# **ELEMENT MATERIALS TECHNOLOGY**



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## SAR EVALUATION REPORT

Applicant Name:
Apple, Inc.
One Apple Park Way
Cupertino, CA 95014 USA

Date of Testing: 06/06/2022 - 08/25/2022 Test Site/Location: Element, Morgan Hill, CA, USA Document Serial No.: 1C2205090032-17.BCG

FCC ID: BCG-A2726

APPLICANT: APPLE, INC.

DUT Type: Watch
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Model: A2726

Equipment	Band & Mode	Tx Frequency	SAR	
Class			1g Head (W/kg)	10g Extremity (W/kg)
PCT	UMTS 850	826.40 - 846.60 MHz	< 0.1	0.31
PCT	UMTS 1750	1712.4 - 1752.6 MHz	0.35	< 0.1
PCT	UMTS 1900	1852.4 - 1907.6 MHz	0.28	< 0.1
PCT	LTE Band 12	699.7 - 715.3 MHz	< 0.1	0.44
PCT	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A
PCT	LTE Band 13	779.5 - 784.5 MHz	< 0.1	0.48
PCT	LTE Band 14	790.5 - 795.5 MHz	< 0.1	0.52
PCT	LTE Band 26 (Cell)	814.7 - 848.3 MHz	< 0.1	0.30
PCT	LTE Band 5 (Cell)	824.7 - 848.3 MHz	< 0.1	0.34
PCT	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.36	0.11
PCT	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A
PCT	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.28	0.13
PCT	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A
PCT	LTE Band 7	2502.5 - 2567.5 MHz	0.99	0.13
PCT	LTE Band 41	2498.5 - 2687.5 MHz	0.24	< 0.1
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.16	< 0.1
DSS/DTS	Bluetooth	2402 - 2480 MHz	0.12 < 0.1	
Simultaneous	s SAR per KDB 690783 D	1.15	0.58	

This watch has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.



Executive Vice President







The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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# 1 DEVICE UNDER TEST

#### 1.1 **Device Overview**

	1	1
Band & Mode	Operating Modes	Tx Frequency
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 14	Voice/Data	790.5 - 795.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz

#### **Power Reduction for SAR** 1.2

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

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#### **Nominal and Maximum Output Power Specifications** 1.3

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

#### **Maximum Output Power – UMTS Mode** 1.3.1

Mode/Band	Antenna	Modulated Average Output Power (in dBm)			
,		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	
		Rel 99	Rel 5	Rel 6	
UMTS Band 5 (850 MHz)	Max allowed power	25.00	25.00	24.00	
OWITS Ballu 5 (850 WIHZ)	Nominal	24.00	24.00	23.00	
UMTS Band 4 (1750 MHz)	Max allowed power	24.00	24.00	24.00	
01V113 Balld 4 (1730 IVIH2)	Nominal	23.00	23.00	23.00	
UMTS Band 2 (1900 MHz)	Max allowed power	24.00	24.00	24.00	
O IVIT 3 Ballu 2 (1900 IVITI2)	Nominal	23.00	23.00	23.00	

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#### **Maximum Output Power – LTE Mode** 1.3.2

Mode / Band		Modulated Average Output Power (in dBm)
LTE FDD Band 12	Max allowed power	25.50
2.2.22 24.14 22	Nominal	24.50
LTE FDD Band 17	Max allowed power	25.50
ETE TOO Band 17	Nominal	24.50
LTE FDD Band 13	Max allowed power	25.50
ETE TOO Band 13	Nominal	24.50
LTE FDD Band 14	Max allowed power	25.50
LIE FDD Balld 14	Nominal	24.50
LTE FDD Band 26	Max allowed power	25.50
LIE FDD Ballu 20	Nominal	24.50
LTF FDD Band 5	Max allowed power	25.50
LIE PDD Ballu 5	Nominal	24.50
LTF FDD Band 4	Max allowed power	24.50
LTE FDD Band 4	Nominal	23.50
LTE EDD David CC	Max allowed power	24.50
LTE FDD Band 66	Nominal	23.50
LTE EDD David 2	Max allowed power	24.50
LTE FDD Band 2	Nominal	23.50
LTE EDD Dowd 25	Max allowed power	24.50
LTE FDD Band 25	Nominal	23.50
LTC CDD David 7	Max allowed power	24.00
LTE FDD Band 7	Nominal	23.00
LTE TDD Decid 44	Max allowed power	24.00
LTE TDD Band 41	Nominal	23.00

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# 1.3.3 Maximum Output Power – WiFi Mode

Mode/ Band			IEEE 802.1	1b (2.4 GHz)	IEEE 802.1	1g (2.4 GHz)	IEEE 802.11	n (2.4 GHz)
		Channel	Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
		1	19.00	18.00	17.00	16.00	17.00	16.00
		2	19.00	18.00	18.50	17.50	18.50	17.50
		3	19.00	18.00	18.50	17.50	18.50	17.50
	20 MHz	4	19.00	18.00	18.50	17.50	18.50	17.50
Modulated		5	19.00	18.00	18.50	17.50	18.50	17.50
Average -		6	19.00	18.00	18.50	17.50	18.50	17.50
Single Tx Chain	Bandwidth	7	19.00	18.00	18.50	17.50	18.50	17.50
(dBm)	Danawiatii	8	19.00	18.00	18.50	17.50	18.50	17.50
(UBIII)		9	19.00	18.00	18.50	17.50	18.50	17.50
		10	19.00	18.00	18.50	17.50	18.50	17.50
		11	19.00	18.00	16.50	15.50	16.50	15.50
		12	18.50	17.50	13.50	12.50	13.50	12.50
		13	18.00	17.00	6.50	5.50	6.50	5.50

# 1.3.4 Maximum Output Power – Bluetooth Mode

Mode / Band	Modulated Average - Single Tx Chain (dBm)	
Bluetooth BDR/LE	Maximum	17.50
Bidetootii BDR/LE	Nominal	16.50
Bluetooth EDR	Maximum	14.00
Bluetootii EDR	Nominal	13.00
Bluetooth HDR	Maximum	13.50
סועפנטטנוו חטא	Nominal	12.50

### 1.4 DUT Antenna Locations

A diagram showing the location of the device antennas can be found in Appendix E.

# 1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in Appendix E.

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#### 1.6 **Simultaneous Transmission Capabilities**

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

Table 1-1 Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Extremity
1	UMTS + 2.4 GHz WI-FI	Yes	Yes
2	UMTS + 2.4 GHz Bluetooth	Yes	Yes
3	LTE + 2.4 GHz WI-FI	Yes	Yes
4	LTE + 2.4 GHz Bluetooth	Yes	Yes

- 1. 2.4 GHz WLAN, and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
- 2. Licensed modes cannot transmit simultaneously.
- 3. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN scenario.
- 4. This device supports VOLTE.
- 5. This device supports VOWIFI.

#### 1.7 **Miscellaneous SAR Test Considerations**

### (A) WIFI/BT

This device supports channel 1-13 for 2.4 GHz WLAN. However, due to the reduced output power for channels 12 and 13, channels 1, 6, and 11 were considered for SAR testing per KDB 248227 D01v02r02.

### (B) Licensed Transmitter(s)

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

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This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

This device is limited to 27 RB on the uplink for 16QAM modulation. Additional measurements were evaluated to support SAR test exclusion for 16 QAM as described in Section 7.5.4.

#### 1.8 **Guidance Applied**

- FCC KDB Publication 941225 D01v03r01, D05v02r04 (3G/4G)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance, Wrist-worn Device Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- IEEE 1528-2013

#### 1.9 **Device Serial Numbers**

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 10.

#### 1.10 **Device Housing Types and Wrist Band Types**

Only one housing type, aluminum, is available for this model. The device can also be used with different wrist band accessories. All metallic wrist bands were tested, and the sport band non-metallic wrist band was tested fully for all required exposure conditions. Other non-metallic wristbands were checked to be similar or lower in SAR.

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# 2 LTE INFORMATION

	LTE Information				
orm Factor		Watch			
requency Range of each LTE transmission band		Band 12 (699.7 - 715.3			
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 14 (790.5 - 795.5 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)  LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
		d 66 (AWS) (1710.7 - 17			
		nd 4 (AWS) (1710.7 - 17			
	LTE Bar	nd 25 (PCS) (1850.7 - 19	14.3 MHz)		
		nd 2 (PCS) (1850.7 - 19			
		Band 7 (2502.5 - 2567.5			
		Band 41 (2498.5 - 2687.			
Channel Bandwidths		12: 1.4 MHz, 3 MHz, 5 M TE Band 17: 5 MHz, 10 M			
		TE Band 13: 5 MHz, 10 M			
		TE Band 14: 5 MHz, 10 M			
		(Cell): 1.4 MHz, 3 MHz,			
		(Cell): 1.4 MHz, 3 MHz, 5			
			10 MHz, 15 MHz, 20 MHz		
		.4 MHz, 3 MHz, 5 MHz, 1			
			10 MHz, 15 MHz, 20 MHz		
		4 MHz, 3 MHz, 5 MHz, 1			
		17: 5 MHz, 10 MHz, 15 M 41: 5 MHz, 10 MHz, 15 M			
hannel Numbers and Frequencies (MHz)	Low Low-Mid	Mid	Mid-High High		
TE Band 12: 1.4 MHz	699.7 (23017)	707.5 (23095)	715.3 (23173)		
TE Band 12: 3 MHz	700.5 (23025)	707.5 (23095)	714.5 (23165)		
TE Band 12: 5 MHz	701.5 (23035)	707.5 (23095)	713.5 (23155)		
TE Band 12: 10 MHz	704 (23060)	707.5 (23095)	711 (23130)		
TE Band 17: 5 MHz	706.5 (23755)	710 (23790)	713.5 (23825)		
TE Band 17: 10 MHz	709 (23780)	710 (23790)	711 (23800)		
TE Band 13: 5 MHz	779.5 (23205)	782 (23230)	784.5 (23255)		
TE Band 13: 10 MHz	N/A	782 (23230)	N/A		
TE Band 14: 5 MHz	790.5 (23305)	793 (23330)	795.5 (23355)		
TE Band 14: 10 MHz TE Band 26 (Cell): 1.4 MHz	N/A	793 (23330)	N/A		
TE Band 26 (Cell): 1.4 MHz	814.7 (26697)	831.5 (26865)	848.3 (27033)		
TE Band 26 (Cell): 5 MHz	815.5 (26705) 816.5 (26715)	831.5 (26865) 831.5 (26865)	847.5 (27025) 846.5 (27015)		
TE Band 26 (Cell): 10 MHz	819 (26740)	831.5 (26865)	844 (26990)		
TE Band 5 (Cell): 1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)		
TE Band 5 (Cell): 3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)		
TE Band 5 (Cell): 5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)		
TE Band 5 (Cell): 10 MHz	829 (20450)	836.5 (20525)	844 (20600)		
TE Band 66 (AWS): 1.4 MHz	1710.7 (131979)	1745 (132322)	1779.3 (132665)		
TE Band 66 (AWS): 3 MHz	1711.5 (131987)	1745 (132322)	1778.5 (132657)		
TE Band 66 (AWS): 5 MHz	1712.5 (131997)	1745 (132322)	1777.5 (132647)		
TE Band 66 (AWS): 10 MHz	1715 (132022)	1745 (132322)	1775 (132622)		
TE Band 66 (AWS): 15 MHz	1717.5 (132047)	1745 (132322)	1772.5 (132597)		
TE Band 66 (AWS): 20 MHz	1720 (132072)	1745 (132322)	1770 (132572)		
TE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	1732.5 (20175)	1754.3 (20393)		
TE Band 4 (AWS): 3 MHz TE Band 4 (AWS): 5 MHz	1711.5 (19965)	1732.5 (20175) 1732.5 (20175)	1753.5 (20385)		
TE Band 4 (AWS): 10 MHz	1712.5 (19975) 1715 (20000)	1732.5 (20175)	1752.5 (20375) 1750 (20350)		
TE Band 4 (AWS): 15 MHz	1717.5 (20025)	1732.5 (20175)	1747.5 (20325)		
TE Band 4 (AWS): 20 MHz	1720 (20050)	1732.5 (20175)	1745 (20300)		
TE Band 25 (PCS): 1.4 MHz	1850.7 (26047)	1882.5 (26365)	1914.3 (26683)		
TE Band 25 (PCS): 3 MHz	1851.5 (26055)	1882.5 (26365)	1913.5 (26675)		
TE Band 25 (PCS): 5 MHz	1852.5 (26065)	1882.5 (26365)	1912.5 (26665)		
TE Band 25 (PCS): 10 MHz	1855 (26090)	1882.5 (26365)	1910 (26640)		
TE Band 25 (PCS): 15 MHz	1857.5 (26115)	1882.5 (26365)	1907.5 (26615)		
TE Band 25 (PCS): 20 MHz	1860 (26140)	1882.5 (26365)	1905 (26590)		
TE Band 2 (PCS): 1.4 MHz	1850.7 (18607)	1880 (18900)	1909.3 (19193)		
TE Band 2 (PCS): 3 MHz	1851.5 (18615)	1880 (18900)	1908.5 (19185)		
TE Band 2 (PCS): 5 MHz TE Band 2 (PCS): 10 MHz	1852.5 (18625)	1880 (18900)	1907.5 (19175) 1905 (19150)		
TE Band 2 (PCS): 10 MHz	1855 (18650) 1857.5 (18675)	1880 (18900) 1880 (18900)	1905 (19150)		
TE Band 2 (PCS): 15 MHz	1860 (18700)	1880 (18900)	1902.3 (19123)		
TE Band 7: 5 MHz	2502.5 (20775)	2535 (21100)	2567.5 (21425)		
TE Band 7: 10 MHz	2505 (20800)	2535 (21100)	2565 (21400)		
TE Band 7: 15 MHz	2507.5 (20825)	2535 (21100)	2562.5 (21375)		
TE Band 7: 20 MHz	2510 (20850)	2535 (21100)	2560 (21350)		
TE Band 41: 5 MHz	2506 (39750) 2549.5 (40185)	2593 (40620)	2636.5 (41055) 2680 (41490		
TE Band 41: 10 MHz	2506 (39750) 2549.5 (40185)	2593 (40620)	2636.5 (41055) 2680 (41490		
TE Band 41: 15 MHz	2506 (39750) 2549.5 (40185)	2593 (40620)	2636.5 (41055) 2680 (41490		
TE Band 41: 20 MHz	2506 (39750) 2549.5 (40185)	2593 (40620)	2636.5 (41055) 2680 (41490		
E Category lodulations Supported in UL		1 QPSK, 16QAM			
TE MPR Permanently implemented per 3GPP TS		Uran, IbuAIVI			
6.101 section 6.2.3~6.2.5? (manufacturer attestation		YES			
be provided)					
-MPR (Additional MPR) disabled for SAR Testing?	-	YES			
TE Additional Information	This device does not support full CA feature	es on 3GPP Release 12	All unlink communications are identical to		
	Release 8 Specifications. The following LT	E Release 12 Features a			

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## 3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

#### 3.1 **SAR Definition**

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

### Equation 3-1 **SAR Mathematical Equation**

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

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

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

where:

 $\sigma$  = conductivity of the tissue-simulating material (S/m) = mass density of the tissue-simulating material (kg/m<sup>3</sup>)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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# **DOSIMETRIC ASSESSMENT**

#### 4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and:

- 1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1).
- 2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.

