FCC SAR TEST REPORT

FCC ID	:	**2ABZ2-AA272**
Equipment	:	**Smart Phone**
Brand Name	:	**ONEPLUS**
Model Name	:	**CPH2389**
Applicant	:	**OnePlus Technology (Shenzhen) Co., Ltd. 18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China**
Manufacturer	:	**OnePlus Technology (Shenzhen) Co., Ltd. 18C02, 18C03, 18C04, and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, Guangdong, P.R. China**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

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

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

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.01

Sporton International Inc. (Shenzhen)
1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China

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Revision History

Report No.	Version	Description	Issued Date
FA221602	01	Initial issue of report	Jun. 02, 2022

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **OnePlus Technology (Shenzhen) Co., Ltd., Smart Phone, CPH2389**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
			Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	Extremity (Separation 0mm)		
			1g SAR (W/kg)			10g SAR (W/kg)		
Licensed	GSM	GSM850	1.07	0.40	0.18		1.57	3.46
		GSM1900	0.89	0.96	0.52	2.06		
	WCDMA	WCDMA V	**1.17**	0.46	0.26			
		WCDMA IV	1.11	1.01	0.92	2.70		
		WCDMA II	1.05	**1.07**	0.99	2.70		
	LTE	LTE Band 71	0.67	0.39	0.26			
		LTE Band 12/17	0.84	0.29	0.27			
		LTE Band 13	0.67	0.23	0.24			
		LTE Band 26/5	1.01	0.50	0.26			
		LTE Band 66/4	0.86	0.90	0.90	1.90		
		LTE Band 25/2	0.91	0.97	0.90	**2.79**		
		LTE Band 7	0.75	0.99	0.51	2.44		
		LTE Band 38	0.78	0.59	0.28			
		LTE Band 41	0.97	0.98	0.33			
	NR	N71	0.76	0.35	0.27			
		N66	1.06	1.04	0.72	2.60		
		N25/2	1.16	0.97	0.83	2.17		
		N41	1.06	0.96	0.74	2.71		
		N77	0.83	0.93	0.86	2.76		
DTS	WLAN	WLAN2.4GHz	0.80	0.47	0.41		1.57	-
NII		WLAN5GHz	1.04	0.48	**1.02**	2.01	1.57	3.46
DSS	2.4GHz Band	Bluetooth	0.30	<0.10	<0.10		1.57	-
Date of Testing:			2022/2/28 ~ 2022/3/30					

Remark:
1. This device supports both LTE B4/5/17 and B66/26/12. Since the supported frequency span for LTE B4/5/17 falls completely within the supports frequency span for LTE B66/26/12, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B66/26/12.
2. This device supports both standalone LTE B2 and B25. Since the supported frequency span for standalone LTE B2 falls completely within the supports frequency span for LTE B25, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for standalone LTE B25.
3. This device supports both 5G NR n2 and 5G NR n25. Since the supported frequency span for 5G NR n2 falls completely within the supports frequency span for 5G NR n25, both NR bands have the same target power, and both NR bands share the same transmission path; therefore, SAR was only assessed for 5G NR n25.

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

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

2. Administration Data

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

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	SAR04-SZ/SAR05-SZ	CN1256	421272

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Smart Phone
Brand Name	ONEPLUS
Model Name	CPH2389
FCC ID	2ABZ2-AA272
IMEI Code	867188060042046
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 17 : 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 5G NR n2 : 1850 MHz ~ 1910 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: 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS AMR / RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is supported) LTE: QPSK, 16QAM, 64QAM 5G NR : CP-OFDM / DFT-s-OFDM, PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM WLAN 2.4GHz : 802.11b/g/n/ac HT20/HT40/VHT20/VHT40 WLAN 5GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC:ASK
HW Version	11
SW Version	CPH2389_11_A.02
GSM / (E)GPRS Dual Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Production Unit
Remark: 1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP) and LTE supports VoLTE operation.	

2. This device does not support DTM operation and supports GPRS/EGPRS mode up to multi-slot class 12.
3. This device WLAN 2.4GHz / 5.2GHz / 5.8GHz supports Hotspot operation and Bluetooth support tethering applications.
4. This device has NFC operations, the NFC antenna is integrated into the device for this model, therefore, all SAR test were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the antenna can be found in the operational description. According to FCC KDB publication 447498 D01v06, transmitters are consider to be operating simultaneously when there is overlapping transmission, with the exception of transmission during network hand-offs with maximum hand-off duration less than 30 seconds.
5. The device implements the power management and proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot/extremity). Details about the power management decision and sensor detection are provided in the operational description. The device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to power table at appendix E. (DSI 5/10: receiver on head power, DSI 18: hotspot on power, DSI 1/2/6/7: P-sensor on extremity for ANT0/1, P-sensor on extremity for ANT7, DSI 4/9: sensor off for body).

DSI	Trigger Conditions	Antenna No.	Exposure conditions	
DSI5	Receiver on	All Ant	Head Standalone	Head all Position
DSI10	Receiver on+WLAN	All Ant	Head Simultaneous	Head all Position
DSI18	Receiver off/Hotspot on	All Ant	Hotspot	body all Position
DSI1	Receiver off/Sensor on	Ant 1	extremity Standalone	See by section 5
	Receiver off/Sensor off	Ant 1	extremity Standalone	No sensor Position
DSI2	Receiver off/Sensor on	Ant 0	extremity Standalone	See by section 5
	Receiver off/Sensor off	Ant 0	extremity Standalone	No sensor Position
DSI6	Receiver off/Sensor on+WLAN	Ant 1	extremity Simultaneous	See by section 5
DSI7	Receiver off/Sensor on+WLAN	Ant 0	extremity Simultaneous	See by section 5
DSI4	Receiver off/Sensor off	All Ant	Body-worn Standalone	Front/Back
DSI9	Receiver off/Sensor off+WLAN	All Ant	Body-worn Simultaneous	Front/Back

6. For WLAN when transmit simultaneous with WWAN, power reduction will be activated to head, body-worn. For WLAN when transmit simultaneous with WWAN and Proximity sensors trigger, power reduction will be activated to extremity.

Trigger Conditions	Exposure conditions	
Receiver on	Head Standalone	Head all Position
Receiver on+WWAN	Head Simultaneous	Head all Position
Receiver off/Hotspot on	Hotspot	body all Position
Receiver off/Sensor on	extremity Standalone	See by section 5
Receiver off/Sensor on+WWAN	extremity Simultaneous	See by section 5
Receiver off/Sensor off	extremity Standalone	No sensor Position
Receiver off/Sensor off	Body-worn Standalone	Front/Back
Receiver off/ Sensor off+WWAN	Body-worn Simultaneous	Front/Back

7. For Some WWAN bands, full power level higher than reduced power level, so full power SAR can represent reduced power SAR conservatively
8. LTE band 41, 5GNR n41/n77 supports HPUE, HPUE power and SAR testing performed separately.
9. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
10. NSA and SA mode should perform conducted measurement and SAR separately.
11. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
12. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
13. For 5G NR EN-DC mode, standalone SAR performed for 5GNR band with the maximum power, EN-DC SAR summed 5GNR standalone SAR and LTE standalone SAR , the result of EN-DC SAR is more conservatively.
14. This device supports 5GNR FR1 bands as following table, including NSA mode and SA mode.

<5G NR>

Mode	Band	Duplex	SCS(KHz)	Bandwidths(BW)
NSA	n2	FDD	15	5, 10, 15, 20
	n25	FDD	15	5, 10, 15, 20, 25, 30, 40
	n66	FDD	15	5, 10, 15, 20, 25, 30, 40
	n71	FDD	15	5, 10, 15, 20
	n41	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100
SA	n2	FDD	15	5, 10, 15, 20
	n25	FDD	15	5, 10, 15, 20, 25, 30, 40
	n66	FDD	15	5, 10, 15, 20, 25, 30, 40
	n71	FDD	15	5, 10, 15, 20
	n41	TDD	30	20, 30, 40, 50, 60, 70, 80, 90, 100
	n77	TDD	30	10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, 100

4.2 General LTE SAR Test and Reporting Considerations

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>2ABZ2-AA272</td></tr>
<tr><td>Equipment Name</td><td>Smart Phone</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>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 17 : 704 MHz ~ 716 MHz
LTE Band 25: 1850 MHz ~ 1915 MHz
LTE Band 26: 814 MHz ~ 849 MHz
LTE Band 38: 2570 MHz ~ 2620 MHz
LTE Band 41: 2496 MHz ~ 2690 MHz
LTE Band 66: 1710 MHz ~ 1780 MHz
LTE Band 71: 663 MHz ~ 698 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>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 17: 5MHz, 10MHz
LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK / 16QAM / 64QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Voice and Data</td></tr>
<tr><td>LTE Release Version</td><td>R12, Cat 13</td></tr>
<tr><td>CA Support</td><td>Yes, Uplink and Downlink</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>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)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>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.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>Yes, receiver detected /hotspot /proximity sensor will trigger reduced power for some bands, the detail please referred to section 13.</td></tr>
<tr><td>LTE Carrier Aggregation Combinations</td><td>Inter-Band and Intra-Band possible combinations and the detail power measurement please referred to section 13.</td></tr>
<tr><td>LTE Carrier Aggregation Additional Information</td><td>1. This device supports LTE Carrier Aggregation (CA) in the uplink for LTE 41C with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance.
2. This device supports maximum of 2 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.</td></tr>
</table>

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

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

LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

LTE Band 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	133322	683
H	133447	695.5	133422	693	133397	690.5	133372	688

4.3 General 5G NR SAR Test and Reporting Considerations

5G NR FR1 Information	
Operating Frequency Range of each 5G NR transmission band	5G NR n2 : 1850 MHz ~ 1910 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 : 3450 MHz ~ 3550 MHz, 3700 MHz ~ 3980 MHz
Channel Bandwidth	5G NR n2: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n25: 5MHz, 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 40MHz 5G NR n41: 20MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 80MHz, 90MHz, 100MHz 5G NR n66: 5MHz, 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 40MHz 5G NR n71: 5MHz, 10MHz, 15MHz, 20MHz 5G NR n77: 10MHz, 15MHz, 20MHz, 25MHz, 30MHz, 40MHz, 50MHz, 60MHz, 70MHz, 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 B12/66
LTE Anchor Bands for n25	LTE B66
LTE Anchor Bands for n41	LTE B2/66
LTE Anchor Bands for n66	LTE B2/12
LTE Anchor Bands for n71	LTE B2/66

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 25

	Bandwidth 5MHz		Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	370500	1852.5	371000	1855	371500	1857.5	372000	1860	372500	1862.5	373000	1865	374000	1870
M	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.5	376500	1882.53
H	382500	1912.5	382000	1910	381500	1907.5	381000	1905	380500	1902.5	380000	1900	379000	1895

NR Band 66

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

NR Band 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	134100	670.5	134600	673
M	136100	680.5	136100	680.5	136100	680.5	136100	680.5
H	139100	695.5	138600	693	138100	690.5	137600	688

NR Band 41																		
	Bandwidth 20MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	501204	2506.02	502200	2511	503202	2516.01	504204	2521.02	505200	2526	506202	2531.01	507204	2536.02	508200	2541	509202	2546.01
M	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99	518598	2592.99
H	535998	2679.99	534996	2674.98	534000	2670	532998	2664.99	531996	2659.98	531000	2655	529998	2649.99	528996	2644.98	528000	2640

For 3450MHz ~ 3550MHz

NR Band 77																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	630334	3455.01	630500	3457.5	630668	3460.02	630834	3462.51	631000	3465	631334	3470.01	631668	3475.02	632000	3480	632334	3485.01	632668	3490.02	633000	3495		
M	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01	633334	3500.01
H	636332	3544.98	636166	3542.49	636000	3540	635832	3537.48	635666	3534.99	635332	3529.98	635000	3525	634666	3519.99	634332	3514.98	634000	3510	633666	3504.99		

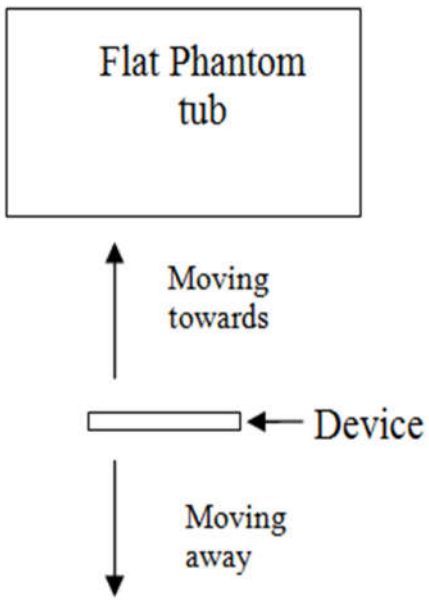
For 3700MHz ~ 3980MHz

NR Band 77																						
	Bandwidth 10MHz		Bandwidth 15MHz		Bandwidth 20MHz		Bandwidth 25MHz		Bandwidth 30MHz		Bandwidth 40MHz		Bandwidth 50MHz		Bandwidth 60MHz		Bandwidth 70MHz		Bandwidth 80MHz		Bandwidth 90MHz		Bandwidth 100MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	647000	3705	647168	3707.52	647334	3710.01	647500	3712.5	647668	3715.02	648000	3720	648334	3725.01	648668	3730.02	649000	3735	649334	3740.01	649668	3745.02	650000	3750
M	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840	656000	3840
H	665000	3975	664832	3972.48	664666	3969.99	664500	3967.5	664332	3964.98	664000	3960	663666	3954.99	663332	3949.98	663000	3945	662666	3939.99	662332	3934.98	662000	3930

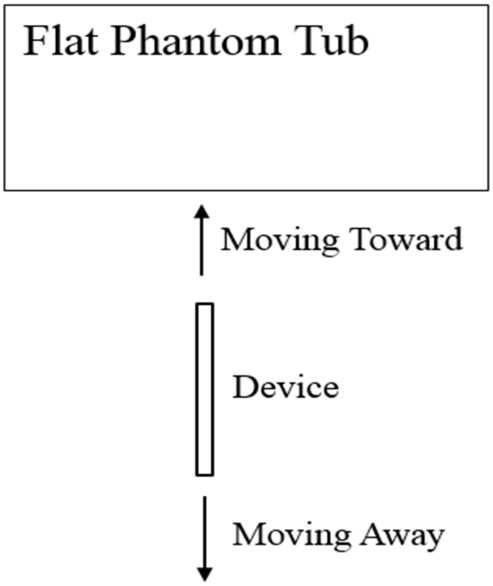
5. Proximity Reduced Triggering Test

<Proximity Reduced Triggering Distance>:

1. Proximity sensor triggering distance testing was performed according and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (5850MHz) and lowest (1750MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body at the front or back of the device.
3. The output power will reduce to body worn power level when top and bottom sensor pad be detected.
4. The device employs proximity sensors also can detect the presence of the user's body or a finger or hand when body or handheld state at the front/back/top/bottom/left/right sides of the device. When front/back/top/bottom/left/right sides of body or handheld condition is detected reduced power will be active.
5. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance -1mm was performed:



sensor detection test set-up, front and back sides



sensor detection test set-up, top, bottom, left and right sides

Proximity Sensor Triggering Distance (mm) for ANT7								
Position	Front		Back		Right Side		Top Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	6	7	9	10	8	9	6	8

Proximity Sensor Triggering Distance (mm) for ANT0								
Position	Front		Back		Left Side		Bottom Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	6	7	14	15	3	4	11	12

Proximity Sensor Triggering Distance (mm) for ANT1								
Position	Front		Back		Left Side		Top Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	6	7	9	10	3	4	10	12

6. RF Exposure Limits

6.1 Uncontrolled Environment

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

6.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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.

