24.1	25.7	24.1
LTE	B66	ANT0	25.5	25.5	25.5	25.1	25.5	25.1
LTE	B71	ANT1	25	25	25	25	25	25
5G FR1	n2	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n5	ANT1	25	25	25	25	25	25
5G FR1	n12	ANT1	23	23	23	23	23	23
5G FR1	n25	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n41 PC3	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n66	ANT0	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n71	ANT1	25	25	25	25	25	25
5G FR1	n77 PC3	ANT2	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n77 HPUE PC2	ANT2	26	26	26	26	26	26
5G FR1	n78 PC3	ANT2	25.5	25.5	25.5	25.5	25.5	25.5
5G FR1	n78 HPUE PC2	ANT2	26	26	26	26	26	26

<WLAN Maximum Power>

General Note:

1. The device implements the power management for WLAN SAR compliance at different exposure conditions (head, body-worn, hotspot). The control logic about the power management decision is provided in the operational description.
2. The WLAN power table relate to each exposure condition is description below:
   a. Default Power Table: when operate at mobile condition.
   b. Body standalone and Body high as Power Table 1: when operate at body or extremity condition in standalone or transmit simultaneous with Bluetooth when WWAN off
   c. Power Table 2: when operate at head exposure condition.
   d. Body low as Power Table 3: when operate at hotspot or body exposure condition when transmit simultaneously with WWAN on.

<Default and Power Table 1>

<2.4GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	20.00	20.00	20.00	20.00	23.0
		6	2437	20.00	20.00	20.00	20.00	23.0
		11	2462	20.00	20.00	20.00	20.00	23.0
	802.11g 6Mbps	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	20.00	20.00	20.00	20.00	23.0
		11	2462	18.00	18.00	18.00	18.00	21.0
	802.11n-HT20 MCS0	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.00	16.00	16.00	16.00	19.0
	802.11ac-VHT20 MCS0	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.00	16.00	16.00	16.00	19.0

<5GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.2GHz WLAN	802.11a 6Mbps	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	38	5190	17.00	17.00	17.00	17.00	20.0
		46	5230	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	38	5190	17.00	17.00	17.00	17.00	20.0
		46	5230	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	42	5210	16.50	16.50	16.50	16.50	19.5

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.3GHz WLAN	802.11a 6Mbps	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	54	5270	17.50	17.50	17.50	17.50	20.5
		62	5310	17.00	17.00	17.00	17.00	20.0
	802.11ac-VHT20 MCS0	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	54	5270	17.50	17.50	17.50	17.50	20.5
		62	5310	17.00	17.00	17.00	17.00	20.0
	802.11ac-VHT80 MCS0	58	5290	16.00	16.00	16.00	16.00	19.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	17.50	17.50	17.50	17.50	20.5
		140	5700	17.50	17.50	17.50	17.50	20.5
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	17.50	17.50	17.50	17.50	20.5
		140	5700	17.50	17.50	17.50	17.50	20.5
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	102	5510	16.00	16.00	16.00	16.00	19.0
		110	5550	17.50	17.50	17.50	17.50	20.5
		126	5630	17.50	17.50	17.50	17.50	20.5
		134	5670	17.50	17.50	17.50	17.50	20.5
		142	5710	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	100	5500	17.50	17.50	17.50	17.50	20.5
		116	5580	17.50	17.50	17.50	17.50	20.5
		124	5620	17.50	17.50	17.50	17.50	20.5
		132	5660	17.50	17.50	17.50	17.50	20.5
		140	5700	17.50	17.50	17.50	17.50	20.5
		144	5720	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	102	5510	16.00	16.00	16.00	16.00	19.0
		110	5550	17.50	17.50	17.50	17.50	20.5
		126	5630	17.50	17.50	17.50	17.50	20.5
		134	5670	17.50	17.50	17.50	17.50	20.5
		142	5710	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	106	5530	14.50	14.50	14.50	14.50	17.5
		122	5610	17.00	17.00	17.00	17.00	20.0
		138	5690	17.00	17.00	17.00	17.00	20.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.8GHz WLAN	802.11a 6Mbps	149	5745	19.50	19.50	19.50	19.50	22.5
		157	5785	19.50	19.50	19.50	19.50	22.5
		165	5825	19.50	19.50	19.50	19.50	22.5
	802.11n-HT20 MCS0	149	5745	19.50	19.50	19.50	19.50	22.5
		157	5785	19.50	19.50	19.50	19.50	22.5
		165	5825	19.50	19.50	19.50	19.50	22.5
	802.11n-HT40 MCS0	151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	149	5745	19.50	19.50	19.50	19.50	22.5
		157	5785	19.50	19.50	19.50	19.50	22.5
		165	5825	19.50	19.50	19.50	19.50	22.5
	802.11ac-VHT40 MCS0	151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	155	5775	17.00	17.00	17.00	17.00	20.0

<Power Table 2>

<2.4GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	16.00	19.00	18.00	20.00	22.1
		6	2437	16.00	19.00	18.00	20.00	22.1
		11	2462	16.00	19.00	18.00	20.00	22.1
	802.11g 6Mbps	1	2412	16.00	17.50	17.50	17.50	20.5
		6	2437	16.00	19.00	18.00	20.00	22.1
		11	2462	16.00	18.00	18.00	18.00	21.0
	802.11n-HT20 MCS0	1	2412	16.00	17.50	17.50	17.50	20.5
		6	2437	16.00	19.00	18.00	19.50	21.8
		11	2462	16.00	16.00	16.00	16.00	19.0
	802.11ac-VHT20 MCS0	1	2412	16.00	17.50	17.50	17.50	20.5
		6	2437	16.00	19.00	18.00	19.50	21.8
		11	2462	16.00	16.00	16.00	16.00	19.0

<5GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.2GHz WLAN	802.11a 6Mbps	36	5180	15.50	17.00	15.50	17.50	19.6
		40	5200	15.50	17.00	15.50	17.50	19.6
		44	5220	15.50	17.00	15.50	17.50	19.6
		48	5240	15.50	17.00	15.50	17.50	19.6
	802.11n-HT20 MCS0	36	5180	15.50	17.00	15.50	17.50	19.6
		40	5200	15.50	17.00	15.50	17.50	19.6
		44	5220	15.50	17.00	15.50	17.50	19.6
		48	5240	15.50	17.00	15.50	17.50	19.6
	802.11n-HT40 MCS0	38	5190	15.50	17.00	15.50	17.00	19.3
		46	5230	15.50	17.00	15.50	17.50	19.6
	802.11ac-VHT20 MCS0	36	5180	15.50	17.00	15.50	17.50	19.6
		40	5200	15.50	17.00	15.50	17.50	19.6
		44	5220	15.50	17.00	15.50	17.50	19.6
		48	5240	15.50	17.00	15.50	17.50	19.6
	802.11ac-VHT40 MCS0	38	5190	15.50	17.00	15.50	17.00	19.3
		46	5230	15.50	17.00	15.50	17.50	19.6
	802.11ac-VHT80 MCS0	42	5210	15.50	16.50	15.50	16.50	19.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.3GHz WLAN	802.11a 6Mbps	52	5260	15.50	17.00	15.50	17.50	19.6
		56	5280	15.50	17.00	15.50	17.50	19.6
		60	5300	15.50	17.00	15.50	17.50	19.6
		64	5320	15.50	17.00	15.50	17.50	19.6
	802.11n-HT20 MCS0	52	5260	15.50	17.00	15.50	17.50	19.6
		56	5280	15.50	17.00	15.50	17.50	19.6
		60	5300	15.50	17.00	15.50	17.50	19.6
		64	5320	15.50	17.00	15.50	17.50	19.6
	802.11n-HT40 MCS0	54	5270	15.50	17.00	15.50	17.50	19.6
		62	5310	15.50	17.00	15.50	17.00	19.3
	802.11ac-VHT20 MCS0	52	5260	15.50	17.00	15.50	17.50	19.6
		56	5280	15.50	17.00	15.50	17.50	19.6
		60	5300	15.50	17.00	15.50	17.50	19.6
		64	5320	15.50	17.00	15.50	17.50	19.6
	802.11ac-VHT40 MCS0	54	5270	15.50	17.00	15.50	17.50	19.6
		62	5310	15.50	17.00	15.50	17.00	19.3
	802.11ac-VHT80 MCS0	58	5290	15.50	16.00	15.50	16.00	18.8

