RF Exposure Evaluation
FCC ID: 2ABES-PILOTX01

1. Client Information

Applicant	:	Pathway Innovations and Technologies, Inc.
Address	:	9985 Pacific Heights Blvd., Suite 100 San Diego, CA 92121, USA
Manufacturer	:	ShenZhen KerunVisual Technology Co., LTD.
Address	:	Unit A, F/11, Bldg.1, Senyang Electronic Technology Park, Tianliao Community, Guangming High Tech Zone, Guangming New District, Shenzhen, China 518132.

2. General Description of EUT

EUT Name	:	PilotX Tablet	
Models No.	:	KR2102, PilotX Tablet, PilotX, PilotS, PilotY, PilotZ, PilotV	
Model Difference	:	All these models are the same PCB, layout and electrical circuit, the only difference is model name.	
Product Description	:	Operation Frequency:	**2.4G:** 802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth 4.2(BLE): 2402MHz~2480MHz **5G:** U-NII-1: 5180MHz~5240MHz
		Modulation Type:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM, 64QAM) 802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM) BLE: GFSK
Power Supply	:	Input: DC 10-15V, 4A DC 7.4V by 10000mAh Li-ion battery	
Software Version	:	win10	
Hardware Version	:	V0.8	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

Note: More test information about the EUT please refer the RF Test Report.

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SAR Test Exclusion Calculations

1. **FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.**
   (1) Clause 4.3: General SAR test reduction and exclusion guidance
   Sub clause 4.31: Standalone SAR test exclusion considerations
   1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance≤5 mm are determined by:
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤3.0 for 1-g SAR
   [(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤7.5.0 for 10-g SAR

2. Evaluation Result

2.1 Conducted Power

[2.4GHz Bluetooth]

Mode	Channel	Frequency	Average Conducted Output Power (dBm)	
			Antenna A	Antenna B
BLE	00	2402	0.068	-0.429
	20	2442	0.122	-0.210
	39	2480	-0.631	-0.745

[2.4GHz WLAN]

Mode	Channel	Frequency	Average Conducted Output Power (dBm)	
			Antenna A	Antenna B
IEEE 802.11b	1	2412	7.16	7.15
	7	2437	7.10	7.12
	13	2462	7.11	7.14
IEEE 802.11g	1	2412	6.49	6.41
	7	2437	6.88	6.69
	13	2462	6.41	6.46
IEEE 802.11n HT20	1	2412	2.67	2.56
	7	2437	2.28	2.72
	13	2462	2.59	2.61

[5GHz WLAN Band 1]

Mode	Channel	Frequency	Average Conducted Output Power (dBm)	
			Antenna A	Antenna B
IEEE 802.11a	36	5180	6.44	6.23
	40	5200	6.34	6.31
	48	5240	6.25	6.35
IEEE 802.11n HT20	36	5180	3.10	3.20
	40	5200	3.13	3.00
	48	5240	3.39	3.23
IEEE 802.11ac VHT20	36	5180	3.21	3.23
	40	5200	3.18	3.18
	48	5240	3.19	3.17
IEEE 802.11n HT40	38	5190	2.27	2.27
	46	5230	2.27	2.25
IEEE 802.11ac VHT40	38	5190	2.23	2.28
	46	5230	2.26	2.24
IEEE 802.11ac VHT80	42	5210	1.27	1.29

2.2 Manufacturing Tolerance

2.4GHz Bluetooth(BLE)						
Frequency (MHz)	Antenna A			Antenna B		
	2402	2442	2480	2402	2442	2480
Target (dBm)	0.0	0.0	0.0	0.0	0.0	0.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
2.4GHz WLAN IEEE 802.11b						
Frequency (MHz)	Antenna A			Antenna B		
	2412	2437	2462	2412	2437	2462
Target (dBm)	7.0	7.0	7.0	7.0	7.0	7.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
2.4GHz WLAN IEEE 802.11g						
Frequency (MHz)	Antenna A			Antenna B		
	2412	2437	2462	2412	2437	2462
Target (dBm)	6.0	6.0	6.0	6.0	6.0	6.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
2.4GHz WLAN IEEE 802.11n HT20						
Frequency (MHz)	Antenna A			Antenna B		
	2412	2437	2462	2412	2437	2462
Target (dBm)	2.0	2.0	2.0	2.0	2.0	2.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0