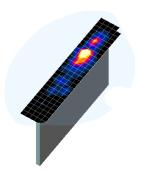


Figure 4-1 Sample SAR Area Scan

- 3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1). On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
  - a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
  - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
  - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
- 4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04\*

Maximum Area Scan Frequency Resolution (mm) (Δx <sub>area</sub> , Δy <sub>area</sub> )				Maximum Zoom Scan Spatial Resolution (mm)		
		(Δx <sub>200m</sub> , Δy <sub>200m</sub> )	Uniform Grid	G	raded Grid	Volume (mm) (x,y,z)
	v died rated	100117	Δz <sub>zoom</sub> (n)	Δz <sub>zoom</sub> (1)*	Δz <sub>zoom</sub> (n>1)*	, ,,, ,
≤2 GHz	≤15	≤8	≤5	≤4	$\leq 1.5*\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤12	≤5	≤5	≤4	$\leq 1.5*\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤12	≤5	≤4	≤3	$\leq 1.5*\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤4	≤3	≤2.5	$\leq 1.5*\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤4	≤2	≤2	$\leq 1.5*\Delta z_{200m}(n-1)$	≥ 22

<sup>\*</sup>Also compliant to IEEE 1528-2013 Table 6

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# 5 TEST CONFIGURATION POSITIONS

#### 5.1 **Device Holder**

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity  $\varepsilon = 3$  and loss tangent  $\delta = 0.02$ . Additionally, a manufacturer provided low-loss foam was used to position the device for head SAR evaluations.

#### 5.2 **Positioning for Head**

Devices that are designed to be worn on the wrist may operate in speaker mode for voice communication, with the device worn on the wrist and positioned next to the mouth. When next-to-mouth SAR evaluation is required, the device is positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium. The device is evaluated with wrist bands strapped together to represent normal use conditions.

#### **Extremity Exposure Configurations** 5.3

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions: i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. When extremity SAR evaluation is required, the device is evaluated with the back of the device touching the flat phantom, which is filled with body tissue-equivalent medium. The device was evaluated with Sport wristband unstrapped and touching the phantom. For Metal Loop and Metal Links wristbands, the device was evaluated with wristbands strapped and the distance between wristbands and the phantom was minimized to represent the spacing created by actual use conditions.

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# 6 RF EXPOSURE LIMITS

#### **Uncontrolled Environment** 6.1

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. This 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.

Table 6-1 SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

	MAN EXPOSURE LIMITS	e.
	UNCONTROLLED ENVIRONMENT	CONTROLLED ENVIRONMENT
	General Population (W/kg) or (mW/g)	Occupational (W/kg) or (mW/g)
Peak Spatial Average SAR <sub>Head</sub>	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

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

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

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

# 7 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

#### 7.1 **Measured and Reported SAR**

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as reported SAR. The highest reported SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

#### 7.2 **3G SAR Test Reduction Procedure**

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

#### 7.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01 "3G SAR Measurement Procedures.'

The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a "point SAR" at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

#### 7.4 SAR Measurement Conditions for UMTS

#### 7.4.1 **Output Power Verification**

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all "1s" or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

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#### 7.4.2 **Head SAR Measurements**

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all "1s". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

#### 7.4.3 **Body SAR Measurements**

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all "1s". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCH<sub>n</sub> configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or DPDCH<sub>n</sub>, for the highest reported SAR configuration in 12.2 kbps RMC.

#### 7.4.4 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

#### SAR Measurements with Rel 6 HSUPA 7.4.5

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Subtest 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

#### 7.5 **SAR Measurement Conditions for LTE**

LTE modes are tested according to FCC KDB 941225 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

#### 7.5.1 Spectrum Plots for RB Configurations

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

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#### 7.5.2 **MPR**

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

#### 7.5.3 A-MPR

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

#### 7.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

- a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
  - i. The required channel and offset combination with the highest maximum output power is required for SAR.
  - ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
  - iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
- b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
- c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
- Per Section 5.2.4 and 5.3. SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.
- e. This device can only operate with 16QAM on the uplink with less than or equal to 27 RB. For 16QAM configurations with 10 MHz, 15 MHz and 20 MHz bandwidths, LTE powers for RB size of 15 ("50% RB") and 27 ("100% RB") with offsets to upper edge, middle, and lower edge of the channel are additionally measured for both QPSK and 16QAM modulations to support comparison and SAR test exclusion per Section 5.2.4 and 5.3.

#### 7.5.5 **TDD**

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

#### 7.6 **SAR Testing with 802.11 Transmitters**

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations

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in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

#### 7.6.1 **General Device Setup**

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

#### 7.6.2 2.4 GHz SAR Test Requirements

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

- 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

#### **OFDM Transmission Mode and SAR Test Channel Selection** 7.6.3

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, and 802.11n or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

#### **Initial Test Configuration Procedure** 7.6.4

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the

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largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 7.6.3). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

#### 7.6.5 **Subsequent Test Configuration Procedures**

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

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# 8 RF CONDUCTED POWERS

#### 8.1 **UMTS Conducted Powers**

Table 8-1 **Maximum Conducted Powers** 

3GPP Release Mode 3GPP 34.121 Subtest		3GPP 34.121	Cellular Band [dBm]		AWS Band [dBm]		PCS Band [dBm]			3GPP MPR		
Version		Subtest	4132	4183	4233	1312	1412	1513	9262	9400	9538	[ub]
99	WCDMA	12.2 kbps RMC	24.05	24.01	24.00	22.87	22.68	22.74	23.05	23.09	23.11	-
99	VVCDIVIA	12.2 kbps AMR	23.83	24.13	23.92	23.03	23.02	22.90	22.96	22.90	23.01	-
6		Subtest 1	24.36	24.67	24.41	23.51	23.50	23.40	23.45	23.40	23.54	0
6	HSDPA	Subtest 2	23.48	23.70	23.45	22.53	22.57	22.45	22.52	22.47	22.60	0
6	TIODEA	Subtest 3	22.88	23.15	22.90	22.03	22.08	21.95	21.97	22.00	22.08	0.5
6		Subtest 4	22.75	22.92	22.71	21.78	21.81	21.72	21.79	21.73	21.80	0.5
6		Subtest 1	22.40	22.70	22.37	22.54	22.53	22.41	22.45	22.46	22.55	0
6		Subtest 2	21.30	21.51	21.25	20.29	20.28	20.25	20.25	20.21	20.30	2
6	HSUPA	Subtest 3	22.22	22.52	22.25	21.16	21.18	21.09	21.19	21.15	21.24	1
6		Subtest 4	21.40	21.67	21.41	20.40	20.57	20.44	20.51	20.50	20.62	2
6		Subtest 5	23.41	23.66	23.38	22.52	22.55	22.43	22.50	22.43	22.57	0

This device does not support DC-HSDPA.



Figure 8-1 **Power Measurement Setup** 

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#### 8.2 **LTE Conducted Powers**

Per FCC KDB Publication 941225 D05v02r05, LTE SAR for the lower bandwidths was not required for testing since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg. Lower bandwidth conducted powers for all LTE bands can be found in appendix F.

Some bands do not support non-overlapping channels. Per FCC Guidance, 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.

#### 8.2.1 LTE Band 12

Table 8-2 LTE Band 12 Conducted Power - 10 MHz Bandwidth

LTE Band 12							
			10 MHz Bandwidth				
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]		
			Conducted Power				
	1	0	[dBm] 24.35		0		
		_		0			
	1	25	24.60	U	0		
	1 05	49	24.26		0		
	25	0	23.57		1		
	25	12	23.62	0-1	1		
	25	25	23.56		1		
QPSK	50	0	23.59		1		
	15	0	23.46	0-1	1		
	15	17	23.51		1		
	15	35	23.34		1		
	27	0	23.49		1		
	27	12	23.56		1		
	27	23	23.44		1		
	1	0	23.90		1		
	1	25	23.94	0-2	1		
	1	49	23.58		1		
	25	0	22.54		2		
	25	12	22.53	0-3	2		
16QAM	25	25	22.33		2		
1000/11/1	15	0	22.60		2		
	15	17	22.54		2		
	15	35	22.24	0-5	2		
	27	0	22.58	] 0-3	2		
	27	12	22.61		2		
	27	23	22.47		2		

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#### LTE Band 13 8.2.2

Table 8-3 LTE Band 13 Conducted Power - 10 MHz Bandwidth

	LTE Band 13 Conducted Power - 10 WINZ Bandwidth							
	10 MHz Bandwidth							
			Mid Channel					
Modulation	RB Size	RB Offset	23230 (782.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]			
			Conducted Power [dBm]	3011 [ub]				
	1	0	24.70		0			
	1	25	24.53	0	0			
	1	49	24.55		0			
	25	0	23.53		1			
	25	12	23.54	0-1	1			
	25	25	23.61	0-1	1			
QPSK	50	0	23.60		1			
	15	0	23.67		1			
	15	17	23.47		1			
	15	35	23.56		1			
	27	0	23.64		1			
	27	12	23.43	0-2	1			
	27	23	23.51		1			
	1	0	24.02		1			
	1	25	23.63	0-2	1			
	1	49	23.85		1			
	25	0	22.72		2			
	25	12	22.58	0-3	2			
16QAM	25	25	22.63		2			
TOWAIVI	15	0	22.82		2			
	15	17	22.56		2			
	15	35	22.70	0-5	2			
	27	0	22.64	0-5	2			
	27	12	22.57		2			
	27	23	22.65		2			

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#### LTE Band 14 8.2.3

Table 8-4 LTE Band 14 Conducted Power - 10 MHz Bandwidth

LTE Band 14 Conducted Power - 10 WINZ Bandwidth						
			10 MHz Bandwidth			
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]	
			Conducted Power	JOIT [UD]		
			[dBm]			
	1	0	24.42		0	
	1	25	24.50	0	0	
	1	49	24.40		0	
	25	0	23.56		1	
	25	12	23.55	0-1	1	
	25	25	23.68	0-1	1	
QPSK	50	0	23.52		1	
	15	0	23.49	0-1	1	
	15	17	23.53		1	
	15	35	23.67		1	
	27	0	23.58		1	
	27	12	23.61	0-2	1	
	27	23	23.69		1	
	1	0	23.86		1	
	1	25	24.09	0-2	1	
	1	49	23.95		1	
	25	0	22.63		2	
	25	12	22.61	0-3	2	
16QAM	25	25	22.70		2	
IOQAIVI	15	0	22.47		2	
	15	17	22.59		2	
	15	35	22.68	0.5	2	
	27	0	22.53	0-5	2	
	27	12	22.61		2	
	27	23	22.49	1	2	

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#### LTE Band 26 8.2.4

Table 8-5 LTE Band 26 Conducted Power - 10 MHz Bandwidth

				acted i ower	· · · · · · · · · · · · · · · · · · ·	a maa	
				LTE Band 26 (Cell) 10 MHz Bandwidth			
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz) Conducted Power [dBm	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
	1	0	24.12	24.04	24.27		0
	1	25	24.32	24.20	24.13	1 0	0
	1	49	24.25	24.42	24.24		0
	25	0	23.38	23.13	23.30		1
	25	12	23.42	23.26	23.15	† <sub>-</sub> .	1
	25	25	23.43	23.52	23.30	0-1	1
QPSK	50	0	23.42	23.33	23.35		1
	15	0	23.22	23.11	23.31		1
	15	17	23.40	23.29	23.14	0-1	1
	15	35	23.42	23.46	23.37		1
	27	0	23.36	23.13	23.30		1
	27	12	23.45	23.26	23.21	0-2	1
	27	23	23.41	23.33	23.31		1
	1	0	23.51	23.53	23.49		1
	1	25	23.63	23.61	23.26	0-2	1
	1	49	23.55	23.48	23.26		1
	25	0	22.20	22.11	22.20		2
	25	12	22.26	22.13	22.06	0-3	2
16QAM	25	25	22.30	22.12	22.18		2
IOGAIVI	15	0	22.18	22.10	22.26		2
	15	17	22.25	22.09	22.12		2
	15	35	22.33	22.21	22.28	0-5	2
	27	0	22.21	22.13	22.24	J 0.5	2
	27	12	22.35	22.09	22.18		2
	27	23	22.36	22.12	22.17		2

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#### LTE Band 5 8.2.5

Table 8-6 LTE Band 5 Conducted Power - 10 MHz Bandwidth

LTE Band 5 Conducted Power - 10 MHZ Bandwidth								
			10 MHz Bandwidth					
			Mid Channel					
Modulation	RB Size	RB Offset	20525 (836.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]			
			Conducted Power [dBm]					
	1	0	24.15		0			
	1	25	24.04	0	0			
	1	49	24.04		0			
	25	0	23.23		1			
	25	12	23.33	0-1	1			
	25	25	23.21	0-1	1			
QPSK	50	0	23.30		1			
	15	0	23.35		1			
	15	17	23.28	0-1	1			
	15	35	23.16		1			
	27	0	23.27		1			
	27	12	23.28	0-2	1			
	27	23	23.18		1			
	1	0	23.41		1			
	1	25	23.54	0-2	1			
	1	49	23.51		1			
	25	0	22.24		2			
	25	12	22.27	0-3	2			
16QAM	25	25	22.29		2			
IOQAIVI	15	0	22.14		2			
	15	17	22.32		2			
	15	35	22.31	0-5	2			
	27	0	22.07	0-5	2			
	27	12	22.22		2			
	27	23	22.28		2			

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#### LTE Band 66 8.2.6

Table 8-7 LTE Band 66 Conducted Power - 20MHz Bandwidth

				LTE Band 66 (AWS)	ZOWIIZ Banawi		
			Low Channel	20 MHz Bandwidth Mid Channel	High Channel		
Modulation	RB Size	RB Offset	132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			(	Conducted Power [dBm	]		
	1	0	22.70	22.83	22.55		0
	1	50	22.78	22.73	22.51	0	0
	1	99	22.72	22.82	22.52		0
	50	0	21.87	22.06	21.86		1
	50	25	22.00	21.88	21.87	0-1	1
	50	50	21.98	21.84	21.88	0-1	1
QPSK	100	0	21.98	21.99	21.94		1
	15	0	22.64	22.70	22.61		0
	15	42	22.71	22.68	22.58	0-1	0
	15	85	22.70	22.69	22.55		0
	27	0	21.91	21.82	21.83		1
	27	37	21.95	21.83	21.82	0-2	1
	27	73	21.86	21.79	21.81		1
	1	0	22.03	21.89	21.73		1
İ	1	50	22.12	21.79	21.68	0-2	1
	1	99	22.23	21.76	21.55		1
İ	15	0	21.67	21.64	21.67		1
16QAM	15	42	21.73	21.56	21.63	0-3	1
	15	85	21.69	21.55	21.51		1
	27	0	20.85	20.81	20.64		2
	27	37	20.92	20.78	20.66	0-5	2
ļ	27	73	20.91	20.75	20.62		2