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.5GHz WLAN	802.11a 6Mbps	100	5500	14.50	15.00	14.50	15.50	18.0
		116	5580	14.50	15.00	14.50	15.50	18.0
		124	5620	14.50	15.00	14.50	15.50	18.0
		132	5660	14.50	15.00	14.50	15.50	18.0
		140	5700	14.50	15.00	14.50	15.50	18.0
		144	5720	14.50	15.00	14.50	15.50	18.0
	802.11n-HT20 MCS0	100	5500	14.50	15.00	14.50	15.50	18.0
		116	5580	14.50	15.00	14.50	15.50	18.0
		124	5620	14.50	15.00	14.50	15.50	18.0
		132	5660	14.50	15.00	14.50	15.50	18.0
		140	5700	14.50	15.00	14.50	15.50	18.0
		144	5720	14.50	15.00	14.50	15.50	18.0
	802.11n-HT40 MCS0	102	5510	14.50	15.00	14.50	15.50	18.0
		110	5550	14.50	15.00	14.50	15.50	18.0
		126	5630	14.50	15.00	14.50	15.50	18.0
		134	5670	14.50	15.00	14.50	15.50	18.0
		142	5710	14.50	15.00	14.50	15.50	18.0
	802.11ac-VHT20 MCS0	100	5500	14.50	15.00	14.50	15.50	18.0
		116	5580	14.50	15.00	14.50	15.50	18.0
		124	5620	14.50	15.00	14.50	15.50	18.0
		132	5660	14.50	15.00	14.50	15.50	18.0
		140	5700	14.50	15.00	14.50	15.50	18.0
		144	5720	14.50	15.00	14.50	15.50	18.0
	802.11ac-VHT40 MCS0	102	5510	14.50	15.00	14.50	15.50	18.0
		110	5550	14.50	15.00	14.50	15.50	18.0
		126	5630	14.50	15.00	14.50	15.50	18.0
		134	5670	14.50	15.00	14.50	15.50	18.0
		142	5710	14.50	15.00	14.50	15.50	18.0
	802.11ac-VHT80 MCS0	106	5530	14.50	14.50	14.50	14.50	17.5
		122	5610	14.50	15.00	14.50	15.50	18.0
		138	5690	14.50	15.00	14.50	15.50	18.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.8GHz WLAN	802.11a 6Mbps	149	5745	15.00	15.00	14.50	17.00	18.9
		157	5785	15.00	15.00	14.50	17.00	18.9
		165	5825	15.00	15.00	14.50	17.00	18.9
	802.11n-HT20 MCS0	149	5745	15.00	15.00	14.50	17.00	18.9
		157	5785	15.00	15.00	14.50	17.00	18.9
		165	5825	15.00	15.00	14.50	17.00	18.9
	802.11n-HT40 MCS0	151	5755	15.00	15.00	14.50	17.00	18.9
		159	5795	15.00	15.00	14.50	17.00	18.9
	802.11ac-VHT20 MCS0	149	5745	15.00	15.00	14.50	17.00	18.9
		157	5785	15.00	15.00	14.50	17.00	18.9
		165	5825	15.00	15.00	14.50	17.00	18.9
	802.11ac-VHT40 MCS0	151	5755	15.00	15.00	14.50	17.00	18.9
		159	5795	15.00	15.00	14.50	17.00	18.9
	802.11ac-VHT80 MCS0	155	5775	15.00	15.00	14.50	17.00	18.9

<Power Table 3>

<2.4GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	1	2412	20.00	20.00	20.00	20.00	23.0
		6	2437	20.00	20.00	20.00	20.00	23.0
		11	2462	20.00	20.00	20.00	20.00	23.0
	802.11g 6Mbps	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	20.00	20.00	20.00	20.00	23.0
		11	2462	18.00	18.00	18.00	18.00	21.0
	802.11n-HT20 MCS0	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.00	16.00	16.00	16.00	19.0
	802.11ac-VHT20 MCS0	1	2412	17.50	17.50	17.50	17.50	20.5
		6	2437	19.50	19.50	19.50	19.50	22.5
		11	2462	16.00	16.00	16.00	16.00	19.0

<5GHz WLAN>

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.2GHz WLAN	802.11a 6Mbps	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	38	5190	17.00	17.00	17.00	17.00	20.0
		46	5230	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	36	5180	17.50	17.50	17.50	17.50	20.5
		40	5200	17.50	17.50	17.50	17.50	20.5
		44	5220	17.50	17.50	17.50	17.50	20.5
		48	5240	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	38	5190	17.00	17.00	17.00	17.00	20.0
		46	5230	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	42	5210	16.50	16.50	16.50	16.50	19.5

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.3GHz WLAN	802.11a 6Mbps	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11n-HT20 MCS0	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11n-HT40 MCS0	54	5270	17.50	17.50	17.50	17.50	20.5
		62	5310	17.00	17.00	17.00	17.00	20.0
	802.11ac-VHT20 MCS0	52	5260	17.50	17.50	17.50	17.50	20.5
		56	5280	17.50	17.50	17.50	17.50	20.5
		60	5300	17.50	17.50	17.50	17.50	20.5
		64	5320	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	54	5270	17.50	17.50	17.50	17.50	20.5
		62	5310	17.00	17.00	17.00	17.00	20.0
	802.11ac-VHT80 MCS0	58	5290	16.00	16.00	16.00	16.00	19.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.50	15.00	17.50	17.50	20.5
		116	5580	17.50	15.00	17.50	17.50	20.5
		124	5620	17.50	15.00	17.50	17.50	20.5
		132	5660	17.50	15.00	17.50	17.50	20.5
		140	5700	17.50	15.00	17.50	17.50	20.5
		144	5720	17.50	15.00	17.50	17.50	20.5
	802.11n-HT20 MCS0	100	5500	17.50	15.00	17.50	17.50	20.5
		116	5580	17.50	15.00	17.50	17.50	20.5
		124	5620	17.50	15.00	17.50	17.50	20.5
		132	5660	17.50	15.00	17.50	17.50	20.5
		140	5700	17.50	15.00	17.50	17.50	20.5
		144	5720	17.50	15.00	17.50	17.50	20.5
	802.11n-HT40 MCS0	102	5510	16.00	15.00	16.00	16.00	19.0
		110	5550	17.50	15.00	17.50	17.50	20.5
		126	5630	17.50	15.00	17.50	17.50	20.5
		134	5670	17.50	15.00	17.50	17.50	20.5
		142	5710	17.50	15.00	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	100	5500	17.50	15.00	17.50	17.50	20.5
		116	5580	17.50	15.00	17.50	17.50	20.5
		124	5620	17.50	15.00	17.50	17.50	20.5
		132	5660	17.50	15.00	17.50	17.50	20.5
		140	5700	17.50	15.00	17.50	17.50	20.5
		144	5720	17.50	15.00	17.50	17.50	20.5
	802.11ac-VHT40 MCS0	102	5510	16.00	15.00	16.00	16.00	19.0
		110	5550	17.50	15.00	17.50	17.50	20.5
		126	5630	17.50	15.00	17.50	17.50	20.5
		134	5670	17.50	15.00	17.50	17.50	20.5
		142	5710	17.50	15.00	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	106	5530	14.50	14.50	14.50	14.50	17.5
		122	5610	17.00	15.00	17.00	17.00	20.0
		138	5690	17.00	15.00	17.00	17.00	20.0

Transmit Antenna				SISO	SISO	MIMO		
	Mode	Channel	Frequency (MHz)	Ant 4 Tune-Up Limit	Ant 3 Tune-Up Limit	Ant 4+3(4) Tune-Up Limit	Ant 4+3(3) Tune-Up Limit	Ant 4+3 Tune-Up Limit
5.8GHz WLAN	802.11a 6Mbps	149	5745	19.50	17.50	19.50	19.50	22.5
		157	5785	19.50	17.50	19.50	19.50	22.5
		165	5825	19.50	17.50	19.50	19.50	22.5
	802.11n-HT20 MCS0	149	5745	19.50	17.50	19.50	19.50	22.5
		157	5785	19.50	17.50	19.50	19.50	22.5
		165	5825	19.50	17.50	19.50	19.50	22.5
	802.11n-HT40 MCS0	151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT20 MCS0	149	5745	19.50	17.50	19.50	19.50	22.5
		157	5785	19.50	17.50	19.50	19.50	22.5
		165	5825	19.50	17.50	19.50	19.50	22.5
	802.11ac-VHT40 MCS0	151	5755	17.50	17.50	17.50	17.50	20.5
		159	5795	17.50	17.50	17.50	17.50	20.5
	802.11ac-VHT80 MCS0	155	5775	17.00	17.00	17.00	17.00	20.0

<Bluetooth Maximum Power>

General Note:

1. The device implements the power management for Bluetooth SAR compliance at different exposure conditions (head, body-worn, hotspot). The control logic about the power management decision is provided in the operational description.
2. The Bluetooth power table relate to each exposure condition is description below:
   a. Default Power Table: when operate at mobile condition.
   b. Body standalone and body high as Power Table 1: when operate at body or extremity condition in standalone or transmit simultaneous with WLAN when WWAN off or transmit simultaneous with WWAN when WLAN off.
   c. Power Table 2: when operate at head exposure condition.
   d. Body low as Power Table 3: when operate at hotspot or body exposure condition and transmit simultaneously with WWAN/WLAN on.

