RF Exposure Evaluation

1 Measuring Standard

KDB 680106 RF Exposure Wireless Charging Apps v03r01

2 Requirements

According to the item 5 of KDB 680106 v03r01:

Inductive wireless power transfer applications that meet all of the following requirements are excluded from submitting an RF exposure evaluation.

(1) Power transfer frequency is less than 1MHz.
This device meet the requirements.

(2) Output power from each primary coil is less than or equal to 15 watts.
This device Output power 3 watts, meet the requirements.

(3) The system may consist of more than one source primary coils, charging one or more clients. If more than one primary coil is present, the coil pairs may be powered on at the same time.
This device only charging one clients, meet the requirements.

(4) Client device is placed directly in contact with the transmitter.
This device meet the requirements.

(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
Can be used as a fixed device or as a portable device

(6) The aggregate H-field strengths anywhere at or beyond 15 cm surrounding the device, and 20 cm away from the surface from all coils that by design can simultaneously transmit, and while those coils are simultaneously energized, are demonstrated to be less than 50% of the applicable MPE limit.

After measuring the product the Max H-field Strength is meet the requirements

Limits

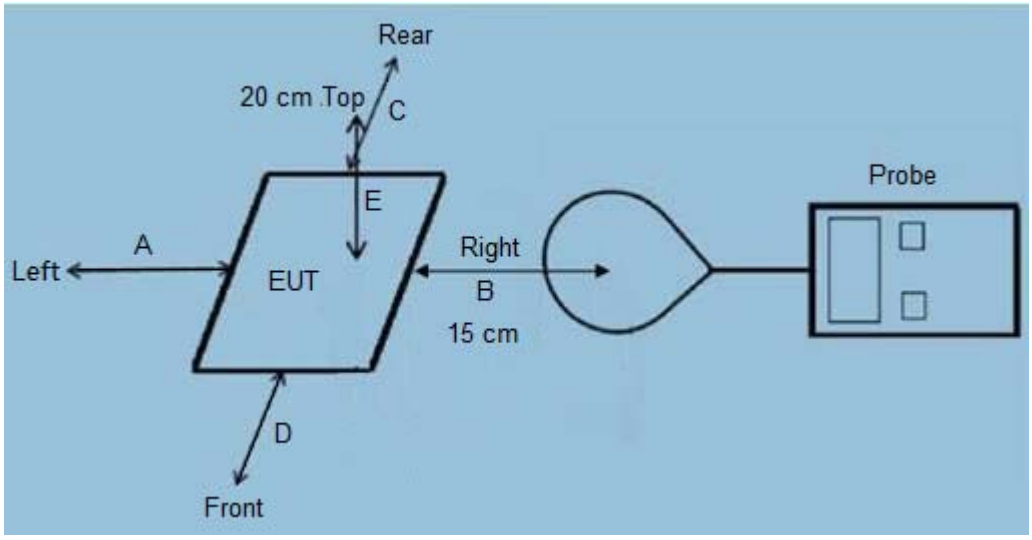
The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*($900/f^2$)	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

F=frequency in MHz
*=Plane-wave equivalent power density
RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

3 Test Setup



4 Test Procedure

1) The RF exposure test was performed in anechoic chamber.

2) The measurement probe was placed at test distance (0/2/4/6/8/10/12/14/16/18/20 cm from all sides) which is between the edge of the charger and the geometric center of probe.

3) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.

4) The EUT was measured according to the dictates of KDB 680106 D01v03.

Remark：The EUT's test position A, B, C, D and E is valid for the H field measurements.

5 Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

Test Mode	Description	
Mode 1	Input 5V+Wireless charging(3w)	Record
Mode 2	Battery+Wireless charging(3w)	Record
Mode 3	Test the EUT in idle mode.	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

6 Test Instruments list

Test Equipment	Manufacturer	Model No.	SN.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
Exposure Level Tester	Narda	ELT-400	M-0155/M-0170	2021.08.30	2022.08.29
Magnetic field probe 100cm^2	Narda	ELT probe 100cm^2	M0675	2021.08.30	2022.08.29

7 Test Result

Charging and communication mode:

