



RF Exposure Evaluation Declaration

FCC ID: 2A13G-A7510

APPLICANT: Pico Technology Co., Ltd.

Application Type: Certification

Product: VR All-In-One Headset

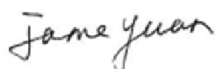
Model No.: A7510

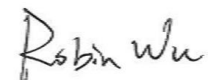
Brand Name: 

Test Procedure(s): KDB 447498 D01v06
Spread Spectrum Transmitter(DSS)

FCC Classification: Digital Transmission System (DTS)
Unlicensed National Information Infrastructure (UNII)

Test Date: July 23, 2018

Reviewed By : 
(Jame Yuan)

Approved By : 
(Robin Wu)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date	Note
1806RSU037-U5	Rev. 01	Initial report	07-23-2018	Valid

1. RF Exposure Evaluation

1.1. Limits

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 Note 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	

Note: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] * \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ 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 5) in section 4.1 is applied to determine SAR test exclusion.

1.2. Test Procedure

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

The temperature and related humidity: 18°C and 58% RH.

1.3. Test Result of RF Exposure Evaluation

Product	VR All-In-One Headset
Test Item	RF Exposure Evaluation

Antenna	Frequency Band (MHz)	Max. Peak Gain (dBi)
1	2400~2500	3.39
	5150~5850	4.10
2	2400~2500	2.25
	5150~5850	4.28

Measured Power List

Mode	Freq. (MHz)	Measured power(dBm)			Bluetooth Mode	Freq. (MHz)	Ant1 Measured power(dBm)
		Ant1	Ant2	Ant1+2			
802.11b	2412	12.36	12.75	15.57	DH5	2402	1.58
	2437	12.02	12.59	15.32		2441	1.03
	2462	12.28	12.66	15.48		2480	1.16
802.11g	2412	14.74	15.16	17.97	2DH5	2402	-1.05
	2437	15.36	15.21	18.30		2441	-2.28
	2462	14.90	15.37	18.15		2480	-1.63
802.11n HT20	2412	13.96	14.33	17.16	3DH5	2402	-1.62
	2437	14.01	14.15	17.09		2441	-2.20
	2462	13.73	14.11	16.93		2480	-1.60
802.11n HT40	2422	14.06	14.01	17.05	BLE	2402	1.88
	2437	13.52	14.09	16.82		2440	1.35
	2452	13.85	14.20	17.04		2480	1.75

Mode	Freq. (MHz)	Measured power(dBm)			Mode	Freq. (MHz)	Measured power(dBm)		
		Ant1	Ant2	Ant1+2			Ant1	Ant2	Ant1+2
802.11a	5180	12.53	13.19	15.88	802.11n HT20	5180	11.76	12.40	15.10
	5220	12.01	13.27	15.70		5220	11.23	12.54	14.94
	5240	11.91	13.48	15.78		5240	11.09	12.83	15.06
	5260	11.24	13.01	15.22		5260	10.93	12.76	14.95
	5300	11.10	13.08	15.21		5300	10.96	12.86	15.02
	5320	10.88	12.98	15.07		5320	10.72	12.74	14.86
	5500	13.04	13.05	16.06		5500	12.44	12.56	15.51
	5600	12.26	13.47	15.92		5600	11.62	12.69	15.20

	5700	12.97	12.66	15.83		5700	12.77	12.59	15.69
	5720	13.45	13.05	16.26		5720	12.87	12.43	15.67
	5745	13.14	12.53	15.86		5745	12.55	11.97	15.28
	5785	13.32	12.46	15.92		5785	12.63	11.76	15.23
	5825	13.29	12.07	15.73		5825	12.71	11.48	15.15
802.11ac VHT20	5180	11.77	12.41	15.11					
	5220	11.14	12.47	14.87					
	5240	10.97	12.66	14.91					
	5260	11.02	12.64	14.92					
	5300	10.83	12.74	14.90					
	5320	10.56	12.72	14.78					
	5500	12.42	12.47	15.46					
	5600	11.54	12.69	15.16					
	5700	12.65	12.57	15.62					
	5720	12.70	12.31	15.52					
	5745	12.47	11.90	15.20					
	5785	12.52	11.72	15.15					
	5825	12.58	11.30	15.00					
802.11n HT40	5190	11.22	11.67	14.46	802.11ac VHT40	5190	11.41	11.73	14.58
	5230	10.71	11.74	14.27		5230	10.58	11.70	14.19
	5270	9.92	11.79	13.97		5270	9.83	11.72	13.89
	5310	8.95	11.53	13.44		5310	9.09	11.55	13.50
	5510	10.33	11.63	14.04		5510	11.42	11.67	14.56
	5590	10.45	11.60	14.07		5590	10.17	11.57	13.94
	5670	11.22	11.54	14.39		5670	11.48	11.51	14.51
	5710	11.66	11.26	14.47		5710	11.60	11.33	14.48
	5755	11.45	10.55	14.03		5755	11.46	10.72	14.12
	5795	11.72	11.06	14.41		5795	11.52	10.30	13.96
802.11ac VHT80	5210	9.86	10.75	13.34					
	5290	8.64	10.67	12.78					
	5530	9.94	10.56	13.27					
	5610	9.12	10.63	12.95					
	5690	10.43	10.31	13.38					
	5775	10.73	9.74	13.27					

