Maximum Permissible Exposure Report

1.Product Information

EUT	:	Multi Touch Screen/interactive Flat Panel Display
Test Model	:	TE-IT-65
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, Only the model name is different for these models.
List Models	:	Refer to below
Power Supply	:	AC 100-240V, 50/60Hz
Hardware Version	:	/
Software Version	:	/
WIFI(2.4G Band)	:	
Frequency Range	:	2412-2462MHz
Channel Spacing	:	5MHz
Channel Number	:	11 channels for 20MHz bandwidth(2412~2462MHz) 7 channels for 40MHz bandwidth(2422~2452MHz)
Modulation Type	:	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK); IEEE 802.11g/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	External antenna, 2.5dBi (Max.)
WIFI(5.2G Band)	:	
Frequency Range	:	5180-5240MHz
Channel Number	:	4 channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz)
Modulation Type	:	IEEE 802.11a/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	External antenna, 2.5dBi (Max.)
WIFI(5.8G Band)	:	
Frequency Range	:	5745-5825MHz
Channel Number	:	5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz)
Modulation Type	:	IEEE 802.11a/n: OFDM(64QAM, 16QAM, QPSK, BPSK)
Antenna Description	:	External antenna, 2.5dBi (Max.)

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/cm^2)	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/cm^2)	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

TE-IT-65 only use antennas certificated as follows provided by manufacturer;

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
Antenna 1	external Antenna	2412 MHz – 2462 MHz	2.50 dBi
		5180 MHz -5240 MHz	2.50 dBi
		5745 MHz -5825 MHz	2.50 dBi

6. Conducted Power

Test Mode	Channel	Frequency (MHz)	Measured Peak Output Power (dBm)		
			Ant 1	Ant 2	Sum
IEEE 802.11b	1	2412	15.02	/	/
	6	2437	15.86	/	/
	11	2462	14.92	/	/
IEEE 802.11g	1	2412	17.70	/	/
	6	2437	18.38	/	/
	11	2462	17.85	/	/
IEEE 802.11n HT20	1	2412	17.65	/	/
	6	2437	18.16	/	/
	11	2462	18.03	/	/
IEEE 802.11n HT40	3	2422	15.70	/	/
	6	2437	17.70	/	/
	9	2452	14.22	/	/

Test Mode	Channel	Frequency (MHz)	Measured Average Output Power (dBm)		
			Ant 1	Ant 2	Sum
IEEE 802.11a	36	5180	10.20	/	/
	40	5200	10.80	/	/
	48	5240	13.55	/	/
IEEE 802.11n HT20	36	5180	13.70	/	/
	40	5200	13.91	/	/
	48	5240	14.19	/	/
IEEE 802.11n HT40	38	5190	13.89	/	/
	46	5230	11.21	/	/
IEEE 802.11a	149	5745	5.81	/	/
	157	5785	8.52	/	/
	165	5825	8.59	/	/
IEEE 802.11n HT20	149	5745	8.17	/	/
	157	5785	8.42	/	/
	165	5825	8.85	/	/
IEEE 802.11n HT40	151	5755	5.96	/	/
	159	5795	8.35	/	/

7. Manufacturing Tolerance

IEEE 802.11b (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	15.0	15.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11g (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	18.0	18.0	18.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	18.0	18.0	18.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	15.0	17.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0

IEEE 802.11a (AV)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	10.0	10.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (AV)			

Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	14.0	14.0	14.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (AV)			
Channel	Channel 38	Channel 46	
Target (dBm)	13.0	11.0	
Tolerance ±(dB)	1.0	1.0	
IEEE 802.11a (AV)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	6.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (AV)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.0	8.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (AV)			
Channel	Channel 151	Channel 159	
Target (dBm)	6.0	8.0	
Tolerance ±(dB)	1.0	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.

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm^2)	MPE Limits (mW/cm^2)
	dBm	mW				
IEEE 802.11b	16.00	39.81	2.50	1.7783	0.0141	1.0000
IEEE 802.11g	19.00	79.43	2.50	1.7783	0.0281	1.0000
IEEE 802.11n HT20	19.00	79.43	2.50	1.7783	0.0281	1.0000
IEEE 802.11n HT40	18.00	63.10	2.50	1.7783	0.0223	1.0000
IEEE 802.11a	14.00	25.12	2.50	1.7783	0.0089	1.0000
IEEE 802.11n HT20	15.00	31.62	2.50	1.7783	0.0112	1.0000
IEEE 802.11n HT40	14.00	25.12	2.50	1.7783	0.0089	1.0000
IEEE 802.11a	9.00	7.94	2.50	1.7783	0.0028	1.0000
IEEE 802.11n HT20	9.00	7.94	2.50	1.7783	0.0028	1.0000
IEEE 802.11n HT40	9.00	7.94	2.50	1.7783	0.0028	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 only supports one WLAN modular and one antenna, simultaneous transmission is unneccessary to evaluate:

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----------