H-Field Strength at 0-20 cm from the edges surrounding the EUT

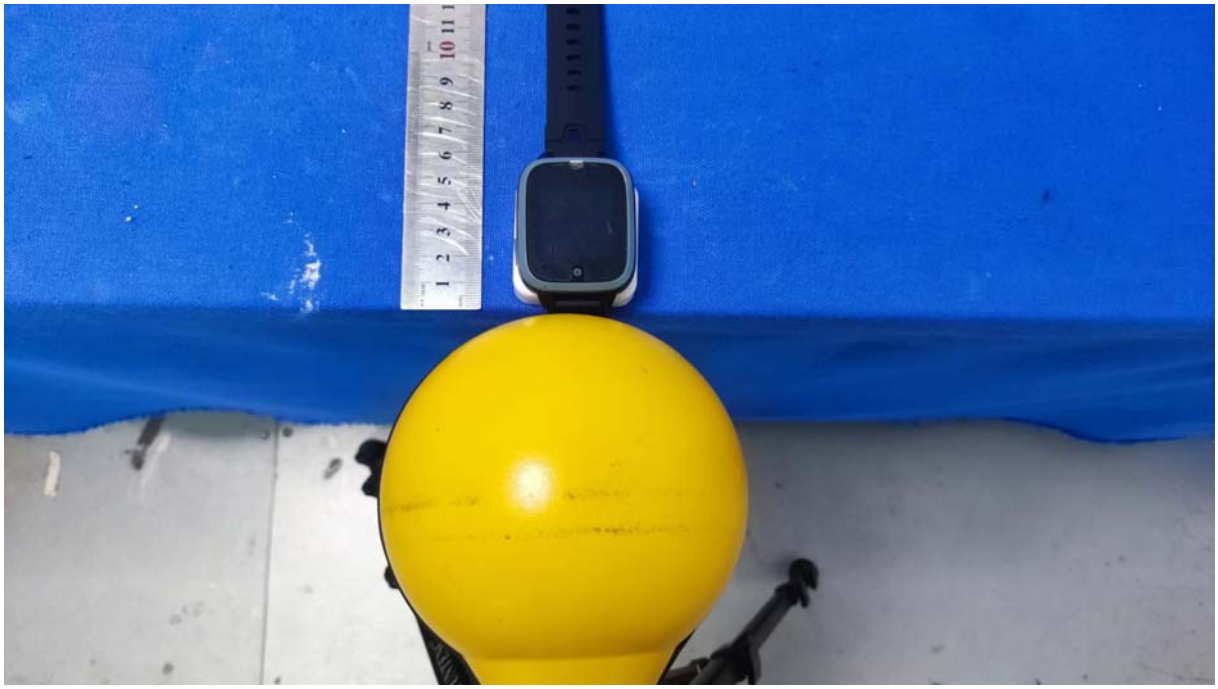
Test Conditions	Unit	Measured Distance (cm)	Measured H-Field Strength Values (A/m)						FCC H-Field Strength (A/m)	
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E	Test Position F	Limits	50% Limits
TM1	uT	0	0.401	0.464	0.456	0.563	0.630	0.647	--	--
	A/m		0.321	0.372	0.365	0.451	0.504	0.518	1.63	0.815
	uT	2	0.379	0.446	0.409	0.516	0.579	0.628	--	--
	A/m		0.303	0.357	0.327	0.412	0.463	0.502	1.63	0.815
	uT	4	0.359	0.426	0.388	0.495	0.559	0.607	--	--
	A/m		0.287	0.340	0.311	0.396	0.447	0.486	1.63	0.815
	uT	6	0.340	0.383	0.356	0.463	0.528	0.589	--	--
	A/m		0.272	0.306	0.285	0.370	0.422	0.471	1.63	0.815
	uT	8	0.339	0.382	0.355	0.462	0.527	0.589	--	--
	A/m		0.271	0.306	0.284	0.370	0.422	0.471	1.63	0.815
	uT	10	0.321	0.354	0.335	0.442	0.484	0.546	--	--
	A/m		0.257	0.283	0.268	0.354	0.387	0.437	1.63	0.815
	uT	12	0.273	0.306	0.288	0.395	0.436	0.498	--	--
	A/m		0.219	0.245	0.230	0.316	0.349	0.399	1.63	0.815
	uT	14	0.231	0.291	0.237	0.343	0.380	0.470	--	--
	A/m		0.184	0.233	0.189	0.275	0.304	0.376	1.63	0.815
	uT	16	0.198	0.259	0.204	0.311	0.348	0.438	--	--
	A/m		0.159	0.207	0.163	0.249	0.278	0.350	1.63	0.815
	uT	18	0.170	0.201	0.173	0.280	0.339	0.423	--	--
	A/m		0.136	0.161	0.139	0.224	0.271	0.338	1.63	0.815
	uT	20	0.150	0.181	0.153	0.260	0.319	0.403	--	--
	A/m		0.120	0.145	0.123	0.208	0.255	0.322	1.63	0.815

