

NBIOT Band 13

Modulation	Sub-carrier Spacing (KHz)	RB offset	Channel	Channel	Channel
			23181	23230	23279
BPSK	3.75	1@0	20.57	20.50	20.34
		1@47	20.43	20.36	20.20
	15	1@0	20.66	20.51	20.47
		1@11	20.57	20.42	20.37
QPSK	3.75	1@0	20.37	20.37	20.61
		1@47	20.26	20.32	20.54
	15	1@0	20.51	20.57	20.70
		1@11	20.47	20.49	20.59
	15	12@0	19.10	19.13	19.41

NBIOT Band 25

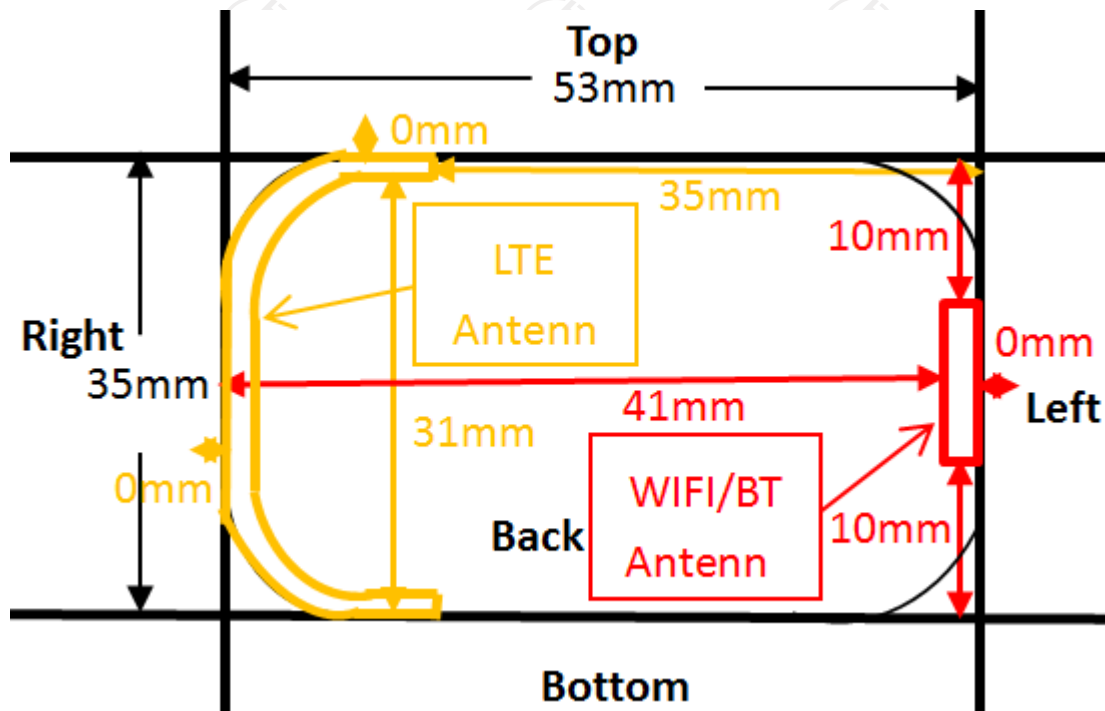
Modulation	Sub-carrier Spacing (KHz)	RB offset	Channel	Channel	Channel
			26041	26365	26689
BPSK	3.75	1@0	19.64	19.04	18.09
		1@47	19.52	18.85	17.90
	15	1@0	19.98	19.32	18.37
		1@11	19.91	19.24	18.31
QPSK	3.75	1@0	19.67	19.26	18.13
		1@47	19.55	19.14	18.00
	15	1@0	19.91	19.35	18.73
		1@11	19.82	19.26	18.70
	15	12@0	18.52	18.02	17.17

NBIOT Band 66

Modulation	Sub-carrier Spacing (KHz)	RB offset	Channel	Channel	Channel
			131973	132322	132671
BPSK	3.75	1@0	19.75	19.73	19.70
		1@47	19.62	19.51	19.56
	15	1@0	19.36	19.78	20.09
		1@11	19.34	19.70	20.01
QPSK	3.75	1@0	19.22	19.76	19.59
		1@47	19.08	19.66	19.31
	15	1@0	19.37	19.72	20.07
		1@11	19.33	19.75	19.92
	15	12@0	18.07	18.46	18.51

9. Exposure Position Consideration

9.1. EUT Antenna Location



9.2. Test Position Consideration

Test Positions						
Mode	Back	Front	Top Side	Bottom Side	Right Side	Left Side
eMTC/NB IoT	Yes	Yes	Yes	Yes	Yes	No
WIFI/BT	Yes	Yes	Yes	Yes	No	Yes

Note:

1. KDB 447498 D01v06, particular DUT edges were not required to be evaluated for SAR if the antenna-to-edge distance is greater than 2.5cm.

10. SAR Test Results Summary

10.1. NBloT Body-Worn 1g SAR Data

Band	Mode	Test Position with 0mm	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/kg)
2.4G	802.11b	Back	1	2412	14.54	15.00	4.01	0.20	1.112	0.22	1.6
		Front	1	2412	14.54	15.00	1.24	0.10	1.112	0.11	
		Left	1	2412	14.54	15.00	2.90	0.04	1.112	0.04	
		Bottom	1	2412	14.54	15.00	-1.98	0.03	1.112	0.03	
		Top	1	2412	14.54	15.00	-4.67	0.02	1.112	0.02	

Band	Mode	Test Position with 10mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)
NBloT Band 2	QPSK (15KHz)	Back	18900	1880	1	0	20.57	21.00	-1.33	0.24	1.104	0.26
					1	11	20.50	21.00	1.04	0.22	1.122	0.25
		Front	18900	1880	1	0	20.57	21.00	1.01	0.12	1.104	0.13
					1	11	20.50	21.00	-1.30	0.11	1.122	0.12
		Right	18900	1880	1	0	20.57	21.00	2.14	0.03	1.104	0.03
					1	11	20.50	21.00	-0.66	0.02	1.122	0.02
		Bottom	18900	1880	1	0	20.57	21.00	2.61	0.05	1.104	0.06
					1	11	20.50	21.00	-2.55	0.04	1.122	0.04
		Top	18900	1880	1	0	20.57	21.00	3.65	0.03	1.104	0.03
					1	11	20.50	21.00	-1.40	0.02	1.122	0.02
NBloT Band 4	QPSK (15KHz)	Back	20399	1754.9	1	0	20.19	20.50	1.54	0.34	1.074	0.37
					1	11	20.09	20.50	-0.24	0.32	1.099	0.35
		Front	20399	1754.9	1	0	20.19	20.50	3.46	0.17	1.074	0.18
					1	11	20.09	20.50	1.24	0.15	1.099	0.16
		Right	20399	1754.9	1	0	20.19	20.50	2.61	0.06	1.074	0.06
					1	11	20.09	20.50	-2.12	0.05	1.099	0.05
		Bottom	20399	1754.9	1	0	20.19	20.50	-3.01	0.02	1.074	0.02
					1	11	20.09	20.50	-2.40	0.01	1.099	0.01
		Top	20399	1754.9	1	0	20.19	20.50	3.61	0.03	1.074	0.03
					1	11	20.09	20.50	-1.21	0.02	1.099	0.02

NBloT Band 5	QPSK (15KHz)	Back	20401	824.1	1	0	20.74	21.00	1.61	0.11	1.062	0.12
					1	11	20.63	21.00	0.67	0.10	1.089	0.11
		Front	20401	824.1	1	0	20.74	21.00	-1.00	0.06	1.062	0.06
					1	11	20.63	21.00	-2.60	0.05	1.089	0.05
		Right	20401	824.1	1	0	20.74	21.00	2.22	0.03	1.062	0.03
					1	11	20.63	21.00	-3.51	0.02	1.089	0.02
		Bottom	20401	824.1	1	0	20.74	21.00	-3.60	0.03	1.062	0.03
					1	11	20.63	21.00	-3.40	0.02	1.089	0.02
		Top	20401	824.1	1	0	20.74	21.00	2.11	0.02	1.062	0.02
					1	11	20.63	21.00	2.10	0.01	1.089	0.01
NBloT Band 12	QPSK (15KHz)	Back	23011	699.1	1	0	20.50	21.00	2.34	0.16	1.122	0.18
					1	11	20.46	20.50	1.59	0.12	1.009	0.12
		Front	23011	699.1	1	0	20.50	21.00	1.29	0.08	1.122	0.09
					1	11	20.46	20.50	-1.49	0.06	1.009	0.06
		Right	23011	699.1	1	0	20.50	21.00	2.64	0.05	1.122	0.06
					1	11	20.46	20.50	-2.61	0.04	1.009	0.04
		Bottom	23011	699.1	1	0	20.50	21.00	0.36	0.02	1.122	0.02
					1	11	20.46	20.50	-0.62	0.01	1.009	0.01
		Top	23011	699.1	1	0	20.50	21.00	2.14	0.03	1.122	0.03
					1	11	20.46	20.50	2.10	0.02	1.009	0.02
NBloT Band 13	QPSK (15KHz)	Back	23279	786.9	1	0	20.70	21.00	0.17	0.07	1.072	0.08
					1	11	20.59	21.00	0.21	0.05	1.099	0.05
		Front	23279	786.9	1	0	20.70	21.00	2.17	0.04	1.072	0.04
					1	11	20.59	21.00	-1.62	0.03	1.099	0.03
		Right	23279	786.9	1	0	20.70	21.00	2.51	0.02	1.072	0.02
					1	11	20.59	21.00	-2.60	0.01	1.099	0.01
		Bottom	23279	786.9	1	0	20.70	21.00	4.02	0.02	1.072	0.02
					1	11	20.59	21.00	-4.11	0.01	1.099	0.01
		Top	23279	786.9	1	0	20.70	21.00	-2.69	0.02	1.072	0.02
					1	11	20.59	21.00	-2.31	0.01	1.099	0.01

