

RAE Systems, Inc

SAR COMPLIANCE REPORT

Report Type:
FCC SAR assessment report

Model:
RMLORAB

REPORT NUMBER:
211000148SHA-002

ISSUE DATE:
November 2, 2022

DOCUMENT CONTROL NUMBER:
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TEST REPORT

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Report no.: 211000148SHA-002

Applicant: RAE Systems, Inc
1349 Moffett Park Drive Sunnyvale, CA 94089, USA

Manufacturer: RAE Systems, Inc
1349 Moffett Park Drive Sunnyvale, CA 94089, USA

FCC ID: SU3RMLORAB

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

KDB 447498 D01 General RF Exposure Guidance v06

FCC Part2.1091, FCC Part2.1093 FCC Part1.1307(b)

PREPARED BY:

Project Engineer

Erick Liu

REVIEWED BY:

Reviewer

Wakeyou Wang

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TEST REPORT**Revision History**

Report No.	Version	Description	Issued Date
211000148SHA-002	Rev. 01	Initial issue of report	November 10, 2021
211000148SHA-002	Rev. 02	Update the Duty Cycle test	January 10, 2022
211000148SHA-002	Rev. 03	Revised the modulation type in page 4	November 2, 2022

TEST REPORT**1 GENERAL INFORMATION****1.1 Description of Equipment Under Test (EUT)**

Product name:	RMLORAB
Type/Model:	RMLORAB
Description of EUT:	The EUT is a wireless module using the 902 ~ 928MHz frequency band, there has only one model.
Rating:	2.5 - 3.6V
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample identification number:	0210924-30-001
Sample received date:	September 24, 2021
Date of test:	September 25, 2021 – January 10, 2022

1.2 Technical Specification

Frequency Range:	902MHz to 928MHz
Operating Frequency:	906MHz to 924MHz
Type of Modulation:	LORA
Channel Number:	10
Channel Separation:	2 MHz
Antenna:	Antenna 1: -0.32dBi, FPC antenna Antenna 2: 3.0dBi, dipole antenna Antenna 3: 3.0dBi, dipole antenna Antenna 4: 3.0dBi, dipole antenna Antenna 5: 1.8dBi, dipole antenna

TEST REPORT**1.3 Description of Test Facility**

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

TEST REPORT**2 Instrument list**

RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2022-03-05

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3 SAR Assessment

Test result: Pass

3.1 SAR Test Exclusion Limit

 100 MHz – 6 GHz and ≤ 50 mm

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	

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100 MHz – 6 GHz and > 50 mm

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

< 100 MHz and < 200 mm

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

TEST REPORT**3.2 Assessment Results**

Seen from the original test report 211000148SHA-001:

The Maximum peak output power = 16.14dBm = 41.12mW;

The Maximum Antenna Gain = 3.00dBi = 1.995;