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#### LTE Band 25 8.2.7

Table 8-8 LTE Band 25 Conducted Power - 20MHz Bandwidth

		_		LTE Band 25 (PCS)	2011112 2411411	14111	
				20 MHz Bandwidth			
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
				Conducted Power [dBm	]		
	1	0	23.21	23.24	23.01		0
	1	50	23.03	23.26	23.27	0	0
	1	99	23.13	23.07	23.14		0
	50	0	22.24	22.19	22.17		1
	50	25	22.02	22.14	22.26	0-1	1
	50	50	22.03	22.05	22.18	0-1	1
QPSK	100	0	22.23	22.16	22.25		1
	15	0	23.17	23.16	23.07		0
	15	42	23.01	23.04	23.16	0-1	0
	15	85	23.04	23.02	23.02		0
	27	0	22.15	22.12	22.10		1
	27	37	22.02	22.05	22.10	0-2	1
	27	73	22.04	22.01	22.05		1
	1	0	22.42	22.33	22.31		1
	1	50	22.32	22.30	22.38	0-2	1
	1	99	22.66	22.30	22.52		1
	15	0	22.00	22.08	22.09		1
16QAM	15	42	22.03	22.17	22.17	0-3	1
	15	85	22.19	22.07	22.09		1
	27	0	20.92	21.03	21.04		2
	27	37	21.00	21.10	21.14	0-5	2
	27	73	21.09	20.99	21.07		2

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#### LTE Band 7 8.2.8

Table 8-9 LTE Band 7 Conducted Power - 20MHz Bandwidth

				LTE Band 7			
	ı			20 MHz Bandwidth			
			Low Channel	Mid Channel	High Channel		
Modulation	RB Size	RB Offset	20850	21100	21350	MPR Allowed per	MPR [dB]
			(2510.0 MHz)	(2535.0 MHz)	(2560.0 MHz)	3GPP [dB]	• •
		_		Conducted Power [dBm			
	1	0	23.14	22.81	22.92		0
	1	50	22.61	22.77	23.15	0	0
	1	99	22.58	22.80	22.99		0
	50	0	21.88	21.83	21.77		1
	50	25	21.60	21.75	22.07	0-1	1
	50	50	21.61	21.67	21.95	] "	1
QPSK	100	0	21.85	21.95	22.06		1
	15	0	23.25	22.77	22.70		0
	15	42	22.61	22.78	22.98	0-1	0
	15	85	22.80	22.65	22.86		0
	27	0	22.10	21.73	21.70		1
	27	37	21.57	21.75	21.95	0-2	1
	27	73	21.52	21.66	21.86	]	1
	1	0	22.35	22.32	22.52		1
	1	50	22.23	22.44	22.49	0-2	1
	1	99	22.43	22.39	22.63	]	1
	15	0	22.42	22.18	22.25		1
16QAM	15	42	22.19	22.22	22.31	0-3	1
	15	85	22.02	21.98	22.13	]	1
	27	0	21.43	21.16	21.02		2
	27	37	21.20	21.08	21.24	0-5	2
	27	73	20.96	21.11	21.26	1	2

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#### LTE Band 41 8.2.9

**Table 8-10** LTE Band 41 Conducted Power - 20MHz Bandwidth

			LIL Danc	1 TI Ooliaao	LTE Band 41	ZUIVII IZ Dali	awiatii		
				2	0 MHz Bandwidth				
			Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel		
Modulation	RB Size	RB Offset	39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
				Co	nducted Power [dB	Bm]			
	1	0	23.02	22.48	22.67	23.00	22.97		0
	1	50	22.93	22.55	22.72	23.09	23.12	0	0
	1	99	22.55	22.57	22.72	23.11	23.08	0-1	0
	50	0	21.98	21.48	21.64	21.72	22.03		1
	50	25	21.87	21.45	21.66	21.74	22.04		1
	50	50	21.67	21.49	21.65	21.79	22.01		1
QPSK	100	0	21.99	21.54	21.71	21.77	22.01		1
	15	0	23.15	22.49	22.70	22.75	22.99		0
	15	42	23.00	22.52	22.73	22.81	23.08	0-1	0
	15	85	22.61	22.54	22.72	22.87	23.06		0
	27	0	22.04	21.47	21.63	21.73	21.99		1
	27	37	21.89	21.50	21.69	21.80	22.06	0-2	1
	27	73	21.61	21.50	21.65	21.79	22.03		1
	1	0	22.45	21.58	21.70	22.02	22.41		1
	1	50	22.25	21.55	21.66	22.04	22.34	0-2	1
	1	99	21.77	21.63	21.70	22.09	22.42		1
	15	0	22.45	21.35	21.64	21.94	22.26		1
16QAM	15	42	22.20	21.32	21.65	21.98	22.15	0-3	1
	15	85	21.75	21.35	21.69	22.00	22.15		1
	27	0	21.34	20.47	20.45	20.95	21.08		2
	27	37	21.15	20.36	20.55	20.87	21.06	0-5	2
	27	73	20.78	20.48	20.63	20.88	21.10		2

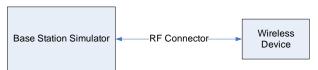


Figure 8-2
Power Measurement Setup

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#### 8.3 **WLAN Conducted Powers**

**Table 8-11** 2.4 GHz WLAN Maximum Average RF Power

2.4GHz Conducted Power [dBm]							
IEEE Transmission Mode							
Freq [MHz]	Channel	Channel 802.11b		802.11n			
		Average	Average	Average			
2412	1	17.72	15.90	15.74			
2417	2		17.40	17.20			
2437	6	17.56	17.42	17.21			
2457	10		17.15	17.25			
2462	11	17.45	15.45	15.45			

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

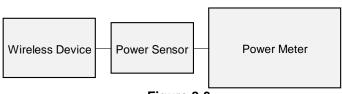


Figure 8-3 **Power Measurement Setup** 

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#### **Bluetooth Conducted Powers** 8.4

**Table 8-12** Bluetooth Average RF Power

_		Data		Avg Conducted Power		
Frequency [MHz]	Modulation	Rate [Mbps]	Channel No.	[dBm]	[mW]	
2402	GFSK	1.0	0	16.58	45.499	
2441	GFSK	1.0	39	16.40	43.652	
2480	GFSK	1.0	78	16.43	43.954	

Note 1: Bluetooth was evaluated with a test mode with 100% transmission duty factor.

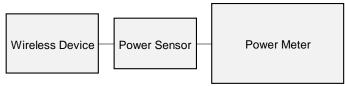


Figure 8-4 Power Measurement Setup

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#### **Tissue Verification** 9.1

Table 9-1 **Measured Head Tissue Properties** 

					ио і торс				
Calibrated for		Tissue Temp	Measured	Measured	Measured	TARGET	TARGET		
Tests Performed	Tissue Type	During Calibration	Frequency	Conductivity,	Dielectric	Conductivity,	Dielectric	% dev σ	% dev ε
on:		(°C)	(MHz)	σ (S/m)	Constant, ε	σ (S/m)	Constant, ε		
			695	0.847	43.439	0.889	42.227	-4.72%	2.87%
			700	0.852	43.373	0.889	42.201	-4.16%	2.78%
			710	0.862	43.242	0.890	42.149	-3.15%	2.59%
06/07/2022	750 Head	21.5	725	0.876	43.047	0.891	42.071	-1.68%	2.32%
			750	0.899	42.697	0.894	41.942	0.56%	1.80%
			770	0.919	42.404	0.895	41.838	2.68%	1.35%
			785	0.933	42.202	0.896	41.760	4.13%	1.06%
			680	0.889	42.947	0.888	42.305	0.11%	1.52%
			695	0.894	42.908	0.889	42.227	0.56%	1.61%
			700	0.896	42.898	0.889	42.201	0.79%	1.65%
			710	0.899	42.882	0.890	42.149	1.01%	1.74%
06/14/2022	750 Head	21.4	725	0.904	42.852	0.891	42.071	1.46%	1.86%
			750	0.912	42.759	0.894	41.942	2.01%	1.95%
			770	0.918	42.671	0.895	41.838	2.57%	1.99%
			785	0.923	42.611	0.896	41.760	3.01%	2.04%
			800	0.929	42.577	0.897	41.682	3.57%	2.15%
			680	0.867	41.019	0.888	42.305	-2.36%	-3.04%
			695	0.872	40.993	0.889	42.227	-1.91%	-2.92%
			700	0.873	40.985	0.889	42.201	-1.80%	-2.88%
			710	0.876	40.969	0.890	42.149	-1.57%	-2.80%
07/30/2022	750 Head	23.9	725	0.880	40.935	0.891	42.071	-1.23%	-2.70%
			750	0.888	40.840	0.894	41.942	-0.67%	-2.63%
			770	0.895	40.767	0.895	41.838	0.00%	-2.56%
			785	0.900	40.737	0.896	41.760	0.45%	-2.45%
			800	0.904	40.721	0.897	41.682	0.78%	-2.31%
			680	0.844	40.630	0.888	42.305	-4.95%	-3.96%
			695	0.849	40.584	0.889	42.227	-4.50%	-3.89%
			700	0.851	40.569	0.889	42.201	-4.27%	-3.87%
			710	0.854	40.542	0.890	42.149	-4.04%	-3.81%
08/01/2022	750 Head	23.5	725	0.859	40.504	0.891	42.071	-3.59%	-3.72%
00/01/2022	7001.000	20.0	750	0.866	40.421	0.894	41.942	-3.13%	-3.63%
			770	0.873	40.355	0.895	41.838	-2.46%	-3.54%
			785	0.878	40.314	0.896	41.760	-2.01%	-3.46%
			800	0.883	40.283	0.897	41.682	-1.56%	-3.36%
			680	0.854	44.044	0.888	42.305	-3.83%	4.11%
			695	0.860	44.007	0.889	42.227	-3.26%	4.22%
			700	0.862	43.987	0.889	42.201	-3.04%	4.23%
			710	0.865	43.960	0.890	42.149	-2.81%	4.30%
08/25/2022	750 Head	22.7	710	0.870	43.920	0.891	42.149	-2.36%	4.39%
JOI LOI LOLL	7001644	22.1	750	0.878	43.842	0.894	41.942	-1.79%	4.53%
			750	0.885	43.787	0.894	41.942	-1.12%	4.66%
			785	0.891	43.751	0.896	41.760	-0.56%	4.77%
			800	0.897	43.718	0.897	41.682	0.00%	4.88%
			815	0.877	40.849	0.898	41.594	-2.34%	-1.79%
			820	0.882	40.782	0.899	41.578	-1.89%	-1.79%
06/10/2022	835 Head	21.2	835	0.896	40.782	0.900	41.500	-0.44%	-2.20%
			850	0.896	40.406	0.900	41.500	-0.44%	-2.20%
		-	815	0.882	40.761	0.898	41.500	-0.55%	-2.00%
			820	0.887	40.761	0.899	41.578	-1.78%	-2.13%
06/12/2022	835 Head	20.0	820	0.887	40.694	0.899	41.578	0.11%	-2.13% -2.42%
			850	0.901	40.494	0.900	41.500	-0.11%	-2.42%
		<del>                                     </del>							
			815	0.879	40.723	0.898	41.594	-2.12%	-2.09%
06/14/2022	835 Head	19.4	820	0.884	40.656	0.899	41.578	-1.67%	-2.22%
			835	0.899	40.459	0.900	41.500	-0.11%	-2.51%
			850	0.912	40.269	0.916	41.500	-0.44%	-2.97%

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Table 9-2 Measured Head Tissue Properties (Cont.)

		IVICASUI	Hooue	Propertie					
Calibrated for	T T	Tissue Temp	Measured	Measured	Measured	TARGET	TARGET	04 -4	0/ -1
Tests Performed on:	Tissue Type	During Calibration (°C)	Frequency (MHz)	Conductivity, σ (S/m)	Dielectric Constant, ε	Conductivity, σ (S/m)	Dielectric Constant, ε	% dev σ	% dev ε
		. ,	1710	1.294	38.577	1.348	40.142	-4.01%	-3.90%
			1720	1.303	38.540	1.354	40.126	-3.77%	-3.95%
			1745	1.325	38.441	1.368	40.120	-3.11%	-4.11%
06/10/2022	1750 Head	21.6							
			1750	1.330	38.422	1.371	40.079	-2.99%	-4.13%
			1770	1.349	38.347	1.383	40.047	-2.46%	-4.25%
			1790	1.367	38.269	1.394	40.016	-1.94%	-4.37%
			1710	1.286	38.433	1.348	40.142	-4.60%	-4.26%
			1720	1.294	38.389	1.354	40.126	-4.43%	-4.33%
06/13/2022	1750 Head	22.0	1745	1.315	38.282	1.368	40.087	-3.87%	-4.50%
			1750	1.320	38.264	1.371	40.079	-3.72%	-4.53%
			1770	1.338	38.197	1.383	40.047	-3.25%	-4.62%
			1790	1.356	38.127	1.394	40.016	-2.73%	-4.72%
			1850	1.418	40.824	1.400	40.000	1.29%	2.06%
			1860	1.425	40.808	1.400	40.000	1.79%	2.02%
06/08/2022	1900 Head	20.5	1880	1.437	40.786	1.400	40.000	2.64%	1.97%
			1900	1.451	40.772	1.400	40.000	3.64%	1.93%
			1905	1.454	40.761	1.400	40.000	3.86%	1.90%
			1910	1.458	40.755	1.400	40.000	4.14%	1.89%
			1850	1.403	38.590	1.400	40.000	0.21%	-3.52%
			1860	1.408	38.571	1.400	40.000	0.57%	-3.57%
06/14/2022	1900 Head	19.2	1880	1.420	38.537	1.400	40.000	1.43%	-3.66%
			1900	1.432	38.510	1.400	40.000	2.29%	-3.73%
			1905	1.435	38.502	1.400	40.000	2.50%	-3.74%
			1910	1.438	38.494	1.400	40.000	2.71%	-3.77%
			2450	1.848	40.168	1.800	39.200	2.67%	2.47%
			2480	1.871	40.117	1.833	39.162	2.07%	2.44%
			2500	1.887	40.086	1.855	39.136	1.73%	2.43%
			2510	1.895	40.072	1.866	39.123	1.55%	2.43%
			2535	1.914	40.038	1.893	39.092	1.11%	2.42%
06/08/2022	2450 Head	21.9	2550	1.926	40.024	1.909	39.073	0.89%	2.43%
			2560	1.934	40.010	1.920	39.060	0.73%	2.43%
			2600	1.970	39.930	1.964	39.009	0.31%	2.36%
			2650	2.014	39.845	2.018	38.945	-0.20%	2.31%
			2680	2.039	39.794	2.051	38.907	-0.59%	2.28%
			2700	2.056	39.759	2.073	38.882	-0.82%	2.26%
			2400	1.811	39.736	1.756	39.289	3.13%	1.14%
00/40/0000		04.0	2450	1.851	39.667	1.800	39.200	2.83%	1.19%
06/10/2022	2450 Head	21.3	2480	1.873	39.603	1.833	39.162	2.18%	1.13%
			2500	1.888	39.573	1.855	39.136	1.78%	1.12%
			2400	1.777	39.471	1.756	39.289	1.20%	0.46%
			2450	1.816	39.399	1.800	39.200	0.89%	0.51%
06/14/2022	2450 Head	21.6	2480	1.837	39.339	1.833	39.162	0.22%	0.45%
			2500	1.853	39.324	1.855	39.136	-0.11%	0.48%
			2400	1.804	38.896	1.756	39.289	2.73%	-1.00%
			2450	1.846	38.827	1.800	39.200	2.56%	-0.95%
			2480	1.867	38.769	1.833	39.162	1.85%	-1.00%
			2500	1.883	38.725	1.855	39.136	1.51%	-1.05%
			2510	1.892	38.707	1.866	39.123	1.39%	-1.06%
			2535	1.914	38.683	1.893	39.092	1.11%	-1.05%
08/22/2022	2450 Head	19.8	2550	1.926	38.664	1.909	39.073	0.89%	-1.05%
			2560	1.933	38.643	1.920	39.060	0.68%	-1.07%
			2600	1.967	38.562	1.964	39.009	0.15%	-1.15%
			2650	2.009	38.491	2.018	38.945	-0.45%	-1.17%
			2680	2.033	38.422	2.051	38.907	-0.43%	-1.25%
			2700	2.051	38.379	2.073	38.882	-1.06%	-1.29%
		1	2100	2.001	30.378	2.013	JU.00Z	-1.00%	-1.2970

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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#### 9.2 **Test System Verification**

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix D.