NB-IoT Band 25	QPSK (15KHz)	Back	26041	1850.1	1	0	19.91	20.00	0.66	0.42	1.021	0.43
					1	11	19.82	20.00	-1.06	0.40	1.042	0.42
		Front	26041	1850.1	1	0	19.91	20.00	-1.32	0.21	1.021	0.21
					1	11	19.82	20.00	2.06	0.20	1.042	0.21
		Right	26041	1850.1	1	0	19.91	20.00	-4.12	0.08	1.021	0.08
					1	11	19.82	20.00	4.09	0.07	1.042	0.07
		Bottom	26041	1850.1	1	0	19.91	20.00	2.07	0.04	1.021	0.04
					1	11	19.82	20.00	3.12	0.03	1.042	0.03
		Top	26041	1850.1	1	0	19.91	20.00	3.34	0.02	1.021	0.02
					1	11	19.82	20.00	-2.61	0.01	1.042	0.01
NB-IoT Band 66	QPSK (15KHz)	Back	13267 1	179.9	1	0	20.07	20.50	-1.21	0.31	1.104	0.34
					1	11	19.92	20.00	0.37	0.28	1.019	0.29
		Front	13267 1	179.9	1	0	20.07	20.50	-1.30	0.16	1.104	0.18
					1	11	19.92	20.00	3.34	0.14	1.019	0.14
		Right	13267 1	179.9	1	0	20.07	20.50	-3.01	0.06	1.104	0.07
					1	11	19.92	20.00	4.06	0.05	1.019	0.05
		Bottom	13267 1	179.9	1	0	20.07	20.50	1.20	0.02	1.104	0.02
					1	11	19.92	20.00	-3.12	0.01	1.019	0.01
		Top	13267 1	179.9	1	0	20.07	20.50	2.05	0.03	1.104	0.03
					1	11	19.92	20.00	-1.06	0.02	1.019	0.02

Note:

1. Per KDB 447498 D01 v06, for each exposure position, if the highest output power channel Reported SAR $\leq 0.8\text{W/kg}$, other channels SAR testing is not necessary.
2. Per KDB 447498 D01 v06, the report SAR is measured SAR value adjusted for maximum tune-up tolerance. Scaling Factor = $10^{[(\text{tune-up limit power(dBm)} - \text{Ave.power power (dBm)})/10]}$, where tune-up limit is the maximum rated power among all production units.
Reported SAR(W/kg) = Measured SAR (W/kg) * Scaling Factor.
3. Per KDB865664D01 v01r04 perform a second repeated measurement only the ratio of largest to smallest SAR for the original and first repeated measurement is >1.20 or when the original or repeated measurement is $\geq 1.45\text{W/kg}$.
4. Perform a second measurement only if the original, first and second repeated measurement is $\geq 1.5\text{W/kg}$ and the ratio of largest to smallest SAR for the original, first and second repeated measurement is >1.20 .

10.2. eMTC Body-Worn 1g SAR Data

Band	Mode	Test Position with 0mm	CH.	Freq. (MHz)	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)	Limit (W/Kg)
2.4G	802.11b	Back	11	2437	14.54	15.00	4.01	0.20	1.112	0.22	1.6
		Front	11	2437	14.54	15.00	1.24	0.10	1.112	0.11	
		Left	11	2437	14.54	15.00	2.90	0.04	1.112	0.04	
		Bottom	11	2437	14.54	15.00	-1.98	0.03	1.112	0.03	
		Top	11	2437	14.54	15.00	-4.67	0.02	1.112	0.02	

Band	Mode	Test Position with 0mm	CH.	Freq. (MHz)	RB allocation	RB offset	Ave. Power (dBm)	Tune-Up Limit (dBm)	Power Drift (%)	Meas. SAR1g (W/kg)	Scaling Factor	Reported SAR1g (W/kg)
EMTC Band 2	QPSK (20MHz)	Back	18700	1860	1	0	20.17	20.50	-2.55	0.48	1.079	0.52
					6	0	20.08	20.50	0.16	0.46	1.102	0.51
		Front	18700	1860	1	0	20.17	20.50	1.31	0.24	1.079	0.26
					6	0	20.08	20.50	2.12	0.23	1.102	0.25
		Right	18700	1860	6	0	20.17	20.50	-1.64	0.09	1.079	0.10
					1	0	20.08	20.50	2.66	0.08	1.102	0.09
		Bottom	18700	1860	6	0	20.17	20.50	-0.91	0.07	1.079	0.08
					1	0	20.08	20.50	2.95	0.06	1.102	0.07
		Top	18700	1860	6	0	20.17	20.50	2.26	0.05	1.079	0.05
					1	0	20.08	20.50	-2.39	0.04	1.102	0.04
EMTC Band 4	QPSK (20MHz)	Back	20050	1720	1	0	20.32	20.50	0.91	0.57	1.042	0.59
					6	0	20.19	20.50	1.14	0.55	1.074	0.59
		Front	20050	1720	1	0	20.32	20.50	2.14	0.36	1.042	0.38
					6	0	20.19	20.50	3.01	0.34	1.074	0.37
		Right	20050	1720	1	0	20.32	20.50	-1.60	0.10	1.042	0.10
					6	0	20.19	20.50	-2.12	0.08	1.074	0.09
		Bottom	20050	1720	1	0	20.32	20.50	2.16	0.07	1.042	0.07
					6	0	20.19	20.50	-3.04	0.06	1.074	0.06
		Top	20050	1720	1	0	20.32	20.50	2.30	0.05	1.042	0.05
					6	0	20.19	20.50	1.29	0.04	1.074	0.04

EMTC Band 5	QPSK (10MHz)	Back	20525	836.5	1	0	20.41	20.50	-1.19	0.23	1.021	0.23
					4	0	20.53	21.00	-1.31	0.21	1.114	0.23
		Front	20525	836.5	1	0	20.41	20.50	1.39	0.12	1.021	0.12
					4	0	20.53	21.00	0.38	0.11	1.114	0.12
		Right	20525	836.5	1	0	20.41	20.50	-0.66	0.04	1.021	0.04
					4	0	20.53	21.00	2.04	0.03	1.114	0.03
		Bottom	20525	836.5	1	0	20.41	20.50	-1.64	0.02	1.021	0.02
					4	0	20.53	21.00	2.43	0.01	1.114	0.01
		Top	20525	836.5	1	0	20.41	20.50	0.52	0.03	1.021	0.03
					4	0	20.53	21.00	-2.68	0.02	1.114	0.02
EMTC Band 12	QPSK (10MHz)	Back	23060	704	1	0	20.21	20.50	0.06	0.38	1.069	0.41
					4	0	20.23	20.50	-1.11	0.36	1.064	0.38
		Front	23060	704	1	0	20.21	20.50	2.11	0.14	1.069	0.15
					4	0	20.23	20.50	2.00	0.12	1.064	0.13
		Right	23060	704	1	0	20.21	20.50	-1.30	0.06	1.069	0.06
					4	0	20.23	20.50	0.45	0.05	1.064	0.05
		Bottom	23060	704	1	0	20.21	20.50	-3.33	0.03	1.069	0.03
					4	0	20.23	20.50	-2.70	0.02	1.064	0.02
		Top	23060	704	1	0	20.21	20.50	1.62	0.02	1.069	0.02
					4	0	20.23	20.50	1.06	0.01	1.064	0.01
EMTC Band 13	QPSK (10MHz)	Back	23230	782	1	0	20.11	20.50	-0.65	0.14	1.094	0.15
					4	0	19.84	20.00	0.20	0.12	1.038	0.12
		Front	23230	782	1	0	20.11	20.50	3.30	0.07	1.094	0.08
					4	0	19.84	20.00	-1.61	0.06	1.038	0.06
		Right	23230	782	1	0	20.11	20.50	-2.64	0.05	1.094	0.05
					4	0	19.84	20.00	0.63	0.04	1.038	0.04
		Bottom	23230	782	1	0	20.11	20.50	-2.65	0.04	1.094	0.04
					4	0	19.84	20.00	3.69	0.03	1.038	0.03
		Top	23230	782	1	0	20.11	20.50	3.65	0.02	1.094	0.02
					4	0	19.84	20.00	2.09	0.01	1.038	0.01

EMTC Band 25	QPSK (20MHz)	Back	26590	19.05	1	0	19.73	20.00	-0.27	0.71	1.064	0.76
					4	0	19.81	20.00	1.16	0.68	1.045	0.71
		Front	26590	19.05	1	0	19.73	20.00	3.49	0.46	1.064	0.49
					4	0	19.81	20.00	-3.66	0.45	1.045	0.47
		Right	26590	19.05	1	0	19.73	20.00	2.90	0.11	1.064	0.12
					4	0	19.81	20.00	2.14	0.10	1.045	0.10
		Bottom	26590	19.05	1	0	19.73	20.00	2.34	0.03	1.064	0.03
					4	0	19.81	20.00	-0.61	0.02	1.045	0.02
		Top	26590	19.05	1	0	19.73	20.00	2.64	0.02	1.064	0.02
					4	0	19.81	20.00	1.30	0.01	1.045	0.01
EMTC Band 66	QPSK (20MHz)	Back	132072	1720	1	0	19.90	20.00	1.29	0.52	1.023	0.53
					6	0	19.81	20.00	0.11	0.50	1.045	0.52
		Front	132072	1720	1	0	19.90	20.00	-0.37	0.27	1.023	0.28
					6	0	19.81	20.00	0.63	0.25	1.045	0.26
		Right	132072	1720	1	0	19.90	20.00	1.11	0.09	1.023	0.09
					6	0	19.81	20.00	-1.14	0.08	1.045	0.08
		Bottom	132072	1720	1	0	19.90	20.00	1.61	0.06	1.023	0.06
					6	0	19.81	20.00	-3.55	0.05	1.045	0.05
		Top	132072	1720	1	0	19.90	20.00	-4.02	0.03	1.023	0.03
					6	0	19.81	20.00	4.13	0.02	1.045	0.02

Note:

1. Per KDB 447498 D01 v06, for each exposure position, if the highest output power channel Reported SAR $\leq 0.8\text{W/kg}$, other channels SAR testing is not necessary.
2. Per KDB 447498 D01 v06, the report SAR is measured SAR value adjusted for maximum tune-up tolerance. Scaling Factor = $10^{[(\text{tune-up limit power(dBm)} - \text{Ave. power (dBm)})/10]}$, where tune-up limit is the maximum rated power among all production units.
Reported SAR(W/kg) = Measured SAR (W/kg) * Scaling Factor.
3. Per KDB865664D01 v01r04 perform a second repeated measurement only the ratio of largest to smallest SAR for the original and first repeated measurement is >1.20 or when the original or repeated measurement is $\geq 1.45\text{W/kg}$.
4. Perform a second measurement only if the original, first and second repeated measurement is $\geq 1.5\text{W/kg}$ and the ratio of largest to smallest SAR for the original, first and second repeated measurement is >1.20 .

