



FCC RF Exposure report

1. Product information

FCC ID	2AZ2T-GXCAP1
Product	Water measurement level sensor that contains a 2.4 GHz BLE radio
Model No.	1
Power supply	Battery, 5 VDC
Antenna type	PCB
Antenna gain	2.11 dBi (max.)
Assigned frequency range	2400.0-2483.5 MHz
Operating frequency range	2402.0-2480.0 MHz
Transmit power (conducted)	1.9 dBm
Modulation bandwidth	2 MHz
Bit rate	1,2,3 (Mbit/s)
SAR test exclusion considerations	A worst-case test separation distance of 5 mm

2. Evaluation Method and Limit

KDB447498 D01 V06 (October 23, 2015),

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1, the standalone SAR test exclusion considerations are: "Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied.

The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1)."

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f \text{ (GHz)}}] \leq 3.0$, where:

- f (GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

f (GHz)	Calculation	1-g SAR
2.44	$[1.9/5.0 \text{ mm}] \cdot [\sqrt{2.44}] = 0.593$	Pass

- Operation frequency: 2.44 GHz
- Maximum power (conducted): 1.9 dBm
- Minimum test separation distance: 5.0 mm
- Antenna gain: 2.1 dBi
- Max. power (EIRP) : $1.9 + 2.1 = 4.0 \text{ dBm} = 2.5 \text{ mW}$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

3. Conducted Test Results

Protocol Type	Operation Frequency (MHz)	Power (dBm)	Power (mW)	Limit (mW)	Margin (mW)
BLE	2402.0	1.9	1.5	1000.0	-998.5
	2440.0	1.8	1.5	1000.0	-998.5
	2480.0	1.6	1.4	1000.0	-998.6

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure, and SAR Exclusion Threshold per KDB 447498 v06.

FCC Test limits

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table. The equation and threshold in 4.3.1 must be applied to determine SAR test exclusion.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	<i>SAR Test Exclusion Threshold (mW)</i>
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	<i>SAR Test Exclusion Threshold (mW)</i>
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

END OF REPORT