7. Specific Absorption Rate (SAR)

7.1 Introduction

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

7.2 SAR Definition

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

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

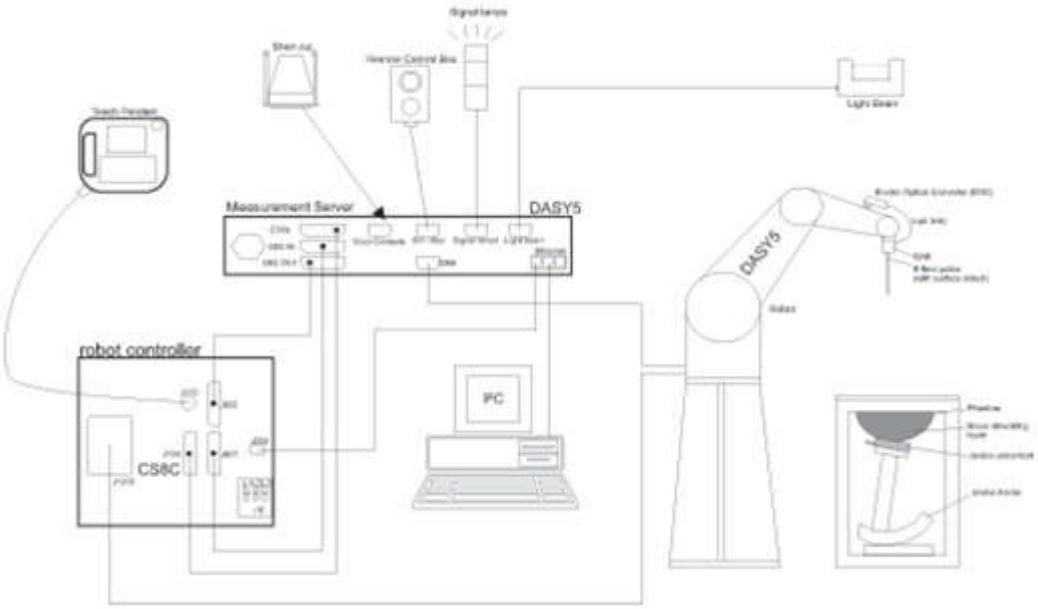
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. System Description and Setup

The 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.

8.1 E-Field Probe

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

<EX3DV4 Probe>

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

8.2 Data Acquisition Electronics (DAE)

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

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

Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

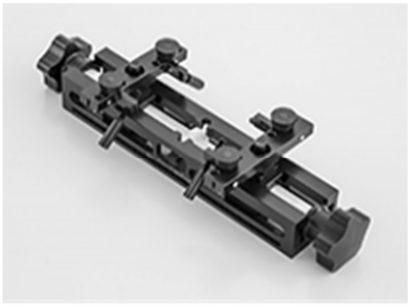
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

9.1 Spatial Peak SAR Evaluation

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

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

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

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

9.2 Power Reference Measurement

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

9.3 Area Scan

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

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

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

9.4 Zoom Scan

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

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

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

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

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

9.5 Volume Scan Procedures

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

9.6 Power Drift Monitoring

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

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1099	Dec. 15, 2021	Dec. 14, 2022
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 16, 2022
SPEAG	1750MHz System Validation Kit	D1750V2	1137	Oct. 19, 2021	Oct. 18, 2022
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 19, 2022
SPEAG	2450MHz System Validation Kit	D2450V2	924	Sep. 02, 2020	Sep. 01, 2023
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 20, 2021	Dec. 19, 2022
SPEAG	3500MHz System Validation Kit	D3500V2	1076	Apr. 29, 2019	Apr. 14, 2022
SPEAG	3700MHz System Validation Kit	D3700V2	1037	Apr. 29, 2019	Apr. 14, 2022
SPEAG	3900MHz System Validation Kit	D3900V2	1022	Jul. 11, 2019	Jul. 06, 2022
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Sep. 24, 2019	Sep. 22, 2022
SPEAG	Data Acquisition Electronics	DAE4	715	Dec. 29, 2021	Dec. 28, 2022
SPEAG	Data Acquisition Electronics	DAE4	1437	Oct. 26, 2021	Oct. 25, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	7576	Apr. 26, 2021	Apr. 25, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Apr. 30, 2021	Apr. 29, 2022
SPEAG	SAM Twin Phantom	QD 000 P40 CC	TP-1500	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P41 AA	2035	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Jul. 14, 2021	Jul. 13, 2022
Anritsu	Radio communication analyzer	MT8821C	6201588577	Apr. 08, 2021	Apr. 07, 2022
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 14, 2021	Jul. 13, 2022
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 25, 2021	Oct. 24, 2022
Speag	Dielectric Assessment KIT	DAK-3.5	1138	Jun. 09, 2021	Jun. 08, 2022
Agilent	Signal Generator	N5181A	MY50145381	Dec. 28, 2021	Dec. 27, 2022
Anritsu	Power Sensor	MA2411B	1306099	Sep. 29, 2021	Sep. 28, 2022
Anritsu	Power Meter	ML2495A	1349001	Sep. 29, 2021	Sep. 28, 2022
Anritsu	Power Sensor	MA2411B	1542004	Dec. 28, 2021	Dec. 27, 2022
Anritsu	Power Meter	ML2495A	1339473	Dec. 28, 2021	Dec. 27, 2022
R&S	Power Sensor	NRP50S	101254	Apr. 09, 2021	Apr. 08, 2022
R&S	Power Sensor	NRP8S	109228	Apr. 09, 2021	Apr. 08, 2022
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 28, 2021	Dec. 27, 2022
R&S	Spectrum Analyzer	FSP7	100818	Jul. 14, 2021	Jul. 13, 2022
TES	Hygrometer	1310	200505600	Jul. 17, 2021	Jul. 16, 2022
Anymetre	Thermo-Hygrometer	JR593	2018100802	Oct. 29, 2021	Oct. 28, 2022
Anymetre	Thermo-Hygrometer	JR593	2020062101	Jul. 17, 2021	Jul. 16, 2022
SPEAG	Device Holder	N/A	N/A	N/A	N/A
AR	Amplifier	5S1G4	0333096	Note 1	
mini-circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
Weinschel	Attenuator 1	3M-10	N/A	Note 1	
Weinschel	Attenuator 2	3M-20	N/A	Note 1	

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. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

11. System Verification

11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 12.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 12.2.

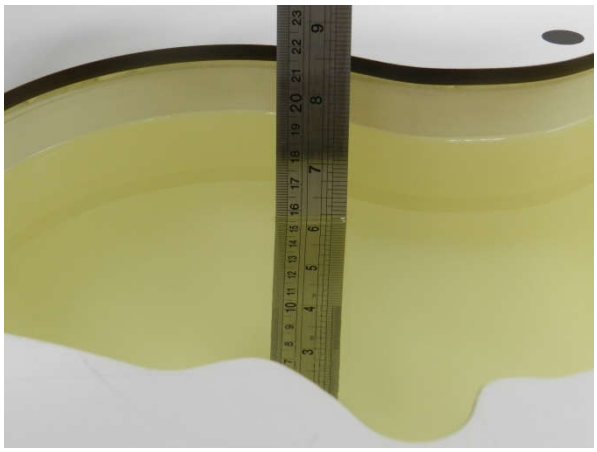


Fig 12.1Photo of Liquid Height for Head SAR

Fig 12.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

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

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

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	22.3	0.886	41.534	0.89	41.90	-0.45	-0.87	±5	2022/2/28
750	Head	22.4	0.879	40.957	0.89	41.90	-1.24	-2.25	±5	2022/3/11
750	Head	22.5	0.880	40.936	0.89	41.90	-1.12	-2.30	±5	2022/3/7
835	Head	22.7	0.904	40.381	0.90	41.50	0.44	-2.70	±5	2022/3/1
835	Head	22.3	0.916	42.677	0.90	41.50	1.78	2.84	±5	2022/3/14
835	Head	22.3	0.919	41.524	0.90	41.50	2.11	0.06	±5	2022/3/11
1750	Head	22.4	1.385	39.708	1.37	40.10	1.09	-0.98	±5	2022/3/1
1750	Head	22.7	1.355	38.395	1.37	40.10	-1.09	-4.25	±5	2022/3/15
1750	Head	22.1	1.382	39.895	1.37	40.10	0.88	-0.51	±5	2022/3/9
1900	Head	22.8	1.422	41.138	1.40	40.00	1.57	2.85	±5	2022/3/3
1900	Head	22.2	1.448	39.105	1.40	40.00	3.43	-2.24	±5	2022/3/17
1900	Head	22.6	1.460	39.248	1.40	40.00	4.29	-1.88	±5	2022/3/15
2450	Head	22.4	1.829	38.235	1.80	39.20	1.61	-2.46	±5	2022/3/3
2450	Head	22.5	1.736	40.751	1.80	39.20	-3.56	3.96	±5	2022/3/19
2600	Head	22.7	1.894	40.240	1.96	39.00	-3.37	3.18	±5	2022/3/5
2600	Head	22.4	1.890	40.256	1.96	39.00	-3.57	3.22	±5	2022/3/23
2600	Head	22.2	2.053	37.984	1.96	39.00	4.74	-2.61	±5	2022/3/17
3500	Head	22.5	2.892	36.795	2.91	37.90	-0.62	-2.92	±5	2022/3/4
3500	Head	22.1	2.905	39.577	2.91	37.90	-0.17	4.42	±5	2022/3/26
3500	Head	22.3	2.887	38.374	2.91	37.90	-0.79	1.25	±5	2022/3/18
3700	Head	22.9	3.041	36.281	3.12	37.70	-2.53	-3.76	±5	2022/3/6
3700	Head	22.1	3.063	39.332	3.12	37.70	-1.83	4.33	±5	2022/3/20
3700	Head	22.3	3.042	36.377	3.12	37.70	-2.50	-3.51	±5	2022/3/28
3900	Head	22.4	3.203	37.933	3.33	37.51	-3.81	1.13	±5	2022/3/7
3900	Head	22.7	3.196	36.353	3.33	37.51	-4.02	-3.08	±5	2022/3/29
3900	Head	22.4	3.199	38.142	3.33	37.51	-3.93	1.68	±5	2022/3/21
5250	Head	22.4	4.565	35.648	4.71	35.95	-3.08	-0.84	±5	2022/3/12
5250	Head	22.3	4.701	36.243	4.71	35.95	-0.19	0.82	±5	2022/3/26
5600	Head	22.2	4.947	35.037	5.07	35.50	-2.43	-1.30	±5	2022/3/13
5600	Head	22.2	5.199	36.179	5.07	35.50	2.54	1.91	±5	2022/3/29
5750	Head	22.6	5.100	34.770	5.22	35.35	-2.30	-1.64	±5	2022/3/12
5750	Head	22.1	5.103	36.744	5.22	35.35	-2.24	3.94	±5	2022/3/30