<Default and Power Table 1, 3>

Mode	Average power (dBm)				
	BR / EDR			LE	
	1Mbps	2Mbps	3Mbps	1Mbps	2Mbps
Tune-up Limit	18	18	18	18	18

<Power Table2>

Mode	Average power (dBm)				
	BR / EDR			LE	
	1Mbps	2Mbps	3Mbps	1Mbps	2Mbps
Tune-up Limit	14.5	14.5	14.5	14.5	14.5

2.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	A4RG1F8F
Equipment Name	Phone
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 48: 3550 MHz ~ 3700 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 30: 5MHz, 10MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 48: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz
uplink modulations used	QPSK / 16QAM / 64QAM
LTE Voice / Data requirements	Voice and Data
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3** Modulation | Channel bandwidth / Transmission bandwidth (N_{RB}) | MPR (dB) 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz QPSK: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 16 QAM: ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 16 QAM: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 64 QAM: ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 2 64 QAM: > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 3 256 QAM: ≥ 1 | ≤ 5
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
Power reduction applied to satisfy SAR compliance	The device has several different power modes for each exposure conditions SAR compliance; power selection is determined by the device's positioning and usage scenarios. Detail refer to operational description.
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to original SAR report
LTE Carrier Aggregation Additional Information	This device supports maximum of 4 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560
LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711
LTE Band 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		
LTE Band 14				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Channel #	Channel #	Freq.(MHz)
L	23305	790.5	23330	793
M	23330	793		
H	23355	795.5		
LTE Band 17				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

LTE Band 25												
	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	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

LTE Band 30				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	27685	2307.5	27710	2310
M	27710	2310		
H	27735	2312.5		

LTE Band 38								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610

LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

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

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 71								
	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	133147	665.5	133172	668	133197	670.5	133222	673
M	133297	680.5	133297	680.5	133297	680.5	133297	680.5
H	133447	695.5	133422	693	133397	690.5	133372	688

2.4 General 5G NR SAR Test and Reporting Considerations

5G NR Information	
FCC	A4RG1F8F
Equipment Name	Phone
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 n12: 699 MHz ~ 716 MHz 5G NR n25: 1850 MHz ~ 1915 MHz 5G NR n41: 2496 MHz ~ 2690 MHz 5G NR n66: 1710 MHz ~ 1780 MHz 5G NR n71: 663 MHz ~ 698 MHz 5G NR n77: 3700 MHz ~ 3980 MHz, 3450MHz ~ 3550MHz 5G NR n78: 3700 MHz ~ 3800 MHz
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n5: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n12: 5MHz, 10MHz, 15MHz 5G NR n25 : 5MHz, 10MHz, 15MHz, 20MHz 5G NR n41: 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n77: 20MHz, 40MHz, 100MHz 5G NR n78: 20MHz, 40MHz, 50MHz, 60MHz, 80MHz, 90MHz, 100MHz
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 n2	LTE B5/12/13/14/30/48/66
LTE Anchor Bands for n5	LTE B2/7/30/48/66
LTE Anchor Bands for n12	LTE B2/66
LTE Anchor Bands for n25	LTE B12
LTE Anchor Bands for n41	LTE B2/4/25/26/66
LTE Anchor Bands for n66	LTE B5/7/12/13/14/30/48/71
LTE Anchor Bands for n71	LTE B2/7/66
LTE Anchor Bands for n77	LTE B2/13/41/66
LTE Anchor Bands for n78	LTE B2/4/5/7/12/13/38/41/66/71

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 12

	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	140300	701.5	140800	704	141300	706.5
M	141500	707.5	141500	707.5	141500	707.5
H	142700	713.5	142200	711	141700	708.5

NR Band 25

	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	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905

NR Band 41																
	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)
L	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
H	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	529998	2649.99	528996	2644.98	528000	2640

NR Band 66								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	342500	1712.5	343000	1715	343500	1717.5	344000	1720
M	349000	1745	349000	1745	349000	1745	349000	1745
H	355500	1777.5	355000	1775	354500	1772.5	354000	1770

NR Band 71								
	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	133100	665.5	133600	668	13410	670.5	134600	673
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5
H	139100	695.5	138600	693	13810	690.5	137600	688

NR Band 77 (3450MHz~3550MHz)						
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630668	3460.02	631334	3470.01		
M	633334	3500.01	633334	3500.01	633334	3500.01
H	636000	3540	635334	3530.01		

NR Band 77(3700MHz~3980MHz)						
	Bandwidth 20MHz		Bandwidth 40MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647334	3710.01	648000	3720	650000	3750
M	656000	3840	656000	3840	656000	3840
H	664668	3970.02	664000	3960	662000	3930

NR Band 78														
	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)
L	647334	3710.01	648000	3720	648334	3725.01	648668	3730.02	649334	3740.01	649668	3745.02		
M	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750	650000	3750
H	652668	3790.02	652000	3780	651668	3775.02	651334	3770.01	650668	3760.02	650334	3755.01		

3. Smart Transmit feature for RF Exposure compliance

The FCC RF exposure limit is defined based on time-averaged RF exposure. The product implements Qualcomm Smart Transmit feature which controls the instantaneous transmitting power for WWAN transmitter to ensure the product in compliance with FCC RF exposure limit over a defined time window, for SAR (transmit frequency ≤ 6GHz). To control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is compliant to the regulation requirement.

This report describes the procedures for the SAR char generation, and the parameters obtained from SAR characterization (referred to as SAR char, respectively) will be used as input for Smart Transmit. SAR char will be entered via the Embedded File System (EFS) to enable the Smart Transmit Feature.

<Terminologies in this report>

P_{limit}	The time-averaged RF power which corresponds to SAR_design_target.
P_{max}	Maximum target power level
SAR_design_target:	The design target for SAR compliance. It should be less than regulatory power density limit to account for all device design related uncertainties.
SAR char	P_{limit} for all the technologies/bands for all applicable DSI

<SAR Characterization>

SAR char must be generated to cover all radio configurations and usage scenarios that the wireless device supports for operating at 6 GHz or below. It will then be used as input for Smart Transmit to control and manage RF exposure for f < 6 GHz.

<SAR design target and uncertainty>

The detail SAR design target relate to each exposure conditions pls refer to operation description

Total Uncertainty					
Config 0			Config 1		
Wireless Technology Band	Antenna	Uncertainty dB (k=2)	Wireless Technology Band	Antenna	Uncertainty dB (k=2)
GSM 850	ANT0	1.0	GSM 850	ANT1	0.7
GSM 1900	ANT2	1.0	GSM 1900	ANT0	0.7
WCDMA B2	ANT2	1.0	WCDMA B2	ANT0	1.5
WCDMA B4	ANT2	1.0	WCDMA B4	ANT0	1.5
WCDMA B5	ANT0	1.0	WCDMA B5	ANT1	1.5
CDMA BC0	ANT0	1.0	CDMA BC0	ANT1	1.5
CDMA BC1	ANT2	1.0	CDMA BC1	ANT0	1.5
CDMA BC10	ANT0	1.0	CDMA BC10	ANT1	1.5
LTE B2	ANT2	1.0	LTE B2	ANT0	1.5
LTE B4	ANT2	1.0	LTE B4	ANT0	1.5
LTE B5	ANT0	1.0	LTE B5	ANT1	1.5
LTE B7	ANT2	1.0	LTE B7	ANT0	1.5
LTE B12	ANT0	1.0	LTE B12	ANT1	1.0
LTE B13	ANT0	1.0	LTE B13	ANT1	1.5
LTE B14	ANT0	1.0	LTE B14	ANT1	1.5
LTE B17	ANT0	1.0	LTE B17	ANT1	1.5
LTE B25	ANT2	1.0	LTE B25	ANT0	1.5
LTE B26	ANT0	1.0	LTE B26	ANT1	1.5
LTE B30	ANT2	1.0	LTE B30	ANT0	1.0
LTE B38	ANT2	1.0	LTE B38	ANT0	1.2
LTE B41	ANT2	1.0	LTE B41	ANT0	1.5
LTE B48	ANT7	1.0	LTE B48	ANT2	1.0
LTE B66	ANT2	1.0	LTE B66	ANT0	1.5
LTE B71	ANT0	1.0	LTE B71	ANT1	1.5
NR n2	ANT2	1.0	NR n2	ANT0	1.5
NR n5	ANT0	1.0	NR n5	ANT1	1.5
NR n12	ANT0	1.0	NR n12	ANT1	1.2
NR n25	ANT2	1.0	NR n25	ANT0	1.5
NR n41	ANT2	1.0	NR n41	ANT0	1.5
NR n41	ANT5	1.0	NR n66	ANT0	1.5
NR n66	ANT2	1.0	NR n71	ANT1	1.5
NR n71	ANT0	1.0	NR n77	ANT2	1.5
NR n77	ANT7	1.0	NR n78	ANT2	1.5
NR n78	ANT7	1.0			

To account for total uncertainty, SAR_design_target should be determined as:

$$SAR\_design\_target \ < SAR_{regulatory\_limit} \times 10^{\frac{-total\ uncertainty}{10}}$$

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit, for each characterized technology and band.

Smart Transmit allows the device to transmit at higher power instantaneously, as high as Pmax, when needed, but enforces power limiting to maintain time-averaged transmit power to Plimit. Below table shows Plimit EFS settings and maximum tune up output power Pmax configured for this EUT for various transmit conditions (Device State Index DSI).