> Table 9-3 System Verification Results - 1a

	System vernication Results – 19											
	System Verification TARGET & MEASURED											
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	Measured SAR1g (W/kg)	1W Target SAR1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation1g (%)
AM2	750	HEAD	06/07/2022	22.2	20.6	0.20	1057	7421	1.820	8.51	9.100	6.93%
AM13	750	HEAD	06/14/2022	21.9	20.7	0.20	1057	7360	1.570	8.51	7.850	-7.76%
AM7	835	HEAD	06/10/2022	20.7	21.8	0.20	4d040	7416	2.010	9.79	10.050	2.66%
AM7	835	HEAD	06/14/2022	21.2	19.8	0.20	4d040	7416	1.930	9.79	9.650	-1.43%
AM1	1750	HEAD	06/10/2022	21.7	21.6	0.10	1083	7639	3.660	36.50	36.600	0.27%
AM1	1750	HEAD	06/13/2022	21.2	22.0	0.10	1104	7639	3.450	35.70	34.500	-3.36%
AM6	1900	HEAD	06/08/2022	21.5	20.0	0.10	5d030	7532	4.200	39.80	42.000	5.53%
AM6	1900	HEAD	06/14/2022	23.1	18.1	0.10	5d030	7532	4.180	39.80	41.800	5.03%
AM10	2450	HEAD	06/10/2022	22.7	21.0	0.10	750	7308	5.150	52.60	51.500	-2.09%
AM10	2450	HEAD	06/14/2022	23.4	21.8	0.10	750	7308	5.260	52.60	52.600	0.00%
AM7	2450	HEAD	08/22/2022	20.1	19.1	0.10	750	7416	5.420	52.60	54.200	3.04%
AM10	2600	HEAD	06/08/2022	23.8	21.6	0.10	1042	7308	5.430	55.80	54.300	-2.69%

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Table 9-4 System Verification Results - 10g

#### System Verification TARGET & MEASURED Tissue Amb. Liquid SAR Tissue Source Measured 1W Target **1W Normalized** Deviation10g Date Probe SN Frequency Temp. Temp. Power System SN SAR10g (W/kg) SAR10g (W/kg) SAR10g (W/kg) (%) Type (MHz) (C) (C) (W) AM6 750 HEAD 07/30/2022 1097 7532 1.060 5.34 5.300 -0.75% 21.5 22.0 0.20 1.130 AM6 750 HEAD 08/01/2022 22.1 21.6 0.20 1097 7532 5.34 5.650 5.81% AM6 750 HEAD 08/25/2022 21.2 22.8 0.20 1097 7532 1.060 5.34 5.300 -0.75% AM7 835 HEAD 06/12/2022 20.3 19.8 0.20 4d040 7416 1.290 6.38 6.450 1.10% AM7 835 HEAD 06/14/2022 21.2 19.8 0.20 4d040 7416 1.260 6.38 6.300 -1.25% 21.6 AM1 1750 **HEAD** 06/10/2022 21.7 0.10 1083 7639 1.930 19.20 19.300 0.52% 21.5 20.0 20.40 AM6 1900 HEAD 06/08/2022 0.10 5d030 7532 2.170 21.700 6.37% AM6 1900 HEAD 06/14/2022 23.1 18.1 0.10 5d030 7532 2.160 20.40 21.600 5.88% AM10 2450 HEAD 7308 2.390 24.50 -2.45% 06/10/2022 22.7 21.0 0.10 750 23.900 AM10 2450 HEAD 06/14/2022 23.4 21.8 0.10 750 7308 2.440 24.50 24.400 -0.41% AM10 2600 HEAD 06/08/2022 23.8 21.6 0.10 1042 7308 2.420 24.90 24.200 -2.81%

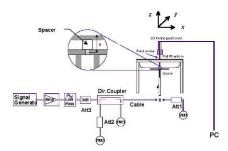


Figure 9-1 **System Verification Setup Diagram** 



Figure 9-2 **System Verification Setup Photo** 

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# 10 SAR DATA SUMMARY

## 10.1 Standalone Head SAR Data

### **Table 10-1 UMTS 850 MHz Head SAR**

							MEAS	UREMEN	NT RESU	LTS								
FREQU	ENCY	Mode	Service	Maximum Allowed	Conducted	Power	Side	Spacing	Housing	Wristband	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#		
MHz	Ch.			Power [dBm]	Power [dBm]	Drift [dB]		•	Туре	Туре	Number	Cycle	(W/kg)	Factor	(W/kg)			
826.40	4132	UMTS 850 RMC		25.00	24.05	-0.06	front	10 mm	Aluminum	Sport	YXTFPCJKFK	1:1	0.000	1.245	0.000			
826.40	4132	UMTS 850 RMC		25.00	24.05	0.06	front	10 mm	Aluminum	Metal Links	YXTFPCJKFK	1:1	0.000	1.245	0.000	A1		
826.40	4132	UMTS 850	RMC	25.00	24.05	-0.15	front	10 mm	Aluminum	Metal Loop	YXTFPCJKFK	1:1	0.000	1.245	0.000			
		ANSI / IEE	E C95.1 1992	- SAFETY LII	MIT						Head							
			Spatial Per				1.6 W/kg (mW/g)											
		Uncontrolled	Exposure/G	eneral Popul	ation						averaged ove	r 1 gram						

### **Table 10-2 UMTS 1750 MHz Head SAR**

	MEASUREMENT RESULTS																		
FREQU	ENCY	Mode	Service	Maximum Allowed	Conducted	Power	Side	Spacing	Housing	Wristband	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#			
MHz	Ch.			Power [dBm]	Power [dBm]	Drift [dB]			Type	Туре	Number	Cycle	(W/kg)	Factor	(W/kg)				
1712.40	1312	UMTS 1750	RMC	24.00	22.87	0.05	front	10 mm	Aluminum	Sport	G36P6V0JKH	1:1	0.193	1.297	0.250				
1712.40	1312	UMTS 1750 RMC		24.00	22.87	0.03	front	10 mm	Aluminum	Metal Links	G36P6V0JKH	1:1	0.240	1.297	0.311				
1712.40	1312	UMTS 1750	RMC	24.00	22.87	-0.06	front	10 mm	Aluminum	Metal Loop	G36P6V0JKH	1:1	0.272	1.297	0.353	A2			
		ANSI / IEE	E C95.1 1992	- SAFETY LI	MIT				•		Head		•						
			Spatial Pe	ak			1.6 W/kg (mW/g)												
		Uncontrolled	d Exposure/G		ation		averaged over 1 gram												
				· · · · · ·							=::=:ugou oro	5							

### **Table 10-3** UMTS 1900 MHz Head SAR

	MEASUREMENT RESULTS																	
FREQU	ENCY	Mode	Service	Maximum Allowed	Conducted	Power	Side	Spacing	Housing	Wristband	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#		
MHz	Ch.			Power [dBm]	Power [dBm]	Drift [dB]		., 5	Туре	Туре	Number	Cycle	(W/kg)	Factor	(W/kg)			
1907.60	9538	UMTS 1900	RMC	24.00	23.11	0.01	front	10 mm	Aluminum	Sport	G36P6V0JKH	1:1	0.152	1.227	0.187			
1907.60	9538	UMTS 1900	RMC	24.00	23.11	0.03	front	10 mm	Aluminum	Metal Links	G36P6V0JKH	1:1	0.156	1.227	0.191			
1907.60	9538	UMTS 1900	RMC	24.00	23.11	-0.02	front	10 mm	Aluminum	Metal Loop	G36P6V0JKH	1:1	0.227	1.227	0.279	A3		
			E C95.1 1992 Spatial Pea I Exposure/G	ak			Head 1.6 W/kg (mW/g) averaged over 1 gram											

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### **Table 10-4** LTE Band 12 Head SAR

									MEA	SUREM	ENT RESULT	S									
FR	EQUENCY	,	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	h.		[MHz]		Power [dBm]	Power [dBm]	Drift [dB]			.,	Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
707.50	23095	Mid	LTE Band 12	10	Sport	25.50	24.60	0.01	0	front	10 mm	Aluminum	QPSK	1	25	K62Y2KJGQX	1:1	0.000	1.230	0.000	A4
707.50	0 23095 Mid LTE Band 12 10 Sport 24.50 23.62 0.02							1	front	10 mm	Aluminum	QPSK	25	12	K62Y2KJGQX	1:1	0.000	1.225	0.000		
707.50	23095	Mid	LTE Band 12	10	Metal Links	25.50	24.60	0.06	0	front	10 mm	Aluminum	QPSK	1	25	K62Y2KJGQX	1:1	0.000	1.230	0.000	
707.50	23095	Mid	LTE Band 12	10	Metal Links	24.50	23.62	0.01	1	front	10 mm	Aluminum	QPSK	25	12	K62Y2KJGQX	1:1	0.000	1.225	0.000	
707.50	23095	Mid	LTE Band 12	10	Metal Loop	25.50	24.60	0.07	0	front	10 mm	Aluminum	QPSK	1	25	K62Y2KJGQX	1:1	0.000	1.230	0.000	
707.50	0 23095 Md LTE Band 12 10 Metal Loop 24.50 23.62 0.05									front	10 mm	Aluminum	QPSK	25	12	K62Y2KJGQX	1:1	0.000	1.225	0.000	
			ANSI /		.1 1992 - SAFE	TY LIMIT				Head											
	Spatial Peak Uncontrolled Exposure/General Population									1.6 W/kg (mW/g) averaged over 1 gram											

## **Table 10-5** LTE Band 13 Head SAR

									MEA	SUREN	MENT RESULT	s									
FR	EQUENCY	,	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	'n.		[MHz]	,,,,	Power [dBm]	Power [dBm]	Drift [dB]			.,	Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
782.00	23230	Mid	LTE Band 13	10	Sport	25.50	24.70	0.06	0	front	10 mm	Aluminum	QPSK	1	0	V2CWQK031H	1:1	0.000	1.202	0.000	
782.00	23230	Mid	LTE Band 13	10	Sport	23.61	1	front	10 mm	Aluminum	QPSK	25	25	V2CWQK031H	1:1	0.000	1.227	0.000			
782.00	23230	Mid	LTE Band 13	10	Metal Links	25.50	24.70	0.09	0	front	10 mm	Aluminum	QPSK	1	0	V2CWQK031H	1:1	0.000	1.202	0.000	A5
782.00	23230	Mid	LTE Band 13	10	Metal Links	24.50	23.61	0.04	1	front	10 mm	Aluminum	QPSK	25	25	V2CWQK031H	1:1	0.000	1.227	0.000	
782.00	23230	Mid	LTE Band 13	10	Metal Loop	25.50	24.70	0.09	0	front	10 mm	Aluminum	QPSK	1	0	V2CWQK031H	1:1	0.000	1.202	0.000	
782.00	0 23230 Mid LTE Band 13 10 Metal Loop 24.50 23.61 0.01									front	10 mm	Aluminum	QPSK	25	25	V2CWQK031H	1:1	0.000	1.227	0.000	
			ANSI /		.1 1992 - SAFE	TY LIMIT										Head					
	Spatial Peak Uncontrolled Exposure/General Population									1.6 W/kg (mW/g) averaged over 1 gram											

### **Table 10-6** LTE Band 14 Head SAR

									MEA	SURE	IENT RESULT	s									
FR	REQUENCY	′	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	С	h.		[MHz]	,,,,	Power [dBm]	Power [dBm]	Drift [dB]				Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
793.00	23330	Mid	LTE Band 14	10	Sport	25.50	24.50	0.08	0	front	10 mm	Aluminum	QPSK	1	25	Y367WNWK29	1:1	0.000	1.259	0.000	A6
793.00	.00 23330 Mid LTE Band 14 10 Sport 24.50 23.68 0.02									front	10 mm	Aluminum	QPSK	25	25	Y367WNWK29	1:1	0.000	1.208	0.000	
793.00	23330	Mid	LTE Band 14	10	Metal Links	25.50	24.50	0.08	0	front	10 mm	Aluminum	QPSK	1	25	Y367WNWK29	1:1	0.000	1.259	0.000	
793.00	23330	Mid	LTE Band 14	10	Metal Links	24.50	23.68	0.04	1	front	10 mm	Aluminum	QPSK	25	25	Y367WNWK29	1:1	0.000	1.208	0.000	
793.00	23330	Mid	LTE Band 14	10	Metal Loop	25.50	24.50	0.04	0	front	10 mm	Aluminum	QPSK	1	25	Y367WNWK29	1:1	0.000	1.259	0.000	
793.00	23330 Mid LTE Band 14 10 Metal Loop 24.50 23.68 0.16									front	10 mm	Aluminum	QPSK	25	25	Y367WNWK29	1:1	0.000	1.208	0.000	
			ANSI		.1 1992 - SAFE	TY LIMIT				Head											
			Uncontr		atial Peak sure/General	Ponulation										kg (mW/g) d over 1 gram					

# **Table 10-7** LTE Band 26 (Cell) Head SAR

	MEASUREMENT DESIGNATION																				
	MEASUREMENT RESULTS																				
FR	EQUENCY	,	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	PR Size	RR Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	h.		[MHz]		Power [dBm]	Power [dBm]	Drift [dB]	[]			Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Sport	25.50	24.42	0.20	0	front	10 mm	Aluminum	QPSK	1	49	N324VKP91W	1:1	0.000	1.282	0.000	A7
831.50	11.50 26865 Mid LTE Band 26 (Cell) 10 Sport 24.50 23.52 0.03								1	front	10 mm	Aluminum	QPSK	25	25	N324VKP91W	1:1	0.000	1.253	0.000	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Links	25.50	24.42	0.20	0	front	10 mm	Aluminum	QPSK	1	49	N324VKP91W	1:1	0.000	1.282	0.000	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Links	24.50	23.52	0.09	1	front	10 mm	Aluminum	QPSK	25	25	N324VKP91W	1:1	0.000	1.253	0.000	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Loop	25.50	24.42	0.05	0	front	10 mm	Aluminum	QPSK	1	49	N324VKP91W	1:1	0.000	1.282	0.000	
831.50	26865 Mid LTE Band 26 (Cell) 10 Metal Loop 24.50 23.52 0.20									front	10 mm	Aluminum	QPSK	25	25	N324VKP91W	1:1	0.000	1.253	0.000	
			ANSI /		1 1992 - SAFE	TY LIMIT				Head											
					atial Peak					l					1.6 W	kg (mW/g)					
	Uncontrolled Exposure/General Population														average	d over 1 gram					