TM2	uT	0	0.441	0.435	0.414	0.480	0.574	0.564	--	--
	A/m		0.353	0.348	0.331	0.384	0.459	0.451	1.63	0.815
	uT	2	0.437	0.430	0.409	0.476	0.569	0.559	--	--
	A/m		0.349	0.344	0.327	0.380	0.455	0.447	1.63	0.815
	uT	4	0.401	0.424	0.377	0.444	0.540	0.500	--	--
	A/m		0.321	0.339	0.302	0.355	0.432	0.400	1.63	0.815
	uT	6	0.390	0.413	0.366	0.432	0.528	0.489	--	--
	A/m		0.312	0.330	0.293	0.346	0.423	0.391	1.63	0.815
	uT	8	0.331	0.354	0.359	0.425	0.513	0.483	--	--
	A/m		0.265	0.284	0.287	0.340	0.410	0.386	1.63	0.815
	uT	10	0.314	0.337	0.342	0.408	0.496	0.466	--	--
	A/m		0.251	0.270	0.273	0.327	0.397	0.373	1.63	0.815
	uT	12	0.308	0.294	0.309	0.376	0.473	0.407	--	--
	A/m		0.246	0.235	0.247	0.301	0.378	0.326	1.63	0.815
	uT	14	0.276	0.262	0.278	0.344	0.441	0.376	--	--
	A/m		0.221	0.210	0.222	0.275	0.353	0.301	1.63	0.815
	uT	16	0.218	0.203	0.249	0.315	0.388	0.332	--	--
	A/m		0.175	0.162	0.199	0.252	0.310	0.266	1.63	0.815
	uT	18	0.211	0.196	0.242	0.308	0.381	0.325	--	--
	A/m		0.169	0.156	0.193	0.246	0.305	0.260	1.63	0.815
	uT	20	0.167	0.195	0.226	0.293	0.328	0.266	--	--
	A/m		0.134	0.156	0.181	0.234	0.262	0.212	1.63	0.815

Note:A/m=uT/1.25

8 Test Setup Photos of the EUT

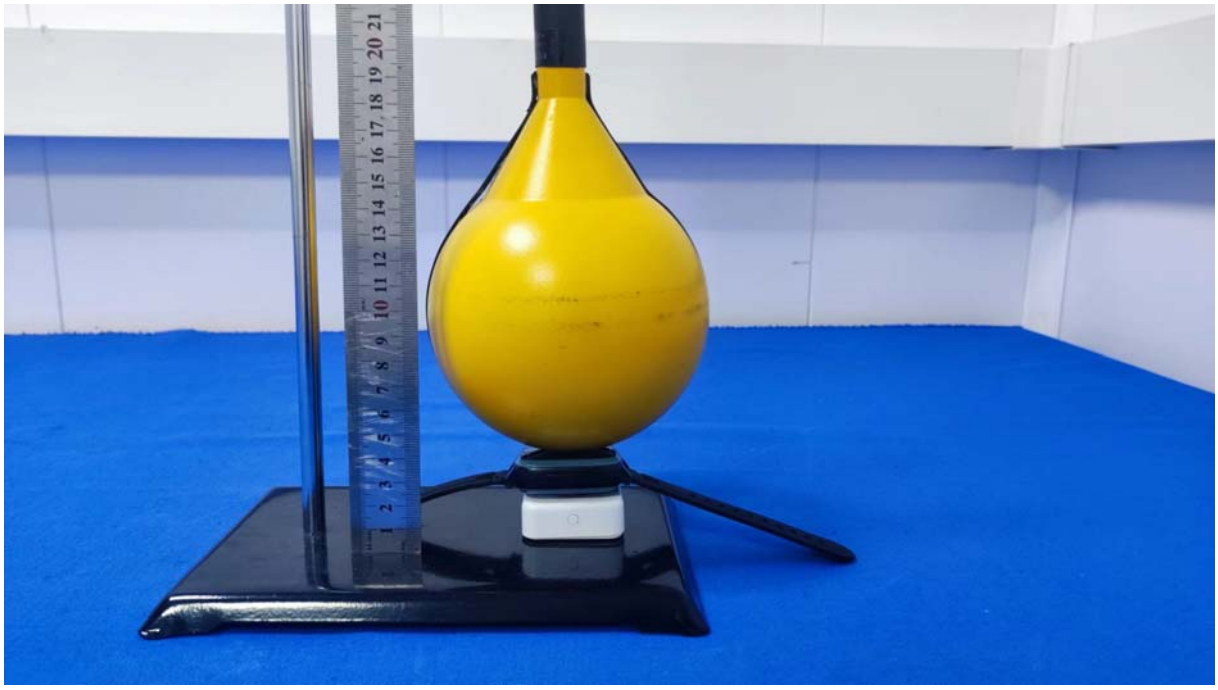
Test Position A-0cm from the edge of EUT to the geometric center of the probe