<P_{limit} for supported technologies and bands (P_{limit} in EFS file)>

Config 0

Band	Config	Antenna	TDD duty cycle	Head		Hotspot	Body-worn/Extremity		PMax*
				Standalone	Simultaneous	Simultaneous	Standalone	Simultaneous	
				DSI 2	DSI 7	DSI 6	DSI 4	DSI 8	
GSM850(GPRS 4 Tx slots)**	0	0	50.00%	30.0	29.2	28.1	28.9	28.1	25.5
GSM1900(GPRS 4 Tx slots)**	0	2	50.00%	30.2	29.4	24.4	25.6	24.8	23.0
WCDMA B2	0	2	100.00%	29.9	29.1	23.9	24.7	23.9	24.7
WCDMA B4	0	2	100.00%	30.2	29.4	23.4	24.2	23.6	24.7
WCDMA B5	0	0	100.00%	29.3	28.5	28.0	28.8	28.0	24.0
CDMA BC0	0	0	100.00%	29.5	28.7	28.1	29.0	28.2	24.5
CDMA BC1	0	2	100.00%	30.5	29.7	23.3	24.1	23.3	24.5
CDMA BC10	0	0	100.00%	29.8	29.0	28.2	29.1	28.3	24.5
LTE B7	0	2	100.00%	29.5	28.7	22.3	23.1	22.3	24.7
LTE B12/17	0	0	100.00%	30.6	29.8	27.3	28.1	27.3	24.7
LTE B13	0	0	100.00%	31.1	30.3	27.9	28.7	27.9	24.2
LTE B14	0	0	100.00%	30.8	30.0	27.9	28.7	27.9	24.7
LTE B25/2	0	2	100.00%	30.9	30.1	23.0	23.8	23.4	24.7
LTE B26/5	0	0	100.00%	29.3	28.5	28.2	29.0	28.2	24.7
LTE B30	0	2	100.00%	29.5	28.7	24.7	25.6	24.8	23.2
LTE B41/B38 PC3**	0	2	63.30%	30.4	29.6	23.3	24.1	23.3	22.7
LTE B41(HPUE) PC2**	0	2	43.30%						22.9
LTE B48**	0	7	63.30%	26.8	26.0	20.3	21.1	20.3	22.7
LTE B66/4	0	2	100.00%	30.5	29.7	23.0	23.8	23.0	24.7
LTE B71	0	0	100.00%	30.8	30.0	27.7	28.5	27.7	24.7
5G FR1 n5	0	0	100.00%	30.6	29.8	28.4	29.2	28.4	24.0
5G FR1 n12	0	0	100.00%	32.9	32.1	27.4	29.1	28.3	23.7
5G FR1 n25/n2	0	2	100.00%	31.0	30.2	23.3	24.1	23.7	24.7
5G FR1 n41 PC3**	0	2	33.00%	50.0	49.2	29.0	29.8	29.0	19.9
5G FR1 n41 PC3**	0	5	33.00%	25.1	24.3	20.1	21.0	21.0	19.9
5G FR1 n41(HPUE) PC2**	0	5	33.00%						21.7
5G FR1 n66	0	2	100.00%	30.4	29.6	23.3	24.1	23.3	24.7
5G FR1 n71	0	0	100.00%	31.6	30.8	28.7	29.5	28.7	24.7
5G FR1 n77 PC3**	0	7	33.00%	25.9	25.1	22.3	23.1	22.3	19.9
5G FR1 n77(HPUE) PC2**	0	7	33.00%						20.7
5G FR1 n78 PC3**	0	7	33.00%	26.8	26.0	21.7	22.5	21.7	19.2
5G FR1 n78(HPUE) PC2**	0	7	33.00%						20.7

Config 1

Band	Config	Antenna	TDD duty cycle	Head		Hotspot	Body-worn/Extremity		PMax*
				Standalone	Simultaneous	Simultaneous	Standalone	Simultaneous	
				DSI 2	DSI 7	DSI 6	DSI 4	DSI 8	
GSM850(GPRS 4 Tx slots)**	1	1	50.00%	26.1	25.3	29.3	30.1	29.3	24.5
GSM1900(GPRS 4 Tx slots)**	1	0	50.00%	29.2	28.4	26.8	27.6	26.8	23.0
WCDMA B2	1	0	100.00%	29.4	28.6	24.2	25.0	24.2	24.0
WCDMA B4	1	0	100.00%	26.2	25.4	24.0	24.8	24.0	24.0
WCDMA B5	1	1	100.00%	25.5	24.7	28.1	28.8	28.1	23.5
CDMA BC0	1	1	100.00%	23.9	23.1	27.8	28.8	28.0	24.0
CDMA BC1	1	0	100.00%	27.0	26.3	24.0	25.2	24.4	24.0
CDMA BC10	1	1	100.00%	24.0	23.2	27.9	29.2	28.4	24.0
LTE B7	1	0	100.00%	31.9	31.1	24.7	25.5	24.7	24.0
LTE B12	1	1	100.00%	26.4	25.6	28.4	30.0	29.2	24.7
LTE B13	1	1	100.00%	26.0	25.2	28.5	29.3	28.5	23.5
LTE B14	1	1	100.00%	25.9	25.2	28.4	29.2	28.4	23.5
LTE B17	1	1	100.00%	25.1	24.4	28.1	28.9	28.1	23.5
LTE B25/2	1	0	100.00%	27.3	26.6	23.6	25.9	25.1	24.0
LTE B26/5	1	1	100.00%	25.0	24.2	27.9	28.6	27.9	23.5
LTE B30	1	0	100.00%	30.1	29.3	25.1	25.9	25.1	24.7
LTE B38 PC3**	1	0	63.30%	32.7	31.9	26.5	27.3	26.5	22.0
LTE B41 PC3**	1	0	63.30%	32.4	31.6	26.3	27.0	26.3	22.0
LTE B41(HPUE) PC2**	1	0	43.30%						21.9
LTE B48**	1	2	63.30%	34.9	34.1	21.1	21.9	21.1	22.7
LTE B66/4	1	0	100.00%	28.2	27.4	23.6	24.3	23.6	24.0
LTE B71	1	1	100.00%	26.7	25.9	29.6	30.4	29.6	23.5
5G FR1 n5	1	1	100.00%	25.7	24.9	28.5	29.3	28.5	23.5
5G FR1 n12	1	1	100.00%	26.2	25.4	28.5	30.4	29.6	21.8
5G FR1 n25/n2	1	0	100.00%	27.5	26.7	24.7	25.5	24.7	24.0
5G FR1 n41 PC3**	1	0	33.00%	33.7	32.9	28.7	31.2	30.4	19.2
5G FR1 n66	1	0	100.00%	26.3	25.5	24.1	24.8	24.1	24.0
5G FR1 n71	1	1	100.00%	26.9	26.1	29.5	30.6	29.8	23.5
5G FR1 n77 PC3**	1	2	33.00%	31.0	30.3	23.7	24.5	23.7	19.2
5G FR1 n77(HPUE) PC2**	1	2	33.00%						19.7
5G FR1 n78 PC3**	1	2	33.00%	34.3	33.5	21.5	22.3	21.5	19.2
5G FR1 n78(HPUE) PC2**	1	2	33.00%						19.7

*P_{max} is used for RF tune up procedure. The maximum allowed output power is equal to Pmax + 1dB uncertainty.

**All P_{limit} power levels entered in the Table correspond to average power levels after accounting for duty cycle in the case TDD modulation schemes (for e.g., GSM & LTE TDD & NR TDD).

The max allowed output power is the P_{limit} + 1dB device uncertainty, and if P_{limit} is higher than P_{max}, the device output power will be P_{max} instead.

4. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01
- FCC KDB 941225 D07 UMPC Mini Tablet v01r02

5. RF Exposure Limits

5.1 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.

5.2 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

1. 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.

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

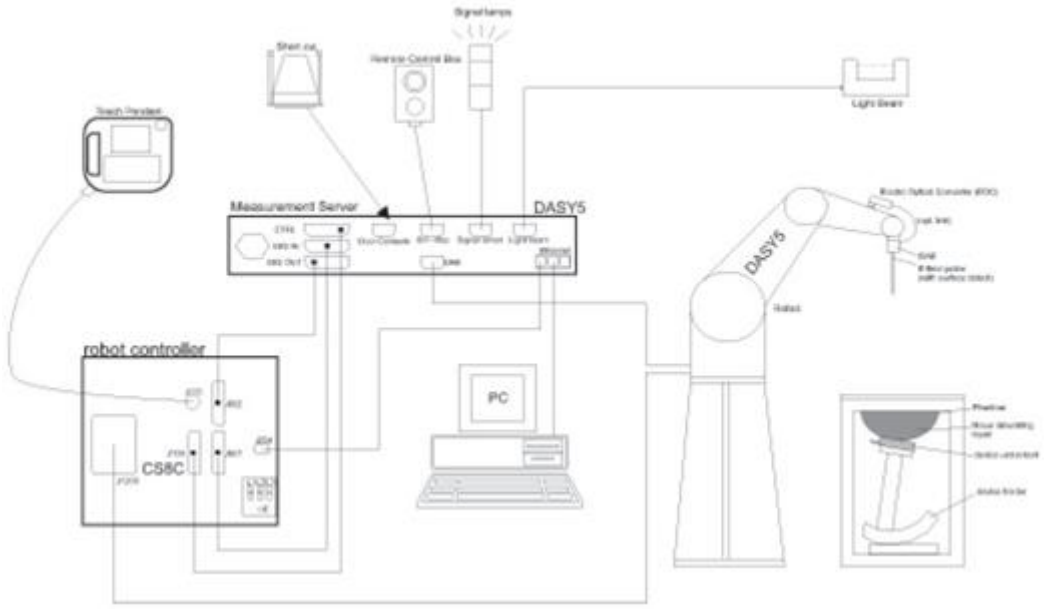
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. 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 WinXP or Win7 and the DASY5 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.

7.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 376) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory		Sporton International Inc. Wensan Laboratory	
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan	
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY
	SAR06-HY	SAR10-HY		

7.2 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.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)	
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

7.3 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.