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## **Table 10-8** LTE Band 5 (Cell) Head SAR

FR	EQUENCY		Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	1.		[MHz]	,,,,	Power [dBm]	Power [dBm]	Drift [dB]			.,	Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Sport	25.50	24.15	0.20	0	front	10 mm	Aluminum	QPSK	1	0	V2CWQK031H	1:1	0.000	1.365	0.000	A8
836.50	20525	Mid	LTE Band 5 (Cell)	10	Sport	24.50	23.33	0.20	1	1 front 10 mm Aluminum QPSK 25 12 V2CWQK031H 1:1 0.000 1.309 0.000											
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Links	25.50	24.15	0.00	0	0 front 10 mm Aluminum QPSK 1 0 V2CWQK031H 1:1 0.000 1.365 0.000											
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Links	24.50	23.33	0.04	1	front	10 mm	Aluminum	QPSK	25	12	V2CWQK031H	1:1	0.000	1.309	0.000	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Loop	25.50	24.15	0.07	0	front	10 mm	Aluminum	QPSK	1	0	V2CWQK031H	1:1	0.000	1.365	0.000	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Loop	24.50	23.33	0.20	1	1 front 10 mm Aluminum QPSK 25 12 V2CWQK031H 1:1 0.000 1.309 0.000									0.000		
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT															Head					
			Umaante		atial Peak	Danulation										kg (mW/g)					
			Uncontr	ollea Expo	sure/General	Population									average	d over 1 gram					

## **Table 10-9** LTE Band 66 (AWS) Head SAR

										<del></del>											
FRI	EQUENCY	,	Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted	Power Drift [dB]	MPR [dB]	Side	Spacing	Housing Type	Modulation	RB Size	RB Offset	Device Serial Number	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	r.		[MHZ]	,,,,	Power [dBm]	Power [dBm]	Drift (aB)			.,	Type				Number	Cycle	(W/kg)	Factor	(W/kg)	1
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Sport	24.50	22.83	0.10	0	front	10 mm	Aluminum	QPSK	1	0	G36P6V0JKH	1:1	0.147	1.469	0.216	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Sport	23.50	22.06	-0.03	1 front 10 mm Aluminum QPSK 50 0 G36P6V0JKH 1:1 0.129 1.393 0.180												
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Links	24.50	22.83	0.13	0 front 10 mm Aluminum QPSK 1 0 G36P6V0JKH 1:1 0.245 1.469 0.360 At									A9			
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Links	23.50	22.06	0.03	1	front	10 mm	Aluminum	QPSK	50	0	G36P6V0JKH	1:1	0.208	1.393	0.290	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Loop	24.50	22.83	-0.03	0	front	10 mm	Aluminum	QPSK	1	0	G36P6V0JKH	1:1	0.238	1.469	0.350	
1745.00	1745.00 132322 Mid LTE Band 66 20 Metal Loop 23.50 22.06 0.02									front	10 mm	Aluminum	QPSK	50	0	G36P6V0JKH	1:1	0.205	1.393	0.286	
			ANSI /	IEEE C95	.1 1992 - SAFE									Head							
				Sp	atial Peak										1.6 W	kg (mW/g)					
			Uncontr	olled Expo	sure/General	Population									average	d over 1 gram					

## **Table 10-10** LTE Band 25 (PCS) Head SAR

									Jana		1 00, 11	<del>ouu ,</del>	<i>9,</i>								
									MEA	SURE	MENT RESULT	s									
FR	EQUENCY	,	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	CI	r.		[MHz]	,,,,	Power [dBm]	Power [dBm]	Drift [dB]				Type				Number	Cycle	(W/kg)	Factor	(W/kg)	
1905.00	26590	High	LTE Band 25 (PCS)	20	Sport	24.50	23.27	0.07	0	front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.133	1.327	0.176	
1905.00	26590	High	LTE Band 25 (PCS)	20	Sport	23.50	22.26	0.00	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.093	1.330	0.124	
1905.00	05.00 26590 High LTE Band 25 (PCS) 20 Metal Links 24.50 23.27 0									front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.189	1.327	0.251	
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Links	23.50	22.26	0.07	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.142	1.330	0.189	
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Loop	24.50	23.27	-0.06	0	front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.208	1.327	0.276	A10
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Loop	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.189	1.330	0.251				
			ANSI /	IEEE C95	.1 1992 - SAFE	TY LIMIT										Head					
				Sp	atial Peak										1.6 W/	kg (mW/g)					
			Uncontr	olled Expo	sure/General	Population									average	d over 1 gram					
											,										

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### **Table 10-11** LTE Band 7 Head SAR

									MEASU	REMEN	T RESULTS										
FR	EQUENCY	,	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	Cł	h.		[MHz]		Power [dBm]	Power [dBm]	Drift (dB)				Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
2510.00	20850	Low	LTE Band 7	20	Sport	24.00	23.14	-0.01	0	front	10 mm	Aluminum	QPSK	1	0	YLVVYX0MV3	1:1	0.808	1.219	0.985	A11
2535.00	21100	Mid	LTE Band 7	20	Sport	24.00	22.81	0.09	0	front	10 mm	Aluminum	QPSK	1	0	YLVVYX0MV3	1:1	0.488	1.315	0.642	
2560.00	21350	High	LTE Band 7	20	Sport	24.00	23.15	0.03	0	front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.369	1.216	0.449	
2560.00	21350	High	LTE Band 7	20	Sport	23.00	22.07	0.05	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.272	1.239	0.337	
2560.00	21350	High	LTE Band 7	20	Sport	23.00	22.06	0.08	1	front	10 mm	Aluminum	QPSK	100	0	YLVVYX0MV3	1:1	0.346	1.242	0.430	
2560.00	21350	High	LTE Band 7	20	Metal Links	24.00	23.15	-0.05	0	front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.252	1.216	0.306	
2560.00	21350	High	LTE Band 7	20	Metal Links	23.00	22.07	0.01	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.126	1.239	0.156	
2560.00	21350	High	LTE Band 7	20	Metal Loop	24.00	23.15	0.06	0	front	10 mm	Aluminum	QPSK	1	50	YLVVYX0MV3	1:1	0.204	1.216	0.248	
2560.00	21350	High	LTE Band 7	20	Metal Loop	23.00	22.07	-0.04	1	front	10 mm	Aluminum	QPSK	50	25	YLVVYX0MV3	1:1	0.170	1.239	0.211	
2510.00											10 mm	Aluminum	QPSK	1	0	YLVVYX0MV3	1:1	0.716	1.219	0.873	
	20850   Low														He 1.6 W/kg eraged o						

Note: Blue entry represents variability measurement.

## **Table 10-12** LTE Band 41 Head SAR

FR	EQUENCY	′	Mode	Bandwidth	Wristband Type	Maximum Allowed	Conducted	Power	MPR [dB]	Side	Spacing	Housing	Modulation	RB Size	RB Offset	Device Serial	Duty	SAR (1g)	Scaling	Reported SAR (1g)	Plot#
MHz	С	h.		[MHz]	,,,	Power [dBm]	Power [dBm]	Drift [dB]				Туре				Number	Cycle	(W/kg)	Factor	(W/kg)	
2680.00	41490	High	LTE Band 41	20	Sport	24.00	23.12	0.00	0	front	10 mm	Aluminum	QPSK	1	50	HN93H4N9RN	1:1.58	0.193	1.225	0.236	A12
2680.00	41490	High	LTE Band 41	20	Sport	23.00	22.04	0.01	1	front	10 mm	Aluminum	QPSK	50	25	HN93H4N9RN	1:1.58	0.145	1.247	0.181	
2680.00	41490	High	LTE Band 41	20	Metal Links	24.00	23.12	-0.03	0 front 10 mm Aluminum QPSK 1 50 HN93H4N9RN 1:1.58 0.099 1.225 0.121												
2680.00	41490	High	LTE Band 41	20	Metal Links	23.00	22.04	-0.08	1	front	10 mm	Aluminum	QPSK	50	25	HN93H4N9RN	1:1.58	0.077	1.247	0.096	
2680.00	41490	High	LTE Band 41	20	Metal Loop	24.00	23.12	-0.11	0	front	10 mm	Aluminum	QPSK	1	50	HN93H4N9RN	1:1.58	0.110	1.225	0.135	
2680.00 41490 High LTE Band 41 20 Metal Loop 23.00 22.04 -0.10									1	front	10 mm	Aluminum	QPSK	50	25	HN93H4N9RN	1:1.58	0.081	1.247	0.101	
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak															Head 'kg (mW/g)					
			Unconti		sure/General								d over 1 gram								

## **Table 10-13** 2.4 GHz WLAN Head SAR

									MEASU	JREMENT R	ESULTS								
FREQU	ENCY	Mode	Service	Bandwidth [MHz]	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	Side	Spacing	Housing Type	Wristband Type	Device Serial Number	Data Rate		SAR (1g)	Scaling Factor	Scaling Factor (Duty	Reported SAR (1g)	Plot#
MHz	Ch.			[MHZ]	Power [dBm]	Power (asm)	υτιπ (αΒ)					Number	(Mbps)	(%)	(W/kg)	(Power)	Cycle)	(W/kg)	
2412	1	802.11b	DSSS	22	19.00	17.72	-0.08	front	10 mm	Aluminum	Sport	GDQCXHQJ49	1	99.7	0.120	1.343	1.003	0.162	A13
2412	1	802.11b	DSSS	22	19.00	17.72	0.00	front	10 mm	Aluminum	Metal Links	GDQCXHQJ49	1	99.7	0.087	1.343	1.003	0.117	
2412	1	802.11b	DSSS	22	19.00	17.72	-0.05	front	10 mm	Aluminum	Metal Loop	GDQCXHQJ49	1	99.7	0.106	1.343	1.003	0.143	
		ANSI / I	EEE C95.1		ETY LIMIT								Head						
				al Peak									6 W/kg (m	•					
		Uncontro	olled Exposu	ure/Genera	al Population					_		ave	raged over	1 gram					

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## **Table 10-14 Bluetooth Head SAR**

							MEAS	SUREME	NT RESUL	TS							
UENCY	Mode	Sarvica	Maximum	Conducted	Power	Side	Spacing	Housing	Wristband	Device Serial	Data Rate	Duty	SAR (1g)	Scaling Factor (Cond	Scaling	Reported SAR (1g)	Plot#
Ch.	Mode	Service	Power [dBm]	Power [dBm]	Drift [dB]	Side	opacing	Type	Туре	Number	(Mbps)	Cycle (%)	(W/kg)	Power)	Cycle)	(W/kg)	1100#
0 0	Bluetooth	FHSS	17.50	16.58	0.03	front	10 mm	Aluminum	Sport	N324VKP91W	1	100	0.097	1.236	1.000	0.120	A14
0 0	Bluetooth	FHSS	17.50	16.58	0.03	front	10 mm	Aluminum	Metal Links	N324VKP91W	1	100	0.057	1.236	1.000	0.070	
0 0	Bluetooth	FHSS	17.50	16.58	0.04	front	10 mm	Aluminum	Metal Loop	N324VKP91W	1	100	0.078	1.236	1.000	0.096	
	ANSI / IEE	E C95.1 1992	- SAFETY LI	MIT							Hea	ad					
		Spatial Pe	ak								1.6 W/kg	(mW/g)					
	Uncontrolled	d Exposure/G	eneral Popul	ation						a	veraged o	ver 1 gram	1				
	Ch. 0 0 0 0 0 0 0	Ch.   Mode	Ch.         Mode         Service           0         0         Bluetooth         FHSS           0         0         Bluetooth         FHSS           0         0         Bluetooth         FHSS           ANSI / IEEE C95.1 1992           Spatial Pe	Ch. Mode Service Allowed Power [dBm]  0 0 Bluetooth FHSS 17.50  0 0 Bluetooth FHSS 17.50  0 0 Bluetooth FHSS 17.50  ANSI / IEEE C95.1 1992 - SAFETY LII Spatial Peak	Ch.   Mode   Service   Allowed   Power [dBm]   Conducted   Power [dBm]   Conducted   Power [dBm]   Conducted   C	Ch.   Mode   Service   Allowed   Power [dBm]   Power   Mode   Power [dBm]   Drift [dB]	Ch.   Mode   Service   Allowed   Power [dBm]   Ornit [dB]   Side	Number   Service   Maximum   Conducted   Power [dBm]   Power   Side   Spacing	Number   N	Number   N	Ch.   Mode   Service   Allowed   Power [dBm]   Power [dBm]   Power [dBm]   Power [dBm]   Side   Spacing   Housing   Type   Wristband   Type   Wristband   Type   Naz4vKP91W	Number   N	Number   N	Number   N	Number   N	Name   Service   Maximum   Allowed   Power [dBm]   Power   Maximum   Conducted   Power [dBm]   Power   Miles   Spacing   Name   Number   Name   Nam	Number   N

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# 10.2 Standalone Extremity SAR Data

## **Table 10-15 UMTS 850 MHz Extremity SAR**

																$\overline{}$
						МЕ	EASURI	EMENT R	ESULTS							
FREQUE	NCY	Mode	Service	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	Spacing	Housing Type	Wristband Type	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.			Power [dBm]	rower [ubili]	Driit [ub]		туре	Туре	Number	Cycle		(W/kg)	racio	(W/kg)	
826.40	4132	UMTS 850	RMC	25.00	24.05	-0.04	0 mm	Aluminum	Sport	G36P6V0JKH	1:1	back	0.169	1.245	0.210	
826.40	4132	UMTS 850	RMC	25.00	24.05	-0.13	0 mm	Aluminum	Metal Links	G36P6V0JKH	1:1	back	0.249	1.245	0.310	A15
826.40	4132	UMTS 850	RMC	25.00	24.05	0.20	0 mm	Aluminum	Metal Loop	G36P6V0JKH	1:1	back	0.182	1.245	0.227	
		ANSI / IEEE	C95.1 1992 - S	AFETY LIMIT	•						Extre	mity				
			Spatial Peak							4	.0 W/kg	(mW/g)				
		Uncontrolled	Exposure/Gene	eral Populati	on					aver	aged ove	er 10 gra	ms			

**Table 10-16 UMTS 1750 MHz Extremity SAR** 

						ME	EASURI	EMENT R	ESULTS							
FREQUE	NCY	Mode	Service	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	Spacing	Housing	Wristband	Device Serial Number	Duty	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.			Power [dBm]	Power [dbiii]	Driit [db]		Type	Туре	Number	Cycle		(W/kg)	ractor	(W/kg)	
1712.40	1312	UMTS 1750	RMC	24.00	22.87	-0.17	0 mm	Aluminum	Sport	K62Y2KJGQX	1:1	back	0.056	1.297	0.073	A16
1712.40	1312	UMTS 1750	RMC	24.00	22.87	-0.05	0 mm	Aluminum	Metal Links	K62Y2KJGQX	1:1	back	0.022	1.297	0.029	
1712.40	1312	UMTS 1750	RMC	24.00	22.87	-0.19	0 mm	Aluminum	Metal Loop	K62Y2KJGQX	1:1	back	0.023	1.297	0.030	
		ANSI / IEEE	C95.1 1992 - S	AFETY LIMIT							Extre	mity				
			Spatial Peak							4	.0 W/kg	(mW/g)				
		Uncontrolled	Exposure/Gene	eral Populati	on					aver	aged ove	r 10 grai	ms			