10.3. Simultaneous Transmission Conclusion

Multi-Band Simultaneous Transmission Considerations

According to FCC KDB Publication 447498 D01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown in below Figure and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Simultaneous Transmission Paths

Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01, the following equation must be used to estimate the standalone 1g SAR and 10g extremity SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5(18.75)} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Head	Body -worn
		Test Distance (mm)	5	5
BLE	1.50	Estimated SAR (W/kg)	/	0.02

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.
2. $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x]$ W/kg for test separation distances ≤ 5 mm; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
3. Next to the mouth exposure requires 1-g SAR, and the wrist-worn condition requires 10-g extremity SAR.

Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

NO.	Configuration	Head	Body-Worn	Hotspot
1.	EMTC +WIFI(2.4)	NO	YES	NO
2	EMTC +BLE	NO	YES	NO
3	NB-IoT +WIFI(2.4)	NO	YES	NO
4	NB-IoT+BLE	NO	YES	NO

10.4. SAR Simultaneous Transmission Analysis

Band	Test Position	RB allocation	Scaled			Σ SAR (W/kg)	SPLSR	Remark
			Body-Worn	WIFI 2.4G	Bluetooth			
NB-IoT Band 2 QPSK (15KHz)	Back	1	0.26	0.22	0.02	0.48	N/A	N/A
		1	0.25	0.22	0.02	0.47	N/A	N/A
NB-IoT Band 4 QPSK (15KHz)	Back	1	0.37	0.22	0.02	0.59	N/A	N/A
		1	0.35	0.22	0.02	0.57	N/A	N/A
NB-IoT Band 5 QPSK (15KHz)	Back	1	0.12	0.22	0.02	0.34	N/A	N/A
		1	0.11	0.22	0.02	0.33	N/A	N/A
NB-IoT Band 12 QPSK (15KHz)	Back	1	0.18	0.22	0.02	0.40	N/A	N/A
		1	0.12	0.22	0.02	0.34	N/A	N/A
NB-IoT Band 13 QPSK (15KHz)	Back	1	0.08	0.22	0.02	0.30	N/A	N/A
		1	0.05	0.22	0.02	0.27	N/A	N/A
NB-IoT Band 25 QPSK (15KHz)	Back	1	0.43	0.22	0.02	0.65	N/A	N/A
		1	0.42	0.22	0.02	0.64	N/A	N/A
NB-IoT Band 66 QPSK (15KHz)	Back	1	0.34	0.22	0.02	0.56	N/A	N/A
		1	0.29	0.22	0.02	0.51	N/A	N/A

Band	Test Position	RB allocation	Scaled			Σ SAR (W/kg)	SPLSR	Remark
			Body-Worn	WIFI 2.4G	Bluetooth			
EMTC Band 2 QPSK (20MHz)	Back	1	0.52	0.22	0.02	0.74	N/A	N/A
		6	0.51	0.22	0.02	0.73	N/A	N/A
EMTC Band 4 QPSK (20MHz)	Back	1	0.59	0.22	0.02	0.81	N/A	N/A
		6	0.59	0.22	0.02	0.81	N/A	N/A
EMTC Band 5 QPSK (10MHz)	Back	1	0.23	0.22	0.02	0.45	N/A	N/A
		4	0.23	0.22	0.02	0.45	N/A	N/A
EMTC Band 12 QPSK (10MHz)	Back	1	0.41	0.22	0.02	0.63	N/A	N/A
		4	0.38	0.22	0.02	0.60	N/A	N/A
EMTC Band 13 QPSK (10MHz)	Back	1	0.15	0.22	0.02	0.37	N/A	N/A
		4	0.12	0.22	0.02	0.34	N/A	N/A
EMTC Band 25 QPSK (20MHz)	Back	1	0.76	0.22	0.02	0.98	N/A	N/A
		4	0.71	0.22	0.02	0.93	N/A	N/A
EMTC Band 66 QPSK (20MHz)	Back	1	0.53	0.22	0.02	0.75	N/A	N/A
		6	0.52	0.22	0.02	0.74	N/A	N/A

Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the 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 measured volumetric simultaneous SAR summation is not required per FCC KDB Publication 447498 D01

10.5. Measurement Uncertainty (450MHz-3GHz)

UNCERTAINTY EVALUATION FOR HEADSET SAR									
Uncertainty Component	Description	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. 1g(%)	Std. Unc. 10g(%)	v
Measurement system									
Probe calibration	7.2.1	5.8	N	1	1	1	5.8	5.8	∞
Axial isotropy	7.2.1.1	3.5	R	$\sqrt{3}$	$(1-C_p)^{1/2}$	$(1-C_p)^{1/2}$	1.43	1.43	∞
Hemispherical isotropy	7.2.1.1	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effects	7.2.1.4	1.00	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	7.2.1.2	4.70	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	7.2.1.2	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	7.2.1.3	3	N	1	1	1	3.00	3.00	∞
Readout Electronics	7.2.1.5	0.5	N	1	1	1	0.50	0.50	∞
Response Time	7.2.1.6	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	7.2.1.7	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflection	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned mechanical Tolerance	7.2.2.1	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	7.2.2.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation interpolation and integration algorithms for Max.SAR evaluation	7.2.4	2.3	R	1	1	1	1.33	1.33	∞
Test sample related									
Test sample positioning	7.2.2.4.4	2.6	N	1	1	1	2.60	2.60	∞
Device holder uncertainty	7.2.2.4.2 7.2.2.4.3	3	N	1	1	1	3.00	3.00	∞
output power variation-SAR drift measurement	7.2.3.6	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
SAR scaling	7.2.5	2	R	$\sqrt{3}$	1	1	1.15	1.15	∞
Phantom and tissue parameters									
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
uncertainty in SAR correction for deviation (in permittivity and conductivity)	7.2.6	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity -measurement uncertainty	7.2.3.3	4	N	1	0.23	0.26	0.92	1.04	∞
Liquid permittivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement uncertainty	7.2.3.4	5	N	1	0.23	0.26	1.15	1.30	∞
Combined standard uncertainty			RSS				10.83	10.54	
Expanded uncertainty (95%CONFIDENCEINTERVAL)			k				21.26	21.08	

UNCERTAINTY FOR PERFORMANCE CHECK

Uncertainty Component	Description	Uncertainty Value(%)	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. 1g(%)	Std. Unc. 10g(%)	v
Measurement system									
Probe calibration	7.2.1	5.8	N	1	1	1	5.8	5.8	∞
Axial isotropy	7.2.1.1	3.5	R	$\sqrt{3}$	$(1-C_p)^{1/2}$	$(1-C_p)^{1/2}$	1.43	1.43	∞
Hemispherical isotropy	7.2.1.1	5.9	R	$\sqrt{3}$	$\sqrt{C_p}$	$\sqrt{C_p}$	2.41	2.41	∞
Boundary Effects	7.2.1.4	1.00	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	7.2.1.2	4.70	R	$\sqrt{3}$	1	1	2.71	2.71	∞
System detection limits	7.2.1.2	1	R	$\sqrt{3}$	1	1	0.58	0.58	∞
Modulation Response	7.2.1.3	3	N	1	1	1	0.00	0.00	∞
Readout Electronics	7.2.1.5	0.5	N	1	1	1	0.50	0.50	∞
Response Time	7.2.1.6	0	R	$\sqrt{3}$	1	1	0.00	0.00	∞
Integration Time	7.2.1.7	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
RF Ambient Conditions-Noise	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
RF Ambient Conditions-Reflection	7.2.3.7	3	R	$\sqrt{3}$	1	1	1.73	1.73	∞
Probe positioned mechanical Tolerance	7.2.2.1	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Probe positioning with respect to phantom shell	7.2.2.3	1.4	R	$\sqrt{3}$	1	1	0.81	0.81	∞
Extrapolation interpolation and integration algorithms for Max.SAR evaluation	7.2.4	2.3	R	1	1	1	1.33	1.33	∞
Dipole									
Deviation of experimental source from numerical source		4	N	1	1	1	4.00	4.00	∞
Input power and SAR drift measurement	7.2.3.6	5	R	$\sqrt{3}$	1	1	2.89	2.89	∞
Dipole axis to liquid distance		2	R	$\sqrt{3}$	1	1			∞
Phantom and tissue parameters									
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	1	2.31	2.31	∞
uncertainty in SAR correction for deviation (in permittivity and conductivity)	7.2.6	2	N	1	1	0.84	2.00	1.68	∞
Liquid conductivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid conductivity -measurement uncertainty	7.2.3.3	4	N	1	0.23	0.26	0.92	1.04	∞
Liquid permittivity (temperature uncertainty)	7.2.3.5	2.5	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement uncertainty	7.2.3.4	5	N	1	0.23	0.26	1.15	1.30	∞
Combined standard uncertainty			RSS				10.15	10.05	
Expanded uncertainty (95%CONFIDENCEINTE RVAL			k				20.29	20.10	