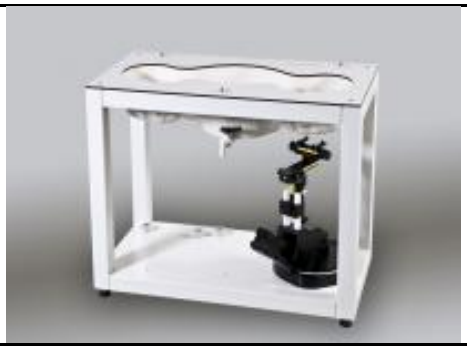
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.4 Phantom

<SAM Twin Phantom>

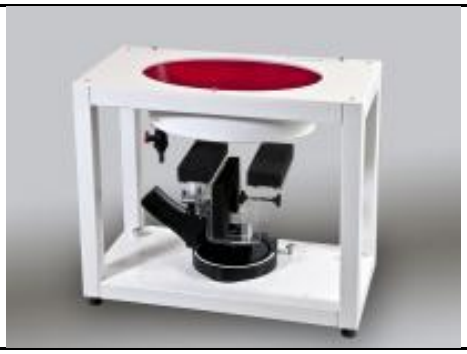
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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 in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.5 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

8. 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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 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.

8.3 Area Scan

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

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

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

8.4 Zoom Scan

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

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

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

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

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

8.5 Volume Scan Procedures

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

8.6 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.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	3500MHz System Validation Kit(2)	D3500V2	1014	Jan. 29, 2019	Jan. 26, 2022
SPEAG	Data Acquisition Electronics(2)	DAE4	316	Jan. 19, 2021	Jan. 18, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7590	Mar. 25, 2021	Mar. 24, 2022
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 10, 2020	Nov. 09, 2021
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 11, 2020	Nov. 10, 2021
Keysight	ENA Network Analyzer	E5071C	MY46104758	Sep. 03, 2020	Sep. 02, 2021
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 16, 2020	Sep. 15, 2021
LINE SEIKI	Digital Thermometer	DTM3000-spezial	2942	Nov. 06, 2020	Nov. 05, 2021
Anritsu	Power Meter	ML2495A	1419002	Aug. 19, 2020	Aug. 18, 2021
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2020	Aug. 17, 2021
Anritsu	Power Meter	ML2495A	1804003	Oct. 21, 2020	Oct. 20, 2021
Anritsu	Power Sensor	MA2411B	1726150	Oct. 21, 2020	Oct. 20, 2021
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 30, 2020	Jun. 29, 2021
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Jan. 15, 2021	Jan. 14, 2022
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 21, 2020	Oct. 20, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	479102029	Aug. 26, 2020	Aug. 25, 2021
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

10. System Verification

10.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
3500	22.1	2.811	37.498	2.91	37.90	-3.40	-1.06	±5	2021/6/25

10.2 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.

Test Site	Date	Frequency (MHz)	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 (%)
SAR05-HY	2021/6/25	3500	100	D3500V2-1014	EX3DV4 - SN7590	DAE4 Sn316	6.19	67.90	61.9	-8.84

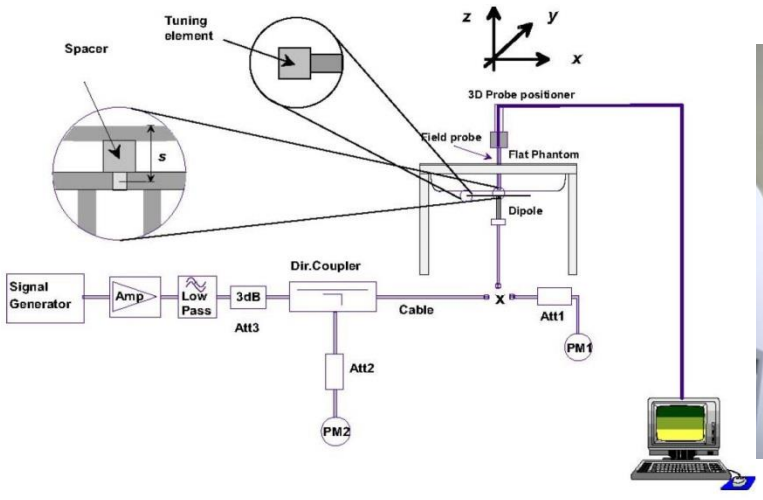


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 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 9.1.2 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 9.1.3). 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 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

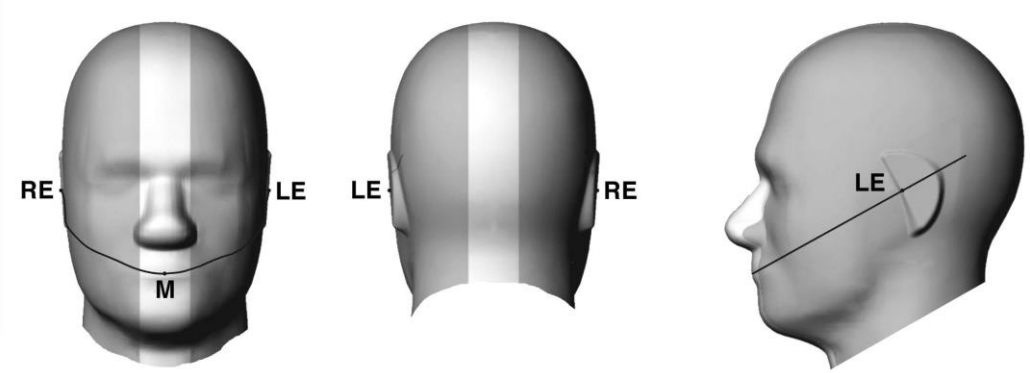


Fig 9.1.1 Front, back, and side views of SAM twin phantom

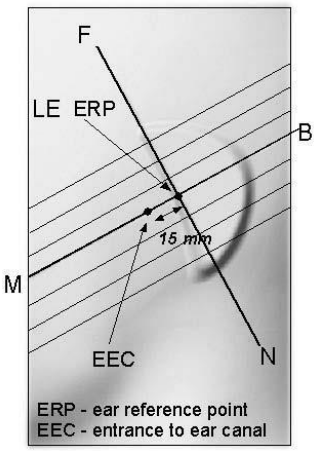


Fig 9.1.2 Close-up side view of phantom showing the ear region.

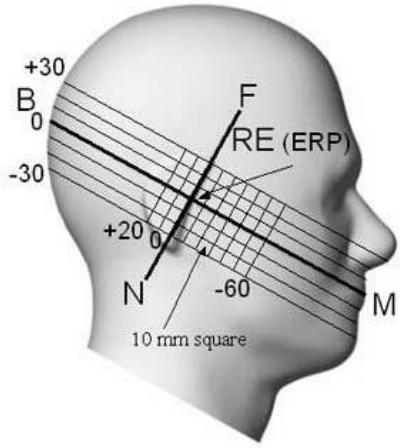


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), 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 9.2.3), 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 9.2.3. The actual rotation angles should be documented in the test report.

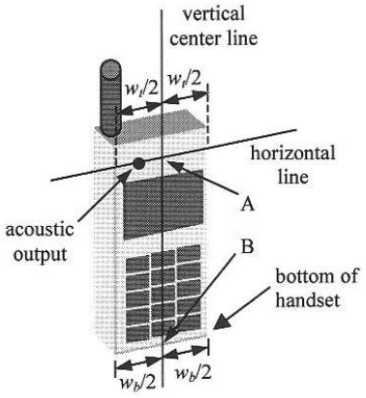


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

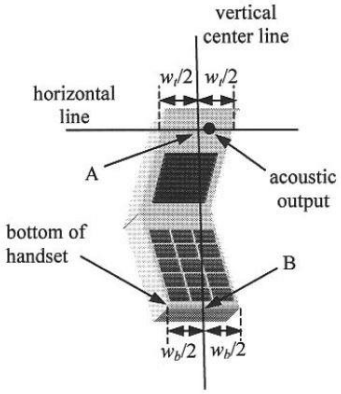


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

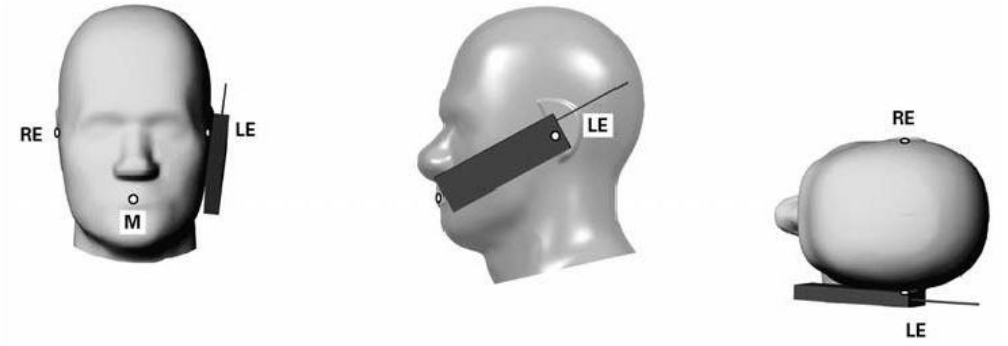


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 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 9.3.1. 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