11.3 System Performance Check Results

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

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2022/2/28	750	Head	250	1099	7576	1437	2.020	8.54	8.08	-5.39
2022/3/11	750	Head	250	1099	7576	1437	2.000	8.54	8	-6.32
2022/3/7	750	Head	250	1099	3819	715	2.180	8.54	8.72	2.11
2022/3/1	835	Head	250	4d162	7576	1437	2.420	9.64	9.68	0.41
2022/3/14	835	Head	250	4d162	7576	1437	2.510	9.64	10.04	4.15
2022/3/11	835	Head	250	4d162	3819	715	2.480	9.64	9.92	2.90
2022/3/1	1750	Head	250	1137	7576	1437	9.430	36.50	37.72	3.34
2022/3/15	1750	Head	250	1137	7576	1437	9.510	36.50	38.04	4.22
2022/3/9	1750	Head	250	1137	3819	715	9.260	36.50	37.04	1.48
2022/3/3	1900	Head	250	5d182	7576	1437	10.300	39.60	41.2	4.04
2022/3/17	1900	Head	250	5d182	7576	1437	10.500	39.60	42	6.06
2022/3/15	1900	Head	250	5d182	3819	715	10.400	39.60	41.6	5.05
2022/3/3	2450	Head	250	924	7576	1437	13.000	51.40	52	1.17
2022/3/19	2450	Head	250	924	7576	1437	13.700	51.40	54.8	6.61
2022/3/5	2600	Head	250	1070	7576	1437	15.300	56.20	61.2	8.90
2022/3/23	2600	Head	250	1070	7576	1437	15.200	56.20	60.8	8.19
2022/3/17	2600	Head	250	1070	3819	715	15.100	56.20	60.4	7.47
2022/3/4	3500	Head	100	1076	7576	1437	6.320	67.90	63.2	-6.92
2022/3/26	3500	Head	100	1076	7576	1437	6.290	67.90	62.9	-7.36
2022/3/18	3500	Head	100	1076	3819	715	6.490	67.90	64.9	-4.42
2022/3/6	3700	Head	100	1037	7576	1437	6.620	68.50	66.2	-3.36
2022/3/20	3700	Head	100	1037	3819	715	6.860	68.50	68.6	0.15
2022/3/28	3700	Head	100	1037	7576	1437	6.620	68.50	66.2	-3.36
2022/3/7	3900	Head	100	1022	7576	1437	6.630	70.50	66.3	-5.96
2022/3/29	3900	Head	100	1022	7576	1437	6.720	70.50	67.2	-4.68
2022/3/21	3900	Head	100	1022	3819	715	6.760	70.50	67.6	-4.11
2022/3/12	5250	Head	100	1113	7576	1437	7.600	80.50	76	-5.59
2022/3/26	5250	Head	100	1113	7576	1437	7.830	80.50	78.3	-2.73
2022/3/13	5600	Head	100	1113	7576	1437	7.810	83.40	78.1	-6.35
2022/3/29	5600	Head	100	1113	7576	1437	8.120	83.40	81.2	-2.64
2022/3/12	5750	Head	100	1113	7576	1437	7.470	80.00	74.7	-6.63
2022/3/30	5750	Head	100	1113	7576	1437	8.320	80.00	83.2	4.00

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2022/2/28	750	Head	250	1099	7576	1437	1.340	5.65	5.36	-5.13
2022/3/11	750	Head	250	1099	7576	1437	1.330	5.65	5.32	-5.84
2022/3/7	750	Head	250	1099	3819	715	1.440	5.65	5.76	1.95
2022/3/1	835	Head	250	4d162	7576	1437	1.520	6.26	6.08	-2.88
2022/3/14	835	Head	250	4d162	7576	1437	1.620	6.26	6.48	3.51
2022/3/11	835	Head	250	4d162	3819	715	1.590	6.26	6.36	1.60
2022/3/1	1750	Head	250	1137	7576	1437	4.960	19.20	19.84	3.33
2022/3/15	1750	Head	250	1137	7576	1437	5.110	19.20	20.44	6.46
2022/3/9	1750	Head	250	1137	3819	715	4.910	19.20	19.64	2.29
2022/3/3	1900	Head	250	5d182	7576	1437	5.230	20.20	20.92	3.56
2022/3/17	1900	Head	250	5d182	7576	1437	5.320	20.20	21.28	5.35
2022/3/15	1900	Head	250	5d182	3819	715	5.380	20.20	21.52	6.53
2022/3/3	2450	Head	250	924	7576	1437	6.000	24.00	24	0.00
2022/3/19	2450	Head	250	924	7576	1437	6.180	24.00	24.72	3.00
2022/3/5	2600	Head	250	1070	7576	1437	6.590	24.60	26.36	7.15
2022/3/23	2600	Head	250	1070	7576	1437	6.580	24.60	26.32	6.99
2022/3/17	2600	Head	250	1070	3819	715	6.520	24.60	26.08	6.02
2022/3/4	3500	Head	100	1076	7576	1437	2.430	25.30	24.3	-3.95
2022/3/26	3500	Head	100	1076	7576	1437	2.300	25.30	23	-9.09
2022/3/18	3500	Head	100	1076	3819	715	2.450	25.30	24.5	-3.16
2022/3/6	3700	Head	100	1037	7576	1437	2.410	24.80	24.1	-2.82
2022/3/20	3700	Head	100	1037	3819	715	2.500	24.80	25	0.81
2022/3/28	3700	Head	100	1037	7576	1437	2.420	24.80	24.2	-2.42
2022/3/7	3900	Head	100	1022	7576	1437	2.360	24.60	23.6	-4.07
2022/3/29	3900	Head	100	1022	7576	1437	2.490	24.60	24.9	1.22
2022/3/21	3900	Head	100	1022	3819	715	2.480	24.60	24.8	0.81
2022/3/12	5250	Head	100	1113	7576	1437	2.180	23.10	21.8	-5.63
2022/3/26	5250	Head	100	1113	7576	1437	2.390	23.10	23.9	3.46
2022/3/13	5600	Head	100	1113	7576	1437	2.220	23.80	22.2	-6.72
2022/3/29	5600	Head	100	1113	7576	1437	2.410	23.80	24.1	1.26
2022/3/12	5750	Head	100	1113	7576	1437	2.210	22.80	22.1	-3.07
2022/3/30	5750	Head	100	1113	7576	1437	2.330	22.80	23.3	2.19

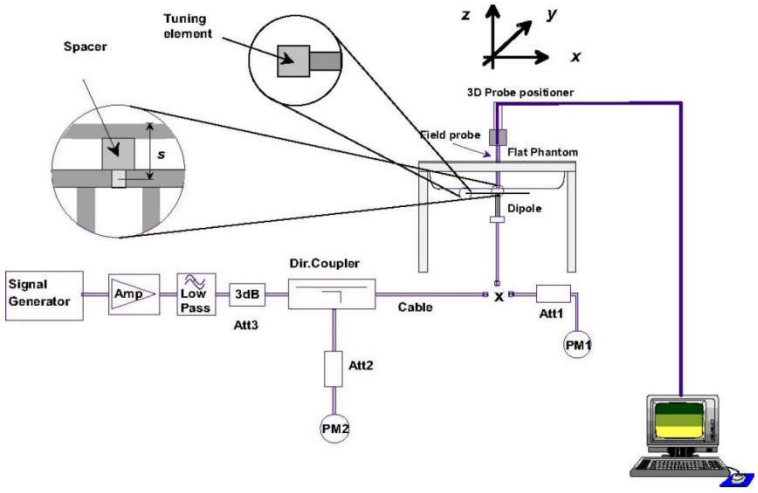


Fig 12.2.1 System Performance Check Setup

Fig 12.2.2 Setup Photo

12. RF Exposure Positions

12.1 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.

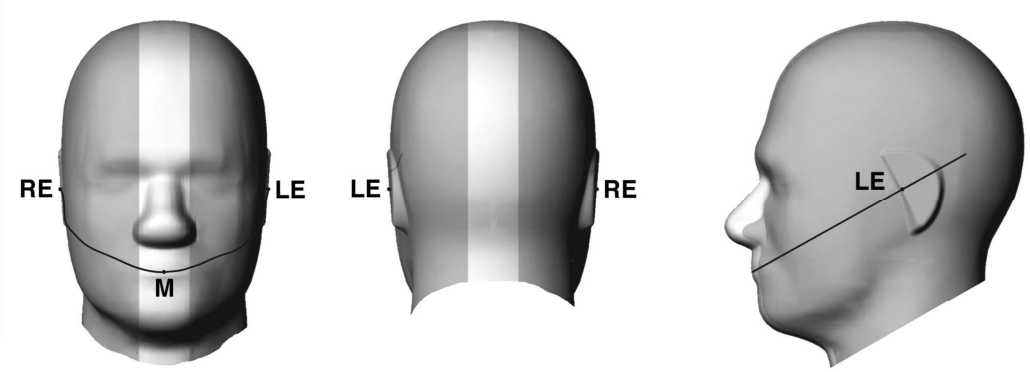


Fig 9.1.1 Front, back, and side views of SAM twin phantom

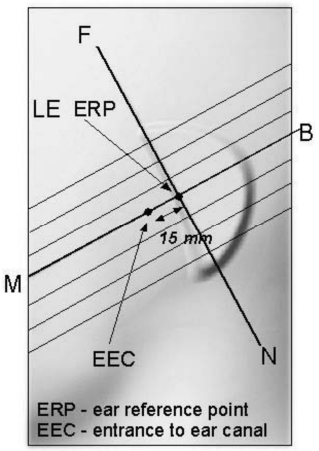


Fig 9.1.2 Close-up side view of phantom showing the ear region.

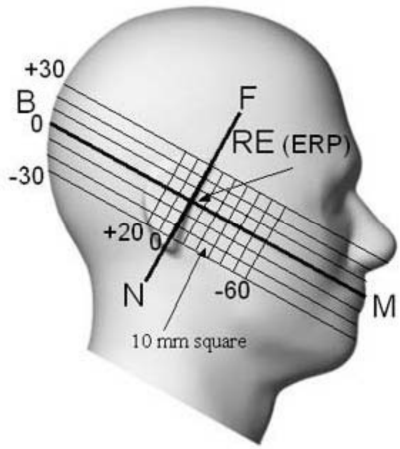


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 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.

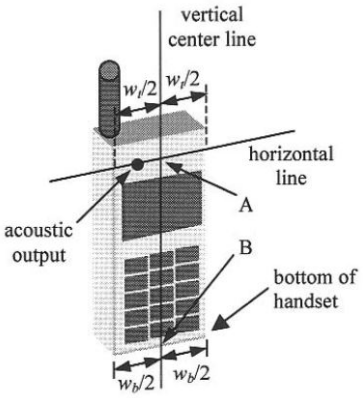


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

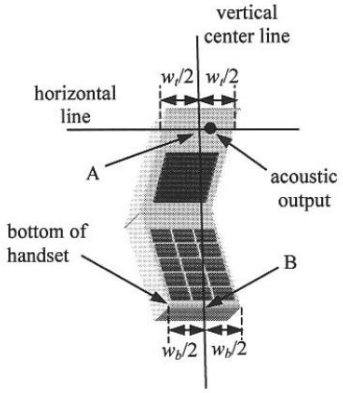


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

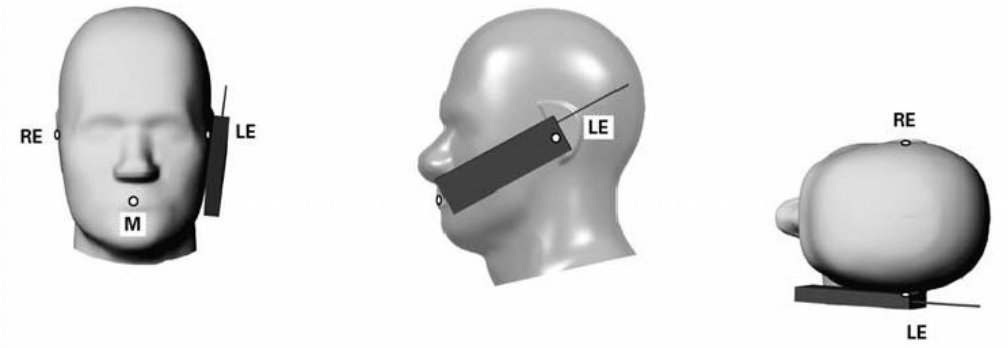


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 Definition of the tilt position

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

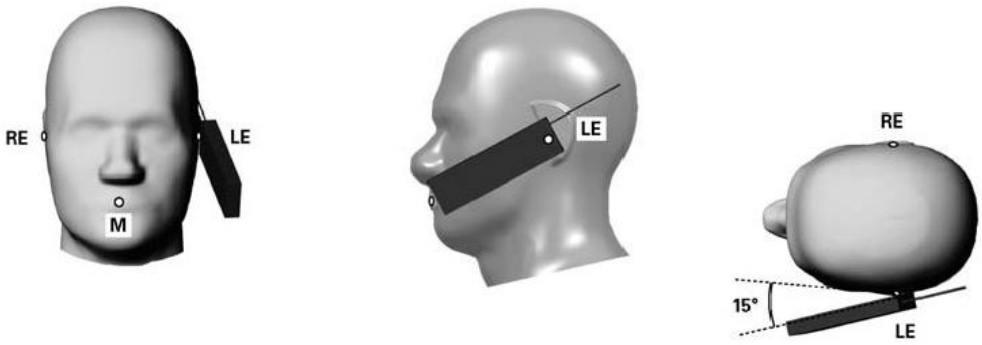


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 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.

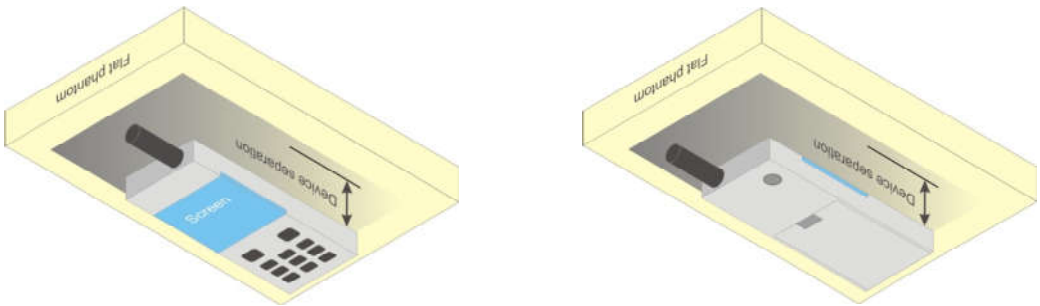


Fig 9.4 Body Worn Position

12.5 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.