10.6. Test Equipment List

Test Equipment	Manufacturer	Model	Serial Number	Calibration	
				Calibration Date (D.M.Y)	Calibration Due (D.M.Y)
PC	Lenovo	H3050	N/A	N/A	N/A
Signal Generator	Angilent	N5182A	MY47070282	Jun. 28, 2020	Jun. 27, 2021
Multimeter	Keithley	Multimeter 2000	4078275	Jun. 28, 2020	Jun. 27, 2021
Network Analyzer	Agilent	8753E	US38432457	Jun. 28, 2020	Jun. 27, 2021
Wireless Communication Test Set	R & S	CMU200	111382	Jun. 28, 2020	Jun. 27, 2021
Wideband Radio Communication Tester	R&S	CMW500	114220	Jun. 28, 2020	Jun. 27, 2021
Power Meter	Agilent	E4418B	GB43312526	Jun. 28, 2020	Jun. 27, 2021
Power Meter	Agilent	E4416A	MY45101555	Jun. 28, 2020	Jun. 27, 2021
Power Meter	Agilent	N1912A	MY50001018	Jun. 28, 2020	Jun. 27, 2021
Power Sensor	Agilent	E9301A	MY41497725	Jun. 28, 2020	Jun. 27, 2021
Power Sensor	Agilent	E9327A	MY44421198	Jun. 28, 2020	Jun. 27, 2021
Power Sensor	Agilent	E9323A	MY53070005	Jun. 28, 2020	Jun. 27, 2021
Power Amplifier	PE	PE15A4019	112342	N/A	N/A
Directional Coupler	Agilent	722D	MY52180104	N/A	N/A
Attenuator	Chensheng	FF779	134251	N/A	N/A
E-Field PROBE	MVG	SSE2	SN 36/20 EPGO346	Oct. 23, 2020	Oct. 22, 2021
DIPOLE 835	MVG	SID835	SN 16/15 DIP 0G835-369	Jun. 05, 2018	Jun. 04, 2021
DIPOLE 1800	MVG	SID 1800	SN 16/15 DIP 1G800-371	Jun. 05, 2018	Jun. 04, 2021
DIPOLE 1900	MVG	SID1900	SN 16/15 DIP 1G900-372	Jun. 05, 2018	Jun. 04, 2021
DIPOLE 2450	MVG	SID 2450	SN 16/15 DIP 2G450-374	Jun. 05, 2018	Jun. 04, 2021
DIPOLE 2600	MVG	SID 2600	SN 16/15 DIP 2G600-375	Jun. 05, 2018	Jun. 04, 2021
Limesar Dielectric Probe	MVG	SCLMP	SN 19/15 OCPG71	Jun. 05, 2018	Jun. 04, 2021
Communication Antenna	MVG	ANTA59	SN 39/14 ANTA59	N/A	N/A
Mobile Phone Position Device	MVG	MSH101	SN 19/15 MSH101	N/A	N/A
Dummy Probe	MVG	DP66	SN 13/15 DP66	N/A	N/A
SAM PHANTOM	MVG	SAM120	SN 19/15 SAM120	N/A	N/A
PHANTOM TABLE	MVG	TABP101	SN 19/15 TABP101	N/A	N/A
Robot TABLE	MVG	TABP61	SN 19/15 TABP61	N/A	N/A
6 AXIS ROBOT	KUKA	KR6-R900	501822	N/A	N/A

Note:1.N/A means this equipment no need to calibrate

2.Each Time means this device need to calibrate every use time

3. The dipole was not damaged properly repaired.

4. The measured SAR deviates from the calibrated SAR value by less than 10%

5. The most recent return-loss result meets the required 20 dB minimum return-loss requirement

6. The most recent measurement of the real or imaginary parts of the impedance deviates by less than 5 Ω from the previous measurement.

11. System Check Results

Date of measurement: 05/28/2021 Test mode: 750 (Body)

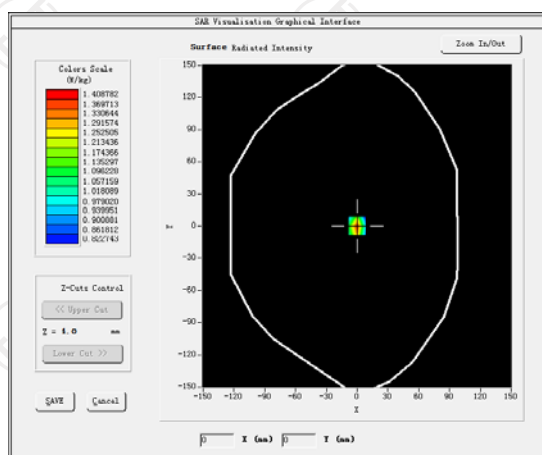
Product Description: Validation

Dipole Model: SID750

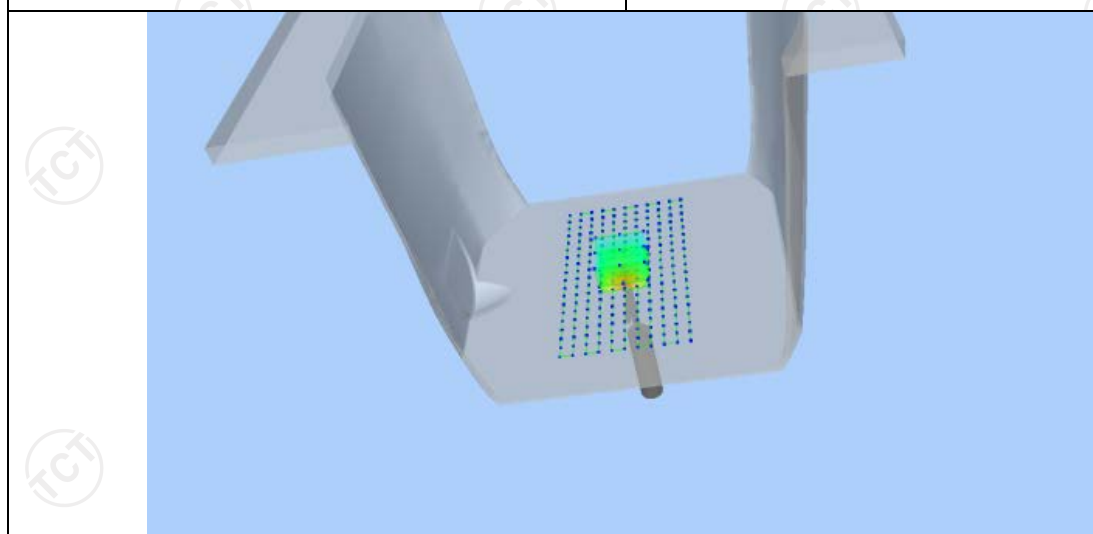
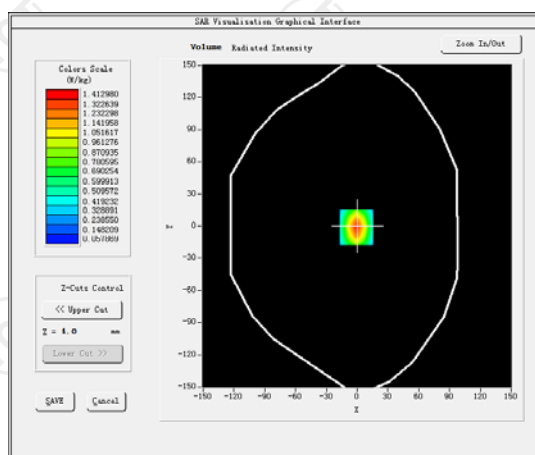
E-Field Probe: SSE2 (SN 36/20 EPGO346)

Phantom	Validation plane
Input Power	100mW
Crest Factor	1.0
Probe Conversion factor	1.78
Frequency (MHz)	750.000000
Relative permittivity (real part)	56.701166
Relative permittivity (imaginary part)	20.148160
Conductivity (S/m)	0.981243
Variation (%)	-0.150000
SAR 10g (W/Kg)	0.562014
SAR 1g (W/Kg)	0.832441

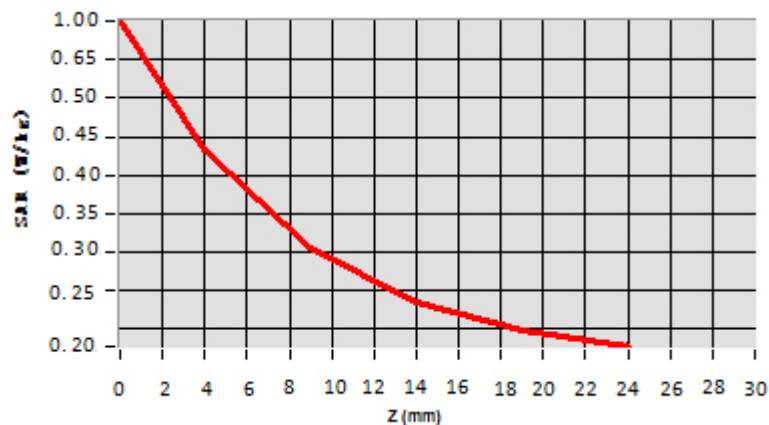
SURFACE SAR



VOLUME SAR



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.014	0.4420	0.3029	0.2419	0.2240



Hot spot position



Date of measurement: 05/28/2021 Test mode: 835 (Body)