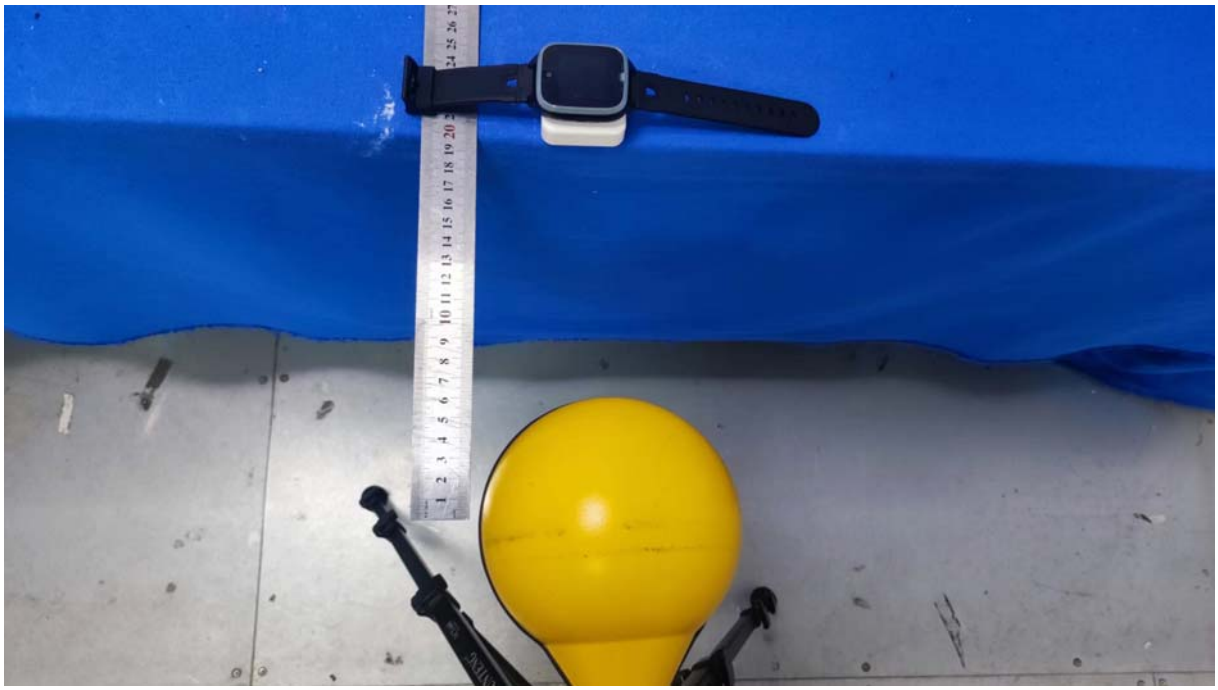
Test Position B-0cm from the edge of EUT to the geometric center of the probe