12.6 Wireless Router

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

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

13. GSM/UMTS/LTE Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

<GSM Conducted Power>

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850 and GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. Both primary and secondary modes must be in the same frequency band. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

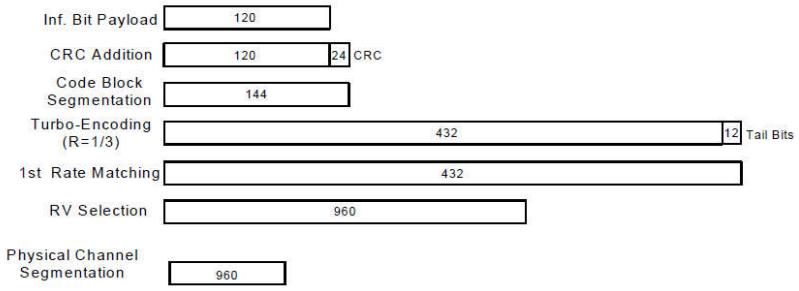


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2E:HSPA+:UL with 16QAM
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.4, quoted from the TS 34.121-1 s5.2E
   iii. Set Channel Parms
   iv. Set Cell Power = -86 dBm
   v. Set Channel Type = HSPA
   vi. Set UE Target Power =21 dBm
   vii. Power Ctrl Mode= All Up Bits
   viii. Set Manual Uplink DPCH Bc/Bd = Manual
   ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
   x. Set HSPA Conn DL Channel Levels
   xi. Set HS-SCCH Configs
   xii. Set RB Test Mode Setup
   xiii. Set Common HSUPA Parameters
   xiv. Set Serving Grant
   xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed}1$: 30/15 $\beta_{ed}2$: 30/15	$\beta_{ed}3$: 24/15 $\beta_{ed}4$: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

Setup Configuration

<WCDMA Conducted Power>

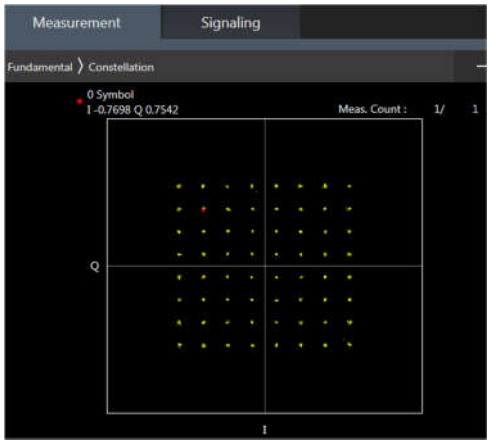
General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation 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.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM/256QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM/256QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > 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; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B17 / B26 / B38 / B71 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. Standalone LTE band 2/4/5/17 SAR test was covered by Band 25/66/26; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM

16QAM

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations

b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS

c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

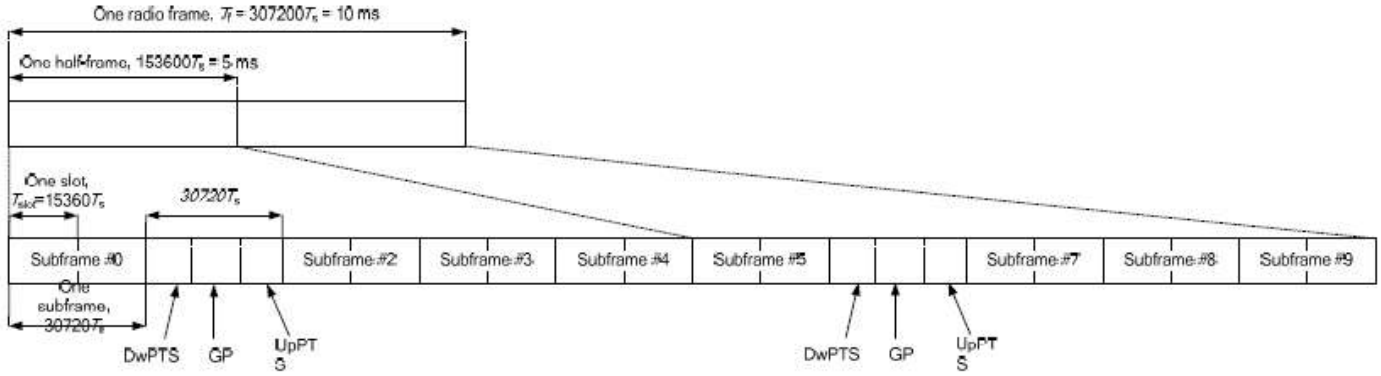


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

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

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

For LTE Band 41 Power class 2

i. Uplink-downlink configuration: 1. In a half-frame consisted of 5 subfames, uplink operation is in 2 uplink subframes and 1 special subframe.
ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (2+0.167)/5 = 43.3%
iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (2+0.143)/5 = 42.9%
v. For TDD LTE SAR measurement, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 43.3%/42.9% = 1.009 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

For LTE Band 41 Power class 3

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.
ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%
iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%
v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

The device can adjust uplink/downlink configuration automatically according to the transmitting power class level, as followings:

LTE TDD Band	Power Class level	support uplink/downlink configuration
LTE Band 41	> 23	1,2,3,4,5
	=23	0,1,2,3,4,5,6
	< 23	0,1,2,3,4,5,6

<LTE Carrier Aggregation>

General Note:

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

2CC Downlink Carrier Aggregation			
Number	Combination	4X4 MIMO	Covered by Measurement Superset
1	CA_2C		
2	CA_2A-2A		
3	CA_2A-4A		
4	CA_2A-5A		
5	CA_2A-12A		
6	CA_2A-13A		
7	CA_2A-66A		
8	CA_2A-71A		
9	CA_4A-4A		
10	CA_4A-5A		
11	CA_4A-12A		
12	CA_4A-13A		
13	CA_4A-71A		
14	CA_5A-66A	66A	
15	CA_7C		
16	CA_7A-7A		
17	CA_7A-12A		
18	CA_12A-66A		
19	CA_13A-66A		
20	CA_25A-25A		
21	CA_25A-26A		
22	CA_25A-41A		
23	CA_41C		
24	CA_41A-41A		
25	CA_38C		
26	CA_66B		
27	CA_66C		
28	CA_66A-66A		
29	CA_66A-71A		

LTE Carrier Aggregation Conducted Power (Downlink)

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. The device supports downlink seven carrier aggregation. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.

vi. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band.

vii. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

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

LTE 4x4 MIMO (Downlink)

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

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

4X4 MIMO	Band
	LTE Band 66

LTE Carrier Aggregation Conducted Power (Uplink)

2CC Uplink Carrier Aggregation		
Number	Combination	Ant No.
1	41C	ANT0/1

<Intra-band>

General Note:

i. The device supports intra-band uplink carrier aggregation for LTE B41 with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre 3GPP requirement.

ii. The device supports uplink carrier aggregation with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when not-contiguous RB allocation is implemented. The conducted power and MPR setting in this device are permanently implemented pre the 3GPP requirement.

iii. According TCB workshop, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

iv. Additional SAR measurement for LTE UL CA whit other DL CA combinations active were not required since the maximum output power for this configuration was not > 0.25dB higher than the maximum output power for UL CA active.

14. 5G NR Output Power (Unit: dBm)

General Note:

1. 5G NR n2 / n25 / n41 / n66 / n71 / n77 is SA mode.
2. 5G NR n2 / n25 / n41 / n66 / n71 is NSA mode.
3. For 5G NR test procedure was following step similar FCC KDB 941225 D05:
   a. For DFT-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, the CP-OFDM mode will not higher than DFT-OFDM mode, therefore, similar FCC KDB 941225 D05 procedure for other modulation output power for each RB allocation configuration is > not ½ dB higher than the same configuration in DFT-QPSK and the reported SAR for the DFT-QPSK configuration is ≤ 1.45 W/kg; CP-OFDM testing is not required.
   b. For DFT-OFDM output power measurement reduction, according to 38.101 maximum power reduction for power class2 and 3, for 16QAM/64QAM/256QAM and smaller bandwidth output power will spot check largest channel bandwidth worst RB configuration to ensure the 16QAM/64QAM/256QAM and smaller bandwidth output power will not ½ dB higher than the same configuration in the largest supported bandwidth.
   c. SAR testing start with the largest channel bandwidth and measure SAR for 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 3GPP MPR 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
4. Due to test setup limitations, SAR testing for NR was performed using Factory Test Mode software to establish the connection and perform SAR with 100% transmission.
5. 5G NR n41 and n77 supports HPUE, HPUE power and SAR testing performed separately.
6. NSA and SA mode should perform conducted measurement and SAR separately.
7. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
8. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.

<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]	≤ 1.2[1]	≤ 0.2[1]
		≤ 0.5[2]	≤ 0.5[2]	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		

<Inter Band EN-DC Configuration>

Mode	5G NR Band/ LTE Band	ANT Port
DC_66A_n2A	n2	ANT0/1/4
	B66	ANT0/1/4
DC_12A_n2A	n2	ANT0/1/4
	B12	ANT0/1
DC_2A_n66A	n66	ANT0/1/4
	B2	ANT0/1/4
DC_12_n66	n66	ANT0/1
	B12	ANT0/1
DC_2A_n41A	n41	ANT0/1/4
	B2	ANT0/1/4
DC_66A_n41A	n41	ANT0/1/4
	B66	ANT0/1/4
DC_2A_n71A	n71	ANT0/1
	B2	ANT0/1/4
DC_66A_n71A	n71	ANT0/1
	B66	ANT0/1
DC_66A_n25A	n25	ANT0/1/4
	B66	ANT0/1/4

15. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

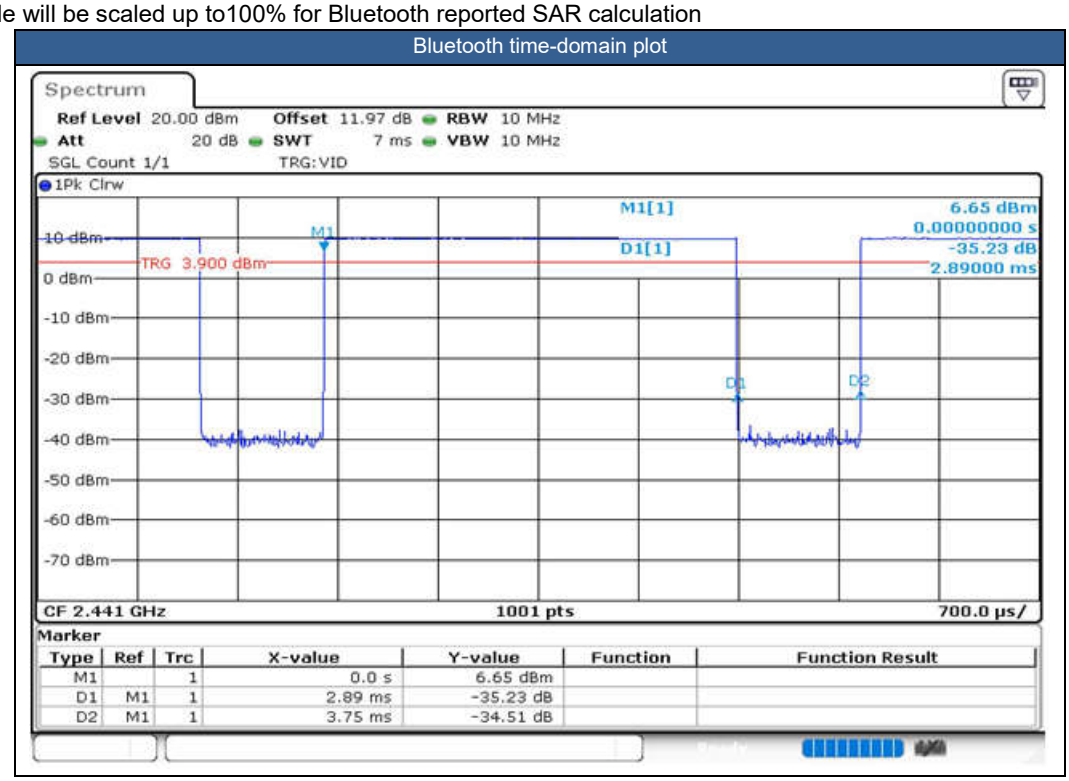
1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz Bluetooth>

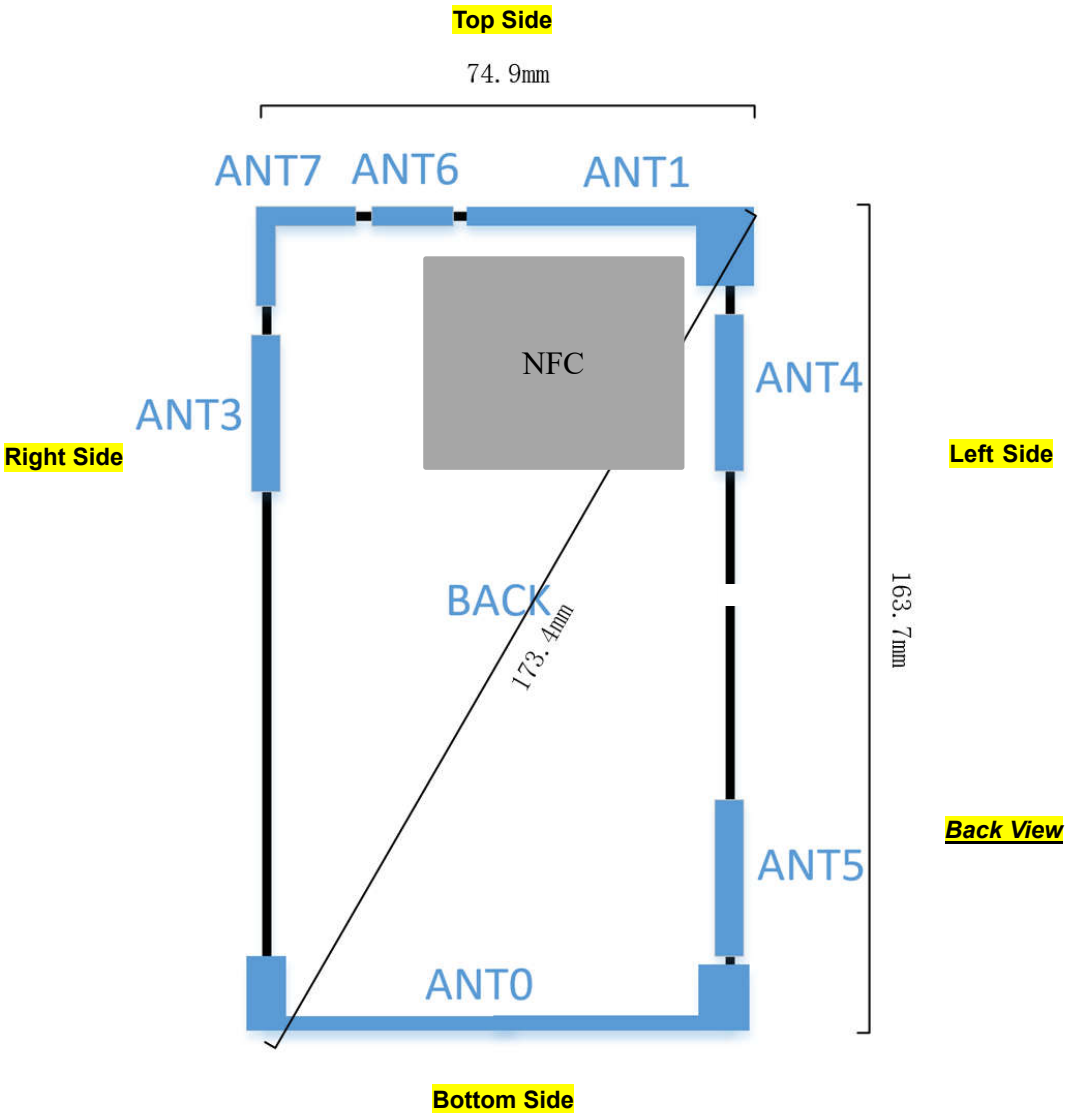
General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle are 77.07 % for ANT4/ANT6 as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to100% for Bluetooth reported SAR calculation

