

SAR TEST EXCLUSION EVALUATION REPORT

Product Name: Wireless Microphone
Trade Mark: North GEMS
Model No./HVIN: K81
Add. Model No.: N/A
Report Number: 2402019154RFC-2
Test Standards: FCC 47 CFR Part 2.1093
FCC ID: 2AO23-K81M
Test Result: PASS
Date of Issue: April 7, 2024

Prepared for:


Chug Inc.
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Prepared by:

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Chug Inc.
Address of Applicant:	7157 Shady Oak Road, Eden Prairie, MN 55344, USA
Manufacturer:	Star Wave technology co.,ltd
Address of Manufacturer:	15/F,HUAIDE INTERNATIONAL BUILDING,NO.73 GUANGSHEN ROAD,FUYONG STREET, SHENZHEN, 518103 CHINA

1.2 EUT INFORMATION

Product Name:	Wireless Microphone	
Model No. /HVIN:	K81	
Trade Mark:	North GEMS	
DUT Stage:	Production Unit	
EUT Supports Function: (Provided by the customer)	2.4 GHz ISM Band:	Bluetooth 5.3
Software Version:	M9-TX-v4.1 (Provided by the customer)	
Hardware Version:	V-1042F_TX_AD6976D_230621_FD163EEC (Provided by the customer)	
Remark:	The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.	

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

For BT_EDR	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth BR + EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, $\pi/4$ DQPSK
Number of Channels:	79
Channel Separation:	1 MHz
Antenna Type:	Chip Antenna
Antenna Gain: (Provided by the customer)	2.7 dBi
Maximum Conducted Peak Power:	2.89 dBm

1.4 OTHER INFORMATION

Test channels for BT_EDR				
Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
$\pi/4$ DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz

1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 2.1093

All test items have been performed and recorded as per the above standards

1.6 DEVIATION FROM STANDARDS

None.

1.7 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

2. EQUIPMENT LIST

Please refer to the RF test report.

3. SAR TEST EXCLUSION EVALUATION

3.1 REFERENCE DOCUMENTS FOR EVALUATION

No.	Identity	Document Title
1	FCC 47 CFR Part 2.1093	Radiofrequency radiation exposure evaluation: portable devices.
2	KDB 447498 D01 General RF Exposure Guidance v06	RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES

3.2 EXEMPTION LIMITS FOR ROUTINE EVALUATION – SAR EVALUATION

3.2.1 SAR Test Exclusion Threshold

3.2.1.1 KDB 447498 D01 v06

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	

Note: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

3.2.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3.3 MPE CALCULATION RESULTS

Note: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.3.1 For BT

For BR+EDR function, operating at 2402MHz to 2480 MHz for GFSK, $\pi/4$ DQPSK

3.3.1.1 Antenna Type:

Chain 0: Chip Antenna

3.3.1.2 Antenna Gain:

Chain 0: 2402MHz to 2480 MHz: 2.7 dBi

3.3.1.3 Results for FCC 47 CFR Part 2.1093

Operating Mode	Frequency (MHz)	Tune-up Power (conducted average) (dBm)	Tolerance (dB)	Antenna Gain (dBi)	Calculated maximum EIRP		Separation Distance (mm)	SAR Test Exclusion Threshold (mW)
					(dBm)	(mW)		
BR+EDR	2402-2480	2.0	2.5	2.7	5.59	3.62	5	10

So the transmitter complies with the RF exposure requirements and the SAR is not required.

APPENDIX 1 PHOTOS OF TEST SETUP

N/A

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal Photos.

*** End of Report ***

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