Tune-up Power List

Mode	Freq. (MHz)	Tune-up power(dBm)			Bluetooth Mode	Freq. (MHz)	Ant1 Tune-up power(dBm)
		Ant1	Ant2	Ant1+2			
802.11b	2412	13.0	13.0	16.0	DH5	2402	2.0
	2437	13.0	13.0	16.0		2441	2.0
	2462	13.0	13.0	16.0		2480	2.0
802.11g	2412	15.5	15.5	18.5	2DH5	2402	-0.5
	2437	15.5	15.5	18.5		2441	-1.5
	2462	15.5	15.5	18.5		2480	-1.0
802.11n HT20	2412	14.5	14.5	17.5	3DH5	2402	-1.0
	2437	14.5	14.5	17.5		2441	-1.5
	2462	14.5	14.5	17.5		2480	-1.0
802.11n HT40	2422	14.5	14.5	17.5	BLE	2402	2.0
	2437	14.5	14.5	17.5		2440	2.0
	2452	14.5	14.5	17.5		2480	2.0

Mode	Freq. (MHz)	Tune-up power(dBm)			Mode	Freq. (MHz)	Tune-up power(dBm)		
		Ant1	Ant2	Ant1+2			Ant1	Ant2	Ant1+2
802.11a	5180	13.5	13.5	16.5	802.11n HT20	5180	12.0	13.0	15.5
	5220	12.5	13.5	16.0		5220	12.0	13.0	15.5
	5240	12.5	13.5	16.0		5240	12.0	13.0	15.5
	5260	12.5	13.5	16.0		5260	12.0	13.0	15.5
	5300	12.5	13.5	16.0		5300	12.0	13.0	15.5
	5320	12.5	13.5	16.0		5320	12.0	13.0	15.5
	5500	13.5	13.5	16.5		5500	13.0	13.0	16.0
	5600	13.5	13.5	16.5		5600	13.0	13.0	16.0
	5700	13.5	13.5	16.5		5700	13.0	13.0	16.0
	5720	13.5	13.5	16.5		5720	13.0	13.0	16.0
	5745	13.5	12.5	16.0		5745	13.0	12.0	15.5
	5785	13.5	12.5	16.0		5785	13.0	12.0	15.5
	5825	13.5	12.5	16.0		5825	13.0	12.0	15.5
802.11ac VHT20	5180	12.0	13.0	15.5					
	5220	12.0	13.0	15.5					
	5240	12.0	13.0	15.5					
	5260	12.0	13.0	15.5					
	5300	12.0	13.0	15.5					

	5320	12.0	13.0	15.5					
	5500	13.0	13.0	16.0					
	5600	13.0	13.0	16.0					
	5700	13.0	13.0	16.0					
	5720	13.0	13.0	16.0					
	5745	13.0	12.0	15.5					
	5785	13.0	12.0	15.5					
	5825	13.0	12.0	15.5					
802.11n HT40	5190	12.0	12.0	15.0	802.11ac VHT40	5190	12.0	12.0	15.0
	5230	12.0	12.0	15.0		5230	11.0	12.0	14.5
	5270	11.0	12.0	14.5		5270	11.0	12.0	14.5
	5310	10.0	12.0	14.1		5310	11.0	12.0	14.5
	5510	12.0	12.0	15.0		5510	12.0	12.0	15.0
	5590	12.0	12.0	15.0		5590	12.0	12.0	15.0
	5670	12.0	12.0	15.0		5670	12.0	12.0	15.0
	5710	12.0	12.0	15.0		5710	12.0	12.0	15.0
	5755	12.0	12.0	15.0		5755	12.0	12.0	15.0
	5795	12.0	12.0	15.0		5795	12.0	12.0	15.0
802.11ac VHT80	5210	10.0	11.0	13.5					
	5290	10.0	11.0	13.5					
	5530	10.0	11.0	13.5					
	5610	10.0	11.0	13.5					
	5690	10.5	10.5	13.5					
	5775	11.0	10.0	13.5					

Per FCC KDB 447498 D01v06, the SAR exclusion threshold for distances < 50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel}(mW)}{\text{Test Separation Distance}(mm)} \times \sqrt{\text{Frequency}(GHz)} \leq 3.0$$

The actual closest distance (From head to the device antenna) is 34.664 mm which is declared by the manufacturer (Detail see operation description). According to FCC KDB 447498 D01v06, the device can be applied to determine SAR test exclusion.