Bluetooth time-domain plot



16. Antenna Location



Antenna	Support Band
Ant 0	GSM 850/1900<TX/RX> WCDMA: B2/4/5 <TX/RX> LTE B2/4/5/7/12/13/17/25/26/66/71/38/41<TX/RX> NR n2/25/66/71/41<TX/RX>
Ant 1	GSM 850/1900<TX/RX> WCDMA: B2/4/5 <TX/RX> LTE B2/4/5/7/12/13/17/25/26/66/71/38/41<TX/RX> NR n2/25/66/71/41<TX/RX>
Ant 3	NR n41<RX> NR n77<TX/RX>
Ant 4	LTE B2/25/66/41<TX/RX> NR n2/25/66/41/77<TX/RX>
Ant 5	NR n77<TX/RX>
Ant 6	NR n77<TX/RX>
Ant 7	WIFI 2.4G<TX/RX> WIFI5G<TX/RX> BT<TX/RX>
NFC Antenna	NFC<TX/RX>

Note:

1. LTE B66-ant 4 and 5G NR n66-ant4 only for EN-DC combination.
2. 5G NR n41 ant 3 support SRS (Sounding Reference Signal) functionality.

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
Ant 0	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
Ant 1	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm
Ant 3	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm
Ant 4	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm
Ant 5	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm	≤ 25mm
Ant 6	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm
Ant 7	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
Ant 0	Yes	Yes	No	Yes	Yes	Yes
Ant 1	Yes	Yes	Yes	No	Yes	Yes
Ant 3	Yes	Yes	Yes	No	Yes	No
Ant 4	Yes	Yes	Yes	No	No	Yes
Ant 5	Yes	Yes	No	Yes	No	Yes
Ant 6	Yes	Yes	Yes	No	Yes	No
Ant 7	Yes	Yes	Yes	No	Yes	No

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

17. 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 SAR testing of BT/WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement of power class 3, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR (W/kg) = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
   f. For TDD LTE SAR measurement of power class 2, the duty cycle 1:2.33 (42.9 %) was used perform testing and considering the theoretical duty cycle of 43.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 42.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 43.3%/42.9% = 1.009 is applied to scale-up the measured SAR result. The reported TDD LTE SAR (W/kg) = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   · ≤ 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. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device implements the power management and proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot/extremity). Details about the power management decision and sensor detection are provided in the operational description. (DSI 5/10: receiver on head power, DSI 18: hotspot on power, DSI 1/2/6/7: P-sensor on extremity for ANT0/1, P-sensor on extremity for ANT7, DSI 4/9: sensor off for body).
5. For WLAN when transmit simultaneous with WWAN, power reduction will be activated to head, body-worn. For WLAN when transmit simultaneous with WWAN and Proximity sensors trigger, power reduction will be activated to extremity.
6. For Some WWAN bands, full power level higher than reduced power level, so full power SAR can represent reduced power SAR conservatively
7. 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.
8. LTE band 41, 5GNR n41/n77 supports HPUE, HPUE power and SAR testing performed separately.
9. For 5G NR test, using FTM (Factory Test Mode) to perform SAR with default 100% transmission.
10. NSA and SA mode should perform conducted measurement and SAR separately.
11. 5G NR supports CP-OFDM and DFT-s-OFDM modulation, for DFT-s-OFDM power is higher than CP-OFDM, so only show DFT-s-OFDM power table and chose DFT-s-OFDM to perform SAR testing.
12. For DFT-s-OFDM and CP-OFDM output power measurement reduction, according to 38.101 maximum power reduction for the CP-OFDM mode will not higher than DFT-s-OFDM mode, therefore, CP-OFDM measurement is unnecessary.
13. 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, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold, GSM1900, WCDMA II/IV, LTE B2/4/7/25/66, 5G NR n2/ n25/n66/n41/n77 and WLAN 5.2/5.8GHz is required to be tested.
14. WLAN 5.3/5.5GHz tested the product specific 10g SAR since it has no hotspot mode.
15. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.
16. For 5GNR EN-DC mode, standalone SAR performed for 5GNR band with the maximum power, EN-DC SAR summed 5GNR standalone SAR and LTE standalone SAR , the result of EN-DC SAR is more conservatively.
17. For distance SAR and non-distance SAR, always chose higher SAR to do co-located analysis.

UL duty cycle detection mechanism specification:

The device supports the UL duty cycle detection mechanism for LTE TDD & 5GNR (including FR1 SA and FR1 ENDC), the rest RAT will not apply. The main purpose is to distinguish duty cycle of UL symbol and apply the relevant power levels accordingly. The main purpose is to provide enhanced user experience while meeting the SAR compliance for transmission scheduling.

Note:

1. SAR is not required because the average output power is not higher than the Max UL duty cycle configuration.
2. For each band, the SAR evaluation uses the highest Time-average power configuration. Since the simulated base station cannot be configured with an accurate Max UL duty cycle, for the SAR test of LTE TDD & 5GNR bands, The highest Time-average power configuration is triggered by the some test script to test 4G/5G bands to simulate extreme scenarios (Max UL duty cycle).
3. The detail results please referred to Duty cycle_OD.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850 and GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. Both primary and secondary modes must be in the same frequency band. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM/256QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM/256QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is > 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; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 / B17 / B26 / B38 / B71 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. Standalone LTE band 2/4/5/17 SAR test was covered by Band 25/66/26/12; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. The maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion.
   b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

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 3GPP MPR 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. This device supports both 5G NR n2 and 5G NR n25. Since the supported frequency span for 5G NR n2 falls completely within the supports frequency span for 5G NR n25, both NR bands have the same target power, and both NR bands share the same transmission path; therefore, SAR was only assessed for 5G NR n25.
g. For 5G FR1 n25/n41/n66/n71/n77 the maximum bandwidth does not support three non-overlapping channels, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 or U-NII-2A SAR testing is not required when the U-NII-1 or U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band or U-NII-2A.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

17.1 Head SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
750MHz																		
	LTE Band 71	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI5/10	133297	680.5	24.30	24.80	1.122	0.05	0.107	0.120
	LTE Band 71	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 0	DSI5/10	133297	680.5	24.30	24.80	1.122	-0.12	0.046	0.051
	LTE Band 71	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI5/10	133297	680.5	24.30	24.80	1.122	0.08	0.114	0.128
	LTE Band 71	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 0	DSI5/10	133297	680.5	24.30	24.80	1.122	0.04	0.050	0.056
	LTE Band 71	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 0	DSI5/10	133297	680.5	23.31	23.80	1.119	-0.08	0.071	0.079
	LTE Band 71	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 0	DSI5/10	133297	680.5	23.31	23.80	1.119	-0.03	0.031	0.035
	LTE Band 71	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 0	DSI5/10	133297	680.5	23.31	23.80	1.119	-0.15	0.088	0.099
	LTE Band 71	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 0	DSI5/10	133297	680.5	23.31	23.80	1.119	0.1	0.040	0.045
	LTE Band 71	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI5	133297	680.5	22.27	22.80	1.130	-0.11	0.572	0.646
	LTE Band 71	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	133297	680.5	22.27	22.80	1.130	-0.09	0.449	0.507
	LTE Band 71	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI5	133297	680.5	22.27	22.80	1.130	-0.12	0.453	0.512
	LTE Band 71	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI5	133297	680.5	22.27	22.80	1.130	-0.11	0.486	0.549
01	LTE Band 71	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	133297	680.5	22.25	22.80	1.135	-0.04	0.594	**0.674**
	LTE Band 71	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	133297	680.5	22.25	22.80	1.135	0.15	0.458	0.520
	LTE Band 71	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI5	133297	680.5	22.25	22.80	1.135	0.08	0.478	0.543
	LTE Band 71	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI5	133297	680.5	22.25	22.80	1.135	0.01	0.499	0.566
	LTE Band 71	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI10	133297	680.5	21.77	22.30	1.130	-0.08	0.458	0.517
	LTE Band 71	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI10	133297	680.5	21.77	22.30	1.130	0.06	0.403	0.455
	LTE Band 71	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI10	133297	680.5	21.77	22.30	1.130	0.03	0.398	0.450
	LTE Band 71	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI10	133297	680.5	21.77	22.30	1.130	-0.07	0.413	0.467
	LTE Band 71	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI10	133297	680.5	21.75	22.30	1.135	-0.13	0.489	0.555
	LTE Band 71	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI10	133297	680.5	21.75	22.30	1.135	0.16	0.407	0.462
	LTE Band 71	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI10	133297	680.5	21.75	22.30	1.135	0.12	0.402	0.456
	LTE Band 71	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI10	133297	680.5	21.75	22.30	1.135	0.06	0.416	0.472
	LTE Band 12	10M	QPSK	1	25	-	Right Cheek	0mm	Ant 0	DSI5/10	23095	707.5	23.91	24.80	1.227	0.12	0.121	0.149
	LTE Band 12	10M	QPSK	1	25	-	Right Tilted	0mm	Ant 0	DSI5/10	23095	707.5	23.91	24.80	1.227	0.12	0.062	0.076
	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 0	DSI5/10	23095	707.5	23.91	24.80	1.227	-0.04	0.140	0.172
	LTE Band 12	10M	QPSK	1	25	-	Left Tilted	0mm	Ant 0	DSI5/10	23095	707.5	23.91	24.80	1.227	-0.05	0.062	0.076
	LTE Band 12	10M	QPSK	25	0	-	Right Cheek	0mm	Ant 0	DSI5/10	23095	707.5	22.92	23.80	1.225	0.14	0.087	0.106
	LTE Band 12	10M	QPSK	25	0	-	Right Tilted	0mm	Ant 0	DSI5/10	23095	707.5	22.92	23.80	1.225	0.04	0.041	0.050
	LTE Band 12	10M	QPSK	25	0	-	Left Cheek	0mm	Ant 0	DSI5/10	23095	707.5	22.92	23.80	1.225	0.13	0.105	0.129
	LTE Band 12	10M	QPSK	25	0	-	Left Tilted	0mm	Ant 0	DSI5/10	23095	707.5	22.92	23.80	1.225	0.11	0.060	0.073
	LTE Band 12	10M	QPSK	1	25	-	Right Cheek	0mm	Ant 1	DSI5	23095	707.5	22.92	23.80	1.225	0.14	0.677	0.829
	LTE Band 12	10M	QPSK	1	25	-	Right Tilted	0mm	Ant 1	DSI5	23095	707.5	22.92	23.80	1.225	0.12	0.673	0.824
	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 1	DSI5	23095	707.5	22.92	23.80	1.225	-0.09	0.460	0.563
	LTE Band 12	10M	QPSK	1	25	-	Left Tilted	0mm	Ant 1	DSI5	23095	707.5	22.92	23.80	1.225	-0.04	0.447	0.547
02	LTE Band 12	10M	QPSK	25	0	-	Right Cheek	0mm	Ant 1	DSI5	23095	707.5	22.78	23.80	1.265	-0.11	0.663	**0.839**
	LTE Band 12	10M	QPSK	25	0	-	Right Tilted	0mm	Ant 1	DSI5	23095	707.5	22.78	23.80	1.265	-0.02	0.653	0.826
	LTE Band 12	10M	QPSK	25	0	-	Left Cheek	0mm	Ant 1	DSI5	23095	707.5	22.78	23.80	1.265	0.01	0.443	0.560
	LTE Band 12	10M	QPSK	25	0	-	Left Tilted	0mm	Ant 1	DSI5	23095	707.5	22.78	23.80	1.265	-0.07	0.435	0.550
	LTE Band 12	10M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	23095	707.5	22.75	23.80	1.274	0.03	0.643	0.819
	LTE Band 12	10M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	23095	707.5	22.75	23.80	1.274	0.08	0.657	0.837
	LTE Band 12	10M	QPSK	1	25	-	Right Cheek	0mm	Ant 1	DSI10	23095	707.5	21.92	22.80	1.225	0.1	0.502	0.615
	LTE Band 12	10M	QPSK	1	25	-	Right Tilted	0mm	Ant 1	DSI10	23095	707.5	21.92	22.80	1.225	0.07	0.486	0.595
	LTE Band 12	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 1	DSI10	23095	707.5	21.92	22.80	1.225	-0.11	0.447	0.547
	LTE Band 12	10M	QPSK	1	25	-	Left Tilted	0mm	Ant 1	DSI10	23095	707.5	21.92	22.80	1.225	0.09	0.450	0.551
	LTE Band 12	10M	QPSK	25	0	-	Right Cheek	0mm	Ant 1	DSI10	23095	707.5	21.84	22.80	1.247	0.02	0.485	0.605
	LTE Band 12	10M	QPSK	25	0	-	Right Tilted	0mm	Ant 1	DSI10	23095	707.5	21.84	22.80	1.247	0.12	0.479	0.597
	LTE Band 12	10M	QPSK	25	0	-	Left Cheek	0mm	Ant 1	DSI10	23095	707.5	21.84	22.80	1.247	0.03	0.437	0.545
	LTE Band 12	10M	QPSK	25	0	-	Left Tilted	0mm	Ant 1	DSI10	23095	707.5	21.84	22.80	1.247	-0.02	0.432	0.539
	LTE Band 13	10M	QPSK	1	25	-	Right Cheek	0mm	Ant 0	DSI5/10	23230	782	23.59	24.30	1.178	-0.12	0.090	0.106