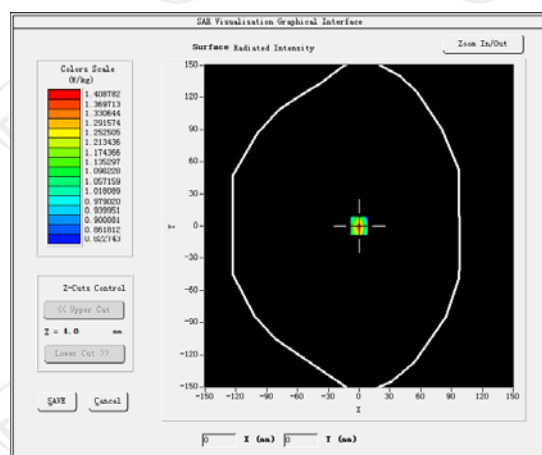
Product Description: Validation

Dipole Model: SID835

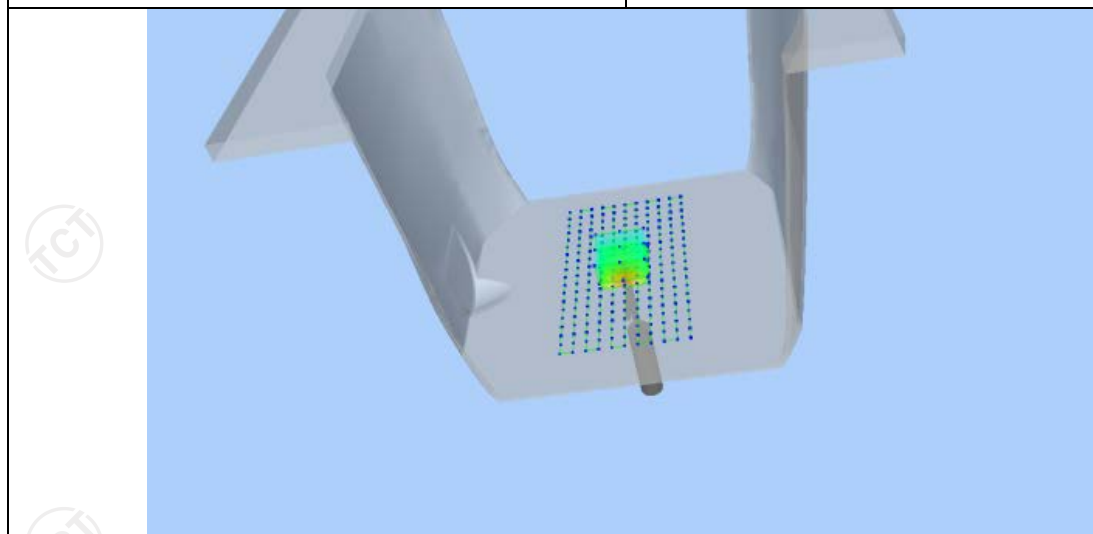
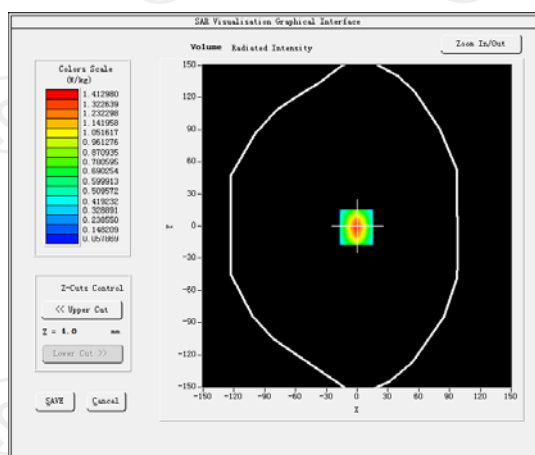
E-Field Probe: SSE2 (SN 36/20 EPGO346)

Phantom	Validation plane
Input Power	100mW
Crest Factor	1.0
Probe Conversion factor	1.86
Frequency (MHz)	835.000000
Relative permittivity (real part)	55.242077
Relative permittivity (imaginary part)	21.378187
Conductivity (S/m)	0.938883
Variation (%)	-0.150000
SAR 10g (W/Kg)	0.633123
SAR 1g (W/Kg)	0.949446

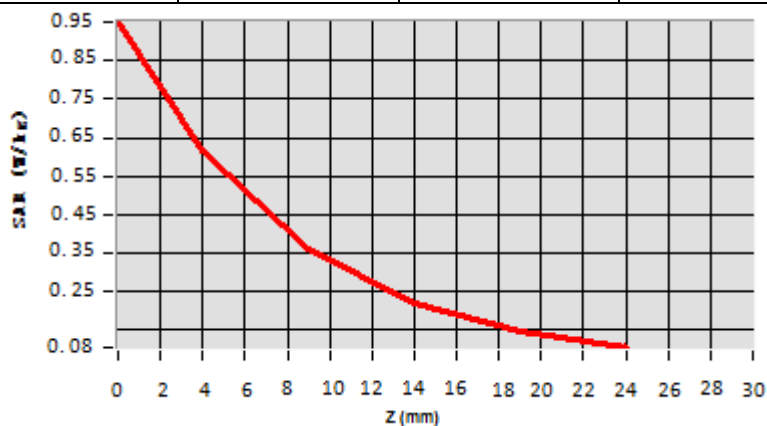
SURFACE SAR



VOLUME SAR



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.9625	0.6022	0.3594	0.2202	0.0725



Hot spot position



Date of measurement: 05/29/2021 Test mode: 1800MHz (Body)

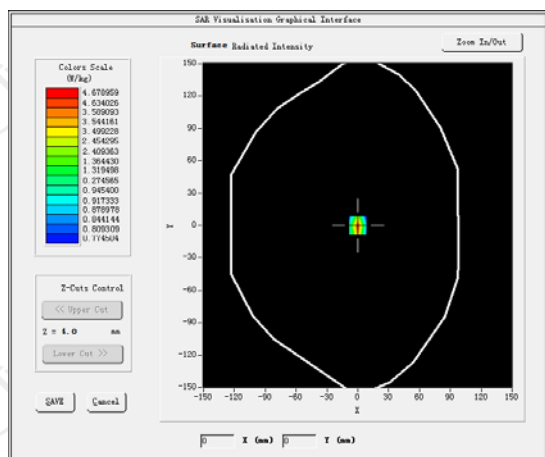
Product Description: Validation

Dipole Model: SID1800

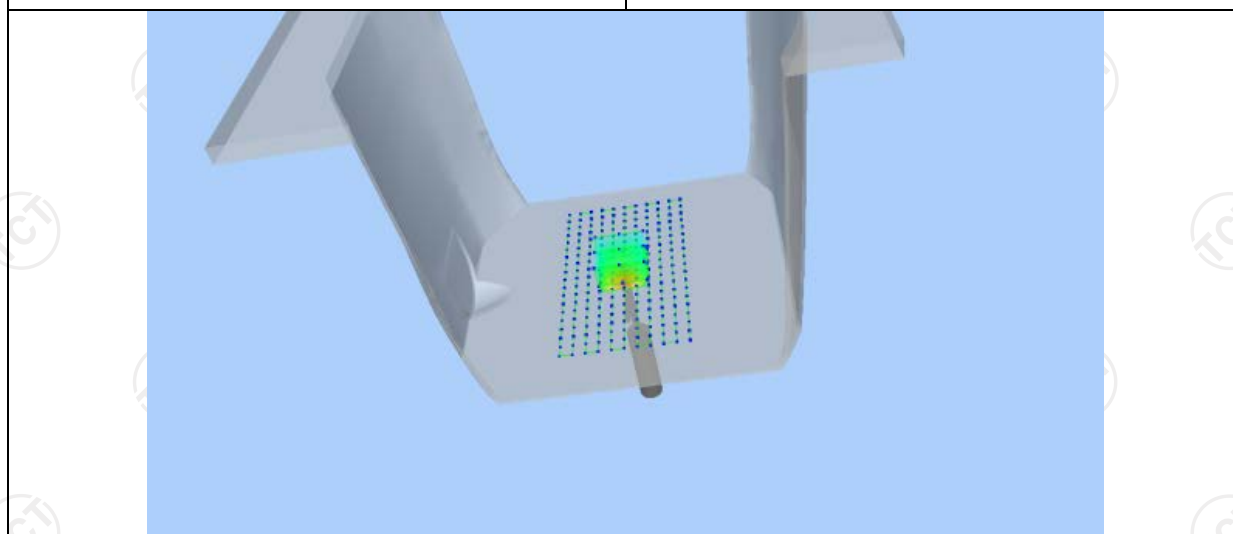
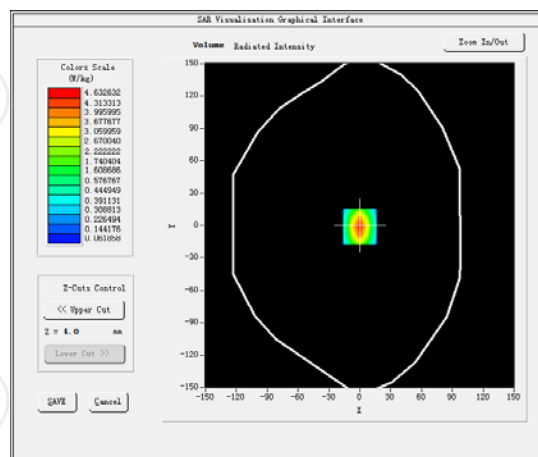
E-Field Probe: SSE2 (SN 36/20 EPGO346)

Phantom	Validation plane
Input Power	100mW
Crest Factor	1.0
Probe Conversion factor	2.16
Frequency (MHz)	1800.000000
Relative permittivity (real part)	53.292699
Relative permittivity (imaginary part)	15.200000
Conductivity (S/m)	1.530000
Variation (%)	3.050000
SAR 10g (W/Kg)	2.053687
SAR 1g (W/Kg)	3.782547