Test Position C-0cm from the edge of EUT to the geometric center of the probe

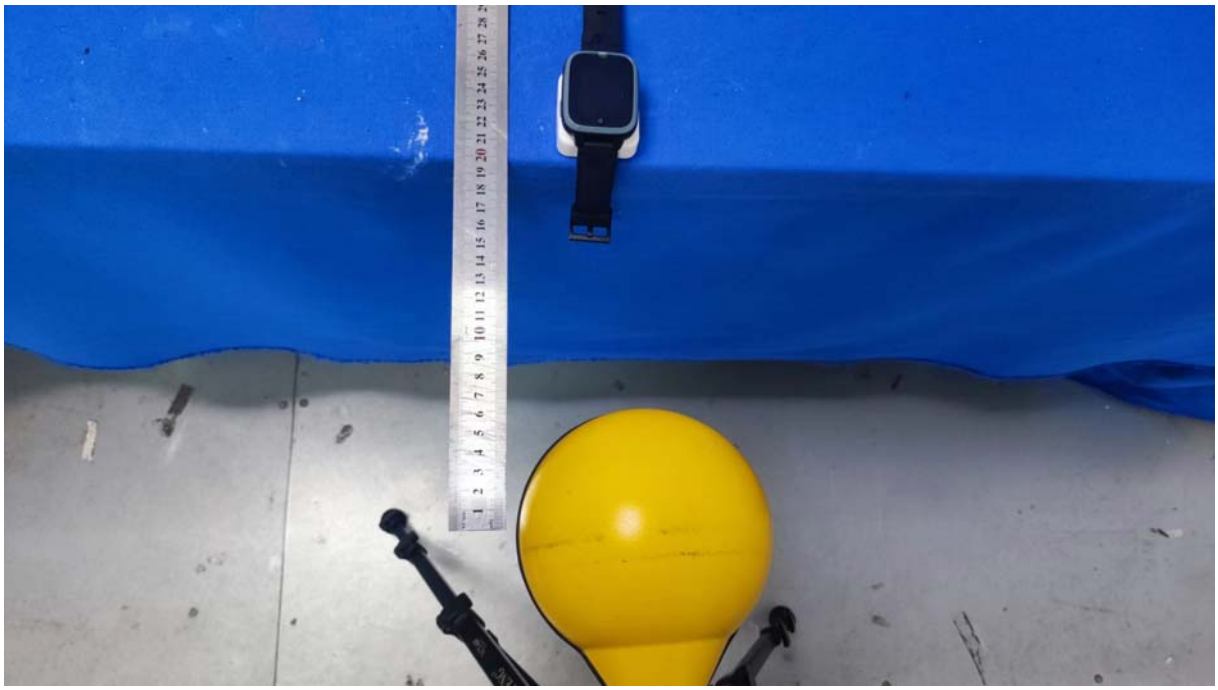
Test Position D-0cm from the edge of EUT to the geometric center of the probe



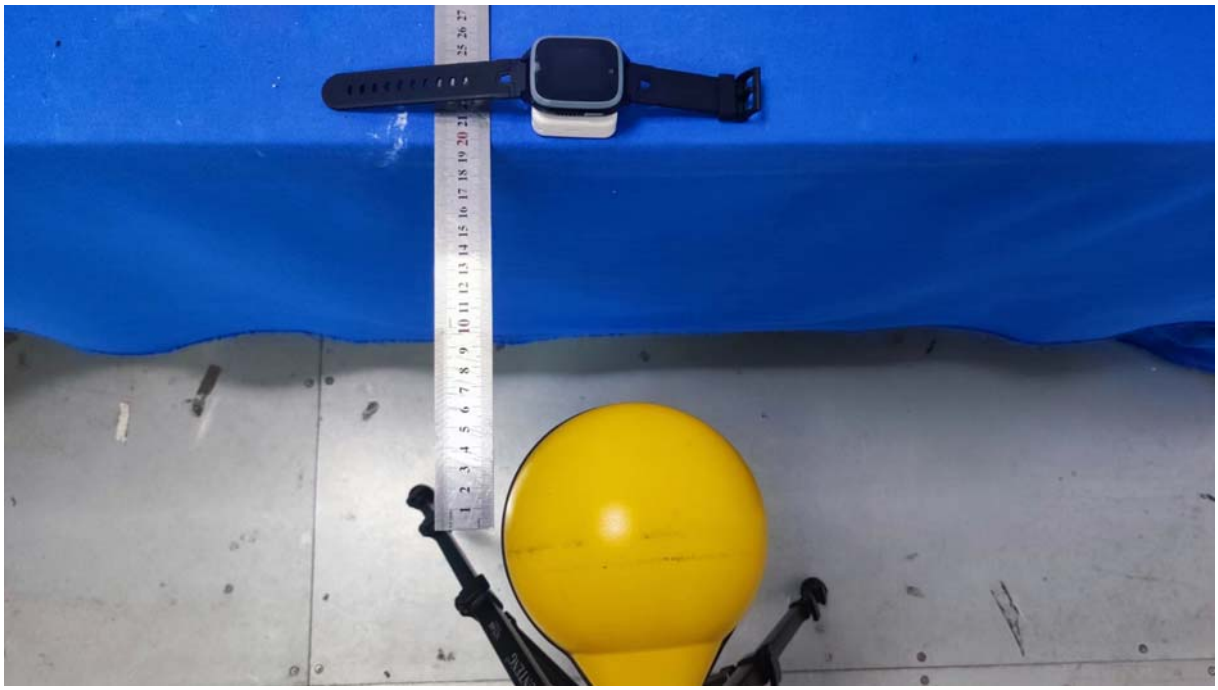
Test Position E-0cm from the edge of EUT to the geometric center of the probe