5GHz WLAN Band 1 IEEE 802.11a						
Frequency (MHz)	Antenna A			Antenna B		
	5180	5200	5240	5180	5200	5240
Target (dBm)	6.0	6.0	6.0	6.0	6.0	6.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
5GHz WLAN Band 1 IEEE 802.11 n HT20						
Frequency (MHz)	Antenna A			Antenna B		
	5180	5200	5240	5180	5200	5240
Target (dBm)	3.0	3.0	3.0	3.0	3.0	3.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
5GHz WLAN Band 1 IEEE 802.11ac VHT20						
Frequency (MHz)	Antenna A			Antenna B		
	5180	5200	5240	5180	5200	5240
Target (dBm)	3.0	3.0	3.0	3.0	3.0	3.0
Tolerance ± (dB)	1.0	1.0	1.0	1.0	1.0	1.0
5GHz WLAN Band 1 IEEE 802.11n HT40						
Frequency (MHz)	Antenna A			Antenna B		
	5190		5230	5190		5230
Target (dBm)	2.0		2.0	2.0		2.0
Tolerance ± (dB)	1.0		1.0	1.0		1.0
5GHz WLAN Band 1 IEEE 802.11ac VHT40						
Frequency (MHz)	Antenna A			Antenna B		
	5190		5230	5190		5230
Target (dBm)	2.0		2.0	2.0		2.0
Tolerance ± (dB)	1.0		1.0	1.0		1.0
5GHz WLAN Band 1 IEEE 802.11ac VHT80						
Frequency (MHz)	Antenna A			Antenna B		
	5210			5210		
Target (dBm)	1.0			1.0		
Tolerance ± (dB)	1.0			1.0		

2.3 Standalone MPE

2.4GHz Bluetooth Antenna A

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
BLE	2.402	5	1.0	1.26	0.390	3.0	YES	0.520
	2.442	5	1.0	1.26	0.393	3.0	YES	0.525
	2.480	5	1.0	1.26	0.397	3.0	YES	0.529

2.4GHz Bluetooth Antenna A

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
BLE	2.402	5	1.0	1.26	0.390	3.0	YES	0.520
	2.442	5	1.0	1.26	0.393	3.0	YES	0.525
	2.480	5	1.0	1.26	0.397	3.0	YES	0.529

2.4GHz WLAN Antenna A

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
802.11b	2.412	5	8.0	6.31	1.960	3.0	YES	0.2613
	2.437	5	8.0	6.31	1.970	3.0	YES	0.2650
	2.462	5	8.0	6.31	1.980	3.0	YES	0.2640
802.11g	2.412	5	7.0	5.01	1.557	3.0	YES	0.2076
	2.437	5	7.0	5.01	1.565	3.0	YES	0.2086
	2.462	5	7.0	5.01	1.573	3.0	YES	0.2097
802.11n (HT20)	2.412	5	3.0	2.00	0.620	3.0	YES	0.0826
	2.437	5	3.0	2.00	0.623	3.0	YES	0.0831
	2.462	5	3.0	2.00	0.626	3.0	YES	0.0835