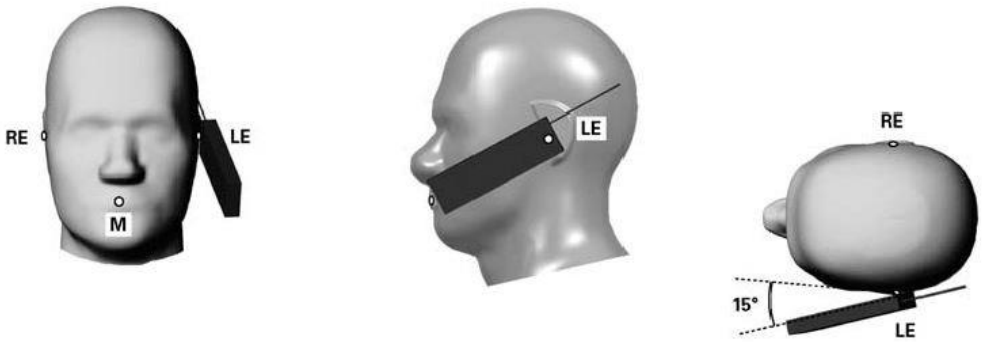


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 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 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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

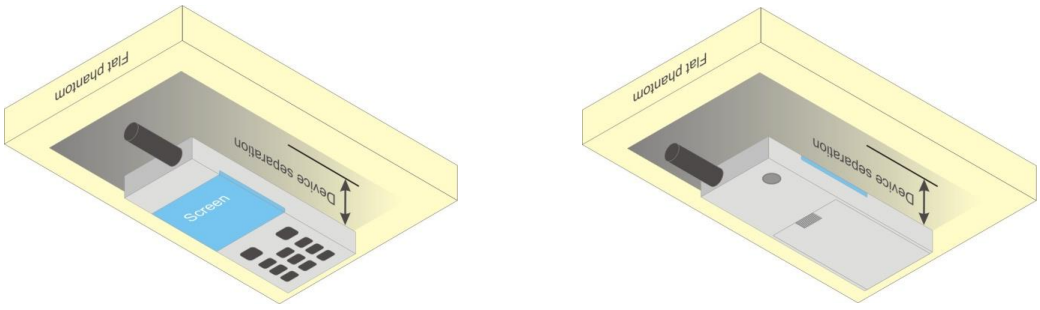


Fig 9.4 Body Worn Position

11.5 Product Specific Exposure

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, 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.

11.6 Wireless Router

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

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

12. 5G NR Output Power (Unit: dBm)

General Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-OFDM output power measurement reduction, full measurement on Pi/2 BPSK and QPSK, for16QAM/64QMA/256QAM spot check 1RB 1offset configuration to ensure the output power will not ½ dB higher than Pi/2 BPSK and QPSK, for smaller bandwidth output power will spot check 1RB 1offset configuration at Pi/2 BPSK to ensure output power will not ½ dB higher than largest supported bandwidth.
   b. The high order modulations for CP-OFDM maximum power according to tune-up document will not ½ dB higher than DFT-OFDM mode, also DFT-OFDM mode reported SAR is ≤ 1.45 W/kg for this device, for CP-OFDM mode output power and SAR measurement is not necessary.
   c. SAR testing start with the largest channel bandwidth and measure SAR for PI/2 BPSK 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 PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   e. PI/2 BPSK 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. QPSK/16QAM/64QAM/256QAM output powers according to tune-up document will not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/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
2. SAR testing for NR FDD was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.
3. SAR testing for NR TDD was performed using Factory Test Mode software to establish the connection, according to manufacturer definition for TDD actual transmission cycle is 33%, but factory test mode software is set and perform SAR with 25%, therefore, the SAR test result will be scaled up to 33%
4. Since the n77/78 support power class 2 and 3 and the same duty cycle, in this report is selected highest output power class 2 to be tested.

<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	≤ 3.5[1] ≤ 0.5[2]	≤ 1.2[1] ≤ 0.5[2]	≤ 0.2[1] 0[2]
	QPSK	≤ 1		0
	16 QAM	≤ 2		≤ 1
	64 QAM	≤ 2.5		
	256 QAM	≤ 4.5		
CP-OFDM	QPSK	≤ 3		≤ 1.5
	16 QAM	≤ 3		≤ 2
	64 QAM	≤ 3.5		
	256 QAM	≤ 6.5		

NOTE 1: Applicable for UE operating in TDD mode with Pi/2 BPSK modulation and UE indicates support for UE capability *powerBoosting-pi2BPSK* and if the IE *powerBoostPi2BPSK* is set to 1 and 40 % or less slots in radio frame are used for UL transmission for bands 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		

<n77_Config 0_Ant 7_DSI 2/4/6/7/8>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633334		
Frequency (MHz)					3500.01		
100	PI/2 BPSK	1	1		24.81		25.7
100	PI/2 BPSK	1	137		24.50		
100	PI/2 BPSK	1	271		24.44		
100	PI/2 BPSK	135	0		24.08		25.2
100	PI/2 BPSK	135	69		24.45		25.7
100	PI/2 BPSK	135	138		23.95		25.2
100	PI/2 BPSK	270	0		23.97		
100	QPSK	1	1		24.70		25.7
100	QPSK	1	137		24.46		
100	QPSK	1	271		24.39		
100	QPSK	135	0		23.62		24.7
100	QPSK	135	69		24.44		25.7
100	QPSK	135	138		23.34		24.7
100	QPSK	270	0		23.43		
100	16QAM	1	1		23.71		24.7
100	64QAM	1	1		22.19		23.2
100	256QAM	1	1		21.89		21.2
Channel				631334	633334	635334	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3500.01	3530.01	
40	PI/2 BPSK	1	1	24.80	24.77	24.72	25.7
Channel				630668	633334	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3500.01	3540	
20	PI/2 BPSK	1	1	24.63	24.69	24.70	25.7

<n77_HPUE_Config 0_Ant 7_DSI 2/4/6/7/8>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633334		
Frequency (MHz)					3500.01		
100	PI/2 BPSK	1	1		25.59		26.5
100	PI/2 BPSK	1	137		25.33		
100	PI/2 BPSK	1	271		25.25		
100	PI/2 BPSK	135	0		24.91		26.0
100	PI/2 BPSK	135	69		25.24		26.5
100	PI/2 BPSK	135	138		24.69		26.0
100	PI/2 BPSK	270	0		24.73		
100	QPSK	1	1		25.53		26.5
100	QPSK	1	137		25.29		
100	QPSK	1	271		25.22		
100	QPSK	135	0		24.41		25.5
100	QPSK	135	69		25.26		26.5
100	QPSK	135	138		24.17		25.5
100	QPSK	270	0		24.25		
100	16QAM	1	1		24.45		25.5
100	64QAM	1	1		22.93		24.0
100	256QAM	1	1		20.75		22.0
Channel				631334	633334	635334	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3500.01	3530.01	
40	PI/2 BPSK	1	1	25.64	25.55	25.30	26.5
Channel				630668	633334	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3500.01	3540	
20	PI/2 BPSK	1	1	25.50	25.52	25.41	26.5

<n77_Config 1_Ant 2_DSI 2/4/6/7/8>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633334		
Frequency (MHz)					3500.01		
100	PI/2 BPSK	1	1		24.65		25.5
100	PI/2 BPSK	1	137		24.37		
100	PI/2 BPSK	1	271		24.20		
100	PI/2 BPSK	135	0		23.94		25.0
100	PI/2 BPSK	135	69		24.28		25.5
100	PI/2 BPSK	135	138		23.73		25.0
100	PI/2 BPSK	270	0		23.81		
100	QPSK	1	1		24.53		25.5
100	QPSK	1	137		24.35		
100	QPSK	1	271		24.17		
100	QPSK	135	0		23.48		24.5
100	QPSK	135	69		24.32		25.5
100	QPSK	135	138		23.25		24.5
100	QPSK	270	0		23.28		
100	16QAM	1	1		23.64		24.5
100	64QAM	1	1		22.02		23.0
100	256QAM	1	1		19.51		21.0
Channel				631334	633334	635334	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3500.01	3530.01	
40	PI/2 BPSK	1	1	24.51	24.60	24.55	25.5
Channel				630668	633334	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3500.01	3540	
20	PI/2 BPSK	1	1	24.46	24.56	24.53	25.5

<n77_HPUE_Config 1_Ant 2_DSI 2/4/6/7/8>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel					633334		
Frequency (MHz)					3500.01		
100	PI/2 BPSK	1	1		25.29		26.0
100	PI/2 BPSK	1	137		24.99		
100	PI/2 BPSK	1	271		24.85		
100	PI/2 BPSK	135	0		24.55		25.5
100	PI/2 BPSK	135	69		24.90		26.0
100	PI/2 BPSK	135	138		24.26		25.5
100	PI/2 BPSK	270	0		24.41		
100	QPSK	1	1		25.11		26.0
100	QPSK	1	137		24.91		
100	QPSK	1	271		24.80		
100	QPSK	135	0		24.06		25.0
100	QPSK	135	69		24.90		26.0
100	QPSK	135	138		23.77		25.0
100	QPSK	270	0		23.94		
100	16QAM	1	1		24.31		25.0
100	64QAM	1	1		22.68		23.5
100	256QAM	1	1		20.10		21.5
Channel				631334	633334	635334	Tune-up limit (dBm)
Frequency (MHz)				3470.01	3500.01	3530.01	
40	PI/2 BPSK	1	1	25.18	25.22	25.20	26.0
Channel				630668	633334	636000	Tune-up limit (dBm)
Frequency (MHz)				3460.02	3500.01	3540	
20	PI/2 BPSK	1	1	25.10	25.19	25.15	26.0

13. RF Exposure position consideration

Distance of the Antenna to the EUT surface/edge						
Antennas	Front	Back	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant 0	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WWAN Ant 1	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm
WWAN Ant 2	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WWAN Ant 5	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WWAN Ant 7	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
2.4GHz WLAN Ant 3	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm
2.4GHz WLAN/BT Ant 4	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm
5GHz WLAN Ant 3	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm
5GHz WLAN Ant 4	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Front	Back	Top Side	Bottom Side	Right Side	Left Side
WWAN Ant 0	Yes	Yes	No	Yes	Yes	Yes
WWAN Ant 1	Yes	Yes	Yes	No	Yes	Yes
WWAN Ant 2	Yes	Yes	No	Yes	Yes	Yes
WWAN Ant 5	Yes	Yes	No	Yes	Yes	Yes
WWAN Ant 7	Yes	Yes	No	Yes	Yes	Yes
2.4GHz WLAN Ant 3	Yes	Yes	Yes	No	Yes	Yes
2.4GHz WLAN/BT Ant 4	Yes	Yes	Yes	No	Yes	Yes
5GHz WLAN Ant 3	Yes	Yes	Yes	No	Yes	Yes
5GHz WLAN Ant 4	Yes	Yes	Yes	No	Yes	Yes

General Note:

1. Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge
2. The detail antenna location refers to operation description.