	LTE Band 13	10M	QPSK	1	25	-	Right Tilted	0mm	Ant 0	DSI5/10	23230	782	23.59	24.30	1.178	0.08	0.051	0.060
	LTE Band 13	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 0	DSI5/10	23230	782	23.59	24.30	1.178	-0.15	0.102	0.120
	LTE Band 13	10M	QPSK	1	25	-	Left Tilted	0mm	Ant 0	DSI5/10	23230	782	23.59	24.30	1.178	0.02	0.059	0.069
	LTE Band 13	10M	QPSK	25	0	-	Right Cheek	0mm	Ant 0	DSI5/10	23230	782	22.46	23.30	1.213	-0.03	0.056	0.068
	LTE Band 13	10M	QPSK	25	0	-	Right Tilted	0mm	Ant 0	DSI5/10	23230	782	22.46	23.30	1.213	-0.15	0.030	0.036
	LTE Band 13	10M	QPSK	25	0	-	Left Cheek	0mm	Ant 0	DSI5/10	23230	782	22.46	23.30	1.213	0.16	0.068	0.083
	LTE Band 13	10M	QPSK	25	0	-	Left Tilted	0mm	Ant 0	DSI5/10	23230	782	22.46	23.30	1.213	0.08	0.043	0.052
03	LTE Band 13	10M	QPSK	1	25	-	Right Cheek	0mm	Ant 1	DSI5/10	23230	782	23.41	24.30	1.227	-0.01	0.549	**0.674**
	LTE Band 13	10M	QPSK	1	25	-	Right Tilted	0mm	Ant 1	DSI5/10	23230	782	23.41	24.30	1.227	-0.14	0.514	0.631
	LTE Band 13	10M	QPSK	1	25	-	Left Cheek	0mm	Ant 1	DSI5/10	23230	782	23.41	24.30	1.227	0.06	0.427	0.524
	LTE Band 13	10M	QPSK	1	25	-	Left Tilted	0mm	Ant 1	DSI5/10	23230	782	23.41	24.30	1.227	0.16	0.388	0.476
	LTE Band 13	10M	QPSK	25	0	-	Right Cheek	0mm	Ant 1	DSI5/10	23230	782	22.35	23.30	1.245	0.05	0.443	0.551
	LTE Band 13	10M	QPSK	25	0	-	Right Tilted	0mm	Ant 1	DSI5/10	23230	782	22.35	23.30	1.245	0.13	0.409	0.509
	LTE Band 13	10M	QPSK	25	0	-	Left Cheek	0mm	Ant 1	DSI5/10	23230	782	22.35	23.30	1.245	0.1	0.386	0.480
	LTE Band 13	10M	QPSK	25	0	-	Left Tilted	0mm	Ant 1	DSI5/10	23230	782	22.35	23.30	1.245	0.06	0.375	0.467
835MHz																		
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 0	DSI5/10	189	836.4	27.56	28.30	1.186	-0.01	0.190	0.225
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 0	DSI5/10	189	836.4	27.56	28.30	1.186	-0.04	0.083	0.098
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 0	DSI5/10	189	836.4	27.56	28.30	1.186	0.09	0.217	0.257
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 0	DSI5/10	189	836.4	27.56	28.30	1.186	-0.1	0.099	0.118
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI5	189	836.4	27.14	28.30	1.306	0.04	0.814	1.063
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	189	836.4	27.14	28.30	1.306	0.15	0.672	0.878
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 1	DSI5	189	836.4	27.14	28.30	1.306	-0.09	0.534	0.697
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 1	DSI5	189	836.4	27.14	28.30	1.306	-0.11	0.488	0.637
04	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI5	128	824.2	27.05	28.30	1.334	0.01	0.801	**1.068**
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI5	251	848.8	27.05	28.30	1.334	-0.01	0.756	1.008
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	128	824.2	27.05	28.30	1.334	0.06	0.671	0.895
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	251	848.8	27.05	28.30	1.334	0.01	0.626	0.835
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI10	189	836.4	26.12	27.30	1.312	-0.16	0.623	0.818
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI10	189	836.4	26.12	27.30	1.312	-0.05	0.522	0.685
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 1	DSI10	189	836.4	26.12	27.30	1.312	-0.12	0.463	0.608
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 1	DSI10	189	836.4	26.12	27.30	1.312	0.1	0.449	0.589
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI10	128	824.2	26.10	27.30	1.318	0.1	0.678	0.894
	GSM850	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI10	251	848.8	26.06	27.30	1.330	0.08	0.621	0.826
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI5/10	4182	836.4	23.93	24.80	1.222	-0.03	0.154	0.188
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 0	DSI5/10	4182	836.4	23.93	24.80	1.222	-0.06	0.084	0.103
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI5/10	4182	836.4	23.93	24.80	1.222	0.04	0.187	0.228
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 0	DSI5/10	4182	836.4	23.93	24.80	1.222	0.05	0.091	0.111
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	4182	836.4	22.24	23.30	1.276	0.01	0.670	0.855
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	4182	836.4	22.24	23.30	1.276	0.04	0.628	0.802
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI5	4182	836.4	22.24	23.30	1.276	-0.06	0.551	0.703
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI5	4182	836.4	22.24	23.30	1.276	-0.01	0.474	0.605
05	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	4132	826.4	22.21	23.30	1.285	0.09	0.909	**1.168**
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	4233	846.6	22.11	23.30	1.315	0.09	0.570	0.750
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	4132	826.4	22.21	23.30	1.285	-0.05	0.684	0.879
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	4233	846.6	22.11	23.30	1.315	-0.11	0.535	0.704
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI10	4182	836.4	21.22	22.30	1.282	0.02	0.538	0.690
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	4182	836.4	21.22	22.30	1.282	-0.02	0.501	0.642
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI10	4182	836.4	21.22	22.30	1.282	0.16	0.479	0.614
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI10	4182	836.4	21.22	22.30	1.282	-0.07	0.442	0.567
	LTE Band 26	15M	QPSK	1	37	-	Right Cheek	0mm	Ant 0	DSI5/10	26865	831.5	23.88	24.80	1.236	-0.1	0.117	0.145
	LTE Band 26	15M	QPSK	1	37	-	Right Tilted	0mm	Ant 0	DSI5/10	26865	831.5	23.88	24.80	1.236	-0.07	0.054	0.067
	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 0	DSI5/10	26865	831.5	23.88	24.80	1.236	-0.11	0.156	0.193
	LTE Band 26	15M	QPSK	1	37	-	Left Tilted	0mm	Ant 0	DSI5/10	26865	831.5	23.88	24.80	1.236	-0.11	0.076	0.094
	LTE Band 26	15M	QPSK	36	0	-	Right Cheek	0mm	Ant 0	DSI5/10	26865	831.5	22.80	23.80	1.259	0.11	0.052	0.065
	LTE Band 26	15M	QPSK	36	0	-	Right Tilted	0mm	Ant 0	DSI5/10	26865	831.5	22.80	23.80	1.259	-0.03	0.046	0.058

	LTE Band 26	15M	QPSK	36	0	-	Left Cheek	0mm	Ant 0	DSI5/10	26865	831.5	22.80	23.80	1.259	-0.09	0.121	0.152
	LTE Band 26	15M	QPSK	36	0	-	Left Tilted	0mm	Ant 0	DSI5/10	26865	831.5	22.80	23.80	1.259	0.05	0.055	0.069
	LTE Band 26	15M	QPSK	1	37	-	Right Cheek	0mm	Ant 1	DSI5	26865	831.5	22.34	23.30	1.247	0.09	0.725	0.904
	LTE Band 26	15M	QPSK	1	37	-	Right Tilted	0mm	Ant 1	DSI5	26865	831.5	22.34	23.30	1.247	-0.03	0.649	0.810
	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI5	26865	831.5	22.34	23.30	1.247	-0.07	0.639	0.797
	LTE Band 26	15M	QPSK	1	37	-	Left Tilted	0mm	Ant 1	DSI5	26865	831.5	22.34	23.30	1.247	-0.1	0.640	0.798
06	LTE Band 26	15M	QPSK	36	0	-	Right Cheek	0mm	Ant 1	DSI5	26865	831.5	22.31	23.30	1.256	-0.06	0.804	**1.010**
	LTE Band 26	15M	QPSK	36	0	-	Right Tilted	0mm	Ant 1	DSI5	26865	831.5	22.31	23.30	1.256	-0.13	0.729	0.916
	LTE Band 26	15M	QPSK	36	0	-	Left Cheek	0mm	Ant 1	DSI5	26865	831.5	22.31	23.30	1.256	-0.13	0.653	0.820
	LTE Band 26	15M	QPSK	36	0	-	Left Tilted	0mm	Ant 1	DSI5	26865	831.5	22.31	23.30	1.256	0.15	0.642	0.806
	LTE Band 26	15M	QPSK	75	0	-	Right Cheek	0mm	Ant 1	DSI5	26865	831.5	22.30	23.30	1.259	0.12	0.782	0.984
	LTE Band 26	15M	QPSK	75	0	-	Right Tilted	0mm	Ant 1	DSI5	26865	831.5	22.30	23.30	1.259	0.09	0.643	0.809
	LTE Band 26	15M	QPSK	75	0	-	Left Cheek	0mm	Ant 1	DSI5	26865	831.5	22.30	23.30	1.259	0.02	0.622	0.783
	LTE Band 26	15M	QPSK	75	0	-	Left Tilted	0mm	Ant 1	DSI5	26865	831.5	22.30	23.30	1.259	0.13	0.604	0.760
	LTE Band 26	15M	QPSK	1	37	-	Right Cheek	0mm	Ant 1	DSI10	26865	831.5	20.84	21.80	1.247	0.04	0.565	0.705
	LTE Band 26	15M	QPSK	1	37	-	Right Tilted	0mm	Ant 1	DSI10	26865	831.5	20.84	21.80	1.247	0.1	0.457	0.570
	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant 1	DSI10	26865	831.5	20.84	21.80	1.247	0.14	0.437	0.545
	LTE Band 26	15M	QPSK	1	37	-	Left Tilted	0mm	Ant 1	DSI10	26865	831.5	20.84	21.80	1.247	0.05	0.431	0.538
	LTE Band 26	15M	QPSK	36	0	-	Right Cheek	0mm	Ant 1	DSI10	26865	831.5	20.82	21.80	1.253	-0.06	0.576	0.722
	LTE Band 26	15M	QPSK	36	0	-	Right Tilted	0mm	Ant 1	DSI10	26865	831.5	20.82	21.80	1.253	0.16	0.466	0.584
	LTE Band 26	15M	QPSK	36	0	-	Left Cheek	0mm	Ant 1	DSI10	26865	831.5	20.82	21.80	1.253	-0.1	0.447	0.560
	LTE Band 26	15M	QPSK	36	0	-	Left Tilted	0mm	Ant 1	DSI10	26865	831.5	20.82	21.80	1.253	0.15	0.443	0.555
	1750MHz																	
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI5/10	1413	1732.6	23.86	24.60	1.186	-0.16	0.100	0.118
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 0	DSI5/10	1413	1732.6	23.86	24.60	1.186	-0.12	0.035	0.041
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI5/10	1413	1732.6	23.86	24.60	1.186	-0.07	0.108	0.128
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 0	DSI5/10	1413	1732.6	23.86	24.60	1.186	0.07	0.043	0.051
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	1413	1732.6	16.07	17.10	1.268	0.08	0.760	0.963
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	1413	1732.6	16.07	17.10	1.268	-0.12	0.815	1.033
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI5	1413	1732.6	16.07	17.10	1.268	-0.03	0.455	0.577
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI5	1413	1732.6	16.07	17.10	1.268	-0.13	0.508	0.644
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	1312	1712.4	16.03	17.10	1.279	-0.04	0.698	0.893
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	1513	1752.6	16.00	17.10	1.288	0.12	0.828	1.067
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	1312	1712.4	16.03	17.10	1.279	0.16	0.750	0.960
07	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	1513	1752.6	16.00	17.10	1.288	0.05	0.863	**1.112**
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI10	1413	1732.6	15.05	16.10	1.274	0.13	0.553	0.704
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	1413	1732.6	15.05	16.10	1.274	0.12	0.655	0.834
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI10	1413	1732.6	15.05	16.10	1.274	-0.01	0.350	0.446
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI10	1413	1732.6	15.05	16.10	1.274	-0.15	0.390	0.497
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	1312	1712.4	15.00	16.10	1.288	0.16	0.603	0.777
	WCDMA IV	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	1513	1752.6	14.99	16.10	1.291	0.15	0.662	0.855
	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI5/10	132322	1745	23.58	24.30	1.180	-0.11	0.101	0.119
	LTE Band 66	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 0	DSI5/10	132322	1745	23.58	24.30	1.180	0.07	0.038	0.045
	LTE Band 66	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI5/10	132322	1745	23.58	24.30	1.180	-0.15	0.106	0.125
	LTE Band 66	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 0	DSI5/10	132322	1745	23.58	24.30	1.180	0.1	0.038	0.045
	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 0	DSI5/10	132322	1745	22.53	23.30	1.194	-0.04	0.066	0.079
	LTE Band 66	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 0	DSI5/10	132322	1745	22.53	23.30	1.194	-0.07	0.042	0.050
	LTE Band 66	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 0	DSI5/10	132322	1745	22.53	23.30	1.194	-0.1	0.079	0.094
	LTE Band 66	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 0	DSI5/10	132322	1745	22.53	23.30	1.194	0.08	0.014	0.017
	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI5	132322	1745	15.44	16.30	1.219	-0.06	0.523	0.638
	LTE Band 66	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	132322	1745	15.44	16.30	1.219	0.08	0.658	0.802
	LTE Band 66	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI5	132322	1745	15.44	16.30	1.219	0.11	0.364	0.444
	LTE Band 66	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI5	132322	1745	15.44	16.30	1.219	-0.06	0.414	0.505
	LTE Band 66	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	132072	1720	15.40	16.30	1.230	-0.04	0.534	0.657
	LTE Band 66	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	132572	1770	15.41	16.30	1.227	-0.08	0.595	0.730
	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	132322	1745	15.42	16.30	1.225	0.01	0.532	0.651