2.4GHz WLAN Antenna B

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
802.11b	2.412	5	8.0	6.31	1.960	3.0	YES	0.2613
	2.437	5	8.0	6.31	1.970	3.0	YES	0.2650
	2.462	5	8.0	6.31	1.980	3.0	YES	0.2640
802.11g	2.412	5	7.0	5.01	1.557	3.0	YES	0.2076
	2.437	5	7.0	5.01	1.565	3.0	YES	0.2086
	2.462	5	7.0	5.01	1.573	3.0	YES	0.2097
802.11n (HT20)	2.412	5	3.0	2.00	0.620	3.0	YES	0.0826
	2.437	5	3.0	2.00	0.623	3.0	YES	0.0831
	2.462	5	3.0	2.00	0.626	3.0	YES	0.0835

5.2GHz WLAN Antenna A

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
802.11a	5.180	5	7.0	5.01	2.281	3.0	YES	0.3042
	5.200	5	7.0	5.01	2.286	3.0	YES	0.3048
	5.240	5	7.0	5.01	2.295	3.0	YES	0.3059
802.11n (HT20)	5.180	5	4.0	2.51	1.143	3.0	YES	0.1525
	5.200	5	4.0	2.51	1.146	3.0	YES	0.1527
	5.240	5	4.0	2.51	1.150	3.0	YES	0.1533
802.11ac (VHT20)	5.180	5	4.0	2.51	1.143	3.0	YES	0.1525
	5.200	5	4.0	2.51	1.146	3.0	YES	0.1527
	5.240	5	4.0	2.51	1.150	3.0	YES	0.1533
802.11n (HT40)	5.190	5	3.0	2.00	0.909	3.0	YES	0.1212
	5.230	5	3.0	2.00	0.913	3.0	YES	0.1217
802.11ac (VHT40)	5.190	5	3.0	2.00	0.909	3.0	YES	0.1212
	5.230	5	3.0	2.00	0.913	3.0	YES	0.1217
802.11ac (VHT80)	5.210	5	2.0	1.58	0.724	3.0	YES	0.0965

5.2GHz WLAN Antenna B

MODE	f (GHz)	Minimum Separation Distance (mm)	Output Power (Turn-up Procedure)		Calculated value	Threshold (1-g SAR)	SAR Test Exclusion	Estimation Standalone SAR (W/kg)
			dBm	mW				
802.11a	5.180	5	7.0	5.01	2.281	3.0	YES	0.3042
	5.200	5	7.0	5.01	2.286	3.0	YES	0.3048
	5.240	5	7.0	5.01	2.295	3.0	YES	0.3059
802.11n (HT20)	5.180	5	4.0	2.51	1.143	3.0	YES	0.1525
	5.200	5	4.0	2.51	1.146	3.0	YES	0.1527
	5.240	5	4.0	2.51	1.150	3.0	YES	0.1533
802.11ac (VHT20)	5.180	5	4.0	2.51	1.143	3.0	YES	0.1525
	5.200	5	4.0	2.51	1.146	3.0	YES	0.1527
	5.240	5	4.0	2.51	1.150	3.0	YES	0.1533
802.11n (HT40)	5.190	5	3.0	2.00	0.909	3.0	YES	0.1212
	5.230	5	3.0	2.00	0.913	3.0	YES	0.1217
802.11ac (VHT40)	5.190	5	3.0	2.00	0.909	3.0	YES	0.1212
	5.230	5	3.0	2.00	0.913	3.0	YES	0.1217
802.11ac (VHT80)	5.210	5	2.0	1.58	0.724	3.0	YES	0.0965

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 is applied to determine SAR test exclusion.

Simultaneous Transmission for SAR Exclusion

The sample supports 2 antennas for Bluetooth, 2.4GHz WLAN and 5G WLAN. The Antenna A is used for Bluetooth and 2.4G/5G WLAN, the Antenna B is used for Bluetooth and 2.4G/5G WLAN. they supports same antenna, need consider simultaneous transmission;

$\sum$ of (the highest measured or estimated $SAR_{AntennaA}$+$SAR_{AntennaB}$)/1.6
=(0.529+0.529)/1.6=0.51< 1.0;

-----END OF REPORT-----