FCC RF Exposure Evaluation

1. Product Information

FCC ID:	2ARN3-UWMIC9STXMINI
Product name	Wireless Microphone
Test Model	UwMic9S TX Mini
Additional Model No	UwMic9S Mini, UwMic9S Kit1 Mini, UwMic9S Kit2 Mini
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Power supply	Input: DC 5V DC 3.7V by Rechargeable Li-ion Battery, 1000mAh
Modulation Type	GFSK
Antenna Type	External Antenna
Antenna Gain	0dBi
Hardware version	/
Software version	/
Frequency Range	514.560MHz - 595.460MHz
Channel Number	192
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Portable Device

Channel A

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	514.56	25	524.400	49	534.240	73	544.080
2	514.970	26	524.810	50	534.650	74	544.490
3	515.380	27	525.220	51	535.060	75	544.900
4	515.790	28	525.630	52	535.470	76	545.310
5	516.200	29	526.040	53	535.880	77	545.720
6	516.610	30	526.450	54	536.290	78	546.130
7	517.020	31	526.860	55	536.700	79	546.540
8	517.430	32	527.270	56	537.110	80	546.950
9	517.840	33	527.680	57	537.520	81	547.360
10	518.250	34	528.090	58	537.930	82	547.770
11	518.660	35	528.500	59	538.340	83	548.180
12	519.070	36	528.910	60	538.750	84	548.590
13	519.480	37	529.320	61	539.160	85	549.000
14	519.890	38	529.730	62	539.570	86	549.410
15	520.300	39	530.140	63	539.980	87	549.820
16	520.710	40	530.550	64	540.390	88	550.230
17	521.120	41	530.960	65	540.800	89	550.640
18	521.530	42	531.370	66	541.210	90	551.050
19	521.940	43	531.780	67	541.620	91	551.460
20	522.350	44	532.190	68	542.030	92	551.870
21	522.760	45	532.600	69	542.440	93	552.280
22	523.170	46	533.010	70	542.850	94	552.690
23	523.580	47	533.420	71	543.260	95	553.100
24	523.990	48	533.830	72	543.670	96	553.510

Channel B

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	556.510	25	566.350	49	576.190	73	586.030
2	556.920	26	566.760	50	576.600	74	586.440
3	557.330	27	567.170	51	577.010	75	586.850
4	557.740	28	567.580	52	577.420	76	587.260
5	558.150	29	567.990	53	577.830	77	587.670
6	558.560	30	568.400	54	578.240	78	588.080
7	558.970	31	568.810	55	578.650	79	588.490
8	559.380	32	569.220	56	579.060	80	588.900
9	559.790	33	569.630	57	579.470	81	589.310
10	560.200	34	570.040	58	579.880	82	589.720
11	560.610	35	570.450	59	580.290	83	590.130
12	561.020	36	570.860	60	580.700	84	590.540
13	561.430	37	571.270	61	581.110	85	590.950
14	561.840	38	571.680	62	581.520	86	591.360
15	562.250	39	572.090	63	581.930	87	591.770
16	562.660	40	572.500	64	582.340	88	592.180
17	563.070	41	572.910	65	582.750	89	592.590
18	563.480	42	573.320	66	583.160	90	593.000
19	563.890	43	573.730	67	583.570	91	593.410
20	564.300	44	574.140	68	583.980	92	593.820
21	564.710	45	574.550	69	584.390	93	594.230
22	565.120	46	574.960	70	584.800	94	594.640
23	565.530	47	575.370	71	585.210	95	595.050
24	565.940	48	575.780	72	585.620	96	595.460

2. Evaluation method and Limit

According to KDB447498 D01 General RF Exposure Guidance v06 Section 4.3.1 Standalone SAR test exclusion considerations: “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. 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.22 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). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.23 “

[(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm)] · [√f (GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, 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
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

  The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 is applied to determine SAR test exclusion.

3. Refer evaluation method

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
FCC KDB publication 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.
FCC CFR 47 part2 2.1093: Radiofrequency radiation exposure evaluation: portable devices

4. Conducted Power Results

Test Mode	Channel	Frequency (MHz)	Measured Maximum Peak Power(dBm)	Limits (dBm)	Verdict
GFSK(A)	1	514.560	11.259	24	PASS
	48	533.830	10.571		
	96	553.510	9.929		
GFSK(B)	1	556.510	10.078	24	PASS
	48	575.780	9.672		
	96	595.460	9.591		

5. Manufacturing tolerance

GFSK Channel A (Peak)			
Channel	Channel 01 (514.560MHz)	Channel 48 (533.830MHz)	Channel 96 (553.510MHz)
Target (dBm)	11.0	10.0	9.0
Tolerance ±(dB)	1.0	1.0	1.0

GFSK Channel B (Peak)			
Channel	Channel 01 (556.510MHz)	Channel 48 (575.780MHz)	Channel 96 (595.460MHz)
Target (dBm)	10.0	9.0	9.0
Tolerance ±(dB)	1.0	1.0	1.0

6. Evaluation Results

Band/Mode	f (GHz)	Antenna Distance (mm)	RF output power		SAR Test Exclusion Threshold	SAR Test Exclusion
			dBm	mW		
GFSK(A)	0.51456	5	12.0	15.8489	2.2738< 3.0	Yes
GFSK(B)	0.55651	5	11.0	12.5893	1.8783< 3.0	Yes

Remark:
1. Output power including tune up tolerance;
2. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to f) in section 4.1 of KDB447498 is applied to determine SAR test exclusion.

7. 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.

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