## **Table 10-17 UMTS 1900 MHz Extremity SAR**

					Oiti	10 10	,00 II	II IZ L/	CII CIIIII	<i>y</i>						
						МЕ	EASURI	EMENT R	ESULTS							
FREQUE	ENCY	Mode	Service	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	Spacing	Housing Type	Wristband Type	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.			Power [dBm]	Fower [ubili]	Driit [ub]		Туре	Туре	Number	Cycle		(W/kg)	racioi	(W/kg)	
1907.60	9538	UMTS 1900	RMC	24.00	23.11	-0.05	0 mm	Aluminum	Sport	K9KGCL4D6V	1:1	back	0.064	1.227	0.079	A17
1907.60	9538	UMTS 1900	RMC	24.00	23.11	0.00	0 mm	Aluminum	Metal Links	K9KGCL4D6V	1:1	back	0.058	1.227	0.071	
1907.60	9538	UMTS 1900	RMC	24.00	23.11	-0.04	0 mm	Aluminum	Metal Loop	K9KGCL4D6V	1:1	back	0.062	1.227	0.076	
		ANSI / IEEE	C95.1 1992 - S	AFETY LIMIT							Extre	mity				
			Spatial Peak							4	.0 W/kg	(mW/g)				
		Uncontrolled	Exposure/Gene	eral Populati	on					aver	aged ove	er 10 gra	ms			

**Table 10-18** LTE Band 12 (Cell) Extremity Body SAR

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									ME	ASUREME	ENT RESULTS										
FRE	EQUENCY	,	Mode	Bandwidth	Wristband	Maximum Allowed	Conducted	Power	MPR [dB]	Housing	Device Serial	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling	Reported SAR (10g)	Plot #
MHz	C	h.		[MHz]	Type	Power [dBm]	Power [dBm]	Drift [dB]		Туре	Number							(W/kg)	Factor	(W/kg)	ı
707.50	23095	Mid	LTE Band 12	10	Sport	25.50	24.60	0.06	0	Aluminum	GDQCXHQJ49	QPSK	1	25	0 mm	back	1:1	0.229	1.230	0.282	
707.50	23095	Mid	LTE Band 12	10	Sport	24.50	23.62	-0.16	1	Aluminum	GDQCXHQJ49	QPSK	25	12	0 mm	back	1:1	0.185	1.225	0.227	
707.50	23095	Mid	LTE Band 12	10	Metal Links	25.50	24.60	-0.11	0	Aluminum	GDQCXHQJ49	QPSK	1	25	0 mm	back	1:1	0.354	1.230	0.435	A18
707.50	23095	Mid	LTE Band 12	10	Metal Links	24.50	23.62	0.08	1	Aluminum	GDQCXHQJ49	QPSK	25	12	0 mm	back	1:1	0.191	1.225	0.234	
707.50	23095	Mid	LTE Band 12	10	Metal Loop	25.50	24.60	-0.16	0	Aluminum	GDQCXHQJ49	QPSK	1	25	0 mm	back	1:1	0.224	1.230	0.276	
707.50	23095	Mid	LTE Band 12	10	Metal Loop	24.50	23.62	-0.10	1	Aluminum	GDQCXHQJ49	QPSK	25	12	0 mm	back	1:1	0.196	1.225	0.240	
			ANSI / IEEE	C95.1 1992	2 - SAFETY	LIMIT								E	xtremity						
				Spatial P	eak									4.0 V	//kg (mW/	(g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10 g	grams					

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## **Table 10-19** LTE Band 13 (Cell) Extremity Body SAR

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									ME	ASUREME	NT RESULTS										
FR	EQUENCY	,	Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing Type	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	C	h.		[WIT 12]	Type	Power [dBm]	rower [dbiii]	Dilit [GD]		Туре	Number							(W/kg)	ractor	(W/kg)	
782.00	23230	Mid	LTE Band 13	10	Sport	25.50	24.70	0.09	0	Aluminum	YLVVYX0MV3	QPSK	1	0	0 mm	back	1:1	0.269	1.202	0.323	
782.00	23230	Mid	LTE Band 13	10	Sport	24.50	23.61	0.05	1	Aluminum	YLVVYX0MV3	QPSK	25	25	0 mm	back	1:1	0.228	1.227	0.280	
782.00	23230	Mid	LTE Band 13	10	Metal Links	25.50	24.70	0.07	0	Aluminum	YLVVYX0MV3	QPSK	1	0	0 mm	back	1:1	0.400	1.202	0.481	A19
782.00	23230	Mid	LTE Band 13	10	Metal Links	24.50	23.61	-0.16	1	Aluminum	YLVVYX0MV3	QPSK	25	25	0 mm	back	1:1	0.265	1.227	0.325	
782.00	23230	Mid	LTE Band 13	10	Metal Loop	25.50	24.70	0.04	0	Aluminum	YLVVYX0MV3	QPSK	1	0	0 mm	back	1:1	0.349	1.202	0.419	
782.00	23230	Mid	LTE Band 13	10	Metal Loop	24.50	23.61	0.01	1	Aluminum	YLVVYX0MV3	QPSK	25	25	0 mm	back	1:1	0.283	1.227	0.347	
			ANSI / IEEE	C95.1 199	2 - SAFETY	LIMIT								Е	xtremity						
				Spatial P	eak									4.0 V	//kg (mW/	/g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10 ç	grams					

## **Table 10-20** LTE Band 14 (Cell) Extremity Body SAR

									MEAS	SUREME	NT RESULTS										
FR	EQUENCY		Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot#
MHz	Ch	١.		[WIFIZ]	Type	Power [dBm]	Power [dbin]	Drift [db]		Туре	Number							(W/kg)	ractor	(W/kg)	1
793.00	23330	Mid	LTE Band 14	10	Sport	25.50	24.50	0.09	0	Aluminum	K62Y2KJGQX	QPSK	1	25	0 mm	back	1:1	0.333	1.259	0.419	
793.00	23330	Mid	LTE Band 14	10	Sport	24.50	23.68	0.01	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.218	1.208	0.263	
793.00	23330	Mid	LTE Band 14	10	Metal Links	25.50	24.50	-0.12	0	Aluminum	K62Y2KJGQX	QPSK	1	25	0 mm	back	1:1	0.395	1.259	0.497	
793.00	23330	Mid	LTE Band 14	10	Metal Links	24.50	23.68	0.04	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.340	1.208	0.411	
793.00	23330	Mid	LTE Band 14	10	Metal Loop	25.50	24.50	0.05	0	Aluminum	K62Y2KJGQX	QPSK	1	25	0 mm	back	1:1	0.414	1.259	0.521	A20
793.00	23330	Mid	LTE Band 14	10	Metal Loop	24.50	23.68	0.03	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.280	1.208	0.338	
			ANSI / IEEE C	295.1 1992	- SAFETY I	IMIT								E	xtremity						
				Spatial Pea	ak				ĺ					4.0 W	//kg (mW	/g)					
			Uncontrolled E	xposure/G	eneral Pop	ulation								averaged	d over 10	grams					

## **Table 10-21** LTE Band 26 (Cell) Extremity Body SAR

									ME	ASUREME	NT RESULTS										
FRI	EQUENCY		Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing Type	Device Serial	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	CI	h.		[WITZ]	туре	Power [dBm]	Power (abili)	Driit (ab)		Туре	Number							(W/kg)	ractor	(W/kg)	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Sport	25.50	24.42	-0.04	0	Aluminum	K62Y2KJGQX	QPSK	1	49	0 mm	back	1:1	0.158	1.282	0.203	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Sport	24.50	23.52	-0.06	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.135	1.253	0.169	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Links	25.50	24.42	0.07	0	Aluminum	K62Y2KJGQX	QPSK	1	49	0 mm	back	1:1	0.235	1.282	0.301	A21
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Links	24.50	23.52	-0.06	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.174	1.253	0.218	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Loop	25.50	24.42	0.05	0	Aluminum	K62Y2KJGQX	QPSK	1	49	0 mm	back	1:1	0.209	1.282	0.268	
831.50	26865	Mid	LTE Band 26 (Cell)	10	Metal Loop	24.50	23.52	0.06	1	Aluminum	K62Y2KJGQX	QPSK	25	25	0 mm	back	1:1	0.156	1.253	0.195	
			ANSI / IEEE	C95.1 1992	2 - SAFETY	LIMIT								Е	xtremity						
				Spatial P	eak									4.0 V	//kg (mW	/g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10	grams					

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## **Table 10-22** LTE Band 5 (Cell) Extremity Body SAR

								Juliu	0 (0	, CII, E	- XUI CIIIIU	, 500	., -	<i>_</i>							
									ME	ASUREME	ENT RESULTS										
FRI	EQUENCY		Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing Type	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot#
MHz	C	١.		[IMI IZ]	Type	Power [dBm]	rower [dbiii]	Dilit [GD]		Туре	Number							(W/kg)	ractor	(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Sport	25.50	24.15	0.06	0	Aluminum	K62Y2KJGQX	QPSK	1	0	0 mm	back	1:1	0.162	1.365	0.221	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Sport	24.50	23.33	-0.13	1	Aluminum	K62Y2KJGQX	QPSK	25	12	0 mm	back	1:1	0.119	1.309	0.156	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Links	25.50	24.15	0.03	0	Aluminum	K62Y2KJGQX	QPSK	1	0	0 mm	back	1:1	0.227	1.365	0.310	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Links	24.50	23.33	-0.01	1	Aluminum	K62Y2KJGQX	QPSK	25	12	0 mm	back	1:1	0.158	1.309	0.207	
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Loop	25.50	24.15	0.03	0	Aluminum	K62Y2KJGQX	QPSK	1	0	0 mm	back	1:1	0.252	1.365	0.344	A22
836.50	20525	Mid	LTE Band 5 (Cell)	10	Metal Loop	24.50	23.33	0.02	1	Aluminum	K62Y2KJGQX	QPSK	25	12	0 mm	back	1:1	0.140	1.309	0.183	
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT													E	xtremity						
	Spatial Peak													4.0 V	//kg (mW/	(g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10 g	grams					

## **Table 10-23** LTE Band 66 (AWS) Extremity Body SAR

									ME	ASUREME	NT RESULTS										
FRE	QUENCY		Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing Type	Device Serial	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	CI	١.		[WITZ]	туре	Power [dBm]	rower [ubin]	Driit [ab]		туре	Number							(W/kg)	Pactor	(W/kg)	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Sport	24.50	22.83	0.05	0	Aluminum	GDQCXHQJ49	QPSK	1	0	0 mm	back	1:1	0.074	1.469	0.109	A23
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Sport	23.50	22.06	-0.04	1	Aluminum	GDQCXHQJ49	QPSK	50	0	0 mm	back	1:1	0.050	1.393	0.070	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Links	24.50	22.83	0.07	0	Aluminum	GDQCXHQJ49	QPSK	1	0	0 mm	back	1:1	0.026	1.469	0.038	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Links	23.50	22.06	-0.14	1	Aluminum	GDQCXHQJ49	QPSK	50	0	0 mm	back	1:1	0.022	1.393	0.031	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Loop	24.50	22.83	0.07	0	Aluminum	GDQCXHQJ49	QPSK	1	0	0 mm	back	1:1	0.045	1.469	0.066	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	Metal Loop	23.50	22.06	-0.11	1	Aluminum	GDQCXHQJ49	QPSK	50	0	0 mm	back	1:1	0.044	1.393	0.061	
			ANSI / IEEE	C95.1 1992	2 - SAFETY	LIMIT								E	xtremity						
				Spatial P	eak									4.0 V	V/kg (mW	/g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10	grams					

## **Table 10-24** LTE Band 25 (PCS) Extremity Body SAR

									ME	ASUREME	ENT RESULTS	;									
FRE	EQUENCY	′	Mode	Bandwidth [MHz]	Wristband Type	Maximum Allowed	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Housing Type	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot#
MHz	С	h.		[WITIZ]	туре	Power [dBm]	Power [dbill]	Driit [db]		туре	Number							(W/kg)	ractor	(W/kg)	
1905.00	26590	High	LTE Band 25 (PCS)	20	Sport	24.50	23.27	0.03	0	Aluminum	K62Y2KJGQX	QPSK	1	50	0 mm	back	1:1	0.067	1.327	0.089	
1905.00	26590	High	LTE Band 25 (PCS)	20	Sport	23.50	22.26	0.04	1	Aluminum	K62Y2KJGQX	QPSK	50	25	0 mm	back	1:1	0.038	1.330	0.051	
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Links	24.50	23.27	-0.09	0	Aluminum	K62Y2KJGQX	QPSK	1	50	0 mm	back	1:1	0.042	1.327	0.056	
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Links	23.50	22.26	-0.17	1	Aluminum	K62Y2KJGQX	QPSK	50	25	0 mm	back	1:1	0.024	1.330	0.032	
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Loop	24.50	23.27	0.09	0	Aluminum	K62Y2KJGQX	QPSK	1	50	0 mm	back	1:1	0.101	1.327	0.134	A24
1905.00	26590	High	LTE Band 25 (PCS)	20	Metal Loop	23.50	22.26	-0.08	1	Aluminum	K62Y2KJGQX	QPSK	50	25	0 mm	back	1:1	0.059	1.330	0.078	
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT													Е	xtremity						
				Spatial P	eak									4.0 V	//kg (mW	/g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10	grams					

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## **Table 10-25** LTE Band 7 Extremity Body SAR

											• <u> </u>										
									ME	ASUREME	ENT RESULTS										
FRE	EQUENCY	′	Mode	Bandwidth	Wristband	Maximum Allowed	Conducted	Power	MPR [dB]	Housing	Device Serial	Modulation	RR Size	RR Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling	Reported SAR (10g)	Plot#
MHz	С	h.		[MHz]	Type	Power [dBm]	Power [dBm]	Drift [dB]		Type	Number				Sp		, ,,,,,,	(W/kg)	Factor	(W/kg)	
2560.00	21350	High	LTE Band 7	20	Sport	24.00	23.15	-0.13	0	Aluminum	GDQCXHQJ49	QPSK	1	50	0 mm	back	1:1	0.041	1.216	0.050	
2560.00	21350	High	LTE Band 7	20	Sport	23.00	22.07	0.09	1	Aluminum	GDQCXHQJ49	QPSK	50	25	0 mm	back	1:1	0.036	1.239	0.045	
2560.00	21350	High	LTE Band 7	20	Metal Links	24.00	23.15	0.05	0	Aluminum	GDQCXHQJ49	QPSK	1	50	0 mm	back	1:1	0.103	1.216	0.125	A25
2560.00	21350	High	LTE Band 7	20	Metal Links	23.00	22.07	-0.09	1	Aluminum	GDQCXHQJ49	QPSK	50	25	0 mm	back	1:1	0.034	1.239	0.042	
2560.00	21350	High	LTE Band 7	20	Metal Loop	24.00	23.15	-0.15	0	Aluminum	GDQCXHQJ49	QPSK	1	50	0 mm	back	1:1	0.071	1.216	0.086	
2560.00	21350 High LTE Band 7 20 Metal Loop 23.00 22.07 (								1	Aluminum	GDQCXHQJ49	QPSK	50	25	0 mm	back	1:1	0.037	1.239	0.046	
			ANSI / IEEE	C95.1 199	2 - SAFETY	LIMIT					-			E	xtremity						
	Spatial Peak													4.0 V	//kg (mW/	(g)					
			Uncontrolled	Exposure/	General Po	pulation								average	d over 10 g	grams					