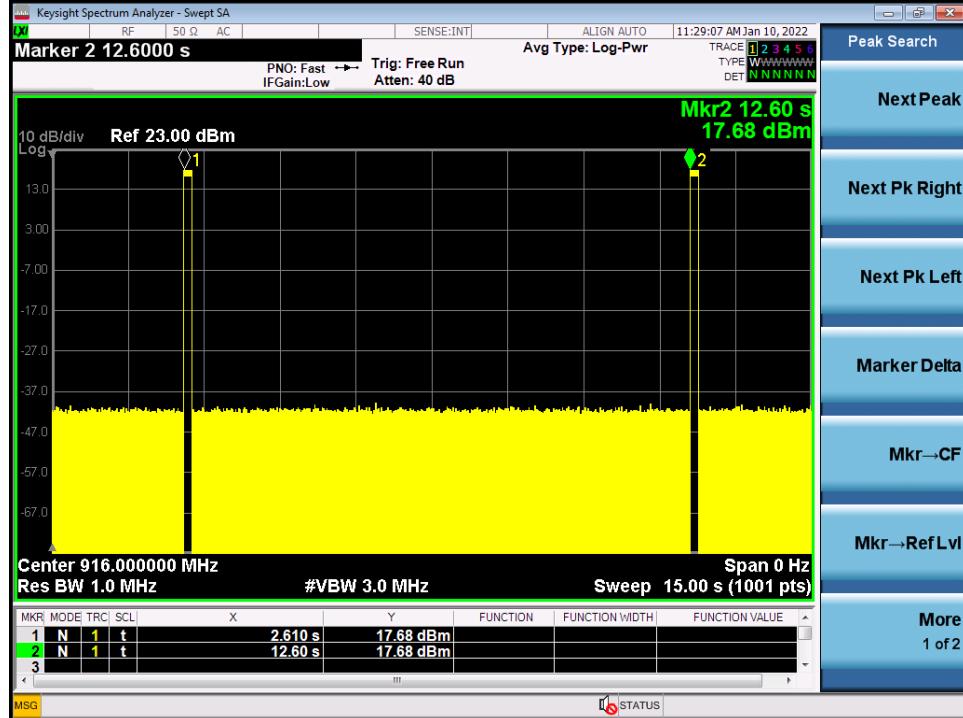
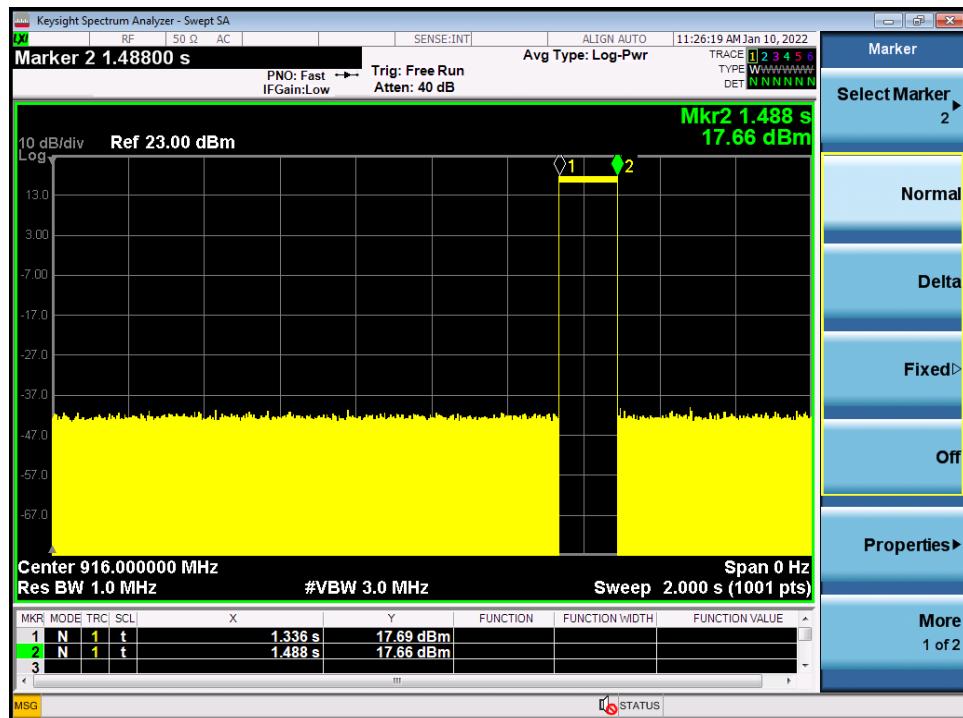
According to measured value from Appendix I, duty cycle = 152ms / 9990ms=1.5%;

After SAR distance assessment, the separation distance is 5mm;

The time-averaged radiated power = $41.12\text{mW} * 1.995 * 1.5\% = 1.23\text{mW} < 16\text{mW}$ (Test Exclusion Thresholds of 900MHz at 5mm)

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Appendix I: Duty Cycle calculation



Duty cycle = $1.488 - 1.336 \text{ s} / 12.60 - 2.610 \text{ s} = 152 \text{ ms} / 9990 \text{ ms} = 0.015 = 1.5\%$.

***** END *****