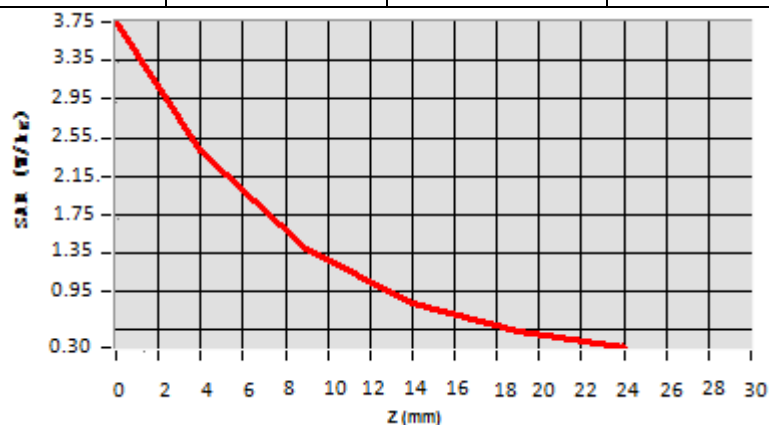
SURFACE SAR



VOLUME SAR



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	3.7545	2.4524	1.3520	0.8214	0.5525



Hot spot position



Date of measurement: 05/29/2021 Test mode: 1900MHz (Body)

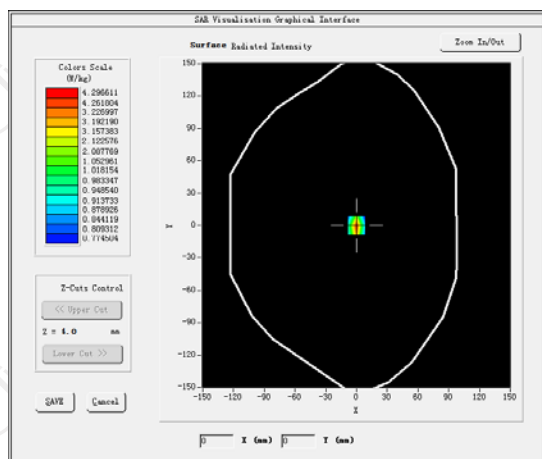
Product Description: Validation

Dipole Model: SID1900

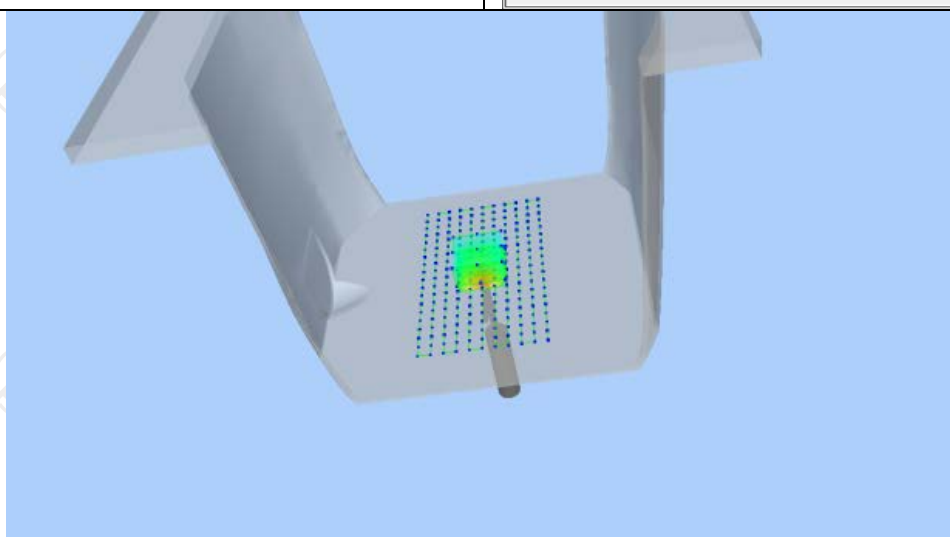
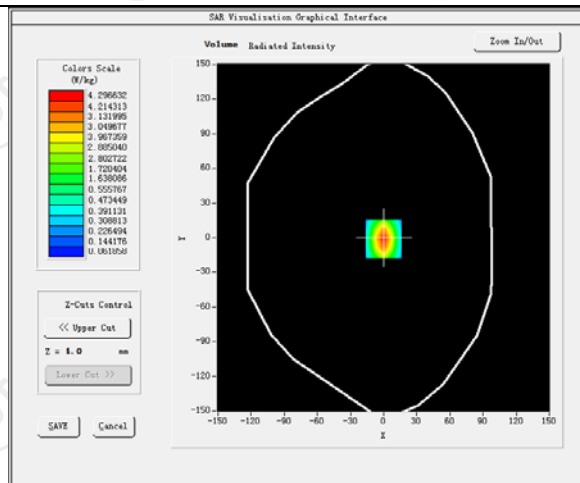
E-Field Probe: SSE2 (SN 36/20 EPGO346)

Phantom	Validation plane
Input Power	100mW
Crest Factor	1.0
Probe Conversion factor	2.32
Frequency (MHz)	1900.000000
Relative permittivity (real part)	53.309999
Relative permittivity (imaginary part)	14.329440
Conductivity (S/m)	1.510354
Variation (%)	1.250000
SAR 10g (W/Kg)	1.994255
SAR 1g (W/Kg)	3.766112

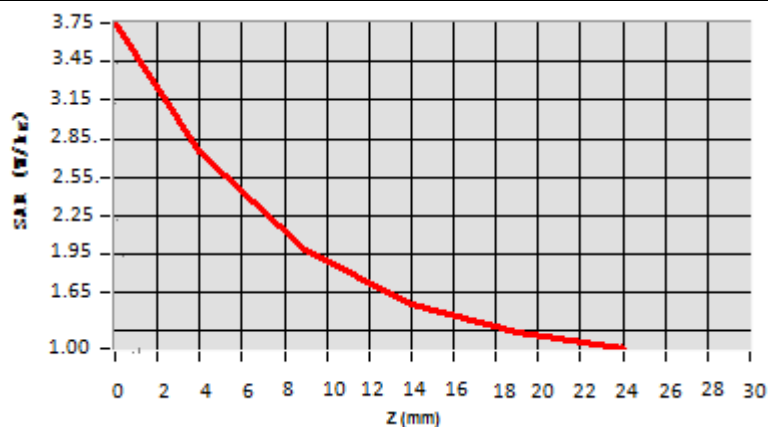
SURFACE SAR



VOLUME SAR



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	3.7752	2.7154	1.9525	1.5694	0.9014

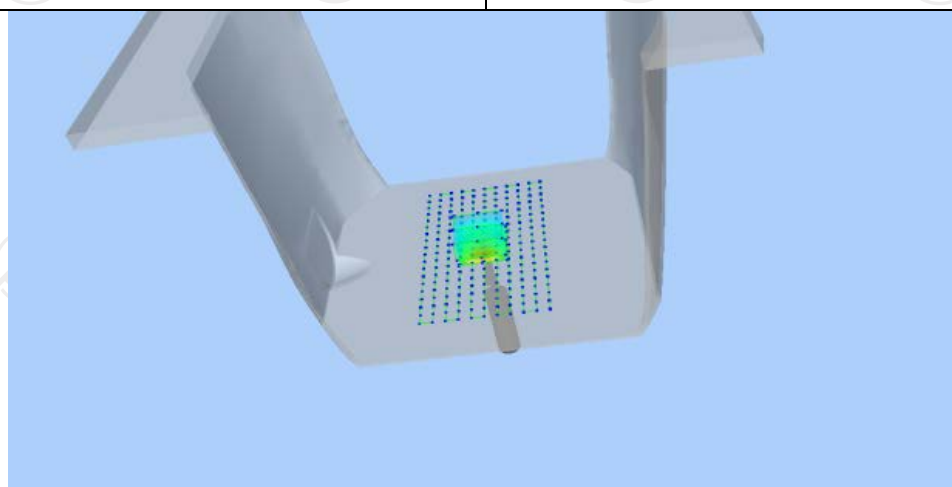
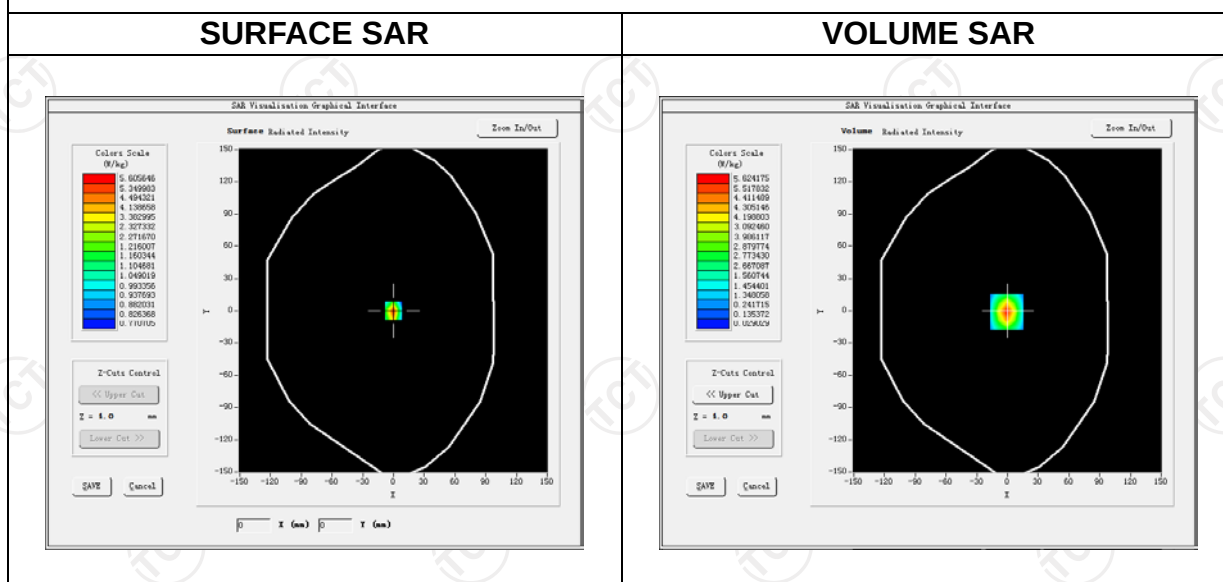