14. SAR Test Results

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 NR TDD SAR = Measured SAR(W/kg)*Tune-up Scaling Factor*transmission cycle factor
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:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g product specific SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

5G NR Note:

1. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. SAR testing start with the largest channel bandwidth and measure SAR for PI/2 BPSK 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.
   b. 50% RB allocation for PI/2 BPSK SAR testing follows 1RB PI/2 BPSK allocation procedure
   c. PI/2 BPSK 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.
   d. QPSK/16QAM/64QAM/256QAM output powers according to tune-up document will not ½ dB higher than the same configuration in PI/2 BPSK, also reported SAR for the PI/2 BPSK configuration is less than 1.45 W/kg, QPSK/16QAM/64QAM/256QAM SAR testing are not required.
   e. 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
   f. SAR testing for NR was performed using Factory Test Mode software to establish the connection, according to manufacturer definition for TDD actual transmission cycle is 33%, but factory test mode software is set and perform SAR with 25%, therefore, the SAR test result will be scaled up to 33%

14.1 Head SAR

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Output Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Right Cheek	0mm	DSI 2/7	633334	3500.01	25.59	26.50	1.233	25	1.320	0.07	0.035	0.057
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Right Cheek	0mm	DSI 2/7	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.13	0.047	0.083
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Right Tilted	0mm	DSI 2/7	633334	3500.01	25.59	26.50	1.233	25	1.320	0.01	0.043	0.070
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Right Tilted	0mm	DSI 2/7	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.02	0.038	0.067
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Left Cheek	0mm	DSI 2/7	633334	3500.01	25.59	26.50	1.233	25	1.320	-0.11	0.075	0.122
01	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Left Cheek	0mm	DSI 2/7	633334	3500.01	25.24	26.50	1.337	25	1.320	0.05	0.082	0.145
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Left Tilted	0mm	DSI 2/7	633334	3500.01	25.59	26.50	1.233	25	1.320	0.08	0.026	0.042
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Left Tilted	0mm	DSI 2/7	633334	3500.01	25.24	26.50	1.337	25	1.320	0.12	0.020	0.035
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Right Cheek	0mm	DSI 2/7	633334	3500.01	25.29	26.00	1.178	25	1.320	0.15	0.022	0.034
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Right Cheek	0mm	DSI 2/7	633334	3500.01	24.90	26.00	1.288	25	1.320	-0.1	0.022	0.037
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Right Tilted	0mm	DSI 2/7	633334	3500.01	25.29	26.00	1.178	25	1.320	0.15	0.011	0.017
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Right Tilted	0mm	DSI 2/7	633334	3500.01	24.90	26.00	1.288	25	1.320	0.17	0.011	0.019
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Left Cheek	0mm	DSI 2/7	633334	3500.01	25.29	26.00	1.178	25	1.320	-0.1	0.018	0.028
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Left Cheek	0mm	DSI 2/7	633334	3500.01	24.90	26.00	1.288	25	1.320	-0.19	0.018	0.031
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Left Tilted	0mm	DSI 2/7	633334	3500.01	25.29	26.00	1.178	25	1.320	0.07	0.024	0.037
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Left Tilted	0mm	DSI 2/7	633334	3500.01	24.90	26.00	1.288	25	1.320	0.07	0.021	0.036

14.2 Hotspot SAR

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Front	10mm	DSI 6	633334	3500.01	25.59	26.50	1.233	25	1.320	0.06	0.171	0.278
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Front	10mm	DSI 6	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.05	0.145	0.256
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Back	10mm	DSI 6	633334	3500.01	25.59	26.50	1.233	25	1.320	0.07	0.404	0.658
02	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Back	10mm	DSI 6	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.01	0.415	0.732
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Left Side	10mm	DSI 6	633334	3500.01	25.59	26.50	1.233	25	1.320	0.15	0.186	0.303
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Left Side	10mm	DSI 6	633334	3500.01	25.24	26.50	1.337	25	1.320	0.1	0.148	0.261
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Right Side	10mm	DSI 6	633334	3500.01	25.59	26.50	1.233	25	1.320	-0.06	0.017	0.028
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Right Side	10mm	DSI 6	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.01	0.021	0.037
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Bottom Side	10mm	DSI 6	633334	3500.01	25.59	26.50	1.233	25	1.320	0.09	0.162	0.264
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Bottom Side	10mm	DSI 6	633334	3500.01	25.24	26.50	1.337	25	1.320	0	0.165	0.291
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Front	10mm	DSI 6	633334	3500.01	25.29	26.00	1.178	25	1.320	-0.01	0.184	0.286
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Front	10mm	DSI 6	633334	3500.01	24.90	26.00	1.288	25	1.320	0.06	0.168	0.286
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Back	10mm	DSI 6	633334	3500.01	25.29	26.00	1.178	25	1.320	-0.12	0.356	0.553
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Back	10mm	DSI 6	633334	3500.01	24.90	26.00	1.288	25	1.320	0.05	0.338	0.575
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Left Side	10mm	DSI 6	633334	3500.01	25.29	26.00	1.178	25	1.320	0.18	0.023	0.036
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Left Side	10mm	DSI 6	633334	3500.01	24.90	26.00	1.288	25	1.320	0.16	0.022	0.037
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Right Side	10mm	DSI 6	633334	3500.01	25.29	26.00	1.178	25	1.320	0.13	0.192	0.298
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Right Side	10mm	DSI 6	633334	3500.01	24.90	26.00	1.288	25	1.320	0.17	0.171	0.291
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Bottom Side	10mm	DSI 6	633334	3500.01	25.29	26.00	1.178	25	1.320	0.08	0.134	0.208
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Bottom Side	10mm	DSI 6	633334	3500.01	24.90	26.00	1.288	25	1.320	0.12	0.102	0.173

14.3 Body Worn Accessory SAR

<5G NR SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Front	10mm	DSI 4/8	633334	3500.01	25.59	26.50	1.233	25	1.320	0.06	0.171	0.278
	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Front	10mm	DSI 4/8	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.05	0.145	0.256
	FR1 n77_HPUE_Ant 7	100M	BPSK	1	1	Back	10mm	DSI 4/8	633334	3500.01	25.59	26.50	1.233	25	1.320	0.07	0.404	0.658
03	FR1 n77_HPUE_Ant 7	100M	BPSK	135	69	Back	10mm	DSI 4/8	633334	3500.01	25.24	26.50	1.337	25	1.320	-0.01	0.415	0.732
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Front	10mm	DSI 4/8	633334	3500.01	25.29	26.00	1.178	25	1.320	-0.01	0.184	0.286
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Front	10mm	DSI 4/8	633334	3500.01	24.90	26.00	1.288	25	1.320	0.06	0.168	0.286
	FR1 n77_HPUE_Ant 2	100M	BPSK	1	1	Back	10mm	DSI 4/8	633334	3500.01	25.29	26.00	1.178	25	1.320	-0.12	0.356	0.553
	FR1 n77_HPUE_Ant 2	100M	BPSK	135	69	Back	10mm	DSI 4/8	633334	3500.01	24.90	26.00	1.288	25	1.320	0.05	0.338	0.575

15. Simultaneous Transmission Analysis

Config	Mode	Capable TX Configurations
1	WWAN OFF (Cellular off)	WiFi 5G SISO (Chain0) + Bluetooth
2		WiFi 5G SISO (Chain1) + Bluetooth
3		WiFi 5G MIMO + Bluetooth
4		WiFi 5G SISO (Chain1)
5		WiFi 5G SISO (Chain0)
6		WiFi 5G MIMO
7		WiFi 2.4G SISO (Chain1)
8		WiFi 2.4G SISO (Chain0)
9		WiFi 2.4G MIMO/CDD
10		Bluetooth
11		WiFi 2.4G SISO (Chain0) + WiFi 5G SISO (Chain1)
12	WWAN ON + FR1 (Cellular on)	WiFi 5G SISO (Chain0) + Bluetooth
13		WiFi 5G SISO (Chain1) + Bluetooth
14		WiFi 5G MIMO + Bluetooth
15		WiFi 5G SISO (Chain1)
16		WiFi 5G SISO (Chain0)
17		WiFi 5G MIMO
18		WiFi 2.4G SISO (Chain1)
19		WiFi 2.4G SISO (Chain0)
20		WiFi 2.4G MIMO/CDD
21		Bluetooth
22		WiFi 2.4G SISO (Chain0) + WiFi 5G SISO (Chain1)

General Note:

1. Simultaneous operation at maximum power levels when the device is neither against the body nor the head (i.e. in a mobile RF exposure condition) is addressed in Sporton's RF Exposure report FA0O1507-05B
2. The WLAN/Bluetooth test results are refer to original report FCC ID: A4RG1F8F, Report No.: FA0O1507-01A and using perform Sim-Tx analysis
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

15.1 5G NR + LTE + WLAN + BT Sim-Tx analysis

In 5G NR + LTE + WLAN + BT simultaneous transmission, 5G NR and LTE transmission are managed and controlled by Qualcomm® Smart Transmit, while the RF exposure from WLAN and BT radios is managed using legacy approach, i.e., through a fixed power back-off if needed.