Based on the maximum conducted power of Bluetooth & WLAN and the antenna to use separation distance, Bluetooth & WLAN SAR was not required;

Ant 1 Test Mode	Frq. (MHz)	Ant-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power		SAR Test (Y/N)
				dBm	mW	
Bluetooth	2480	34.664	66	2.0	1.6	N
2.4G Wi-Fi	2462	34.664	66	15.5	35.5	N
5G Wi-Fi	5180	34.664	46	13.5	22.4	N
	5220	34.664	46	12.5	17.8	N
	5240	34.664	45	12.5	17.8	N
	5260	34.664	45	12.5	17.8	N
	5280	34.664	45	12.5	17.8	N
	5300	34.664	45	12.5	17.8	N
	5320	34.664	45	12.5	17.8	N
	5500	34.664	44	13.5	22.4	N
	5600	34.664	44	13.5	22.4	N
	5720	34.664	43	13.5	22.4	N
	5745	34.664	43	13.5	22.4	N
5785	34.664	43	13.5	22.4	N	
5825	34.664	43	13.5	22.4	N	

Ant 2 Test Mode	Frq. (MHz)	Ant-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power		SAR Test (Y/N)
				dBm	mW	
2.4G Wi-Fi	2462	34.664	66	15.5	35.5	N
5G Wi-Fi	5180	34.664	46	13.5	22.4	N
	5220	34.664	46	13.5	22.4	N
	5240	34.664	45	13.5	22.4	N
	5260	34.664	45	13.5	22.4	N
	5280	34.664	45	13.5	22.4	N
	5300	34.664	45	13.5	22.4	N
	5320	34.664	45	13.5	22.4	N
	5500	34.664	44	13.5	22.4	N
	5600	34.664	44	13.5	22.4	N
	5720	34.664	43	13.5	22.4	N
	5745	34.664	43	12.5	17.8	N
5785	34.664	43	12.5	17.8	N	
5825	34.664	43	12.5	17.8	N	

Per FCC KDB 447498 D01v06 section 4.3.2 b), Estimated SAR for distances < 50mm is defined by the following equation:

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation, mm}}$$

Antenna No.	Test Mode	Frq. (MHz)	Min.Separation, mm	Max. Power, dBm	Max. Power, mW	Estimated SAR, W/kg
1	Bluetooth	2480	34.664	2.0	1.6	0.02
1	802.11g	2462	34.664	15.5	35.5	0.34
2	802.11g	2462	34.664	15.5	35.5	0.34

Alternative method described in appendix D may be applied, as KDB 447498 D01v06 section 4.3.2 b) mentions:

Estimated SAR higher than 0.4 W/kg do not apply; therefore, they are not indicated							
Red numbers in "mW" column are the approximate maximum output power at the SAR Test Exclusion Threshold for standalone SAR test exclusion. Top row indicates different levels of test device maximum output power in mW							
MHz	10	25	50	100	150	200	mW
150	0.0	0.0	0.1	0.1	0.2	0.3	271
300	0.0	0.1	0.1	0.2	0.3		192
450	0.0	0.1	0.1	0.3	0.4		157
835	0.0	0.1	0.2	0.3			115
900	0.0	0.1	0.2	0.4			111
1500	0.0	0.1	0.2				86
1900	0.1	0.1	0.3				76
2450	0.1	0.1	0.3				67
3600	0.1	0.2	0.4				55
5100	0.1	0.2					46
5400	0.1	0.2					45
5800	0.1	0.2					44

35 (mm)

Antenna No.	Test Mode	Frq. (MHz)	Min.Separation, mm	Max. Power, dBm	Max. Power, mW	Estimated SAR, W/kg
1	802.11a	5320	34.664	13.5	22.4	0.2
	802.11a	5720	34.664	13.5	22.4	0.2
	802.11a	5825	34.664	13.5	22.4	0.2
2	802.11a	5320	34.664	13.5	22.4	0.2
	802.11a	5720	34.664	13.5	22.4	0.2
	802.11a	5825	34.664	13.5	22.4	0.2

Max. Simultaneous Estimated SAR

Mode	Sum Max. Estimated SAR (W/kg)	SAR Limit (W/kg)
Bluetooth Ant1 + 2.4GHz Wi-Fi Ant2	0.36	1.6
Bluetooth Ant1 + 5GHz Wi-Fi Ant2	0.22	1.6
2.4GHz Wi-Fi Ant1 + 2.4GHz Wi-Fi Ant2	0.68	1.6
5GHz Wi-Fi Ant1 + 5GHz Wi-Fi Ant2	0.40	1.6

The End