Hot spot position

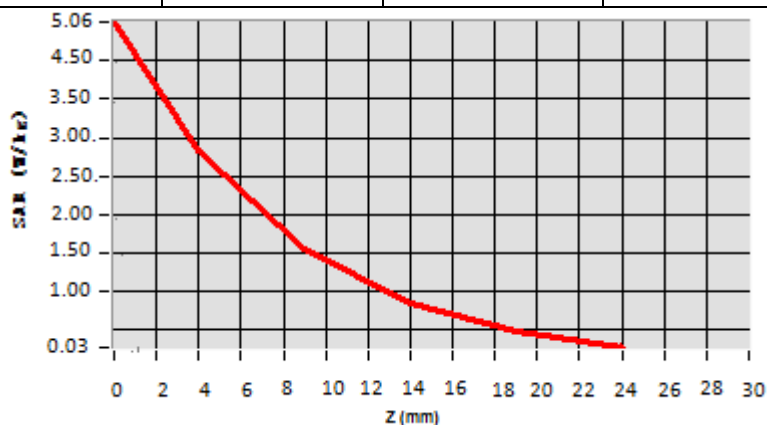


Date of measurement: 05/29/2021 Test mode: 2450MHz (Body)
 Product Description: Validation
 Dipole Model: SID2450
 E-Field Probe: SSE2 (SN 36/20 EPGO346)

Phantom	Validation plane
Input Power	100mW
Crest Factor	1.0
Probe Conversion factor	2.37
Frequency (MHz)	2450.000000
Relative permittivity (real part)	54.616199
Relative permittivity (imaginary part)	14.930150
Conductivity (S/m)	2.012159
Variation (%)	-0.230000
SAR 10g (W/Kg)	2.416669
SAR 1g (W/Kg)	5.066368



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	5.0622	2.7984	1.5251	0.8352	0.4200



Hot spot position



12. SAR Test Data

LTE Band 2

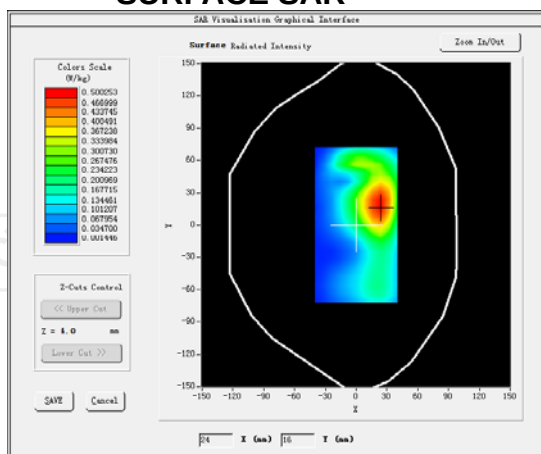
MEASUREMENT 1

Lower Band SAR (Channel 18700):

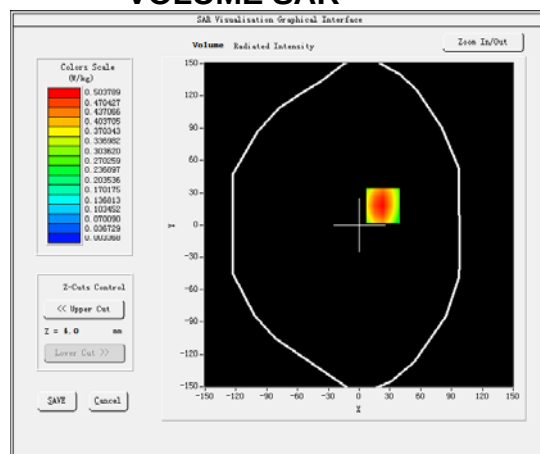
Date: 05/29/2021

Frequency (MHz)	1860.000000
Relative permittivity (real part)	53.291337
Relative permittivity (imaginary part)	14.232400
Conductivity (S/m)	1.531736
Variation (%)	-2.550000
Crest Factor	1.0
Probe Conversion factor	2.32
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
Area Scan	<u>dx=8mm dy=8mm, h= 5.00 mm</u>
ZoomScan	<u>5x5x7, dx=8mm dy=8mm</u> <u>dz=5mm, Complete/ndx=8mm dy=8mm, h=</u> <u>5.00 mm</u>
Phantom	<u>Validation plane</u>
Device Position	<u>Body back(0mm)</u>
Band	<u>EMTC band 2 (1 RB#0)</u>

SURFACE SAR



VOLUME SAR



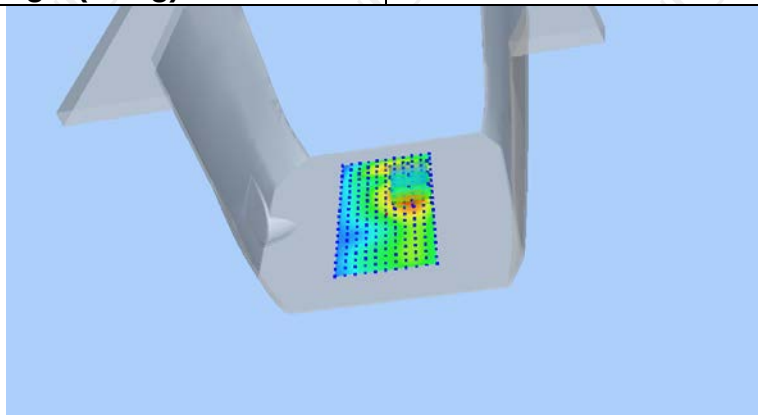
Maximum location: X=13.00, Y=17.00 SAR Peak: 0.70 W/kg

SAR 10g (W/Kg)

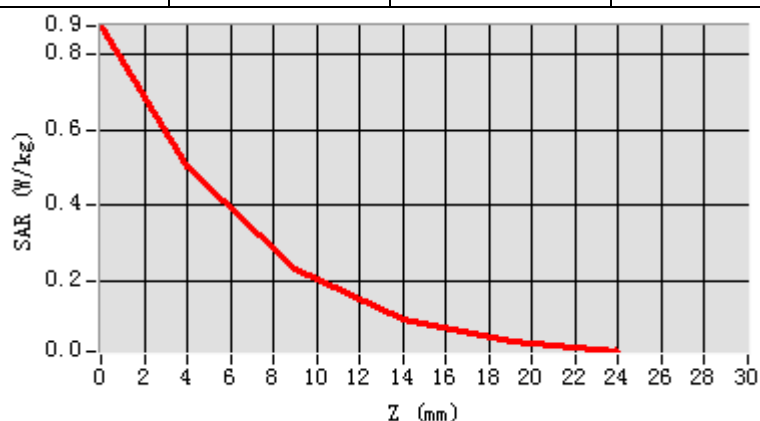
0.243211

SAR 1g (W/Kg)

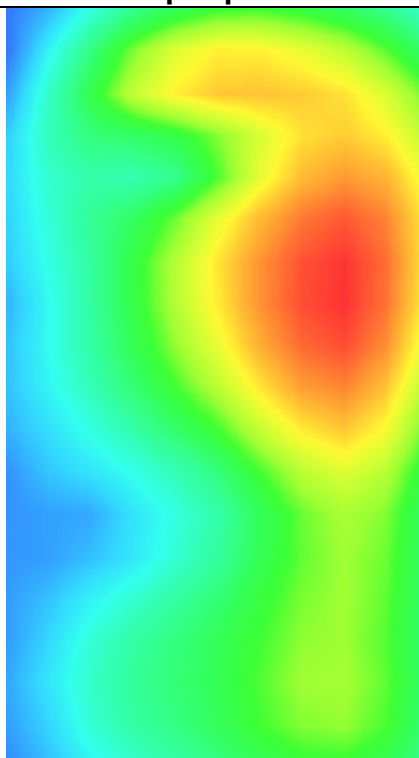
0.482330



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.8721	0.5112	0.1933	0.0877	0.0287



Hot spot position



LTE Band 4

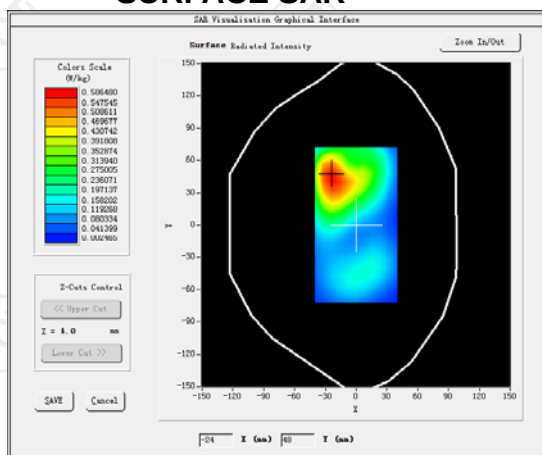
MEASUREMENT 1

Lower Band SAR (Channel 20050):

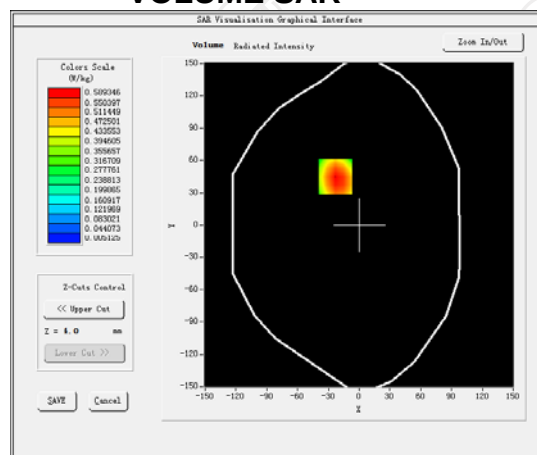
Date: 05/29/2021

Frequency (MHz)	1720.000000
Relative permittivity (real part)	53.321249
Relative permittivity (imaginary part)	12.468850
Conductivity (S/m)	1.502592
Variation (%)	0.910000
Crest Factor	1.0
Probe Conversion factor	2.16
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	EMTC band 4(1 RB#0)