Since WLAN and BT do not employ time-averaging, 1gSAR and 10gSAR measurement for WLAN and BT need to be conducted at their corresponding rated power following current FCC test procedures to determine reported SAR values.

Smart Transmit current implementation assumes hotspots from 5G NR and LTE are collocated. Therefore, for a total of 100% exposure margin, if LTE uses x%, then the exposure margin left for 5G NR is capped to (100-x)%. Thus, the compliance equation for LTE + 5G NR is

*x% * A + (100-x)% * B ≤ 1.0,*

Where, A is normalized reported time-averaged SAR exposure ratio from LTE, and A ≤ 1.0; B is normalized reported time-averaged exposure ratio from 5G NR (i.e., PD exposure for 5G FR2 or SAR exposure for 5G FR1), and B ≤1.0.

Let C = normalized reported SAR exposure ratio from WLAN+BT, then for compliance,

*x% * A + (100-x)% * B + C ≤ 1.0* (1)

x% * A + (100-x)% * B ≤ x% * max(A, B) + (100-x)% * max(A, B) ≤ max(A, B)

*x% * A + (100-x)% * B + C ≤ max(A, B) + C ≤ 1.0* (2)

if A + C ≤ 1.0 and B + C ≤ 1.0 can be proven, then “x% * A + (100-x)% * B + C ≤ 1.0”. Therefore simultaneous transmission analysis for 5G NR + LTE + WLAN + BT can be performed in two steps

Step 1: Prove total exposure ratio (TER) of LTE + WLAN + BT < 1
Step 2: Prove total exposure ratio (TER) of 5G NR + WLAN + BT < 1

15.2 Head Exposure Conditions

WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	1+4+8 Summed 1g SAR (W/kg)	1+5+8 Summed 1g SAR (W/kg)	1+7+8 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+6 Summed 1g SAR (W/kg)	1+8 Summed 1g SAR (W/kg)	1+2+5 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN Ant 4	2.4GHz WLAN Ant 3	5GHz WLAN Ant 4	5GHz WLAN Ant 3	2.4GHz WLAN Ant 4+3	5GHz WLAN Ant 4+3	Bluetooth Ant 4							
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
FR1 n77_Ant 7	Right Cheek	0.083	0.163	0.214	0.422	0.092	0.337	0.378	0.027	**0.532**	**0.202**	**0.488**	**0.297**	**0.420**	**0.110**	**0.338**
	Right Tilted	0.070	0.090	0.121	0.425	0.039	0.620	0.459	0.042	**0.537**	**0.151**	**0.571**	**0.191**	**0.690**	**0.112**	**0.199**
	Left Cheek	0.145	0.241	0.437	0.419	0.610	0.518	0.735	0.134	**0.698**	**0.889**	**1.014**	**0.582**	**0.663**	**0.279**	**0.996**
	Left Tilted	0.042	0.237	0.076	0.615	0.184	0.336	0.679	0.086	**0.743**	**0.312**	**0.807**	**0.118**	**0.378**	**0.128**	**0.463**
FR1 n77_Ant 2	Right Cheek	0.037	0.163	0.214	0.422	0.092	0.337	0.378	0.027	**0.486**	**0.156**	**0.442**	**0.251**	**0.374**	**0.064**	**0.292**
	Right Tilted	0.019	0.090	0.121	0.425	0.039	0.620	0.459	0.042	**0.486**	**0.100**	**0.520**	**0.140**	**0.639**	**0.061**	**0.148**
	Left Cheek	0.031	0.241	0.437	0.419	0.610	0.518	0.735	0.134	**0.584**	**0.775**	**0.900**	**0.468**	**0.549**	**0.165**	**0.882**
	Left Tilted	0.037	0.237	0.076	0.615	0.184	0.336	0.679	0.086	**0.738**	**0.307**	**0.802**	**0.113**	**0.373**	**0.123**	**0.458**

15.3 Hotspot Exposure Conditions

<Simultaneous Transmission is active_ WWAN ON>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	1+4+8 Summed 1g SAR (W/kg)	1+5+8 Summed 1g SAR (W/kg)	1+7+8 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+6 Summed 1g SAR (W/kg)	1+8 Summed 1g SAR (W/kg)	1+2+5 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN Ant 4	2.4GHz WLAN Ant 3	5GHz WLAN Ant 4	5GHz WLAN Ant 3	2.4GHz WLAN Ant 4+3	5GHz WLAN Ant 4+3	Bluetooth Ant 4							
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
FR1 n77_Ant 7	Front	0.278	0.188	0.140	0.116	0.054	0.221	0.111	0.058	**0.452**	**0.390**	**0.447**	**0.418**	**0.499**	**0.336**	**0.520**
	Back	0.732	0.276	0.330	0.371	0.142	0.401	0.276	0.102	**1.205**	**0.976**	**1.110**	**1.062**	**1.133**	**0.834**	**1.150**
	Left side	0.303		0.238		0.246	0.259	0.388		**0.303**	**0.549**	**0.691**	**0.541**	**0.562**	**0.303**	**0.549**
	Right side	0.037	0.178		0.359		0.113	0.347	0.056	**0.452**	**0.093**	**0.440**	**0.037**	**0.150**	**0.093**	**0.215**
	Top side		0.218		0.806		0.235	0.677	0.072	**0.878**	**0.072**	**0.749**	**0.000**	**0.235**	**0.072**	**0.218**
	Bottom side	0.291								**0.291**	**0.291**	**0.291**	**0.291**	**0.291**	**0.291**	**0.291**
FR1 n77_Ant 2	Front	0.286	0.188	0.140	0.116	0.054	0.221	0.111	0.058	**0.460**	**0.398**	**0.455**	**0.426**	**0.507**	**0.344**	**0.528**
	Back	0.575	0.276	0.330	0.371	0.142	0.401	0.276	0.102	**1.048**	**0.819**	**0.953**	**0.905**	**0.976**	**0.677**	**0.993**
	Left side	0.037		0.238		0.246	0.259	0.388		**0.037**	**0.283**	**0.425**	**0.275**	**0.296**	**0.037**	**0.283**
	Right side	0.298	0.178		0.359		0.113	0.347	0.056	**0.713**	**0.354**	**0.701**	**0.298**	**0.411**	**0.354**	**0.476**
	Top side		0.218		0.806		0.235	0.677	0.072	**0.878**	**0.072**	**0.749**	**0.000**	**0.235**	**0.072**	**0.218**
	Bottom side	0.208								**0.208**	**0.208**	**0.208**	**0.208**	**0.208**	**0.208**	**0.208**

15.4 Body-Worn Accessory Exposure Conditions

<Simultaneous Transmission is active_ WWAN ON>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	8	1+4+8 Summed 1g SAR (W/kg)	1+5+8 Summed 1g SAR (W/kg)	1+7+8 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+6 Summed 1g SAR (W/kg)	1+8 Summed 1g SAR (W/kg)	1+2+5 Summed 1g SAR (W/kg)
		WWAN	2.4GHz WLAN Ant 4	2.4GHz WLAN Ant 3	5GHz WLAN Ant 4	5GHz WLAN Ant 3	2.4GHz WLAN Ant 4+3	5GHz WLAN Ant 4+3	Bluetooth Ant 4							
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
FR1 n77_Ant 7	Front	0.278	0.188	0.140	0.114	0.048	0.221	0.091	0.058	**0.450**	**0.384**	**0.427**	**0.418**	**0.499**	**0.336**	**0.514**
	Back	0.732	0.276	0.330	0.371	0.184	0.401	0.276	0.102	**1.205**	**1.018**	**1.110**	**1.062**	**1.133**	**0.834**	**1.192**
FR1 n77_Ant 2	Front	0.286	0.188	0.140	0.114	0.048	0.221	0.091	0.058	**0.458**	**0.392**	**0.435**	**0.426**	**0.507**	**0.344**	**0.522**
	Back	0.575	0.276	0.330	0.371	0.184	0.401	0.276	0.102	**1.048**	**0.861**	**0.953**	**0.905**	**0.976**	**0.677**	**1.035**

Test Engineer： Jordar Jhuang, White Huang, and Wilson Lin

16. Uncertainty Assessment

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

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.

17. References

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

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

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

[4] SPEAG DASY System Handbook

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

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

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

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

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

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

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

[12] FCC KDB 941225 D07 v01r02, " SAR Evaluation Procedures for UMPC Mini-Tablet Devices", Oct 2015.

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

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