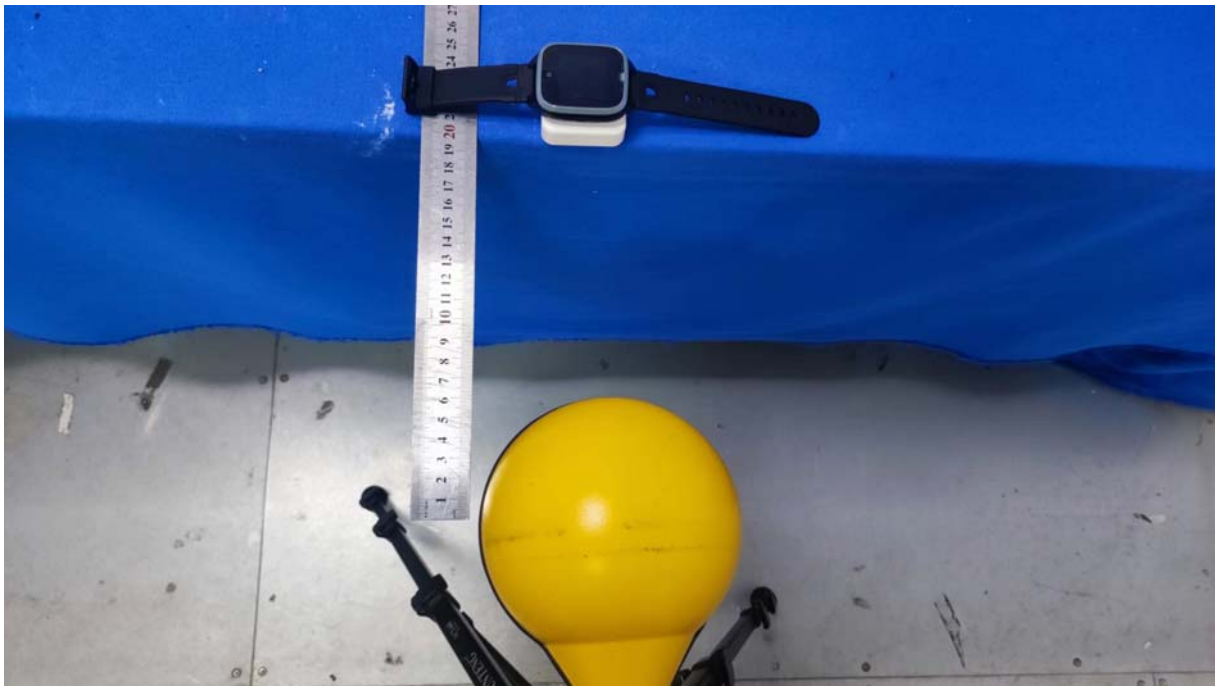
Test Position A-20cm from the edge of EUT to the geometric center of the probe



Test Position B-20cm from the edge of EUT to the geometric center of the probe



Test Position C-20cm from the edge of EUT to the geometric center of the probe



Test Position D-20cm from the edge of EUT to the geometric center of the probe

Test Position E-20cm from the edge of EUT to the geometric center of the probe

** End of report **