## **Table 10-26** LTE Band 41 Extremity Body SAR

	MEASUREMENT RESULTS																				
FRI	EQUENCY	′	Mode	Bandwidth	Wristband	Maximum Allowed	Conducted	Power	MPR [dB]	Housing	Device Serial	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling	Reported SAR (10g)	Plot#
MHz	С	h.		[MHz]	Type	Power [dBm]	Power [dBm]	Drift [dB]		Type	Number						.,,,,,	(W/kg)	Factor	(W/kg)	
2680.00	41490	High	LTE Band 41	20	Sport	24.00	23.12	0.02	0	Aluminum	Y367WNWK29	QPSK	1	50	0 mm	back	1:1.58	0.019	1.225	0.023	
2680.00	41490	High	LTE Band 41	20	Sport	23.00	22.04	-0.11	1	Aluminum	Y367WNWK29	QPSK	50	25	0 mm	back	1:1.58	0.016	1.247	0.020	
2680.00	41490	High	LTE Band 41	20	Metal Links	24.00	23.12	0.06	0	Aluminum	Y367WNWK29	QPSK	1	50	0 mm	back	1:1.58	0.022	1.225	0.027	
2680.00	41490	High	LTE Band 41	20	Metal Links	23.00	22.04	-0.03	1	Aluminum	Y367WNWK29	QPSK	50	25	0 mm	back	1:1.58	0.016	1.247	0.020	
2680.00	41490	High	LTE Band 41	20	Metal Loop	24.00	23.12	-0.07	0	Aluminum	Y367WNWK29	QPSK	1	50	0 mm	back	1:1.58	0.024	1.225	0.029	A26
2680.00	41490	High	LTE Band 41	20	Metal Loop	23.00	22.04	-0.07	1	Aluminum	Y367WNWK29	QPSK	50	25	0 mm	back	1:1.58	0.017	1.247	0.021	
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT												xtremity								
	Spatial Peak						4.0 W/kg (mW/g)														
	Uncontrolled Exposure/General Population						averaged over 10 grams														

## **Table 10-27** 2.4 GHz WLAN Extremity Body SAR

	MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power	Conducted Power	Power Drift [dB]	Spacing	Housing Type	Wristband Type	Device Serial Number	Data Rate	Side	Duty Cycle	SAR (10g)	Scaling Factor	Scaling Factor (Duty	Reported SAR (10g)	Plot#
MHz	Ch.			[IIII 12]	[dBm]	[ubiii]	[ub]		.,,,,,	Туре	Number	(Mbps)		(%)	(W/kg)	(Power)	Cycle)	(W/kg)	
2412	1	802.11b	DSSS	22	19.00	17.72	-0.09	0 mm	Aluminum	Sport	Y367WNWK29	1	back	99.7	0.022	1.343	1.003	0.030	
2412	1	802.11b	DSSS	22	19.00	17.72	-0.20	0 mm	Aluminum	Metal Links	Y367WNWK29	1	back	99.7	0.029	1.343	1.003	0.039	
2412	1	802.11b	DSSS	22	19.00	17.72	-0.03	0 mm	Aluminum	Metal Loop	Y367WNWK29	1	back	99.7	0.045	1.343	1.003	0.061	A27
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Extremity										
	Spatial Peak													kg (mW					
		Unc	ontrolled	Evnoeuro/Co	eneral Population	n.						21	hanera	over 10 a	arame				

## **Table 10-28 Bluetooth Extremity SAR**

	Bidetootii Extremity SAN																	
	MEASUREMENT RESULTS																	
FREQU		Mode	Service	Maximum Allowed	Conducted Power [dBm]		Spacing	Housing Type	Wristband Type	Device Serial Number	Data Rate	Side	Duty Cycle	SAR (10g)	Scaling Factor (Cond	Factor (Duty	Reported SAR (10g)	Plot #
MHz	Ch.			Power [dBm]	[	11		.,,,	.,,,-		(Mbps)		(%)	(W/kg)	Power)	Cycle)	(W/kg)	
2402	0	Bluetooth	FHSS	17.50	16.58	-0.06	0 mm	Aluminum	Sport	N324VKP91W	1	back	100	0.038	1.236	1.000	0.047	A28
2402	0	Bluetooth	FHSS	17.50	16.58	0.04	0 mm	Aluminum	Metal Links	N324VKP91W	1	back	100	0.023	1.236	1.000	0.028	
2402	0	Bluetooth	FHSS	17.50	16.58	0.05	0 mm	Aluminum	Metal Loop	N324VKP91W	1	back	100	0.011	1.236	1.000	0.014	
	ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Extremity										
	Spatial Peak							4.0 W/kg (mW/g)										
	Uncontrolled Exposure/General Population										ave	eraged o	ver 10 g	rams				

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### 10.3 SAR Test Notes

### General Notes:

- 1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 447498 D01v06.
- Batteries are fully charged at the beginning of the SAR measurements.
- 3. Liquid tissue depth was at least 15.0 cm for all frequencies.
- 4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
- 5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
- 6. Per FCC KDB Publication 865664 D01v01r04, variability SAR tests were required since measured SAR results for all frequency bands were less than 0.8 W/kg and 2.0 W/kg for 10g SAR.
- 7. This device has one housing type: Aluminum. The non-metallic wrist accessory, sport band, was evaluated for all exposure conditions. The available metallic wrist accessories, metal links band and metal loop band, were additionally evaluated.
- 8. This device is a portable wrist-worn device and does not support any other use conditions. Therefore, the procedures in FCC KDB Publication 447498 D01v06 Section 6.2 have been applied for extremity and next to mouth (head) conditions.
- 9. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.
- 10. The orange highlights throughout the report represent the highest scaled SAR per Equipment Class.

#### UMTS Notes:

- 1. UMTS mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
- 2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations and ≤ 2.0 W/kg for 10g SAR then testing at the other channels is not required for such test configuration(s).

### LTE Notes:

- 1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 7.5.4.
- 2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
- 3. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
- 4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations and > 1.5 W/kg for 10g SAR, testing at the other channels was required for such test configurations.
- TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
- 6. This device can only operate with 16 QAM on the uplink with less than or equal to 27 RB. QPSK and 16QAM LTE powers for RB size of 15 ("50% RB") and 27 ("100% RB") were additionally measured to support comparison and SAR test exclusion per KDB 941225 D05v02r04 Section 5.2.4 and 5.3.

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### WLAN Notes:

- 1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.6.2 for more information.
- 2. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.
- 3. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance.

#### **Bluetooth Notes**

1. To determine compliance, Bluetooth SAR was measured with the maximum power condition. Bluetooth was evaluated with a test mode with 100% transmission duty factor.

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## FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

### 11.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with builtin unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

### 11.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

## **Head SAR Simultaneous Transmission Analysis**

For SAR summation, the highest reported SAR across all housing and wristband types was used as a conservative evaluation for the simultaneous transmission analysis.

**Table 11-1** Simultaneous Transmission Scenario with 2.4 GHz WLAN (Head at 1.0 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
	UMTS 850	0.000	0.162	0.162
	UMTS 1750	0.353	0.162	0.515
	UMTS 1900	0.279	0.162	0.441
	LTE Band 12	0.000	0.162	0.162
	LTE Band 13	0.000	0.162	0.162
Head SAR	LTE Band 14	0.000	0.162	0.162
I lead SAN	LTE Band 26 (Cell)	0.000	0.162	0.162
	LTE Band 5 (Cell)	0.000	0.162	0.162
	LTE Band 66 (AWS)	0.360	0.162	0.522
	LTE Band 25 (PCS)	0.276	0.162	0.438
	LTE Band 7	0.985	0.162	1.147
	LTE Band 41	0.236	0.162	0.398

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**Table 11-2** Simultaneous Transmission Scenario with Bluetooth (Head at 1.0 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
	UMTS 850	0.000	0.120	0.120
	UMTS 1750	0.353	0.120	0.473
	UMTS 1900	0.279	0.120	0.399
	LTE Band 12	0.000	0.120	0.120
	LTE Band 13	0.000	0.120	0.120
Head SAR	LTE Band 14	0.000	0.120	0.120
I lead SAIX	LTE Band 26 (Cell)	0.000	0.120	0.120
	LTE Band 5 (Cell)	0.000	0.120	0.120
	LTE Band 66 (AWS)	0.360	0.120	0.480
	LTE Band 25 (PCS)	0.276	0.120	0.396
	LTE Band 7	0.985	0.120	1.105
	LTE Band 41	0.236	0.120	0.356

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# 11.4 Extremity SAR Simultaneous Transmission Analysis

For SAR summation, the highest reported SAR across all housing and wristband types was used as a conservative evaluation for the simultaneous transmission analysis.

> **Table 11-3** Simultaneous Transmission Scenario with 2.4 GHz WLAN (Extremity at 0.0 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
	UMTS 850	0.310	0.061	0.371
	UMTS 1750	0.073	0.061	0.134
	UMTS 1900	0.079	0.061	0.140
	LTE Band 12	0.435	0.061	0.496
	LTE Band 13	0.481	0.061	0.542
Extremity SAR	LTE Band 14	0.521	0.061	0.582
LAUGITHLY SAIN	LTE Band 26 (Cell)	0.301	0.061	0.362
	LTE Band 5 (Cell)	0.344	0.061	0.405
	LTE Band 66 (AWS)	0.109	0.061	0.170
	LTE Band 25 (PCS)	0.134	0.061	0.195
	LTE Band 7	0.125	0.061	0.186
	LTE Band 41	0.029	0.061	0.090

**Table 11-4** Simultaneous Transmission Scenario with Bluetooth (Extremity at 0.0 cm)

Exposure Condition	Mode	3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
	UMTS 850	0.310	0.047	0.357
	UMTS 1750	0.073	0.047	0.120
	UMTS 1900	0.079	0.047	0.126
	LTE Band 12	0.435	0.047	0.482
	LTE Band 13	0.481	0.047	0.528
Extremity SAR	LTE Band 14	0.521	0.047	0.568
Extremity SAR	LTE Band 26 (Cell)	0.301	0.047	0.348
	LTE Band 5 (Cell)	0.344	0.047	0.391
	LTE Band 66 (AWS)	0.109	0.047	0.156
	LTE Band 25 (PCS)	0.134	0.047	0.181
	LTE Band 7	0.125	0.047	0.172
	LTE Band 41	0.029	0.047	0.076

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## **Simultaneous Transmission Conclusion**

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06.

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## SAR MEASUREMENT VARIABILITY

#### 12.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
- Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
- 5) When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

**Table 12-1 Head SAR Measurement Variability Results** 

	HEAD VARIABILITY RESULTS												
Band	FREQUENCY Mode		Service	Side	Test Position	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio	
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2450	2510.00	20850	LTE Band 7, 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	Front	10 mm	0.808	0.716	1.13	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT			Head										
Spatial Peak				1.6 W/kg (mW/g)									
		Uncon	trolled Exposure/General Popu	lation				average	ed over 1	gram			

#### 12.2 **Measurement Uncertainty**

The measured SAR was <1.5 W/kg for 1g and <3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis was not required.