	LTE Band 66	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	132322	1745	15.42	16.30	1.225	-0.06	0.662	0.811
	LTE Band 66	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI5	132322	1745	15.42	16.30	1.225	0.11	0.368	0.451
	LTE Band 66	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI5	132322	1745	15.42	16.30	1.225	-0.04	0.423	0.518
	LTE Band 66	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	132072	1720	15.41	16.30	1.227	0.06	0.595	0.730
08	LTE Band 66	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	132572	1770	15.39	16.30	1.233	-0.03	0.699	**0.862**
	LTE Band 66	20M	QPSK	100	0	-	Right Tilted	0mm	Ant 1	DSI5	132322	1745	15.41	16.30	1.227	-0.01	0.574	0.705
	LTE Band 66	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI10	132322	1745	14.43	15.30	1.222	0.13	0.455	0.556
	LTE Band 66	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI10	132322	1745	14.43	15.30	1.222	0.06	0.554	0.677
	LTE Band 66	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI10	132322	1745	14.43	15.30	1.222	-0.04	0.315	0.385
	LTE Band 66	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI10	132322	1745	14.43	15.30	1.222	0.08	0.361	0.441
	LTE Band 66	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI10	132322	1745	14.42	15.30	1.225	-0.01	0.473	0.579
	LTE Band 66	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI10	132322	1745	14.42	15.30	1.225	0.05	0.429	0.525
	LTE Band 66	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI10	132322	1745	14.42	15.30	1.225	-0.03	0.317	0.388
	LTE Band 66	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI10	132322	1745	14.42	15.30	1.225	-0.09	0.356	0.436
							1900MHz											
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 0	DSI5/10	661	1880	24.68	25.30	1.153	-0.05	0.047	0.055
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 0	DSI5/10	661	1880	24.68	25.30	1.153	0.12	0.044	0.050
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 0	DSI5/10	661	1880	24.68	25.30	1.153	0.03	0.061	0.070
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 0	DSI5/10	661	1880	24.68	25.30	1.153	-0.01	0.050	0.058
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI5	661	1880	18.72	19.30	1.143	-0.14	0.668	0.763
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	661	1880	18.72	19.30	1.143	0.01	0.764	0.873
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 1	DSI5	661	1880	18.72	19.30	1.143	0.08	0.406	0.464
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 1	DSI5	661	1880	18.72	19.30	1.143	0.16	0.455	0.520
09	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	512	1850.2	18.69	19.30	1.151	-0.07	0.772	**0.888**
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI5	810	1909.8	18.71	19.30	1.146	-0.13	0.702	0.804
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Cheek	0mm	Ant 1	DSI10	661	1880	17.63	18.30	1.167	-0.14	0.531	0.620
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Right Tilted	0mm	Ant 1	DSI10	661	1880	17.63	18.30	1.167	0.01	0.672	0.784
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Cheek	0mm	Ant 1	DSI10	661	1880	17.63	18.30	1.167	0.08	0.322	0.376
	GSM1900	-	-	-	-	GPRS(4 Tx slots)	Left Tilted	0mm	Ant 1	DSI10	661	1880	17.63	18.30	1.167	0.16	0.361	0.421
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 0	DSI5/10	9400	1880	23.85	24.60	1.189	0.12	0.076	0.090
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 0	DSI5/10	9400	1880	23.85	24.60	1.189	0.07	0.047	0.056
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 0	DSI5/10	9400	1880	23.85	24.60	1.189	-0.09	0.088	0.105
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 0	DSI5/10	9400	1880	23.85	24.60	1.189	0.01	0.050	0.059
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	9400	1880	15.65	16.60	1.245	-0.09	0.764	0.951
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	9400	1880	15.65	16.60	1.245	0.06	0.824	1.025
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI5	9400	1880	15.65	16.60	1.245	0.03	0.474	0.590
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI5	9400	1880	15.65	16.60	1.245	-0.16	0.526	0.655
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	9262	1852.4	15.64	16.60	1.247	0.06	0.801	0.999
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI5	9538	1907.6	15.60	16.60	1.259	0.01	0.734	0.924
10	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	9262	1852.4	15.64	16.60	1.247	-0.08	0.845	**1.054**
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI5	9538	1907.6	15.60	16.60	1.259	-0.08	0.833	1.049
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI10	9400	1880	15.15	16.10	1.245	-0.02	0.677	0.843
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	9400	1880	15.15	16.10	1.245	-0.12	0.731	0.910
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant 1	DSI10	9400	1880	15.15	16.10	1.245	0.01	0.428	0.533
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant 1	DSI10	9400	1880	15.15	16.10	1.245	-0.08	0.481	0.599
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI10	9262	1852.4	15.14	16.10	1.247	0.09	0.710	0.886
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant 1	DSI10	9538	1907.6	15.04	16.10	1.276	0.11	0.632	0.807
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	9262	1852.4	15.14	16.10	1.247	0.14	0.752	0.938
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant 1	DSI10	9538	1907.6	15.04	16.10	1.276	-0.13	0.739	0.943
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 0	DSI5/10	26340	1880	23.56	24.30	1.186	-0.09	0.068	0.080
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 0	DSI5/10	26340	1880	23.56	24.30	1.186	-0.06	0.056	0.067
	LTE Band 25	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 0	DSI5/10	26340	1880	23.56	24.30	1.186	0.14	0.047	0.055
	LTE Band 25	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 0	DSI5/10	26340	1880	23.56	24.30	1.186	-0.05	0.050	0.059
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 0	DSI5/10	26340	1880	22.60	23.30	1.175	0.11	0.054	0.063
	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 0	DSI5/10	26340	1880	22.60	23.30	1.175	-0.07	0.045	0.053
	LTE Band 25	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 0	DSI5/10	26340	1880	22.60	23.30	1.175	-0.13	0.037	0.043

	LTE Band 25	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 0	DSI5/10	26340	1880	22.60	23.30	1.175	-0.01	0.039	0.046
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI5	26340	1880	15.57	16.30	1.183	0.03	0.703	0.832
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	26340	1880	15.57	16.30	1.183	0.15	0.725	0.858
	LTE Band 25	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI5	26340	1880	15.57	16.30	1.183	-0.15	0.426	0.504
	LTE Band 25	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI5	26340	1880	15.57	16.30	1.183	-0.15	0.487	0.576
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI5	26140	1860	15.50	16.30	1.202	-0.06	0.692	0.832
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI5	26590	1905	15.56	16.30	1.186	0.12	0.681	0.808
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	26140	1860	15.50	16.30	1.202	-0.15	0.747	0.898
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI5	26590	1905	15.56	16.30	1.186	0.11	0.730	0.866
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	26340	1880	15.55	16.30	1.189	0.16	0.714	0.849
	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	26340	1880	15.55	16.30	1.189	0.15	0.742	0.882
	LTE Band 25	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI5	26340	1880	15.55	16.30	1.189	-0.12	0.459	0.546
	LTE Band 25	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI5	26340	1880	15.55	16.30	1.189	-0.11	0.511	0.607
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	26140	1860	15.52	16.30	1.197	0.04	0.709	0.848
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI5	26590	1905	15.54	16.30	1.191	-0.13	0.682	0.812
11	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	26140	1860	15.52	16.30	1.197	0.12	0.759	**0.908**
	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI5	26590	1905	15.54	16.30	1.191	0.01	0.746	0.889
	LTE Band 25	20M	QPSK	100	0	-	Right Cheek	0mm	Ant 1	DSI5	26340	1880	15.52	16.30	1.197	0.11	0.611	0.731
	LTE Band 25	20M	QPSK	100	0	-	Right Tilted	0mm	Ant 1	DSI5	26340	1880	15.52	16.30	1.197	0.01	0.695	0.832
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 1	DSI10	26340	1880	14.58	15.30	1.180	0.09	0.499	0.589
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 1	DSI10	26340	1880	14.58	15.30	1.180	0.06	0.628	0.741
	LTE Band 25	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 1	DSI10	26340	1880	14.58	15.30	1.180	0.09	0.347	0.410
	LTE Band 25	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 1	DSI10	26340	1880	14.58	15.30	1.180	-0.1	0.406	0.479
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 1	DSI10	26340	1880	14.55	15.30	1.189	0.1	0.490	0.582
	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 1	DSI10	26340	1880	14.55	15.30	1.189	-0.09	0.588	0.699
	LTE Band 25	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 1	DSI10	26340	1880	14.55	15.30	1.189	0.09	0.361	0.429
	LTE Band 25	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 1	DSI10	26340	1880	14.55	15.30	1.189	-0.01	0.455	0.541
	LTE Band 25	20M	QPSK	1	49	-	Right Cheek	0mm	Ant 4	DSI5/10	26340	1880	22.37	23.30	1.239	-0.1	0.407	0.504
	LTE Band 25	20M	QPSK	1	49	-	Right Tilted	0mm	Ant 4	DSI5/10	26340	1880	22.37	23.30	1.239	0.08	0.128	0.159
	LTE Band 25	20M	QPSK	1	49	-	Left Cheek	0mm	Ant 4	DSI5/10	26340	1880	22.37	23.30	1.239	-0.16	0.239	0.296
	LTE Band 25	20M	QPSK	1	49	-	Left Tilted	0mm	Ant 4	DSI5/10	26340	1880	22.37	23.30	1.239	0.11	0.110	0.136
	LTE Band 25	20M	QPSK	50	0	-	Right Cheek	0mm	Ant 4	DSI5/10	26340	1880	21.36	22.30	1.242	0.12	0.245	0.304
	LTE Band 25	20M	QPSK	50	0	-	Right Tilted	0mm	Ant 4	DSI5/10	26340	1880	21.36	22.30	1.242	-0.02	0.091	0.113
	LTE Band 25	20M	QPSK	50	0	-	Left Cheek	0mm	Ant 4	DSI5/10	26340	1880	21.36	22.30	1.242	-0.12	0.181	0.225
	LTE Band 25	20M	QPSK	50	0	-	Left Tilted	0mm	Ant 4	DSI5/10	26340	1880	21.36	22.30	1.242	0.02	0.099	0.123

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
2600MHz																			
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	Ant 0	DSI5/10	21100	2535	23.25	23.60	1.084	-	1.000	-0.02	0.309	0.335
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	Ant 0	DSI5/10	21100	2535	23.25	23.60	1.084	-	1.000	0.09	0.155	0.168
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	Ant 0	DSI5/10	21100	2535	23.25	23.60	1.084	-	1.000	-0.04	0.162	0.176
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	Ant 0	DSI5/10	21100	2535	23.25	23.60	1.084	-	1.000	-0.15	0.127	0.138
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	Ant 0	DSI5/10	21100	2535	22.28	22.60	1.076	-	1.000	-0.14	0.250	0.269
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	Ant 0	DSI5/10	21100	2535	22.28	22.60	1.076	-	1.000	0.12	0.114	0.123
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Ant 0	DSI5/10	21100	2535	22.28	22.60	1.076	-	1.000	-0.16	0.109	0.117
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	Ant 0	DSI5/10	21100	2535	22.28	22.60	1.076	-	1.000	-0.13	0.098	0.105
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	21100	2535	16.45	16.60	1.035	-	1.000	-0.04	0.691	0.715
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	21100	2535	16.45	16.60	1.035	-	1.000	0.1	0.723	0.748
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI5	21100	2535	16.45	16.60	1.035	-	1.000	0.14	0.242	0.251
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI5	21100	2535	16.45	16.60	1.035	-	1.000	-0.12	0.301	0.312
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	21100	2535	16.44	16.60	1.038	-	1.000	0.08	0.701	0.727
12	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	21100	2535	16.44	16.60	1.038	-	1.000	-0.06	0.724	**0.751**
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI5	21100	2535	16.44	16.60	1.038	-	1.000	0.04	0.298	0.309

