Maximum Permissible Exposure Report

1. Product Information

FCC ID	*2ASRT-NPX540*
Product name	Screeneo Innovation SA
Model number	NeoPix Prime
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Test Model	NeoPix Prime
Power supply	For Adapter: Input: AC 100-240V, 50/60Hz, 1.5A Max Output: DC 24V/4.15A
BT Modulation Type	GFSK, π/4-DQPSK, 8-DPSK (BT V5.0)
WLAN Modulation Type	IEEE 802.11b: DSSS (CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM,QPSK,BPSK)
Antenna Type	PCB Antenna
Antenna Gain	BT 2.00dBi(Max.) WLAN 2.38 dBi (Max.)
Hardware version	TY501W V1.2
Software version	V1.0.0
BT FCC Operation Frequency	2402MHz-2480MHz
WLAN FCC Operation Frequency	IEEE 802.11b: 2412 – 2462 MHz IEEE 802.11g: 2412 – 2462 MHz IEEE 802.11n HT20: 2412 – 2462 MHz IEEE 802.11n HT40: 2422 – 2452 MHz
Exposure category	General population/uncontrolled environment
EUT Type	Production Unit
Device Type	Mobile Device

2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0. The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3. 1 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_1_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 2.1091: Radiofrequency radiation exposure evaluation: mobile devices

3. 2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f^2)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f^2)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz
*=Plane-wave equivalent power density

4. MPE Calculation Method

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density
　　　　P=power input to antenna
　　　　G=power gain of the antenna in the direction of interest relative to an isotropic radiator
　　　　R=distance to the center of radiation of the antenna

5. Antenna Information

NeoPix Prime can only use antennas certificated as follows provided by manufacturer;

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Note
ANT0	PCB Antenna	2000 MHz – 2500 MHz	2.00 dBi	BT Antenna
ANT1	PCB Antenna	2000 MHz – 2500 MHz	2.38 dBi	WLAN Antenna

6. Conducted Power

[BT Max Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)
GFSK	0	2402	3.336
	39	2441	3.512
	78	2480	4.123
π/4DQPSK	0	2402	2.545
	39	2441	2.730
	78	2480	3.310
8DPSK	0	2402	2.596
	39	2441	2.812
	78	2480	3.430

[2.4GWLAN]

Mode	Channel	Frequency(MHz)	Peak Conducted Output Power (dBm)
IEEE 802.11b	1	2412	17.15
	6	2437	17.85
	11	2462	17.23
IEEE 802.11g	1	2412	19.62
	6	2437	19.66
	11	2462	20.50
IEEE 802.11n HT20	1	2412	19.39
	6	2437	19.37
	11	2462	20.15

7. Manufacturing Tolerance

[BT Max Conducted Power]

Test Mode	Channel	Max Conducted Power (dBm)	ANT Max. Tune Up Power (dBm)
GFSK	LCH	3.336	-1.0±1.0
	MCH	3.512	-2.0±1.0
	HCH	4.123	-1.0±1.0
π/4DQPSK	LCH	2.545	-1.0±1.0
	MCH	2.730	-2.0±1.0
	HCH	3.310	-1.0±1.0
8DPSK	LCH	2.596	-1.0±1.0
	MCH	2.812	-2.0±1.0
	HCH	3.430	-1.0±1.0

[2.4GWLAN Max Conducted Power]

Test Mode	Channel	Max Conducted Power (dBm)	ANT Max. Tune Up Power (dBm)
IEEE 802.11b	LCH	17.15	10.0±1.0
	MCH	17.85	10.0±1.0
	HCH	17.23	10.0±1.0
IEEE 802.11g	LCH	19.62	13.0±1.0
	MCH	19.66	13.0±1.0
	HCH	20.50	13.0±1.0
IEEE 802.11n HT20	LCH	19.39	12.0±1.0
	MCH	19.37	12.0±1.0
	HCH	20.15	12.0±1.0
IEEE 802.11n HT40	LCH	17.15	12.0±1.0
	MCH	17.85	12.0±1.0
	HCH	17.23	12.0±1.0

8. Measurement Results

8.1 Standalone MPE

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r =20cm, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[Antenna 0]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW				
GFSK	5	3.16	2.0	1.5849	0.001	1.0
π/4DQPSK	4	2.51	2.0	1.5849	0.001	1.0
8DPSK	4	2.51	2.0	1.5849	0.001	1.0

[Antenna 1]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW					
IEEE 802.11b	18.00	63.10	2.38	1.7298	100%	0.022	1.0000
IEEE 802.11g	21.00	125.89	2.38	1.7298	100%	0.043	1.0000
IEEE 802.11n HT20	21.00	125.89	2.38	1.7298	100%	0.043	1.0000
IEEE 802.11n HT40	18 .00	63.10	2.38	1.7298	100%	0.022	1.0000

Remark:
1. Output power including tune-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;

8.2 Simultaneous Transmission MPE

The sample support one BT modular and one WLAN modular , need consider simultaneous transmission;
Simultaneous transmission MPE
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
$\sum \sum$ of MPE ratios ≤ 1.0

Mode	$\sum$ MPE max ratios	Limit	Results
BT + WIFI	0.07358	1.0	Pass

9. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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