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## **EQUIPMENT LIST**

Aglient         R5515C         Wireless Communications Test Set         5/4/2021         Biennia           Aglient         N5182A         MKS Vector Signal Generator         1/12/2022         Annual           Aglient         E4438C         E56 Vector Signal Generator         1/18/2022         Annual           Aglient         E4438C         E56 Vector Signal Generator         3/24/2022         Annual           Applifier         E81         Applifier         CBT         N/A           Amplifier Research         155166         Amplifier         CBT         N/A           Annitsu         MA24106A         USB Power Sensor         3/28/2022         Annual           Anritsu         MA24106A         USB Power Sensor         3/28/2022         Annual           Anritsu         MA2411B         Pube Power Sensor         3/28/2022         Annual           Anritsu         MR821C         Radio Communication Analyzer MT8821C         5/2/2022         Annual           Anritsu         MR821C         Radio Communication Analyzer MT8821C         5/1/2022         Annual           Control Company         4040         Therm/Clock/Humidity Monitor         3/12/2021         Annual           Control Company         4040         Therm/Clock/Humidity Monitor         <	val C	Cal Due	Serial Number
Agilent	al 5	5/4/2023	GB41450275
Agilent         E4440A         PSA Series Spectrum Analyzer         3/22/2022         Annual           Agilent         E4438C         ESG Vector Signal Generator         3/24/2022         Annual           Amplifier Research         155166         Amplifier         CBT         N/A           Amplifier Research         155166         Amplifier         CBT         N/A           Anrissu         MA24106A         USB Power Sensor         3/28/2022         Annual           Anrissu         MA24106A         USB Power Sensor         3/28/2022         Annual           Anrissu         MT8800A         Radio Communication Test Station         4/15/2022         Annual           Anrissu         MT8821C         Radio Communication Analyzer MT8821C         5/2/2022         Annual           Anrissu         MT8821C         Radio Communication Analyzer MT8821C         5/2/2022         Annual           Control Company         4040         Therm./Clock/Humidity Monitor         1/21/2022         Annual           Control Company         4933         Long Stem Thermometer         10/28/2020         Blennia           Control Company         4935         Long Stem Thermometer         10/28/2020         Blennia           Montral Control Company         4935         Long	1 1/	/12/2023	MY47420837
Aglient         E4438C         E5G Vector Signal Generator         3/24/2022         Annual           Amplifier Research         155166         Amplifier         CBT         N/A           Amplifier Research         155166         Amplifier         CBT         N/A           Annitsu         MA24106A         USB Power Sensor         3/28/2022         Annual           Anritsu         MA24118         Pulse Power Sensor         3/28/2022         Annual           Anritsu         MT8000A         Radio Communication Station         415/2022         Annual           Anritsu         MT8821C         Radio Communication Analyzer MT8821C         5/2/2022         Annual           Anritsu         MT8821C         Radio Communication Analyzer MT8821C         5/12/2022         Annual           Control Company         4040         Therm./Clock/Humidity Monitor         1/2/2022         Annual           Control Company         4353         Long Stem Thermometer         10/28/2020         Blennia           Control Company         4353         Long Stem Thermometer         10/28/2020         Blennia           Control Company         4353         Long Stem Thermometer         10/28/2020         Blennia           Control Company         4553         Retwork Analyzer<	l 1/	/18/2023	MY42081752
Ampilifier Research	I 3/	3/22/2023	MY46186272
Amplifier Research	I 3/	3/24/2023	MY45093678
Annitsu   MA24106A   USB Power Sensor   3/28/2022   Annual Annitsu   MA24106A   USB Power Sensor   3/28/2022   Annual Annitsu   MA24118   Pulse Power Sensor   3/28/2022   Annual Annitsu   MA24118   Pulse Power Sensor   3/28/2022   Annual Annitsu   MI8000A   Radio Communication Test Station   4/15/2022   Annual Annitsu   MI8821C   Radio Communication Analyzer MT8821C   5/21/2022   Annual Annitsu   MI8821C   Radio Communication Analyzer MT8821C   5/21/2022   Annual Annitsu   MI8821C   Radio Communication Analyzer MT8821C   5/11/2022   Annual Annitsu   MI8821C   Radio Communication Analyzer MT8821C   5/11/2022   Annual Control Company   4040   Therm./Clock/Humidity Monitor   1/21/2022   Annual Control Company   4353   Long Stem Thermometer   10/28/2020   Blennia   Control Company   4353   Long Stem Thermometer   10/28/2020   Blennia   Control Company   4353   Long Stem Thermometer   10/28/2020   Blennia   Insize   1108-150   Digital Caliper   4/5/2022   Blennia   Resign Technologies   A7/87059   De Power Supply   CBT   N/A   Keysight Technologies   E4438C   VECTOR SIGNAL GENERATOR   10/15/2021   Annual   MCL   BW-N10W5+   3dB Attenuator   CBT   N/A   MCL   BW-N10W5+   3dB Attenuator   CBT   N/A   MIni-Circuits   NLP-1200+   Low Pass Filter   CBT   N/A   Mini-Circuits   NLP-1200+   Low Pass Filter   CBT   N/A   Mini-Circuits   NLP-2950+   NLP-2950+   NLP-2950+   NLP-2950+   NLP-2950+   N		CBT	343972
Anritsu   MA24106A   USB Power Sensor   3/28/2022   Annual Anritsu   MA2411B   Pulse Power Sensor   3/28/2022   Annual Anritsu   MT8000A   Radio Communication Test Station   4/15/2022   Annual Anritsu   MT8021C   Radio Communication Analyzer MT8821C   5/2/2022   Annual Anritsu   MT8821C   Radio Communication Analyzer MT8821C   5/12/2022   Annual Anritsu   MT8821C   Radio Communication Analyzer MT8821C   5/12/2022   Annual Control Company   4040   Therm./Clock/Humidity Monitor   1/21/2021   Annual Control Company   4040   Therm./Clock/Humidity Monitor   1/21/2021   Annual Control Company   4040   Therm./Clock/Humidity Monitor   1/21/2021   Annual Control Company   4353   Long Stem Thermometer   10/28/2020   Biennia   MEWETT PACKARD   8735E   Network Analyzer   12/30/2021   Biennia   MEWETT PACKARD   8735E   Network Analyzer   12/30/2021   Annual Insize   1108-150   Digital Caliper   4/5/2022   Biennia   MCL   BW-N50W5+   Digital Caliper   4/5/2022   Biennia   MCL   BW-N10W5+   Digital Caliper   4/5/2022   Biennia   MCL   BW-N10W5+   10dB Attenuator   CBT   N/A   MCL   BW-N10W5+   3dB Attenuator   CBT   N/A   MCL   BW-N10W5+   3dB Attenuator   CBT   N/A   MINI-Circuits   NIP-1000+   Low Pass Filter   CBT   N/A   MINI-Circuits   NIP-1200+   Low Pass Filter   CBT   N/A   MINI-Circuits   NIP-2950+   Low Pass Filter   CBT   N/A		CBT	343971
Annitsu	I 3/	3/28/2023	1520503
Anritsu	I 3/	3/28/2023	1520501
Anritsu         MT8821C         Radio Communication Analyzer MT8821C         5/2/2022         Annual Anritsu           Anritsu         MT8821C         Radio Communication Analyzer MT8821C         5/11/2022         Annual Control Company         4040         Therm./Clock/Humidity Monitor         1/21/2021         Binnia Control Company         4040         Therm./Clock/Humidity Monitor         3/12/2021         Biennia Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia Control Company         4550202         Biennia Control Control Control Control Control Control Control Control Control Control Control Control Control Control Control Con	I 3/	3/28/2023	1339007
Anritsu	I 4/	/15/2023	6272337439
Control Company         4040         Therm./Clock/Humidity Monitor         1/21/2022         Annual Control Company         4040         Therm./Clock/Humidity Monitor         3/21/2021         Annual Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia Stem Thermometer         11/28/2020         Biennia Stem Thermometer         11/28/2020         Biennia Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Annual Stem Thermometer         12/30/2021         Benature Thermometer         12/30/2021         Benature Thermometer         12/20/2021         Annual Stem Thermometer         12/28/2020         Biennia Stem Thermometer         12/28/2020         Biennia Stem Thermometer         12/28/2020         Biennia Stem Thermometer         12/28/2020         Biennia Stem Thermometer         12/28/2021         Biennia Stem Thermometer         12/28/2021         Biennia Stem Thermometer         12/28/2021         Annual Stem Thermometer         12/28/2021         Annual Stem Thermometer         42/20/	.1 5	5/2/2023	6200901190
Control Company         4040         Therm./Clock/Humidity Monitor         3/12/2021         Biennia           Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia           Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia           Control Company         4353         Long Stem Thermometer         110/28/2020         Biennia           HEWLETT PACKARD         8753E         Network Analyzer         11/23/2021         Annual           Insize         1108-150         Digital Caliper         4/5/2022         Blennia           Keysight Technologies         AT/N6705B         DC Power Supply         CBT         N/A           MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N10W5+         3dB Attenuator         CBT         N/A           MCL         BW-N5W5+         6dB Attenuator         CBT         N/A           MINI-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A <t< td=""><td>.I 5/</td><td>/11/2023</td><td>6262044715</td></t<>	.I 5/	/11/2023	6262044715
Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia           Control Company         4353         Long Stem Thermometer         10/28/2020         Biennia           IEWLETT PECKARD         8753E         Network Analyzer         12/20/2021         Annual           Insize         1108-150         Digital Caliper         4/5/2022         Biennia           Keysight Technologies         AT/N6705B         DC Power Supply         CBT         N/A           Keysight Technologies         E4438C         VECTOR SIGNAL GENERATOR         10/15/2021         Annual           MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N10W5+         3dB Attenuator         CBT         N/A           MCL         BW-N6W5+         6dB Attenuator         CBT         N/A           Mini-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Rohde & Sch	I 1/	/21/2023	160574418
Control Company	al 3/	3/12/2023	210202100
HEWLETT PACKARD	al 10	0/28/2022	200670633
Insize	al 10	0/28/2022	200670623
Keysight Technologies         AT/N6705B         DC Power Supply         CBT         N/A           Keysight Technologies         E4438C         VECTOR SIGNAL GENERATOR         10/15/2021         Annual           MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N3W5+         3dB Attenuator         CBT         N/A           MCL         BW-N6W5+         6dB Attenuator         CBT         N/A           MICL         BW-N6W5+         6dB Attenuator         CBT         N/A           Min-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Min-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Min-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A           Min-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Min-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW	1 12	2/30/2022	US38161081
Keysight Technologies         AT/N6705B         DC Power Supply         CBT         N/A           Keysight Technologies         E4438C         VECTOR SIGNAL GENERATOR         10/15/2021         Annual           MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N3W5+         3dB Attenuator         CBT         N/A           MCL         BW-N6W5+         6dB Attenuator         CBT         N/A           MICL         BW-N6W5+         6dB Attenuator         CBT         N/A           Min-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Min-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Min-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A           Min-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Min-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW	ıl 4	4/5/2023	409193536
MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N3W5+         3dB Attenuator         CBT         N/A           MCL         BW-N8W5+         6dB Attenuator         CBT         N/A           Mini-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950-         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-5+         S0-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022		CBT	MY53001315
MCL         BW-N10W5+         10dB Attenuator         CBT         N/A           MCL         BW-N3W5+         3dB Attenuator         CBT         N/A           MCL         BW-N8W5+         6dB Attenuator         CBT         N/A           Mini-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950-         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-5+         S0-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022	1 10	0/15/2022	MY45092078
MCL         BW-N6WS+         6dB Attenuator         CBT         N/A           Mini-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-S+         50-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         11/12/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideb		CBT	1611
Mini-Circuits         NLP-1000+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950-         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-5+         S0-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz		CBT	1812
Mini-Circuits         NLP-1200+         Low Pass Filter         CBT         N/A           Mini-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber+ Suhner         742-0-0-21         Torque Wrench         4/6/2022         Biennia           SPEAG         DAKS-3.5 <td< td=""><td></td><td>CBT</td><td>1311</td></td<>		CBT	1311
Mini-Circuits         NLP-2950+         Low Pass Filter         CBT         N/A           Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-S+         SO-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Bobas         SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual     <		CBT	N/A
Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-S+         50-6000MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           SPEAG         DAKS-3.5         Portable Dok         10/12/2022         Annual		CBT	N/A
Mini-Circuits         VLF-6000+         Low Pass Filter         CBT         N/A           Mini-Circuits         ZHDC-16-63-5+         50-600MHz Bidirectional Coupler         CBT         N/A           Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/12/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber + Suhner         742-0-0-21         Torque Wrench         4/6/2022         Biennia           SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPE		CBT	N/A
Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Bread         Annual         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer		CBT	N/A
Rohde & Schwarz         NRX         Power Meter         11/22/2021         Annual           Rohde & Schwarz         SMB100A03         Signal Generator         10/11/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Bread         Annual         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer		CBT	N/A
Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber + Suhner         742-0-0-21         Torque Wrench         4/6/2022         Blennia           SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2 <td>11</td> <td>1/22/2022</td> <td>102583</td>	11	1/22/2022	102583
Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         12/22/2021         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         1/11/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber + Suhner         742-0-0-21         Torque Wrench         4/6/2022         Blennia           SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2 <td>1 10</td> <td>0/11/2022</td> <td>182899</td>	1 10	0/11/2022	182899
Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber + Suhner         742-0-0-21         Torque Wrench         4/6/2022         Blennia           SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         0750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         0750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR D	1 12	2/22/2022	106578
Rohde & Schwarz         CMW500         Wideband Radio Communication Tester         4/14/2022         Annual           Huber + Suhner         74Z-0-0-21         Torque Wrench         4/6/2022         Biennia           SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Ormi-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Biennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022	1 1/	/11/2023	101699
Huber + Suhner	1 4/	/14/2023	167284
SPEAG         DAKS-3.5         Portable DAK         10/7/2021         Annual           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Biennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1900V2         1900 MHz SAR Dipole         5/11/2022         Annual	1 4/	/14/2023	167285
SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1900V2         1900 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         An	al 4	4/6/2024	84378
SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1900V2         1900 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         An	10	.0/7/2022	1045
SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         MAIIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Blennia           SPEAG         D1900V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2500V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual		CBT	1324
SPEAG         MAIA         Modulation and Audio Interference Analyzer         CBT         N/A           SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Biennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Biennia           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Biennia           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1900V2         1900 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2500V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG		CBT	1260
SPEAG         Antenna         Omni-Directional Ultra-Wideband Antenna         CBT         N/A           SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Blennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Blennia           SPEAG         D1750V2         1750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1900V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4		CBT	1237
SPEAG         D750V3         750 MHz SAR Dipole         9/8/2021         Biennia           SPEAG         D750V3         750 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Biennia           SPEAG         D1900V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/2/2/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe		CBT	1309
SPEAG         D750V3         750 MHz SAR Dipole         \$/16/2022         Annual           SPEAG         D835V2         835 MHz SAR Dipole         \$/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         \$/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         \$/9/2020         Blennia           SPEAG         D1900V2         1900 MHz SAR Dipole         \$/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         \$/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         \$/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         \$/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         \$/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         \$/11/6/2021         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe	al 9	9/8/2022	1097
SPEAG         D835V2         835 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Blennia           SPEAG         D1750V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022 <td></td> <td>/16/2023</td> <td>1057</td>		/16/2023	1057
SPEAG         D1750V2         1750 MHz SAR Dipole         5/10/2022         Annual           SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Blennia           SPEAG         D1900V2         1990 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         DASDV4         SAR Probe         3/21/2022		/16/2023	4d040
SPEAG         D1750V2         1750 MHz SAR Dipole         9/9/2020         Biennia           SPEAG         D1900V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         DAS4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics		5/10/2023	1083
SPEAG         D1900V2         1900 MHz SAR Dipole         5/16/2022         Annual           SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		9/9/2022	1104
SPEAG         D2450V2         2450 MHz SAR Dipole         5/11/2022         Annual           SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAS4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		6/16/2023	5d030
SPEAG         D2600V2         2600 MHz SAR Dipole         5/11/2022         Annual           SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		5/11/2023	750
SPEAG         EX3DV4         SAR Probe         5/18/2022         Annual           SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAS4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		5/11/2023	1042
SPEAG         EX3DV4         SAR Probe         11/16/2021         Annual           SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		5/18/2023	7416
SPEAG         EX3DV4         SAR Probe         4/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		1/16/2022	7639
SPEAG         EX3DV4         SAR Probe         3/22/2022         Annual           SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		1/22/2023	7532
SPEAG         EX3DV4         SAR Probe         3/21/2022         Annual           SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		3/22/2023	7421
SPEAG         EX3DV4         SAR Probe         2/21/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		3/21/2023	7360
SPEAG         DAE4         Dasy Data Acquisition Electronics         5/16/2022         Annual           SPEAG         DAE4         Dasy Data Acquisition Electronics         11/11/2021         Annual		2/21/2023	7308
SPEAG DAE4 Dasy Data Acquisition Electronics 11/11/2021 Annual		5/16/2023	701
		1/11/2022	1646
SPEAG DAE4 Dasy Data Acquisition Electronics 4/13/2022 Annual		1/11/2022	501
SPEAG DAE4 Dasy Data Acquisition Electronics 4/13/2022 Annual SPEAG DAE4 Dasy Data Acquisition Electronics 2/24/2022 Annual		2/24/2023	467
SPEAG DAE4 Dasy Data Acquisition Electronics 2/24/2022 Annual SPEAG DAE4 Dasy Data Acquisition Electronics 3/21/2022 Annual		3/21/2023	534
SPEAG DAE4 Dasy Data Acquisition Electronics 3/21/2022 Annual SPEAG DAE5 Dasy Data Acquisition Electronics 3/22/2022 Annual		3/21/2023	604

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements. Each equipment item was used solely within its respective calibration period.

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# MEASUREMENT UNCERTAINTIES

а	b	С	d	e=	f	g	h =	i =	k
				f(d,k)			c x f/e	cxg/e	
	IEEE	Tol.	Prob.		C <sub>i</sub>	C <sub>i</sub>	1gm	10gms	
Uncertainty Component	1528 Sec.	(± %)	Dist.	Div.	1gm	10 gms	u <sub>i</sub>	u <sub>i</sub>	V <sub>i</sub>
	Sec.	(= /-/	- 14.		. 3		(± %)	(± %)	- 1
Measurement System			,			•	, ,		•
Probe Calibration	E2.1	7	N	1	1	1	7.0	7.0	∞
Axial Isotropy	E2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.732	1	1	1.2	1.2	∞
Linearity	E2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E2.4	0.25	R	1.732	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.732	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E5	4	R	1.732	1	1	2.3	2.3	8
Test Sample Related									
Test Sample Positioning	E4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E2.9	5	R	1.732	1	1	2.9	2.9	∞
SAR Scaling	E6.5	0	R	1.732	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E3.4	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E3.4	0.6	R	1.732	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)							12.2	12.0	191
Expanded Uncertainty k=2								24.0	
(95% CONFIDENCE LEVEL)								1	1

The above measurement uncertainties are according to I  $\boxplus$  Std. 1528-2013

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## CONCLUSION

#### 15.1 **Measurement Conclusion**

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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