	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI5	21100	2535	16.44	16.60	1.038	-	1.000	0.06	0.321	0.333
	LTE Band 7	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	21100	2535	15.93	16.10	1.040	-	1.000	-0.14	0.616	0.641
	LTE Band 7	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	21100	2535	15.93	16.10	1.040	-	1.000	0.06	0.644	0.670
	LTE Band 7	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI10	21100	2535	15.93	16.10	1.040	-	1.000	-0.03	0.216	0.225
	LTE Band 7	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI10	21100	2535	15.93	16.10	1.040	-	1.000	-0.04	0.268	0.279
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	21100	2535	15.92	16.10	1.042	-	1.000	0.08	0.625	0.651
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	21100	2535	15.92	16.10	1.042	-	1.000	0.16	0.645	0.672
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI10	21100	2535	15.92	16.10	1.042	-	1.000	0.11	0.266	0.277
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI10	21100	2535	15.92	16.10	1.042	-	1.000	0.06	0.286	0.298
	LTE Band 38	20M	QPSK	1	49	Right Cheek	0mm	Ant 0	DSI5/10	38000	2595	23.35	23.80	1.109	62.9	1.006	0.08	0.189	0.211
	LTE Band 38	20M	QPSK	1	49	Right Tilted	0mm	Ant 0	DSI5/10	38000	2595	23.35	23.80	1.109	62.9	1.006	0.16	0.095	0.106
	LTE Band 38	20M	QPSK	1	49	Left Cheek	0mm	Ant 0	DSI5/10	38000	2595	23.35	23.80	1.109	62.9	1.006	-0.06	0.093	0.103
	LTE Band 38	20M	QPSK	1	49	Left Tilted	0mm	Ant 0	DSI5/10	38000	2595	23.35	23.80	1.109	62.9	1.006	0.07	0.070	0.078
	LTE Band 38	20M	QPSK	50	0	Right Cheek	0mm	Ant 0	DSI5/10	38000	2595	22.27	22.80	1.130	62.9	1.006	-0.04	0.141	0.160
	LTE Band 38	20M	QPSK	50	0	Right Tilted	0mm	Ant 0	DSI5/10	38000	2595	22.27	22.80	1.130	62.9	1.006	-0.04	0.071	0.080
	LTE Band 38	20M	QPSK	50	0	Left Cheek	0mm	Ant 0	DSI5/10	38000	2595	22.27	22.80	1.130	62.9	1.006	-0.15	0.069	0.079
	LTE Band 38	20M	QPSK	50	0	Left Tilted	0mm	Ant 0	DSI5/10	38000	2595	22.27	22.80	1.130	62.9	1.006	-0.12	0.052	0.059
	LTE Band 38	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	38000	2595	19.53	19.80	1.064	62.9	1.006	-0.02	0.627	0.671
	LTE Band 38	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	38000	2595	19.53	19.80	1.064	62.9	1.006	0.03	0.713	0.763
	LTE Band 38	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI5	38000	2595	19.53	19.80	1.064	62.9	1.006	0.06	0.292	0.313
	LTE Band 38	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI5	38000	2595	19.53	19.80	1.064	62.9	1.006	-0.08	0.314	0.336
	LTE Band 38	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	38000	2595	19.49	19.80	1.074	62.9	1.006	0.04	0.640	0.691
13	LTE Band 38	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	38000	2595	19.49	19.80	1.074	62.9	1.006	0.09	0.719	**0.777**
	LTE Band 38	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI5	38000	2595	19.49	19.80	1.074	62.9	1.006	-0.14	0.301	0.325
	LTE Band 38	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI5	38000	2595	19.49	19.80	1.074	62.9	1.006	-0.13	0.321	0.347
	LTE Band 38	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	38000	2595	17.99	18.30	1.074	62.9	1.006	0.16	0.442	0.478
	LTE Band 38	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	38000	2595	17.99	18.30	1.074	62.9	1.006	0.12	0.503	0.543
	LTE Band 38	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI10	38000	2595	17.99	18.30	1.074	62.9	1.006	-0.1	0.207	0.224
	LTE Band 38	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI10	38000	2595	17.99	18.30	1.074	62.9	1.006	0.14	0.221	0.239
	LTE Band 38	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	38000	2595	17.93	18.30	1.089	62.9	1.006	-0.08	0.454	0.497
	LTE Band 38	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	38000	2595	17.93	18.30	1.089	62.9	1.006	-0.12	0.508	0.556
	LTE Band 38	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI10	38000	2595	17.93	18.30	1.089	62.9	1.006	0.08	0.212	0.232
	LTE Band 38	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI10	38000	2595	17.93	18.30	1.089	62.9	1.006	0.08	0.228	0.250
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 0	DSI5/10	40620	2593	22.59	23.80	1.321	62.9	1.006	-0.15	0.148	0.197
	LTE Band 41C	20M	QPSK	1	49	Right Cheek	0mm	Ant 0	DSI5/10	40620 +40422	2593 +2573.2	22.52	23.80	1.343	62.9	1.006	0.05	0.142	0.192
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 0	DSI5/10	40620	2593	22.59	23.80	1.321	62.9	1.006	-0.13	0.083	0.110
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	Ant 0	DSI5/10	40620	2593	22.59	23.80	1.321	62.9	1.006	0.11	0.072	0.096
	LTE Band 41	20M	QPSK	1	49	Left Tilted	0mm	Ant 0	DSI5/10	40620	2593	22.59	23.80	1.321	62.9	1.006	-0.06	0.054	0.071
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 0	DSI5/10	40620	2593	21.70	22.80	1.288	62.9	1.006	-0.03	0.116	0.150
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 0	DSI5/10	40620	2593	21.70	22.80	1.288	62.9	1.006	0.1	0.058	0.076
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	Ant 0	DSI5/10	40620	2593	21.70	22.80	1.288	62.9	1.006	0.14	0.053	0.069
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	Ant 0	DSI5/10	40620	2593	21.70	22.80	1.288	62.9	1.006	0.14	0.047	0.060
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.04	0.617	0.813
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.03	0.620	0.817
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	0.15	0.189	0.249
	LTE Band 41	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.1	0.229	0.302
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	39750	2506	17.56	18.80	1.330	62.9	1.006	0.16	0.602	0.806
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	40185	2549.5	17.53	18.80	1.340	62.9	1.006	0.06	0.567	0.764
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	41055	2636.5	17.43	18.80	1.371	62.9	1.006	-0.11	0.551	0.760
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI5	41490	2680	17.32	18.80	1.406	62.9	1.006	0.04	0.519	0.734
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	39750	2506	17.56	18.80	1.330	62.9	1.006	0.04	0.586	0.784
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	40185	2549.5	17.53	18.80	1.340	62.9	1.006	0.08	0.628	0.846
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	41055	2636.5	17.43	18.80	1.371	62.9	1.006	0.16	0.610	0.841
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI5	41490	2680	17.32	18.80	1.406	62.9	1.006	-0.13	0.512	0.724
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	0.12	0.618	0.814
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.06	0.629	0.828

	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.06	0.197	0.259
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI5	40620	2593	17.63	18.80	1.309	62.9	1.006	-0.16	0.228	0.300
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	39750	2506	17.47	18.80	1.358	62.9	1.006	0.11	0.604	0.825
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	40185	2549.5	17.55	18.80	1.334	62.9	1.006	0.01	0.605	0.812
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	41055	2636.5	17.41	18.80	1.377	62.9	1.006	-0.1	0.546	0.756
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI5	41490	2680	17.31	18.80	1.409	62.9	1.006	-0.04	0.510	0.723
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	39750	2506	17.47	18.80	1.358	62.9	1.006	0.07	0.621	0.849
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	40185	2549.5	17.55	18.80	1.334	62.9	1.006	-0.01	0.639	0.857
	LTE Band 41C	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	40185 +40383	2549.5 +2569.3	17.36	18.80	1.393	62.9	1.006	0.01	0.602	0.844
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	41055	2636.5	17.41	18.80	1.377	62.9	1.006	-0.07	0.616	0.853
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI5	41490	2680	17.31	18.80	1.409	62.9	1.006	-0.04	0.522	0.740
	LTE Band 41	20M	QPSK	100	0	Right Cheek	0mm	Ant 1	DSI5	40620	2593	17.61	18.80	1.315	62.9	1.006	-0.04	0.605	0.800
	LTE Band 41	20M	QPSK	100	0	Right Tilted	0mm	Ant 1	DSI5	40620	2593	17.61	18.80	1.315	62.9	1.006	0.03	0.612	0.810
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	40620	2593	16.65	17.80	1.303	62.9	1.006	-0.03	0.486	0.637
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	40620	2593	16.65	17.80	1.303	62.9	1.006	-0.08	0.492	0.645
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	Ant 1	DSI10	40620	2593	16.65	17.80	1.303	62.9	1.006	-0.12	0.150	0.197
	LTE Band 41	20M	QPSK	1	49	Left Tilted	0mm	Ant 1	DSI10	40620	2593	16.65	17.80	1.303	62.9	1.006	-0.08	0.182	0.239
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	39750	2506	16.51	17.80	1.346	62.9	1.006	0.05	0.478	0.647
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	40185	2549.5	16.24	17.80	1.432	62.9	1.006	-0.12	0.450	0.648
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	41055	2636.5	16.14	17.80	1.466	62.9	1.006	0.02	0.438	0.646
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 1	DSI10	41490	2680	16.30	17.80	1.413	62.9	1.006	-0.14	0.412	0.585
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	39750	2506	16.51	17.80	1.346	62.9	1.006	-0.05	0.465	0.630
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	40185	2549.5	16.24	17.80	1.432	62.9	1.006	-0.06	0.482	0.694
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	41055	2636.5	16.14	17.80	1.466	62.9	1.006	-0.04	0.467	0.689
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 1	DSI10	41490	2680	16.30	17.80	1.413	62.9	1.006	0.12	0.407	0.578
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	40620	2593	16.61	17.80	1.315	62.9	1.006	0.15	0.491	0.650
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	40620	2593	16.61	17.80	1.315	62.9	1.006	-0.07	0.500	0.662
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	Ant 1	DSI10	40620	2593	16.61	17.80	1.315	62.9	1.006	0.04	0.156	0.206
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	Ant 1	DSI10	40620	2593	16.61	17.80	1.315	62.9	1.006	-0.11	0.181	0.239
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	39750	2506	16.47	17.80	1.358	62.9	1.006	0.16	0.480	0.656
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	40185	2549.5	16.49	17.80	1.352	62.9	1.006	-0.04	0.481	0.654
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	41055	2636.5	16.21	17.80	1.442	62.9	1.006	0.06	0.434	0.630
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 1	DSI10	41490	2680	16.07	17.80	1.489	62.9	1.006	-0.13	0.405	0.607
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	39750	2506	16.47	17.80	1.358	62.9	1.006	-0.12	0.493	0.674
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	40185	2549.5	16.49	17.80	1.352	62.9	1.006	-0.15	0.516	0.702
	LTE Band 41C	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	40185 40383	2549.5 +2569.3	16.31	17.80	1.409	62.9	1.006	-0.08	0.493	0.699
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	41055	2636.5	16.21	17.80	1.442	62.9	1.006	0.04	0.481	0.698
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 1	DSI10	41490	2680	16.07	17.80	1.489	62.9	1.006	0.12	0.415	0.622
	LTE Band 41	20M	QPSK	100	0	Right Cheek	0mm	Ant 1	DSI10	40620	2593	16.60	17.80	1.318	62.9	1.006	-0.02	0.481	0.638
	LTE Band 41	20M	QPSK	100	0	Right Tilted	0mm	Ant 1	DSI10	40620	2593	16.60	17.80	1.318	62.9	1.006	-0.14	0.486	0.645
	LTE Band 41	20M	QPSK	1	49	Right Cheek	0mm	Ant 4	DSI5/10	40620	2593	19.79	20.30	1.125	62.9	1.006	0.09	0.234	0.265
	LTE Band 41	20M	QPSK	1	49	Right Tilted	0mm	Ant 4	DSI5/10	40620	2593	19.79	20.30	1.125	62.9	1.006	0.16	0.196	0.222
	LTE Band 41	20M	QPSK	1	49	Left Cheek	0mm	Ant 4	DSI5/10	40620	2593	19.79	20.30	1.125	62.9	1.006	-0.04	0.132	0.149
	LTE Band 41	20M	QPSK	1	49	Left Tilted	0mm	Ant 4	DSI5/10	40620	2593	19.79	20.30	1.125	62.9	1.006	0.14	0.109	0.123
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	Ant 4	DSI5/10	40620	2593	18.99	19.30	1.074	62.9	1.006	0.09	0.186	0.201
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	Ant 4	DSI5/10	40620	2593	18.99	19.30	1.074	62.9	1.006	-0.08	0.156	0.169
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	Ant 4	DSI5/10	40620	2593	18.99	19.30	1.074	62.9	1.006	0.02	0.105	0.113
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	Ant 4	DSI5/10	40620	2593	18.99	19.30	1.074	62.9	1.006	-0.08	0.087	0.094
	LTE Band 41 (HPUE)	20M	QPSK	1	49	Right Cheek	0mm	Ant 0	DSI5/10	40620	2593	25.52	26.00	1.117	42.9	1.009	0.04	0.173	0.195
	LTE Band 41 (HPUE)	20M	QPSK	1	49	Right Tilted	0mm	Ant 0	DSI5/10	40620	2593	25.52	26.00	1.117	42.9	1.009	0.13	0.104	0.117
	LTE Band 41 (HPUE)	20M	QPSK	1	49	Left Cheek	0mm	Ant 0	DSI5/10	40620	2593	25.52	26.00	1.117	42.9	1.009	-0.13	0.111	0.125
	LTE Band 41 (HPUE)	20M	QPSK	1	49	Left Tilted	0mm	Ant 0	DSI5/10	40620	2593	25.52	26.00	1.117	42.9	1.009	0.12	0.074	0.083
	LTE Band 41 (HPUE)	20M	QPSK	50	0	Right Cheek	0mm	Ant 0	DSI5/10	40620	2593	24.61	25.00	1.094	42.9	1.009	0.1	0.166	0.183
	LTE Band 41 (HPUE)	20M	QPSK	50	0	Right Tilted	0mm	Ant 0	DSI5/10	40620	2593	24.61	25.00	1.094	42.9	1.009	0.14	0.090	0.100
	LTE Band 41 (HPUE)	20M	QPSK	50	0	Left Cheek	0mm	Ant 0	DSI5/10	40620	2593	24.61	25.00	1.094	42.9	1.009	-0.16	0.061	0.067
	LTE Band 41 (HPUE)	20M	QPSK	50	0	Left Tilted	0mm	Ant 0	DSI5/10	40620	2593	24.61	25.00	1.094	42.9	1.009	-0.15	0.054	0.060