



RF Exposure / SAR Exclusion Report

Applicant	AeroScout Inc.
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Product	Asset Tag
FCC ID	Q3HTAG1200SB
IC	5115A-TAG1200SB
Standard(s)	FCC Part 15, Subpart C RSS-247, Issue 2, February 2017, Section 5 RSS-Gen, Issue 5, April 2018
Test Report No.	Ra266060.01

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1 EUT Information

Model No.	T12S
Power supply	3 Vdc
Antenna type	Integral
Antenna gain	+0.7 dBi
Assigned frequency range	2402-2483.5 MHz
Operating frequency range	Wi-Fi: 2412-2462 MHz BLE: 2402-2480 MHz
Transmit power (conducted)	BLE: -1.09 dBm Wi-Fi: 19.79 dBm
Modulation bandwidth	WIFI: 20 MHz BLE: 1/2 MHz
Bit rate	72 MB/s (MCS7)
Distance from human body (min.)	5 mm

2 Evaluation Method and Limits

2.1 FCC: MPE (Maximum Permissible Exposure) assessment

- 47 CFR Section 1.1310(e)(1)

The limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are as described in table 1 to § 1.1310(e)(1). See below.

Table 1 to § 1.1310(e)(1) - 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)
(i) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30



- KDB447498 D01 V06

“RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices” v06, Section 4.3.1: “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(s), listed below, is (are) satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The minimum test separation distance defined in 4.1 f) 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”.

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	SAR Test Exclusion Threshold (mW)	
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		SAR Test Exclusion Threshold (mW)
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		



2.2 ISED

The limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic fields are as described in RSS-102 - Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus, table 4. See below.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz.
* Based on nerve stimulation (NS).
** Based on specific absorption rate (SAR).

- RSS-102, Issue 5, March 2015, Sections 2.5.2, 3, and 4, table 4.

According to RSS-102, Section 3, “Devices that have a radiating element normally operating at or below 6 GHz, with a separation distance of up to 20 cm between the user and/or bystander and the device, shall undergo a SAR evaluation. Devices that have a radiating element normally operating at or below 6 GHz, with a separation distance greater than 20 cm between the user and/or bystander and the device shall undergo an RF exposure evaluation. However, a SAR evaluation may be performed in lieu of an RF exposure evaluation for devices operating below 6 GHz with a separation distance of greater than 20 cm between the user and/or bystander and the device. Devices operating above 6 GHz regardless of the separation distance shall undergo an RF exposure evaluation.”



Table 1: SAR evaluation — Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

2.3 Calculated MPE

1. Max. power (conducted):
 - a) BLE: $-1.09 \text{ dBm} = 0.78 \text{ mW} = 0.00078 \text{ W}$
 - b) Wi-Fi: $19.79 \text{ dBm} = 95.28 \text{ mW} = 0.0953 \text{ W}$
2. Antenna gain: 0.7 dBi
3. EIRP = Max. power + gain =
 - a) BLE: $-1.09 + 0.7 = -0.39$
 - b) Wi-Fi: $19.79 + 0.7 = 20.49$
4. Tune-up tolerance (according customer declaration) = $<0.002\%$
5. EIRP (including tune-up tolerance):
 - a) BLE: $-0.39 + 20 * \log(0.002) = -54.37 \text{ dBm} = 0.000004 \text{ mW}$



b) Wi-Fi: $20.49 + 20 \cdot \log(0.002) = -33.49 \text{ dBm} = 0.00045 \text{ mW}$

6. Minimum distance from human body: $5 \text{ mm} = 0.005 \text{ m}$

3 Test Results

Power terms	Frequency (MHz)	Calculation	Limit	Verdict
BLE	2,402.0	$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = [(0.000004) / (5)] \cdot [\sqrt{2.4}] = 0.00031$	7	PASS
Wi-Fi	2,412.0	$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = [(0.00045) / (5)] \cdot [\sqrt{2.4}] = 0.0035$	7	PASS

4 Conclusion

The measurement results comply with the limits per the abovementioned FCC requirements.

End of Report