SURFACE SAR

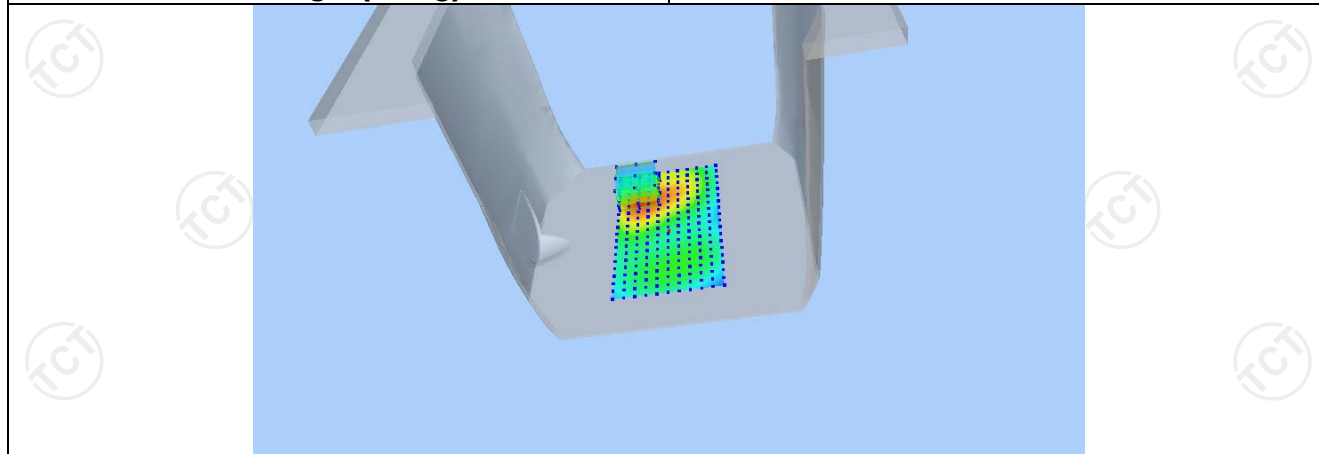


VOLUME SAR

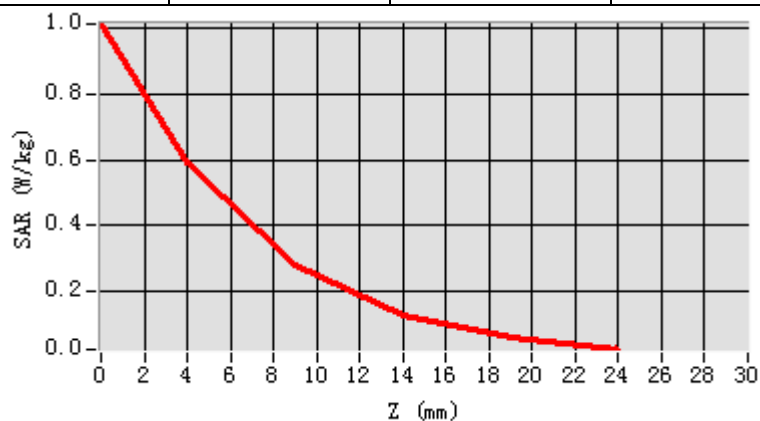


Maximum location: X=-21.00, Y=40.00 SAR Peak: 1.00 W/kg

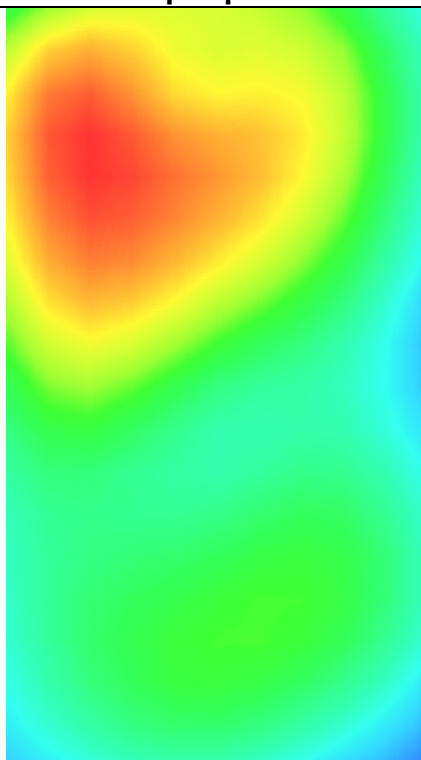
SAR 10g (W/Kg)	0.297565
SAR 1g (W/Kg)	0.566932



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	1.0151	0.5893	0.2786	0.1246	0.0547



Hot spot position



LTE Band 5

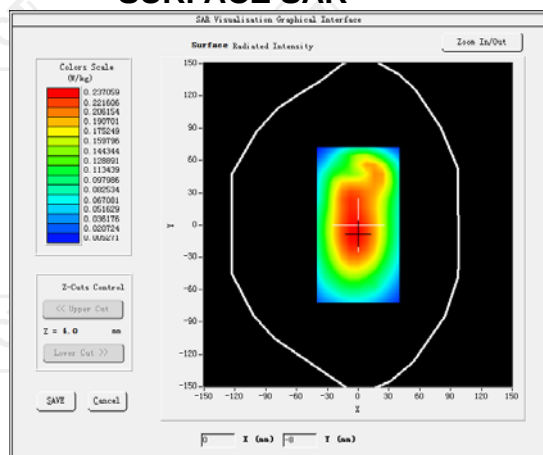
MEASUREMENT 1

Middle Band SAR (Channel 20525):

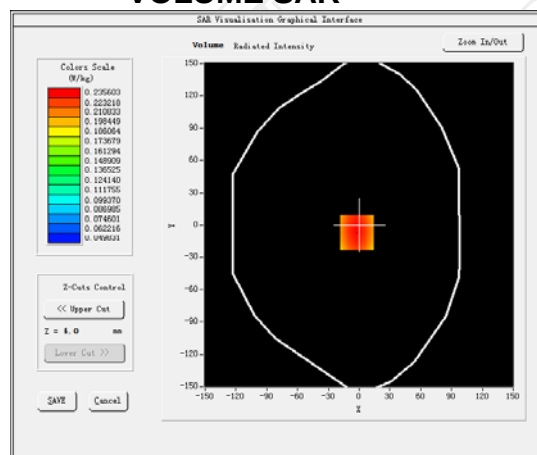
Date: 05/28/2021

Frequency (MHz)	836.500000
Relative permittivity (real part)	55.260832
Relative permittivity (imaginary part)	12.468860
Conductivity (S/m)	0.934272
Variation (%)	-1.190000
Crest Factor	1.0
Probe Conversion factor	1.86
E-Field Probe:	SSE2 (SN 36/20 EPG0346)
Area Scan	dx=8mm dy=8mm, h= 5.00 mm
ZoomScan	5x5x7,dx=8mm dy=8mm dz=5mm,Complete/ndx=8mm dy=8mm, h= 5.00 mm
Phantom	Validation plane
Device Position	Body back(0mm)
Band	EMTC band 5(1 RB#0)

SURFACE SAR

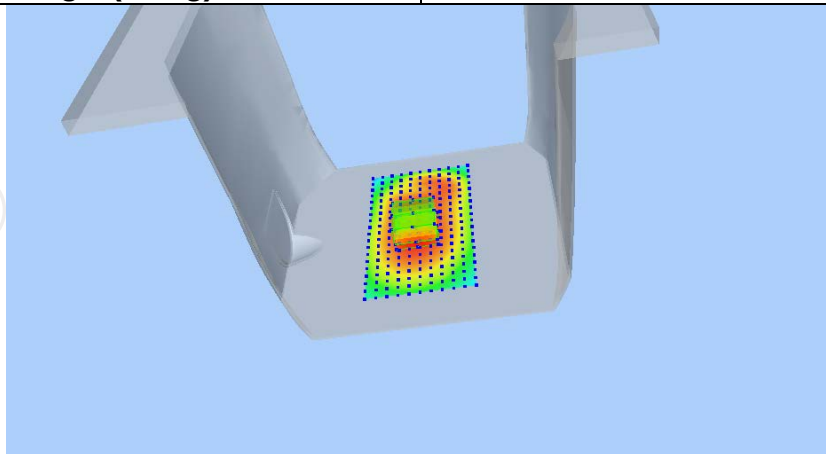


VOLUME SAR

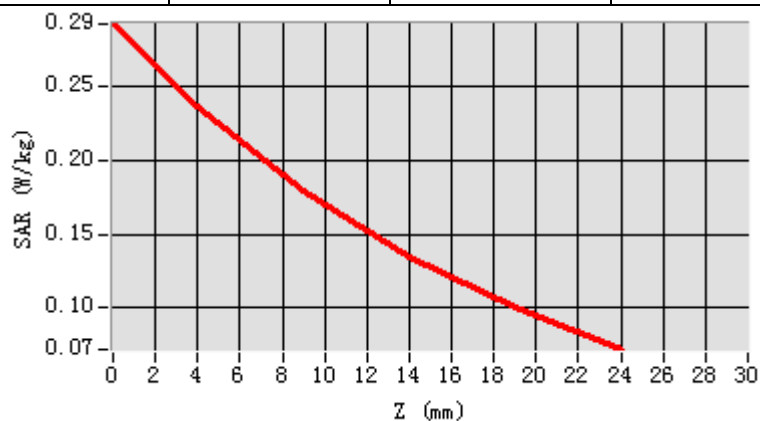


Maximum location: X=-2.00, Y=-7.00 SAR Peak: 0.29 W/kg

SAR 10g (W/Kg)	0.165419
SAR 1g (W/Kg)	0.227376



Z (mm)	0.00	4.00	9.00	14.00	19.00
SAR (W/Kg)	0.2917	0.2356	0.1788	0.1345	0.1000



Hot spot position

